



Environment  
Canada

Environnement  
Canada



# National Inventory Report

1990–2013

GREENHOUSE GAS SOURCES  
AND SINKS IN CANADA

The Canadian Government's Submission  
to the UN Framework Convention on Climate Change

Part 3



En81-4/2013E-PDF

ISSN: 1719-0487

Unless otherwise specified, you may not reproduce materials in this publication, in whole or in part, for the purposes of commercial redistribution without prior written permission from Environment Canada's copyright administrator. To obtain permission to reproduce Government of Canada materials for commercial purposes, apply for Crown Copyright Clearance by contacting:

Environment Canada

Inquiry Centre

10 Wellington Street, 23rd Floor

Gatineau QC K1A 0H3

Telephone: 819-997-2800

Toll Free: 1-800-668-6767 (in Canada only)

Fax: 819-994-1412

TTY: 819-994-0736

Email: [enviroinfo@ec.gc.ca](mailto:enviroinfo@ec.gc.ca)

Cover photos: © thinkstockphotos.ca – 2015

© Her Majesty the Queen in Right of Canada, represented by the Minister of the Environment, 2015

Aussi disponible en français

# List of Acronyms, Abbreviations and Units

|                                     |  |
|-------------------------------------|--|
| AAC                                 | Aluminum Association of Canada   |
| AAFC                                | Agriculture and Agri-Food Canada   |
| AC                                  | air conditioning   |
| AEDT                                | Aviation Environmental Design Tool   |
| AER                                 | Alberta Energy Regulator   |
| AGEM                                | Aviation Greenhouse Gas Emission Model   |
| AIA                                 | Association de l'industrie d'aluminium du Québec                               |
| Al                                  | aluminium  |
| Al <sub>2</sub> O <sub>3</sub>      | alumina  |
| API                                 | American Petroleum Institute   |
| ASH                                 | manure ash content   |
| Asha                                | Ash content in baked anodes  |
| Ashp                                | Ash content in pitch   |
| ATV                                 | all-terrain vehicle  |
| AWMS                                | animal waste management system   |
| BADA                                | Base of Aircraft Data  |
| B <sub>0</sub>                      | maximum methane production potential   |
| BC                                  | average binder content in paste  |
| BOF                                 | basic oxygen furnace   |
| BOD <sub>5</sub>                    | five-day biochemical oxygen demand   |
| BSM                                 | emissions of benzene-soluble matter  |
| C                                   | carbon   |
| CAC                                 | Criteria Air Contaminant (for Land Use, Land-use Change and Forestry Sector)   |
| CAC                                 | Cement Association of Canada (for Industrial Processes and Product Use Sector) |
| CaC <sub>2</sub>                    | calcium carbide  |
| CaCO <sub>3</sub>                   | calcium carbonate; limestone   |
| CaMg(CO <sub>3</sub> ) <sub>2</sub> | dolomite (also CaCO <sub>3</sub> •MgCO <sub>3</sub> )                          |
| CanFI                               | Canada's National Forest Inventory   |
| CANSIM                              | Statistics Canada's key socioeconomic database                                 |
| CanSIS                              | Canadian Soil Information System   |
| CanWEA                              | Canadian Wind Energy Association   |
| CaO                                 | lime; quicklime; calcined limestone  |
| CAPP                                | Canadian Association of Petroleum Producers                                    |
| CBM                                 | Carbon Budget Model  |
| CBM-CFS3                            | Carbon Budget Model for the Canadian Forest Sector, version 3                  |
| CC                                  | baked anode consumption per tonne of aluminium                                 |
| CEA                                 | Canadian Electricity Association   |
| CEPA 1999                           | <i>Canadian Environmental Protection Act, 1999</i>                             |
| CESI                                | Canadian Environmental Sustainability Indicators                               |
| CF <sub>4</sub>                     | carbon tetrafluoride   |
| C <sub>2</sub> F <sub>6</sub>       | carbon hexafluoride  |
| CFC                                 | chlorofluorocarbon   |
| CFS                                 | Canadian Forest Service  |
| CGA                                 | Canadian Gas Association   |
| CH <sub>3</sub> OH                  | methanol   |
| CH <sub>4</sub>                     | methane  |
| C <sub>2</sub> H <sub>6</sub>       | ethane   |
| C <sub>3</sub> H <sub>8</sub>       | propane  |
| C <sub>4</sub> H <sub>10</sub>      | butane   |
| C <sub>2</sub> H <sub>4</sub>       | ethylene   |

|                               |  |
|-------------------------------|--|
| C <sub>6</sub> H <sub>6</sub> | benzene  |
| CHCl <sub>3</sub>             | chloroform   |
| CIEEDAC                       | Canadian Industrial Energy End-Use Data Analysis Centre          |
| CKD                           | cement kiln dust   |
| CLRTAP                        | Convention on Long-range Transboundary Air Pollution             |
| CO                            | carbon monoxide  |
| CO <sub>2</sub>               | carbon dioxide   |
| CO <sub>2</sub> eq            | carbon dioxide equivalent  |
| COD                           | chemical oxygen demand   |
| CORINAIR                      | Core Inventory of Air Emissions in Europe                        |
| CPPI                          | Canadian Petroleum Products Institute                            |
| CRF                           | Common Reporting Format  |
| CRW                           | crown cover area growth rate                                     |
| CSPA                          | Canadian Steel Producers Association                             |
| CTS                           | crop and tillage system  |
| CVS                           | Canadian Vehicle Survey  |
| DE                            | digestible energy  |
| DEF                           | diesel exhaust fluid   |
| DM                            | dry matter   |
| DMI                           | dry matter intake  |
| DOC                           | dissolved organic carbon (for LULUCF Sector)                     |
| DOC                           | degradable organic carbon (for Waste Sector)                     |
| DOCF                          | degradable organic carbon dissimilated                           |
| DOM                           | dead organic matter  |
| EAF                           | electric arc furnace   |
| EC                            | Environment Canada   |
| EDC                           | ethylene dichloride  |
| EF                            | emission factor  |
| EF <sub>BASE</sub>            | base emission factor   |
| EMEP                          | European Monitoring and Evaluation Programme                     |
| EO                            | Earth Observation  |
| EPA                           | Environmental Protection Agency (United States)                  |
| EPGTD                         | Electric Power Generation, Transmission and Distribution         |
| eq                            | equivalent   |
| ERCB                          | Energy Resources Conservation Board                              |
| ERS                           | Economic Research Service (USDA)                                 |
| ERT                           | Expert Review Team   |
| EU                            | European Union   |
| FAA                           | Federal Aviation Administration (United States)                  |
| FAACS                         | Feasibility Assessment of Afforestation for Carbon Sequestration |
| FCR                           | fuel consumption ratio   |
| FGD                           | flue gas desulphurization  |
| FLCL                          | forest land converted to cropland                                |
| FLWL                          | forest land converted to wetland                                 |
| FOCA                          | Federal Office of Civil Aviation                                 |
| FOI                           | Swedish Defence Research Agency                                  |
| F <sub>TILL</sub>             | tillage ratio factor   |
| GCD                           | great-circle distance  |
| GCV                           | gross calorific value  |
| GDP                           | gross domestic product   |
| GE                            | gross energy   |
| GHG                           | greenhouse gas   |
| GHGRP                         | Greenhouse Gas Reporting Program                                 |

|                                |   |
|--------------------------------|---|
| GIS                            | geographic information system                                   |
| GO                             | gross output  |
| Gt                             | gigatonne   |
| GRI                            | Gas Research Institute  |
| GTIS                           | Global Trade Information Services                               |
| GVWR                           | gross vehicle weight rating                                     |
| GWP                            | global warming potential  |
| H <sub>2</sub>                 | hydrogen  |
| H <sub>2</sub> O               | water   |
| H <sub>2</sub> S               | hydrogen sulphide   |
| HCFC                           | hydrochlorofluorocarbon   |
| HCl                            | hydrochloric acid   |
| HDD                            | heating degree-day  |
| HDDV                           | heavy-duty diesel vehicle                                       |
| HDGV                           | heavy-duty gasoline vehicle                                     |
| HE                             | harvest emissions   |
| HF                             | hydrogen fluoride   |
| HFC                            | hydrofluorocarbon   |
| HHV                            | higher heating value  |
| HNO <sub>3</sub>               | nitric acid   |
| HQ                             | Hydro-Québec  |
| HRAI                           | Heating, Refrigeration and Air Conditioning Institute of Canada |
| HSS                            | horizontal stud Söderberg                                       |
| HWP                            | harvested wood products   |
| HWP-C                          | carbon stored in harvested wood products                        |
| IAI                            | International Aluminium Institute                               |
| ICAO                           | International Civil Aviation Organization                       |
| IE                             | included elsewhere  |
| IEA                            | International Energy Agency                                     |
| IESO                           | Independent Electricity System Operator                         |
| I/M                            | inspection and maintenance                                      |
| Impa                           | fluorine and other impurities                                   |
| IPCC                           | Intergovernmental Panel on Climate Change                       |
| IPPU                           | Industrial Processes and Product Use                            |
| IT                             | intensive tillage   |
| KAR                            | kilometre accumulation rate                                     |
| K <sub>2</sub> CO <sub>3</sub> | potassium carbonate   |
| kg                             | kilogram  |
| kha                            | kilohectare   |
| kt                             | kilotonne   |
| kWh                            | kilowatt-hour   |
| L <sub>0</sub>                 | methane generation potential                                    |
| LDDT                           | light-duty diesel truck   |
| LDDV                           | light-duty diesel vehicle                                       |
| LDGT                           | light-duty gasoline truck                                       |
| LDGV                           | light-duty gasoline vehicle                                     |
| LFG                            | landfill gas  |
| LHV                            | lower heating value   |
| LMC                            | land management change  |
| LPG                            | liquefied petroleum gases                                       |
| LTO                            | landing and takeoff   |
| LULUCF                         | Land Use, Land-use Change and Forestry                          |
| m                              | metre   |

|                                  |  |
|----------------------------------|--|
| MARS                             | Monitoring, Accounting and Reporting System            |
| MC                               | motorcycle   |
| MCF                              | methane conversion factor (Agriculture)                |
| MCF                              | methane correction factor (Waste)                      |
| Mg                               | magnesium; also megagram                               |
| MgCO <sub>3</sub>                | magnesite; magnesium carbonate                         |
| MGEM                             | Mobile Greenhouse Gas Emission Model                   |
| MgO                              | magnesia; dolomitic lime                               |
| Mha                              | megahectare, equivalent to a million hectares          |
| MI                               | Manufactured Items                                     |
| MMIC                             | Motorcycle & Moped Industry Council                    |
| MODTF                            | Modeling and Database Task Force                       |
| mol                              | mole   |
| MP                               | total aluminum production                              |
| MS                               | manure system distribution factor                      |
| MSW                              | municipal solid waste                                  |
| Mt                               | megatonne  |
| MTOW                             | maximum takeoff weight                                 |
| MW                               | megawatt   |
| N                                | nitrogen   |
| N <sub>2</sub>                   | nitrogen gas   |
| Na <sub>2</sub> CO <sub>3</sub>  | sodium carbonate; soda ash                             |
| Na <sub>3</sub> AlF <sub>6</sub> | cryolite   |
| NA                               | not applicable   |
| N/A                              | not available  |
| NAICS                            | North American Industry Classification System          |
| NAP                              | National Action Plan                                   |
| NCASI                            | National Council for Air and Stream Improvement        |
| NCV                              | net calorific value                                    |
| NE                               | not estimated  |
| NEB                              | National Energy Board                                  |
| NEU                              | non-energy use   |
| NFI                              | National Forest Inventory                              |
| NFR                              | nomenclature for reporting                             |
| NGL                              | natural gas liquid                                     |
| NH <sub>3</sub>                  | ammonia  |
| NH <sub>4</sub> <sup>+</sup>     | ammonium   |
| NH <sub>4</sub> NO <sub>3</sub>  | ammonium nitrate                                       |
| NIR                              | National Inventory Report                              |
| NMVOC                            | non-methane volatile organic compound                  |
| N <sub>2</sub> O                 | nitrous oxide  |
| NO                               | nitric oxide; also used for not occurring              |
| NO <sub>2</sub>                  | nitrogen dioxide                                       |
| NO <sub>3</sub> <sup>-</sup>     | nitrate  |
| NO <sub>x</sub>                  | nitrogen oxides  |
| NOC                              | Nitrous Oxide of Canada                                |
| NPRI                             | National Pollutant Release Inventory                   |
| NRCan                            | Natural Resources Canada                               |
| NSCR                             | non-selective catalytic reduction                      |
| NT                               | no tillage   |
| O <sub>2</sub>                   | oxygen   |
| ODS                              | ozone-depleting substance                              |
| OECD                             | Organisation for Economic Co-operation and Development |

|                 |   |
|-----------------|---|
| OEM             | original equipment manufacturer                       |
| OS/HOU          | oil sands and heavy oil upgrading                     |
| PC              | paste consumption                                     |
| PFC             | perfluorocarbon                                       |
| PIRD            | Pollutant Inventories and Reporting Division          |
| PJ              | petajoule   |
| POP             | persistent organic pollutant                          |
| P/PE            | precipitation/potential evapotranspiration            |
| PTRC            | Petroleum Technology Research Centre                  |
| QA              | quality assurance                                     |
| QC              | quality control                                       |
| RA              | reference approach                                    |
| RESD            | <i>Report on Energy Supply and Demand in Canada</i>   |
| RPP             | refined petroleum product                             |
| RT              | reduced tillage                                       |
| RTI             | Research Triangle Institute                           |
| SA              | sectoral approach                                     |
| Sa              | sulphur content in baked anodes                       |
| SAGE            | System for assessing Aviation's Global Emissions      |
| SBR             | styrene-butadiene                                     |
| Sc              | sulphur content in calcinated coke                    |
| SCR             | selective catalytic reduction                         |
| SF <sub>6</sub> | sulphur hexafluoride                                  |
| SIC             | Standard Industrial Classification                    |
| SiC             | silicon carbide                                       |
| SLC             | Soil Landscapes of Canada                             |
| SMR             | steam methane reforming                               |
| SO <sub>2</sub> | sulphur dioxide                                       |
| SO <sub>x</sub> | sulphur oxides  |
| SOC             | soil organic carbon                                   |
| Sp              | sulphur content in pitch                              |
| SUV             | sport utility vehicle                                 |
| t               | tonne   |
| TWh             | terrawatt-hour  |
| UNECE           | United Nations Economic Commission for Europe         |
| UNFCCC          | United Nations Framework Convention on Climate Change |
| UPCIS           | Use Patterns and Controls Implementation Section      |
| UOG             | upstream oil and gas                                  |
| UTC             | urban tree crown                                      |
| USDA            | United States Department of Agriculture               |
| VCM             | vinyl chloride monomer                                |
| VKT             | vehicle kilometres travelled                          |
| VSS             | vertical stud Söderberg                               |
| VS              | volatile solids                                       |
| WMO             | World Meteorological Organization                     |



# Table of Contents

|                 |  |    |
|-----------------|--|----|
| Annex 8         | Rounding Protocol .....  | 13 |
| Annex 9         | Canada's Greenhouse Gas Emission Tables, 1990–2013 .....               | 15 |
| Annex 10        | Provincial/Territorial Greenhouse Gas Emission Tables, 1990–2013 ..... | 42 |
| Annex 11        | Electricity in Canada: Summary and Intensity Tables .....              | 71 |
| References..... |  | 85 |

# List of Tables

|              |  |    |
|--------------|--|----|
| Table A8-1   | Number of Significant Figures Applied to GHG Summary Tables  | 14 |
| Table A9-1   | GHG Source/Sink Category Description                         | 16 |
| Table A9-2   | Canada's 1990-2013 GHG Emissions by Sector                   | 17 |
| Table A9-3   | 2013 GHG Emission Summary for Canada                         | 18 |
| Table A9-4   | 2012 GHG Emission Summary for Canada                         | 19 |
| Table A9-5   | 2011 GHG Emission Summary for Canada                         | 20 |
| Table A9-6   | 2010 GHG Emission Summary for Canada                         | 21 |
| Table A9-7   | 2009 GHG Emission Summary for Canada                         | 22 |
| Table A9-8   | 2008 GHG Emission Summary for Canada                         | 23 |
| Table A9-9   | 2007 GHG Emission Summary for Canada                         | 24 |
| Table A9-10  | 2006 GHG Emission Summary for Canada                         | 25 |
| Table A9-11  | 2005 GHG Emission Summary for Canada                         | 26 |
| Table A9-12  | 2004 GHG Emission Summary for Canada                         | 27 |
| Table A9-13  | 2003 GHG Emission Summary for Canada                         | 28 |
| Table A9-14  | 2002 GHG Emission Summary for Canada                         | 29 |
| Table A9-15  | 2001 GHG Emission Summary for Canada                         | 30 |
| Table A9-16  | 2000 GHG Emission Summary for Canada                         | 31 |
| Table A9-17  | 1999 GHG Emission Summary for Canada                         | 32 |
| Table A9-18  | 1998 GHG Emission Summary for Canada                         | 33 |
| Table A9-19  | 1997 GHG Emission Summary for Canada                         | 34 |
| Table A9-20  | 1996 GHG Emission Summary for Canada                         | 35 |
| Table A9-21  | 1995 GHG Emission Summary for Canada                         | 36 |
| Table A9-22  | 1994 GHG Emission Summary for Canada                         | 37 |
| Table A9-23  | 1993 GHG Emission Summary for Canada                         | 38 |
| Table A9-24  | 1992 GHG Emission Summary for Canada                         | 39 |
| Table A9-25  | 1991 GHG Emission Summary for Canada                         | 40 |
| Table A9-26  | 1990 GHG Emission Summary for Canada                         | 41 |
| Table A10-1  | GHG Source/Sink Category Description                         | 43 |
| Table A10-2  | 1990-2013 GHG Emission Summary for Newfoundland and Labrador | 44 |
| Table A10-3  | 2013 GHG Emission Summary for Newfoundland and Labrador      | 45 |
| Table A10-4  | 1990-2013 GHG Emission Summary for Prince Edward Island      | 46 |
| Table A10-5  | 2013 GHG Emission Summary for Prince Edward Island           | 47 |
| Table A10-6  | 1990-2013 GHG Emission Summary for Nova Scotia               | 48 |
| Table A10-7  | 2013 GHG Emission Summary for Nova Scotia                    | 49 |
| Table A10-8  | 1990-2013 GHG Emission Summary for New Brunswick             | 50 |
| Table A10-9  | 2013 GHG Emission Summary for New Brunswick                  | 51 |
| Table A10-10 | 1990-2013 GHG Emission Summary for Quebec                    | 52 |
| Table A10-11 | 2013 GHG Emission Summary for Quebec                         | 53 |
| Table A10-12 | 1990-2013 GHG Emission Summary for Ontario                   | 54 |
| Table A10-13 | 2013 GHG Emission Summary for Ontario                        | 55 |
| Table A10-14 | 1990-2013 GHG Emission for Manitoba                          | 56 |
| Table A10-15 | 2013 GHG Emission Summary for Manitoba                       | 57 |
| Table A10-16 | 1990-2013 GHG Emission Summary from Saskatchewan             | 58 |
| Table A10-17 | 2013 GHG Emission Summary for Saskatchewan                   | 59 |

|              |   |    |
|--------------|---|----|
| Table A10–18 | 1990–2013 GHG Emission Summary for Alberta  | 60 |
| Table A10–19 | 2013 GHG Emission Summary for Alberta   | 61 |
| Table A10–20 | 1990–2013 GHG Emission Summary for British Columbia                                       | 62 |
| Table A10–21 | 2013 GHG Emission Summary for British Columbia  | 63 |
| Table A10–22 | 1990–2013 GHG Emission Summary for Yukon  | 64 |
| Table A10–23 | 2013 GHG Emission Summary for Yukon   | 65 |
| Table A10–24 | 1999–2013 GHG Emission Summary for Northwest Territories                                  | 66 |
| Table A10–25 | 2013 GHG Emission Summary for Northwest Territories                                       | 67 |
| Table A10–26 | 1999–2013 GHG Emission Summary for Nunavut  | 68 |
| Table A10–27 | 2013 GHG Emission Summary for Nunavut   | 69 |
| Table A10–28 | 1990–1998 GHG Emission Summary for Northwest Territories and Nunavut                      | 70 |
| Table A11–1  | Electricity Generation and GHG Emission Details for Canada                                | 72 |
| Table A11–2  | Electricity Generation and GHG Emission Details for Newfoundland and Labrador             | 73 |
| Table A11–3  | Electricity Generation and GHG Emission Details for Prince Edward Island                  | 74 |
| Table A11–4  | Electricity Generation and GHG Emission Details for Nova Scotia                           | 75 |
| Table A11–5  | Electricity Generation and GHG Emission Details for New Brunswick                         | 76 |
| Table A11–6  | Electricity Generation and GHG Emission Details for Quebec                                | 77 |
| Table A11–7  | Electricity Generation and GHG Emission Details for Ontario                               | 78 |
| Table A11–8  | Electricity Generation and GHG Emission Details for Manitoba                              | 79 |
| Table A11–9  | Electricity Generation and GHG Emission Details for Saskatchewan                          | 80 |
| Table A11–10 | Electricity Generation and GHG Emission Details for Alberta                               | 81 |
| Table A11–11 | Electricity Generation and GHG Emission Details for British Columbia                      | 82 |
| Table A11–12 | Electricity Generation and GHG Emission Details for Yukon                                 | 83 |
| Table A11–13 | Electricity Generation and GHG Emission Details for the Northwest Territories and Nunavut | 84 |



# Annex 8

## Rounding Protocol

A rounding protocol has been developed for the emission and removal estimates in order to reflect their uncertainty levels. The accuracy of a value is reflected by presenting the emission and removal estimates rounded to an appropriate number of significant figures based on the uncertainty of the category in question. The number of significant figures to which each source and sink category has been rounded, using the rounding rules provided in this protocol, can be found in Table A8–1.

A large number of the uncertainty ranges that are used for the various categories were developed using Monte Carlo analysis, as performed by ICF Consulting (ICF Consulting 2004, 2005), using the 2001 inventory estimates submitted in the NIR 2003. Default uncertainty values published by the IPCC (IPCC/OECD/IEA 1997; IPCC 2001) and those resulting from expert elicitation were also utilized for some ranges. Since 2004-2005, many methodological changes, refinements and updates, including updates to the uncertainty parameters themselves, have been made. The uncertainty ranges have been calculated around the mean values established by these analyses.

For a more complete description of the analysis of uncertainty in Canada's emission estimates, please refer to Annex 2, which includes tables of current uncertainty values. Recent updates to uncertainty estimates are provided in the respective sectoral chapters.

The following uncertainty values have been used to establish the number of significant figures to which the estimates have been rounded:

- uncertainty greater than 50%: one significant figure;
- uncertainty between 10% and 50%: two significant figures:  
and
- uncertainty equal to or less than 10%: three significant figures.

All calculations, including the summing of emission totals, were made using unrounded data. The rounding protocol was applied only after the calculations had been completed. The reader should also note that formatting in Annex 9 and Annex 10 limits the maximum number of decimal places and, therefore, even though a zero entry is recorded, some emissions may exist in that category (zero emissions are identified with a dash "-"). Because of these procedures, individual values in the emission tables may not add up to the subtotals and/or overall totals.

Table A8-1 Number of Significant Figures Applied to GHG Summary Tables

| Greenhouse Gas Categories                     |  | Number of Significant Figures |                 |                  |      |      |                 |                 |       |
|---|--|-------------------------------|-----------------|------------------|------|------|-----------------|-----------------|-------|
|   |  | CO <sub>2</sub>               | CH <sub>4</sub> | N <sub>2</sub> O | HFCs | PFCs | SF <sub>6</sub> | NF <sub>3</sub> | TOTAL |
| <b>TOTAL</b>                                  |  | 3                             | 2               | 2                | 2    | 2    | 2               | 1               | 3     |
| <b>ENERGY</b>                                 |  | 3                             | 2               | 1                |      |      |                 |                 | 3     |
| a.  | Stationary Combustion Sources  | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Public Electricity and Heat Production   | 3                             | 2               | 1                |      |      |                 |                 | 3     |
|   | Petroleum Refining Industries  | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Mining and Upstream Oil and Gas Production   | 3                             | 2               | 1                |      |      |                 |                 | 3     |
|   | Manufacturing Industries   | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Iron and Steel   | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Non Ferrous Metals   | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Chemical   | 3                             | 2               | 1                |      |      |                 |                 | 3     |
|   | Pulp and Paper   | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Cement   | 3                             | 2               | 1                |      |      |                 |                 | 3     |
|   | Other Manufacturing  | 3                             | 2               | 1                |      |      |                 |                 | 3     |
|   | Construction   | 3                             | 2               | 1                |      |      |                 |                 | 3     |
|   | Commercial & Institutional   | 3                             | 2               | 1                |      |      |                 |                 | 3     |
|   | Residential  | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Agriculture & Forestry   | 3                             | 2               | 2                |      |      |                 |                 | 3     |
| b.  | Transport  | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Domestic Aviation  | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Road Transportation  | 3                             | 1               | 2                |      |      |                 |                 | 3     |
|   | Light-duty Gasoline Vehicles   | 3                             | 2               | 2                |      |      |                 |                 | 3     |
|   | Light-duty Gasoline Trucks   | 3                             | 2               | 2                |      |      |                 |                 | 3     |
|   | Heavy-duty Gasoline Vehicles   | 3                             | 2               | 2                |      |      |                 |                 | 3     |
|   | Motorcycles  | 3                             | 2               | 2                |      |      |                 |                 | 3     |
|   | Light-duty Diesel Vehicles   | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Light-duty Diesel Trucks   | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Heavy-duty Diesel Vehicles   | 3                             | 1               | 1                |      |      |                 |                 | 3     |
|   | Propane & Natural Gas Vehicles   | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Railways   | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Domestic Navigation  | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Other Transportation   | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Off-road Gasoline  | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Off-road Diesel  | 3                             | 1               | 1                |      |      |                 |                 | 2     |
|   | Pipelines Transport  | 3                             | 2               | 1                |      |      |                 |                 | 3     |
| c.  | Fugitive Sources   | 2                             | 2               | 1                |      |      |                 |                 | 2     |
|   | Coal Mining  |                               | 1               |                  |      |      |                 |                 | 1     |
|   | Oil and Natural Gas  | 2                             | 2               | 1                |      |      |                 |                 | 2     |
|   | Oil  | 2                             | 2               | 1                |      |      |                 |                 | 2     |
|   | Natural Gas  | 2                             | 2               |                  |      |      |                 |                 | 2     |
|   | Venting  | 2                             | 2               |                  |      |      |                 |                 | 2     |
|   | Flaring  | 2                             | 2               | 1                |      |      |                 |                 | 2     |
| d.  | CO <sub>2</sub> Transport and Storage  | 1                             |                 |                  |      |      |                 |                 | 1     |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>   |  | 3                             | 2               | 3                | 2    | 2    | 2               |                 | 3     |
| a.  | Mineral Products   | 2                             |                 |                  |      |      |                 |                 | 2     |
|   | Cement Production  | 2                             |                 |                  |      |      |                 |                 | 2     |
|   | Lime Production  | 3                             |                 |                  |      |      |                 |                 | 3     |
|   | Mineral Product Use  | 2                             |                 |                  |      |      |                 |                 | 2     |
| b.  | Chemical Industry  | 2                             | 2               | 2                |      |      |                 |                 | 2     |
|   | Ammonia Production   | 3                             |                 |                  |      |      |                 |                 | 3     |
|   | Nitric Acid Production   |                               |                 | 2                |      |      |                 |                 | 2     |
|   | Adipic Acid Production   |                               |                 | 2                |      |      |                 |                 | 2     |
|   | Petrochemical and Carbon Black Production  |                               | 2               | 2                |      |      |                 |                 | 2     |
| c.  | Metal Production   | 3                             |                 |                  |      | 3    | 3               |                 | 3     |
|   | Iron and Steel Production  | 3                             |                 |                  |      |      |                 |                 | 3     |
|   | Aluminium Production   | 3                             |                 |                  |      | 3    | 3               |                 | 3     |
|   | SF <sub>6</sub> Used in Magnesium Smelters and Casters                             |                               |                 |                  |      |      | 3               |                 | 3     |
| d.  | Production and Consumption of Halocarbons, and SF <sub>6</sub> and NF <sub>3</sub> |                               |                 |                  | 2    | 2    | 2               | 1               | 2     |
| e.  | Non-Energy Products from Fuels and Solvent Use                                     | 2                             |                 |                  |      |      |                 |                 | 2     |
| f.  | Other Product Manufacture and Use  | 1                             |                 | 2                |      |      |                 |                 | 2     |
| <b>AGRICULTURE</b>                            |  |                               | 2               | 1                |      |      |                 |                 | 2     |
| a.  | Enteric Fermentation   |                               | 2               |                  |      |      |                 |                 | 2     |
| b.  | Manure Management  |                               | 2               | 3                |      |      |                 |                 | 2     |
| c.  | Agricultural Soils   |                               |                 | 2                |      |      |                 |                 | 2     |
|   | Direct Sources   |                               |                 | 2                |      |      |                 |                 | 2     |
|   | Indirect Sources   |                               |                 | 1                |      |      |                 |                 | 1     |
| d.  | Field Burning of Agricultural Residues   |                               | 1               | 1                |      |      |                 |                 | 1     |
| e.  | Liming, Urea Application and Other Carbon-Containing Fertilizers                   | 1                             |                 |                  |      |      |                 |                 | 1     |
| <b>WASTE</b>                                  |  | 2                             | 2               | 1                |      |      |                 |                 | 2     |
| a.  | Solid Waste Disposal on Land   |                               | 2               |                  |      |      |                 |                 | 2     |
| b.  | Wastewater Handling  |                               | 2               | 1                |      |      |                 |                 | 2     |
| c.  | Waste Incineration   | 2                             | 1               | 1                |      |      |                 |                 | 2     |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b> |  | 2                             | 2               | 2                |      |      |                 |                 | 2     |
| a.  | Forest Land  | 2                             | 2               | 2                |      |      |                 |                 | 2     |
| b.  | Cropland   | 2                             | 1               | 1                |      |      |                 |                 | 2     |
| c.  | Grassland  |                               | 1               | 1                |      |      |                 |                 | 1     |
| d.  | Wetlands   | 1                             | 1               | 1                |      |      |                 |                 | 1     |
| e.  | Settlements  | 1                             | 1               | 1                |      |      |                 |                 | 1     |
| f.  | Harvested Wood Products  | 2                             |                 |                  |      |      |                 |                 | 2     |

# Annex 9

## **Canada's Greenhouse Gas Emission Tables, 1990–2013**

This annex contains summary tables (Table A9–1 to Table A9–26) illustrating national GHG emissions by year, by gas, and by sector.

Table A9-1 GHG Source/Sink Category Description

| GHG Source/Sink Categories  |   |
|---|---|
| <b>ENERGY</b>   |   |
| <b>a. Stationary Combustion Sources</b>   |   |
| Public Electricity and Heat Production  | Emissions from fuel consumed by utility electricity generation and steam production (for sale)  |
| Petroleum Refining Industries   | Emissions from fuel consumed by petroleum refining industries   |
| Mining and Upstream Oil and Gas Production  | Emissions from fuel consumed by: <ul style="list-style-type: none"> <li>- Metal and non-metal mines, coal mines, stone quarries, and gravel pits</li> <li>- Oil and gas extraction industries</li> <li>- Mineral exploration and contract drilling operations</li> </ul>  |
| Manufacturing Industries  | Emissions from fuel consumed by the following industries: <ul style="list-style-type: none"> <li>- Iron and Steel (steel foundries, casting and rolling mills)</li> <li>- Non-ferrous metals (aluminium, magnesium and other production)</li> <li>- Chemical (fertilizer manufacturing, organic and inorganic chemical manufacturing)</li> <li>- Pulp and Paper (primarily pulp, paper, and paper product manufacturers)</li> <li>- Cement and other non-metallic mineral production</li> <li>- Other manufacturing industries not listed (such as automobile manufacturing, textiles, food and beverage industries)</li> </ul>   |
| Construction  | Emissions from fuels consumed by the construction industry – buildings, highways etc.   |
| Commercial & Institutional  | Emissions from fuel consumed by: <ul style="list-style-type: none"> <li>- Service industries related to mining, communication, wholesale and retail trade, finance and insurance, real estate, education, etc.)</li> <li>- Federal, provincial and municipal establishments</li> <li>- National Defence and Canadian Coast Guard</li> <li>- Train stations, airports and warehouses</li> </ul>  |
| Residential   | Emissions from fuel consumed for personal residences (homes, apartment hotels, condominiums and farm houses)  |
| Agriculture & Forestry  | Emissions from fuel consumed by: <ul style="list-style-type: none"> <li>- Forestry and logging service industry</li> <li>- Agricultural, hunting and trapping industry (excluding food processing, farm machinery manufacturing, and repair)</li> </ul>   |
| <b>b. Transportation</b>  | Emissions resulting from the: <ul style="list-style-type: none"> <li>- Consumption of fossil fuels by aircrafts flying domestically with Canadian purchased fuel</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from ethanol and biodiesel) by vehicles licensed to operate on roads</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from biodiesel) by Canadian railways</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from ethanol and biodiesel) by Canadian registered marine vessels fuelled domestically</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from ethanol and biodiesel) by combustion devices not licensed to operate on roads</li> <li>- Transportation and distribution of crude oil, natural gas and other products</li> </ul> |
| <b>c. Fugitive Sources</b>  | Intentional and unintentional releases of greenhouse gases from the following activities: <ul style="list-style-type: none"> <li>- Underground and surface mining, abandoned underground coal mines</li> <li>- Conventional and unconventional oil and gas exploration, production, transportation, and distribution</li> </ul>   |
| <b>d. CO<sub>2</sub> Transport and Storage</b>                                    | Intentional and unintentional releases of greenhouse gases from the transport and storage of carbon dioxide   |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>                                       |   |
| a. Mineral Products   | - Production of cement and lime; use of soda ash, limestone & dolomite, and magnesite   |
| b. Chemical Industry  | - Production of ammonia, nitric acid, adipic acid, carbide, carbon black, ethylene dichloride, ethylene, methanol and styrene   |
| c. Metal Production   | - Production of aluminum, iron and steel production, magnesium production and casting   |
| d. Production and Consumption of Halocarbons, SF <sub>6</sub> and NF <sub>3</sub> | - By-product production of HFC-23; use of HFCs and/or PFCs in air conditioning units, refrigeration units, fire extinguishers, aerosol cans, solvents, foam blowing, semiconductor manufacturing and electronics industry; use of SF <sub>6</sub> in electrical equipment and semiconductor manufacturing; use of NF <sub>3</sub> in semiconductor manufacturing  |
| e. Non-Energy Products from Fuels and Solvent Use                                 | - Non-energy use of fossil fuels mostly in chemical/petrochemical activities, including solvents and lubricants   |
| f. Other Product Manufacture and Use  | - Emissions resulting from the use of N <sub>2</sub> O as an anaesthetic and propellant; emissions from the use of urea in selective catalytic reduction (SCR) equipped vehicles  |
| <b>AGRICULTURE</b>  |   |
| a. Enteric Fermentation   | - Eructation of CH <sub>4</sub> during the digestion of plant material by (mainly) ruminants  |
| b. Manure Management  | - Release of CH <sub>4</sub> and N <sub>2</sub> O due to microbial activity during the storage of feces, urine and bedding materials from the cleaning of barns and pens<br>- Indirect N <sub>2</sub> O emissions from volatilization and leaching of nitrogen from animal manure during storage  |
| c. Agricultural Soils   | - Direct sources<br>- Direct N <sub>2</sub> O emissions from Synthetic fertilizer, manure on cropland, pasture range and paddock, crop residue, tillage, summer-fallow, irrigation and cultivation of organic soils<br>- Indirect N <sub>2</sub> O emissions from volatilization and leaching of animal manure nitrogen, synthetic fertilizer nitrogen and crop residue nitrogen  |
| d. Field Burning of Agricultural Residues   | - CH <sub>4</sub> and N <sub>2</sub> O emissions from crop residue burning  |
| e. Liming, Urea Application and Other Carbon-containing Fertilizers               | - Direct emissions of CO <sub>2</sub> from the application of lime, urea and other fertilizers containing carbon  |
| <b>WASTE</b>  |   |
| a. Solid Waste Disposal on Land   | Emissions resulting from: <ul style="list-style-type: none"> <li>- Municipal solid waste management sites (landfills) and dedicated wood waste landfills</li> </ul>   |
| b. Wastewater Handling  | - Wastewater treatment  |
| c. Waste Incineration   | - Municipal solid waste, sewage sludge and hazardous waste incineration   |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>                                     |   |
| a. Forest Land  | Emissions and removals resulting from: <ul style="list-style-type: none"> <li>- Managed forests and lands converted to forests; includes growth, natural and anthropogenic disturbances (fire, harvest, insects)</li> </ul>   |
| b. Cropland   | - Management practices on lands in annual crops, summerfallow and perennial crops (forage, specialty crops, orchards); immediate and residual emissions from lands converted to cropland  |
| c. Grassland  | - Managed agricultural grassland  |
| d. Wetlands   | - Peatlands disturbed for peat extraction, or land flooded from hydro reservoir development   |
| e. Settlements  | - Forest and grassland converted to built-up land (settlements, transport infrastructure, oil & gas infrastructure, mining, etc); urban tree growth   |
| f. Harvested Wood Products  | - Use and disposal of harvested wood products manufactured from wood coming from forest harvest and forest conversion activities in Canada  |

Table A9-2 Canada's 1990-2013 GHG Emissions by Sector

| Greenhouse Gas Categories  | 1990                         | 2000            | 2005            | 2009            | 2010           | 2011           | 2012           | 2013            |
|--|------------------------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-----------------|
|  | <i>kt CO<sub>2</sub> eq.</i> |                 |                 |                 |                |                |                |                 |
| <b>TOTAL<sup>1</sup></b>   | <b>613 000</b>               | <b>745 000</b>  | <b>749 000</b>  | <b>699 000</b>  | <b>707 000</b> | <b>709 000</b> | <b>715 000</b> | <b>726 000</b>  |
| <b>ENERGY</b>  | <b>485 000</b>               | <b>606 000</b>  | <b>601 000</b>  | <b>563 000</b>  | <b>573 000</b> | <b>576 000</b> | <b>577 000</b> | <b>588 000</b>  |
| <b>a. Stationary Combustion Sources</b>  | <b>288 000</b>               | <b>355 000</b>  | <b>344 000</b>  | <b>318 000</b>  | <b>318 000</b> | <b>321 000</b> | <b>320 000</b> | <b>325 000</b>  |
| Public Electricity and Heat Production   | 94 500                       | 131 000         | 124 000         | 100 000         | 102 000        | 94 500         | 89 000         | 87 500          |
| Petroleum Refining Industries  | 17 000                       | 17 000          | 20 000          | 19 000          | 18 000         | 17 000         | 19 000         | 18 000          |
| Mining and Upstream Oil and Gas Production   | 41 100                       | 63 400          | 67 800          | 77 800          | 79 800         | 81 600         | 90 500         | 93 600          |
| Manufacturing Industries   | 56 200                       | 56 200          | 48 700          | 40 500          | 41 300         | 44 900         | 44 500         | 46 100          |
| Iron and Steel   | 4 970                        | 6 230           | 5 570           | 4 300           | 4 450          | 5 290          | 5 510          | 5 560           |
| Non Ferrous Metals   | 3 320                        | 3 590           | 3 620           | 2 850           | 2 990          | 3 310          | 2 930          | 3 200           |
| Chemical   | 8 260                        | 10 800          | 8 320           | 8 870           | 9 910          | 11 100         | 11 000         | 11 400          |
| Pulp and Paper   | 14 600                       | 12 600          | 8 660           | 6 410           | 5 990          | 6 260          | 6 040          | 6 520           |
| Cement   | 3 960                        | 4 630           | 5 430           | 4 480           | 4 070          | 4 290          | 4 050          | 3 890           |
| Other Manufacturing  | 21 200                       | 18 200          | 17 100          | 13 500          | 13 900         | 14 600         | 15 100         | 15 500          |
| Construction   | 1 880                        | 1 080           | 1 450           | 1 220           | 1 510          | 1 440          | 1 460          | 1 440           |
| Commercial and Institutional   | 25 800                       | 33 100          | 32 100          | 29 600          | 28 200         | 30 100         | 28 200         | 28 900          |
| Residential  | 48 900                       | 49 700          | 47 700          | 47 100          | 44 700         | 47 800         | 44 200         | 45 800          |
| Agriculture and Forestry   | 2 410                        | 2 570           | 2 110           | 2 550           | 2 900          | 3 460          | 3 560          | 3 580           |
| <b>b. Transport<sup>2</sup></b>  | <b>148 000</b>               | <b>182 000</b>  | <b>195 000</b>  | <b>190 000</b>  | <b>200 000</b> | <b>199 000</b> | <b>199 000</b> | <b>204 000</b>  |
| Domestic Aviation  | 7 200                        | 7 700           | 7 600           | 6 500           | 6 500          | 6 200          | 7 300          | 7 500           |
| Road Transportation  | 97 700                       | 119 000         | 132 000         | 133 000         | 135 000        | 134 000        | 134 000        | 137 000         |
| Light-Duty Gasoline Vehicles   | 45 900                       | 42 400          | 40 500          | 40 100          | 40 400         | 38 900         | 38 600         | 39 400          |
| Light-Duty Gasoline Trucks   | 20 500                       | 36 700          | 43 100          | 42 900          | 43 300         | 41 600         | 41 700         | 42 900          |
| Heavy-Duty Gasoline Vehicles   | 7 530                        | 5 530           | 6 610           | 6 990           | 7 100          | 6 770          | 6 940          | 7 310           |
| Motorcycles  | 155                          | 164             | 258             | 269             | 275            | 267            | 271            | 279             |
| Light-Duty Diesel Vehicles   | 473                          | 470             | 579             | 706             | 756            | 795            | 832            | 877             |
| Light-Duty Diesel Trucks   | 708                          | 1 680           | 1 940           | 2 050           | 2 110          | 2 070          | 2 160          | 2 210           |
| Heavy-Duty Diesel Vehicles   | 20 200                       | 31 100          | 38 000          | 39 400          | 40 600         | 42 400         | 42 100         | 42 900          |
| Propane and Natural Gas Vehicles   | 2 200                        | 1 100           | 730             | 790             | 780            | 820            | 880            | 720             |
| Railways   | 7 000                        | 6 600           | 6 700           | 5 100           | 6 600          | 7 600          | 7 600          | 7 400           |
| Domestic Navigation  | 5 100                        | 5 200           | 6 700           | 6 700           | 7 000          | 5 900          | 5 800          | 5 300           |
| Other Transportation   | 31 000                       | 43 000          | 43 000          | 38 000          | 44 000         | 46 000         | 45 000         | 47 000          |
| Off-Road Gasoline  | 7 900                        | 8 900           | 8 400           | 7 400           | 8 100          | 8 200          | 7 800          | 8 500           |
| Off-Road Diesel  | 16 000                       | 23 000          | 24 000          | 25 000          | 30 000         | 32 000         | 31 000         | 32 000          |
| Pipeline Transport   | 6 910                        | 11 300          | 10 200          | 6 360           | 5 720          | 5 650          | 5 730          | 6 390           |
| <b>c. Fugitive Sources</b>   | <b>49 000</b>                | <b>70 000</b>   | <b>61 000</b>   | <b>56 000</b>   | <b>55 000</b>  | <b>56 000</b>  | <b>57 000</b>  | <b>59 000</b>   |
| Coal Mining  | 3 000                        | 2 000           | 2 000           | 1 000           | 2 000          | 2 000          | 2 000          | 2 000           |
| Oil and Natural Gas  | 46 000                       | 68 000          | 59 000          | 54 000          | 53 000         | 54 000         | 56 000         | 57 000          |
| Oil  | 5 000                        | 6 500           | 6 400           | 5 900           | 6 000          | 6 200          | 6 800          | 7 200           |
| Natural Gas  | 13 000                       | 18 000          | 14 000          | 13 000          | 12 000         | 12 000         | 12 000         | 13 000          |
| Venting  | 23 000                       | 38 000          | 34 000          | 31 000          | 30 000         | 31 000         | 32 000         | 32 000          |
| Flaring  | 4 600                        | 5 700           | 5 300           | 4 900           | 4 700          | 4 900          | 4 900          | 5 400           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                     | <b>0.09</b>     | <b>0.09</b>     | <b>0.09</b>     | <b>0.09</b>    | <b>0.09</b>    | <b>0.09</b>    | <b>0.09</b>     |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>55 100</b>                | <b>53 400</b>   | <b>58 800</b>   | <b>49 100</b>   | <b>50 700</b>  | <b>50 900</b>  | <b>55 000</b>  | <b>52 200</b>   |
| <b>a. Mineral Products</b>   | <b>8 700</b>                 | <b>10 000</b>   | <b>10 000</b>   | <b>7 300</b>    | <b>8 000</b>   | <b>8 200</b>   | <b>8 800</b>   | <b>8 100</b>    |
| Cement Production  | 5 800                        | 7 200           | 7 600           | 5 400           | 6 000          | 6 100          | 6 600          | 6 000           |
| Lime Production  | 1 760                        | 1 870           | 1 710           | 1 190           | 1 370          | 1 430          | 1 450          | 1 320           |
| Mineral Product Use  | 1 200                        | 1 200           | 1 000           | 720             | 540            | 670            | 770            | 780             |
| <b>b. Chemical Industry</b>  | <b>14 000</b>                | <b>5 100</b>    | <b>6 500</b>    | <b>4 200</b>    | <b>3 600</b>   | <b>4 100</b>   | <b>4 200</b>   | <b>4 500</b>    |
| Ammonia Production   | 2 770                        | 2 960           | 2 710           | 2 400           | 2 490          | 2 880          | 3 000          | 3 480           |
| Nitric Acid Production   | 970                          | 1 200           | 1 200           | 1 100           | 1 100          | 1 100          | 1 100          | 990             |
| Adipic Acid Production   | 10 000                       | 870             | 2 500           | 640             | -              | -              | -              | -               |
| Petrochemical and Carbon Black Production <sup>3</sup>   | 130                          | 110             | 90              | 68              | 68             | 69             | 71             | 84              |
| <b>c. Metal Production</b>   | <b>23 500</b>                | <b>23 100</b>   | <b>20 100</b>   | <b>15 700</b>   | <b>16 100</b>  | <b>16 900</b>  | <b>16 600</b>  | <b>14 500</b>   |
| Iron and Steel Production  | 10 200                       | 11 500          | 10 200          | 8 030           | 9 030          | 9 860          | 9 840          | 7 530           |
| Aluminum Production  | 10 300                       | 8 890           | 8 680           | 7 540           | 6 870          | 6 810          | 6 470          | 6 720           |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | 2 960                        | 2 660           | 1 230           | 184             | 182            | 183            | 248            | 213             |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | <b>1 200</b>                 | <b>3 800</b>    | <b>5 400</b>    | <b>5 800</b>    | <b>5 900</b>   | <b>6 100</b>   | <b>6 400</b>   | <b>6 600</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>7 400</b>                 | <b>11 000</b>   | <b>16 000</b>   | <b>16 000</b>   | <b>17 000</b>  | <b>15 000</b>  | <b>19 000</b>  | <b>18 000</b>   |
| <b>f. Other Product Manufacture and Use</b>  | <b>170</b>                   | <b>430</b>      | <b>360</b>      | <b>250</b>      | <b>240</b>     | <b>260</b>     | <b>330</b>     | <b>300</b>      |
| <b>AGRICULTURE</b>   | <b>49 000</b>                | <b>59 000</b>   | <b>62 000</b>   | <b>58 000</b>   | <b>57 000</b>  | <b>56 000</b>  | <b>58 000</b>  | <b>60 000</b>   |
| <b>a. Enteric Fermentation</b>   | <b>23 000</b>                | <b>28 000</b>   | <b>31 000</b>   | <b>27 000</b>   | <b>26 000</b>  | <b>25 000</b>  | <b>25 000</b>  | <b>25 000</b>   |
| <b>b. Manure Management</b>  | <b>7 600</b>                 | <b>9 200</b>    | <b>9 900</b>    | <b>8 700</b>    | <b>8 500</b>   | <b>8 400</b>   | <b>8 400</b>   | <b>8 400</b>    |
| <b>c. Agriculture Soils</b>  | <b>17 000</b>                | <b>19 000</b>   | <b>19 000</b>   | <b>20 000</b>   | <b>21 000</b>  | <b>20 000</b>  | <b>22 000</b>  | <b>24 000</b>   |
| Direct Sources   | 14 000                       | 16 000          | 15 000          | 16 000          | 17 000         | 17 000         | 18 000         | 20 000          |
| Indirect Sources   | 3 000                        | 4 000           | 4 000           | 4 000           | 4 000          | 4 000          | 4 000          | 5 000           |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>200</b>                   | <b>100</b>      | <b>50</b>       | <b>50</b>       | <b>30</b>      | <b>30</b>      | <b>40</b>      | <b>50</b>       |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>                 | <b>2 000</b>    | <b>1 000</b>    | <b>2 000</b>    | <b>2 000</b>   | <b>2 000</b>   | <b>2 000</b>   | <b>3 000</b>    |
| <b>WASTE</b>   | <b>24 000</b>                | <b>26 000</b>   | <b>28 000</b>   | <b>28 000</b>   | <b>27 000</b>  | <b>26 000</b>  | <b>26 000</b>  | <b>25 000</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | <b>22 000</b>                | <b>25 000</b>   | <b>26 000</b>   | <b>27 000</b>   | <b>25 000</b>  | <b>25 000</b>  | <b>24 000</b>  | <b>24 000</b>   |
| <b>b. Wastewater Handling</b>  | <b>870</b>                   | <b>950</b>      | <b>980</b>      | <b>1 000</b>    | <b>1 000</b>   | <b>1 000</b>   | <b>1 000</b>   | <b>1 100</b>    |
| <b>c. Waste Incineration</b>   | <b>730</b>                   | <b>740</b>      | <b>690</b>      | <b>640</b>      | <b>660</b>     | <b>640</b>     | <b>710</b>     | <b>550</b>      |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-87 000</b>               | <b>-77 000</b>  | <b>16 000</b>   | <b>-7 900</b>   | <b>81 000</b>  | <b>82 000</b>  | <b>60 000</b>  | <b>-15 000</b>  |
| <b>a. Forest Land</b>  | <b>-250 000</b>              | <b>-250 000</b> | <b>-140 000</b> | <b>-140 000</b> | <b>-65 000</b> | <b>-69 000</b> | <b>-94 000</b> | <b>-160 000</b> |
| <b>b. Cropland</b>   | <b>10 000</b>                | <b>-2 100</b>   | <b>-8 400</b>   | <b>-8 700</b>   | <b>-8 400</b>  | <b>-8 000</b>  | <b>-7 700</b>  | <b>-7 400</b>   |
| <b>c. Grassland</b>  | <b>600</b>                   | <b>1 000</b>    | <b>900</b>      | <b>400</b>      | <b>300</b>     | <b>600</b>     | <b>2 000</b>   | <b>700</b>      |
| <b>d. Wetlands</b>   | <b>6 000</b>                 | <b>4 000</b>    | <b>4 000</b>    | <b>4 000</b>    | <b>4 000</b>   | <b>4 000</b>   | <b>4 000</b>   | <b>4 000</b>    |
| <b>e. Settlements</b>  | <b>4 000</b>                 | <b>4 000</b>    | <b>4 000</b>    | <b>4 000</b>    | <b>4 000</b>   | <b>4 000</b>   | <b>4 000</b>   | <b>4 000</b>    |
| <b>f. Harvested Wood Products</b>  | <b>140 000</b>               | <b>170 000</b>  | <b>160 000</b>  | <b>130 000</b>  | <b>150 000</b> | <b>150 000</b> | <b>150 000</b> | <b>150 000</b>  |

## Notes:

1. National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.

2. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

3. The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.

4. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A9-3 2013 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                 |                 |                 |                                 |                  |                                  |                           |                           |                                     |                                     |
|--|----------------------------------|-----------------|-----------------|---------------------------------|------------------|----------------------------------|---------------------------|---------------------------|-------------------------------------|-------------------------------------|
|  | CO <sub>2</sub>                  | CH <sub>4</sub> | CH <sub>4</sub> | N <sub>2</sub> O                | N <sub>2</sub> O | HFCs <sup>5</sup>                | PFCs <sup>5</sup>         | SF <sub>6</sub>           | NF <sub>3</sub>                     | TOTAL                               |
|  | Global Warming Potential<br>Unit | kt              | kt              | 25<br>kt CO <sub>2</sub><br>eq. | kt               | 298<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | 22 800<br>kt CO <sub>2</sub><br>eq. | 17 200<br>kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>570 000</b>                   | <b>4 300</b>    | <b>110 000</b>  | <b>140</b>                      | <b>41 000</b>    | <b>6 400</b>                     | <b>1 600</b>              | <b>430</b>                | <b>0.2</b>                          | <b>726 000</b>                      |
| <b>ENERGY</b>  | <b>524 000</b>                   | <b>2 100</b>    | <b>54 000</b>   | <b>30</b>                       | <b>10 000</b>    | -                                | -                         | -                         | -                                   | <b>588 000</b>                      |
| <b>a. Stationary Combustion Sources</b>  | <b>315 000</b>                   | <b>300</b>      | <b>7 000</b>    | <b>10</b>                       | <b>3 000</b>     | -                                | -                         | -                         | -                                   | <b>325 000</b>                      |
| Public Electricity and Heat Production   | 86 800                           | 5.9             | 150             | 2                               | 500              | -                                | -                         | -                         | -                                   | 87 500                              |
| Petroleum Refining Industries  | 18 300                           | 0.2             | 6               | 0.1                             | 40               | -                                | -                         | -                         | -                                   | 18 000                              |
| Mining and Upstream Oil and Gas Production   | 90 900                           | 85              | 2 100           | 2                               | 600              | -                                | -                         | -                         | -                                   | 93 600                              |
| Manufacturing Industries   | 45 400                           | 3               | 70              | 2                               | 600              | -                                | -                         | -                         | -                                   | 46 100                              |
| Iron and Steel   | 5 510                            | 0.2             | 5               | 0.2                             | 50               | -                                | -                         | -                         | -                                   | 5 560                               |
| Non Ferrous Metals   | 3 190                            | 0.06            | 1               | 0.04                            | 10               | -                                | -                         | -                         | -                                   | 3 200                               |
| Chemical   | 11 400                           | 0.22            | 5.6             | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 11 400                              |
| Pulp and Paper   | 6 190                            | 1               | 30              | 1                               | 300              | -                                | -                         | -                         | -                                   | 6 520                               |
| Cement   | 3 860                            | 0.23            | 5.7             | 0.06                            | 20               | -                                | -                         | -                         | -                                   | 3 890                               |
| Other Manufacturing  | 15 300                           | 0.72            | 18              | 0.6                             | 200              | -                                | -                         | -                         | -                                   | 15 500                              |
| Construction   | 1 430                            | 0.03            | 0.64            | 0.04                            | 10               | -                                | -                         | -                         | -                                   | 1 440                               |
| Commercial and Institutional   | 28 700                           | 0.55            | 14              | 0.6                             | 200              | -                                | -                         | -                         | -                                   | 28 900                              |
| Residential  | 39 900                           | 200             | 5 000           | 3                               | 900              | -                                | -                         | -                         | -                                   | 45 800                              |
| Agriculture and Forestry   | 3 550                            | 0.06            | 1.6             | 0.09                            | 27               | -                                | -                         | -                         | -                                   | 3 580                               |
| <b>b. Transport<sup>2</sup></b>  | <b>196 000</b>                   | <b>30</b>       | <b>700</b>      | <b>20</b>                       | <b>7 000</b>     | -                                | -                         | -                         | -                                   | <b>204 000</b>                      |
| Domestic Aviation  | 7 440                            | 0.3             | 8               | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 7 500                               |
| Road Transportation  | 134 000                          | 10              | 200             | 8.3                             | 2 500            | -                                | -                         | -                         | -                                   | 137 000                             |
| Light-Duty Gasoline Vehicles   | 38 600                           | 3.3             | 83              | 2.5                             | 740              | -                                | -                         | -                         | -                                   | 39 400                              |
| Light-Duty Gasoline Trucks   | 42 000                           | 3.7             | 92              | 2.6                             | 760              | -                                | -                         | -                         | -                                   | 42 900                              |
| Heavy-Duty Gasoline Vehicles   | 7 120                            | 0.28            | 6.9             | 0.61                            | 180              | -                                | -                         | -                         | -                                   | 7 310                               |
| Motorcycles  | 274                              | 0.11            | 2.7             | 0.01                            | 1.5              | -                                | -                         | -                         | -                                   | 279                                 |
| Light-Duty Diesel Vehicles   | 855                              | 0.02            | 0.4             | 0.07                            | 20               | -                                | -                         | -                         | -                                   | 877                                 |
| Light-Duty Diesel Trucks   | 2 160                            | 0.06            | 1               | 0.2                             | 50               | -                                | -                         | -                         | -                                   | 2 210                               |
| Heavy-Duty Diesel Vehicles   | 42 100                           | 2               | 40              | 2                               | 700              | -                                | -                         | -                         | -                                   | 42 900                              |
| Propane and Natural Gas Vehicles   | 697                              | 0.6             | 20              | 0.01                            | 4                | -                                | -                         | -                         | -                                   | 720                                 |
| Railways   | 6 540                            | 0.4             | 9               | 3                               | 800              | -                                | -                         | -                         | -                                   | 7 400                               |
| Domestic Navigation  | 5 050                            | 0.4             | 10              | 0.9                             | 300              | -                                | -                         | -                         | -                                   | 5 300                               |
| Other Transportation   | 43 100                           | 20              | 400             | 10                              | 4 000            | -                                | -                         | -                         | -                                   | 47 000                              |
| Off-Road Gasoline  | 8 140                            | 10              | 300             | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 8 500                               |
| Off-Road Diesel  | 28 800                           | 2               | 40              | 10                              | 4 000            | -                                | -                         | -                         | -                                   | 32 000                              |
| Pipeline Transport   | 6 190                            | 6.2             | 150             | 0.2                             | 50               | -                                | -                         | -                         | -                                   | 6 390                               |
| <b>c. Fugitive Sources</b>   | <b>13 000</b>                    | <b>1 800</b>    | <b>45 000</b>   | <b>0.2</b>                      | <b>50</b>        | -                                | -                         | -                         | -                                   | <b>59 000</b>                       |
| Coal Mining  | -                                | 70              | 2 000           | -                               | -                | -                                | -                         | -                         | -                                   | 2 000                               |
| Oil and Natural Gas  | 13 000                           | 1 700           | 44 000          | 0.2                             | 50               | -                                | -                         | -                         | -                                   | 57 000                              |
| Oil  | 210                              | 280             | 6 900           | 0.1                             | 30               | -                                | -                         | -                         | -                                   | 7 200                               |
| Natural Gas  | 73                               | 500             | 12 000          | -                               | -                | -                                | -                         | -                         | -                                   | 13 000                              |
| Venting  | 8 100                            | 950             | 24 000          | -                               | -                | -                                | -                         | -                         | -                                   | 32 000                              |
| Flaring  | 4 800                            | 20              | 510             | 0.04                            | 10               | -                                | -                         | -                         | -                                   | 5 400                               |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>                      | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>0.09</b>                         |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>42 400</b>                    | <b>3</b>        | <b>76</b>       | <b>4.19</b>                     | <b>1 250</b>     | <b>6 400</b>                     | <b>1 600</b>              | <b>430</b>                | -                                   | <b>52 200</b>                       |
| <b>a. Mineral Products</b>   | <b>8 100</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>8 100</b>                        |
| Cement Production  | 6 000                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 6 000                               |
| Lime Production  | 1 320                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 1 320                               |
| Mineral Product Use  | 780                              | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 780                                 |
| <b>b. Chemical Industry</b>  | <b>3 500</b>                     | <b>3</b>        | <b>76</b>       | <b>3.3</b>                      | <b>990</b>       | -                                | -                         | -                         | -                                   | <b>4 500</b>                        |
| Ammonia Production   | 3 480                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 3 480                               |
| Nitric Acid Production   | -                                | -               | -               | 3.3                             | 990              | -                                | -                         | -                         | -                                   | 990                                 |
| Adipic Acid Production   | -                                | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                | 3               | 76              | 0.03                            | 8.4              | -                                | -                         | -                         | -                                   | 84                                  |
| <b>c. Metal Production</b>   | <b>12 700</b>                    | -               | -               | -                               | -                | -                                | <b>1 590</b>              | <b>219</b>                | -                                   | <b>14 500</b>                       |
| Iron and Steel Production  | 7 530                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 7 530                               |
| Aluminum Production  | 5 120                            | -               | -               | -                               | -                | -                                | 1 590                     | 5.39                      | -                                   | 6 720                               |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                | -               | -               | -                               | -                | -                                | -                         | 213                       | -                                   | 213                                 |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                                | -               | -               | -                               | -                | <b>6 400</b>                     | <b>23</b>                 | <b>210</b>                | <b>0.2</b>                          | <b>6 600</b>                        |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>18 000</b>                    | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>18 000</b>                       |
| <b>f. Other Product Manufacture and Use</b>  | <b>50</b>                        | -               | -               | <b>0.86</b>                     | <b>260</b>       | -                                | -                         | -                         | -                                   | <b>300</b>                          |
| <b>AGRICULTURE</b>   | -                                | <b>1 200</b>    | <b>29 000</b>   | <b>100</b>                      | <b>30 000</b>    | -                                | -                         | -                         | -                                   | <b>60 000</b>                       |
| <b>a. Enteric Fermentation</b>   | -                                | <b>1 000</b>    | <b>25 000</b>   | -                               | -                | -                                | -                         | -                         | -                                   | <b>25 000</b>                       |
| <b>b. Manure Management</b>  | -                                | <b>150</b>      | <b>3 700</b>    | <b>15.9</b>                     | <b>4 730</b>     | -                                | -                         | -                         | -                                   | <b>8 400</b>                        |
| <b>c. Agriculture Soils</b>  | -                                | -               | -               | <b>81</b>                       | <b>24 000</b>    | -                                | -                         | -                         | -                                   | <b>24 000</b>                       |
| Direct Sources   | -                                | -               | -               | 66                              | 20 000           | -                                | -                         | -                         | -                                   | 20 000                              |
| Indirect Sources   | -                                | -               | -               | 20                              | 5 000            | -                                | -                         | -                         | -                                   | 5 000                               |
| <b>d. Field Burning of Agricultural Residues</b>   | -                                | <b>2</b>        | <b>40</b>       | <b>0.04</b>                     | <b>10</b>        | -                                | -                         | -                         | -                                   | <b>50</b>                           |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>3 000</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>3 000</b>                        |
| <b>WASTE</b>   | <b>400</b>                       | <b>970</b>      | <b>24 000</b>   | <b>3</b>                        | <b>800</b>       | -                                | -                         | -                         | -                                   | <b>25 000</b>                       |
| <b>a. Solid Waste Disposal on Land</b>   | -                                | <b>950</b>      | <b>24 000</b>   | -                               | -                | -                                | -                         | -                         | -                                   | <b>24 000</b>                       |
| <b>b. Wastewater Handling</b>  | -                                | <b>16</b>       | <b>390</b>      | <b>2</b>                        | <b>700</b>       | -                                | -                         | -                         | -                                   | <b>1 100</b>                        |
| <b>c. Waste Incineration</b>   | <b>400</b>                       | <b>0.1</b>      | <b>3</b>        | <b>0.5</b>                      | <b>100</b>       | -                                | -                         | -                         | -                                   | <b>550</b>                          |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-24 000</b>                   | <b>250</b>      | <b>6 300</b>    | <b>10</b>                       | <b>3 100</b>     | -                                | -                         | -                         | -                                   | <b>-15 000</b>                      |
| <b>a. Forest Land</b>  | <b>-170 000</b>                  | <b>220</b>      | <b>5 500</b>    | <b>9.2</b>                      | <b>2 800</b>     | -                                | -                         | -                         | -                                   | <b>-160 000</b>                     |
| <b>b. Cropland</b>   | <b>-7 600</b>                    | <b>5</b>        | <b>100</b>      | <b>0.2</b>                      | <b>70</b>        | -                                | -                         | -                         | -                                   | <b>-7 400</b>                       |
| <b>c. Grassland</b>  | -                                | <b>20</b>       | <b>500</b>      | <b>0.5</b>                      | <b>200</b>       | -                                | -                         | -                         | -                                   | <b>700</b>                          |
| <b>d. Wetlands</b>   | <b>4 000</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>4 000</b>                        |
| <b>e. Settlements</b>  | <b>4 000</b>                     | <b>6</b>        | <b>100</b>      | <b>0.2</b>                      | <b>60</b>        | -                                | -                         | -                         | -                                   | <b>4 000</b>                        |
| <b>f. Harvested Wood Products</b>  | <b>150 000</b>                   | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>150 000</b>                      |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
  - Indicates no emissions
  - 0.0 Indicates emissions truncated due to rounding

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A9-4 2012 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCS <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>562 000</b>   | <b>4 200</b>    | <b>110 000</b>         | <b>130</b>       | <b>298</b>             | <b>6 200</b>           | <b>1 800</b>           | <b>440</b>             | <b>0.2</b>             | <b>715 000</b>         |
| <b>ENERGY</b>  | <b>514 000</b>   | <b>2 100</b>    | <b>52 000</b>          | <b>30</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>577 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>310 000</b>   | <b>300</b>      | <b>7 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>320 000</b>         |
| Public Electricity and Heat Production   | 88 300           | 6.5             | 160                    | 2                | 600                    | -                      | -                      | -                      | -                      | 89 000                 |
| Petroleum Refining Industries  | 18 600           | 0.2             | 6                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 19 000                 |
| Mining and Upstream Oil and Gas Production   | 87 900           | 80              | 2 000                  | 2                | 600                    | -                      | -                      | -                      | -                      | 90 500                 |
| Manufacturing Industries   | 43 900           | 2               | 60                     | 2                | 600                    | -                      | -                      | -                      | -                      | 44 500                 |
| Iron and Steel   | 5 450            | 0.2             | 6                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 5 510                  |
| Non Ferrous Metals   | 2 920            | 0.05            | 1                      | 0.04             | 10                     | -                      | -                      | -                      | -                      | 2 930                  |
| Chemical   | 10 900           | 0.21            | 5.3                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 11 000                 |
| Pulp and Paper   | 5 750            | 1               | 30                     | 0.9              | 300                    | -                      | -                      | -                      | -                      | 6 040                  |
| Cement   | 4 030            | 0.23            | 5.8                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 4 050                  |
| Other Manufacturing  | 14 900           | 0.64            | 16                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 15 100                 |
| Construction   | 1 450            | 0.03            | 0.63                   | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 460                  |
| Commercial and Institutional   | 28 000           | 0.53            | 13                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 28 200                 |
| Residential  | 38 300           | 200             | 5 000                  | 3                | 900                    | -                      | -                      | -                      | -                      | 44 200                 |
| Agriculture and Forestry   | 3 530            | 0.06            | 1.6                    | 0.1              | 28                     | -                      | -                      | -                      | -                      | 3 560                  |
| <b>b. Transport<sup>2</sup></b>  | <b>191 000</b>   | <b>30</b>       | <b>700</b>             | <b>20</b>        | <b>7 000</b>           | -                      | -                      | -                      | -                      | <b>199 000</b>         |
| Domestic Aviation  | 7 200            | 0.3             | 9                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 7 300                  |
| Road Transportation  | 131 000          | 10              | 200                    | 9.1              | 2 700                  | -                      | -                      | -                      | -                      | 134 000                |
| Light-Duty Gasoline Vehicles   | 37 700           | 3.3             | 84                     | 2.9              | 870                    | -                      | -                      | -                      | -                      | 38 600                 |
| Light-Duty Gasoline Trucks   | 40 700           | 3.7             | 92                     | 3                | 890                    | -                      | -                      | -                      | -                      | 41 700                 |
| Heavy-Duty Gasoline Vehicles   | 6 760            | 0.27            | 6.8                    | 0.58             | 170                    | -                      | -                      | -                      | -                      | 6 940                  |
| Motorcycles  | 267              | 0.11            | 2.7                    | 0.01             | 1.5                    | -                      | -                      | -                      | -                      | 271                    |
| Light-Duty Diesel Vehicles   | 812              | 0.02            | 0.4                    | 0.07             | 20                     | -                      | -                      | -                      | -                      | 832                    |
| Light-Duty Diesel Trucks   | 2 100            | 0.05            | 1                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 2 160                  |
| Heavy-Duty Diesel Vehicles   | 41 400           | 2               | 40                     | 2                | 700                    | -                      | -                      | -                      | -                      | 42 100                 |
| Propane and Natural Gas Vehicles   | 862              | 0.7             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 880                    |
| Railways   | 6 790            | 0.4             | 9                      | 3                | 800                    | -                      | -                      | -                      | -                      | 7 600                  |
| Domestic Navigation  | 5 530            | 0.4             | 10                     | 1                | 300                    | -                      | -                      | -                      | -                      | 5 800                  |
| Other Transportation   | 40 700           | 20              | 400                    | 10               | 4 000                  | -                      | -                      | -                      | -                      | 45 000                 |
| Off-Road Gasoline  | 7 500            | 9               | 200                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 7 800                  |
| Off-Road Diesel  | 27 700           | 2               | 40                     | 10               | 3 000                  | -                      | -                      | -                      | -                      | 31 000                 |
| Pipeline Transport   | 5 540            | 5.6             | 140                    | 0.1              | 40                     | -                      | -                      | -                      | -                      | 5 730                  |
| <b>c. Fugitive Sources</b>   | <b>13 000</b>    | <b>1 800</b>    | <b>44 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>57 000</b>          |
| Coal Mining  | -                | 60              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 13 000           | 1 700           | 43 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 56 000                 |
| Oil  | 220              | 260             | 6 600                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 800                  |
| Natural Gas  | 72               | 490             | 12 000                 | -                | -                      | -                      | -                      | -                      | -                      | 12 000                 |
| Venting  | 8 400            | 930             | 23 000                 | -                | -                      | -                      | -                      | -                      | -                      | 32 000                 |
| Flaring  | 4 500            | 18              | 450                    | 0.02             | 6                      | -                      | -                      | -                      | -                      | 4 900                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>45 200</b>    | <b>2.7</b>      | <b>69</b>              | <b>4.71</b>      | <b>1 400</b>           | <b>6 200</b>           | <b>1 800</b>           | <b>440</b>             | -                      | <b>55 000</b>          |
| <b>a. Mineral Products</b>   | <b>8 800</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>8 800</b>           |
| Cement Production  | 6 600            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 6 600                  |
| Lime Production  | 1 450            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 450                  |
| Mineral Product Use  | 770              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 770                    |
| <b>b. Chemical Industry</b>  | <b>3 000</b>     | <b>2.7</b>      | <b>69</b>              | <b>3.7</b>       | <b>1 100</b>           | -                      | -                      | -                      | -                      | <b>4 200</b>           |
| Ammonia Production   | 3 000            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 3 000                  |
| Nitric Acid Production   | -                | -               | -                      | 3.7              | 1 100                  | -                      | -                      | -                      | -                      | 1 100                  |
| Adipic Acid Production   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 2.7             | 69                     | 0.01             | 2.1                    | -                      | -                      | -                      | -                      | 71                     |
| <b>c. Metal Production</b>   | <b>14 600</b>    | -               | -                      | -                | -                      | -                      | <b>1 760</b>           | <b>253</b>             | -                      | <b>16 600</b>          |
| Iron and Steel Production  | 9 840            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 9 840                  |
| Aluminum Production  | 4 710            | -               | -                      | -                | -                      | -                      | 1 760                  | 4.78                   | -                      | 6 470                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 248                    | -                      | 248                    |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>6 200</b>           | <b>41</b>              | <b>180</b>             | <b>0.2</b>             | <b>6 400</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>19 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | <b>40</b>        | -               | -                      | <b>1</b>         | <b>300</b>             | -                      | -                      | -                      | -                      | <b>330</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 200</b>    | <b>29 000</b>          | <b>90</b>        | <b>30 000</b>          | -                      | -                      | -                      | -                      | <b>58 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 000</b>    | <b>25 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>150</b>      | <b>3 600</b>           | <b>15.9</b>      | <b>4 750</b>           | -                      | -                      | -                      | -                      | <b>8 400</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>74</b>        | <b>22 000</b>          | -                      | -                      | -                      | -                      | <b>22 000</b>          |
| Direct Sources   | -                | -               | -                      | 60               | 18 000                 | -                      | -                      | -                      | -                      | 18 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>1</b>        | <b>30</b>              | <b>0.03</b>      | <b>9</b>               | -                      | -                      | -                      | -                      | <b>40</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>500</b>       | <b>970</b>      | <b>24 000</b>          | <b>3</b>         | <b>900</b>             | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>950</b>      | <b>24 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>24 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>390</b>             | <b>2</b>         | <b>700</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>c. Waste Incineration</b>   | <b>500</b>       | <b>0.1</b>      | <b>3</b>               | <b>0.7</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>710</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>42 000</b>    | <b>480</b>      | <b>12 000</b>          | <b>19</b>        | <b>5 700</b>           | -                      | -                      | -                      | -                      | <b>60 000</b>          |
| <b>a. Forest Land</b>  | <b>-110 000</b>  | <b>420</b>      | <b>10 000</b>          | <b>18</b>        | <b>5 200</b>           | -                      | -                      | -                      | -                      | <b>-94 000</b>         |
| <b>b. Cropland</b>   | <b>-7 900</b>    | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>-7 700</b>          |
| <b>c. Grassland</b>  | -                | <b>50</b>       | <b>1 000</b>           | <b>1</b>         | <b>400</b>             | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>d. Wetlands</b>   | <b>4 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>100</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>150 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>150 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-5 2011 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>559 000</b>   | <b>4 200</b>    | <b>100 000</b>         | <b>130</b>       | <b>38 000</b>          | <b>5 900</b>           | <b>1 700</b>           | <b>400</b>             | <b>0.2</b>             | <b>709 000</b>         |
| <b>ENERGY</b>  | <b>515 000</b>   | <b>2 000</b>    | <b>50 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>576 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>311 000</b>   | <b>300</b>      | <b>7 000</b>           | <b>9</b>         | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>321 000</b>         |
| Public Electricity and Heat Production   | 93 800           | 6.6             | 170                    | 2                | 600                    | -                      | -                      | -                      | -                      | 94 500                 |
| Petroleum Refining Industries  | 17 300           | 0.2             | 6                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 17 000                 |
| Mining and Upstream Oil and Gas Production   | 79 200           | 75              | 1 900                  | 2                | 500                    | -                      | -                      | -                      | -                      | 81 600                 |
| Manufacturing Industries   | 44 200           | 2               | 60                     | 2                | 600                    | -                      | -                      | -                      | -                      | 44 900                 |
| Iron and Steel   | 5 240            | 0.2             | 6                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 5 290                  |
| Non Ferrous Metals   | 3 290            | 0.06            | 1                      | 0.04             | 10                     | -                      | -                      | -                      | -                      | 3 310                  |
| Chemical   | 11 000           | 0.21            | 5.3                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 11 100                 |
| Pulp and Paper   | 5 960            | 1               | 30                     | 0.9              | 300                    | -                      | -                      | -                      | -                      | 6 260                  |
| Cement   | 4 270            | 0.2             | 4.9                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 4 290                  |
| Other Manufacturing  | 14 400           | 0.6             | 15                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 14 600                 |
| Construction   | 1 420            | 0.03            | 0.62                   | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 440                  |
| Commercial and Institutional   | 29 900           | 0.57            | 14                     | 0.7              | 200                    | -                      | -                      | -                      | -                      | 30 100                 |
| Residential  | 41 900           | 200             | 5 000                  | 3                | 900                    | -                      | -                      | -                      | -                      | 47 800                 |
| Agriculture and Forestry   | 3 430            | 0.06            | 1.5                    | 0.09             | 27                     | -                      | -                      | -                      | -                      | 3 460                  |
| <b>b. Transport<sup>2</sup></b>  | <b>191 000</b>   | <b>30</b>       | <b>700</b>             | <b>30</b>        | <b>8 000</b>           | -                      | -                      | -                      | -                      | <b>199 000</b>         |
| Domestic Aviation  | 6 150            | 0.3             | 8                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 6 200                  |
| Road Transportation  | 130 000          | 10              | 300                    | 10               | 3 000                  | -                      | -                      | -                      | -                      | 134 000                |
| Light-Duty Gasoline Vehicles   | 37 800           | 3.4             | 86                     | 3.3              | 1 000                  | -                      | -                      | -                      | -                      | 38 900                 |
| Light-Duty Gasoline Trucks   | 40 400           | 3.7             | 93                     | 3.5              | 1 100                  | -                      | -                      | -                      | -                      | 41 600                 |
| Heavy-Duty Gasoline Vehicles   | 6 600            | 0.28            | 6.9                    | 0.55             | 160                    | -                      | -                      | -                      | -                      | 6 770                  |
| Motorcycles  | 263              | 0.11            | 2.7                    | 0.01             | 1.5                    | -                      | -                      | -                      | -                      | 267                    |
| Light-Duty Diesel Vehicles   | 776              | 0.02            | 0.4                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 795                    |
| Light-Duty Diesel Trucks   | 2 020            | 0.05            | 1                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 2 070                  |
| Heavy-Duty Diesel Vehicles   | 41 600           | 2               | 40                     | 2                | 700                    | -                      | -                      | -                      | -                      | 42 400                 |
| Propane and Natural Gas Vehicles   | 801              | 0.7             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 820                    |
| Railways   | 6 730            | 0.4             | 9                      | 3                | 800                    | -                      | -                      | -                      | -                      | 7 600                  |
| Domestic Navigation  | 5 540            | 0.4             | 10                     | 1                | 300                    | -                      | -                      | -                      | -                      | 5 900                  |
| Other Transportation   | 42 000           | 20              | 400                    | 10               | 4 000                  | -                      | -                      | -                      | -                      | 46 000                 |
| Off-Road Gasoline  | 7 880            | 10              | 200                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 8 200                  |
| Off-Road Diesel  | 28 600           | 2               | 40                     | 10               | 4 000                  | -                      | -                      | -                      | -                      | 32 000                 |
| Pipeline Transport   | 5 470            | 5.5             | 140                    | 0.1              | 40                     | -                      | -                      | -                      | -                      | 5 650                  |
| <b>c. Fugitive Sources</b>   | <b>13 000</b>    | <b>1 700</b>    | <b>42 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>56 000</b>          |
| Coal Mining  | -                | 60              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 13 000           | 1 600           | 41 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 54 000                 |
| Oil  | 210              | 240             | 5 900                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 200                  |
| Natural Gas  | 70               | 480             | 12 000                 | -                | -                      | -                      | -                      | -                      | -                      | 12 000                 |
| Venting  | 8 400            | 900             | 22 000                 | -                | -                      | -                      | -                      | -                      | -                      | 31 000                 |
| Flaring  | 4 500            | 18              | 450                    | 0.03             | 7                      | -                      | -                      | -                      | -                      | 4 900                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>41 400</b>    | <b>2.7</b>      | <b>67</b>              | <b>4.56</b>      | <b>1 360</b>           | <b>5 900</b>           | <b>1 700</b>           | <b>400</b>             | <b>0.2</b>             | <b>50 900</b>          |
| <b>a. Mineral Products</b>   | <b>8 200</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>8 200</b>           |
| Cement Production  | 6 100            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 6 100                  |
| Lime Production  | 1 430            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 430                  |
| Mineral Product Use  | 670              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 670                    |
| <b>b. Chemical Industry</b>  | <b>2 900</b>     | <b>2.7</b>      | <b>67</b>              | <b>3.8</b>       | <b>1 100</b>           | -                      | -                      | -                      | -                      | <b>4 100</b>           |
| Ammonia Production   | 2 880            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 880                  |
| Nitric Acid Production   | -                | -               | -                      | 3.8              | 1 100                  | -                      | -                      | -                      | -                      | 1 100                  |
| Adipic Acid Production   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 2.7             | 67                     | 0.01             | 2.2                    | -                      | -                      | -                      | -                      | 69                     |
| <b>c. Metal Production</b>   | <b>14 900</b>    | -               | -                      | -                | -                      | -                      | <b>1 670</b>           | <b>256</b>             | -                      | <b>16 900</b>          |
| Iron and Steel Production  | 9 860            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 9 860                  |
| Aluminum Production  | 5 070            | -               | -                      | -                | -                      | -                      | 1 670                  | 73.2                   | -                      | 6 810                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 183                    | -                      | 183                    |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>5 900</b>           | <b>20</b>              | <b>140</b>             | <b>0.2</b>             | <b>6 100</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>15 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>15 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | <b>20</b>        | -               | -                      | <b>0.8</b>       | <b>240</b>             | -                      | -                      | -                      | -                      | <b>260</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 200</b>    | <b>29 000</b>          | <b>80</b>        | <b>30 000</b>          | -                      | -                      | -                      | -                      | <b>56 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 000</b>    | <b>25 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>150</b>      | <b>3 700</b>           | <b>15.9</b>      | <b>4 720</b>           | -                      | -                      | -                      | -                      | <b>8 400</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>69</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>20 000</b>          |
| Direct Sources   | -                | -               | -                      | 56               | 17 000                 | -                      | -                      | -                      | -                      | 17 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>0.9</b>      | <b>20</b>              | <b>0.02</b>      | <b>7</b>               | -                      | -                      | -                      | -                      | <b>30</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>460</b>       | <b>1 000</b>    | <b>25 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>990</b>      | <b>25 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>380</b>             | <b>2</b>         | <b>700</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>c. Waste Incineration</b>   | <b>460</b>       | <b>0.1</b>      | <b>3</b>               | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>640</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>63 000</b>    | <b>510</b>      | <b>13 000</b>          | <b>21</b>        | <b>6 400</b>           | -                      | -                      | -                      | -                      | <b>82 000</b>          |
| <b>a. Forest Land</b>  | <b>-87 000</b>   | <b>480</b>      | <b>12 000</b>          | <b>20</b>        | <b>6 100</b>           | -                      | -                      | -                      | -                      | <b>-69 000</b>         |
| <b>b. Cropland</b>   | <b>-8 200</b>    | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>-8 000</b>          |
| <b>c. Grassland</b>  | -                | <b>20</b>       | <b>500</b>             | <b>0.5</b>       | <b>100</b>             | -                      | -                      | -                      | -                      | <b>600</b>             |
| <b>d. Wetlands</b>   | <b>4 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>200</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>150 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>150 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-6 2010 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCS <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>556 000</b>   | <b>4 200</b>    | <b>100 000</b>         | <b>130</b>       | <b>38 000</b>          | <b>5 700</b>           | <b>1 900</b>           | <b>440</b>             | <b>0.2</b>             | <b>707 000</b>         |
| <b>ENERGY</b>  | <b>513 000</b>   | <b>2 000</b>    | <b>49 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>573 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>309 000</b>   | <b>300</b>      | <b>7 000</b>           | <b>9</b>         | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>318 000</b>         |
| Public Electricity and Heat Production   | 101 000          | 5.9             | 150                    | 2                | 600                    | -                      | -                      | -                      | -                      | 102 000                |
| Petroleum Refining Industries  | 18 000           | 0.2             | 6                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 18 000                 |
| Mining and Upstream Oil and Gas Production   | 77 500           | 74              | 1 900                  | 2                | 500                    | -                      | -                      | -                      | -                      | 79 800                 |
| Manufacturing Industries   | 40 700           | 2               | 60                     | 2                | 500                    | -                      | -                      | -                      | -                      | 41 300                 |
| Iron and Steel   | 4 400            | 0.2             | 5                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 4 450                  |
| Non Ferrous Metals   | 2 970            | 0.06            | 2                      | 0.05             | 10                     | -                      | -                      | -                      | -                      | 2 990                  |
| Chemical   | 9 850            | 0.19            | 4.8                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 9 910                  |
| Pulp and Paper   | 5 690            | 1               | 30                     | 0.9              | 300                    | -                      | -                      | -                      | -                      | 5 990                  |
| Cement   | 4 050            | 0.2             | 5                      | 0.05             | 10                     | -                      | -                      | -                      | -                      | 4 070                  |
| Other Manufacturing  | 13 700           | 0.61            | 15                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 13 900                 |
| Construction   | 1 500            | 0.03            | 0.65                   | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 510                  |
| Commercial and Institutional   | 28 000           | 0.53            | 13                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 28 200                 |
| Residential  | 38 800           | 200             | 5 000                  | 3                | 900                    | -                      | -                      | -                      | -                      | 44 700                 |
| Agriculture and Forestry   | 2 870            | 0.05            | 1.3                    | 0.08             | 23                     | -                      | -                      | -                      | -                      | 2 900                  |
| <b>b. Transport<sup>2</sup></b>  | <b>191 000</b>   | <b>30</b>       | <b>700</b>             | <b>30</b>        | <b>8 000</b>           | -                      | -                      | -                      | -                      | <b>200 000</b>         |
| Domestic Aviation  | 6 420            | 0.3             | 8                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 500                  |
| Road Transportation  | 132 000          | 10              | 300                    | 11               | 3 300                  | -                      | -                      | -                      | -                      | 135 000                |
| Light-Duty Gasoline Vehicles   | 39 100           | 3.6             | 90                     | 3.9              | 1 200                  | -                      | -                      | -                      | -                      | 40 400                 |
| Light-Duty Gasoline Trucks   | 42 000           | 3.9             | 97                     | 4.3              | 1 300                  | -                      | -                      | -                      | -                      | 43 300                 |
| Heavy-Duty Gasoline Vehicles   | 6 920            | 0.3             | 7.4                    | 0.56             | 170                    | -                      | -                      | -                      | -                      | 7 100                  |
| Motorcycles  | 271              | 0.11            | 2.7                    | 0.01             | 1.5                    | -                      | -                      | -                      | -                      | 275                    |
| Light-Duty Diesel Vehicles   | 738              | 0.01            | 0.4                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 756                    |
| Light-Duty Diesel Trucks   | 2 060            | 0.05            | 1                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 2 110                  |
| Heavy-Duty Diesel Vehicles   | 39 900           | 2               | 40                     | 2                | 700                    | -                      | -                      | -                      | -                      | 40 600                 |
| Propane and Natural Gas Vehicles   | 763              | 0.7             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 780                    |
| Railways   | 5 880            | 0.3             | 8                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 600                  |
| Domestic Navigation  | 6 700            | 0.5             | 10                     | 1                | 300                    | -                      | -                      | -                      | -                      | 7 000                  |
| Other Transportation   | 40 300           | 20              | 400                    | 10               | 3 000                  | -                      | -                      | -                      | -                      | 44 000                 |
| Off-Road Gasoline  | 7 770            | 10              | 200                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 8 100                  |
| Off-Road Diesel  | 27 000           | 1               | 40                     | 10               | 3 000                  | -                      | -                      | -                      | -                      | 30 000                 |
| Pipeline Transport   | 5 530            | 5.6             | 140                    | 0.2              | 40                     | -                      | -                      | -                      | -                      | 5 720                  |
| <b>c. Fugitive Sources</b>   | <b>13 000</b>    | <b>1 700</b>    | <b>41 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>55 000</b>          |
| Coal Mining  | -                | 60              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 13 000           | 1 600           | 40 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 53 000                 |
| Oil  | 220              | 230             | 5 800                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 000                  |
| Natural Gas  | 68               | 490             | 12 000                 | -                | -                      | -                      | -                      | -                      | -                      | 12 000                 |
| Venting  | 8 600            | 850             | 21 000                 | -                | -                      | -                      | -                      | -                      | -                      | 30 000                 |
| Flaring  | 4 200            | 17              | 440                    | 0.03             | 9                      | -                      | -                      | -                      | -                      | 4 700                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>41 300</b>    | <b>2.7</b>      | <b>66</b>              | <b>4.34</b>      | <b>1 290</b>           | <b>5 700</b>           | <b>1 900</b>           | <b>440</b>             | <b>.</b>               | <b>50 700</b>          |
| <b>a. Mineral Products</b>   | <b>8 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>8 000</b>           |
| Cement Production  | 6 000            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 6 000                  |
| Lime Production  | 1 370            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 370                  |
| Mineral Product Use  | 540              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 540                    |
| <b>b. Chemical Industry</b>  | <b>2 500</b>     | <b>2.7</b>      | <b>66</b>              | <b>3.6</b>       | <b>1 100</b>           | -                      | -                      | -                      | -                      | <b>3 600</b>           |
| Ammonia Production   | 2 490            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 490                  |
| Nitric Acid Production   | -                | -               | -                      | 3.6              | 1 100                  | -                      | -                      | -                      | -                      | 1 100                  |
| Adipic Acid Production   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 2.7             | 66                     | 0.01             | 2.1                    | -                      | -                      | -                      | -                      | 68                     |
| <b>c. Metal Production</b>   | <b>14 000</b>    | -               | -                      | -                | -                      | -                      | <b>1 850</b>           | <b>254</b>             | -                      | <b>16 100</b>          |
| Iron and Steel Production  | 9 030            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 9 030                  |
| Aluminum Production  | 4 950            | -               | -                      | -                | -                      | -                      | 1 850                  | 72.7                   | -                      | 6 870                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 182                    | -                      | 182                    |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>5 700</b>           | <b>12</b>              | <b>180</b>             | <b>0.2</b>             | <b>5 900</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>17 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>17 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | <b>9</b>         | -               | -                      | <b>0.78</b>      | <b>230</b>             | -                      | -                      | -                      | -                      | <b>240</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 200</b>    | <b>30 000</b>          | <b>90</b>        | <b>30 000</b>          | -                      | -                      | -                      | -                      | <b>57 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 000</b>    | <b>26 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>150</b>      | <b>3 700</b>           | <b>16.2</b>      | <b>4 820</b>           | -                      | -                      | -                      | -                      | <b>8 500</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>70</b>        | <b>21 000</b>          | -                      | -                      | -                      | -                      | <b>21 000</b>          |
| Direct Sources   | -                | -               | -                      | 56               | 17 000                 | -                      | -                      | -                      | -                      | 17 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>1</b>        | <b>30</b>              | <b>0.03</b>      | <b>8</b>               | -                      | -                      | -                      | -                      | <b>30</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>470</b>       | <b>1 000</b>    | <b>25 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>27 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>1 000</b>    | <b>25 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>380</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>c. Waste Incineration</b>   | <b>470</b>       | <b>0.1</b>      | <b>3</b>               | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>660</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>63 000</b>    | <b>500</b>      | <b>13 000</b>          | <b>21</b>        | <b>6 300</b>           | -                      | -                      | -                      | -                      | <b>81 000</b>          |
| <b>a. Forest Land</b>  | <b>-83 000</b>   | <b>480</b>      | <b>12 000</b>          | <b>20</b>        | <b>6 000</b>           | -                      | -                      | -                      | -                      | <b>-65 000</b>         |
| <b>b. Cropland</b>   | <b>-8 600</b>    | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>-8 400</b>          |
| <b>c. Grassland</b>  | -                | <b>10</b>       | <b>200</b>             | <b>0.3</b>       | <b>80</b>              | -                      | -                      | -                      | -                      | <b>300</b>             |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.5</b>      | <b>10</b>              | <b>0.02</b>      | <b>6</b>               | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>100</b>             | <b>0.2</b>       | <b>60</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>150 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>150 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-7 2009 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                           |                  |                           |                           |                           |                           |                           |                           |
|--|------------------|-----------------|---------------------------|------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>           | N <sub>2</sub> O | N <sub>2</sub> O          | HFCs <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>           | NF <sub>3</sub>           | TOTAL                     |
| Global Warming Potential<br>Unit   | kt               | kt              | kt CO <sub>2</sub><br>eq. | kt               | kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>545 000</b>   | <b>4 300</b>    | <b>110 000</b>            | <b>130</b>       | <b>38 000</b>             | <b>5 700</b>              | <b>2 500</b>              | <b>370</b>                | <b>0.2</b>                | <b>699 000</b>            |
| <b>ENERGY</b>  | <b>504 000</b>   | <b>2 000</b>    | <b>49 000</b>             | <b>30</b>        | <b>10 000</b>             | -                         | -                         | -                         | -                         | <b>563 000</b>            |
| <b>a. Stationary Combustion Sources</b>  | <b>308 000</b>   | <b>300</b>      | <b>7 000</b>              | <b>9</b>         | <b>3 000</b>              | -                         | -                         | -                         | -                         | <b>318 000</b>            |
| Public Electricity and Heat Production   | 99 300           | 5.2             | 130                       | 2                | 600                       | -                         | -                         | -                         | -                         | 100 000                   |
| Petroleum Refining Industries  | 19 000           | 0.3             | 7                         | 0.1              | 40                        | -                         | -                         | -                         | -                         | 19 000                    |
| Mining and Upstream Oil and Gas Production   | 75 400           | 76              | 1 900                     | 2                | 500                       | -                         | -                         | -                         | -                         | 77 800                    |
| Manufacturing Industries   | 39 900           | 2               | 60                        | 2                | 500                       | -                         | -                         | -                         | -                         | 40 500                    |
| Iron and Steel   | 4 250            | 0.2             | 5                         | 0.2              | 40                        | -                         | -                         | -                         | -                         | 4 300                     |
| Non Ferrous Metals   | 2 830            | 0.06            | 2                         | 0.04             | 10                        | -                         | -                         | -                         | -                         | 2 850                     |
| Chemical   | 8 820            | 0.18            | 4.4                       | 0.2              | 50                        | -                         | -                         | -                         | -                         | 8 870                     |
| Pulp and Paper   | 6 110            | 1               | 30                        | 0.9              | 300                       | -                         | -                         | -                         | -                         | 6 410                     |
| Cement   | 4 460            | 0.21            | 5.2                       | 0.05             | 20                        | -                         | -                         | -                         | -                         | 4 480                     |
| Other Manufacturing  | 13 400           | 0.56            | 14                        | 0.5              | 100                       | -                         | -                         | -                         | -                         | 13 500                    |
| Construction   | 1 210            | 0.02            | 0.53                      | 0.03             | 9                         | -                         | -                         | -                         | -                         | 1 220                     |
| Commercial and Institutional   | 29 400           | 0.56            | 14                        | 0.6              | 200                       | -                         | -                         | -                         | -                         | 29 600                    |
| Residential  | 41 500           | 200             | 5 000                     | 3                | 800                       | -                         | -                         | -                         | -                         | 47 100                    |
| Agriculture and Forestry   | 2 530            | 0.05            | 1.1                       | 0.07             | 21                        | -                         | -                         | -                         | -                         | 2 550                     |
| <b>b. Transport<sup>2</sup></b>  | <b>182 000</b>   | <b>30</b>       | <b>700</b>                | <b>20</b>        | <b>7 000</b>              | -                         | -                         | -                         | -                         | <b>190 000</b>            |
| Domestic Aviation  | 6 400            | 0.4             | 9                         | 0.2              | 60                        | -                         | -                         | -                         | -                         | 6 500                     |
| Road Transportation  | 129 000          | 10              | 300                       | 12               | 3 600                     | -                         | -                         | -                         | -                         | 133 000                   |
| Light-Duty Gasoline Vehicles   | 38 700           | 3.6             | 91                        | 4.3              | 1 300                     | -                         | -                         | -                         | -                         | 40 100                    |
| Light-Duty Gasoline Trucks   | 41 400           | 3.9             | 98                        | 4.9              | 1 400                     | -                         | -                         | -                         | -                         | 42 900                    |
| Heavy-Duty Gasoline Vehicles   | 6 820            | 0.3             | 7.6                       | 0.53             | 160                       | -                         | -                         | -                         | -                         | 6 990                     |
| Motorcycles  | 265              | 0.1             | 2.6                       | 0.0              | 1.5                       | -                         | -                         | -                         | -                         | 269                       |
| Light-Duty Diesel Vehicles   | 689              | 0.01            | 0.3                       | 0.06             | 20                        | -                         | -                         | -                         | -                         | 706                       |
| Light-Duty Diesel Trucks   | 2 000            | 0.05            | 1                         | 0.2              | 50                        | -                         | -                         | -                         | -                         | 2 050                     |
| Heavy-Duty Diesel Vehicles   | 38 700           | 2               | 40                        | 2                | 600                       | -                         | -                         | -                         | -                         | 39 400                    |
| Propane and Natural Gas Vehicles   | 767              | 0.7             | 20                        | 0.02             | 5                         | -                         | -                         | -                         | -                         | 790                       |
| Railways   | 4 550            | 0.3             | 6                         | 2                | 600                       | -                         | -                         | -                         | -                         | 5 100                     |
| Domestic Navigation  | 6 430            | 0.5             | 10                        | 1                | 300                       | -                         | -                         | -                         | -                         | 6 700                     |
| Other Transportation   | 35 300           | 20              | 400                       | 9                | 3 000                     | -                         | -                         | -                         | -                         | 38 000                    |
| Off-Road Gasoline  | 7 100            | 9               | 200                       | 0.2              | 50                        | -                         | -                         | -                         | -                         | 7 400                     |
| Off-Road Diesel  | 22 000           | 1               | 30                        | 9                | 3 000                     | -                         | -                         | -                         | -                         | 25 000                    |
| Pipeline Transport   | 6 160            | 6.2             | 150                       | 0.2              | 50                        | -                         | -                         | -                         | -                         | 6 360                     |
| <b>c. Fugitive Sources</b>   | <b>14 000</b>    | <b>1 700</b>    | <b>42 000</b>             | <b>0.1</b>       | <b>40</b>                 | -                         | -                         | -                         | -                         | <b>56 000</b>             |
| Coal Mining  | -                | 60              | 1 000                     | -                | -                         | -                         | -                         | -                         | -                         | 1 000                     |
| Oil and Natural Gas  | 14 000           | 1 600           | 41 000                    | 0.1              | 40                        | -                         | -                         | -                         | -                         | 54 000                    |
| Oil  | 210              | 230             | 5 700                     | 0.1              | 30                        | -                         | -                         | -                         | -                         | 5 900                     |
| Natural Gas  | 67               | 510             | 13 000                    | -                | -                         | -                         | -                         | -                         | -                         | 13 000                    |
| Venting  | 9 000            | 870             | 22 000                    | -                | -                         | -                         | -                         | -                         | -                         | 31 000                    |
| Flaring  | 4 400            | 18              | 460                       | 0.04             | 10                        | -                         | -                         | -                         | -                         | 4 900                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>0.09</b>               |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>38 500</b>    | <b>2.6</b>      | <b>66</b>                 | <b>6.69</b>      | <b>1 990</b>              | <b>5 700</b>              | <b>2 500</b>              | <b>370</b>                | <b>0.2</b>                | <b>49 100</b>             |
| <b>a. Mineral Products</b>   | <b>7 300</b>     | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>7 300</b>              |
| Cement Production  | 5 400            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 5 400                     |
| Lime Production  | 1 190            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 1 190                     |
| Mineral Product Use  | 720              | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 720                       |
| <b>b. Chemical Industry</b>  | <b>2 400</b>     | <b>2.6</b>      | <b>66</b>                 | <b>5.9</b>       | <b>1 700</b>              | -                         | -                         | -                         | -                         | <b>4 200</b>              |
| Ammonia Production   | 2 400            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 2 400                     |
| Nitric Acid Production   | -                | -               | -                         | 3.7              | 1 100                     | -                         | -                         | -                         | -                         | 1 100                     |
| Adipic Acid Production   | -                | -               | -                         | 2.1              | 640                       | -                         | -                         | -                         | -                         | 640                       |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 2.6             | 66                        | 0.01             | 1.9                       | -                         | -                         | -                         | -                         | 68                        |
| <b>c. Metal Production</b>   | <b>13 100</b>    | -               | -                         | -                | -                         | -                         | <b>2 500</b>              | <b>198</b>                | -                         | <b>15 700</b>             |
| Iron and Steel Production  | 8 030            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 8 030                     |
| Aluminum Production  | 5 030            | -               | -                         | -                | -                         | -                         | 2 500                     | 13.1                      | -                         | 7 540                     |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                         | -                | -                         | -                         | -                         | 184                       | -                         | 184                       |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                         | -                | -                         | <b>5 700</b>              | <b>11</b>                 | <b>180</b>                | <b>0.2</b>                | <b>5 800</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>16 000</b>    | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>16 000</b>             |
| <b>f. Other Product Manufacture and Use</b>  | <b>2</b>         | -               | -                         | <b>0.84</b>      | <b>250</b>                | -                         | -                         | -                         | -                         | <b>250</b>                |
| <b>AGRICULTURE</b>   | -                | <b>1 200</b>    | <b>31 000</b>             | <b>90</b>        | <b>30 000</b>             | -                         | -                         | -                         | -                         | <b>58 000</b>             |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 100</b>    | <b>27 000</b>             | -                | -                         | -                         | -                         | -                         | -                         | <b>27 000</b>             |
| <b>b. Manure Management</b>  | -                | <b>150</b>      | <b>3 700</b>              | <b>16.7</b>      | <b>4 970</b>              | -                         | -                         | -                         | -                         | <b>8 700</b>              |
| <b>c. Agriculture Soils</b>  | -                | -               | -                         | <b>68</b>        | <b>20 000</b>             | -                         | -                         | -                         | -                         | <b>20 000</b>             |
| Direct Sources   | -                | -               | -                         | 55               | 16 000                    | -                         | -                         | -                         | -                         | 16 000                    |
| Indirect Sources   | -                | -               | -                         | 10               | 4 000                     | -                         | -                         | -                         | -                         | 4 000                     |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>2</b>        | <b>40</b>                 | <b>0.04</b>      | <b>10</b>                 | -                         | -                         | -                         | -                         | <b>50</b>                 |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>2 000</b>              |
| <b>WASTE</b>   | <b>460</b>       | <b>1 100</b>    | <b>27 000</b>             | <b>3</b>         | <b>800</b>                | -                         | -                         | -                         | -                         | <b>28 000</b>             |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>1 100</b>    | <b>27 000</b>             | -                | -                         | -                         | -                         | -                         | -                         | <b>27 000</b>             |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>370</b>                | <b>2</b>         | <b>600</b>                | -                         | -                         | -                         | -                         | <b>1 000</b>              |
| <b>c. Waste Incineration</b>   | <b>460</b>       | <b>0.1</b>      | <b>3</b>                  | <b>0.6</b>       | <b>200</b>                | -                         | -                         | -                         | -                         | <b>640</b>                |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-18 000</b>   | <b>280</b>      | <b>7 000</b>              | <b>12</b>        | <b>3 500</b>              | -                         | -                         | -                         | -                         | <b>-7 900</b>             |
| <b>a. Forest Land</b>  | <b>-150 000</b>  | <b>260</b>      | <b>6 400</b>              | <b>11</b>        | <b>3 200</b>              | -                         | -                         | -                         | -                         | <b>-140 000</b>           |
| <b>b. Cropland</b>   | <b>-8 900</b>    | <b>5</b>        | <b>100</b>                | <b>0.2</b>       | <b>70</b>                 | -                         | -                         | -                         | -                         | <b>-8 700</b>             |
| <b>c. Grassland</b>  | -                | <b>10</b>       | <b>300</b>                | <b>0.3</b>       | <b>100</b>                | -                         | -                         | -                         | -                         | <b>400</b>                |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.6</b>      | <b>10</b>                 | <b>0.02</b>      | <b>7</b>                  | -                         | -                         | -                         | -                         | <b>4 000</b>              |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>100</b>                | <b>0.2</b>       | <b>70</b>                 | -                         | -                         | -                         | -                         | <b>4 000</b>              |
| <b>f. Harvested Wood Products</b>  | <b>130 000</b>   | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>130 000</b>            |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-8 2008 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCS <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>579 000</b>   | <b>4 400</b>    | <b>110 000</b>         | <b>140</b>       | <b>42 000</b>          | <b>5 500</b>           | <b>2 600</b>           | <b>640</b>             | <b>0.2</b>             | <b>741 000</b>         |
| <b>ENERGY</b>  | <b>533 000</b>   | <b>2 100</b>    | <b>52 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>596 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>330 000</b>   | <b>300</b>      | <b>7 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>340 000</b>         |
| Public Electricity and Heat Production   | 115 000          | 5.5             | 140                    | 2                | 700                    | -                      | -                      | -                      | -                      | 116 000                |
| Petroleum Refining Industries  | 19 500           | 0.3             | 7                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 20 000                 |
| Mining and Upstream Oil and Gas Production   | 73 800           | 81              | 2 000                  | 2                | 500                    | -                      | -                      | -                      | -                      | 76 300                 |
| Manufacturing Industries   | 44 600           | 3               | 70                     | 2                | 600                    | -                      | -                      | -                      | -                      | 45 200                 |
| Iron and Steel   | 5 720            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 5 790                  |
| Non Ferrous Metals   | 3 770            | 0.09            | 2                      | 0.06             | 20                     | -                      | -                      | -                      | -                      | 3 790                  |
| Chemical   | 8 740            | 0.17            | 4.3                    | 0.2              | 40                     | -                      | -                      | -                      | -                      | 8 790                  |
| Pulp and Paper   | 5 980            | 1               | 30                     | 0.9              | 300                    | -                      | -                      | -                      | -                      | 6 290                  |
| Cement   | 4 870            | 0.23            | 5.8                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 4 900                  |
| Other Manufacturing  | 15 500           | 0.63            | 16                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 15 700                 |
| Construction   | 1 370            | 0.02            | 0.59                   | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 380                  |
| Commercial and Institutional   | 29 600           | 0.56            | 14                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 29 800                 |
| Residential  | 43 400           | 200             | 5 000                  | 3                | 900                    | -                      | -                      | -                      | -                      | 49 200                 |
| Agriculture and Forestry   | 2 610            | 0.05            | 1.1                    | 0.07             | 22                     | -                      | -                      | -                      | -                      | 2 630                  |
| <b>b. Transport<sup>2</sup></b>  | <b>188 000</b>   | <b>30</b>       | <b>700</b>             | <b>30</b>        | <b>8 000</b>           | -                      | -                      | -                      | -                      | <b>197 000</b>         |
| Domestic Aviation  | 7 270            | 0.4             | 9                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 7 300                  |
| Road Transportation  | 129 000          | 10              | 300                    | 13               | 3 900                  | -                      | -                      | -                      | -                      | 133 000                |
| Light-Duty Gasoline Vehicles   | 38 300           | 3.7             | 93                     | 4.8              | 1 400                  | -                      | -                      | -                      | -                      | 39 900                 |
| Light-Duty Gasoline Trucks   | 40 900           | 4               | 99                     | 5.5              | 1 700                  | -                      | -                      | -                      | -                      | 42 700                 |
| Heavy-Duty Gasoline Vehicles   | 6 710            | 0.33            | 8.3                    | 0.52             | 150                    | -                      | -                      | -                      | -                      | 6 870                  |
| Motorcycles  | 262              | 0.1             | 2.6                    | 0.0              | 1.4                    | -                      | -                      | -                      | -                      | 266                    |
| Light-Duty Diesel Vehicles   | 642              | 0.01            | 0.3                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 657                    |
| Light-Duty Diesel Trucks   | 1 990            | 0.05            | 1                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 2 030                  |
| Heavy-Duty Diesel Vehicles   | 38 900           | 2               | 40                     | 2                | 600                    | -                      | -                      | -                      | -                      | 39 500                 |
| Propane and Natural Gas Vehicles   | 860              | 0.8             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 880                    |
| Railways   | 7 040            | 0.4             | 10                     | 3                | 900                    | -                      | -                      | -                      | -                      | 7 900                  |
| Domestic Navigation  | 6 220            | 0.5             | 10                     | 1                | 300                    | -                      | -                      | -                      | -                      | 6 600                  |
| Other Transportation   | 39 200           | 20              | 400                    | 10               | 3 000                  | -                      | -                      | -                      | -                      | 43 000                 |
| Off-Road Gasoline  | 7 140            | 9               | 200                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 7 400                  |
| Off-Road Diesel  | 24 700           | 1               | 30                     | 10               | 3 000                  | -                      | -                      | -                      | -                      | 28 000                 |
| Pipeline Transport   | 7 280            | 7.3             | 180                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 7 520                  |
| <b>c. Fugitive Sources</b>   | <b>15 000</b>    | <b>1 800</b>    | <b>44 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>59 000</b>          |
| Coal Mining  | -                | 60              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 15 000           | 1 700           | 43 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 57 000                 |
| Oil  | 210              | 230             | 5 800                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 000                  |
| Natural Gas  | 66               | 520             | 13 000                 | -                | -                      | -                      | -                      | -                      | -                      | 13 000                 |
| Venting  | 9 800            | 930             | 23 000                 | -                | -                      | -                      | -                      | -                      | -                      | 33 000                 |
| Flaring  | 4 700            | 22              | 540                    | 0.02             | 6                      | -                      | -                      | -                      | -                      | 5 200                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>44 300</b>    | <b>3.1</b>      | <b>77</b>              | <b>13</b>        | <b>3 880</b>           | <b>5 500</b>           | <b>2 600</b>           | <b>640</b>             | <b>0.2</b>             | <b>57 000</b>          |
| <b>a. Mineral Products</b>   | <b>9 400</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>9 400</b>           |
| Cement Production  | 7 000            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 7 000                  |
| Lime Production  | 1 540            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 540                  |
| Mineral Product Use  | 890              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 890                    |
| <b>b. Chemical Industry</b>  | <b>2 800</b>     | <b>3.1</b>      | <b>77</b>              | <b>12</b>        | <b>3 500</b>           | -                      | -                      | -                      | -                      | <b>6 400</b>           |
| Ammonia Production   | 2 810            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 810                  |
| Nitric Acid Production   | -                | -               | -                      | 4.1              | 1 200                  | -                      | -                      | -                      | -                      | 1 200                  |
| Adipic Acid Production   | -                | -               | -                      | 7.8              | 2 300                  | -                      | -                      | -                      | -                      | 2 300                  |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 3.1             | 77                     | 0.01             | 2                      | -                      | -                      | -                      | -                      | 79                     |
| <b>c. Metal Production</b>   | <b>15 800</b>    | -               | -                      | -                | -                      | <b>2 590</b>           | <b>438</b>             | -                      | -                      | <b>18 900</b>          |
| Iron and Steel Production  | 10 700           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 10 700                 |
| Aluminum Production  | 5 170            | -               | -                      | -                | -                      | 2 590                  | 3.57                   | -                      | -                      | 7 760                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | 435                    | -                      | -                      | 435                    |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>5 500</b>           | <b>13</b>              | <b>210</b>             | <b>0.2</b>             | <b>5 700</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>16 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>16 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | <b>0.0</b>       | -               | -                      | <b>1.1</b>       | <b>330</b>             | -                      | -                      | -                      | -                      | <b>330</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 300</b>    | <b>32 000</b>          | <b>90</b>        | <b>30 000</b>          | -                      | -                      | -                      | -                      | <b>61 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 100</b>    | <b>29 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>29 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>150</b>      | <b>3 800</b>           | <b>17.5</b>      | <b>5 210</b>           | -                      | -                      | -                      | -                      | <b>9 100</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>71</b>        | <b>21 000</b>          | -                      | -                      | -                      | -                      | <b>21 000</b>          |
| Direct Sources   | -                | -               | -                      | 57               | 17 000                 | -                      | -                      | -                      | -                      | 17 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>2</b>        | <b>40</b>              | <b>0.04</b>      | <b>10</b>              | -                      | -                      | -                      | -                      | <b>50</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>480</b>       | <b>1 100</b>    | <b>27 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>28 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>1 100</b>    | <b>26 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>370</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>c. Waste Incineration</b>   | <b>480</b>       | <b>0.1</b>      | <b>3</b>               | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>670</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-24 000</b>   | <b>210</b>      | <b>5 200</b>           | <b>8.5</b>       | <b>2 500</b>           | -                      | -                      | -                      | -                      | <b>-16 000</b>         |
| <b>a. Forest Land</b>  | <b>-160 000</b>  | <b>180</b>      | <b>4 500</b>           | <b>7.6</b>       | <b>2 300</b>           | -                      | -                      | -                      | -                      | <b>-160 000</b>        |
| <b>b. Cropland</b>   | <b>-9 300</b>    | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>-9 100</b>          |
| <b>c. Grassland</b>  | -                | <b>10</b>       | <b>400</b>             | <b>0.4</b>       | <b>100</b>             | -                      | -                      | -                      | -                      | <b>500</b>             |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.5</b>      | <b>10</b>              | <b>0.02</b>      | <b>7</b>               | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>200</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>5 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>140 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>140 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-9 2007 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                 |                 |                                 |                  |                                  |                           |                           |                                     |                                     |                           |
|--|----------------------------------|-----------------|---------------------------------|------------------|----------------------------------|---------------------------|---------------------------|-------------------------------------|-------------------------------------|---------------------------|
|  | CO <sub>2</sub>                  | CH <sub>4</sub> | CH <sub>4</sub>                 | N <sub>2</sub> O | N <sub>2</sub> O                 | HFCs <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>                     | NF <sub>3</sub>                     | TOTAL                     |
|  | Global Warming Potential<br>Unit |                 |                                 |                  |                                  |                           |                           |                                     |                                     |                           |
|  | kt                               | kt              | 25<br>kt CO <sub>2</sub><br>eq. | kt               | 298<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | 22 800<br>kt CO <sub>2</sub><br>eq. | 17 200<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>598 000</b>                   | <b>4 600</b>    | <b>110 000</b>                  | <b>140</b>       | <b>40 000</b>                    | <b>5 400</b>              | <b>2 500</b>              | <b>730</b>                          | <b>0.2</b>                          | <b>761 000</b>            |
| <b>ENERGY</b>  | <b>549 000</b>                   | <b>2 100</b>    | <b>53 000</b>                   | <b>40</b>        | <b>10 000</b>                    | -                         | -                         | -                                   | -                                   | <b>614 000</b>            |
| <b>a. Stationary Combustion Sources</b>  | <b>346 000</b>                   | <b>300</b>      | <b>7 000</b>                    | <b>10</b>        | <b>3 000</b>                     | -                         | -                         | -                                   | -                                   | <b>356 000</b>            |
| Public Electricity and Heat Production   | 123 000                          | 5.4             | 140                             | 2                | 700                              | -                         | -                         | -                                   | -                                   | 123 000                   |
| Petroleum Refining Industries  | 20 600                           | 0.3             | 7                               | 0.1              | 40                               | -                         | -                         | -                                   | -                                   | 21 000                    |
| Mining and Upstream Oil and Gas Production   | 77 200                           | 88              | 2 200                           | 2                | 500                              | -                         | -                         | -                                   | -                                   | 79 900                    |
| Manufacturing Industries   | 47 100                           | 3               | 70                              | 2                | 600                              | -                         | -                         | -                                   | -                                   | 47 800                    |
| Iron and Steel   | 5 950                            | 0.3             | 7                               | 0.2              | 60                               | -                         | -                         | -                                   | -                                   | 6 020                     |
| Non Ferrous Metals   | 3 790                            | 0.09            | 2                               | 0.06             | 20                               | -                         | -                         | -                                   | -                                   | 3 810                     |
| Chemical   | 8 660                            | 0.17            | 4.3                             | 0.1              | 40                               | -                         | -                         | -                                   | -                                   | 8 710                     |
| Pulp and Paper   | 7 400                            | 1               | 30                              | 1                | 300                              | -                         | -                         | -                                   | -                                   | 7 750                     |
| Cement   | 5 010                            | 0.24            | 5.9                             | 0.06             | 20                               | -                         | -                         | -                                   | -                                   | 5 040                     |
| Other Manufacturing  | 16 300                           | 0.7             | 17                              | 0.6              | 200                              | -                         | -                         | -                                   | -                                   | 16 400                    |
| Construction   | 1 390                            | 0.02            | 0.6                             | 0.03             | 10                               | -                         | -                         | -                                   | -                                   | 1 400                     |
| Commercial and Institutional   | 30 200                           | 0.59            | 15                              | 0.7              | 200                              | -                         | -                         | -                                   | -                                   | 30 400                    |
| Residential  | 44 100                           | 200             | 5 000                           | 3                | 800                              | -                         | -                         | -                                   | -                                   | 49 800                    |
| Agriculture and Forestry   | 2 600                            | 0.05            | 1.1                             | 0.07             | 21                               | -                         | -                         | -                                   | -                                   | 2 630                     |
| <b>b. Transport<sup>2</sup></b>  | <b>189 000</b>                   | <b>30</b>       | <b>800</b>                      | <b>30</b>        | <b>9 000</b>                     | -                         | -                         | -                                   | -                                   | <b>198 000</b>            |
| Domestic Aviation  | 7 680                            | 0.3             | 9                               | 0.2              | 70                               | -                         | -                         | -                                   | -                                   | 7 800                     |
| Road Transportation  | 129 000                          | 10              | 300                             | 15               | 4 400                            | -                         | -                         | -                                   | -                                   | 134 000                   |
| Light-Duty Gasoline Vehicles   | 38 600                           | 3.9             | 97                              | 5.5              | 1 600                            | -                         | -                         | -                                   | -                                   | 40 400                    |
| Light-Duty Gasoline Trucks   | 41 100                           | 4.1             | 100                             | 6.4              | 1 900                            | -                         | -                         | -                                   | -                                   | 43 100                    |
| Heavy-Duty Gasoline Vehicles   | 6 660                            | 0.35            | 8.7                             | 0.51             | 150                              | -                         | -                         | -                                   | -                                   | 6 820                     |
| Motorcycles  | 261                              | 0.1             | 2.6                             | 0.0              | 1.4                              | -                         | -                         | -                                   | -                                   | 265                       |
| Light-Duty Diesel Vehicles   | 607                              | 0.01            | 0.3                             | 0.05             | 10                               | -                         | -                         | -                                   | -                                   | 622                       |
| Light-Duty Diesel Trucks   | 1 980                            | 0.05            | 1                               | 0.2              | 50                               | -                         | -                         | -                                   | -                                   | 2 030                     |
| Heavy-Duty Diesel Vehicles   | 39 300                           | 2               | 40                              | 2                | 600                              | -                         | -                         | -                                   | -                                   | 39 900                    |
| Propane and Natural Gas Vehicles   | 815                              | 0.7             | 20                              | 0.02             | 5                                | -                         | -                         | -                                   | -                                   | 840                       |
| Railways   | 6 640                            | 0.4             | 9                               | 3                | 800                              | -                         | -                         | -                                   | -                                   | 7 500                     |
| Domestic Navigation  | 6 440                            | 0.5             | 10                              | 1                | 400                              | -                         | -                         | -                                   | -                                   | 6 800                     |
| Other Transportation   | 38 700                           | 20              | 500                             | 10               | 3 000                            | -                         | -                         | -                                   | -                                   | 42 000                    |
| Off-Road Gasoline  | 7 830                            | 9               | 200                             | 0.2              | 50                               | -                         | -                         | -                                   | -                                   | 8 100                     |
| Off-Road Diesel  | 22 700                           | 1               | 30                              | 9                | 3 000                            | -                         | -                         | -                                   | -                                   | 26 000                    |
| Pipeline Transport   | 8 180                            | 8.2             | 200                             | 0.2              | 70                               | -                         | -                         | -                                   | -                                   | 8 450                     |
| <b>c. Fugitive Sources</b>   | <b>15 000</b>                    | <b>1 800</b>    | <b>45 000</b>                   | <b>0.1</b>       | <b>40</b>                        | -                         | -                         | -                                   | -                                   | <b>60 000</b>             |
| Coal Mining  | -                                | 60              | 2 000                           | -                | -                                | -                         | -                         | -                                   | -                                   | 2 000                     |
| Oil and Natural Gas  | 15 000                           | 1 700           | 44 000                          | 0.1              | 40                               | -                         | -                         | -                                   | -                                   | 58 000                    |
| Oil  | 220                              | 250             | 6 100                           | 0.1              | 30                               | -                         | -                         | -                                   | -                                   | 6 400                     |
| Natural Gas  | 63                               | 530             | 13 000                          | -                | -                                | -                         | -                         | -                                   | -                                   | 13 000                    |
| Venting  | 9 500                            | 950             | 24 000                          | -                | -                                | -                         | -                         | -                                   | -                                   | 33 000                    |
| Flaring  | 4 900                            | 20              | 510                             | 0.02             | 5                                | -                         | -                         | -                                   | -                                   | 5 400                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>                      | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>0.09</b>               |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>46 500</b>                    | <b>3.4</b>      | <b>84</b>                       | <b>9.53</b>      | <b>2 840</b>                     | <b>5 400</b>              | <b>2 500</b>              | <b>730</b>                          | -                                   | <b>58 100</b>             |
| <b>a. Mineral Products</b>   | <b>10 000</b>                    | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>10 000</b>             |
| Cement Production  | 7 800                            | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 7 800                     |
| Lime Production  | 1 590                            | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 1 590                     |
| Mineral Product Use  | 850                              | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 850                       |
| <b>b. Chemical Industry</b>  | <b>2 600</b>                     | <b>3.4</b>      | <b>84</b>                       | <b>8.5</b>       | <b>2 500</b>                     | -                         | -                         | -                                   | -                                   | <b>5 200</b>              |
| Ammonia Production   | 2 570                            | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 2 570                     |
| Nitric Acid Production   | -                                | -               | -                               | 3.7              | 1 100                            | -                         | -                         | -                                   | -                                   | 1 100                     |
| Adipic Acid Production   | -                                | -               | -                               | 4.8              | 1 400                            | -                         | -                         | -                                   | -                                   | 1 400                     |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                | 3.4             | 84                              | 0.01             | 2                                | -                         | -                         | -                                   | -                                   | 86                        |
| <b>c. Metal Production</b>   | <b>16 200</b>                    | -               | -                               | -                | -                                | -                         | <b>2 520</b>              | <b>501</b>                          | -                                   | <b>19 200</b>             |
| Iron and Steel Production  | 11 100                           | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 11 100                    |
| Aluminum Production  | 5 100                            | -               | -                               | -                | -                                | -                         | 2 520                     | 11.9                                | -                                   | 7 630                     |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                | -               | -                               | -                | -                                | -                         | -                         | 489                                 | -                                   | 489                       |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                                | -               | -                               | -                | -                                | <b>5 400</b>              | <b>11</b>                 | <b>230</b>                          | <b>0.2</b>                          | <b>5 700</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>18 000</b>                    | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>18 000</b>             |
| <b>f. Other Product Manufacture and Use</b>  | -                                | -               | -                               | <b>1.1</b>       | <b>310</b>                       | -                         | -                         | -                                   | -                                   | <b>310</b>                |
| <b>AGRICULTURE</b>   | -                                | <b>1 300</b>    | <b>33 000</b>                   | <b>80</b>        | <b>30 000</b>                    | -                         | -                         | -                                   | -                                   | <b>60 000</b>             |
| <b>a. Enteric Fermentation</b>   | -                                | <b>1 200</b>    | <b>29 000</b>                   | -                | -                                | -                         | -                         | -                                   | -                                   | <b>29 000</b>             |
| <b>b. Manure Management</b>  | -                                | <b>160</b>      | <b>4 000</b>                    | <b>18</b>        | <b>5 360</b>                     | -                         | -                         | -                                   | -                                   | <b>9 400</b>              |
| <b>c. Agriculture Soils</b>  | -                                | -               | -                               | <b>66</b>        | <b>20 000</b>                    | -                         | -                         | -                                   | -                                   | <b>20 000</b>             |
| Direct Sources   | -                                | -               | -                               | 53               | 16 000                           | -                         | -                         | -                                   | -                                   | 16 000                    |
| Indirect Sources   | -                                | -               | -                               | 10               | 4 000                            | -                         | -                         | -                                   | -                                   | 4 000                     |
| <b>d. Field Burning of Agricultural Residues</b>   | -                                | <b>1</b>        | <b>30</b>                       | <b>0.03</b>      | <b>9</b>                         | -                         | -                         | -                                   | -                                   | <b>40</b>                 |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>                     | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>2 000</b>              |
| <b>WASTE</b>   | <b>460</b>                       | <b>1 100</b>    | <b>27 000</b>                   | <b>3</b>         | <b>800</b>                       | -                         | -                         | -                                   | -                                   | <b>28 000</b>             |
| <b>a. Solid Waste Disposal on Land</b>   | -                                | <b>1 100</b>    | <b>27 000</b>                   | -                | -                                | -                         | -                         | -                                   | -                                   | <b>27 000</b>             |
| <b>b. Wastewater Handling</b>  | -                                | <b>14</b>       | <b>360</b>                      | <b>2</b>         | <b>600</b>                       | -                         | -                         | -                                   | -                                   | <b>1 000</b>              |
| <b>c. Waste Incineration</b>   | <b>460</b>                       | <b>0.1</b>      | <b>2</b>                        | <b>0.6</b>       | <b>200</b>                       | -                         | -                         | -                                   | -                                   | <b>640</b>                |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>19 000</b>                    | <b>340</b>      | <b>8 500</b>                    | <b>14</b>        | <b>4 200</b>                     | -                         | -                         | -                                   | -                                   | <b>31 000</b>             |
| <b>a. Forest Land</b>  | <b>-120 000</b>                  | <b>310</b>      | <b>7 800</b>                    | <b>13</b>        | <b>3 900</b>                     | -                         | -                         | -                                   | -                                   | <b>-110 000</b>           |
| <b>b. Cropland</b>   | <b>-9 400</b>                    | <b>5</b>        | <b>100</b>                      | <b>0.3</b>       | <b>80</b>                        | -                         | -                         | -                                   | -                                   | <b>-9 200</b>             |
| <b>c. Grassland</b>  | -                                | <b>10</b>       | <b>300</b>                      | <b>0.3</b>       | <b>100</b>                       | -                         | -                         | -                                   | -                                   | <b>400</b>                |
| <b>d. Wetlands</b>   | <b>4 000</b>                     | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>4 000</b>              |
| <b>e. Settlements</b>  | <b>4 000</b>                     | <b>7</b>        | <b>200</b>                      | <b>0.3</b>       | <b>80</b>                        | -                         | -                         | -                                   | -                                   | <b>5 000</b>              |
| <b>f. Harvested Wood Products</b>  | <b>140 000</b>                   | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>140 000</b>            |

## Notes:

1. National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.

2. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

3. The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.4. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

5. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A9-10 2006 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCS <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>575 000</b>   | <b>4 600</b>    | <b>120 000</b>         | <b>130</b>       | <b>298</b>             | <b>5 400</b>           | <b>3 000</b>           | <b>1 500</b>           | <b>0.2</b>             | <b>740 000</b>         |
| <b>ENERGY</b>  | <b>526 000</b>   | <b>2 200</b>    | <b>54 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>591 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>325 000</b>   | <b>300</b>      | <b>7 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>335 000</b>         |
| Public Electricity and Heat Production   | 118 000          | 5.7             | 140                    | 2                | 700                    | -                      | -                      | -                      | -                      | 118 000                |
| Petroleum Refining Industries  | 20 400           | 0.3             | 8                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 20 000                 |
| Mining and Upstream Oil and Gas Production   | 68 800           | 84              | 2 100                  | 2                | 500                    | -                      | -                      | -                      | -                      | 71 400                 |
| Manufacturing Industries   | 45 900           | 3               | 70                     | 2                | 600                    | -                      | -                      | -                      | -                      | 46 700                 |
| Iron and Steel   | 5 500            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 5 560                  |
| Non Ferrous Metals   | 3 430            | 0.07            | 2                      | 0.05             | 10                     | -                      | -                      | -                      | -                      | 3 450                  |
| Chemical   | 8 820            | 0.18            | 4.4                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 8 870                  |
| Pulp and Paper   | 7 120            | 1               | 40                     | 1                | 300                    | -                      | -                      | -                      | -                      | 7 490                  |
| Cement   | 5 720            | 0.22            | 5.5                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 5 740                  |
| Other Manufacturing  | 15 400           | 0.67            | 17                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 15 500                 |
| Construction   | 1 390            | 0.02            | 0.6                    | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 400                  |
| Commercial and Institutional   | 29 100           | 0.54            | 14                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 29 300                 |
| Residential  | 39 900           | 200             | 5 000                  | 3                | 800                    | -                      | -                      | -                      | -                      | 45 600                 |
| Agriculture and Forestry   | 2 050            | 0.04            | 0.87                   | 0.06             | 17                     | -                      | -                      | -                      | -                      | 2 070                  |
| <b>b. Transport<sup>2</sup></b>  | <b>185 000</b>   | <b>30</b>       | <b>800</b>             | <b>30</b>        | <b>9 000</b>           | -                      | -                      | -                      | -                      | <b>195 000</b>         |
| Domestic Aviation  | 7 750            | 0.3             | 8                      | 0.2              | 70                     | -                      | -                      | -                      | -                      | 7 800                  |
| Road Transportation  | 128 000          | 10              | 300                    | 16               | 4 700                  | -                      | -                      | -                      | -                      | 133 000                |
| Light-Duty Gasoline Vehicles   | 38 700           | 4               | 99                     | 6                | 1 800                  | -                      | -                      | -                      | -                      | 40 600                 |
| Light-Duty Gasoline Trucks   | 41 100           | 4.1             | 100                    | 7                | 2 100                  | -                      | -                      | -                      | -                      | 43 300                 |
| Heavy-Duty Gasoline Vehicles   | 6 580            | 0.35            | 8.8                    | 0.48             | 140                    | -                      | -                      | -                      | -                      | 6 730                  |
| Motorcycles  | 258              | 0.11            | 2.7                    | 0.0              | 1.4                    | -                      | -                      | -                      | -                      | 262                    |
| Light-Duty Diesel Vehicles   | 571              | 0.01            | 0.3                    | 0.05             | 10                     | -                      | -                      | -                      | -                      | 585                    |
| Light-Duty Diesel Trucks   | 1 930            | 0.05            | 1                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 1 980                  |
| Heavy-Duty Diesel Vehicles   | 38 200           | 2               | 40                     | 2                | 600                    | -                      | -                      | -                      | -                      | 38 900                 |
| Propane and Natural Gas Vehicles   | 773              | 0.7             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 800                    |
| Railways   | 6 200            | 0.3             | 8                      | 3                | 800                    | -                      | -                      | -                      | -                      | 7 000                  |
| Domestic Navigation  | 5 830            | 0.4             | 10                     | 1                | 400                    | -                      | -                      | -                      | -                      | 6 200                  |
| Other Transportation   | 37 400           | 20              | 500                    | 9                | 3 000                  | -                      | -                      | -                      | -                      | 40 000                 |
| Off-Road Gasoline  | 7 430            | 9               | 200                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 7 700                  |
| Off-Road Diesel  | 20 500           | 1               | 30                     | 8                | 3 000                  | -                      | -                      | -                      | -                      | 23 000                 |
| Pipeline Transport   | 9 390            | 9.4             | 230                    | 0.3              | 70                     | -                      | -                      | -                      | -                      | 9 700                  |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>    | <b>1 800</b>    | <b>46 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>62 000</b>          |
| Coal Mining  | -                | 60              | 1 000                  | -                | -                      | -                      | -                      | -                      | -                      | 1 000                  |
| Oil and Natural Gas  | 16 000           | 1 800           | 44 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 60 000                 |
| Oil  | 190              | 250             | 6 200                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 400                  |
| Natural Gas  | 61               | 540             | 13 000                 | -                | -                      | -                      | -                      | -                      | -                      | 14 000                 |
| Venting  | 9 900            | 970             | 24 000                 | -                | -                      | -                      | -                      | -                      | -                      | 34 000                 |
| Flaring  | 5 500            | 23              | 580                    | 0.02             | 5                      | -                      | -                      | -                      | -                      | 6 100                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>46 900</b>    | <b>3.4</b>      | <b>84</b>              | <b>8.96</b>      | <b>2 670</b>           | <b>5 400</b>           | <b>3 000</b>           | <b>1 500</b>           | -                      | <b>59 500</b>          |
| <b>a. Mineral Products</b>   | <b>10 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>10 000</b>          |
| Cement Production  | 7 700            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 7 700                  |
| Lime Production  | 1 630            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 630                  |
| Mineral Product Use  | 970              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 970                    |
| <b>b. Chemical Industry</b>  | <b>2 800</b>     | <b>3.4</b>      | <b>84</b>              | <b>7.9</b>       | <b>2 400</b>           | -                      | -                      | -                      | -                      | <b>5 200</b>           |
| Ammonia Production   | 2 780            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 780                  |
| Nitric Acid Production   | -                | -               | -                      | 4                | 1 200                  | -                      | -                      | -                      | -                      | 1 200                  |
| Adipic Acid Production   | -                | -               | -                      | 3.9              | 1 200                  | -                      | -                      | -                      | -                      | 1 200                  |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 3.4             | 84                     | 0.01             | 4.1                    | -                      | -                      | -                      | -                      | 88                     |
| <b>c. Metal Production</b>   | <b>16 300</b>    | -               | -                      | -                | -                      | -                      | <b>2 980</b>           | <b>1 350</b>           | -                      | <b>20 600</b>          |
| Iron and Steel Production  | 11 200           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 11 200                 |
| Aluminum Production  | 5 090            | -               | -                      | -                | -                      | -                      | 2 980                  | 12.5                   | -                      | 8 080                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 1 340                  | -                      | 1 340                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>5 400</b>           | <b>10</b>              | <b>180</b>             | <b>0.2</b>             | <b>5 500</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>17 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>17 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>1.1</b>       | <b>320</b>             | -                      | -                      | -                      | -                      | <b>320</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 400</b>    | <b>35 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>61 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 200</b>    | <b>30 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>30 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>170</b>      | <b>4 300</b>           | <b>18.5</b>      | <b>5 510</b>           | -                      | -                      | -                      | -                      | <b>9 800</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>63</b>        | <b>19 000</b>          | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| Direct Sources   | -                | -               | -                      | 51               | 15 000                 | -                      | -                      | -                      | -                      | 15 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>2</b>        | <b>40</b>              | <b>0.04</b>      | <b>10</b>              | -                      | -                      | -                      | -                      | <b>50</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>WASTE</b>   | <b>480</b>       | <b>1 100</b>    | <b>27 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>29 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>1 100</b>    | <b>27 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>27 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>14</b>       | <b>360</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>990</b>             |
| <b>c. Waste Incineration</b>   | <b>480</b>       | <b>0.09</b>     | <b>2</b>               | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>670</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>27 000</b>    | <b>390</b>      | <b>9 800</b>           | <b>16</b>        | <b>4 800</b>           | -                      | -                      | -                      | -                      | <b>42 000</b>          |
| <b>a. Forest Land</b>  | <b>-120 000</b>  | <b>350</b>      | <b>8 600</b>           | <b>15</b>        | <b>4 300</b>           | -                      | -                      | -                      | -                      | <b>-100 000</b>        |
| <b>b. Cropland</b>   | <b>-9 800</b>    | <b>5</b>        | <b>100</b>             | <b>0.3</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>-9 600</b>          |
| <b>c. Grassland</b>  | -                | <b>40</b>       | <b>900</b>             | <b>0.9</b>       | <b>300</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.1</b>      | <b>4</b>               | <b>0.01</b>      | <b>2</b>               | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>7</b>        | <b>200</b>             | <b>0.3</b>       | <b>80</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>150 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>150 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9–11 2005 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                        |                 |                                 |                  |                                  |                           |                           |                                     |                                     |                           |
|--|---|-----------------|---------------------------------|------------------|----------------------------------|---------------------------|---------------------------|-------------------------------------|-------------------------------------|---------------------------|
|  | CO <sub>2</sub>                         | CH <sub>4</sub> | CH <sub>4</sub>                 | N <sub>2</sub> O | N <sub>2</sub> O                 | HFCs <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>                     | NF <sub>3</sub>                     | TOTAL                     |
|  | Global Warming Potential<br><i>Unit</i> |                 |                                 |                  |                                  |                           |                           |                                     |                                     |                           |
|  | kt                                      | kt              | 25<br>kt CO <sub>2</sub><br>eq. | kt               | 298<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | 22 800<br>kt CO <sub>2</sub><br>eq. | 17 200<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>580 000</b>                          | <b>4 700</b>    | <b>120 000</b>                  | <b>140</b>       | <b>41 000</b>                    | <b>5 300</b>              | <b>3 800</b>              | <b>1 400</b>                        | <b>0.2</b>                          | <b>749 000</b>            |
| <b>ENERGY</b>  | <b>534 000</b>                          | <b>2 200</b>    | <b>54 000</b>                   | <b>40</b>        | <b>10 000</b>                    | -                         | -                         | -                                   | -                                   | <b>601 000</b>            |
| <b>a. Stationary Combustion Sources</b>  | <b>334 000</b>                          | <b>300</b>      | <b>7 000</b>                    | <b>10</b>        | <b>3 000</b>                     | -                         | -                         | -                                   | -                                   | <b>344 000</b>            |
| Public Electricity and Heat Production   | 123 000                                 | 5.6             | 140                             | 3                | 700                              | -                         | -                         | -                                   | -                                   | 124 000                   |
| Petroleum Refining Industries  | 20 200                                  | 0.3             | 9                               | 0.2              | 50                               | -                         | -                         | -                                   | -                                   | 20 000                    |
| Mining and Upstream Oil and Gas Production   | 65 200                                  | 84              | 2 100                           | 2                | 500                              | -                         | -                         | -                                   | -                                   | 67 800                    |
| Manufacturing Industries   | 48 000                                  | 3               | 70                              | 2                | 700                              | -                         | -                         | -                                   | -                                   | 48 700                    |
| Iron and Steel   | 5 500                                   | 0.3             | 6                               | 0.2              | 60                               | -                         | -                         | -                                   | -                                   | 5 570                     |
| Non Ferrous Metals   | 3 600                                   | 0.08            | 2                               | 0.05             | 20                               | -                         | -                         | -                                   | -                                   | 3 620                     |
| Chemical   | 8 280                                   | 0.17            | 4.2                             | 0.1              | 40                               | -                         | -                         | -                                   | -                                   | 8 320                     |
| Pulp and Paper   | 8 270                                   | 2               | 40                              | 1                | 400                              | -                         | -                         | -                                   | -                                   | 8 660                     |
| Cement   | 5 400                                   | 0.21            | 5.3                             | 0.06             | 20                               | -                         | -                         | -                                   | -                                   | 5 430                     |
| Other Manufacturing  | 16 900                                  | 0.63            | 16                              | 0.5              | 200                              | -                         | -                         | -                                   | -                                   | 17 100                    |
| Construction   | 1 440                                   | 0.03            | 0.62                            | 0.03             | 10                               | -                         | -                         | -                                   | -                                   | 1 450                     |
| Commercial and Institutional   | 31 900                                  | 0.59            | 15                              | 0.7              | 200                              | -                         | -                         | -                                   | -                                   | 32 100                    |
| Residential  | 41 900                                  | 200             | 5 000                           | 3                | 800                              | -                         | -                         | -                                   | -                                   | 47 700                    |
| Agriculture and Forestry   | 2 090                                   | 0.04            | 0.89                            | 0.06             | 18                               | -                         | -                         | -                                   | -                                   | 2 110                     |
| <b>b. Transport<sup>2</sup></b>  | <b>185 000</b>                          | <b>30</b>       | <b>800</b>                      | <b>30</b>        | <b>9 000</b>                     | -                         | -                         | -                                   | -                                   | <b>195 000</b>            |
| Domestic Aviation  | 7 570                                   | 0.3             | 8                               | 0.2              | 70                               | -                         | -                         | -                                   | -                                   | 7 600                     |
| Road Transportation  | 126 000                                 | 10              | 300                             | 17               | 5 100                            | -                         | -                         | -                                   | -                                   | 132 000                   |
| Light-Duty Gasoline Vehicles   | 38 400                                  | 4.1             | 100                             | 6.7              | 2 000                            | -                         | -                         | -                                   | -                                   | 40 500                    |
| Light-Duty Gasoline Trucks   | 40 600                                  | 4.2             | 110                             | 7.9              | 2 400                            | -                         | -                         | -                                   | -                                   | 43 100                    |
| Heavy-Duty Gasoline Vehicles   | 6 460                                   | 0.37            | 9.2                             | 0.46             | 140                              | -                         | -                         | -                                   | -                                   | 6 610                     |
| Motorcycles  | 254                                     | 0.11            | 2.7                             | 0.0              | 1.4                              | -                         | -                         | -                                   | -                                   | 258                       |
| Light-Duty Diesel Vehicles   | 565                                     | 0.01            | 0.3                             | 0.05             | 10                               | -                         | -                         | -                                   | -                                   | 579                       |
| Light-Duty Diesel Trucks   | 1 890                                   | 0.05            | 1                               | 0.2              | 40                               | -                         | -                         | -                                   | -                                   | 1 940                     |
| Heavy-Duty Diesel Vehicles   | 37 400                                  | 2               | 40                              | 2                | 600                              | -                         | -                         | -                                   | -                                   | 38 000                    |
| Propane and Natural Gas Vehicles   | 708                                     | 0.7             | 20                              | 0.01             | 4                                | -                         | -                         | -                                   | -                                   | 730                       |
| Railways   | 5 920                                   | 0.3             | 8                               | 2                | 700                              | -                         | -                         | -                                   | -                                   | 6 700                     |
| Domestic Navigation  | 6 320                                   | 0.5             | 10                              | 1                | 400                              | -                         | -                         | -                                   | -                                   | 6 700                     |
| Other Transportation   | 39 300                                  | 20              | 500                             | 9                | 3 000                            | -                         | -                         | -                                   | -                                   | 43 000                    |
| Off-Road Gasoline  | 8 150                                   | 10              | 200                             | 0.2              | 50                               | -                         | -                         | -                                   | -                                   | 8 400                     |
| Off-Road Diesel  | 21 300                                  | 1               | 30                              | 9                | 3 000                            | -                         | -                         | -                                   | -                                   | 24 000                    |
| Pipeline Transport   | 9 830                                   | 9.8             | 250                             | 0.3              | 80                               | -                         | -                         | -                                   | -                                   | 10 200                    |
| <b>c. Fugitive Sources</b>   | <b>15 000</b>                           | <b>1 800</b>    | <b>46 000</b>                   | <b>0.1</b>       | <b>40</b>                        | -                         | -                         | -                                   | -                                   | <b>61 000</b>             |
| Coal Mining  | -                                       | 70              | 2 000                           | -                | -                                | -                         | -                         | -                                   | -                                   | 2 000                     |
| Oil and Natural Gas  | 15 000                                  | 1 800           | 45 000                          | 0.1              | 40                               | -                         | -                         | -                                   | -                                   | 59 000                    |
| Oil  | 170                                     | 250             | 6 200                           | 0.1              | 30                               | -                         | -                         | -                                   | -                                   | 6 400                     |
| Natural Gas  | 57                                      | 550             | 14 000                          | -                | -                                | -                         | -                         | -                                   | -                                   | 14 000                    |
| Venting  | 9 900                                   | 970             | 24 000                          | -                | -                                | -                         | -                         | -                                   | -                                   | 34 000                    |
| Flaring  | 4 800                                   | 21              | 530                             | 0.01             | 4                                | -                         | -                         | -                                   | -                                   | 5 300                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>                             | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>0.09</b>               |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>44 100</b>                           | <b>3.4</b>      | <b>85</b>                       | <b>13.8</b>      | <b>4 120</b>                     | <b>5 300</b>              | <b>3 800</b>              | <b>1 400</b>                        | -                                   | <b>58 800</b>             |
| <b>a. Mineral Products</b>   | <b>10 000</b>                           | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>10 000</b>             |
| Cement Production  | 7 600                                   | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 7 600                     |
| Lime Production  | 1 710                                   | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 1 710                     |
| Mineral Product Use  | 1 000                                   | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 1 000                     |
| <b>b. Chemical Industry</b>  | <b>2 700</b>                            | <b>3.4</b>      | <b>85</b>                       | <b>13</b>        | <b>3 800</b>                     | -                         | -                         | -                                   | -                                   | <b>6 500</b>              |
| Ammonia Production   | 2 710                                   | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 2 710                     |
| Nitric Acid Production   | -                                       | -               | -                               | 4                | 1 200                            | -                         | -                         | -                                   | -                                   | 1 200                     |
| Adipic Acid Production   | -                                       | -               | -                               | 8.5              | 2 500                            | -                         | -                         | -                                   | -                                   | 2 500                     |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                       | 3.4             | 85                              | 0.02             | 5.7                              | -                         | -                         | -                                   | -                                   | 90                        |
| <b>c. Metal Production</b>   | <b>15 100</b>                           | -               | -                               | -                | -                                | -                         | <b>3 830</b>              | <b>1 250</b>                        | -                                   | <b>20 100</b>             |
| Iron and Steel Production  | 10 200                                  | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 10 200                    |
| Aluminum Production  | 4 840                                   | -               | -                               | -                | -                                | -                         | 3 830                     | 16.7                                | -                                   | 8 680                     |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                       | -               | -                               | -                | -                                | -                         | -                         | 1 230                               | -                                   | 1 230                     |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                                       | -               | -                               | -                | -                                | <b>5 300</b>              | <b>10</b>                 | <b>170</b>                          | <b>0.2</b>                          | <b>5 400</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>16 000</b>                           | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>16 000</b>             |
| <b>f. Other Product Manufacture and Use</b>  | -                                       | -               | -                               | <b>1.2</b>       | <b>360</b>                       | -                         | -                         | -                                   | -                                   | <b>360</b>                |
| <b>AGRICULTURE</b>   | -                                       | <b>1 400</b>    | <b>36 000</b>                   | <b>80</b>        | <b>20 000</b>                    | -                         | -                         | -                                   | -                                   | <b>62 000</b>             |
| <b>a. Enteric Fermentation</b>   | -                                       | <b>1 300</b>    | <b>31 000</b>                   | -                | -                                | -                         | -                         | -                                   | -                                   | <b>31 000</b>             |
| <b>b. Manure Management</b>  | -                                       | <b>170</b>      | <b>4 300</b>                    | <b>18.9</b>      | <b>5 620</b>                     | -                         | -                         | -                                   | -                                   | <b>9 900</b>              |
| <b>c. Agriculture Soils</b>  | -                                       | -               | -                               | <b>63</b>        | <b>19 000</b>                    | -                         | -                         | -                                   | -                                   | <b>19 000</b>             |
| Direct Sources   | -                                       | -               | -                               | 51               | 15 000                           | -                         | -                         | -                                   | -                                   | 15 000                    |
| Indirect Sources   | -                                       | -               | -                               | 10               | 4 000                            | -                         | -                         | -                                   | -                                   | 4 000                     |
| <b>d. Field Burning of Agricultural Residues</b>   | -                                       | <b>1</b>        | <b>40</b>                       | <b>0.04</b>      | <b>10</b>                        | -                         | -                         | -                                   | -                                   | <b>50</b>                 |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>                            | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>1 000</b>              |
| <b>WASTE</b>   | <b>490</b>                              | <b>1 100</b>    | <b>27 000</b>                   | <b>3</b>         | <b>800</b>                       | -                         | -                         | -                                   | -                                   | <b>28 000</b>             |
| <b>a. Solid Waste Disposal on Land</b>   | -                                       | <b>1 100</b>    | <b>26 000</b>                   | -                | -                                | -                         | -                         | -                                   | -                                   | <b>26 000</b>             |
| <b>b. Wastewater Handling</b>  | -                                       | <b>14</b>       | <b>350</b>                      | <b>2</b>         | <b>600</b>                       | -                         | -                         | -                                   | -                                   | <b>980</b>                |
| <b>c. Waste Incineration</b>   | <b>490</b>                              | <b>0.09</b>     | <b>2</b>                        | <b>0.7</b>       | <b>200</b>                       | -                         | -                         | -                                   | -                                   | <b>690</b>                |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>5 300</b>                            | <b>300</b>      | <b>7 500</b>                    | <b>12</b>        | <b>3 600</b>                     | -                         | -                         | -                                   | -                                   | <b>16 000</b>             |
| <b>a. Forest Land</b>  | <b>-150 000</b>                         | <b>260</b>      | <b>6 500</b>                    | <b>11</b>        | <b>3 300</b>                     | -                         | -                         | -                                   | -                                   | <b>-140 000</b>           |
| <b>b. Cropland</b>   | <b>-8 600</b>                           | <b>5</b>        | <b>100</b>                      | <b>0.2</b>       | <b>70</b>                        | -                         | -                         | -                                   | -                                   | <b>-8 400</b>             |
| <b>c. Grassland</b>  | -                                       | <b>30</b>       | <b>700</b>                      | <b>0.7</b>       | <b>200</b>                       | -                         | -                         | -                                   | -                                   | <b>900</b>                |
| <b>d. Wetlands</b>   | <b>4 000</b>                            | <b>1</b>        | <b>40</b>                       | <b>0.06</b>      | <b>20</b>                        | -                         | -                         | -                                   | -                                   | <b>4 000</b>              |
| <b>e. Settlements</b>  | <b>4 000</b>                            | <b>6</b>        | <b>200</b>                      | <b>0.2</b>       | <b>70</b>                        | -                         | -                         | -                                   | -                                   | <b>4 000</b>              |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>                          | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>160 000</b>            |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
  - Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A9-12 2004 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCS <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>587 000</b>   | <b>4 700</b>    | <b>120 000</b>         | <b>140</b>       | <b>43 000</b>          | <b>5 000</b>           | <b>3 500</b>           | <b>2 300</b>           | <b>0.2</b>             | <b>758 000</b>         |
| <b>ENERGY</b>  | <b>540 000</b>   | <b>2 300</b>    | <b>56 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>609 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>344 000</b>   | <b>300</b>      | <b>8 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>354 000</b>         |
| Public Electricity and Heat Production   | 124 000          | 5.6             | 140                    | 3                | 800                    | -                      | -                      | -                      | -                      | 125 000                |
| Petroleum Refining Industries  | 21 600           | 0.4             | 9                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 22 000                 |
| Mining and Upstream Oil and Gas Production   | 67 100           | 98              | 2 400                  | 2                | 500                    | -                      | -                      | -                      | -                      | 70 000                 |
| Manufacturing Industries   | 50 500           | 3               | 80                     | 2                | 700                    | -                      | -                      | -                      | -                      | 51 200                 |
| Iron and Steel   | 5 780            | 0.3             | 6                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 5 850                  |
| Non Ferrous Metals   | 3 540            | 0.08            | 2                      | 0.05             | 20                     | -                      | -                      | -                      | -                      | 3 560                  |
| Chemical   | 9 130            | 0.19            | 4.7                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 9 180                  |
| Pulp and Paper   | 9 860            | 2               | 40                     | 1                | 400                    | -                      | -                      | -                      | -                      | 10 300                 |
| Cement   | 5 430            | 0.25            | 6.3                    | 0.07             | 20                     | -                      | -                      | -                      | -                      | 5 460                  |
| Other Manufacturing  | 16 800           | 0.64            | 16                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 16 900                 |
| Construction   | 1 410            | 0.03            | 0.61                   | 0.03             | 9                      | -                      | -                      | -                      | -                      | 1 420                  |
| Commercial and Institutional   | 33 600           | 0.61            | 15                     | 0.7              | 200                    | -                      | -                      | -                      | -                      | 33 800                 |
| Residential  | 42 700           | 200             | 5 000                  | 3                | 900                    | -                      | -                      | -                      | -                      | 48 800                 |
| Agriculture and Forestry   | 2 200            | 0.04            | 0.92                   | 0.06             | 17                     | -                      | -                      | -                      | -                      | 2 210                  |
| <b>b. Transport<sup>2</sup></b>  | <b>181 000</b>   | <b>30</b>       | <b>800</b>             | <b>30</b>        | <b>9 000</b>           | -                      | -                      | -                      | -                      | <b>191 000</b>         |
| Domestic Aviation  | 7 460            | 0.3             | 7                      | 0.2              | 70                     | -                      | -                      | -                      | -                      | 7 500                  |
| Road Transportation  | 124 000          | 10              | 300                    | 19               | 5 600                  | -                      | -                      | -                      | -                      | 130 000                |
| Light-Duty Gasoline Vehicles   | 39 400           | 4.4             | 110                    | 7.6              | 2 300                  | -                      | -                      | -                      | -                      | 41 700                 |
| Light-Duty Gasoline Trucks   | 39 300           | 4.3             | 110                    | 8.6              | 2 600                  | -                      | -                      | -                      | -                      | 41 900                 |
| Heavy-Duty Gasoline Vehicles   | 6 560            | 0.4             | 10                     | 0.45             | 130                    | -                      | -                      | -                      | -                      | 6 710                  |
| Motorcycles  | 247              | 0.11            | 2.7                    | 0.0              | 1.3                    | -                      | -                      | -                      | -                      | 251                    |
| Light-Duty Diesel Vehicles   | 561              | 0.01            | 0.3                    | 0.04             | 10                     | -                      | -                      | -                      | -                      | 574                    |
| Light-Duty Diesel Trucks   | 1 810            | 0.05            | 1                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 1 850                  |
| Heavy-Duty Diesel Vehicles   | 35 800           | 2               | 40                     | 2                | 500                    | -                      | -                      | -                      | -                      | 36 300                 |
| Propane and Natural Gas Vehicles   | 841              | 0.7             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 860                    |
| Railways   | 5 560            | 0.3             | 8                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 200                  |
| Domestic Navigation  | 6 610            | 0.5             | 10                     | 1                | 400                    | -                      | -                      | -                      | -                      | 7 000                  |
| Other Transportation   | 37 300           | 20              | 500                    | 9                | 3 000                  | -                      | -                      | -                      | -                      | 40 000                 |
| Off-Road Gasoline  | 8 760            | 10              | 300                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 9 100                  |
| Off-Road Diesel  | 20 200           | 1               | 30                     | 8                | 2 000                  | -                      | -                      | -                      | -                      | 23 000                 |
| Pipeline Transport   | 8 270            | 8.3             | 210                    | 0.2              | 70                     | -                      | -                      | -                      | -                      | 8 550                  |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>    | <b>1 900</b>    | <b>48 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>63 000</b>          |
| Coal Mining  | -                | 60              | 1 000                  | -                | -                      | -                      | -                      | -                      | -                      | 1 000                  |
| Oil and Natural Gas  | 16 000           | 1 800           | 46 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 62 000                 |
| Oil  | 180              | 260             | 6 600                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 800                  |
| Natural Gas  | 51               | 540             | 14 000                 | -                | -                      | -                      | -                      | -                      | -                      | 14 000                 |
| Venting  | 10 000           | 1 000           | 26 000                 | -                | -                      | -                      | -                      | -                      | -                      | 36 000                 |
| Flaring  | 5 100            | 18              | 450                    | 0.02             | 5                      | -                      | -                      | -                      | -                      | 5 500                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>44 200</b>    | <b>4.2</b>      | <b>100</b>             | <b>15.3</b>      | <b>4 550</b>           | <b>5 000</b>           | <b>3 500</b>           | <b>2 300</b>           | <b>0.2</b>             | <b>59 700</b>          |
| <b>a. Mineral Products</b>   | <b>10 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>10 000</b>          |
| Cement Production  | 7 500            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 7 500                  |
| Lime Production  | 1 780            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 780                  |
| Mineral Product Use  | 970              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 970                    |
| <b>b. Chemical Industry</b>  | <b>2 900</b>     | <b>4.2</b>      | <b>100</b>             | <b>14</b>        | <b>4 200</b>           | -                      | -                      | -                      | -                      | <b>7 200</b>           |
| Ammonia Production   | 2 930            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 930                  |
| Nitric Acid Production   | -                | -               | -                      | 4                | 1 200                  | -                      | -                      | -                      | -                      | 1 200                  |
| Adipic Acid Production   | -                | -               | -                      | 10               | 3 000                  | -                      | -                      | -                      | -                      | 3 000                  |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4.2             | 100                    | 0.02             | 5.7                    | -                      | -                      | -                      | -                      | 110                    |
| <b>c. Metal Production</b>   | <b>14 800</b>    | -               | -                      | -                | -                      | <b>3 510</b>           | <b>2 120</b>           | -                      | -                      | <b>20 400</b>          |
| Iron and Steel Production  | 10 500           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 10 500                 |
| Aluminum Production  | 4 220            | -               | -                      | -                | -                      | 3 510                  | 30.4                   | -                      | -                      | 7 770                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | 2 090                  | -                      | -                      | 2 090                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>5 000</b>           | <b>10</b>              | <b>220</b>             | <b>0.2</b>             | <b>5 200</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>16 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>16 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>1.3</b>       | <b>390</b>             | -                      | -                      | -                      | -                      | <b>390</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 400</b>    | <b>35 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>61 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 200</b>    | <b>31 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>31 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>170</b>      | <b>4 300</b>           | <b>18.5</b>      | <b>5 500</b>           | -                      | -                      | -                      | -                      | <b>9 800</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>65</b>        | <b>19 000</b>          | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| Direct Sources   | -                | -               | -                      | 52               | 16 000                 | -                      | -                      | -                      | -                      | 16 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>1</b>        | <b>30</b>              | <b>0.03</b>      | <b>8</b>               | -                      | -                      | -                      | -                      | <b>40</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>WASTE</b>   | <b>500</b>       | <b>1 100</b>    | <b>26 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>28 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>1 000</b>    | <b>26 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>14</b>       | <b>350</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>980</b>             |
| <b>c. Waste Incineration</b>   | <b>500</b>       | <b>0.09</b>     | <b>2</b>               | <b>0.7</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>700</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>79 000</b>    | <b>600</b>      | <b>15 000</b>          | <b>25</b>        | <b>7 300</b>           | -                      | -                      | -                      | -                      | <b>100 000</b>         |
| <b>a. Forest Land</b>  | <b>-84 000</b>   | <b>560</b>      | <b>14 000</b>          | <b>23</b>        | <b>7 000</b>           | -                      | -                      | -                      | -                      | <b>-63 000</b>         |
| <b>b. Cropland</b>   | <b>-7 400</b>    | <b>5</b>        | <b>100</b>             | <b>0.3</b>       | <b>80</b>              | -                      | -                      | -                      | -                      | <b>-7 200</b>          |
| <b>c. Grassland</b>  | -                | <b>30</b>       | <b>700</b>             | <b>0.7</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>900</b>             |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>1</b>        | <b>20</b>              | <b>0.04</b>      | <b>10</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>200</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>160 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-13 2003 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>588 000</b>   | <b>4 700</b>    | <b>120 000</b>         | <b>130</b>       | <b>40 000</b>          | <b>4 700</b>           | <b>3 500</b>           | <b>2 700</b>           | <b>0.2</b>             | <b>756 000</b>         |
| <b>ENERGY</b>  | <b>544 000</b>   | <b>2 300</b>    | <b>57 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>614 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>352 000</b>   | <b>300</b>      | <b>8 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>363 000</b>         |
| Public Electricity and Heat Production   | 131 000          | 5.4             | 140                    | 3                | 800                    | -                      | -                      | -                      | -                      | 132 000                |
| Petroleum Refining Industries  | 20 100           | 0.3             | 7                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 20 000                 |
| Mining and Upstream Oil and Gas Production   | 68 900           | 110             | 2 700                  | 2                | 500                    | -                      | -                      | -                      | -                      | 72 100                 |
| Manufacturing Industries   | 48 900           | 3               | 70                     | 2                | 600                    | -                      | -                      | -                      | -                      | 49 600                 |
| Iron and Steel   | 5 490            | 0.2             | 6                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 5 550                  |
| Non Ferrous Metals   | 3 530            | 0.08            | 2                      | 0.05             | 20                     | -                      | -                      | -                      | -                      | 3 550                  |
| Chemical   | 8 330            | 0.17            | 4.3                    | 0.1              | 40                     | -                      | -                      | -                      | -                      | 8 380                  |
| Pulp and Paper   | 10 100           | 1               | 40                     | 1                | 300                    | -                      | -                      | -                      | -                      | 10 400                 |
| Cement   | 4 970            | 0.22            | 5.6                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 4 990                  |
| Other Manufacturing  | 16 500           | 0.59            | 15                     | 0.5              | 100                    | -                      | -                      | -                      | -                      | 16 700                 |
| Construction   | 1 340            | 0.02            | 0.58                   | 0.03             | 9                      | -                      | -                      | -                      | -                      | 1 350                  |
| Commercial and Institutional   | 34 900           | 0.64            | 16                     | 0.7              | 200                    | -                      | -                      | -                      | -                      | 35 100                 |
| Residential  | 44 200           | 200             | 5 000                  | 3                | 900                    | -                      | -                      | -                      | -                      | 50 500                 |
| Agriculture and Forestry   | 2 280            | 0.04            | 0.97                   | 0.06             | 17                     | -                      | -                      | -                      | -                      | 2 300                  |
| <b>b. Transport<sup>2</sup></b>  | <b>176 000</b>   | <b>30</b>       | <b>800</b>             | <b>30</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>187 000</b>         |
| Domestic Aviation  | 6 960            | 0.3             | 8                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 7 000                  |
| Road Transportation  | 120 000          | 10              | 300                    | 20               | 5 900                  | -                      | -                      | -                      | -                      | 126 000                |
| Light-Duty Gasoline Vehicles   | 39 500           | 4.7             | 120                    | 8.4              | 2 500                  | -                      | -                      | -                      | -                      | 42 100                 |
| Light-Duty Gasoline Trucks   | 37 700           | 4.2             | 110                    | 9.1              | 2 700                  | -                      | -                      | -                      | -                      | 40 500                 |
| Heavy-Duty Gasoline Vehicles   | 6 220            | 0.41            | 10                     | 0.41             | 120                    | -                      | -                      | -                      | -                      | 6 350                  |
| Motorcycles  | 229              | 0.1             | 2.6                    | 0.0              | 1.3                    | -                      | -                      | -                      | -                      | 232                    |
| Light-Duty Diesel Vehicles   | 517              | 0.01            | 0.3                    | 0.04             | 10                     | -                      | -                      | -                      | -                      | 529                    |
| Light-Duty Diesel Trucks   | 1 740            | 0.04            | 1                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 1 780                  |
| Heavy-Duty Diesel Vehicles   | 33 500           | 1               | 40                     | 2                | 500                    | -                      | -                      | -                      | -                      | 34 000                 |
| Propane and Natural Gas Vehicles   | 798              | 0.7             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 820                    |
| Railways   | 5 410            | 0.3             | 7                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 100                  |
| Domestic Navigation  | 6 210            | 0.5             | 10                     | 1                | 300                    | -                      | -                      | -                      | -                      | 6 500                  |
| Other Transportation   | 37 600           | 20              | 500                    | 9                | 3 000                  | -                      | -                      | -                      | -                      | 41 000                 |
| Off-Road Gasoline  | 8 590            | 10              | 300                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 8 900                  |
| Off-Road Diesel  | 20 200           | 1               | 30                     | 8                | 2 000                  | -                      | -                      | -                      | -                      | 23 000                 |
| Pipeline Transport   | 8 830            | 8.8             | 220                    | 0.2              | 70                     | -                      | -                      | -                      | -                      | 9 120                  |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>    | <b>1 900</b>    | <b>48 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>64 000</b>          |
| Coal Mining  | -                | 60              | 1 000                  | -                | -                      | -                      | -                      | -                      | -                      | 1 000                  |
| Oil and Natural Gas  | 16 000           | 1 900           | 47 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 63 000                 |
| Oil  | 170              | 260             | 6 500                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 700                  |
| Natural Gas  | 51               | 550             | 14 000                 | -                | -                      | -                      | -                      | -                      | -                      | 14 000                 |
| Venting  | 10 000           | 1 000           | 26 000                 | -                | -                      | -                      | -                      | -                      | -                      | 37 000                 |
| Flaring  | 5 300            | 15              | 370                    | 0.01             | 4                      | -                      | -                      | -                      | -                      | 5 600                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>42 000</b>    | <b>3.7</b>      | <b>93</b>              | <b>9.04</b>      | <b>2 690</b>           | <b>4 700</b>           | <b>3 500</b>           | <b>2 700</b>           | <b>0.2</b>             | <b>55 600</b>          |
| <b>a. Mineral Products</b>   | <b>9 800</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>9 800</b>           |
| Cement Production  | 7 200            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 7 200                  |
| Lime Production  | 1 650            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 650                  |
| Mineral Product Use  | 910              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 910                    |
| <b>b. Chemical Industry</b>  | <b>2 600</b>     | <b>3.7</b>      | <b>93</b>              | <b>7.6</b>       | <b>2 300</b>           | -                      | -                      | -                      | -                      | <b>5 000</b>           |
| Ammonia Production   | 2 630            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 630                  |
| Nitric Acid Production   | -                | -               | -                      | 4.1              | 1 200                  | -                      | -                      | -                      | -                      | 1 200                  |
| Adipic Acid Production   | -                | -               | -                      | 3.5              | 1 000                  | -                      | -                      | -                      | -                      | 1 000                  |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 3.7             | 93                     | 0.02             | 5.6                    | -                      | -                      | -                      | -                      | 98                     |
| <b>c. Metal Production</b>   | <b>14 900</b>    | -               | -                      | -                | -                      | -                      | <b>3 480</b>           | <b>2 440</b>           | -                      | <b>20 900</b>          |
| Iron and Steel Production  | 10 400           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 10 400                 |
| Aluminum Production  | 4 580            | -               | -                      | -                | -                      | -                      | 3 480                  | 67.2                   | -                      | 8 130                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 2 370                  | -                      | 2 370                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>4 700</b>           | <b>8.2</b>             | <b>220</b>             | <b>0.2</b>             | <b>4 900</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>15 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>15 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>1.4</b>       | <b>430</b>             | -                      | -                      | -                      | -                      | <b>430</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 400</b>    | <b>34 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>60 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 200</b>    | <b>30 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>30 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>170</b>      | <b>4 200</b>           | <b>18.1</b>      | <b>5 390</b>           | -                      | -                      | -                      | -                      | <b>9 600</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>63</b>        | <b>19 000</b>          | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| Direct Sources   | -                | -               | -                      | 50               | 15 000                 | -                      | -                      | -                      | -                      | 15 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>4</b>        | <b>100</b>             | <b>0.1</b>       | <b>30</b>              | -                      | -                      | -                      | -                      | <b>100</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>460</b>       | <b>1 000</b>    | <b>26 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>27 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>1 000</b>    | <b>26 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>14</b>       | <b>350</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>970</b>             |
| <b>c. Waste Incineration</b>   | <b>460</b>       | <b>0.08</b>     | <b>2</b>               | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>650</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>6 000</b>     | <b>470</b>      | <b>12 000</b>          | <b>19</b>        | <b>5 700</b>           | -                      | -                      | -                      | -                      | <b>23 000</b>          |
| <b>a. Forest Land</b>  | <b>-140 000</b>  | <b>420</b>      | <b>11 000</b>          | <b>18</b>        | <b>5 300</b>           | -                      | -                      | -                      | -                      | <b>-120 000</b>        |
| <b>b. Cropland</b>   | <b>-6 200</b>    | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>70</b>              | -                      | -                      | -                      | -                      | <b>-6 000</b>          |
| <b>c. Grassland</b>  | -                | <b>40</b>       | <b>900</b>             | <b>0.9</b>       | <b>300</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.7</b>      | <b>20</b>              | <b>0.03</b>      | <b>8</b>               | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>100</b>             | <b>0.2</b>       | <b>60</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>140 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>140 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-14 2002 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                           |                  |                           |                           |                           |                           |                           |                           |
|--|------------------|-----------------|---------------------------|------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>           | N <sub>2</sub> O | N <sub>2</sub> O          | HFCS <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>           | NF <sub>3</sub>           | TOTAL                     |
| Global Warming Potential<br>Unit   | kt               | kt              | kt CO <sub>2</sub><br>eq. | kt               | kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>571 000</b>   | <b>4 700</b>    | <b>120 000</b>            | <b>130</b>       | <b>38 000</b>             | <b>4 400</b>              | <b>3 500</b>              | <b>3 000</b>              | <b>0.2</b>                | <b>738 000</b>            |
| <b>ENERGY</b>  | <b>529 000</b>   | <b>2 400</b>    | <b>59 000</b>             | <b>40</b>        | <b>10 000</b>             | -                         | -                         | -                         | -                         | <b>600 000</b>            |
| <b>a. Stationary Combustion Sources</b>  | <b>342 000</b>   | <b>400</b>      | <b>9 000</b>              | <b>10</b>        | <b>3 000</b>              | -                         | -                         | -                         | -                         | <b>354 000</b>            |
| Public Electricity and Heat Production   | 127 000          | 4.7             | 120                       | 2                | 700                       | -                         | -                         | -                         | -                         | 127 000                   |
| Petroleum Refining Industries  | 19 100           | 0.3             | 7                         | 0.2              | 50                        | -                         | -                         | -                         | -                         | 19 000                    |
| Mining and Upstream Oil and Gas Production   | 65 700           | 110             | 2 800                     | 2                | 500                       | -                         | -                         | -                         | -                         | 68 900                    |
| Manufacturing Industries   | 51 000           | 3               | 70                        | 2                | 600                       | -                         | -                         | -                         | -                         | 51 700                    |
| Iron and Steel   | 5 820            | 0.3             | 6                         | 0.2              | 60                        | -                         | -                         | -                         | -                         | 5 880                     |
| Non Ferrous Metals   | 3 520            | 0.07            | 2                         | 0.05             | 20                        | -                         | -                         | -                         | -                         | 3 530                     |
| Chemical   | 9 270            | 0.18            | 4.6                       | 0.2              | 50                        | -                         | -                         | -                         | -                         | 9 320                     |
| Pulp and Paper   | 10 700           | 1               | 30                        | 1                | 300                       | -                         | -                         | -                         | -                         | 11 000                    |
| Cement   | 4 940            | 0.22            | 5.6                       | 0.06             | 20                        | -                         | -                         | -                         | -                         | 4 970                     |
| Other Manufacturing  | 16 800           | 0.8             | 20                        | 0.6              | 200                       | -                         | -                         | -                         | -                         | 17 000                    |
| Construction   | 1 260            | 0.02            | 0.55                      | 0.03             | 9                         | -                         | -                         | -                         | -                         | 1 270                     |
| Commercial and Institutional   | 33 700           | 0.61            | 15                        | 0.7              | 200                       | -                         | -                         | -                         | -                         | 33 900                    |
| Residential  | 42 000           | 200             | 6 000                     | 3                | 1 000                     | -                         | -                         | -                         | -                         | 49 100                    |
| Agriculture and Forestry   | 2 140            | 0.04            | 1                         | 0.06             | 18                        | -                         | -                         | -                         | -                         | 2 160                     |
| <b>b. Transport<sup>2</sup></b>  | <b>171 000</b>   | <b>30</b>       | <b>900</b>                | <b>30</b>        | <b>9 000</b>              | -                         | -                         | -                         | -                         | <b>181 000</b>            |
| Domestic Aviation  | 6 860            | 0.3             | 8                         | 0.2              | 60                        | -                         | -                         | -                         | -                         | 6 900                     |
| Road Transportation  | 118 000          | 10              | 300                       | 19               | 5 800                     | -                         | -                         | -                         | -                         | 124 000                   |
| Light-Duty Gasoline Vehicles   | 39 800           | 4.8             | 120                       | 8.6              | 2 500                     | -                         | -                         | -                         | -                         | 42 500                    |
| Light-Duty Gasoline Trucks   | 36 500           | 4.1             | 100                       | 8.8              | 2 600                     | -                         | -                         | -                         | -                         | 39 200                    |
| Heavy-Duty Gasoline Vehicles   | 6 050            | 0.44            | 11                        | 0.37             | 110                       | -                         | -                         | -                         | -                         | 6 170                     |
| Motorcycles  | 209              | 0.1             | 2.5                       | 0.0              | 1.1                       | -                         | -                         | -                         | -                         | 213                       |
| Light-Duty Diesel Vehicles   | 505              | 0.01            | 0.3                       | 0.04             | 10                        | -                         | -                         | -                         | -                         | 517                       |
| Light-Duty Diesel Trucks   | 1 700            | 0.04            | 1                         | 0.1              | 40                        | -                         | -                         | -                         | -                         | 1 740                     |
| Heavy-Duty Diesel Vehicles   | 32 100           | 1               | 40                        | 2                | 500                       | -                         | -                         | -                         | -                         | 32 600                    |
| Propane and Natural Gas Vehicles   | 827              | 0.7             | 20                        | 0.02             | 5                         | -                         | -                         | -                         | -                         | 850                       |
| Railways   | 5 350            | 0.3             | 7                         | 2                | 700                       | -                         | -                         | -                         | -                         | 6 000                     |
| Domestic Navigation  | 5 360            | 0.4             | 10                        | 1                | 400                       | -                         | -                         | -                         | -                         | 5 700                     |
| Other Transportation   | 36 200           | 20              | 500                       | 7                | 2 000                     | -                         | -                         | -                         | -                         | 39 000                    |
| Off-Road Gasoline  | 8 440            | 10              | 200                       | 0.2              | 50                        | -                         | -                         | -                         | -                         | 8 700                     |
| Off-Road Diesel  | 17 200           | 0.9             | 20                        | 7                | 2 000                     | -                         | -                         | -                         | -                         | 19 000                    |
| Pipeline Transport   | 10 600           | 11              | 260                       | 0.3              | 80                        | -                         | -                         | -                         | -                         | 10 900                    |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>    | <b>2 000</b>    | <b>49 000</b>             | <b>0.1</b>       | <b>40</b>                 | -                         | -                         | -                         | -                         | <b>65 000</b>             |
| Coal Mining  | -                | 60              | 2 000                     | -                | -                         | -                         | -                         | -                         | -                         | 2 000                     |
| Oil and Natural Gas  | 16 000           | 1 900           | 47 000                    | 0.1              | 40                        | -                         | -                         | -                         | -                         | 63 000                    |
| Oil  | 180              | 250             | 6 300                     | 0.1              | 30                        | -                         | -                         | -                         | -                         | 6 500                     |
| Natural Gas  | 49               | 550             | 14 000                    | -                | -                         | -                         | -                         | -                         | -                         | 14 000                    |
| Venting  | 10 000           | 1 100           | 27 000                    | -                | -                         | -                         | -                         | -                         | -                         | 37 000                    |
| Flaring  | 5 000            | 11              | 290                       | 0.01             | 4                         | -                         | -                         | -                         | -                         | 5 300                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>0.09</b>               |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>40 100</b>    | <b>4</b>        | <b>99</b>                 | <b>9.35</b>      | <b>2 790</b>              | <b>4 400</b>              | <b>3 500</b>              | <b>3 000</b>              | -                         | <b>53 900</b>             |
| <b>a. Mineral Products</b>   | <b>9 800</b>     | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>9 800</b>              |
| Cement Production  | 7 200            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 7 200                     |
| Lime Production  | 1 670            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 1 670                     |
| Mineral Product Use  | 940              | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 940                       |
| <b>b. Chemical Industry</b>  | <b>2 600</b>     | <b>4</b>        | <b>99</b>                 | <b>8.1</b>       | <b>2 400</b>              | -                         | -                         | -                         | -                         | <b>5 100</b>              |
| Ammonia Production   | 2 630            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 2 630                     |
| Nitric Acid Production   | -                | -               | -                         | 4.1              | 1 200                     | -                         | -                         | -                         | -                         | 1 200                     |
| Adipic Acid Production   | -                | -               | -                         | 4                | 1 200                     | -                         | -                         | -                         | -                         | 1 200                     |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4               | 99                        | 0.02             | 5.5                       | -                         | -                         | -                         | -                         | 100                       |
| <b>c. Metal Production</b>   | <b>14 900</b>    | -               | -                         | -                | -                         | <b>3 440</b>              | <b>2 880</b>              | -                         | -                         | <b>21 200</b>             |
| Iron and Steel Production  | 10 400           | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 10 400                    |
| Aluminum Production  | 4 420            | -               | -                         | -                | -                         | 3 440                     | 76.5                      | -                         | -                         | 7 930                     |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                         | -                | -                         | -                         | 2 800                     | -                         | -                         | 2 800                     |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                         | -                | -                         | <b>4 400</b>              | <b>25</b>                 | <b>140</b>                | <b>0.2</b>                | <b>4 500</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>13 000</b>    | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>13 000</b>             |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                         | <b>1.2</b>       | <b>370</b>                | -                         | -                         | -                         | -                         | <b>370</b>                |
| <b>AGRICULTURE</b>   | -                | <b>1 300</b>    | <b>34 000</b>             | <b>80</b>        | <b>20 000</b>             | -                         | -                         | -                         | -                         | <b>58 000</b>             |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 200</b>    | <b>29 000</b>             | -                | -                         | -                         | -                         | -                         | -                         | <b>29 000</b>             |
| <b>b. Manure Management</b>  | -                | <b>170</b>      | <b>4 200</b>              | <b>17.9</b>      | <b>5 340</b>              | -                         | -                         | -                         | -                         | <b>9 600</b>              |
| <b>c. Agriculture Soils</b>  | -                | -               | -                         | <b>57</b>        | <b>17 000</b>             | -                         | -                         | -                         | -                         | <b>17 000</b>             |
| Direct Sources   | -                | -               | -                         | 46               | 14 000                    | -                         | -                         | -                         | -                         | 14 000                    |
| Indirect Sources   | -                | -               | -                         | 10               | 3 000                     | -                         | -                         | -                         | -                         | 3 000                     |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>3</b>        | <b>90</b>                 | <b>0.09</b>      | <b>30</b>                 | -                         | -                         | -                         | -                         | <b>100</b>                |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>2 000</b>              |
| <b>WASTE</b>   | <b>530</b>       | <b>1 000</b>    | <b>26 000</b>             | <b>3</b>         | <b>800</b>                | -                         | -                         | -                         | -                         | <b>27 000</b>             |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>1 000</b>    | <b>25 000</b>             | -                | -                         | -                         | -                         | -                         | -                         | <b>25 000</b>             |
| <b>b. Wastewater Handling</b>  | -                | <b>14</b>       | <b>340</b>                | <b>2</b>         | <b>600</b>                | -                         | -                         | -                         | -                         | <b>970</b>                |
| <b>c. Waste Incineration</b>   | <b>530</b>       | <b>0.08</b>     | <b>2</b>                  | <b>0.7</b>       | <b>200</b>                | -                         | -                         | -                         | -                         | <b>750</b>                |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>81 000</b>    | <b>700</b>      | <b>17 000</b>             | <b>29</b>        | <b>8 600</b>              | -                         | -                         | -                         | -                         | <b>110 000</b>            |
| <b>a. Forest Land</b>  | <b>-81 000</b>   | <b>650</b>      | <b>16 000</b>             | <b>28</b>        | <b>8 200</b>              | -                         | -                         | -                         | -                         | <b>-56 000</b>            |
| <b>b. Cropland</b>   | <b>-4 800</b>    | <b>5</b>        | <b>100</b>                | <b>0.3</b>       | <b>80</b>                 | -                         | -                         | -                         | -                         | <b>-4 600</b>             |
| <b>c. Grassland</b>  | -                | <b>30</b>       | <b>800</b>                | <b>0.9</b>       | <b>300</b>                | -                         | -                         | -                         | -                         | <b>1 000</b>              |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.0</b>      | <b>0.03</b>               | <b>0.0</b>       | <b>0.01</b>               | -                         | -                         | -                         | -                         | <b>4 000</b>              |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>6</b>        | <b>100</b>                | <b>0.2</b>       | <b>60</b>                 | -                         | -                         | -                         | -                         | <b>4 000</b>              |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>   | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>160 000</b>            |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9–15 2001 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                 |                 |                                 |                  |                                  |                           |                           |                                     |                                     |                           |
|--|----------------------------------|-----------------|---------------------------------|------------------|----------------------------------|---------------------------|---------------------------|-------------------------------------|-------------------------------------|---------------------------|
|  | CO <sub>2</sub>                  | CH <sub>4</sub> | CH <sub>4</sub>                 | N <sub>2</sub> O | N <sub>2</sub> O                 | HFCs <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>                     | NF <sub>3</sub>                     | TOTAL                     |
|  | Global Warming Potential<br>Unit |                 |                                 |                  |                                  |                           |                           |                                     |                                     |                           |
|  | kt                               | kt              | 25<br>kt CO <sub>2</sub><br>eq. | kt               | 298<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | 22 800<br>kt CO <sub>2</sub><br>eq. | 17 200<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>565 000</b>                   | <b>4 800</b>    | <b>120 000</b>                  | <b>130</b>       | <b>39 000</b>                    | <b>3 900</b>              | <b>4 000</b>              | <b>2 600</b>                        | <b>0.2</b>                          | <b>735 000</b>            |
| <b>ENERGY</b>  | <b>525 000</b>                   | <b>2 500</b>    | <b>62 000</b>                   | <b>40</b>        | <b>10 000</b>                    | -                         | -                         | -                                   | -                                   | <b>599 000</b>            |
| <b>a. Stationary Combustion Sources</b>  | <b>339 000</b>                   | <b>300</b>      | <b>9 000</b>                    | <b>10</b>        | <b>3 000</b>                     | -                         | -                         | -                                   | -                                   | <b>351 000</b>            |
| Public Electricity and Heat Production   | 132 000                          | 5               | 130                             | 2                | 700                              | -                         | -                         | -                                   | -                                   | 132 000                   |
| Petroleum Refining Industries  | 18 000                           | 0.3             | 7                               | 0.2              | 60                               | -                         | -                         | -                                   | -                                   | 18 000                    |
| Mining and Upstream Oil and Gas Production   | 62 600                           | 110             | 2 800                           | 1                | 400                              | -                         | -                         | -                                   | -                                   | 65 900                    |
| Manufacturing Industries   | 51 400                           | 3               | 70                              | 2                | 600                              | -                         | -                         | -                                   | -                                   | 52 100                    |
| Iron and Steel   | 4 970                            | 0.2             | 6                               | 0.2              | 60                               | -                         | -                         | -                                   | -                                   | 5 030                     |
| Non Ferrous Metals   | 3 780                            | 0.08            | 2                               | 0.06             | 20                               | -                         | -                         | -                                   | -                                   | 3 800                     |
| Chemical   | 9 770                            | 0.2             | 5                               | 0.2              | 50                               | -                         | -                         | -                                   | -                                   | 9 830                     |
| Pulp and Paper   | 11 400                           | 1               | 30                              | 1                | 300                              | -                         | -                         | -                                   | -                                   | 11 700                    |
| Cement   | 4 570                            | 0.17            | 4.2                             | 0.05             | 20                               | -                         | -                         | -                                   | -                                   | 4 590                     |
| Other Manufacturing  | 17 000                           | 0.74            | 18                              | 0.6              | 200                              | -                         | -                         | -                                   | -                                   | 17 200                    |
| Construction   | 1 020                            | 0.02            | 0.44                            | 0.03             | 8                                | -                         | -                         | -                                   | -                                   | 1 030                     |
| Commercial and Institutional   | 32 200                           | 0.63            | 16                              | 0.7              | 200                              | -                         | -                         | -                                   | -                                   | 32 500                    |
| Residential  | 39 900                           | 200             | 6 000                           | 3                | 900                              | -                         | -                         | -                                   | -                                   | 46 500                    |
| Agriculture and Forestry   | 2 220                            | 0.04            | 1                               | 0.06             | 18                               | -                         | -                         | -                                   | -                                   | 2 240                     |
| <b>b. Transport<sup>2</sup></b>  | <b>170 000</b>                   | <b>30</b>       | <b>800</b>                      | <b>30</b>        | <b>9 000</b>                     | -                         | -                         | -                                   | -                                   | <b>180 000</b>            |
| Domestic Aviation  | 7 050                            | 0.4             | 9                               | 0.2              | 60                               | -                         | -                         | -                                   | -                                   | 7 100                     |
| Road Transportation  | 116 000                          | 10              | 300                             | 19               | 5 700                            | -                         | -                         | -                                   | -                                   | 122 000                   |
| Light-Duty Gasoline Vehicles   | 39 600                           | 4.9             | 120                             | 8.6              | 2 600                            | -                         | -                         | -                                   | -                                   | 42 300                    |
| Light-Duty Gasoline Trucks   | 34 900                           | 3.9             | 99                              | 8.4              | 2 500                            | -                         | -                         | -                                   | -                                   | 37 500                    |
| Heavy-Duty Gasoline Vehicles   | 6 180                            | 0.47            | 12                              | 0.36             | 110                              | -                         | -                         | -                                   | -                                   | 6 300                     |
| Motorcycles  | 184                              | 0.1             | 2.4                             | 0.0              | 1                                | -                         | -                         | -                                   | -                                   | 187                       |
| Light-Duty Diesel Vehicles   | 478                              | 0.01            | 0.3                             | 0.04             | 10                               | -                         | -                         | -                                   | -                                   | 489                       |
| Light-Duty Diesel Trucks   | 1 620                            | 0.04            | 1                               | 0.1              | 40                               | -                         | -                         | -                                   | -                                   | 1 660                     |
| Heavy-Duty Diesel Vehicles   | 31 800                           | 1               | 40                              | 1                | 400                              | -                         | -                         | -                                   | -                                   | 32 300                    |
| Propane and Natural Gas Vehicles   | 1 120                            | 0.9             | 20                              | 0.02             | 7                                | -                         | -                         | -                                   | -                                   | 1 100                     |
| Railways   | 5 820                            | 0.3             | 8                               | 2                | 700                              | -                         | -                         | -                                   | -                                   | 6 500                     |
| Domestic Navigation  | 5 340                            | 0.4             | 10                              | 1                | 300                              | -                         | -                         | -                                   | -                                   | 5 700                     |
| Other Transportation   | 36 100                           | 20              | 500                             | 8                | 2 000                            | -                         | -                         | -                                   | -                                   | 39 000                    |
| Off-Road Gasoline  | 8 420                            | 10              | 200                             | 0.2              | 50                               | -                         | -                         | -                                   | -                                   | 8 700                     |
| Off-Road Diesel  | 17 700                           | 1               | 20                              | 7                | 2 000                            | -                         | -                         | -                                   | -                                   | 20 000                    |
| Pipeline Transport   | 10 000                           | 10              | 250                             | 0.3              | 80                               | -                         | -                         | -                                   | -                                   | 10 300                    |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>                    | <b>2 100</b>    | <b>52 000</b>                   | <b>0.1</b>       | <b>40</b>                        | -                         | -                         | -                                   | -                                   | <b>68 000</b>             |
| Coal Mining  | -                                | 70              | 2 000                           | -                | -                                | -                         | -                         | -                                   | -                                   | 2 000                     |
| Oil and Natural Gas  | 16 000                           | 2 000           | 50 000                          | 0.1              | 40                               | -                         | -                         | -                                   | -                                   | 66 000                    |
| Oil  | 170                              | 260             | 6 600                           | 0.1              | 30                               | -                         | -                         | -                                   | -                                   | 6 800                     |
| Natural Gas  | 51                               | 620             | 16 000                          | -                | -                                | -                         | -                         | -                                   | -                                   | 16 000                    |
| Venting  | 10 000                           | 1 100           | 28 000                          | -                | -                                | -                         | -                         | -                                   | -                                   | 38 000                    |
| Flaring  | 5 000                            | 9               | 220                             | 0.01             | 4                                | -                         | -                         | -                                   | -                                   | 5 200                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>                      | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>0.09</b>               |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>38 500</b>                    | <b>4.1</b>      | <b>100</b>                      | <b>8.11</b>      | <b>2 420</b>                     | <b>3 900</b>              | <b>4 000</b>              | <b>2 600</b>                        | -                                   | <b>51 500</b>             |
| <b>a. Mineral Products</b>   | <b>9 600</b>                     | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>9 600</b>              |
| Cement Production  | 7 000                            | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 7 000                     |
| Lime Production  | 1 640                            | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 1 640                     |
| Mineral Product Use  | 970                              | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 970                       |
| <b>b. Chemical Industry</b>  | <b>2 600</b>                     | <b>4.1</b>      | <b>100</b>                      | <b>6.8</b>       | <b>2 000</b>                     | -                         | -                         | -                                   | -                                   | <b>4 700</b>              |
| Ammonia Production   | 2 600                            | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 2 600                     |
| Nitric Acid Production   | -                                | -               | -                               | 4.1              | 1 200                            | -                         | -                         | -                                   | -                                   | 1 200                     |
| Adipic Acid Production   | -                                | -               | -                               | 2.6              | 770                              | -                         | -                         | -                                   | -                                   | 770                       |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                | 4.1             | 100                             | 0.02             | 5.4                              | -                         | -                         | -                                   | -                                   | 110                       |
| <b>c. Metal Production</b>   | <b>14 800</b>                    | -               | -                               | -                | -                                | -                         | <b>4 010</b>              | <b>2 290</b>                        | -                                   | <b>21 100</b>             |
| Iron and Steel Production  | 10 600                           | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | 10 600                    |
| Aluminum Production  | 4 200                            | -               | -                               | -                | -                                | -                         | 4 010                     | 41.9                                | -                                   | 8 260                     |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                | -               | -                               | -                | -                                | -                         | -                         | 2 250                               | -                                   | 2 250                     |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                                | -               | -                               | -                | -                                | <b>3 900</b>              | <b>37</b>                 | <b>260</b>                          | <b>0.2</b>                          | <b>4 200</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>11 000</b>                    | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>11 000</b>             |
| <b>f. Other Product Manufacture and Use</b>  | -                                | -               | -                               | <b>1.4</b>       | <b>400</b>                       | -                         | -                         | -                                   | -                                   | <b>400</b>                |
| <b>AGRICULTURE</b>   | -                                | <b>1 300</b>    | <b>33 000</b>                   | <b>80</b>        | <b>20 000</b>                    | -                         | -                         | -                                   | -                                   | <b>58 000</b>             |
| <b>a. Enteric Fermentation</b>   | -                                | <b>1 200</b>    | <b>29 000</b>                   | -                | -                                | -                         | -                         | -                                   | -                                   | <b>29 000</b>             |
| <b>b. Manure Management</b>  | -                                | <b>160</b>      | <b>4 100</b>                    | <b>17.9</b>      | <b>5 330</b>                     | -                         | -                         | -                                   | -                                   | <b>9 400</b>              |
| <b>c. Agriculture Soils</b>  | -                                | -               | -                               | <b>60</b>        | <b>18 000</b>                    | -                         | -                         | -                                   | -                                   | <b>18 000</b>             |
| Direct Sources   | -                                | -               | -                               | 48               | 14 000                           | -                         | -                         | -                                   | -                                   | 14 000                    |
| Indirect Sources   | -                                | -               | -                               | 10               | 4 000                            | -                         | -                         | -                                   | -                                   | 4 000                     |
| <b>d. Field Burning of Agricultural Residues</b>   | -                                | <b>3</b>        | <b>90</b>                       | <b>0.09</b>      | <b>30</b>                        | -                         | -                         | -                                   | -                                   | <b>100</b>                |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>                     | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>1 000</b>              |
| <b>WASTE</b>   | <b>550</b>                       | <b>1 000</b>    | <b>25 000</b>                   | <b>3</b>         | <b>800</b>                       | -                         | -                         | -                                   | -                                   | <b>27 000</b>             |
| <b>a. Solid Waste Disposal on Land</b>   | -                                | <b>990</b>      | <b>25 000</b>                   | -                | -                                | -                         | -                         | -                                   | -                                   | <b>25 000</b>             |
| <b>b. Wastewater Handling</b>  | -                                | <b>14</b>       | <b>340</b>                      | <b>2</b>         | <b>600</b>                       | -                         | -                         | -                                   | -                                   | <b>960</b>                |
| <b>c. Waste Incineration</b>   | <b>550</b>                       | <b>0.08</b>     | <b>2</b>                        | <b>0.7</b>       | <b>200</b>                       | -                         | -                         | -                                   | -                                   | <b>770</b>                |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-80 000</b>                   | <b>180</b>      | <b>4 500</b>                    | <b>7.1</b>       | <b>2 100</b>                     | -                         | -                         | -                                   | -                                   | <b>-73 000</b>            |
| <b>a. Forest Land</b>  | <b>-230 000</b>                  | <b>140</b>      | <b>3 500</b>                    | <b>5.8</b>       | <b>1 700</b>                     | -                         | -                         | -                                   | -                                   | <b>-230 000</b>           |
| <b>b. Cropland</b>   | <b>-3 200</b>                    | <b>6</b>        | <b>200</b>                      | <b>0.3</b>       | <b>90</b>                        | -                         | -                         | -                                   | -                                   | <b>-2 900</b>             |
| <b>c. Grassland</b>  | -                                | <b>30</b>       | <b>700</b>                      | <b>0.8</b>       | <b>200</b>                       | -                         | -                         | -                                   | -                                   | <b>1 000</b>              |
| <b>d. Wetlands</b>   | <b>4 000</b>                     | <b>0.0</b>      | <b>0.03</b>                     | <b>0.0</b>       | <b>0.01</b>                      | -                         | -                         | -                                   | -                                   | <b>4 000</b>              |
| <b>e. Settlements</b>  | <b>3 000</b>                     | <b>5</b>        | <b>100</b>                      | <b>0.2</b>       | <b>60</b>                        | -                         | -                         | -                                   | -                                   | <b>4 000</b>              |
| <b>f. Harvested Wood Products</b>  | <b>150 000</b>                   | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   | <b>150 000</b>            |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
  - Indicates no emissions
  - 0.0 Indicates emissions truncated due to rounding

Table A9-16 2000 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>572 000</b>   | <b>4 900</b>    | <b>120 000</b>         | <b>130</b>       | <b>40 000</b>          | <b>3 600</b>           | <b>5 000</b>           | <b>2 900</b>           | <b>0.2</b>             | <b>745 000</b>         |
| <b>ENERGY</b>  | <b>530 000</b>   | <b>2 500</b>    | <b>64 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>606 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>343 000</b>   | <b>400</b>      | <b>9 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>355 000</b>         |
| Public Electricity and Heat Production   | 131 000          | 5               | 120                    | 2                | 700                    | -                      | -                      | -                      | -                      | 131 000                |
| Petroleum Refining Industries  | 17 200           | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 17 000                 |
| Mining and Upstream Oil and Gas Production   | 60 100           | 110             | 2 800                  | 1                | 400                    | -                      | -                      | -                      | -                      | 63 400                 |
| Manufacturing Industries   | 55 500           | 3               | 70                     | 2                | 600                    | -                      | -                      | -                      | -                      | 56 200                 |
| Iron and Steel   | 6 160            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 230                  |
| Non Ferrous Metals   | 3 580            | 0.07            | 2                      | 0.05             | 20                     | -                      | -                      | -                      | -                      | 3 590                  |
| Chemical   | 10 800           | 0.22            | 5.4                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 10 800                 |
| Pulp and Paper   | 12 300           | 2               | 40                     | 1                | 400                    | -                      | -                      | -                      | -                      | 12 600                 |
| Cement   | 4 610            | 0.17            | 4.3                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 4 630                  |
| Other Manufacturing  | 18 100           | 0.49            | 12                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 18 200                 |
| Construction   | 1 080            | 0.02            | 0.46                   | 0.03             | 8                      | -                      | -                      | -                      | -                      | 1 080                  |
| Commercial and Institutional   | 32 800           | 0.61            | 15                     | 0.7              | 200                    | -                      | -                      | -                      | -                      | 33 100                 |
| Residential  | 42 700           | 200             | 6 000                  | 3                | 1 000                  | -                      | -                      | -                      | -                      | 49 700                 |
| Agriculture and Forestry   | 2 550            | 0.04            | 1.1                    | 0.06             | 18                     | -                      | -                      | -                      | -                      | 2 570                  |
| <b>b. Transport<sup>2</sup></b>  | <b>172 000</b>   | <b>40</b>       | <b>900</b>             | <b>30</b>        | <b>9 000</b>           | -                      | -                      | -                      | -                      | <b>182 000</b>         |
| Domestic Aviation  | 7 640            | 0.4             | 9                      | 0.2              | 70                     | -                      | -                      | -                      | -                      | 7 700                  |
| Road Transportation  | 113 000          | 10              | 300                    | 18               | 5 500                  | -                      | -                      | -                      | -                      | 119 000                |
| Light-Duty Gasoline Vehicles   | 39 700           | 5.2             | 130                    | 8.5              | 2 500                  | -                      | -                      | -                      | -                      | 42 400                 |
| Light-Duty Gasoline Trucks   | 34 200           | 4               | 99                     | 8.1              | 2 400                  | -                      | -                      | -                      | -                      | 36 700                 |
| Heavy-Duty Gasoline Vehicles   | 5 440            | 0.5             | 12                     | 0.27             | 81                     | -                      | -                      | -                      | -                      | 5 530                  |
| Motorcycles  | 161              | 0.09            | 2.3                    | 0.0              | 0.9                    | -                      | -                      | -                      | -                      | 164                    |
| Light-Duty Diesel Vehicles   | 459              | 0.01            | 0.3                    | 0.04             | 10                     | -                      | -                      | -                      | -                      | 470                    |
| Light-Duty Diesel Trucks   | 1 640            | 0.04            | 1                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 1 680                  |
| Heavy-Duty Diesel Vehicles   | 30 700           | 1               | 30                     | 1                | 400                    | -                      | -                      | -                      | -                      | 31 100                 |
| Propane and Natural Gas Vehicles   | 1 070            | 1               | 20                     | 0.02             | 6                      | -                      | -                      | -                      | -                      | 1 100                  |
| Railways   | 5 880            | 0.3             | 8                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 600                  |
| Domestic Navigation  | 4 890            | 0.3             | 9                      | 1                | 300                    | -                      | -                      | -                      | -                      | 5 200                  |
| Other Transportation   | 39 900           | 20              | 600                    | 9                | 3 000                  | -                      | -                      | -                      | -                      | 43 000                 |
| Off-Road Gasoline  | 8 560            | 10              | 300                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 8 900                  |
| Off-Road Diesel  | 20 400           | 1               | 30                     | 8                | 2 000                  | -                      | -                      | -                      | -                      | 23 000                 |
| Pipeline Transport   | 11 000           | 11              | 270                    | 0.3              | 90                     | -                      | -                      | -                      | -                      | 11 300                 |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>    | <b>2 100</b>    | <b>54 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>70 000</b>          |
| Coal Mining  | -                | 70              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 16 000           | 2 100           | 52 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 68 000                 |
| Oil  | 130              | 250             | 6 300                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 500                  |
| Natural Gas  | 54               | 700             | 17 000                 | -                | -                      | -                      | -                      | -                      | -                      | 18 000                 |
| Venting  | 10 000           | 1 100           | 28 000                 | -                | -                      | -                      | -                      | -                      | -                      | 38 000                 |
| Flaring  | 5 600            | 7               | 170                    | 0.01             | 3                      | -                      | -                      | -                      | -                      | 5 700                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>0.09</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>39 400</b>    | <b>4.2</b>      | <b>110</b>             | <b>8.34</b>      | <b>2 490</b>           | <b>3 600</b>           | <b>5 000</b>           | <b>2 900</b>           | -                      | <b>53 400</b>          |
| <b>a. Mineral Products</b>   | <b>10 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>10 000</b>          |
| Cement Production  | 7 200            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 7 200                  |
| Lime Production  | 1 870            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 870                  |
| Mineral Product Use  | 1 200            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 200                  |
| <b>b. Chemical Industry</b>  | <b>3 000</b>     | <b>4.2</b>      | <b>110</b>             | <b>6.9</b>       | <b>2 100</b>           | -                      | -                      | -                      | -                      | <b>5 100</b>           |
| Ammonia Production   | 2 960            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 960                  |
| Nitric Acid Production   | -                | -               | -                      | 4                | 1 200                  | -                      | -                      | -                      | -                      | 1 200                  |
| Adipic Acid Production   | -                | -               | -                      | 2.9              | 870                    | -                      | -                      | -                      | -                      | 870                    |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4.2             | 110                    | 0.02             | 6                      | -                      | -                      | -                      | -                      | 110                    |
| <b>c. Metal Production</b>   | <b>15 400</b>    | -               | -                      | -                | -                      | -                      | <b>4 950</b>           | <b>2 700</b>           | -                      | <b>23 100</b>          |
| Iron and Steel Production  | 11 500           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 11 500                 |
| Aluminum Production  | 3 900            | -               | -                      | -                | -                      | -                      | 4 950                  | 45.1                   | -                      | 8 890                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 2 660                  | -                      | 2 660                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>3 600</b>           | <b>37</b>              | <b>200</b>             | <b>0.2</b>             | <b>3 800</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>11 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>11 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>1.5</b>       | <b>430</b>             | -                      | -                      | -                      | -                      | <b>430</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 300</b>    | <b>33 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>59 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 100</b>    | <b>28 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>28 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>160</b>      | <b>4 000</b>           | <b>17.4</b>      | <b>5 180</b>           | -                      | -                      | -                      | -                      | <b>9 200</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>65</b>        | <b>19 000</b>          | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| Direct Sources   | -                | -               | -                      | 52               | 16 000                 | -                      | -                      | -                      | -                      | 16 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>4</b>        | <b>100</b>             | <b>0.1</b>       | <b>30</b>              | -                      | -                      | -                      | -                      | <b>100</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>530</b>       | <b>1 000</b>    | <b>25 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>990</b>      | <b>25 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>14</b>       | <b>350</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>950</b>             |
| <b>c. Waste Incineration</b>   | <b>530</b>       | <b>0.07</b>     | <b>2</b>               | <b>0.7</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>740</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-80 000</b>   | <b>100</b>      | <b>2 600</b>           | <b>3.9</b>       | <b>1 200</b>           | -                      | -                      | -                      | -                      | <b>-77 000</b>         |
| <b>a. Forest Land</b>  | <b>-250 000</b>  | <b>62</b>       | <b>1 600</b>           | <b>2.6</b>       | <b>780</b>             | -                      | -                      | -                      | -                      | <b>-250 000</b>        |
| <b>b. Cropland</b>   | <b>-2 300</b>    | <b>5</b>        | <b>100</b>             | <b>0.3</b>       | <b>80</b>              | -                      | -                      | -                      | -                      | <b>-2 100</b>          |
| <b>c. Grassland</b>  | -                | <b>30</b>       | <b>800</b>             | <b>0.8</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>d. Wetlands</b>   | <b>4 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>3 000</b>     | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>60</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>170 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>170 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-17 1999 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>549 000</b>   | <b>4 800</b>    | <b>120 000</b>         | <b>140</b>       | <b>40 000</b>          | <b>3 000</b>           | <b>5 400</b>           | <b>2 400</b>           | <b>0.2</b>             | <b>722 000</b>         |
| <b>ENERGY</b>  | <b>508 000</b>   | <b>2 600</b>    | <b>64 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>584 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>321 000</b>   | <b>400</b>      | <b>9 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>333 000</b>         |
| Public Electricity and Heat Production   | 119 000          | 4               | 100                    | 2                | 700                    | -                      | -                      | -                      | -                      | 120 000                |
| Petroleum Refining Industries  | 17 200           | 0.3             | 7                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 17 000                 |
| Mining and Upstream Oil and Gas Production   | 56 300           | 110             | 2 800                  | 1                | 400                    | -                      | -                      | -                      | -                      | 59 400                 |
| Manufacturing Industries   | 55 200           | 3               | 70                     | 2                | 600                    | -                      | -                      | -                      | -                      | 55 900                 |
| Iron and Steel   | 6 280            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 350                  |
| Non Ferrous Metals   | 3 680            | 0.07            | 2                      | 0.05             | 20                     | -                      | -                      | -                      | -                      | 3 700                  |
| Chemical   | 11 100           | 0.23            | 5.7                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 11 200                 |
| Pulp and Paper   | 12 200           | 2               | 40                     | 1                | 400                    | -                      | -                      | -                      | -                      | 12 600                 |
| Cement   | 4 430            | 0.16            | 3.9                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 4 450                  |
| Other Manufacturing  | 17 500           | 0.48            | 12                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 17 600                 |
| Construction   | 1 160            | 0.02            | 0.5                    | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 170                  |
| Commercial and Institutional   | 28 900           | 0.53            | 13                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 29 100                 |
| Residential  | 40 400           | 200             | 6 000                  | 3                | 1 000                  | -                      | -                      | -                      | -                      | 47 600                 |
| Agriculture and Forestry   | 2 660            | 0.04            | 1.1                    | 0.06             | 18                     | -                      | -                      | -                      | -                      | 2 680                  |
| <b>b. Transport<sup>2</sup></b>  | <b>171 000</b>   | <b>40</b>       | <b>900</b>             | <b>30</b>        | <b>9 000</b>           | -                      | -                      | -                      | -                      | <b>181 000</b>         |
| Domestic Aviation  | 7 730            | 0.4             | 9                      | 0.2              | 70                     | -                      | -                      | -                      | -                      | 7 800                  |
| Road Transportation  | 112 000          | 10              | 300                    | 18               | 5 500                  | -                      | -                      | -                      | -                      | 118 000                |
| Light-Duty Gasoline Vehicles   | 40 000           | 5.3             | 130                    | 8.7              | 2 600                  | -                      | -                      | -                      | -                      | 42 800                 |
| Light-Duty Gasoline Trucks   | 33 400           | 3.9             | 97                     | 7.9              | 2 400                  | -                      | -                      | -                      | -                      | 35 900                 |
| Heavy-Duty Gasoline Vehicles   | 5 360            | 0.53            | 13                     | 0.25             | 73                     | -                      | -                      | -                      | -                      | 5 440                  |
| Motorcycles  | 144              | 0.09            | 2.3                    | 0.0              | 0.82                   | -                      | -                      | -                      | -                      | 147                    |
| Light-Duty Diesel Vehicles   | 439              | 0.01            | 0.3                    | 0.03             | 10                     | -                      | -                      | -                      | -                      | 449                    |
| Light-Duty Diesel Trucks   | 1 540            | 0.04            | 1                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 1 570                  |
| Heavy-Duty Diesel Vehicles   | 29 900           | 1               | 30                     | 1                | 400                    | -                      | -                      | -                      | -                      | 30 300                 |
| Propane and Natural Gas Vehicles   | 1 470            | 1               | 30                     | 0.03             | 9                      | -                      | -                      | -                      | -                      | 1 500                  |
| Railways   | 5 690            | 0.3             | 8                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 400                  |
| Domestic Navigation  | 4 720            | 0.3             | 8                      | 1                | 300                    | -                      | -                      | -                      | -                      | 5 100                  |
| Other Transportation   | 40 100           | 20              | 600                    | 8                | 2 000                  | -                      | -                      | -                      | -                      | 43 000                 |
| Off-Road Gasoline  | 9 160            | 10              | 300                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 9 500                  |
| Off-Road Diesel  | 18 800           | 1               | 30                     | 8                | 2 000                  | -                      | -                      | -                      | -                      | 21 000                 |
| Pipeline Transport   | 12 200           | 12              | 310                    | 0.3              | 100                    | -                      | -                      | -                      | -                      | 12 600                 |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>    | <b>2 200</b>    | <b>54 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>70 000</b>          |
| Coal Mining  | -                | 70              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 16 000           | 2 100           | 52 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 69 000                 |
| Oil  | 130              | 250             | 6 200                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 400                  |
| Natural Gas  | 53               | 780             | 19 000                 | -                | -                      | -                      | -                      | -                      | -                      | 19 000                 |
| Venting  | 11 000           | 1 100           | 27 000                 | -                | -                      | -                      | -                      | -                      | -                      | 37 000                 |
| Flaring  | 5 400            | 8.2             | 200                    | 0.01             | 3                      | -                      | -                      | -                      | -                      | 5 600                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>39 400</b>    | <b>4.1</b>      | <b>100</b>             | <b>10.8</b>      | <b>3 200</b>           | <b>3 000</b>           | <b>5 400</b>           | <b>2 400</b>           | <b>0.2</b>             | <b>53 500</b>          |
| <b>a. Mineral Products</b>   | <b>9 900</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>9 900</b>           |
| Cement Production  | 7 100            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 7 100                  |
| Lime Production  | 1 920            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 920                  |
| Mineral Product Use  | 960              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 960                    |
| <b>b. Chemical Industry</b>  | <b>3 000</b>     | <b>4.1</b>      | <b>100</b>             | <b>9.4</b>       | <b>2 800</b>           | -                      | -                      | -                      | -                      | <b>5 900</b>           |
| Ammonia Production   | 3 000            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 3 000                  |
| Nitric Acid Production   | -                | -               | -                      | 3.8              | 1 100                  | -                      | -                      | -                      | -                      | 1 100                  |
| Adipic Acid Production   | -                | -               | -                      | 5.6              | 1 700                  | -                      | -                      | -                      | -                      | 1 700                  |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4.1             | 100                    | 0.02             | 6.7                    | -                      | -                      | -                      | -                      | 110                    |
| <b>c. Metal Production</b>   | <b>15 400</b>    | -               | -                      | -                | -                      | -                      | <b>5 340</b>           | <b>2 220</b>           | -                      | <b>23 000</b>          |
| Iron and Steel Production  | 11 500           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 11 500                 |
| Aluminum Production  | 3 950            | -               | -                      | -                | -                      | -                      | 5 340                  | 51.1                   | -                      | 9 340                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 2 160                  | -                      | 2 160                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>3 000</b>           | <b>28</b>              | <b>200</b>             | <b>0.2</b>             | <b>3 200</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>11 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>11 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>1.3</b>       | <b>390</b>             | -                      | -                      | -                      | -                      | <b>390</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 300</b>    | <b>32 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>58 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 100</b>    | <b>28 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>28 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>160</b>      | <b>3 900</b>           | <b>16.9</b>      | <b>5 050</b>           | -                      | -                      | -                      | -                      | <b>8 900</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>65</b>        | <b>19 000</b>          | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| Direct Sources   | -                | -               | -                      | 53               | 16 000                 | -                      | -                      | -                      | -                      | 16 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>5</b>        | <b>100</b>             | <b>0.1</b>       | <b>30</b>              | -                      | -                      | -                      | -                      | <b>100</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>480</b>       | <b>1 000</b>    | <b>25 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>990</b>      | <b>25 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>360</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>960</b>             |
| <b>c. Waste Incineration</b>   | <b>480</b>       | <b>0.06</b>     | <b>1</b>               | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>660</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-25 000</b>   | <b>330</b>      | <b>8 300</b>           | <b>14</b>        | <b>4 100</b>           | -                      | -                      | -                      | -                      | <b>-12 000</b>         |
| <b>a. Forest Land</b>  | <b>-190 000</b>  | <b>300</b>      | <b>7 400</b>           | <b>13</b>        | <b>3 700</b>           | -                      | -                      | -                      | -                      | <b>-180 000</b>        |
| <b>b. Cropland</b>   | <b>-990</b>      | <b>6</b>        | <b>100</b>             | <b>0.3</b>       | <b>90</b>              | -                      | -                      | -                      | -                      | <b>-750</b>            |
| <b>c. Grassland</b>  | -                | <b>20</b>       | <b>600</b>             | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>800</b>             |
| <b>d. Wetlands</b>   | <b>5 000</b>     | <b>2</b>        | <b>40</b>              | <b>0.07</b>      | <b>20</b>              | -                      | -                      | -                      | -                      | <b>5 000</b>           |
| <b>e. Settlements</b>  | <b>3 000</b>     | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>60</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>160 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-18 1998 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCS <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>534 000</b>   | <b>4 900</b>    | <b>120 000</b>         | <b>140</b>       | <b>43 000</b>          | <b>2 400</b>           | <b>6 500</b>           | <b>2 400</b>           | <b>0.3</b>             | <b>709 000</b>         |
| <b>ENERGY</b>  | <b>493 000</b>   | <b>2 600</b>    | <b>65 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>570 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>309 000</b>   | <b>400</b>      | <b>9 000</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>321 000</b>         |
| Public Electricity and Heat Production   | 122 000          | 4               | 99                     | 2                | 700                    | -                      | -                      | -                      | -                      | 123 000                |
| Petroleum Refining Industries  | 18 200           | 0.3             | 7                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 18 000                 |
| Mining and Upstream Oil and Gas Production   | 45 200           | 86              | 2 100                  | 1                | 300                    | -                      | -                      | -                      | -                      | 47 700                 |
| Manufacturing Industries   | 54 200           | 3               | 70                     | 2                | 600                    | -                      | -                      | -                      | -                      | 54 800                 |
| Iron and Steel   | 6 180            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 250                  |
| Non Ferrous Metals   | 3 870            | 0.08            | 2                      | 0.06             | 20                     | -                      | -                      | -                      | -                      | 3 890                  |
| Chemical   | 10 800           | 0.22            | 5.5                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 10 800                 |
| Pulp and Paper   | 11 800           | 1               | 40                     | 1                | 300                    | -                      | -                      | -                      | -                      | 12 200                 |
| Cement   | 4 160            | 0.15            | 3.9                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 4 180                  |
| Other Manufacturing  | 17 400           | 0.48            | 12                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 17 500                 |
| Construction   | 1 110            | 0.02            | 0.47                   | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 120                  |
| Commercial and Institutional   | 27 300           | 0.5             | 13                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 27 500                 |
| Residential  | 38 600           | 300             | 7 000                  | 3                | 1 000                  | -                      | -                      | -                      | -                      | 46 100                 |
| Agriculture and Forestry   | 2 580            | 0.04            | 1.1                    | 0.06             | 17                     | -                      | -                      | -                      | -                      | 2 600                  |
| <b>b. Transport<sup>2</sup></b>  | <b>167 000</b>   | <b>40</b>       | <b>900</b>             | <b>30</b>        | <b>9 000</b>           | -                      | -                      | -                      | -                      | <b>176 000</b>         |
| Domestic Aviation  | 7 360            | 0.4             | 9                      | 0.2              | 70                     | -                      | -                      | -                      | -                      | 7 400                  |
| Road Transportation  | 109 000          | 10              | 300                    | 18               | 5 200                  | -                      | -                      | -                      | -                      | 115 000                |
| Light-Duty Gasoline Vehicles   | 39 100           | 5.4             | 130                    | 8.6              | 2 600                  | -                      | -                      | -                      | -                      | 41 800                 |
| Light-Duty Gasoline Trucks   | 31 400           | 3.7             | 91                     | 7.4              | 2 200                  | -                      | -                      | -                      | -                      | 33 700                 |
| Heavy-Duty Gasoline Vehicles   | 5 820            | 0.64            | 16                     | 0.23             | 69                     | -                      | -                      | -                      | -                      | 5 910                  |
| Motorcycles  | 147              | 0.11            | 2.6                    | 0.0              | 0.86                   | -                      | -                      | -                      | -                      | 151                    |
| Light-Duty Diesel Vehicles   | 421              | 0.01            | 0.3                    | 0.03             | 10                     | -                      | -                      | -                      | -                      | 430                    |
| Light-Duty Diesel Trucks   | 1 540            | 0.04            | 1                      | 0.1              | 40                     | -                      | -                      | -                      | -                      | 1 580                  |
| Heavy-Duty Diesel Vehicles   | 29 300           | 1               | 30                     | 1                | 400                    | -                      | -                      | -                      | -                      | 29 700                 |
| Propane and Natural Gas Vehicles   | 1 740            | 1               | 30                     | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 800                  |
| Railways   | 5 380            | 0.3             | 7                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 000                  |
| Domestic Navigation  | 4 890            | 0.3             | 9                      | 1                | 300                    | -                      | -                      | -                      | -                      | 5 200                  |
| Other Transportation   | 39 400           | 20              | 600                    | 8                | 2 000                  | -                      | -                      | -                      | -                      | 42 000                 |
| Off-Road Gasoline  | 9 750            | 10              | 300                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 10 000                 |
| Off-Road Diesel  | 17 500           | 1               | 20                     | 7                | 2 000                  | -                      | -                      | -                      | -                      | 20 000                 |
| Pipeline Transport   | 12 100           | 12              | 300                    | 0.3              | 100                    | -                      | -                      | -                      | -                      | 12 500                 |
| <b>c. Fugitive Sources</b>   | <b>18 000</b>    | <b>2 200</b>    | <b>55 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>73 000</b>          |
| Coal Mining  | -                | 80              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 18 000           | 2 100           | 53 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 71 000                 |
| Oil  | 120              | 250             | 6 300                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 400                  |
| Natural Gas  | 59               | 800             | 20 000                 | -                | -                      | -                      | -                      | -                      | -                      | 20 000                 |
| Venting  | 10 000           | 1 100           | 27 000                 | -                | -                      | -                      | -                      | -                      | -                      | 37 000                 |
| Flaring  | 7 100            | 9               | 230                    | 0.02             | 5                      | -                      | -                      | -                      | -                      | 7 400                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>38 200</b>    | <b>3.6</b>      | <b>91</b>              | <b>21</b>        | <b>6 260</b>           | <b>2 400</b>           | <b>6 500</b>           | <b>2 400</b>           | <b>0.3</b>             | <b>55 800</b>          |
| <b>a. Mineral Products</b>   | <b>9 700</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>9 700</b>           |
| Cement Production  | 6 800            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 6 800                  |
| Lime Production  | 1 850            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 850                  |
| Mineral Product Use  | 1 100            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 100                  |
| <b>b. Chemical Industry</b>  | <b>3 100</b>     | <b>3.6</b>      | <b>91</b>              | <b>20</b>        | <b>5 900</b>           | -                      | -                      | -                      | -                      | <b>9 100</b>           |
| Ammonia Production   | 3 100            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 3 100                  |
| Nitric Acid Production   | -                | -               | -                      | 3.3              | 1 000                  | -                      | -                      | -                      | -                      | 1 000                  |
| Adipic Acid Production   | -                | -               | -                      | 16               | 4 900                  | -                      | -                      | -                      | -                      | 4 900                  |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 3.6             | 91                     | 0.02             | 7.2                    | -                      | -                      | -                      | -                      | 98                     |
| <b>c. Metal Production</b>   | <b>15 200</b>    | -               | -                      | -                | -                      | <b>6 450</b>           | <b>2 160</b>           | -                      | -                      | <b>23 800</b>          |
| Iron and Steel Production  | 11 200           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 11 200                 |
| Aluminum Production  | 3 980            | -               | -                      | -                | -                      | 6 450                  | 56.4                   | -                      | -                      | 10 500                 |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | 2 100                  | -                      | -                      | 2 100                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>2 400</b>           | <b>22</b>              | <b>200</b>             | <b>0.3</b>             | <b>2 600</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>10 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>10 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>1.3</b>       | <b>390</b>             | -                      | -                      | -                      | -                      | <b>390</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 300</b>    | <b>32 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>58 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 100</b>    | <b>28 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>28 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>150</b>      | <b>3 900</b>           | <b>16.7</b>      | <b>4 960</b>           | -                      | -                      | -                      | -                      | <b>8 800</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>64</b>        | <b>19 000</b>          | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| Direct Sources   | -                | -               | -                      | 52               | 16 000                 | -                      | -                      | -                      | -                      | 16 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>6</b>        | <b>200</b>             | <b>0.2</b>       | <b>50</b>              | -                      | -                      | -                      | -                      | <b>200</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2 000</b>           |
| <b>WASTE</b>   | <b>530</b>       | <b>980</b>      | <b>25 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>970</b>      | <b>24 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>24 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>380</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>960</b>             |
| <b>c. Waste Incineration</b>   | <b>530</b>       | <b>0.06</b>     | <b>2</b>               | <b>0.7</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>730</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>94 000</b>    | <b>800</b>      | <b>20 000</b>          | <b>33</b>        | <b>9 900</b>           | -                      | -                      | -                      | -                      | <b>120 000</b>         |
| <b>a. Forest Land</b>  | <b>-69 000</b>   | <b>760</b>      | <b>19 000</b>          | <b>32</b>        | <b>9 600</b>           | -                      | -                      | -                      | -                      | <b>-41 000</b>         |
| <b>b. Cropland</b>   | <b>300</b>       | <b>6</b>        | <b>200</b>             | <b>0.3</b>       | <b>90</b>              | -                      | -                      | -                      | -                      | <b>540</b>             |
| <b>c. Grassland</b>  | -                | <b>20</b>       | <b>500</b>             | <b>0.5</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>700</b>             |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.9</b>      | <b>20</b>              | <b>0.04</b>      | <b>10</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>3 000</b>     | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>50</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>160 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9–19 1997 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                 |                 |                 |                                 |                  |                                  |                           |                           |                                     |                                     |
|--|----------------------------------|-----------------|-----------------|---------------------------------|------------------|----------------------------------|---------------------------|---------------------------|-------------------------------------|-------------------------------------|
|  | CO <sub>2</sub>                  | CH <sub>4</sub> | CH <sub>4</sub> | N <sub>2</sub> O                | N <sub>2</sub> O | HFCs <sup>5</sup>                | PFCs <sup>5</sup>         | SF <sub>6</sub>           | NF <sub>3</sub>                     | TOTAL                               |
|  | Global Warming Potential<br>Unit | kt              | kt              | 25<br>kt CO <sub>2</sub><br>eq. | kt               | 298<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | 22 800<br>kt CO <sub>2</sub><br>eq. | 17 200<br>kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>524 000</b>                   | <b>4 800</b>    | <b>120 000</b>  | <b>160</b>                      | <b>47 000</b>    | <b>1 900</b>                     | <b>6 400</b>              | <b>1 800</b>              | <b>0.3</b>                          | <b>701 000</b>                      |
| <b>ENERGY</b>  | <b>485 000</b>                   | <b>2 500</b>    | <b>64 000</b>   | <b>40</b>                       | <b>10 000</b>    | -                                | -                         | -                         | -                                   | <b>560 000</b>                      |
| <b>a. Stationary Combustion Sources</b>  | <b>305 000</b>                   | <b>300</b>      | <b>8 000</b>    | <b>9</b>                        | <b>3 000</b>     | -                                | -                         | -                         | -                                   | <b>316 000</b>                      |
| Public Electricity and Heat Production   | 109 000                          | 3.2             | 81              | 2                               | 600              | -                                | -                         | -                         | -                                   | 110 000                             |
| Petroleum Refining Industries  | 18 500                           | 0.3             | 8               | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 19 000                              |
| Mining and Upstream Oil and Gas Production   | 42 200                           | 73              | 1 800           | 1                               | 300              | -                                | -                         | -                         | -                                   | 44 300                              |
| Manufacturing Industries   | 57 200                           | 3               | 60              | 2                               | 600              | -                                | -                         | -                         | -                                   | 57 800                              |
| Iron and Steel   | 6 120                            | 0.3             | 7               | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 6 180                               |
| Non Ferrous Metals   | 3 880                            | 0.08            | 2               | 0.06                            | 20               | -                                | -                         | -                         | -                                   | 3 900                               |
| Chemical   | 10 200                           | 0.21            | 5.3             | 0.2                             | 50               | -                                | -                         | -                         | -                                   | 10 200                              |
| Pulp and Paper   | 12 900                           | 1               | 40              | 1                               | 300              | -                                | -                         | -                         | -                                   | 13 300                              |
| Cement   | 4 010                            | 0.12            | 3               | 0.05                            | 10               | -                                | -                         | -                         | -                                   | 4 030                               |
| Other Manufacturing  | 20 100                           | 0.43            | 11              | 0.4                             | 100              | -                                | -                         | -                         | -                                   | 20 200                              |
| Construction   | 1 240                            | 0.02            | 0.51            | 0.03                            | 10               | -                                | -                         | -                         | -                                   | 1 250                               |
| Commercial and Institutional   | 29 900                           | 0.54            | 14              | 0.6                             | 200              | -                                | -                         | -                         | -                                   | 30 100                              |
| Residential  | 43 700                           | 200             | 6 000           | 3                               | 1 000            | -                                | -                         | -                         | -                                   | 50 800                              |
| Agriculture and Forestry   | 2 900                            | 0.04            | 1.1             | 0.07                            | 20               | -                                | -                         | -                         | -                                   | 2 920                               |
| <b>b. Transport<sup>2</sup></b>  | <b>163 000</b>                   | <b>40</b>       | <b>900</b>      | <b>30</b>                       | <b>9 000</b>     | -                                | -                         | -                         | -                                   | <b>173 000</b>                      |
| Domestic Aviation  | 7 070                            | 0.3             | 8               | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 7 100                               |
| Road Transportation  | 107 000                          | 10              | 300             | 17                              | 5 100            | -                                | -                         | -                         | -                                   | 112 000                             |
| Light-Duty Gasoline Vehicles   | 40 400                           | 5.7             | 140             | 8.8                             | 2 600            | -                                | -                         | -                         | -                                   | 43 200                              |
| Light-Duty Gasoline Trucks   | 29 200                           | 3.4             | 86              | 6.9                             | 2 000            | -                                | -                         | -                         | -                                   | 31 300                              |
| Heavy-Duty Gasoline Vehicles   | 5 730                            | 0.71            | 18              | 0.19                            | 56               | -                                | -                         | -                         | -                                   | 5 800                               |
| Motorcycles  | 125                              | 0.1             | 2.5             | 0.0                             | 0.74             | -                                | -                         | -                         | -                                   | 129                                 |
| Light-Duty Diesel Vehicles   | 406                              | 0.01            | 0.3             | 0.03                            | 9                | -                                | -                         | -                         | -                                   | 416                                 |
| Light-Duty Diesel Trucks   | 1 400                            | 0.04            | 0.9             | 0.1                             | 30               | -                                | -                         | -                         | -                                   | 1 430                               |
| Heavy-Duty Diesel Vehicles   | 27 500                           | 1               | 30              | 1                               | 300              | -                                | -                         | -                         | -                                   | 27 900                              |
| Propane and Natural Gas Vehicles   | 1 800                            | 1               | 30              | 0.04                            | 10               | -                                | -                         | -                         | -                                   | 1 800                               |
| Railways   | 5 580                            | 0.3             | 8               | 2                               | 700              | -                                | -                         | -                         | -                                   | 6 300                               |
| Domestic Navigation  | 4 250                            | 0.3             | 7               | 1                               | 300              | -                                | -                         | -                         | -                                   | 4 600                               |
| Other Transportation   | 39 700                           | 20              | 600             | 8                               | 2 000            | -                                | -                         | -                         | -                                   | 43 000                              |
| Off-Road Gasoline  | 8 630                            | 10              | 300             | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 8 900                               |
| Off-Road Diesel  | 18 900                           | 1               | 30              | 8                               | 2 000            | -                                | -                         | -                         | -                                   | 21 000                              |
| Pipeline Transport   | 12 200                           | 12              | 310             | 0.3                             | 100              | -                                | -                         | -                         | -                                   | 12 600                              |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>                    | <b>2 200</b>    | <b>55 000</b>   | <b>0.1</b>                      | <b>40</b>        | -                                | -                         | -                         | -                                   | <b>71 000</b>                       |
| Coal Mining  | -                                | 90              | 2 000           | -                               | -                | -                                | -                         | -                         | -                                   | 2 000                               |
| Oil and Natural Gas  | 16 000                           | 2 100           | 52 000          | 0.1                             | 40               | -                                | -                         | -                         | -                                   | 69 000                              |
| Oil  | 120                              | 260             | 6 500           | 0.1                             | 30               | -                                | -                         | -                         | -                                   | 6 600                               |
| Natural Gas  | 47                               | 740             | 18 000          | -                               | -                | -                                | -                         | -                         | -                                   | 18 000                              |
| Venting  | 10 000                           | 1 100           | 27 000          | -                               | -                | -                                | -                         | -                         | -                                   | 38 000                              |
| Flaring  | 5 600                            | 7.8             | 200             | 0.01                            | 3                | -                                | -                         | -                         | -                                   | 5 800                               |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                                | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | -                                   |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>37 800</b>                    | <b>3.8</b>      | <b>95</b>       | <b>36.1</b>                     | <b>10 700</b>    | <b>1 900</b>                     | <b>6 400</b>              | <b>1 800</b>              | <b>-</b>                            | <b>58 700</b>                       |
| <b>a. Mineral Products</b>   | <b>9 600</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>9 600</b>                        |
| Cement Production  | 6 600                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 6 600                               |
| Lime Production  | 1 860                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 1 860                               |
| Mineral Product Use  | 1 100                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 1 100                               |
| <b>b. Chemical Industry</b>  | <b>2 800</b>                     | <b>3.8</b>      | <b>95</b>       | <b>35</b>                       | <b>11 000</b>    | -                                | -                         | -                         | -                                   | <b>13 000</b>                       |
| Ammonia Production   | 2 800                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 2 800                               |
| Nitric Acid Production   | -                                | -               | -               | 3.4                             | 1 000            | -                                | -                         | -                         | -                                   | 1 000                               |
| Adipic Acid Production   | -                                | -               | -               | 32                              | 9 500            | -                                | -                         | -                         | -                                   | 9 500                               |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                | 3.8             | 95              | 0.03                            | 8.1              | -                                | -                         | -                         | -                                   | 100                                 |
| <b>c. Metal Production</b>   | <b>14 900</b>                    | -               | -               | -                               | -                | -                                | <b>6 350</b>              | <b>1 650</b>              | -                                   | <b>22 900</b>                       |
| Iron and Steel Production  | 11 000                           | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 11 000                              |
| Aluminum Production  | 3 930                            | -               | -               | -                               | -                | -                                | 6 350                     | 56.4                      | -                                   | 10 300                              |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                | -               | -               | -                               | -                | -                                | -                         | 1 600                     | -                                   | 1 600                               |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                                | -               | -               | -                               | -                | <b>1 900</b>                     | <b>23</b>                 | <b>180</b>                | <b>0.3</b>                          | <b>2 100</b>                        |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>11 000</b>                    | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>11 000</b>                       |
| <b>f. Other Product Manufacture and Use</b>  | -                                | -               | -               | <b>0.74</b>                     | <b>220</b>       | -                                | -                         | -                         | -                                   | <b>220</b>                          |
| <b>AGRICULTURE</b>   | -                                | <b>1 300</b>    | <b>32 000</b>   | <b>80</b>                       | <b>20 000</b>    | -                                | -                         | -                         | -                                   | <b>57 000</b>                       |
| <b>a. Enteric Fermentation</b>   | -                                | <b>1 100</b>    | <b>28 000</b>   | -                               | -                | -                                | -                         | -                         | -                                   | <b>28 000</b>                       |
| <b>b. Manure Management</b>  | -                                | <b>150</b>      | <b>3 800</b>    | <b>16.4</b>                     | <b>4 880</b>     | -                                | -                         | -                         | -                                   | <b>8 700</b>                        |
| <b>c. Agriculture Soils</b>  | -                                | -               | -               | <b>63</b>                       | <b>19 000</b>    | -                                | -                         | -                         | -                                   | <b>19 000</b>                       |
| Direct Sources   | -                                | -               | -               | 51                              | 15 000           | -                                | -                         | -                         | -                                   | 15 000                              |
| Indirect Sources   | -                                | -               | -               | 10                              | 4 000            | -                                | -                         | -                         | -                                   | 4 000                               |
| <b>d. Field Burning of Agricultural Residues</b>   | -                                | <b>6</b>        | <b>100</b>      | <b>0.1</b>                      | <b>40</b>        | -                                | -                         | -                         | -                                   | <b>200</b>                          |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>2 000</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>2 000</b>                        |
| <b>WASTE</b>   | <b>500</b>                       | <b>970</b>      | <b>24 000</b>   | <b>3</b>                        | <b>700</b>       | -                                | -                         | -                         | -                                   | <b>26 000</b>                       |
| <b>a. Solid Waste Disposal on Land</b>   | -                                | <b>960</b>      | <b>24 000</b>   | -                               | -                | -                                | -                         | -                         | -                                   | <b>24 000</b>                       |
| <b>b. Wastewater Handling</b>  | -                                | <b>16</b>       | <b>390</b>      | <b>2</b>                        | <b>600</b>       | -                                | -                         | -                         | -                                   | <b>960</b>                          |
| <b>c. Waste Incineration</b>   | <b>500</b>                       | <b>0.05</b>     | <b>1</b>        | <b>0.6</b>                      | <b>200</b>       | -                                | -                         | -                         | -                                   | <b>680</b>                          |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-92 000</b>                   | <b>110</b>      | <b>2 800</b>    | <b>4.4</b>                      | <b>1 300</b>     | -                                | -                         | -                         | -                                   | <b>-88 000</b>                      |
| <b>a. Forest Land</b>  | <b>-260 000</b>                  | <b>84</b>       | <b>2 100</b>    | <b>3.5</b>                      | <b>1 000</b>     | -                                | -                         | -                         | -                                   | <b>-260 000</b>                     |
| <b>b. Cropland</b>   | <b>1 600</b>                     | <b>6</b>        | <b>200</b>      | <b>0.3</b>                      | <b>90</b>        | -                                | -                         | -                         | -                                   | <b>1 900</b>                        |
| <b>c. Grassland</b>  | -                                | <b>20</b>       | <b>400</b>      | <b>0.4</b>                      | <b>100</b>       | -                                | -                         | -                         | -                                   | <b>600</b>                          |
| <b>d. Wetlands</b>   | <b>4 000</b>                     | <b>0.1</b>      | <b>4</b>        | <b>0.01</b>                     | <b>2</b>         | -                                | -                         | -                         | -                                   | <b>4 000</b>                        |
| <b>e. Settlements</b>  | <b>3 000</b>                     | <b>5</b>        | <b>100</b>      | <b>0.2</b>                      | <b>50</b>        | -                                | -                         | -                         | -                                   | <b>3 000</b>                        |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>                   | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>160 000</b>                      |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
  - Indicates no emissions
  - 0.0 Indicates emissions truncated due to rounding

Table A9-20 1996 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>510 000</b>   | <b>4 700</b>    | <b>120 000</b>         | <b>160</b>       | <b>48 000</b>          | <b>1 400</b>           | <b>6 500</b>           | <b>1 800</b>           | <b>0.3</b>             | <b>685 000</b>         |
| <b>ENERGY</b>  | <b>471 000</b>   | <b>2 500</b>    | <b>62 000</b>          | <b>40</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>544 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>298 000</b>   | <b>300</b>      | <b>8 000</b>           | <b>9</b>         | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>309 000</b>         |
| Public Electricity and Heat Production   | 97 800           | 2.6             | 66                     | 2                | 500                    | -                      | -                      | -                      | -                      | 98 400                 |
| Petroleum Refining Industries  | 18 700           | 0.3             | 8                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 19 000                 |
| Mining and Upstream Oil and Gas Production   | 43 600           | 77              | 1 900                  | 1                | 300                    | -                      | -                      | -                      | -                      | 45 800                 |
| Manufacturing Industries   | 57 000           | 3               | 60                     | 2                | 600                    | -                      | -                      | -                      | -                      | 57 700                 |
| Iron and Steel   | 6 100            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 170                  |
| Non Ferrous Metals   | 4 000            | 0.08            | 2                      | 0.06             | 20                     | -                      | -                      | -                      | -                      | 4 020                  |
| Chemical   | 9 860            | 0.21            | 5.1                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 9 920                  |
| Pulp and Paper   | 13 100           | 1               | 30                     | 1                | 300                    | -                      | -                      | -                      | -                      | 13 500                 |
| Cement   | 4 100            | 0.18            | 4.6                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 4 120                  |
| Other Manufacturing  | 19 800           | 0.42            | 11                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 20 000                 |
| Construction   | 1 260            | 0.02            | 0.52                   | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 270                  |
| Commercial and Institutional   | 29 400           | 0.53            | 13                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 29 600                 |
| Residential  | 47 000           | 300             | 6 000                  | 3                | 1 000                  | -                      | -                      | -                      | -                      | 54 400                 |
| Agriculture and Forestry   | 2 910            | 0.04            | 1.1                    | 0.07             | 20                     | -                      | -                      | -                      | -                      | 2 930                  |
| <b>b. Transport<sup>2</sup></b>  | <b>158 000</b>   | <b>40</b>       | <b>900</b>             | <b>30</b>        | <b>8 000</b>           | -                      | -                      | -                      | -                      | <b>167 000</b>         |
| Domestic Aviation  | 7 020            | 0.3             | 8                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 7 100                  |
| Road Transportation  | 102 000          | 10              | 300                    | 16               | 4 800                  | -                      | -                      | -                      | -                      | 107 000                |
| Light-Duty Gasoline Vehicles   | 40 500           | 5.9             | 150                    | 8.7              | 2 600                  | -                      | -                      | -                      | -                      | 43 200                 |
| Light-Duty Gasoline Trucks   | 26 700           | 3.2             | 81                     | 6.2              | 1 800                  | -                      | -                      | -                      | -                      | 28 600                 |
| Heavy-Duty Gasoline Vehicles   | 5 830            | 0.77            | 19                     | 0.16             | 48                     | -                      | -                      | -                      | -                      | 5 890                  |
| Motorcycles  | 119              | 0.11            | 2.7                    | 0.0              | 0.72                   | -                      | -                      | -                      | -                      | 122                    |
| Light-Duty Diesel Vehicles   | 406              | 0.01            | 0.3                    | 0.03             | 9                      | -                      | -                      | -                      | -                      | 415                    |
| Light-Duty Diesel Trucks   | 1 280            | 0.03            | 0.8                    | 0.1              | 30                     | -                      | -                      | -                      | -                      | 1 310                  |
| Heavy-Duty Diesel Vehicles   | 25 500           | 1               | 30                     | 0.9              | 300                    | -                      | -                      | -                      | -                      | 25 800                 |
| Propane and Natural Gas Vehicles   | 1 940            | 1               | 30                     | 0.04             | 10                     | -                      | -                      | -                      | -                      | 2 000                  |
| Railways   | 5 500            | 0.3             | 8                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 200                  |
| Domestic Navigation  | 4 170            | 0.3             | 7                      | 1                | 300                    | -                      | -                      | -                      | -                      | 4 500                  |
| Other Transportation   | 38 600           | 20              | 600                    | 8                | 2 000                  | -                      | -                      | -                      | -                      | 41 000                 |
| Off-Road Gasoline  | 9 190            | 10              | 300                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 9 500                  |
| Off-Road Diesel  | 17 300           | 0.9             | 20                     | 7                | 2 000                  | -                      | -                      | -                      | -                      | 19 000                 |
| Pipeline Transport   | 12 100           | 12              | 300                    | 0.3              | 100                    | -                      | -                      | -                      | -                      | 12 500                 |
| <b>c. Fugitive Sources</b>   | <b>16 000</b>    | <b>2 100</b>    | <b>53 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>69 000</b>          |
| Coal Mining  | -                | 90              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 16 000           | 2 000           | 50 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 66 000                 |
| Oil  | 120              | 250             | 6 200                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 6 300                  |
| Natural Gas  | 52               | 750             | 19 000                 | -                | -                      | -                      | -                      | -                      | -                      | 19 000                 |
| Venting  | 10 000           | 1 000           | 25 000                 | -                | -                      | -                      | -                      | -                      | -                      | 36 000                 |
| Flaring  | 5 400            | 7.7             | 190                    | 0.01             | 3                      | -                      | -                      | -                      | -                      | 5 600                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>36 800</b>    | <b>4</b>        | <b>99</b>              | <b>41.3</b>      | <b>12 300</b>          | <b>1 400</b>           | <b>6 500</b>           | <b>1 800</b>           | <b>-</b>               | <b>58 900</b>          |
| <b>a. Mineral Products</b>   | <b>8 900</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>8 900</b>           |
| Cement Production  | 6 100            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 6 100                  |
| Lime Production  | 1 800            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 800                  |
| Mineral Product Use  | 1 000            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 000                  |
| <b>b. Chemical Industry</b>  | <b>2 800</b>     | <b>4</b>        | <b>99</b>              | <b>41</b>        | <b>12 000</b>          | -                      | -                      | -                      | -                      | <b>15 000</b>          |
| Ammonia Production   | 2 800            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 800                  |
| Nitric Acid Production   | -                | -               | -                      | 3.6              | 1 100                  | -                      | -                      | -                      | -                      | 1 100                  |
| Adipic Acid Production   | -                | -               | -                      | 37               | 11 000                 | -                      | -                      | -                      | -                      | 11 000                 |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4               | 99                     | 0.03             | 7.8                    | -                      | -                      | -                      | -                      | 110                    |
| <b>c. Metal Production</b>   | <b>15 000</b>    | -               | -                      | -                | -                      | -                      | <b>6 480</b>           | <b>1 620</b>           | -                      | <b>23 100</b>          |
| Iron and Steel Production  | 11 200           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 11 200                 |
| Aluminum Production  | 3 860            | -               | -                      | -                | -                      | -                      | 6 480                  | 56.4                   | -                      | 10 400                 |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 1 560                  | -                      | 1 560                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>1 400</b>           | <b>27</b>              | <b>150</b>             | <b>0.3</b>             | <b>1 600</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>10 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>10 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>0.7</b>       | <b>210</b>             | -                      | -                      | -                      | -                      | <b>210</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 300</b>    | <b>32 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>57 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 100</b>    | <b>28 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>28 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>150</b>      | <b>3 800</b>           | <b>16.3</b>      | <b>4 850</b>           | -                      | -                      | -                      | -                      | <b>8 700</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>64</b>        | <b>19 000</b>          | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| Direct Sources   | -                | -               | -                      | 52               | 16 000                 | -                      | -                      | -                      | -                      | 16 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 4 000                  | -                      | -                      | -                      | -                      | 4 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>5</b>        | <b>100</b>             | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>200</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>WASTE</b>   | <b>540</b>       | <b>960</b>      | <b>24 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>940</b>      | <b>24 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>24 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>16</b>       | <b>400</b>             | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>950</b>             |
| <b>c. Waste Incineration</b>   | <b>540</b>       | <b>0.4</b>      | <b>9</b>               | <b>0.8</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>780</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-48 000</b>   | <b>260</b>      | <b>6 400</b>           | <b>11</b>        | <b>3 100</b>           | -                      | -                      | -                      | -                      | <b>-38 000</b>         |
| <b>a. Forest Land</b>  | <b>-220 000</b>  | <b>230</b>      | <b>5 800</b>           | <b>9.7</b>       | <b>2 900</b>           | -                      | -                      | -                      | -                      | <b>-210 000</b>        |
| <b>b. Cropland</b>   | <b>2 900</b>     | <b>6</b>        | <b>200</b>             | <b>0.3</b>       | <b>100</b>             | -                      | -                      | -                      | -                      | <b>3 200</b>           |
| <b>c. Grassland</b>  | -                | <b>20</b>       | <b>400</b>             | <b>0.4</b>       | <b>100</b>             | -                      | -                      | -                      | -                      | <b>500</b>             |
| <b>d. Wetlands</b>   | <b>4 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>3 000</b>     | <b>4</b>        | <b>100</b>             | <b>0.2</b>       | <b>50</b>              | -                      | -                      | -                      | -                      | <b>3 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>160 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9–21 1995 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                 |                                  |                                 |                  |                           |                           |                           |                                     |                                     | TOTAL          |
|--|----------------------------------|----------------------------------|---------------------------------|------------------|---------------------------|---------------------------|---------------------------|-------------------------------------|-------------------------------------|----------------|
|  | CO <sub>2</sub>                  | CH <sub>4</sub>                  | CH <sub>4</sub>                 | N <sub>2</sub> O | N <sub>2</sub> O          | HFCs <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>                     | NF <sub>3</sub>                     |                |
|  | Global Warming Potential<br>Unit | Global Warming Potential<br>Unit | 25<br>kt CO <sub>2</sub><br>eq. | kt               | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | 22 800<br>kt CO <sub>2</sub><br>eq. | 17 200<br>kt CO <sub>2</sub><br>eq. |                |
| <b>TOTAL<sup>1</sup></b>   | <b>494 000</b>                   | <b>4 600</b>                     | <b>110 000</b>                  | <b>150</b>       | <b>46 000</b>             | <b>960</b>                | <b>6 300</b>              | <b>2 300</b>                        | <b>0.3</b>                          | <b>664 000</b> |
| <b>ENERGY</b>  | <b>457 000</b>                   | <b>2 300</b>                     | <b>59 000</b>                   | <b>30</b>        | <b>10 000</b>             | -                         | -                         | -                                   | -                                   | <b>526 000</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>289 000</b>                   | <b>300</b>                       | <b>9 000</b>                    | <b>9</b>         | <b>3 000</b>              | -                         | -                         | -                                   | -                                   | <b>300 000</b> |
| Public Electricity and Heat Production   | 98 300                           | 3                                | 74                              | 2                | 600                       | -                         | -                         | -                                   | -                                   | 98 900         |
| Petroleum Refining Industries  | 16 000                           | 0.3                              | 7                               | 0.2              | 50                        | -                         | -                         | -                                   | -                                   | 16 000         |
| Mining and Upstream Oil and Gas Production   | 44 000                           | 78                               | 1 900                           | 1                | 300                       | -                         | -                         | -                                   | -                                   | 46 200         |
| Manufacturing Industries   | 55 400                           | 3                                | 60                              | 2                | 600                       | -                         | -                         | -                                   | -                                   | 56 100         |
| Iron and Steel   | 5 730                            | 0.3                              | 7                               | 0.2              | 60                        | -                         | -                         | -                                   | -                                   | 5 800          |
| Non Ferrous Metals   | 3 220                            | 0.06                             | 2                               | 0.04             | 10                        | -                         | -                         | -                                   | -                                   | 3 230          |
| Chemical   | 10 200                           | 0.21                             | 5.2                             | 0.2              | 50                        | -                         | -                         | -                                   | -                                   | 10 300         |
| Pulp and Paper   | 12 500                           | 1                                | 40                              | 1                | 300                       | -                         | -                         | -                                   | -                                   | 12 900         |
| Cement   | 4 120                            | 0.18                             | 4.5                             | 0.05             | 20                        | -                         | -                         | -                                   | -                                   | 4 140          |
| Other Manufacturing  | 19 600                           | 0.41                             | 10                              | 0.4              | 100                       | -                         | -                         | -                                   | -                                   | 19 700         |
| Construction   | 1 170                            | 0.02                             | 0.48                            | 0.03             | 9                         | -                         | -                         | -                                   | -                                   | 1 180          |
| Commercial and Institutional   | 28 800                           | 0.52                             | 13                              | 0.6              | 200                       | -                         | -                         | -                                   | -                                   | 29 000         |
| Residential  | 42 300                           | 300                              | 6 000                           | 3                | 1 000                     | -                         | -                         | -                                   | -                                   | 49 800         |
| Agriculture and Forestry   | 2 740                            | 0.04                             | 1.1                             | 0.07             | 20                        | -                         | -                         | -                                   | -                                   | 2 770          |
| <b>b. Transport<sup>2</sup></b>  | <b>154 000</b>                   | <b>40</b>                        | <b>900</b>                      | <b>30</b>        | <b>8 000</b>              | -                         | -                         | -                                   | -                                   | <b>162 000</b> |
| Domestic Aviation  | 6 570                            | 0.4                              | 9                               | 0.2              | 60                        | -                         | -                         | -                                   | -                                   | 6 600          |
| Road Transportation  | 103 000                          | 10                               | 300                             | 16               | 4 600                     | -                         | -                         | -                                   | -                                   | 108 000        |
| Light-Duty Gasoline Vehicles   | 41 500                           | 6.3                              | 160                             | 8.7              | 2 600                     | -                         | -                         | -                                   | -                                   | 44 200         |
| Light-Duty Gasoline Trucks   | 25 800                           | 3.2                              | 80                              | 5.8              | 1 700                     | -                         | -                         | -                                   | -                                   | 27 600         |
| Heavy-Duty Gasoline Vehicles   | 6 240                            | 0.87                             | 22                              | 0.14             | 43                        | -                         | -                         | -                                   | -                                   | 6 310          |
| Motorcycles  | 123                              | 0.12                             | 3.1                             | 0.0              | 0.76                      | -                         | -                         | -                                   | -                                   | 127            |
| Light-Duty Diesel Vehicles   | 423                              | 0.01                             | 0.3                             | 0.03             | 10                        | -                         | -                         | -                                   | -                                   | 433            |
| Light-Duty Diesel Trucks   | 1 290                            | 0.03                             | 0.8                             | 0.1              | 30                        | -                         | -                         | -                                   | -                                   | 1 320          |
| Heavy-Duty Diesel Vehicles   | 26 100                           | 1                                | 30                              | 0.8              | 200                       | -                         | -                         | -                                   | -                                   | 26 400         |
| Propane and Natural Gas Vehicles   | 2 060                            | 1                                | 30                              | 0.04             | 10                        | -                         | -                         | -                                   | -                                   | 2 100          |
| Railways   | 5 630                            | 0.3                              | 8                               | 2                | 700                       | -                         | -                         | -                                   | -                                   | 6 300          |
| Domestic Navigation  | 4 060                            | 0.3                              | 7                               | 1                | 300                       | -                         | -                         | -                                   | -                                   | 4 400          |
| Other Transportation   | 33 900                           | 20                               | 500                             | 6                | 2 000                     | -                         | -                         | -                                   | -                                   | 36 000         |
| Off-Road Gasoline  | 7 550                            | 9                                | 200                             | 0.2              | 50                        | -                         | -                         | -                                   | -                                   | 7 800          |
| Off-Road Diesel  | 14 700                           | 0.8                              | 20                              | 6                | 2 000                     | -                         | -                         | -                                   | -                                   | 16 000         |
| Pipeline Transport   | 11 700                           | 12                               | 290                             | 0.3              | 100                       | -                         | -                         | -                                   | -                                   | 12 000         |
| <b>c. Fugitive Sources</b>   | <b>15 000</b>                    | <b>2 000</b>                     | <b>49 000</b>                   | <b>0.1</b>       | <b>40</b>                 | -                         | -                         | -                                   | -                                   | <b>64 000</b>  |
| Coal Mining  | -                                | 90                               | 2 000                           | -                | -                         | -                         | -                         | -                                   | -                                   | 2 000          |
| Oil and Natural Gas  | 15 000                           | 1 900                            | 47 000                          | 0.1              | 40                        | -                         | -                         | -                                   | -                                   | 62 000         |
| Oil  | 120                              | 240                              | 6 000                           | 0.1              | 30                        | -                         | -                         | -                                   | -                                   | 6 100          |
| Natural Gas  | 39                               | 680                              | 17 000                          | -                | -                         | -                         | -                         | -                                   | -                                   | 17 000         |
| Venting  | 9 600                            | 950                              | 24 000                          | -                | -                         | -                         | -                         | -                                   | -                                   | 33 000         |
| Flaring  | 5 100                            | 7.5                              | 190                             | 0.01             | 3                         | -                         | -                         | -                                   | -                                   | 5 300          |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                                | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | -              |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>35 100</b>                    | <b>3.9</b>                       | <b>97</b>                       | <b>38.6</b>      | <b>11 500</b>             | <b>960</b>                | <b>6 300</b>              | <b>2 300</b>                        | -                                   | <b>56 300</b>  |
| <b>a. Mineral Products</b>   | <b>9 200</b>                     | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | <b>9 200</b>   |
| Cement Production  | 6 500                            | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | 6 500          |
| Lime Production  | 1 860                            | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | 1 860          |
| Mineral Product Use  | 890                              | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | 890            |
| <b>b. Chemical Industry</b>  | <b>2 900</b>                     | <b>3.9</b>                       | <b>97</b>                       | <b>38</b>        | <b>11 000</b>             | -                         | -                         | -                                   | -                                   | <b>14 000</b>  |
| Ammonia Production   | 2 940                            | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | 2 940          |
| Nitric Acid Production   | -                                | -                                | -                               | 3.2              | 960                       | -                         | -                         | -                                   | -                                   | 960            |
| Adipic Acid Production   | -                                | -                                | -                               | 35               | 10 000                    | -                         | -                         | -                                   | -                                   | 10 000         |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                | 3.9                              | 97                              | 0.03             | 8.3                       | -                         | -                         | -                                   | -                                   | 100            |
| <b>c. Metal Production</b>   | <b>15 000</b>                    | -                                | -                               | -                | -                         | -                         | <b>6 310</b>              | <b>2 070</b>                        | -                                   | <b>23 400</b>  |
| Iron and Steel Production  | 11 300                           | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | 11 300         |
| Aluminum Production  | 3 640                            | -                                | -                               | -                | -                         | -                         | 6 310                     | 56.4                                | -                                   | 10 000         |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                | -                                | -                               | -                | -                         | -                         | -                         | 2 010                               | -                                   | 2 010          |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                                | -                                | -                               | -                | -                         | <b>960</b>                | <b>35</b>                 | <b>210</b>                          | <b>0.3</b>                          | <b>1 200</b>   |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>8 000</b>                     | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | <b>8 000</b>   |
| <b>f. Other Product Manufacture and Use</b>  | -                                | -                                | -                               | <b>0.69</b>      | <b>200</b>                | -                         | -                         | -                                   | -                                   | <b>200</b>     |
| <b>AGRICULTURE</b>   | -                                | <b>1 200</b>                     | <b>31 000</b>                   | <b>80</b>        | <b>20 000</b>             | -                         | -                         | -                                   | -                                   | <b>56 000</b>  |
| <b>a. Enteric Fermentation</b>   | -                                | <b>1 100</b>                     | <b>27 000</b>                   | -                | -                         | -                         | -                         | -                                   | -                                   | <b>27 000</b>  |
| <b>b. Manure Management</b>  | -                                | <b>150</b>                       | <b>3 800</b>                    | <b>16.2</b>      | <b>4 830</b>              | -                         | -                         | -                                   | -                                   | <b>8 600</b>   |
| <b>c. Agriculture Soils</b>  | -                                | -                                | -                               | <b>61</b>        | <b>18 000</b>             | -                         | -                         | -                                   | -                                   | <b>18 000</b>  |
| Direct Sources   | -                                | -                                | -                               | 50               | 15 000                    | -                         | -                         | -                                   | -                                   | 15 000         |
| Indirect Sources   | -                                | -                                | -                               | 10               | 3 000                     | -                         | -                         | -                                   | -                                   | 3 000          |
| <b>d. Field Burning of Agricultural Residues</b>   | -                                | <b>6</b>                         | <b>100</b>                      | <b>0.1</b>       | <b>40</b>                 | -                         | -                         | -                                   | -                                   | <b>200</b>     |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>                     | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | <b>1 000</b>   |
| <b>WASTE</b>   | <b>580</b>                       | <b>960</b>                       | <b>24 000</b>                   | <b>3</b>         | <b>800</b>                | -                         | -                         | -                                   | -                                   | <b>25 000</b>  |
| <b>a. Solid Waste Disposal on Land</b>   | -                                | <b>950</b>                       | <b>24 000</b>                   | -                | -                         | -                         | -                         | -                                   | -                                   | <b>24 000</b>  |
| <b>b. Wastewater Handling</b>  | -                                | <b>16</b>                        | <b>390</b>                      | <b>2</b>         | <b>500</b>                | -                         | -                         | -                                   | -                                   | <b>940</b>     |
| <b>c. Waste Incineration</b>   | <b>580</b>                       | <b>0.4</b>                       | <b>9</b>                        | <b>0.9</b>       | <b>300</b>                | -                         | -                         | -                                   | -                                   | <b>840</b>     |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>150 000</b>                   | <b>960</b>                       | <b>24 000</b>                   | <b>40</b>        | <b>12 000</b>             | -                         | -                         | -                                   | -                                   | <b>190 000</b> |
| <b>a. Forest Land</b>  | <b>-26 000</b>                   | <b>930</b>                       | <b>23 000</b>                   | <b>39</b>        | <b>12 000</b>             | -                         | -                         | -                                   | -                                   | <b>9 500</b>   |
| <b>b. Cropland</b>   | <b>4 000</b>                     | <b>7</b>                         | <b>200</b>                      | <b>0.4</b>       | <b>100</b>                | -                         | -                         | -                                   | -                                   | <b>4 300</b>   |
| <b>c. Grassland</b>  | -                                | <b>9</b>                         | <b>200</b>                      | <b>0.2</b>       | <b>70</b>                 | -                         | -                         | -                                   | -                                   | <b>300</b>     |
| <b>d. Wetlands</b>   | <b>4 000</b>                     | <b>0.01</b>                      | <b>0.3</b>                      | <b>0.0</b>       | <b>0.2</b>                | -                         | -                         | -                                   | -                                   | <b>4 000</b>   |
| <b>e. Settlements</b>  | <b>3 000</b>                     | <b>4</b>                         | <b>100</b>                      | <b>0.2</b>       | <b>50</b>                 | -                         | -                         | -                                   | -                                   | <b>4 000</b>   |
| <b>f. Harvested Wood Products</b>  | <b>170 000</b>                   | -                                | -                               | -                | -                         | -                         | -                         | -                                   | -                                   | <b>170 000</b> |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-22 1994 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>482 000</b>   | <b>4 400</b>    | <b>110 000</b>         | <b>150</b>       | <b>45 000</b>          | -                      | <b>6 900</b>           | <b>2 400</b>           | <b>0.3</b>             | <b>646 000</b>         |
| <b>ENERGY</b>  | <b>446 000</b>   | <b>2 200</b>    | <b>56 000</b>          | <b>30</b>        | <b>10 000</b>          | -                      | -                      | -                      | -                      | <b>512 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>282 000</b>   | <b>400</b>      | <b>9 000</b>           | <b>9</b>         | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>293 000</b>         |
| Public Electricity and Heat Production   | 94 900           | 2.5             | 64                     | 2                | 500                    | -                      | -                      | -                      | -                      | 95 500                 |
| Petroleum Refining Industries  | 15 700           | 0.3             | 6                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 16 000                 |
| Mining and Upstream Oil and Gas Production   | 42 500           | 76              | 1 900                  | 1                | 300                    | -                      | -                      | -                      | -                      | 44 700                 |
| Manufacturing Industries   | 53 700           | 3               | 60                     | 2                | 600                    | -                      | -                      | -                      | -                      | 54 300                 |
| Iron and Steel   | 5 970            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 040                  |
| Non Ferrous Metals   | 3 420            | 0.07            | 2                      | 0.05             | 10                     | -                      | -                      | -                      | -                      | 3 440                  |
| Chemical   | 9 950            | 0.2             | 5.1                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 10 000                 |
| Pulp and Paper   | 12 600           | 1               | 40                     | 1                | 300                    | -                      | -                      | -                      | -                      | 13 000                 |
| Cement   | 4 040            | 0.2             | 5.1                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 4 060                  |
| Other Manufacturing  | 17 700           | 0.38            | 9.6                    | 0.3              | 100                    | -                      | -                      | -                      | -                      | 17 800                 |
| Construction   | 1 390            | 0.02            | 0.58                   | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 400                  |
| Commercial and Institutional   | 27 300           | 0.52            | 13                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 27 500                 |
| Residential  | 43 500           | 300             | 7 000                  | 4                | 1 000                  | -                      | -                      | -                      | -                      | 51 400                 |
| Agriculture and Forestry   | 2 530            | 0.04            | 1.1                    | 0.06             | 19                     | -                      | -                      | -                      | -                      | 2 540                  |
| <b>b. Transport<sup>2</sup></b>  | <b>150 000</b>   | <b>30</b>       | <b>800</b>             | <b>20</b>        | <b>7 000</b>           | -                      | -                      | -                      | -                      | <b>158 000</b>         |
| Domestic Aviation  | 6 190            | 0.3             | 8                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 300                  |
| Road Transportation  | 102 000          | 10              | 300                    | 15               | 4 400                  | -                      | -                      | -                      | -                      | 107 000                |
| Light-Duty Gasoline Vehicles   | 42 100           | 6.6             | 160                    | 8.5              | 2 500                  | -                      | -                      | -                      | -                      | 44 800                 |
| Light-Duty Gasoline Trucks   | 25 000           | 3.2             | 81                     | 5.4              | 1 600                  | -                      | -                      | -                      | -                      | 26 700                 |
| Heavy-Duty Gasoline Vehicles   | 6 690            | 0.96            | 24                     | 0.16             | 48                     | -                      | -                      | -                      | -                      | 6 760                  |
| Motorcycles  | 127              | 0.13            | 3.2                    | 0.0              | 0.78                   | -                      | -                      | -                      | -                      | 131                    |
| Light-Duty Diesel Vehicles   | 440              | 0.01            | 0.3                    | 0.03             | 10                     | -                      | -                      | -                      | -                      | 450                    |
| Light-Duty Diesel Trucks   | 1 130            | 0.03            | 0.7                    | 0.08             | 30                     | -                      | -                      | -                      | -                      | 1 150                  |
| Heavy-Duty Diesel Vehicles   | 24 600           | 1               | 30                     | 0.7              | 200                    | -                      | -                      | -                      | -                      | 24 900                 |
| Propane and Natural Gas Vehicles   | 1 890            | 1               | 30                     | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 900                  |
| Railways   | 6 210            | 0.3             | 8                      | 3                | 800                    | -                      | -                      | -                      | -                      | 7 000                  |
| Domestic Navigation  | 4 350            | 0.3             | 7                      | 1                | 300                    | -                      | -                      | -                      | -                      | 4 700                  |
| Other Transportation   | 31 000           | 20              | 500                    | 6                | 2 000                  | -                      | -                      | -                      | -                      | 33 000                 |
| Off-Road Gasoline  | 7 000            | 8               | 200                    | 0.2              | 50                     | -                      | -                      | -                      | -                      | 7 300                  |
| Off-Road Diesel  | 13 500           | 0.7             | 20                     | 6                | 2 000                  | -                      | -                      | -                      | -                      | 15 000                 |
| Pipeline Transport   | 10 500           | 10              | 260                    | 0.3              | 90                     | -                      | -                      | -                      | -                      | 10 800                 |
| <b>c. Fugitive Sources</b>   | <b>14 000</b>    | <b>1 900</b>    | <b>46 000</b>          | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>61 000</b>          |
| Coal Mining  | -                | 100             | 3 000                  | -                | -                      | -                      | -                      | -                      | -                      | 3 000                  |
| Oil and Natural Gas  | 14 000           | 1 800           | 44 000                 | 0.1              | 40                     | -                      | -                      | -                      | -                      | 58 000                 |
| Oil  | 110              | 220             | 5 500                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 5 700                  |
| Natural Gas  | 36               | 650             | 16 000                 | -                | -                      | -                      | -                      | -                      | -                      | 16 000                 |
| Venting  | 9 300            | 880             | 22 000                 | -                | -                      | -                      | -                      | -                      | -                      | 31 000                 |
| Flaring  | 4 900            | 7.3             | 180                    | 0.01             | 3                      | -                      | -                      | -                      | -                      | 5 100                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>33 900</b>    | <b>4</b>        | <b>100</b>             | <b>39.1</b>      | <b>11 600</b>          | -                      | <b>6 900</b>           | <b>2 400</b>           | -                      | <b>55 000</b>          |
| <b>a. Mineral Products</b>   | <b>8 500</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>8 500</b>           |
| Cement Production  | 5 700            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 5 700                  |
| Lime Production  | 1 850            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 850                  |
| Mineral Product Use  | 930              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 930                    |
| <b>b. Chemical Industry</b>  | <b>3 000</b>     | <b>4</b>        | <b>100</b>             | <b>38</b>        | <b>11 000</b>          | -                      | -                      | -                      | -                      | <b>15 000</b>          |
| Ammonia Production   | 3 030            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 3 030                  |
| Nitric Acid Production   | -                | -               | -                      | 3.1              | 920                    | -                      | -                      | -                      | -                      | 920                    |
| Adipic Acid Production   | -                | -               | -                      | 35               | 11 000                 | -                      | -                      | -                      | -                      | 11 000                 |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4               | 100                    | 0.03             | 9                      | -                      | -                      | -                      | -                      | 110                    |
| <b>c. Metal Production</b>   | <b>14 700</b>    | -               | -                      | -                | -                      | -                      | <b>6 890</b>           | <b>2 240</b>           | -                      | <b>23 800</b>          |
| Iron and Steel Production  | 10 900           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 10 900                 |
| Aluminum Production  | 3 770            | -               | -                      | -                | -                      | -                      | 6 890                  | 56.3                   | -                      | 10 700                 |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 2 180                  | -                      | 2 180                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | -                      | <b>0.05</b>            | <b>210</b>             | <b>0.3</b>             | <b>210</b>             |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>7 700</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>7 700</b>           |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>0.57</b>      | <b>170</b>             | -                      | -                      | -                      | -                      | <b>170</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 200</b>    | <b>30 000</b>          | <b>80</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>54 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>1 000</b>    | <b>26 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>26 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>140</b>      | <b>3 600</b>           | <b>15.5</b>      | <b>4 610</b>           | -                      | -                      | -                      | -                      | <b>8 200</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>60</b>        | <b>18 000</b>          | -                      | -                      | -                      | -                      | <b>18 000</b>          |
| Direct Sources   | -                | -               | -                      | 49               | 15 000                 | -                      | -                      | -                      | -                      | 15 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 3 000                  | -                      | -                      | -                      | -                      | 3 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>6</b>        | <b>100</b>             | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>200</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>WASTE</b>   | <b>550</b>       | <b>960</b>      | <b>24 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>950</b>      | <b>24 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>24 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>16</b>       | <b>390</b>             | <b>2</b>         | <b>500</b>             | -                      | -                      | -                      | -                      | <b>930</b>             |
| <b>c. Waste Incineration</b>   | <b>550</b>       | <b>0.3</b>      | <b>8</b>               | <b>0.8</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>780</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-50 000</b>   | <b>320</b>      | <b>7 900</b>           | <b>13</b>        | <b>3 800</b>           | -                      | -                      | -                      | -                      | <b>-38 000</b>         |
| <b>a. Forest Land</b>  | <b>-220 000</b>  | <b>280</b>      | <b>6 900</b>           | <b>12</b>        | <b>3 400</b>           | -                      | -                      | -                      | -                      | <b>-210 000</b>        |
| <b>b. Cropland</b>   | <b>5 100</b>     | <b>8</b>        | <b>200</b>             | <b>0.4</b>       | <b>100</b>             | -                      | -                      | -                      | -                      | <b>5 400</b>           |
| <b>c. Grassland</b>  | -                | <b>30</b>       | <b>700</b>             | <b>0.8</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>d. Wetlands</b>   | <b>4 000</b>     | <b>0.0</b>      | <b>0.0</b>             | <b>0.0</b>       | <b>0.0</b>             | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>4</b>        | <b>100</b>             | <b>0.2</b>       | <b>50</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>160 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HFC production (HFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9–23 1993 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                 |                 |                           |                  |                           |                           |                           |                           |                           |                           |
|--|----------------------------------|-----------------|---------------------------|------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|  | CO <sub>2</sub>                  | CH <sub>4</sub> | CH <sub>4</sub>           | N <sub>2</sub> O | N <sub>2</sub> O          | HFCs <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>           | NF <sub>3</sub>           | TOTAL                     |
|  | Global Warming Potential<br>Unit |                 |                           |                  |                           |                           |                           |                           |                           |                           |
|  | kt                               | kt              | kt CO <sub>2</sub><br>eq. | kt               | kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>467 000</b>                   | <b>4 200</b>    | <b>110 000</b>            | <b>140</b>       | <b>42 000</b>             | <b>-</b>                  | <b>7 500</b>              | <b>2 400</b>              | <b>0.3</b>                | <b>625 000</b>            |
| <b>ENERGY</b>  | <b>431 000</b>                   | <b>2 100</b>    | <b>54 000</b>             | <b>30</b>        | <b>10 000</b>             | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>495 000</b>            |
| <b>a. Stationary Combustion Sources</b>  | <b>276 000</b>                   | <b>300</b>      | <b>9 000</b>              | <b>9</b>         | <b>3 000</b>              | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>287 000</b>            |
| Public Electricity and Heat Production   | 92 700                           | 2.5             | 62                        | 2                | 500                       | -                         | -                         | -                         | -                         | 93 200                    |
| Petroleum Refining Industries  | 16 800                           | 0.3             | 7                         | 0.2              | 50                        | -                         | -                         | -                         | -                         | 17 000                    |
| Mining and Upstream Oil and Gas Production   | 40 900                           | 73              | 1 800                     | 0.9              | 300                       | -                         | -                         | -                         | -                         | 43 000                    |
| Manufacturing Industries   | 50 300                           | 2               | 60                        | 2                | 500                       | -                         | -                         | -                         | -                         | 50 900                    |
| Iron and Steel   | 5 350                            | 0.3             | 6                         | 0.2              | 60                        | -                         | -                         | -                         | -                         | 5 420                     |
| Non Ferrous Metals   | 2 830                            | 0.06            | 1                         | 0.04             | 10                        | -                         | -                         | -                         | -                         | 2 840                     |
| Chemical   | 8 480                            | 0.17            | 4.3                       | 0.1              | 40                        | -                         | -                         | -                         | -                         | 8 530                     |
| Pulp and Paper   | 12 700                           | 1               | 30                        | 1                | 300                       | -                         | -                         | -                         | -                         | 13 000                    |
| Cement   | 3 440                            | 0.13            | 3.2                       | 0.04             | 10                        | -                         | -                         | -                         | -                         | 3 460                     |
| Other Manufacturing  | 17 500                           | 0.38            | 9.5                       | 0.4              | 100                       | -                         | -                         | -                         | -                         | 17 600                    |
| Construction   | 1 380                            | 0.02            | 0.59                      | 0.03             | 10                        | -                         | -                         | -                         | -                         | 1 390                     |
| Commercial and Institutional   | 27 900                           | 0.51            | 13                        | 0.6              | 200                       | -                         | -                         | -                         | -                         | 28 100                    |
| Residential  | 42 800                           | 300             | 7 000                     | 3                | 1 000                     | -                         | -                         | -                         | -                         | 50 400                    |
| Agriculture and Forestry   | 3 020                            | 0.05            | 1.3                       | 0.07             | 21                        | -                         | -                         | -                         | -                         | 3 050                     |
| <b>b. Transport<sup>2</sup></b>  | <b>143 000</b>                   | <b>30</b>       | <b>800</b>                | <b>20</b>        | <b>7 000</b>              | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>151 000</b>            |
| Domestic Aviation  | 5 920                            | 0.3             | 8                         | 0.2              | 50                        | -                         | -                         | -                         | -                         | 6 000                     |
| Road Transportation  | 96 400                           | 10              | 300                       | 14               | 4 100                     | -                         | -                         | -                         | -                         | 101 000                   |
| Light-Duty Gasoline Vehicles   | 42 600                           | 6.9             | 170                       | 8                | 2 400                     | -                         | -                         | -                         | -                         | 45 200                    |
| Light-Duty Gasoline Trucks   | 23 300                           | 3.1             | 79                        | 4.8              | 1 400                     | -                         | -                         | -                         | -                         | 24 800                    |
| Heavy-Duty Gasoline Vehicles   | 6 220                            | 0.94            | 24                        | 0.16             | 47                        | -                         | -                         | -                         | -                         | 6 290                     |
| Motorcycles  | 134                              | 0.13            | 3.4                       | 0.0              | 0.83                      | -                         | -                         | -                         | -                         | 139                       |
| Light-Duty Diesel Vehicles   | 451                              | 0.01            | 0.3                       | 0.03             | 10                        | -                         | -                         | -                         | -                         | 461                       |
| Light-Duty Diesel Trucks   | 952                              | 0.03            | 0.6                       | 0.07             | 20                        | -                         | -                         | -                         | -                         | 974                       |
| Heavy-Duty Diesel Vehicles   | 20 800                           | 1               | 30                        | 0.6              | 200                       | -                         | -                         | -                         | -                         | 21 000                    |
| Propane and Natural Gas Vehicles   | 1 990                            | 1               | 30                        | 0.04             | 10                        | -                         | -                         | -                         | -                         | 2 000                     |
| Railways   | 6 010                            | 0.3             | 8                         | 2                | 700                       | -                         | -                         | -                         | -                         | 6 700                     |
| Domestic Navigation  | 4 190                            | 0.3             | 7                         | 1                | 300                       | -                         | -                         | -                         | -                         | 4 500                     |
| Other Transportation   | 30 300                           | 20              | 500                       | 6                | 2 000                     | -                         | -                         | -                         | -                         | 33 000                    |
| Off-Road Gasoline  | 6 520                            | 8               | 200                       | 0.1              | 40                        | -                         | -                         | -                         | -                         | 6 800                     |
| Off-Road Diesel  | 13 700                           | 0.7             | 20                        | 6                | 2 000                     | -                         | -                         | -                         | -                         | 15 000                    |
| Pipeline Transport   | 10 000                           | 10              | 250                       | 0.3              | 80                        | -                         | -                         | -                         | -                         | 10 400                    |
| <b>c. Fugitive Sources</b>   | <b>13 000</b>                    | <b>1 800</b>    | <b>44 000</b>             | <b>0.1</b>       | <b>30</b>                 | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>57 000</b>             |
| Coal Mining  | -                                | 100             | 3 000                     | -                | -                         | -                         | -                         | -                         | -                         | 3 000                     |
| Oil and Natural Gas  | 13 000                           | 1 700           | 42 000                    | 0.1              | 30                        | -                         | -                         | -                         | -                         | 54 000                    |
| Oil  | 110                              | 220             | 5 400                     | 0.1              | 30                        | -                         | -                         | -                         | -                         | 5 600                     |
| Natural Gas  | 34                               | 610             | 15 000                    | -                | -                         | -                         | -                         | -                         | -                         | 15 000                    |
| Venting  | 8 000                            | 830             | 21 000                    | -                | -                         | -                         | -                         | -                         | -                         | 29 000                    |
| Flaring  | 4 700                            | 6.8             | 170                       | 0.01             | 3                         | -                         | -                         | -                         | -                         | 4 800                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                         | <b>-</b>        | <b>-</b>                  | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>33 600</b>                    | <b>3.9</b>      | <b>97</b>                 | <b>33.2</b>      | <b>9 900</b>              | <b>-</b>                  | <b>7 500</b>              | <b>2 400</b>              | <b>-</b>                  | <b>53 400</b>             |
| <b>a. Mineral Products</b>   | <b>7 400</b>                     | <b>-</b>        | <b>-</b>                  | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>7 400</b>              |
| Cement Production  | 4 800                            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 4 800                     |
| Lime Production  | 1 800                            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 1 800                     |
| Mineral Product Use  | 790                              | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 790                       |
| <b>b. Chemical Industry</b>  | <b>2 900</b>                     | <b>3.9</b>      | <b>97</b>                 | <b>33</b>        | <b>9 700</b>              | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>13 000</b>             |
| Ammonia Production   | 2 920                            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 2 920                     |
| Nitric Acid Production   | -                                | -               | -                         | 3.4              | 1 000                     | -                         | -                         | -                         | -                         | 1 000                     |
| Adipic Acid Production   | -                                | -               | -                         | 29               | 8 700                     | -                         | -                         | -                         | -                         | 8 700                     |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                | 3.9             | 97                        | 0.03             | 7.7                       | -                         | -                         | -                         | -                         | 110                       |
| <b>c. Metal Production</b>   | <b>15 700</b>                    | <b>-</b>        | <b>-</b>                  | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>7 460</b>              | <b>2 170</b>              | <b>-</b>                  | <b>25 300</b>             |
| Iron and Steel Production  | 11 800                           | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 11 800                    |
| Aluminum Production  | 3 910                            | -               | -                         | -                | -                         | -                         | 7 460                     | 56.3                      | -                         | 11 400                    |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                | -               | -                         | -                | -                         | -                         | -                         | 2 110                     | -                         | 2 110                     |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | <b>-</b>                         | <b>-</b>        | <b>-</b>                  | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>0.05</b>               | <b>210</b>                | <b>0.3</b>                | <b>210</b>                |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>7 600</b>                     | <b>-</b>        | <b>-</b>                  | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>7 600</b>              |
| <b>f. Other Product Manufacture and Use</b>  | <b>-</b>                         | <b>-</b>        | <b>-</b>                  | <b>0.51</b>      | <b>150</b>                | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>150</b>                |
| <b>AGRICULTURE</b>   | <b>-</b>                         | <b>1 100</b>    | <b>29 000</b>             | <b>70</b>        | <b>20 000</b>             | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>52 000</b>             |
| <b>a. Enteric Fermentation</b>   | <b>-</b>                         | <b>1 000</b>    | <b>25 000</b>             | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>25 000</b>             |
| <b>b. Manure Management</b>  | <b>-</b>                         | <b>140</b>      | <b>3 600</b>              | <b>14.9</b>      | <b>4 450</b>              | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>8 000</b>              |
| <b>c. Agriculture Soils</b>  | <b>-</b>                         | <b>-</b>        | <b>-</b>                  | <b>58</b>        | <b>17 000</b>             | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>17 000</b>             |
| Direct Sources   | -                                | -               | -                         | 48               | 14 000                    | -                         | -                         | -                         | -                         | 14 000                    |
| Indirect Sources   | -                                | -               | -                         | 10               | 3 000                     | -                         | -                         | -                         | -                         | 3 000                     |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>-</b>                         | <b>5</b>        | <b>100</b>                | <b>0.1</b>       | <b>40</b>                 | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>200</b>                |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>                     | <b>-</b>        | <b>-</b>                  | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>1 000</b>              |
| <b>WASTE</b>   | <b>520</b>                       | <b>960</b>      | <b>24 000</b>             | <b>2</b>         | <b>700</b>                | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>25 000</b>             |
| <b>a. Solid Waste Disposal on Land</b>   | <b>-</b>                         | <b>940</b>      | <b>24 000</b>             | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>24 000</b>             |
| <b>b. Wastewater Handling</b>  | <b>-</b>                         | <b>15</b>       | <b>390</b>                | <b>2</b>         | <b>500</b>                | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>910</b>                |
| <b>c. Waste Incineration</b>   | <b>520</b>                       | <b>0.3</b>      | <b>8</b>                  | <b>0.7</b>       | <b>200</b>                | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>750</b>                |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-58 000</b>                   | <b>280</b>      | <b>7 000</b>              | <b>11</b>        | <b>3 400</b>              | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-48 000</b>            |
| <b>a. Forest Land</b>  | <b>-230 000</b>                  | <b>250</b>      | <b>6 300</b>              | <b>11</b>        | <b>3 100</b>              | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-220 000</b>           |
| <b>b. Cropland</b>   | <b>6 300</b>                     | <b>9</b>        | <b>200</b>                | <b>0.4</b>       | <b>100</b>                | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>6 600</b>              |
| <b>c. Grassland</b>  | <b>-</b>                         | <b>10</b>       | <b>300</b>                | <b>0.3</b>       | <b>100</b>                | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>400</b>                |
| <b>d. Wetlands</b>   | <b>6 000</b>                     | <b>0.2</b>      | <b>4</b>                  | <b>0.01</b>      | <b>2</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>6 000</b>              |
| <b>e. Settlements</b>  | <b>4 000</b>                     | <b>5</b>        | <b>100</b>                | <b>0.2</b>       | <b>50</b>                 | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>4 000</b>              |
| <b>f. Harvested Wood Products</b>  | <b>160 000</b>                   | <b>-</b>        | <b>-</b>                  | <b>-</b>         | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>-</b>                  | <b>160 000</b>            |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

Table A9-24 1992 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>5</sup>      | PFCs <sup>5</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Global Warming Potential   | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>468 000</b>   | <b>4 100</b>    | <b>100 000</b>         | <b>140</b>       | <b>41 000</b>          | <b>830</b>             | <b>7 600</b>           | <b>2 600</b>           | <b>0.3</b>             | <b>623 000</b>         |
| <b>ENERGY</b>  | <b>434 000</b>   | <b>2 000</b>    | <b>51 000</b>          | <b>30</b>        | <b>9 000</b>           | -                      | -                      | -                      | -                      | <b>493 000</b>         |
| <b>a. Stationary Combustion Sources</b>  | <b>282 000</b>   | <b>300</b>      | <b>8 000</b>           | <b>9</b>         | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>293 000</b>         |
| Public Electricity and Heat Production   | 102 000          | 2.3             | 57                     | 2                | 600                    | -                      | -                      | -                      | -                      | 102 000                |
| Petroleum Refining Industries  | 16 200           | 0.3             | 7                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 16 000                 |
| Mining and Upstream Oil and Gas Production   | 38 500           | 73              | 1 800                  | 0.9              | 300                    | -                      | -                      | -                      | -                      | 40 600                 |
| Manufacturing Industries   | 52 500           | 2               | 60                     | 2                | 500                    | -                      | -                      | -                      | -                      | 53 000                 |
| Iron and Steel   | 5 250            | 0.3             | 7                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 5 320                  |
| Non Ferrous Metals   | 2 940            | 0.06            | 2                      | 0.04             | 10                     | -                      | -                      | -                      | -                      | 2 950                  |
| Chemical   | 8 550            | 0.17            | 4.3                    | 0.1              | 40                     | -                      | -                      | -                      | -                      | 8 600                  |
| Pulp and Paper   | 12 700           | 1               | 30                     | 1                | 300                    | -                      | -                      | -                      | -                      | 13 000                 |
| Cement   | 3 380            | 0.1             | 2.4                    | 0.04             | 10                     | -                      | -                      | -                      | -                      | 3 390                  |
| Other Manufacturing  | 19 600           | 0.43            | 11                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 19 700                 |
| Construction   | 1 740            | 0.03            | 0.74                   | 0.06             | 20                     | -                      | -                      | -                      | -                      | 1 760                  |
| Commercial and Institutional   | 26 900           | 0.49            | 12                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 27 100                 |
| Residential  | 40 800           | 300             | 6 000                  | 3                | 1 000                  | -                      | -                      | -                      | -                      | 48 100                 |
| Agriculture and Forestry   | 3 220            | 0.05            | 1.2                    | 0.08             | 24                     | -                      | -                      | -                      | -                      | 3 250                  |
| <b>b. Transport<sup>2</sup></b>  | <b>140 000</b>   | <b>30</b>       | <b>800</b>             | <b>20</b>        | <b>6 000</b>           | -                      | -                      | -                      | -                      | <b>147 000</b>         |
| Domestic Aviation  | 6 250            | 0.3             | 8                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 6 300                  |
| Road Transportation  | 94 000           | 10              | 400                    | 12               | 3 500                  | -                      | -                      | -                      | -                      | 97 900                 |
| Light-Duty Gasoline Vehicles   | 42 700           | 7.2             | 180                    | 6.9              | 2 100                  | -                      | -                      | -                      | -                      | 44 900                 |
| Light-Duty Gasoline Trucks   | 21 600           | 3.1             | 79                     | 4                | 1 200                  | -                      | -                      | -                      | -                      | 22 800                 |
| Heavy-Duty Gasoline Vehicles   | 6 350            | 0.99            | 25                     | 0.17             | 49                     | -                      | -                      | -                      | -                      | 6 430                  |
| Motorcycles  | 138              | 0.14            | 3.4                    | 0.0              | 0.85                   | -                      | -                      | -                      | -                      | 142                    |
| Light-Duty Diesel Vehicles   | 448              | 0.01            | 0.3                    | 0.03             | 10                     | -                      | -                      | -                      | -                      | 459                    |
| Light-Duty Diesel Trucks   | 803              | 0.02            | 0.5                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 821                    |
| Heavy-Duty Diesel Vehicles   | 19 400           | 1               | 30                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 19 600                 |
| Propane and Natural Gas Vehicles   | 2 640            | 2               | 40                     | 0.05             | 10                     | -                      | -                      | -                      | -                      | 2 700                  |
| Railways   | 6 030            | 0.3             | 8                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 800                  |
| Domestic Navigation  | 4 800            | 0.3             | 8                      | 1                | 300                    | -                      | -                      | -                      | -                      | 5 100                  |
| Other Transportation   | 28 700           | 20              | 400                    | 6                | 2 000                  | -                      | -                      | -                      | -                      | 31 000                 |
| Off-Road Gasoline  | 6 330            | 7               | 200                    | 0.1              | 40                     | -                      | -                      | -                      | -                      | 6 600                  |
| Off-Road Diesel  | 12 800           | 0.7             | 20                     | 5                | 2 000                  | -                      | -                      | -                      | -                      | 14 000                 |
| Pipeline Transport   | 9 580            | 9.6             | 240                    | 0.3              | 80                     | -                      | -                      | -                      | -                      | 9 890                  |
| <b>c. Fugitive Sources</b>   | <b>12 000</b>    | <b>1 700</b>    | <b>42 000</b>          | <b>0.1</b>       | <b>30</b>              | -                      | -                      | -                      | -                      | <b>54 000</b>          |
| Coal Mining  | -                | 90              | 2 000                  | -                | -                      | -                      | -                      | -                      | -                      | 2 000                  |
| Oil and Natural Gas  | 12 000           | 1 600           | 39 000                 | 0.1              | 30                     | -                      | -                      | -                      | -                      | 52 000                 |
| Oil  | 110              | 220             | 5 400                  | 0.1              | 30                     | -                      | -                      | -                      | -                      | 5 500                  |
| Natural Gas  | 30               | 580             | 15 000                 | -                | -                      | -                      | -                      | -                      | -                      | 15 000                 |
| Venting  | 7 700            | 780             | 19 000                 | -                | -                      | -                      | -                      | -                      | -                      | 27 000                 |
| Flaring  | 4 300            | 6.1             | 150                    | 0.01             | 3                      | -                      | -                      | -                      | -                      | 4 500                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>32 500</b>    | <b>4</b>        | <b>99</b>              | <b>36.1</b>      | <b>10 800</b>          | <b>830</b>             | <b>7 600</b>           | <b>2 600</b>           | <b>-</b>               | <b>54 400</b>          |
| <b>a. Mineral Products</b>   | <b>7 500</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>7 500</b>           |
| Cement Production  | 4 800            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 4 800                  |
| Lime Production  | 1 800            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 800                  |
| Mineral Product Use  | 950              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 950                    |
| <b>b. Chemical Industry</b>  | <b>2 500</b>     | <b>4</b>        | <b>99</b>              | <b>36</b>        | <b>11 000</b>          | -                      | -                      | -                      | -                      | <b>13 000</b>          |
| Ammonia Production   | 2 500            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 500                  |
| Nitric Acid Production   | -                | -               | -                      | 3.5              | 1 000                  | -                      | -                      | -                      | -                      | 1 000                  |
| Adipic Acid Production   | -                | -               | -                      | 32               | 9 600                  | -                      | -                      | -                      | -                      | 9 600                  |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4               | 99                     | 0.02             | 7                      | -                      | -                      | -                      | -                      | 110                    |
| <b>c. Metal Production</b>   | <b>15 500</b>    | -               | -                      | -                | -                      | -                      | <b>7 580</b>           | <b>2 350</b>           | -                      | <b>25 400</b>          |
| Iron and Steel Production  | 12 200           | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 12 200                 |
| Aluminum Production  | 3 270            | -               | -                      | -                | -                      | -                      | 7 580                  | 56.3                   | -                      | 10 900                 |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                      | -                | -                      | -                      | -                      | 2 290                  | -                      | 2 290                  |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                      | -                | -                      | <b>830</b>             | <b>0.05</b>            | <b>210</b>             | <b>0.3</b>             | <b>1 000</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>7 100</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>7 100</b>           |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                      | <b>0.46</b>      | <b>140</b>             | -                      | -                      | -                      | -                      | <b>140</b>             |
| <b>AGRICULTURE</b>   | -                | <b>1 100</b>    | <b>28 000</b>          | <b>70</b>        | <b>20 000</b>          | -                      | -                      | -                      | -                      | <b>50 000</b>          |
| <b>a. Enteric Fermentation</b>   | -                | <b>980</b>      | <b>24 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>24 000</b>          |
| <b>b. Manure Management</b>  | -                | <b>140</b>      | <b>3 600</b>           | <b>14.7</b>      | <b>4 390</b>           | -                      | -                      | -                      | -                      | <b>8 000</b>           |
| <b>c. Agriculture Soils</b>  | -                | -               | -                      | <b>56</b>        | <b>17 000</b>          | -                      | -                      | -                      | -                      | <b>17 000</b>          |
| Direct Sources   | -                | -               | -                      | 46               | 14 000                 | -                      | -                      | -                      | -                      | 14 000                 |
| Indirect Sources   | -                | -               | -                      | 10               | 3 000                  | -                      | -                      | -                      | -                      | 3 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>5</b>        | <b>100</b>             | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>200</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>WASTE</b>   | <b>530</b>       | <b>940</b>      | <b>24 000</b>          | <b>3</b>         | <b>800</b>             | -                      | -                      | -                      | -                      | <b>25 000</b>          |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>920</b>      | <b>23 000</b>          | -                | -                      | -                      | -                      | -                      | -                      | <b>23 000</b>          |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>380</b>             | <b>2</b>         | <b>500</b>             | -                      | -                      | -                      | -                      | <b>900</b>             |
| <b>c. Waste Incineration</b>   | <b>530</b>       | <b>0.5</b>      | <b>10</b>              | <b>0.8</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>780</b>             |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-110 000</b>  | <b>140</b>      | <b>3 400</b>           | <b>5.1</b>       | <b>1 500</b>           | -                      | -                      | -                      | -                      | <b>-100 000</b>        |
| <b>a. Forest Land</b>  | <b>-280 000</b>  | <b>82</b>       | <b>2 000</b>           | <b>3.4</b>       | <b>1 000</b>           | -                      | -                      | -                      | -                      | <b>-270 000</b>        |
| <b>b. Cropland</b>   | <b>7 700</b>     | <b>10</b>       | <b>300</b>             | <b>0.5</b>       | <b>100</b>             | -                      | -                      | -                      | -                      | <b>8 100</b>           |
| <b>c. Grassland</b>  | -                | <b>40</b>       | <b>900</b>             | <b>1</b>         | <b>300</b>             | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>d. Wetlands</b>   | <b>6 000</b>     | <b>0.7</b>      | <b>20</b>              | <b>0.03</b>      | <b>9</b>               | -                      | -                      | -                      | -                      | <b>6 000</b>           |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>5</b>        | <b>100</b>             | <b>0.2</b>       | <b>50</b>              | -                      | -                      | -                      | -                      | <b>4 000</b>           |
| <b>f. Harvested Wood Products</b>  | <b>150 000</b>   | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>150 000</b>         |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HFC production (HFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A9–25 1991 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases                 |                 |                 |                                 |                  |                                  |                           |                           |                                     | TOTAL           |
|--|----------------------------------|-----------------|-----------------|---------------------------------|------------------|----------------------------------|---------------------------|---------------------------|-------------------------------------|-----------------|
|  | CO <sub>2</sub>                  | CH <sub>4</sub> | CH <sub>4</sub> | N <sub>2</sub> O                | N <sub>2</sub> O | HFCs <sup>5</sup>                | PFCs <sup>5</sup>         | SF <sub>6</sub>           | NF <sub>3</sub>                     |                 |
|  | Global Warming Potential<br>Unit | kt              | kt              | 25<br>kt CO <sub>2</sub><br>eq. | kt               | 298<br>kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | kt CO <sub>2</sub><br>eq. | 22 800<br>kt CO <sub>2</sub><br>eq. |                 |
| <b>TOTAL<sup>1</sup></b>   | <b>453 000</b>                   | <b>3 900</b>    | <b>98 000</b>   | <b>140</b>                      | <b>41 000</b>    | <b>1 100</b>                     | <b>8 000</b>              | <b>3 700</b>              | <b>0.3</b>                          | <b>605 000</b>  |
| <b>ENERGY</b>  | <b>419 000</b>                   | <b>1 900</b>    | <b>48 000</b>   | <b>30</b>                       | <b>9 000</b>     | -                                | -                         | -                         | -                                   | <b>476 000</b>  |
| <b>a. Stationary Combustion Sources</b>  | <b>272 000</b>                   | <b>300</b>      | <b>8 000</b>    | <b>9</b>                        | <b>3 000</b>     | -                                | -                         | -                         | -                                   | <b>283 000</b>  |
| Public Electricity and Heat Production   | 95 300                           | 1.7             | 42              | 2                               | 500              | -                                | -                         | -                         | -                                   | 95 900          |
| Petroleum Refining Industries  | 16 000                           | 0.3             | 7               | 0.2                             | 50               | -                                | -                         | -                         | -                                   | 16 000          |
| Mining and Upstream Oil and Gas Production   | 36 500                           | 70              | 1 700           | 0.9                             | 300              | -                                | -                         | -                         | -                                   | 38 500          |
| Manufacturing Industries   | 53 400                           | 2               | 60              | 2                               | 500              | -                                | -                         | -                         | -                                   | 54 000          |
| Iron and Steel   | 4 920                            | 0.3             | 6               | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 4 980           |
| Non Ferrous Metals   | 2 700                            | 0.06            | 1               | 0.04                            | 10               | -                                | -                         | -                         | -                                   | 2 710           |
| Chemical   | 8 600                            | 0.17            | 4.3             | 0.1                             | 40               | -                                | -                         | -                         | -                                   | 8 650           |
| Pulp and Paper   | 13 800                           | 1               | 30              | 1                               | 300              | -                                | -                         | -                         | -                                   | 14 100          |
| Cement   | 3 410                            | 0.08            | 2               | 0.04                            | 10               | -                                | -                         | -                         | -                                   | 3 420           |
| Other Manufacturing  | 20 000                           | 0.42            | 11              | 0.4                             | 100              | -                                | -                         | -                         | -                                   | 20 100          |
| Construction   | 1 620                            | 0.03            | 0.68            | 0.05                            | 20               | -                                | -                         | -                         | -                                   | 1 630           |
| Commercial and Institutional   | 26 300                           | 0.5             | 12              | 0.5                             | 200              | -                                | -                         | -                         | -                                   | 26 500          |
| Residential  | 39 600                           | 300             | 7 000           | 3                               | 1 000            | -                                | -                         | -                         | -                                   | 47 300          |
| Agriculture and Forestry   | 2 720                            | 0.04            | 1.1             | 0.06                            | 18               | -                                | -                         | -                         | -                                   | 2 740           |
| <b>b. Transport<sup>2</sup></b>  | <b>136 000</b>                   | <b>30</b>       | <b>800</b>      | <b>20</b>                       | <b>6 000</b>     | -                                | -                         | -                         | -                                   | <b>143 000</b>  |
| Domestic Aviation  | 6 240                            | 0.4             | 9               | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 6 300           |
| Road Transportation  | 92 200                           | 10              | 300             | 11                              | 3 400            | -                                | -                         | -                         | -                                   | 95 900          |
| Light-Duty Gasoline Vehicles   | 42 500                           | 7.2             | 180             | 6.7                             | 2 000            | -                                | -                         | -                         | -                                   | 44 700          |
| Light-Duty Gasoline Trucks   | 20 200                           | 3               | 74              | 3.7                             | 1 100            | -                                | -                         | -                         | -                                   | 21 300          |
| Heavy-Duty Gasoline Vehicles   | 6 650                            | 1.1             | 27              | 0.18                            | 53               | -                                | -                         | -                         | -                                   | 6 730           |
| Motorcycles  | 142                              | 0.14            | 3.5             | 0.0                             | 0.88             | -                                | -                         | -                         | -                                   | 146             |
| Light-Duty Diesel Vehicles   | 450                              | 0.01            | 0.3             | 0.03                            | 10               | -                                | -                         | -                         | -                                   | 460             |
| Light-Duty Diesel Trucks   | 729                              | 0.02            | 0.5             | 0.05                            | 20               | -                                | -                         | -                         | -                                   | 745             |
| Heavy-Duty Diesel Vehicles   | 19 200                           | 1               | 30              | 0.6                             | 200              | -                                | -                         | -                         | -                                   | 19 400          |
| Propane and Natural Gas Vehicles   | 2 280                            | 1               | 40              | 0.04                            | 10               | -                                | -                         | -                         | -                                   | 2 300           |
| Railways   | 5 760                            | 0.3             | 8               | 2                               | 700              | -                                | -                         | -                         | -                                   | 6 500           |
| Domestic Navigation  | 4 950                            | 0.4             | 9               | 1                               | 300              | -                                | -                         | -                         | -                                   | 5 300           |
| Other Transportation   | 27 000                           | 20              | 400             | 6                               | 2 000            | -                                | -                         | -                         | -                                   | 29 000          |
| Off-Road Gasoline  | 6 510                            | 8               | 200             | 0.1                             | 40               | -                                | -                         | -                         | -                                   | 6 700           |
| Off-Road Diesel  | 13 100                           | 0.7             | 20              | 5                               | 2 000            | -                                | -                         | -                         | -                                   | 15 000          |
| Pipeline Transport   | 7 410                            | 7.4             | 190             | 0.2                             | 60               | -                                | -                         | -                         | -                                   | 7 650           |
| <b>c. Fugitive Sources</b>   | <b>11 000</b>                    | <b>1 500</b>    | <b>39 000</b>   | <b>0.1</b>                      | <b>30</b>        | -                                | -                         | -                         | -                                   | <b>50 000</b>   |
| Coal Mining  | -                                | 100             | 3 000           | -                               | -                | -                                | -                         | -                         | -                                   | 3 000           |
| Oil and Natural Gas  | 11 000                           | 1 400           | 36 000          | 0.1                             | 30               | -                                | -                         | -                         | -                                   | 47 000          |
| Oil  | 100                              | 200             | 5 000           | 0.1                             | 30               | -                                | -                         | -                         | -                                   | 5 100           |
| Natural Gas  | 28                               | 540             | 14 000          | -                               | -                | -                                | -                         | -                         | -                                   | 14 000          |
| Venting  | 6 900                            | 680             | 17 000          | -                               | -                | -                                | -                         | -                         | -                                   | 24 000          |
| Flaring  | 4 300                            | 5.6             | 140             | 0.01                            | 2                | -                                | -                         | -                         | -                                   | 4 400           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                                | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | -               |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>32 900</b>                    | <b>4.4</b>      | <b>110</b>      | <b>36.2</b>                     | <b>10 800</b>    | <b>1 100</b>                     | <b>8 000</b>              | <b>3 700</b>              | -                                   | <b>56 600</b>   |
| <b>a. Mineral Products</b>   | <b>7 800</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>7 800</b>    |
| Cement Production  | 4 700                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 4 700           |
| Lime Production  | 1 790                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 1 790           |
| Mineral Product Use  | 1 200                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 1 200           |
| <b>b. Chemical Industry</b>  | <b>2 800</b>                     | <b>4.4</b>      | <b>110</b>      | <b>36</b>                       | <b>11 000</b>    | -                                | -                         | -                         | -                                   | <b>14 000</b>   |
| Ammonia Production   | 2 750                            | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 2 750           |
| Nitric Acid Production   | -                                | -               | -               | 3.4                             | 1 000            | -                                | -                         | -                         | -                                   | 1 000           |
| Adipic Acid Production   | -                                | -               | -               | 32                              | 9 600            | -                                | -                         | -                         | -                                   | 9 600           |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                                | 4.4             | 110             | 0.02                            | 7                | -                                | -                         | -                         | -                                   | 120             |
| <b>c. Metal Production</b>   | <b>15 100</b>                    | -               | -               | -                               | -                | -                                | <b>8 030</b>              | <b>3 480</b>              | -                                   | <b>26 600</b>   |
| Iron and Steel Production  | 11 900                           | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | 11 900          |
| Aluminum Production  | 3 150                            | -               | -               | -                               | -                | -                                | 8 030                     | 56.3                      | -                                   | 11 200          |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                | -               | -               | -                               | -                | -                                | -                         | 3 420                     | -                                   | 3 420           |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                                | -               | -               | -                               | -                | <b>1 100</b>                     | <b>0.06</b>               | <b>210</b>                | <b>0.3</b>                          | <b>1 300</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>7 300</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>7 300</b>    |
| <b>f. Other Product Manufacture and Use</b>  | -                                | -               | -               | <b>0.55</b>                     | <b>160</b>       | -                                | -                         | -                         | -                                   | <b>160</b>      |
| <b>AGRICULTURE</b>   | -                                | <b>1 100</b>    | <b>27 000</b>   | <b>70</b>                       | <b>20 000</b>    | -                                | -                         | -                         | -                                   | <b>49 000</b>   |
| <b>a. Enteric Fermentation</b>   | -                                | <b>930</b>      | <b>23 000</b>   | -                               | -                | -                                | -                         | -                         | -                                   | <b>23 000</b>   |
| <b>b. Manure Management</b>  | -                                | <b>140</b>      | <b>3 500</b>    | <b>14.1</b>                     | <b>4 190</b>     | -                                | -                         | -                         | -                                   | <b>7 700</b>    |
| <b>c. Agriculture Soils</b>  | -                                | -               | -               | <b>56</b>                       | <b>17 000</b>    | -                                | -                         | -                         | -                                   | <b>17 000</b>   |
| Direct Sources   | -                                | -               | -               | 46                              | 14 000           | -                                | -                         | -                         | -                                   | 14 000          |
| Indirect Sources   | -                                | -               | -               | 10                              | 3 000            | -                                | -                         | -                         | -                                   | 3 000           |
| <b>d. Field Burning of Agricultural Residues</b>   | -                                | <b>6</b>        | <b>100</b>      | <b>0.2</b>                      | <b>40</b>        | -                                | -                         | -                         | -                                   | <b>200</b>      |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>                     | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>1 000</b>    |
| <b>WASTE</b>   | <b>510</b>                       | <b>930</b>      | <b>23 000</b>   | <b>2</b>                        | <b>700</b>       | -                                | -                         | -                         | -                                   | <b>24 000</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | -                                | <b>910</b>      | <b>23 000</b>   | -                               | -                | -                                | -                         | -                         | -                                   | <b>23 000</b>   |
| <b>b. Wastewater Handling</b>  | -                                | <b>15</b>       | <b>380</b>      | <b>2</b>                        | <b>500</b>       | -                                | -                         | -                         | -                                   | <b>890</b>      |
| <b>c. Waste Incineration</b>   | <b>510</b>                       | <b>0.5</b>      | <b>10</b>       | <b>0.7</b>                      | <b>200</b>       | -                                | -                         | -                         | -                                   | <b>740</b>      |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-66 000</b>                   | <b>290</b>      | <b>7 300</b>    | <b>12</b>                       | <b>3 500</b>     | -                                | -                         | -                         | -                                   | <b>-55 000</b>  |
| <b>a. Forest Land</b>  | <b>-230 000</b>                  | <b>250</b>      | <b>6 200</b>    | <b>10</b>                       | <b>3 100</b>     | -                                | -                         | -                         | -                                   | <b>-220 000</b> |
| <b>b. Cropland</b>   | <b>8 900</b>                     | <b>10</b>       | <b>300</b>      | <b>0.5</b>                      | <b>200</b>       | -                                | -                         | -                         | -                                   | <b>9 300</b>    |
| <b>c. Grassland</b>  | -                                | <b>20</b>       | <b>600</b>      | <b>0.6</b>                      | <b>200</b>       | -                                | -                         | -                         | -                                   | <b>800</b>      |
| <b>d. Wetlands</b>   | <b>6 000</b>                     | <b>0.5</b>      | <b>10</b>       | <b>0.02</b>                     | <b>6</b>         | -                                | -                         | -                         | -                                   | <b>6 000</b>    |
| <b>e. Settlements</b>  | <b>4 000</b>                     | <b>5</b>        | <b>100</b>      | <b>0.2</b>                      | <b>50</b>        | -                                | -                         | -                         | -                                   | <b>4 000</b>    |
| <b>f. Harvested Wood Products</b>  | <b>140 000</b>                   | -               | -               | -                               | -                | -                                | -                         | -                         | -                                   | <b>140 000</b>  |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
- Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
- The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
- HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
- IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A9-26 1990 GHG Emission Summary for Canada

| Greenhouse Gas Categories  | Greenhouse Gases |                 |                           |                  |                           |                           |                           |                           |                           |                           |
|--|------------------|-----------------|---------------------------|------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>           | N <sub>2</sub> O | N <sub>2</sub> O          | HFCs <sup>5</sup>         | PFCs <sup>5</sup>         | SF <sub>6</sub>           | NF <sub>3</sub>           | TOTAL                     |
| Global Warming Potential<br>Unit   | kt               | kt              | kt CO <sub>2</sub><br>eq. | kt               | kt CO <sub>2</sub><br>eq. |
| <b>TOTAL<sup>1</sup></b>   | <b>463 000</b>   | <b>3 800</b>    | <b>96 000</b>             | <b>140</b>       | <b>42 000</b>             | <b>970</b>                | <b>7 600</b>              | <b>3 200</b>              | <b>0.3</b>                | <b>613 000</b>            |
| <b>ENERGY</b>  | <b>429 000</b>   | <b>1 900</b>    | <b>47 000</b>             | <b>30</b>        | <b>9 000</b>              | -                         | -                         | -                         | -                         | <b>485 000</b>            |
| <b>a. Stationary Combustion Sources</b>  | <b>277 000</b>   | <b>300</b>      | <b>9 000</b>              | <b>9</b>         | <b>3 000</b>              | -                         | -                         | -                         | -                         | <b>288 000</b>            |
| Public Electricity and Heat Production   | 94 000           | 1.8             | 45                        | 2                | 500                       | -                         | -                         | -                         | -                         | 94 500                    |
| Petroleum Refining Industries  | 17 000           | 0.3             | 7                         | 0.2              | 50                        | -                         | -                         | -                         | -                         | 17 000                    |
| Mining and Upstream Oil and Gas Production   | 38 900           | 74              | 1 900                     | 0.9              | 300                       | -                         | -                         | -                         | -                         | 41 100                    |
| Manufacturing Industries   | 55 600           | 2               | 60                        | 2                | 500                       | -                         | -                         | -                         | -                         | 56 200                    |
| Iron and Steel   | 4 900            | 0.2             | 6                         | 0.2              | 60                        | -                         | -                         | -                         | -                         | 4 970                     |
| Non Ferrous Metals   | 3 310            | 0.07            | 2                         | 0.05             | 10                        | -                         | -                         | -                         | -                         | 3 320                     |
| Chemical   | 8 220            | 0.17            | 4.1                       | 0.1              | 40                        | -                         | -                         | -                         | -                         | 8 260                     |
| Pulp and Paper   | 14 200           | 1               | 30                        | 1                | 300                       | -                         | -                         | -                         | -                         | 14 600                    |
| Cement   | 3 940            | 0.12            | 2.9                       | 0.05             | 10                        | -                         | -                         | -                         | -                         | 3 960                     |
| Other Manufacturing  | 21 000           | 0.45            | 11                        | 0.4              | 100                       | -                         | -                         | -                         | -                         | 21 200                    |
| Construction   | 1 860            | 0.03            | 0.78                      | 0.05             | 20                        | -                         | -                         | -                         | -                         | 1 880                     |
| Commercial and Institutional   | 25 700           | 0.49            | 12                        | 0.5              | 100                       | -                         | -                         | -                         | -                         | 25 800                    |
| Residential  | 41 100           | 300             | 7 000                     | 3                | 1 000                     | -                         | -                         | -                         | -                         | 48 900                    |
| Agriculture and Forestry   | 2 390            | 0.04            | 0.97                      | 0.06             | 16                        | -                         | -                         | -                         | -                         | 2 410                     |
| <b>b. Transport<sup>2</sup></b>  | <b>141 000</b>   | <b>30</b>       | <b>800</b>                | <b>20</b>        | <b>6 000</b>              | -                         | -                         | -                         | -                         | <b>148 000</b>            |
| Domestic Aviation  | 7 090            | 0.5             | 10                        | 0.2              | 70                        | -                         | -                         | -                         | -                         | 7 200                     |
| Road Transportation  | 94 300           | 10              | 400                       | 10               | 3 100                     | -                         | -                         | -                         | -                         | 97 700                    |
| Light-Duty Gasoline Vehicles   | 43 900           | 7.7             | 190                       | 6.2              | 1 800                     | -                         | -                         | -                         | -                         | 45 900                    |
| Light-Duty Gasoline Trucks   | 19 400           | 3               | 76                        | 3.2              | 950                       | -                         | -                         | -                         | -                         | 20 500                    |
| Heavy-Duty Gasoline Vehicles   | 7 440            | 1.2             | 31                        | 0.21             | 62                        | -                         | -                         | -                         | -                         | 7 530                     |
| Motorcycles  | 150              | 0.15            | 3.7                       | 0.0              | 0.93                      | -                         | -                         | -                         | -                         | 155                       |
| Light-Duty Diesel Vehicles   | 463              | 0.01            | 0.3                       | 0.03             | 10                        | -                         | -                         | -                         | -                         | 473                       |
| Light-Duty Diesel Trucks   | 693              | 0.02            | 0.5                       | 0.05             | 10                        | -                         | -                         | -                         | -                         | 708                       |
| Heavy-Duty Diesel Vehicles   | 20 000           | 1               | 30                        | 0.6              | 200                       | -                         | -                         | -                         | -                         | 20 200                    |
| Propane and Natural Gas Vehicles   | 2 180            | 1               | 30                        | 0.04             | 10                        | -                         | -                         | -                         | -                         | 2 200                     |
| Railways   | 6 220            | 0.3             | 8                         | 3                | 800                       | -                         | -                         | -                         | -                         | 7 000                     |
| Domestic Navigation  | 4 740            | 0.3             | 8                         | 1                | 300                       | -                         | -                         | -                         | -                         | 5 100                     |
| Other Transportation   | 28 700           | 20              | 400                       | 6                | 2 000                     | -                         | -                         | -                         | -                         | 31 000                    |
| Off-Road Gasoline  | 7 660            | 9               | 200                       | 0.2              | 50                        | -                         | -                         | -                         | -                         | 7 900                     |
| Off-Road Diesel  | 14 300           | 0.8             | 20                        | 6                | 2 000                     | -                         | -                         | -                         | -                         | 16 000                    |
| Pipeline Transport   | 6 680            | 6.7             | 170                       | 0.2              | 50                        | -                         | -                         | -                         | -                         | 6 910                     |
| <b>c. Fugitive Sources</b>   | <b>12 000</b>    | <b>1 500</b>    | <b>37 000</b>             | <b>0.1</b>       | <b>30</b>                 | -                         | -                         | -                         | -                         | <b>49 000</b>             |
| Coal Mining  | -                | 100             | 3 000                     | -                | -                         | -                         | -                         | -                         | -                         | 3 000                     |
| Oil and Natural Gas  | 12 000           | 1 400           | 34 000                    | 0.1              | 30                        | -                         | -                         | -                         | -                         | 46 000                    |
| Oil  | 95               | 190             | 4 800                     | 0.1              | 30                        | -                         | -                         | -                         | -                         | 5 000                     |
| Natural Gas  | 26               | 520             | 13 000                    | -                | -                         | -                         | -                         | -                         | -                         | 13 000                    |
| Venting  | 7 000            | 650             | 16 000                    | -                | -                         | -                         | -                         | -                         | -                         | 23 000                    |
| Flaring  | 4 500            | 5.5             | 140                       | 0.01             | 3                         | -                         | -                         | -                         | -                         | 4 600                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -                | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | -                         |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>31 800</b>    | <b>4.7</b>      | <b>120</b>                | <b>38.4</b>      | <b>11 500</b>             | <b>970</b>                | <b>7 600</b>              | <b>3 200</b>              | <b>0.3</b>                | <b>55 100</b>             |
| <b>a. Mineral Products</b>   | <b>8 700</b>     | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>8 700</b>              |
| Cement Production  | 5 800            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 5 800                     |
| Lime Production  | 1 760            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 1 760                     |
| Mineral Product Use  | 1 200            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 1 200                     |
| <b>b. Chemical Industry</b>  | <b>2 800</b>     | <b>4.7</b>      | <b>120</b>                | <b>38</b>        | <b>11 000</b>             | -                         | -                         | -                         | -                         | <b>14 000</b>             |
| Ammonia Production   | 2 770            | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 2 770                     |
| Nitric Acid Production   | -                | -               | -                         | 3.3              | 970                       | -                         | -                         | -                         | -                         | 970                       |
| Adipic Acid Production   | -                | -               | -                         | 35               | 10 000                    | -                         | -                         | -                         | -                         | 10 000                    |
| Petrochemical and Carbon Black Production <sup>3</sup>   | -                | 4.7             | 120                       | 0.02             | 7                         | -                         | -                         | -                         | -                         | 130                       |
| <b>c. Metal Production</b>   | <b>12 900</b>    | -               | -                         | -                | -                         | -                         | <b>7 560</b>              | <b>3 020</b>              | -                         | <b>23 500</b>             |
| Iron and Steel Production  | 10 200           | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | 10 200                    |
| Aluminum Production  | 2 710            | -               | -                         | -                | -                         | -                         | 7 560                     | 56.3                      | -                         | 10 300                    |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                | -               | -                         | -                | -                         | -                         | -                         | 2 960                     | -                         | 2 960                     |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>4</sup></b> | -                | -               | -                         | -                | -                         | <b>970</b>                | <b>0.06</b>               | <b>210</b>                | <b>0.3</b>                | <b>1 200</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>7 400</b>     | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>7 400</b>              |
| <b>f. Other Product Manufacture and Use</b>  | -                | -               | -                         | <b>0.58</b>      | <b>170</b>                | -                         | -                         | -                         | -                         | <b>170</b>                |
| <b>AGRICULTURE</b>   | -                | <b>1 100</b>    | <b>27 000</b>             | <b>70</b>        | <b>20 000</b>             | -                         | -                         | -                         | -                         | <b>49 000</b>             |
| <b>a. Enteric Fermentation</b>   | -                | <b>910</b>      | <b>23 000</b>             | -                | -                         | -                         | -                         | -                         | -                         | <b>23 000</b>             |
| <b>b. Manure Management</b>  | -                | <b>140</b>      | <b>3 500</b>              | <b>13.8</b>      | <b>4 120</b>              | -                         | -                         | -                         | -                         | <b>7 600</b>              |
| <b>c. Agriculture Soils</b>  | -                | -               | -                         | <b>58</b>        | <b>17 000</b>             | -                         | -                         | -                         | -                         | <b>17 000</b>             |
| Direct Sources   | -                | -               | -                         | 48               | 14 000                    | -                         | -                         | -                         | -                         | 14 000                    |
| Indirect Sources   | -                | -               | -                         | 10               | 3 000                     | -                         | -                         | -                         | -                         | 3 000                     |
| <b>d. Field Burning of Agricultural Residues</b>   | -                | <b>7</b>        | <b>200</b>                | <b>0.2</b>       | <b>50</b>                 | -                         | -                         | -                         | -                         | <b>200</b>                |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>1 000</b>     | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>1 000</b>              |
| <b>WASTE</b>   | <b>510</b>       | <b>910</b>      | <b>23 000</b>             | <b>2</b>         | <b>700</b>                | -                         | -                         | -                         | -                         | <b>24 000</b>             |
| <b>a. Solid Waste Disposal on Land</b>   | -                | <b>890</b>      | <b>22 000</b>             | -                | -                         | -                         | -                         | -                         | -                         | <b>22 000</b>             |
| <b>b. Wastewater Handling</b>  | -                | <b>15</b>       | <b>380</b>                | <b>2</b>         | <b>500</b>                | -                         | -                         | -                         | -                         | <b>870</b>                |
| <b>c. Waste Incineration</b>   | <b>510</b>       | <b>0.5</b>      | <b>10</b>                 | <b>0.7</b>       | <b>200</b>                | -                         | -                         | -                         | -                         | <b>730</b>                |
| <b>LAND USE, LAND-USE CHANGE AND FORESTRY</b>  | <b>-94 000</b>   | <b>180</b>      | <b>4 400</b>              | <b>7.2</b>       | <b>2 100</b>              | -                         | -                         | -                         | -                         | <b>-87 000</b>            |
| <b>a. Forest Land</b>  | <b>-250 000</b>  | <b>140</b>      | <b>3 500</b>              | <b>5.9</b>       | <b>1 700</b>              | -                         | -                         | -                         | -                         | <b>-250 000</b>           |
| <b>b. Cropland</b>   | <b>9 800</b>     | <b>10</b>       | <b>300</b>                | <b>0.6</b>       | <b>200</b>                | -                         | -                         | -                         | -                         | <b>10 000</b>             |
| <b>c. Grassland</b>  | -                | <b>20</b>       | <b>500</b>                | <b>0.5</b>       | <b>200</b>                | -                         | -                         | -                         | -                         | <b>600</b>                |
| <b>d. Wetlands</b>   | <b>6 000</b>     | <b>0.3</b>      | <b>8</b>                  | <b>0.01</b>      | <b>4</b>                  | -                         | -                         | -                         | -                         | <b>6 000</b>              |
| <b>e. Settlements</b>  | <b>4 000</b>     | <b>5</b>        | <b>100</b>                | <b>0.2</b>       | <b>50</b>                 | -                         | -                         | -                         | -                         | <b>4 000</b>              |
| <b>f. Harvested Wood Products</b>  | <b>140 000</b>   | -               | -                         | -                | -                         | -                         | -                         | -                         | -                         | <b>140 000</b>            |

## Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry Sector.
  - Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.
  - The Petrochemical and Carbon Black Production category includes CH<sub>4</sub> and N<sub>2</sub>O emissions; CO<sub>2</sub> emissions are included in Non-Energy Products from Fuels and Solvent Use.
  - HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HFC production (HFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.
  - IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.
- Indicates no emissions  
0.0 Indicates emissions truncated due to rounding

# Annex 10

## Provincial/Territorial Greenhouse Gas Emission Tables, 1990–2013

Summary tables illustrating GHG emissions (for GHG categories, see Table A10–1) by province/territory, sector, and year are included in this annex (Table A10–1 to Table A10–28). To account for the creation of Nunavut in 1999, a time series from 1999–2013 is provided for both Nunavut and the Northwest Territories (Table A10–24 and Table A10–26) and the years 1990–1998 are presented as a combined region in Table A10–28.

Although the UNFCCC reporting guidelines require that only national-level detail be reported, provincial- and territorial-level detail is important, owing to the regional differences in emission levels and trends. Note that provincial and territorial emission estimates may not necessarily sum to the national totals due to rounding and suppression of confidential data. For example, provincial and territorial emission totals do not include consumption of PFCs and SF<sub>6</sub> (e.g., refrigeration, air conditioning and semiconductor manufacturing).

The reader should also note that many provinces develop independent inventories of provincial GHG emissions, in some cases making use of alternate methodologies, data inputs and/or inclusions/omissions of GHG source categories. While Canada is developing a national emissions inventory consistent with IPCC guidelines and international obligations, provincial governments may elect to develop an inventory structure in accordance with specific provincial needs. Environment Canada encourages collaboration with provinces for quality assurance and continuous improvement of this annual National Inventory Report. The Department is striving to ensure consistency between different estimates, as some provincial GHG estimates presented in this report used to develop the national estimates may differ from those developed by provincial governments.

Table A10-1 GHG Source/Sink Category Description

| GHG Source/Sink Categories   |   |
|--|---|
| <b>ENERGY</b>  |   |
| <b>a. Stationary Combustion Sources</b>  |   |
| Public Electricity and Heat Production   | Emissions from fuel consumed by utility electricity generation and steam production (for sale)  |
| Petroleum Refining Industries  | Emissions from fuel consumed by petroleum refining industries   |
| Mining and Upstream Oil and Gas Production   | Emissions from fuel consumed by: <ul style="list-style-type: none"> <li>- Metal and non-metal mines, coal mines, stone quarries, and gravel pits</li> <li>- Oil and gas extraction industries</li> <li>- Mineral exploration and contract drilling operations</li> </ul>  |
| Manufacturing Industries   | Emissions from fuel consumed by the following industries: <ul style="list-style-type: none"> <li>- Iron and Steel (steel foundries, casting and rolling mills)</li> <li>- Non-ferrous metals (aluminium, magnesium and other production)</li> <li>- Chemical (fertilizer manufacturing, organic and inorganic chemical manufacturing)</li> <li>- Pulp and Paper (primarily pulp, paper, and paper product manufacturers)</li> <li>- Cement and other non-metallic mineral production</li> <li>- Other manufacturing industries not listed (such as automobile manufacturing, textiles, food and beverage industries)</li> </ul>   |
| Construction   | Emissions from fuels consumed by the construction industry – buildings, highways etc.   |
| Commercial & Institutional   | Emissions from fuel consumed by: <ul style="list-style-type: none"> <li>- Service industries related to mining, communication, wholesale and retail trade, finance and insurance, real estate, education, etc.)</li> <li>- Federal, provincial and municipal establishments</li> <li>- National Defence and Canadian Coast Guard</li> <li>- Train stations, airports and warehouses</li> </ul>  |
| Residential  | Emissions from fuel consumed for personal residences (homes, apartment hotels, condominiums and farm houses)  |
| Agriculture & Forestry   | Emissions from fuel consumed by: <ul style="list-style-type: none"> <li>- Forestry and logging service industry</li> <li>- Agricultural, hunting and trapping industry (excluding food processing, farm machinery manufacturing, and repair)</li> </ul>   |
| Residential  | Emissions from fuel consumed for personal residences (homes, apartment hotels, condominiums and farm houses)  |
| Agriculture & Forestry   | Emissions from fuel consumed by: <ul style="list-style-type: none"> <li>- Forestry and logging service industry</li> <li>- Agricultural, hunting and trapping industry (excluding food processing, farm machinery manufacturing, and repair)</li> </ul>   |
| <b>b. Transportation</b>   | Emissions resulting from the: <ul style="list-style-type: none"> <li>- Consumption of fossil fuels by aircrafts flying domestically with Canadian purchased fuel</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from ethanol and biodiesel) by vehicles licensed to operate on roads</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from biodiesel) by Canadian railways</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from ethanol and biodiesel) by Canadian registered marine vessels fuelled domestically</li> <li>- Consumption of fossil fuels (including non-CO<sub>2</sub> emissions from ethanol and biodiesel) by combustion devices not licensed to operate on roads</li> <li>- Transportation and distribution of crude oil, natural gas and other products</li> </ul> |
| <b>c. Fugitive Sources</b>   | Intentional and unintentional releases of greenhouse gases from the following activities: <ul style="list-style-type: none"> <li>- Underground and surface mining, abandoned underground coal mines</li> <li>- Conventional and unconventional oil and gas exploration, production, transportation, and distribution</li> </ul>   |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | Intentional and unintentional releases of greenhouse gases from the transport and storage of carbon dioxide   |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |   |
| <b>a. Mineral Products</b>   | Emissions resulting from the following process activities: <ul style="list-style-type: none"> <li>- Production of cement and lime; use of soda ash, limestone &amp; dolomite, and magnesite</li> </ul>  |
| <b>b. Chemical Industry</b>  | Production of ammonia, nitric acid, adipic acid, carbide, carbon black, ethylene dichloride, ethylene, methanol and styrene   |
| <b>c. Metal Production</b>   | Production of aluminum, iron and steel production, magnesium production and casting   |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub></b> | By-product production of HFC-23; use of HFCs and/or PFCs in air conditioning units, refrigeration units, fire extinguishers, aerosol cans, solvents, foam blowing, semiconductor manufacturing and electronics industry; use of SF <sub>6</sub> in electrical equipment and semiconductor manufacturing; use of NF <sub>3</sub> in semiconductor manufacturing  |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>                               | Non-energy use of fossil fuels mostly in chemical/petrochemical activities, including solvents and lubricants   |
| <b>f. Other Product Manufacture and Use</b>  | Emissions resulting from the use of N <sub>2</sub> O as an anaesthetic and propellant; emissions from the use of urea in selective catalytic reduction (SCR) equipped vehicles  |
| <b>AGRICULTURE</b>   |   |
| <b>a. Enteric Fermentation</b>   | Emissions resulting from the: <ul style="list-style-type: none"> <li>- Eructation of CH<sub>4</sub> during the digestion of plant material by (mainly) ruminants</li> </ul>   |
| <b>b. Manure Management</b>  | <ul style="list-style-type: none"> <li>- Release of CH<sub>4</sub> and N<sub>2</sub>O due to microbial activity during the storage of feces, urine and bedding materials from the cleaning of barns and pens</li> <li>- Indirect N<sub>2</sub>O emissions from volatilization and leaching of nitrogen from animal manure during storage</li> </ul>   |
| <b>c. Agricultural Soils</b>   |   |
| Direct sources   | Direct N <sub>2</sub> O emissions from Synthetic fertilizer, manure on cropland, pasture range and paddock, crop residue, tillage, summerfallow, irrigation and cultivation of organic soils  |
| Indirect Sources   | Indirect N <sub>2</sub> O emissions from volatilization and leaching of animal manure nitrogen, synthetic fertilizer nitrogen and crop residue nitrogen   |
| <b>d. Field Burning of Agricultural Residues</b>                                       | CH <sub>4</sub> and N <sub>2</sub> O emissions from crop residue burning  |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>             | Direct emissions of CO <sub>2</sub> from the application of lime, urea and other fertilizers containing carbon  |
| <b>WASTE</b>   |   |
| <b>a. Solid Waste Disposal on Land</b>   | Emissions resulting from: <ul style="list-style-type: none"> <li>- Municipal solid waste management sites (landfills) and dedicated wood waste landfills</li> </ul>   |
| <b>b. Wastewater Handling</b>  | Wastewater treatment  |
| <b>c. Waste Incineration</b>   | Municipal solid waste, sewage sludge and hazardous waste incineration   |

Table A10–2 1990–2013 GHG Emission Summary for Newfoundland and Labrador

| Greenhouse Gas Categories  |                                     |              |               |               |              |              |              |              |
|--|-------------------------------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|
|  | 1990                                | 2000         | 2005          | 2009          | 2010         | 2011         | 2012         | 2013         |
|  | <i>kt CO<sub>2</sub> equivalent</i> |              |               |               |              |              |              |              |
| <b>TOTAL</b>   | <b>9 750</b>                        | <b>9 290</b> | <b>10 300</b> | <b>10 200</b> | <b>9 800</b> | <b>9 820</b> | <b>9 180</b> | <b>8 640</b> |
| <b>ENERGY</b>  | <b>8 840</b>                        | <b>8 260</b> | <b>9 290</b>  | <b>9 140</b>  | <b>8 770</b> | <b>8 740</b> | <b>8 170</b> | <b>7 660</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>5 680</b>                        | <b>4 610</b> | <b>4 870</b>  | <b>4 780</b>  | <b>4 250</b> | <b>4 180</b> | <b>3 900</b> | <b>3 830</b> |
| Public Electricity and Heat Production   | 1 650                               | 823          | 865           | 829           | 747          | 865          | 851          | 866          |
| Petroleum Refining Industries  | 1 000                               | 1 000        | 910           | 1 100         | 970          | 790          | 990          | 850          |
| Mining and Upstream Oil and Gas Production   | 1 160                               | 1 460        | 1 890         | 1 970         | 1 600        | 1 500        | 1 220        | 1 370        |
| Manufacturing Industries   | 506                                 | 245          | 279           | 87.9          | 76.7         | 79.3         | 84.9         | 76.7         |
| Construction   | 33                                  | 10.5         | 23.6          | 8.72          | 11.2         | 15           | 9.27         | 6.39         |
| Commercial and Institutional   | 320                                 | 311          | 356           | 199           | 257          | 262          | 202          | 199          |
| Residential  | 970                                 | 679          | 543           | 621           | 581          | 646          | 537          | 455          |
| Agriculture and Forestry   | 24.5                                | 47           | 8.11          | 8.17          | 11.5         | 17.6         | 11.2         | 8.32         |
| <b>b. Transport<sup>1</sup></b>  | <b>3 110</b>                        | <b>3 350</b> | <b>3 520</b>  | <b>3 740</b>  | <b>3 940</b> | <b>4 070</b> | <b>3 740</b> | <b>3 270</b> |
| Domestic Aviation  | 190                                 | 190          | 210           | 180           | 190          | 180          | 230          | 230          |
| Road Transportation  | 1 650                               | 1 780        | 1 920         | 2 070         | 2 140        | 2 200        | 2 250        | 2 200        |
| Light-Duty Gasoline Vehicles   | 760                                 | 637          | 601           | 648           | 653          | 667          | 699          | 650          |
| Light-Duty Gasoline Trucks   | 434                                 | 652          | 758           | 822           | 831          | 852          | 895          | 835          |
| Heavy-Duty Gasoline Vehicles   | 108                                 | 46.1         | 54.2          | 61.6          | 62.9         | 65.2         | 69.2         | 65.2         |
| Motorcycles  | 5.2                                 | 3.68         | 4.12          | 4.68          | 4.78         | 4.94         | 5.24         | 4.94         |
| Light-Duty Diesel Vehicles   | 2.31                                | 1.33         | 1.57          | 1.93          | 2.06         | 2.33         | 2.57         | 2.49         |
| Light-Duty Diesel Trucks   | 5.59                                | 14.3         | 19.3          | 20.4          | 20.6         | 22.3         | 23.4         | 21.8         |
| Heavy-Duty Diesel Vehicles   | 339                                 | 422          | 481           | 512           | 565          | 582          | 550          | 615          |
| Propane and Natural Gas Vehicles   | 1.4                                 | 0.92         | 0.31          | 0.46          | 0.46         | 0.46         | 0.46         | 0.62         |
| Railways   | -                                   | -            | -             | -             | 1.5          | -            | -            | -            |
| Domestic Navigation  | 700                                 | 690          | 590           | 760           | 860          | 590          | 420          | 240          |
| Other Transportation   | 570                                 | 690          | 800           | 740           | 750          | 1 100        | 850          | 600          |
| Off-Road Gasoline  | 140                                 | 100          | x             | x             | x            | x            | x            | x            |
| Off-Road Diesel  | 420                                 | 590          | 740           | 590           | 580          | 830          | 470          | 330          |
| Pipeline Transport   | -                                   | -            | x             | x             | x            | x            | x            | x            |
| <b>c. Fugitive Sources</b>   | <b>41</b>                           | <b>310</b>   | <b>910</b>    | <b>610</b>    | <b>580</b>   | <b>490</b>   | <b>520</b>   | <b>560</b>   |
| Coal Mining  | -                                   | -            | -             | -             | -            | -            | -            | -            |
| Oil and Natural Gas  | 41                                  | 310          | 910           | 610           | 580          | 490          | 520          | 560          |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                            | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>86.6</b>                         | <b>132</b>   | <b>137</b>    | <b>143</b>    | <b>158</b>   | <b>191</b>   | <b>144</b>   | <b>157</b>   |
| <b>a. Mineral Products</b>   | <b>64</b>                           | <b>1.7</b>   | <b>1.5</b>    | <b>1.1</b>    | <b>0.8</b>   | <b>0.75</b>  | <b>1</b>     | <b>1.1</b>   |
| Cement Production  | 60                                  | -            | -             | -             | -            | -            | -            | -            |
| Lime Production  | -                                   | -            | -             | -             | -            | -            | -            | -            |
| Mineral Products Use   | 3.4                                 | 1.7          | 1.5           | 1.1           | 0.8          | 0.75         | 1            | 1.1          |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>                            | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     |
| Adipic Acid Production   | -                                   | -            | -             | -             | -            | -            | -            | -            |
| <b>c. Metal Production</b>   | <b>-</b>                            | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     |
| Iron and Steel Production  | -                                   | -            | -             | -             | -            | -            | -            | -            |
| Aluminum Production  | -                                   | -            | -             | -             | -            | -            | -            | -            |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                   | -            | -             | -             | -            | -            | -            | -            |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>0.91</b>                         | <b>47</b>    | <b>65</b>     | <b>72</b>     | <b>75</b>    | <b>79</b>    | <b>84</b>    | <b>88</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>19</b>                           | <b>76</b>    | <b>64</b>     | <b>66</b>     | <b>79</b>    | <b>110</b>   | <b>54</b>    | <b>63</b>    |
| <b>f. Other Product Manufacture and Use</b>  | <b>3.6</b>                          | <b>7.4</b>   | <b>5.8</b>    | <b>3.9</b>    | <b>3.7</b>   | <b>3.9</b>   | <b>5</b>     | <b>4.5</b>   |
| <b>AGRICULTURE</b>   | <b>57</b>                           | <b>69</b>    | <b>73</b>     | <b>81</b>     | <b>95</b>    | <b>110</b>   | <b>140</b>   | <b>140</b>   |
| <b>a. Enteric Fermentation</b>   | <b>25</b>                           | <b>27</b>    | <b>35</b>     | <b>37</b>     | <b>36</b>    | <b>35</b>    | <b>35</b>    | <b>36</b>    |
| <b>b. Manure Management</b>  | <b>19</b>                           | <b>20</b>    | <b>25</b>     | <b>27</b>     | <b>26</b>    | <b>26</b>    | <b>26</b>    | <b>26</b>    |
| <b>c. Agriculture Soils</b>  | <b>10</b>                           | <b>10</b>    | <b>13</b>     | <b>15</b>     | <b>15</b>    | <b>14</b>    | <b>14</b>    | <b>13</b>    |
| Direct Sources   | 8.3                                 | 8.5          | 11            | 12            | 12           | 12           | 11           | 11           |
| Indirect Sources   | 2                                   | 2            | 3             | 3             | 3            | 3            | 3            | 3            |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>-</b>                            | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>3</b>                            | <b>10</b>    | <b>-</b>      | <b>2</b>      | <b>20</b>    | <b>40</b>    | <b>60</b>    | <b>60</b>    |
| <b>WASTE</b>   | <b>770</b>                          | <b>830</b>   | <b>840</b>    | <b>850</b>    | <b>780</b>   | <b>780</b>   | <b>730</b>   | <b>680</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | <b>730</b>                          | <b>790</b>   | <b>800</b>    | <b>810</b>    | <b>740</b>   | <b>740</b>   | <b>700</b>   | <b>650</b>   |
| <b>b. Wastewater Handling</b>  | <b>37</b>                           | <b>34</b>    | <b>33</b>     | <b>33</b>     | <b>34</b>    | <b>34</b>    | <b>34</b>    | <b>34</b>    |
| <b>c. Waste Incineration</b>   | <b>-</b>                            | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-3 2013 GHG Emission Summary for Newfoundland and Labrador

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                              |                  |                               |                        |                        |                                  |                                  |                        |
|--|--|------------------|-----------------|------------------------------|------------------|-------------------------------|------------------------|------------------------|----------------------------------|----------------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>              | N <sub>2</sub> O | N <sub>2</sub> O              | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>                  | NF <sub>3</sub>                  | TOTAL                  |
| Unit   |  | kt               | kt              | 25<br>kt CO <sub>2</sub> eq. | kt               | 298<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | 22 800<br>kt CO <sub>2</sub> eq. | 17 200<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>7 360</b>     | <b>40</b>       | <b>1 000</b>                 | <b>0.62</b>      | <b>190</b>                    | <b>87</b>              | -                      | <b>1.4</b>                       | -                                | <b>8 640</b>           |
| <b>ENERGY</b>  |  | <b>7 230</b>     | <b>12</b>       | <b>290</b>                   | <b>0.5</b>       | <b>100</b>                    | -                      | -                      | -                                | -                                | <b>7 660</b>           |
| <b>a. Stationary Combustion Sources</b>  |  | <b>3 590</b>     | <b>8</b>        | <b>200</b>                   | <b>0.1</b>       | <b>40</b>                     | -                      | -                      | -                                | -                                | <b>3 830</b>           |
| Public Electricity and Heat Production   |  | 861              | 0.01            | 0.3                          | 0.02             | 5                             | -                      | -                      | -                                | -                                | 866                    |
| Petroleum Refining Industries  |  | 848              | 0.02            | 0.4                          | 0.01             | 3                             | -                      | -                      | -                                | -                                | 850                    |
| Mining and Upstream Oil and Gas Production   |  | 1 310            | 1.7             | 44                           | 0.04             | 10                            | -                      | -                      | -                                | -                                | 1 370                  |
| Manufacturing Industries   |  | 76.1             | 0.0             | 0.03                         | 0.0              | 0.6                           | -                      | -                      | -                                | -                                | 76.7                   |
| Construction   |  | 6.36             | 0.0             | 0.0                          | 0.0              | 0.03                          | -                      | -                      | -                                | -                                | 6.39                   |
| Commercial and Institutional   |  | 197              | 0.0             | 0.06                         | 0.01             | 2                             | -                      | -                      | -                                | -                                | 199                    |
| Residential  |  | 285              | 6               | 100                          | 0.07             | 20                            | -                      | -                      | -                                | -                                | 455                    |
| Agriculture and Forestry   |  | 8.29             | 0.0             | 0.0                          | 0.0              | 0.03                          | -                      | -                      | -                                | -                                | 8.32                   |
| <b>b. Transport<sup>1</sup></b>  |  | <b>3 160</b>     | <b>0.5</b>      | <b>10</b>                    | <b>0.3</b>       | <b>100</b>                    | -                      | -                      | -                                | -                                | <b>3 270</b>           |
| Domestic Aviation  |  | 230              | 0.01            | 0.2                          | 0.01             | 2                             | -                      | -                      | -                                | -                                | 230                    |
| Road Transportation  |  | 2 160            | 0.2             | 4                            | 0.12             | 36                            | -                      | -                      | -                                | -                                | 2 200                  |
| Light-Duty Gasoline Vehicles   |  | 639              | 0.06            | 1.4                          | 0.03             | 9.9                           | -                      | -                      | -                                | -                                | 650                    |
| Light-Duty Gasoline Trucks   |  | 820              | 0.08            | 1.9                          | 0.05             | 13                            | -                      | -                      | -                                | -                                | 835                    |
| Heavy-Duty Gasoline Vehicles   |  | 63.5             | 0.0             | 0.05                         | 0.01             | 1.6                           | -                      | -                      | -                                | -                                | 65.2                   |
| Motorcycles  |  | 4.87             | 0.0             | 0.04                         | 0.0              | 0.03                          | -                      | -                      | -                                | -                                | 4.94                   |
| Light-Duty Diesel Vehicles   |  | 2.43             | 0.0             | 0.0                          | 0.0              | 0.06                          | -                      | -                      | -                                | -                                | 2.49                   |
| Light-Duty Diesel Trucks   |  | 21.2             | 0.0             | 0.01                         | 0.0              | 0.5                           | -                      | -                      | -                                | -                                | 21.8                   |
| Heavy-Duty Diesel Vehicles   |  | 604              | 0.03            | 0.6                          | 0.03             | 10                            | -                      | -                      | -                                | -                                | 615                    |
| Propane and Natural Gas Vehicles   |  | 0.61             | 0.0             | 0.01                         | 0.0              | 0.0                           | -                      | -                      | -                                | -                                | 0.62                   |
| Railways   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Domestic Navigation  |  | 220              | 0.02            | 0.4                          | 0.08             | 20                            | -                      | -                      | -                                | -                                | 240                    |
| Other Transportation   |  | 555              | 0.3             | 8                            | 0.1              | 40                            | -                      | -                      | -                                | -                                | 600                    |
| Off-Road Gasoline  |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Off-Road Diesel  |  | 294              | 0.02            | 0.4                          | 0.1              | 40                            | -                      | -                      | -                                | -                                | 330                    |
| Pipeline Transport   |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| <b>c. Fugitive Sources</b>   |  | <b>480</b>       | <b>3.2</b>      | <b>81</b>                    | <b>0.01</b>      | <b>2</b>                      | -                      | -                      | -                                | -                                | <b>560</b>             |
| Coal Mining  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Oil and Natural Gas  |  | 480              | 3.2             | 81                           | 0.01             | 2                             | -                      | -                      | -                                | -                                | 560                    |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>64.3</b>      | -               | -                            | <b>0.01</b>      | <b>3.84</b>                   | <b>87</b>              | -                      | <b>1.4</b>                       | -                                | <b>157</b>             |
| <b>a. Mineral Products</b>   |  | <b>1.1</b>       | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>1.1</b>             |
| Cement Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Lime Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Mineral Products Use   |  | 1.1              | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | 1.1                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Adipic Acid Production   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Iron and Steel Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Aluminum Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                            | -                | -                             | <b>87</b>              | -                      | <b>1.4</b>                       | -                                | <b>88</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>63</b>        | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>63</b>              |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>0.6</b>       | -               | -                            | <b>0.01</b>      | <b>3.8</b>                    | -                      | -                      | -                                | -                                | <b>4.5</b>             |
| <b>AGRICULTURE</b>   |  | <b>100</b>       | <b>1.9</b>      | <b>47</b>                    | <b>0.09</b>      | <b>30</b>                     | -                      | -                      | -                                | -                                | <b>140</b>             |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>1.4</b>      | <b>36</b>                    | -                | -                             | -                      | -                      | -                                | -                                | <b>36</b>              |
| <b>b. Manure Management</b>  |  | -                | <b>0.47</b>     | <b>12</b>                    | <b>0.05</b>      | <b>14.4</b>                   | -                      | -                      | -                                | -                                | <b>26</b>              |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                            | <b>0.05</b>      | <b>13</b>                     | -                      | -                      | -                                | -                                | <b>13</b>              |
| Direct Sources   |  | -                | -               | -                            | 0.04             | 11                            | -                      | -                      | -                                | -                                | 11                     |
| Indirect Sources   |  | -                | -               | -                            | 0.01             | 3                             | -                      | -                      | -                                | -                                | 3                      |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>60</b>        | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>60</b>              |
| <b>WASTE</b>   |  | -                | <b>27</b>       | <b>670</b>                   | <b>0.03</b>      | <b>10</b>                     | -                      | -                      | -                                | -                                | <b>680</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>26</b>       | <b>650</b>                   | -                | -                             | -                      | -                      | -                                | -                                | <b>650</b>             |
| <b>b. Wastewater Handling</b>  |  | -                | <b>0.96</b>     | <b>24</b>                    | <b>0.03</b>      | <b>10</b>                     | -                      | -                      | -                                | -                                | <b>34</b>              |
| <b>c. Waste Incineration</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–4 1990–2013 GHG Emission Summary for Prince Edward Island

| Greenhouse Gas Categories  |              |              |              |              |              |              |              |              |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|  | 1990         | 2000         | 2005         | 2009         | 2010         | 2011         | 2012         | 2013         |
| <i>kt CO<sub>2</sub> equivalent</i>  |              |              |              |              |              |              |              |              |
| <b>TOTAL</b>   | <b>2 000</b> | <b>2 190</b> | <b>2 120</b> | <b>1 980</b> | <b>2 030</b> | <b>2 100</b> | <b>2 110</b> | <b>1 800</b> |
| <b>ENERGY</b>  | <b>1 480</b> | <b>1 590</b> | <b>1 490</b> | <b>1 450</b> | <b>1 530</b> | <b>1 590</b> | <b>1 580</b> | <b>1 310</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>772</b>   | <b>756</b>   | <b>635</b>   | <b>652</b>   | <b>678</b>   | <b>754</b>   | <b>703</b>   | <b>567</b>   |
| Public Electricity and Heat Production   | 104          | 53           | 4.76         | 6.03         | 1.59         | 1.23         | 10.8         | 3.92         |
| Petroleum Refining Industries  | -            | -            | -            | -            | -            | -            | -            | -            |
| Mining and Upstream Oil and Gas Production   | 0.89         | 7.53         | x            | x            | x            | 0.16         | -            | -            |
| Manufacturing Industries   | 55.2         | 136          | 144          | 130          | 171          | 142          | 187          | 114          |
| Construction   | 11.1         | 6.68         | x            | x            | x            | x            | x            | x            |
| Commercial and Institutional   | 160          | 179          | 120          | 52.4         | 47.6         | 86.4         | 74.2         | 75           |
| Residential  | 423          | 342          | 331          | 438          | 408          | 484          | 410          | 359          |
| Agriculture and Forestry   | 18.5         | 31.9         | 24           | 17.8         | 29.5         | 30.5         | 17.5         | 12.5         |
| <b>b. Transport<sup>1</sup></b>  | <b>703</b>   | <b>837</b>   | <b>851</b>   | <b>802</b>   | <b>847</b>   | <b>838</b>   | <b>873</b>   | <b>742</b>   |
| Domestic Aviation  | 17           | 11           | 14           | 18           | 18           | 16           | 19           | 20           |
| Road Transportation  | 512          | 584          | 620          | 620          | 614          | 512          | 596          | 564          |
| Light-Duty Gasoline Vehicles   | 245          | 229          | 217          | 206          | 211          | 163          | 204          | 189          |
| Light-Duty Gasoline Trucks   | 114          | 195          | 235          | 226          | 231          | 179          | 226          | 209          |
| Heavy-Duty Gasoline Vehicles   | 51.7         | 17.6         | 23.9         | 23.9         | 24.8         | 19.4         | 24.7         | 23.2         |
| Motorcycles  | 1.04         | 1.42         | 2.74         | 2.73         | 2.83         | 2.21         | 2.82         | 2.64         |
| Light-Duty Diesel Vehicles   | 2.36         | 1.83         | x            | x            | x            | 2.38         | x            | x            |
| Light-Duty Diesel Trucks   | 3.19         | 7.23         | 9.12         | 8.64         | 8.85         | 9.25         | 9.15         | 8.38         |
| Heavy-Duty Diesel Vehicles   | 93.7         | 130          | 130          | 151          | 133          | 137          | 127          | 130          |
| Propane and Natural Gas Vehicles   | 1.1          | 0.77         | x            | x            | x            | -            | x            | x            |
| Railways   | -            | -            | -            | -            | -            | -            | -            | -            |
| Domestic Navigation  | 89           | 85           | 100          | 81           | 110          | 140          | 95           | 71           |
| Other Transportation   | 83           | 160          | 120          | 84           | 110          | 170          | 160          | 87           |
| Off-Road Gasoline  | 44           | 75           | 78           | 58           | 71           | x            | x            | x            |
| Off-Road Diesel  | 39           | 83           | x            | x            | x            | 94           | 69           | 32           |
| Pipeline Transport   | -            | -            | x            | x            | x            | x            | x            | x            |
| <b>c. Fugitive Sources</b>   | <b>-</b>     | <b>-</b>     | <b>0.0</b>   | <b>-</b>     | <b>-</b>     | <b>0.0</b>   | <b>-</b>     | <b>-</b>     |
| Coal Mining  | -            | -            | -            | -            | -            | -            | -            | -            |
| Oil and Natural Gas  | -            | -            | 0.0          | -            | -            | 0.0          | -            | -            |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>     |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>4.48</b>  | <b>21</b>    | <b>28.1</b>  | <b>28.8</b>  | <b>28.4</b>  | <b>29.5</b>  | <b>30.3</b>  | <b>31.3</b>  |
| <b>a. Mineral Products</b>   | <b>0.34</b>  | <b>0.69</b>  | <b>0.88</b>  | <b>1</b>     | <b>0.66</b>  | <b>0.62</b>  | <b>0.6</b>   | <b>0.6</b>   |
| Cement Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| Lime Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| Mineral Products Use   | 0.34         | 0.69         | 0.88         | 1            | 0.66         | 0.62         | 0.6          | 0.6          |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>     |
| Adipic Acid Production   | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>c. Metal Production</b>   | <b>-</b>     |
| Iron and Steel Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| Aluminum Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>-</b>     | <b>16</b>    | <b>24</b>    | <b>25</b>    | <b>26</b>    | <b>27</b>    | <b>27</b>    | <b>29</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>3.3</b>   | <b>2.4</b>   | <b>1.3</b>   | <b>1.4</b>   | <b>0.99</b>  | <b>1.3</b>   | <b>0.85</b>  | <b>0.99</b>  |
| <b>f. Other Product Manufacture and Use</b>  | <b>0.81</b>  | <b>1.9</b>   | <b>1.6</b>   | <b>1</b>     | <b>1</b>     | <b>1.1</b>   | <b>1.4</b>   | <b>1.2</b>   |
| <b>AGRICULTURE</b>   | <b>410</b>   | <b>450</b>   | <b>470</b>   | <b>360</b>   | <b>340</b>   | <b>340</b>   | <b>360</b>   | <b>320</b>   |
| <b>a. Enteric Fermentation</b>   | <b>150</b>   | <b>150</b>   | <b>140</b>   | <b>120</b>   | <b>120</b>   | <b>120</b>   | <b>120</b>   | <b>120</b>   |
| <b>b. Manure Management</b>  | <b>61</b>    | <b>63</b>    | <b>63</b>    | <b>46</b>    | <b>45</b>    | <b>45</b>    | <b>44</b>    | <b>44</b>    |
| <b>c. Agriculture Soils</b>  | <b>190</b>   | <b>230</b>   | <b>260</b>   | <b>190</b>   | <b>170</b>   | <b>170</b>   | <b>200</b>   | <b>150</b>   |
| Direct Sources   | 160          | 190          | 210          | 160          | 140          | 140          | 160          | 130          |
| Indirect Sources   | 40           | 40           | 50           | 30           | 30           | 30           | 30           | 30           |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>0.09</b>  | <b>0.2</b>   | <b>0.2</b>   | <b>0.1</b>   | <b>0.1</b>   | <b>0.1</b>   | <b>0.2</b>   | <b>0.2</b>   |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>5</b>     | <b>5</b>     | <b>5</b>     | <b>4</b>     | <b>3</b>     | <b>3</b>     | <b>2</b>     | <b>2</b>     |
| <b>WASTE</b>   | <b>110</b>   | <b>130</b>   | <b>140</b>   | <b>140</b>   | <b>140</b>   | <b>140</b>   | <b>140</b>   | <b>140</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | <b>96</b>    | <b>110</b>   | <b>120</b>   | <b>110</b>   | <b>120</b>   | <b>110</b>   | <b>110</b>   | <b>110</b>   |
| <b>b. Wastewater Handling</b>  | <b>6.2</b>   | <b>8</b>     | <b>8.1</b>   | <b>8</b>     | <b>8</b>     | <b>8.1</b>   | <b>8.2</b>   | <b>8.4</b>   |
| <b>c. Waste Incineration</b>   | <b>11</b>    | <b>12</b>    | <b>12</b>    | <b>12</b>    | <b>13</b>    | <b>13</b>    | <b>13</b>    | <b>13</b>    |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-5 2013 GHG Emission Summary for Prince Edward Island

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>1 230</b>     | <b>13</b>       | <b>320</b>             | <b>0.72</b>      | <b>210</b>             | <b>29</b>              | -                      | -                      | -                      | <b>1 800</b>           |
| <b>ENERGY</b>  |  | <b>1 210</b>     | <b>2.6</b>      | <b>64</b>              | <b>0.1</b>       | <b>30</b>              | -                      | -                      | -                      | -                      | <b>1 310</b>           |
| <b>a. Stationary Combustion Sources</b>  |  | <b>496</b>       | <b>2</b>        | <b>60</b>              | <b>0.03</b>      | <b>9</b>               | -                      | -                      | -                      | -                      | <b>567</b>             |
| Public Electricity and Heat Production   |  | 3.9              | 0.0             | 0.0                    | 0.0              | 0.02                   | -                      | -                      | -                      | -                      | 3.92                   |
| Petroleum Refining Industries  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Mining and Upstream Oil and Gas Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Manufacturing Industries   |  | 113              | 0.0             | 0.07                   | 0.0              | 0.6                    | -                      | -                      | -                      | -                      | 114                    |
| Construction   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Commercial and Institutional   |  | 74.5             | 0.0             | 0.02                   | 0.0              | 0.5                    | -                      | -                      | -                      | -                      | 75                     |
| Residential  |  | 289              | 2               | 60                     | 0.03             | 8                      | -                      | -                      | -                      | -                      | 359                    |
| Agriculture and Forestry   |  | 12.5             | 0.0             | 0.0                    | 0.0              | 0.06                   | -                      | -                      | -                      | -                      | 12.5                   |
| <b>b. Transport<sup>1</sup></b>  |  | <b>717</b>       | <b>0.1</b>      | <b>3</b>               | <b>0.07</b>      | <b>20</b>              | -                      | -                      | -                      | -                      | <b>742</b>             |
| Domestic Aviation  |  | 19.7             | 0.0             | 0.01                   | 0.0              | 0.2                    | -                      | -                      | -                      | -                      | 20                     |
| Road Transportation  |  | 553              | 0.05            | 1                      | 0.03             | 10                     | -                      | -                      | -                      | -                      | 564                    |
| Light-Duty Gasoline Vehicles   |  | 185              | 0.02            | 0.44                   | 0.01             | 3.5                    | -                      | -                      | -                      | -                      | 189                    |
| Light-Duty Gasoline Trucks   |  | 205              | 0.02            | 0.53                   | 0.01             | 3.8                    | -                      | -                      | -                      | -                      | 209                    |
| Heavy-Duty Gasoline Vehicles   |  | 22.6             | 0.0             | 0.03                   | 0.0              | 0.53                   | -                      | -                      | -                      | -                      | 23.2                   |
| Motorcycles  |  | 2.61             | 0.0             | 0.02                   | 0.0              | 0.01                   | -                      | -                      | -                      | -                      | 2.64                   |
| Light-Duty Diesel Vehicles   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Light-Duty Diesel Trucks   |  | 8.18             | 0.0             | 0.01                   | 0.0              | 0.2                    | -                      | -                      | -                      | -                      | 8.38                   |
| Heavy-Duty Diesel Vehicles   |  | 128              | 0.01            | 0.1                    | 0.01             | 2                      | -                      | -                      | -                      | -                      | 130                    |
| Propane and Natural Gas Vehicles   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Railways   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Domestic Navigation  |  | 62.7             | 0.0             | 0.09                   | 0.03             | 8                      | -                      | -                      | -                      | -                      | 71                     |
| Other Transportation   |  | 81.3             | 0.07            | 2                      | 0.01             | 4                      | -                      | -                      | -                      | -                      | 87                     |
| Off-Road Gasoline  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Off-Road Diesel  |  | 28.8             | 0.0             | 0.04                   | 0.01             | 4                      | -                      | -                      | -                      | -                      | 32                     |
| Pipeline Transport   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| <b>c. Fugitive Sources</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Coal Mining  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Oil and Natural Gas  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>1.73</b>      | -               | -                      | <b>0.0</b>       | <b>1.06</b>            | <b>29</b>              | -                      | -                      | -                      | <b>31.3</b>            |
| <b>a. Mineral Products</b>   |  | <b>0.6</b>       | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.6</b>             |
| Cement Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Lime Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Mineral Products Use   |  | 0.6              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 0.6                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Iron and Steel Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Aluminum Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                      | -                | -                      | <b>29</b>              | -                      | -                      | -                      | <b>29</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>0.99</b>      | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>0.99</b>            |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>0.1</b>       | -               | -                      | <b>0.0</b>       | <b>1.1</b>             | -                      | -                      | -                      | -                      | <b>1.2</b>             |
| <b>AGRICULTURE</b>   |  | -                | <b>5.6</b>      | <b>140</b>             | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>320</b>             |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>4.9</b>      | <b>120</b>             | -                | -                      | -                      | -                      | -                      | -                      | <b>120</b>             |
| <b>b. Manure Management</b>  |  | -                | <b>0.76</b>     | <b>19</b>              | <b>0.09</b>      | <b>25.3</b>            | -                      | -                      | -                      | -                      | <b>44</b>              |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                      | <b>0.51</b>      | <b>150</b>             | -                      | -                      | -                      | -                      | <b>150</b>             |
| Direct Sources   |  | -                | -               | -                      | 0.43             | 130                    | -                      | -                      | -                      | -                      | 130                    |
| Indirect Sources   |  | -                | -               | -                      | 0.08             | 30                     | -                      | -                      | -                      | -                      | 30                     |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | <b>0.01</b>     | <b>0.1</b>             | <b>0.0</b>       | <b>0.04</b>            | -                      | -                      | -                      | -                      | <b>0.2</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>2</b>         | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>2</b>               |
| <b>WASTE</b>   |  | <b>12</b>        | <b>4.8</b>      | <b>120</b>             | <b>0.01</b>      | <b>4</b>               | -                      | -                      | -                      | -                      | <b>140</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>4.6</b>      | <b>110</b>             | -                | -                      | -                      | -                      | -                      | -                      | <b>110</b>             |
| <b>b. Wastewater Handling</b>  |  | -                | <b>0.23</b>     | <b>5.7</b>             | <b>0.01</b>      | <b>3</b>               | -                      | -                      | -                      | -                      | <b>8.4</b>             |
| <b>c. Waste Incineration</b>   |  | <b>12</b>        | -               | -                      | <b>0.01</b>      | <b>2</b>               | -                      | -                      | -                      | -                      | <b>13</b>              |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–6 1990–2013 GHG Emission Summary for Nova Scotia

| Greenhouse Gas Categories  |               |               |               |               |               |               |               |               |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|  | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013          |
| <i>kt CO<sub>2</sub> equivalent</i>  |               |               |               |               |               |               |               |               |
| <b>TOTAL</b>   | <b>20 200</b> | <b>22 700</b> | <b>24 000</b> | <b>21 000</b> | <b>20 700</b> | <b>21 400</b> | <b>19 600</b> | <b>18 300</b> |
| <b>ENERGY</b>  | <b>18 300</b> | <b>20 800</b> | <b>22 200</b> | <b>19 600</b> | <b>19 200</b> | <b>19 900</b> | <b>18 000</b> | <b>16 700</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>11 700</b> | <b>14 500</b> | <b>15 700</b> | <b>14 100</b> | <b>13 500</b> | <b>13 600</b> | <b>12 300</b> | <b>11 500</b> |
| Public Electricity and Heat Production   | 6 930         | 9 540         | 10 800        | 9 450         | 8 860         | 8 520         | 7 680         | 7 310         |
| Petroleum Refining Industries  | 610           | 550           | 1 100         | 890           | 770           | 700           | 870           | 750           |
| Mining and Upstream Oil and Gas Production   | 85.3          | 420           | 326           | 314           | 413           | 628           | 525           | 527           |
| Manufacturing Industries   | 777           | 731           | 554           | 648           | 586           | 540           | 523           | 413           |
| Construction   | 49.6          | 28.1          | 48.7          | 25.3          | 26            | 23.8          | 20.6          | 10.4          |
| Commercial and Institutional   | 797           | 924           | 1 260         | 815           | 783           | 922           | 661           | 642           |
| Residential  | 2 380         | 2 030         | 1 550         | 1 930         | 1 960         | 2 190         | 1 960         | 1 770         |
| Agriculture and Forestry   | 104           | 236           | 96.3          | 70.1          | 81.6          | 110           | 70.5          | 38.5          |
| <b>b. Transport<sup>1</sup></b>  | <b>4 910</b>  | <b>5 610</b>  | <b>6 070</b>  | <b>5 040</b>  | <b>5 360</b>  | <b>5 880</b>  | <b>5 340</b>  | <b>4 920</b>  |
| Domestic Aviation  | 280           | 310           | 260           | 220           | 220           | 210           | 240           | 250           |
| Road Transportation  | 3 130         | 3 510         | 3 800         | 3 660         | 3 750         | 3 830         | 3 670         | 3 530         |
| Light-Duty Gasoline Vehicles   | 1 580         | 1 300         | 1 290         | 1 210         | 1 230         | 1 270         | 1 210         | 1 130         |
| Light-Duty Gasoline Trucks   | 679           | 1 180         | 1 310         | 1 240         | 1 270         | 1 320         | 1 260         | 1 180         |
| Heavy-Duty Gasoline Vehicles   | 166           | 90.7          | 112           | 111           | 114           | 120           | 116           | 109           |
| Motorcycles  | 10            | 7.6           | 9.33          | 9.25          | 9.55          | 10            | 9.66          | 9.12          |
| Light-Duty Diesel Vehicles   | 23.3          | 19.5          | 24.2          | 26            | 27.9          | 30.8          | 32.2          | 31.5          |
| Light-Duty Diesel Trucks   | 23.5          | 47.4          | 52.9          | 49.2          | 50.3          | 53            | 53            | 49.4          |
| Heavy-Duty Diesel Vehicles   | 641           | 859           | 994           | 1 010         | 1 040         | 1 020         | 988           | 1 020         |
| Propane and Natural Gas Vehicles   | 7.5           | 4.2           | 4.9           | 5.4           | 5.2           | 4.2           | 3.5           | 3.2           |
| Railways   | 66            | 74            | 120           | 120           | 140           | 170           | 130           | 110           |
| Domestic Navigation  | 620           | 680           | 850           | 450           | 490           | 530           | 410           | 330           |
| Other Transportation   | 820           | 1 000         | 1 000         | 590           | 760           | 1 100         | 880           | 700           |
| Off-Road Gasoline  | 330           | 410           | 280           | 110           | 150           | 310           | 350           | 130           |
| Off-Road Diesel  | 490           | 620           | 730           | 400           | 530           | 820           | 530           | 570           |
| Pipeline Transport   | -             | -             | 34.6          | 77.8          | 74.6          | 2.95          | 3.93          | 3.93          |
| <b>c. Fugitive Sources</b>   | <b>1 700</b>  | <b>700</b>    | <b>480</b>    | <b>420</b>    | <b>410</b>    | <b>390</b>    | <b>390</b>    | <b>360</b>    |
| Coal Mining  | 2 000         | 600           | 400           | 300           | 300           | 300           | 300           | 300           |
| Oil and Natural Gas  | 51            | 140           | 130           | 120           | 120           | 110           | 100           | 86            |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>318</b>    | <b>426</b>    | <b>476</b>    | <b>328</b>    | <b>420</b>    | <b>482</b>    | <b>479</b>    | <b>538</b>    |
| <b>a. Mineral Products</b>   | <b>190</b>    | <b>230</b>    | <b>250</b>    | <b>100</b>    | <b>200</b>    | <b>200</b>    | <b>210</b>    | <b>190</b>    |
| Cement Production  | 180           | 230           | 250           | 100           | 190           | 190           | 210           | 190           |
| Lime Production  | -             | -             | -             | -             | -             | -             | -             | -             |
| Mineral Products Use   | 8.2           | 3.1           | 3             | 2.2           | 1.7           | 1.7           | 1.7           | 1.7           |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>      |
| Adipic Acid Production   | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>c. Metal Production</b>   | <b>-</b>      |
| Iron and Steel Production  | -             | -             | -             | -             | -             | -             | -             | -             |
| Aluminum Production  | -             | -             | -             | -             | -             | -             | -             | -             |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>23</b>     | <b>110</b>    | <b>160</b>    | <b>160</b>    | <b>170</b>    | <b>180</b>    | <b>170</b>    | <b>190</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>100</b>    | <b>66</b>     | <b>52</b>     | <b>59</b>     | <b>49</b>     | <b>100</b>    | <b>89</b>     | <b>150</b>    |
| <b>f. Other Product Manufacture and Use</b>  | <b>5.6</b>    | <b>13</b>     | <b>11</b>     | <b>7</b>      | <b>6.7</b>    | <b>7.1</b>    | <b>9</b>      | <b>7.9</b>    |
| <b>AGRICULTURE</b>   | <b>550</b>    | <b>570</b>    | <b>550</b>    | <b>480</b>    | <b>460</b>    | <b>450</b>    | <b>450</b>    | <b>450</b>    |
| <b>a. Enteric Fermentation</b>   | <b>250</b>    | <b>240</b>    | <b>230</b>    | <b>200</b>    | <b>190</b>    | <b>190</b>    | <b>190</b>    | <b>190</b>    |
| <b>b. Manure Management</b>  | <b>150</b>    | <b>160</b>    | <b>180</b>    | <b>150</b>    | <b>140</b>    | <b>130</b>    | <b>130</b>    | <b>130</b>    |
| <b>c. Agriculture Soils</b>  | <b>110</b>    | <b>120</b>    | <b>130</b>    | <b>120</b>    | <b>110</b>    | <b>110</b>    | <b>110</b>    | <b>100</b>    |
| Direct Sources   | 92            | 99            | 110           | 96            | 94            | 88            | 94            | 85            |
| Indirect Sources   | 20            | 20            | 30            | 20            | 20            | 20            | 20            | 20            |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>0.03</b>   | <b>0.1</b>    | <b>0.1</b>    | <b>0.05</b>   | <b>0.05</b>   | <b>0.06</b>   | <b>0.04</b>   | <b>0.04</b>   |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>40</b>     | <b>40</b>     | <b>10</b>     | <b>10</b>     | <b>10</b>     | <b>10</b>     | <b>10</b>     | <b>20</b>     |
| <b>WASTE</b>   | <b>980</b>    | <b>900</b>    | <b>720</b>    | <b>620</b>    | <b>610</b>    | <b>590</b>    | <b>600</b>    | <b>610</b>    |
| <b>a. Solid Waste Disposal on Land</b>   | <b>900</b>    | <b>830</b>    | <b>660</b>    | <b>550</b>    | <b>540</b>    | <b>530</b>    | <b>540</b>    | <b>550</b>    |
| <b>b. Wastewater Handling</b>  | <b>50</b>     | <b>53</b>     |
| <b>c. Waste Incineration</b>   | <b>26</b>     | <b>15</b>     | <b>13</b>     | <b>13</b>     | <b>12</b>     | <b>11</b>     | <b>10</b>     | <b>11</b>     |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-7 2013 GHG Emission Summary for Nova Scotia

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                              |                  |                               |                        |                        |                                  |                                  |                        |
|--|--|------------------|-----------------|------------------------------|------------------|-------------------------------|------------------------|------------------------|----------------------------------|----------------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>              | N <sub>2</sub> O | N <sub>2</sub> O              | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>                  | NF <sub>3</sub>                  | TOTAL                  |
| Unit   |  | kt               | kt              | 25<br>kt CO <sub>2</sub> eq. | kt               | 298<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | 22 800<br>kt CO <sub>2</sub> eq. | 17 200<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>16 200</b>    | <b>62</b>       | <b>1 500</b>                 | <b>1.5</b>       | <b>440</b>                    | <b>150</b>             | -                      | <b>36</b>                        | -                                | <b>18 300</b>          |
| <b>ENERGY</b>  |  | <b>15 800</b>    | <b>28</b>       | <b>700</b>                   | <b>0.8</b>       | <b>300</b>                    | -                      | -                      | -                                | -                                | <b>16 700</b>          |
| <b>a. Stationary Combustion Sources</b>  |  | <b>11 000</b>    | <b>20</b>       | <b>400</b>                   | <b>0.3</b>       | <b>90</b>                     | -                      | -                      | -                                | -                                | <b>11 500</b>          |
| Public Electricity and Heat Production   |  | 7 270            | 0.26            | 6.6                          | 0.1              | 30                            | -                      | -                      | -                                | -                                | 7 310                  |
| Petroleum Refining Industries  |  | 754              | 0.01            | 0.2                          | 0.0              | 0.6                           | -                      | -                      | -                                | -                                | 750                    |
| Mining and Upstream Oil and Gas Production   |  | 494              | 1.2             | 29                           | 0.01             | 4                             | -                      | -                      | -                                | -                                | 527                    |
| Manufacturing Industries   |  | 402              | 0.04            | 1                            | 0.03             | 9                             | -                      | -                      | -                                | -                                | 413                    |
| Construction   |  | 10.4             | 0.0             | 0.0                          | 0.0              | 0.06                          | -                      | -                      | -                                | -                                | 10.4                   |
| Commercial and Institutional Residential   |  | 637              | 0.01            | 0.22                         | 0.01             | 4                             | -                      | -                      | -                                | -                                | 642                    |
| Residential  |  | 1 390            | 10              | 300                          | 0.2              | 50                            | -                      | -                      | -                                | -                                | 1 770                  |
| Agriculture and Forestry   |  | 38.3             | 0.0             | 0.01                         | 0.0              | 0                             | -                      | -                      | -                                | -                                | 38.5                   |
| <b>b. Transport<sup>1</sup></b>  |  | <b>4 750</b>     | <b>0.5</b>      | <b>10</b>                    | <b>0.5</b>       | <b>200</b>                    | -                      | -                      | -                                | -                                | <b>4 920</b>           |
| Domestic Aviation  |  | 249              | 0.01            | 0.2                          | 0.01             | 2                             | -                      | -                      | -                                | -                                | 250                    |
| Road Transportation  |  | 3 460            | 0.3             | 6                            | 0.19             | 56                            | -                      | -                      | -                                | -                                | 3 530                  |
| Light-Duty Gasoline Vehicles   |  | 1 110            | 0.1             | 2.4                          | 0.06             | 17                            | -                      | -                      | -                                | -                                | 1 130                  |
| Light-Duty Gasoline Trucks   |  | 1 160            | 0.11            | 2.7                          | 0.06             | 18                            | -                      | -                      | -                                | -                                | 1 180                  |
| Heavy-Duty Gasoline Vehicles   |  | 106              | 0.0             | 0.09                         | 0.01             | 2.8                           | -                      | -                      | -                                | -                                | 109                    |
| Motorcycles  |  | 8.99             | 0.0             | 0.08                         | 0.0              | 0.05                          | -                      | -                      | -                                | -                                | 9.12                   |
| Light-Duty Diesel Vehicles   |  | 30.7             | 0.0             | 0.01                         | 0.0              | 0.7                           | -                      | -                      | -                                | -                                | 31.5                   |
| Light-Duty Diesel Trucks   |  | 48.2             | 0.0             | 0.03                         | 0.0              | 1                             | -                      | -                      | -                                | -                                | 49.4                   |
| Heavy-Duty Diesel Vehicles   |  | 997              | 0.04            | 1                            | 0.06             | 20                            | -                      | -                      | -                                | -                                | 1 020                  |
| Propane and Natural Gas Vehicles   |  | 3.18             | 0.0             | 0.03                         | 0.0              | 0.02                          | -                      | -                      | -                                | -                                | 3.2                    |
| Railways   |  | 93.9             | 0.01            | 0.1                          | 0.04             | 10                            | -                      | -                      | -                                | -                                | 110                    |
| Domestic Navigation  |  | 309              | 0.02            | 0.5                          | 0.08             | 20                            | -                      | -                      | -                                | -                                | 330                    |
| Other Transportation   |  | 630              | 0.2             | 5                            | 0.2              | 60                            | -                      | -                      | -                                | -                                | 700                    |
| Off-Road Gasoline  |  | 122              | 0.1             | 4                            | 0.0              | 0.8                           | -                      | -                      | -                                | -                                | 130                    |
| Off-Road Diesel  |  | 505              | 0.03            | 0.7                          | 0.2              | 60                            | -                      | -                      | -                                | -                                | 570                    |
| Pipeline Transport   |  | 3.8              | 0.0             | 0.1                          | 0.0              | 0.03                          | -                      | -                      | -                                | -                                | 3.93                   |
| <b>c. Fugitive Sources</b>   |  | <b>53</b>        | <b>12</b>       | <b>310</b>                   | <b>0.0</b>       | <b>0.8</b>                    | -                      | -                      | -                                | -                                | <b>360</b>             |
| Coal Mining  |  | -                | 10              | 300                          | -                | -                             | -                      | -                      | -                                | -                                | 300                    |
| Oil and Natural Gas  |  | 53               | 1.3             | 32                           | 0.0              | 0.8                           | -                      | -                      | -                                | -                                | 86                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>345</b>       | -               | -                            | <b>0.02</b>      | <b>6.86</b>                   | <b>150</b>             | -                      | <b>36</b>                        | -                                | <b>538</b>             |
| <b>a. Mineral Products</b>   |  | <b>190</b>       | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>190</b>             |
| Cement Production  |  | 190              | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | 190                    |
| Lime Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Mineral Products Use   |  | 1.7              | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | 1.7                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Adipic Acid Production   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Iron and Steel Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Aluminum Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                            | -                | -                             | <b>150</b>             | -                      | <b>36</b>                        | -                                | <b>190</b>             |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>150</b>       | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>150</b>             |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>1</b>         | -               | -                            | <b>0.02</b>      | <b>6.9</b>                    | -                      | -                      | -                                | -                                | <b>7.9</b>             |
| <b>AGRICULTURE</b>   |  | -                | <b>11</b>       | <b>260</b>                   | <b>0.6</b>       | <b>200</b>                    | -                      | -                      | -                                | -                                | <b>450</b>             |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>7.8</b>      | <b>190</b>                   | -                | -                             | -                      | -                      | -                                | -                                | <b>190</b>             |
| <b>b. Manure Management</b>  |  | -                | <b>2.8</b>      | <b>70</b>                    | <b>0.21</b>      | <b>62.3</b>                   | -                      | -                      | -                                | -                                | <b>130</b>             |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                            | <b>0.35</b>      | <b>100</b>                    | -                      | -                      | -                                | -                                | <b>100</b>             |
| Direct Sources   |  | -                | -               | -                            | 0.29             | 85                            | -                      | -                      | -                                | -                                | 85                     |
| Indirect Sources   |  | -                | -               | -                            | 0.06             | 20                            | -                      | -                      | -                                | -                                | 20                     |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | <b>0.0</b>      | <b>0.03</b>                  | <b>0.0</b>       | <b>0.01</b>                   | -                      | -                      | -                                | -                                | <b>0.04</b>            |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>20</b>        | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>20</b>              |
| <b>WASTE</b>   |  | <b>9.8</b>       | <b>23</b>       | <b>580</b>                   | <b>0.06</b>      | <b>20</b>                     | -                      | -                      | -                                | -                                | <b>610</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>22</b>       | <b>550</b>                   | -                | -                             | -                      | -                      | -                                | -                                | <b>550</b>             |
| <b>b. Wastewater Handling</b>  |  | -                | <b>1.4</b>      | <b>35</b>                    | <b>0.06</b>      | <b>20</b>                     | -                      | -                      | -                                | -                                | <b>53</b>              |
| <b>c. Waste Incineration</b>   |  | <b>9.8</b>       | -               | -                            | <b>0.01</b>      | <b>1</b>                      | -                      | -                      | -                                | -                                | <b>11</b>              |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–8 1990–2013 GHG Emission Summary for New Brunswick

| Greenhouse Gas Categories  |               |               |               |               |               |               |               |               |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|  | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013          |
| <i>kt CO<sub>2</sub> equivalent</i>  |               |               |               |               |               |               |               |               |
| <b>TOTAL</b>   | <b>16 500</b> | <b>21 300</b> | <b>20 600</b> | <b>18 700</b> | <b>18 700</b> | <b>18 800</b> | <b>16 900</b> | <b>15 700</b> |
| <b>ENERGY</b>  | <b>15 100</b> | <b>19 500</b> | <b>18 900</b> | <b>16 500</b> | <b>16 100</b> | <b>16 900</b> | <b>14 800</b> | <b>13 100</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>10 900</b> | <b>14 100</b> | <b>13 300</b> | <b>11 900</b> | <b>10 800</b> | <b>10 600</b> | <b>9 480</b>  | <b>8 730</b>  |
| Public Electricity and Heat Production   | 6 030         | 9 010         | 8 100         | 7 080         | 5 360         | 4 950         | 4 080         | 4 220         |
| Petroleum Refining Industries  | 1 100         | 1 700         | 2 300         | 2 300         | 2 800         | 2 500         | 2 400         | 2 500         |
| Mining and Upstream Oil and Gas Production   | 126           | 132           | 158           | 88.8          | 147           | 260           | 204           | 58.6          |
| Manufacturing Industries   | 1 640         | 1 550         | 1 210         | 1 010         | 891           | 905           | 873           | 874           |
| Construction   | 68.6          | 41.7          | 5.56          | 19.2          | 54.4          | 19            | 13.7          | 8.98          |
| Commercial and Institutional   | 580           | 586           | 577           | 395           | 502           | 748           | 817           | 312           |
| Residential  | 1 310         | 989           | 965           | 883           | 979           | 1 080         | 958           | 667           |
| Agriculture and Forestry   | 52.9          | 65            | 31.8          | 62            | 113           | 116           | 85.4          | 56.9          |
| <b>b. Transport<sup>1</sup></b>  | <b>4 090</b>  | <b>5 340</b>  | <b>5 310</b>  | <b>4 450</b>  | <b>5 090</b>  | <b>6 070</b>  | <b>5 110</b>  | <b>4 160</b>  |
| Domestic Aviation  | 140           | 120           | 120           | 98            | 100           | 86            | 100           | 110           |
| Road Transportation  | 2 970         | 3 680         | 3 890         | 3 710         | 3 900         | 3 980         | 3 870         | 3 470         |
| Light-Duty Gasoline Vehicles   | 1 320         | 1 150         | 1 070         | 999           | 1 050         | 1 080         | 1 050         | 943           |
| Light-Duty Gasoline Trucks   | 657           | 1 090         | 1 220         | 1 150         | 1 210         | 1 250         | 1 220         | 1 100         |
| Heavy-Duty Gasoline Vehicles   | 166           | 90.1          | 128           | 126           | 134           | 139           | 138           | 125           |
| Motorcycles  | 7.15          | 6.83          | 10.6          | 10.4          | 11            | 11.5          | 11.4          | 10.3          |
| Light-Duty Diesel Vehicles   | 14.9          | 11.8          | 13.3          | 14            | 15.4          | 17.5          | 18            | 16.7          |
| Light-Duty Diesel Trucks   | 23.3          | 43.5          | 49            | 45.5          | 47.9          | 52.2          | 51.5          | 45.9          |
| Heavy-Duty Diesel Vehicles   | 776           | 1 270         | 1 400         | 1 370         | 1 440         | 1 430         | 1 380         | 1 230         |
| Propane and Natural Gas Vehicles   | 5.1           | 6.8           | 0.62          | 0.77          | 0.62          | 0.77          | 0.62          | 0.46          |
| Railways   | 130           | 230           | 290           | 260           | 310           | x             | x             | x             |
| Domestic Navigation  | 270           | 400           | 420           | 320           | 400           | x             | x             | x             |
| Other Transportation   | 580           | 910           | 590           | 62            | 380           | 1 100         | 500           | 110           |
| Off-Road Gasoline  | 190           | 150           | x             | x             | x             | x             | x             | x             |
| Off-Road Diesel  | 390           | 760           | 430           | -             | 290           | 730           | 180           | -             |
| Pipeline Transport   | -             | -             | x             | x             | x             | x             | x             | x             |
| <b>c. Fugitive Sources</b>   | <b>60</b>     | <b>130</b>    | <b>220</b>    | <b>200</b>    | <b>210</b>    | <b>200</b>    | <b>200</b>    | <b>190</b>    |
| Coal Mining  | 1             | 0.4           | 0.3           | 0.3           | -             | -             | -             | -             |
| Oil and Natural Gas  | 60            | 130           | 220           | 200           | 210           | 200           | 200           | 190           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>166</b>    | <b>391</b>    | <b>326</b>    | <b>981</b>    | <b>1 340</b>  | <b>873</b>    | <b>950</b>    | <b>1 580</b>  |
| <b>a. Mineral Products</b>   | <b>88</b>     | <b>120</b>    | <b>94</b>     | <b>47</b>     | <b>54</b>     | <b>57</b>     | <b>57</b>     | <b>52</b>     |
| Cement Production  | -             | -             | -             | -             | -             | -             | -             | -             |
| Lime Production  | 76.4          | 103           | 85.6          | 40.9          | 49            | 51.1          | 51.7          | 47.2          |
| Mineral Products Use   | 12            | 14            | 8.7           | 6             | 5.5           | 5.7           | 5             | 5.2           |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>      |
| Adipic Acid Production   | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>c. Metal Production</b>   | <b>-</b>      |
| Iron and Steel Production  | -             | -             | -             | -             | -             | -             | -             | -             |
| Aluminum Production  | -             | -             | -             | -             | -             | -             | -             | -             |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>0.68</b>   | <b>81</b>     | <b>110</b>    | <b>120</b>    | <b>120</b>    | <b>120</b>    | <b>130</b>    | <b>130</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>72</b>     | <b>180</b>    | <b>110</b>    | <b>810</b>    | <b>1 200</b>  | <b>690</b>    | <b>760</b>    | <b>1 400</b>  |
| <b>f. Other Product Manufacture and Use</b>  | <b>4.6</b>    | <b>11</b>     | <b>8.4</b>    | <b>5.6</b>    | <b>5.5</b>    | <b>6</b>      | <b>7.7</b>    | <b>6.8</b>    |
| <b>AGRICULTURE</b>   | <b>530</b>    | <b>580</b>    | <b>580</b>    | <b>510</b>    | <b>500</b>    | <b>470</b>    | <b>520</b>    | <b>470</b>    |
| <b>a. Enteric Fermentation</b>   | <b>210</b>    | <b>200</b>    | <b>200</b>    | <b>180</b>    | <b>180</b>    | <b>180</b>    | <b>170</b>    | <b>170</b>    |
| <b>b. Manure Management</b>  | <b>92</b>     | <b>98</b>     | <b>96</b>     | <b>83</b>     | <b>82</b>     | <b>78</b>     | <b>78</b>     | <b>79</b>     |
| <b>c. Agriculture Soils</b>  | <b>170</b>    | <b>190</b>    | <b>230</b>    | <b>180</b>    | <b>170</b>    | <b>160</b>    | <b>190</b>    | <b>150</b>    |
| Direct Sources   | 140           | 160           | 190           | 150           | 140           | 140           | 160           | 120           |
| Indirect Sources   | 30            | 30            | 40            | 30            | 30            | 30            | 30            | 20            |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>0.03</b>   | <b>0.02</b>   | <b>0.02</b>   | <b>0.02</b>   | <b>0.03</b>   | <b>0.01</b>   | <b>0.02</b>   | <b>0.02</b>   |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>70</b>     | <b>80</b>     | <b>50</b>     | <b>60</b>     | <b>60</b>     | <b>60</b>     | <b>70</b>     | <b>80</b>     |
| <b>WASTE</b>   | <b>750</b>    | <b>800</b>    | <b>800</b>    | <b>730</b>    | <b>740</b>    | <b>630</b>    | <b>610</b>    | <b>570</b>    |
| <b>a. Solid Waste Disposal on Land</b>   | <b>720</b>    | <b>760</b>    | <b>770</b>    | <b>700</b>    | <b>710</b>    | <b>600</b>    | <b>580</b>    | <b>540</b>    |
| <b>b. Wastewater Handling</b>  | <b>29</b>     | <b>31</b>     | <b>31</b>     | <b>31</b>     | <b>31</b>     | <b>31</b>     | <b>32</b>     | <b>31</b>     |
| <b>c. Waste Incineration</b>   | <b>-</b>      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-9 2013 GHG Emission Summary for New Brunswick

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>14 100</b>    | <b>41</b>       | <b>1 000</b>           | <b>1.3</b>       | <b>400</b>             | <b>130</b>             | -                      | <b>0.91</b>            | -                      | <b>15 700</b>          |
| <b>ENERGY</b>  |  | <b>12 600</b>    | <b>10</b>       | <b>260</b>             | <b>0.7</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>13 100</b>          |
| <b>a. Stationary Combustion Sources</b>  |  | <b>8 430</b>     | <b>9</b>        | <b>200</b>             | <b>0.3</b>       | <b>80</b>              | -                      | -                      | -                      | -                      | <b>8 730</b>           |
| Public Electricity and Heat Production   |  | 4 190            | 0.31            | 7.8                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 4 220                  |
| Petroleum Refining Industries  |  | 2 530            | 0.04            | 1                      | 0.02             | 6                      | -                      | -                      | -                      | -                      | 2 500                  |
| Mining and Upstream Oil and Gas Production   |  | 58.2             | 0.0             | 0.02                   | 0.0              | 0.4                    | -                      | -                      | -                      | -                      | 58.6                   |
| Manufacturing Industries   |  | 846              | 0.1             | 3                      | 0.08             | 20                     | -                      | -                      | -                      | -                      | 874                    |
| Construction   |  | 8.94             | 0.0             | 0.0                    | 0.0              | 0.04                   | -                      | -                      | -                      | -                      | 8.98                   |
| Commercial and Institutional   |  | 309              | 0.01            | 0.13                   | 0.01             | 2                      | -                      | -                      | -                      | -                      | 312                    |
| Residential  |  | 433              | 8               | 200                    | 0.09             | 30                     | -                      | -                      | -                      | -                      | 667                    |
| Agriculture and Forestry   |  | 56.5             | 0.0             | 0.02                   | 0.0              | 0.32                   | -                      | -                      | -                      | -                      | 56.9                   |
| <b>b. Transport<sup>1</sup></b>  |  | <b>4 040</b>     | <b>0.4</b>      | <b>10</b>              | <b>0.4</b>       | <b>100</b>             | -                      | -                      | -                      | -                      | <b>4 160</b>           |
| Domestic Aviation  |  | 111              | 0.01            | 0.2                    | 0.0              | 1                      | -                      | -                      | -                      | -                      | 110                    |
| Road Transportation  |  | 3 400            | 0.3             | 6                      | 0.2              | 59                     | -                      | -                      | -                      | -                      | 3 470                  |
| Light-Duty Gasoline Vehicles   |  | 925              | 0.09            | 2.1                    | 0.05             | 16                     | -                      | -                      | -                      | -                      | 943                    |
| Light-Duty Gasoline Trucks   |  | 1 080            | 0.11            | 2.7                    | 0.06             | 18                     | -                      | -                      | -                      | -                      | 1 100                  |
| Heavy-Duty Gasoline Vehicles   |  | 122              | 0.0             | 0.11                   | 0.01             | 3.1                    | -                      | -                      | -                      | -                      | 125                    |
| Motorcycles  |  | 10.2             | 0.0             | 0.09                   | 0.0              | 0.06                   | -                      | -                      | -                      | -                      | 10.3                   |
| Light-Duty Diesel Vehicles   |  | 16.3             | 0.0             | 0.01                   | 0.0              | 0.4                    | -                      | -                      | -                      | -                      | 16.7                   |
| Light-Duty Diesel Trucks   |  | 44.8             | 0.0             | 0.03                   | 0.0              | 1                      | -                      | -                      | -                      | -                      | 45.9                   |
| Heavy-Duty Diesel Vehicles   |  | 1 210            | 0.05            | 1                      | 0.07             | 20                     | -                      | -                      | -                      | -                      | 1 230                  |
| Propane and Natural Gas Vehicles   |  | 0.46             | 0.0             | 0.01                   | 0.0              | 0.0                    | -                      | -                      | -                      | -                      | 0.46                   |
| Railways   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Domestic Navigation  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Other Transportation   |  | 102              | 0.1             | 3                      | 0.0              | 0.7                    | -                      | -                      | -                      | -                      | 110                    |
| Off-Road Gasoline  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Off-Road Diesel  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Pipeline Transport   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| <b>c. Fugitive Sources</b>   |  | <b>150</b>       | <b>1.1</b>      | <b>28</b>              | <b>0.01</b>      | <b>4</b>               | -                      | -                      | -                      | -                      | <b>190</b>             |
| Coal Mining  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Oil and Natural Gas  |  | 150              | 1.1             | 28                     | 0.01             | 4                      | -                      | -                      | -                      | -                      | 190                    |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>1 440</b>     | -               | -                      | <b>0.02</b>      | <b>5.51</b>            | <b>130</b>             | -                      | <b>0.91</b>            | -                      | <b>1 580</b>           |
| <b>a. Mineral Products</b>   |  | <b>52</b>        | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>52</b>              |
| Cement Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Lime Production  |  | 47.2             | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 47.2                   |
| Mineral Products Use   |  | 5.2              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 5.2                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Iron and Steel Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Aluminum Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                      | -                | -                      | <b>130</b>             | -                      | <b>0.91</b>            | -                      | <b>130</b>             |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>1 400</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 400</b>           |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>1</b>         | -               | -                      | <b>0.02</b>      | <b>5.5</b>             | -                      | -                      | -                      | -                      | <b>6.8</b>             |
| <b>AGRICULTURE</b>   |  | <b>100</b>       | <b>8.5</b>      | <b>210</b>             | <b>0.6</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>470</b>             |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>6.9</b>      | <b>170</b>             | -                | -                      | -                      | -                      | -                      | -                      | <b>170</b>             |
| <b>b. Manure Management</b>  |  | -                | <b>1.6</b>      | <b>40</b>              | <b>0.13</b>      | <b>38.9</b>            | -                      | -                      | -                      | -                      | <b>79</b>              |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                      | <b>0.49</b>      | <b>150</b>             | -                      | -                      | -                      | -                      | <b>150</b>             |
| Direct Sources   |  | -                | -               | -                      | 0.41             | 120                    | -                      | -                      | -                      | -                      | 120                    |
| Indirect Sources   |  | -                | -               | -                      | 0.08             | 20                     | -                      | -                      | -                      | -                      | 20                     |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | <b>0.0</b>      | <b>0.02</b>            | <b>0.0</b>       | <b>0.01</b>            | -                      | -                      | -                      | -                      | <b>0.02</b>            |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>80</b>        | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>80</b>              |
| <b>WASTE</b>   |  | -                | <b>22</b>       | <b>560</b>             | <b>0.05</b>      | <b>10</b>              | -                      | -                      | -                      | -                      | <b>570</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>22</b>       | <b>540</b>             | -                | -                      | -                      | -                      | -                      | -                      | <b>540</b>             |
| <b>b. Wastewater Handling</b>  |  | -                | <b>0.69</b>     | <b>17</b>              | <b>0.05</b>      | <b>10</b>              | -                      | -                      | -                      | -                      | <b>31</b>              |
| <b>c. Waste Incineration</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–10 1990–2013 GHG Emission Summary for Quebec

| Greenhouse Gas Categories  |                                     |               |               |               |               |               |               |               |
|--|-------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|  | 1990                                | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013          |
|  | <i>kt CO<sub>2</sub> equivalent</i> |               |               |               |               |               |               |               |
| <b>TOTAL</b>   | <b>89 800</b>                       | <b>89 700</b> | <b>90 200</b> | <b>87 600</b> | <b>82 700</b> | <b>84 200</b> | <b>81 600</b> | <b>82 600</b> |
| <b>ENERGY</b>  | <b>60 700</b>                       | <b>63 000</b> | <b>62 700</b> | <b>62 700</b> | <b>59 000</b> | <b>59 900</b> | <b>58 300</b> | <b>58 800</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>32 300</b>                       | <b>30 600</b> | <b>28 400</b> | <b>26 400</b> | <b>23 300</b> | <b>23 500</b> | <b>22 600</b> | <b>23 600</b> |
| Public Electricity and Heat Production   | 1 500                               | 572           | 622           | 651           | 430           | 405           | 488           | 371           |
| Petroleum Refining Industries  | 3 400                               | 3 200         | 3 700         | 3 600         | 1 900         | 2 300         | 2 200         | 2 200         |
| Mining and Upstream Oil and Gas Production   | 824                                 | 998           | 318           | 1 600         | 1 210         | 486           | 655           | 1 080         |
| Manufacturing Industries   | 12 300                              | 11 300        | 10 300        | 8 110         | 8 170         | 9 090         | 9 260         | 9 840         |
| Construction   | 458                                 | 191           | 308           | 388           | 420           | 343           | 364           | 362           |
| Commercial and Institutional   | 4 240                               | 5 550         | 5 250         | 5 180         | 4 890         | 4 890         | 3 980         | 4 080         |
| Residential  | 9 310                               | 8 430         | 7 650         | 6 450         | 5 820         | 5 630         | 5 310         | 5 280         |
| Agriculture and Forestry   | 291                                 | 263           | 292           | 413           | 450           | 399           | 406           | 405           |
| <b>b. Transport<sup>1</sup></b>  | <b>28 000</b>                       | <b>31 900</b> | <b>33 900</b> | <b>35 900</b> | <b>35 400</b> | <b>36 100</b> | <b>35 300</b> | <b>34 900</b> |
| Domestic Aviation  | 820                                 | 730           | 740           | 620           | 620           | 620           | 740           | 730           |
| Road Transportation  | 20 800                              | 25 100        | 27 800        | 27 700        | 27 800        | 27 600        | 27 600        | 27 300        |
| Light-Duty Gasoline Vehicles   | 11 900                              | 11 300        | 10 700        | 10 600        | 10 600        | 10 400        | 10 300        | 10 200        |
| Light-Duty Gasoline Trucks   | 3 750                               | 6 560         | 7 770         | 7 750         | 7 750         | 7 570         | 7 540         | 7 480         |
| Heavy-Duty Gasoline Vehicles   | 585                                 | 545           | 863           | 902           | 912           | 901           | 905           | 907           |
| Motorcycles  | 32.3                                | 47.6          | 81.4          | 85            | 86            | 84.8          | 85.2          | 85.3          |
| Light-Duty Diesel Vehicles   | 186                                 | 181           | 223           | 263           | 279           | 297           | 309           | 318           |
| Light-Duty Diesel Trucks   | 194                                 | 360           | 363           | 366           | 369           | 376           | 376           | 371           |
| Heavy-Duty Diesel Vehicles   | 4 020                               | 6 140         | 7 740         | 7 650         | 7 730         | 8 000         | 8 070         | 7 900         |
| Propane and Natural Gas Vehicles   | 110                                 | 36            | 34            | 26            | 31            | 30            | 38            | 44            |
| Railways   | 570                                 | 810           | 710           | 940           | 850           | 900           | 940           | 880           |
| Domestic Navigation  | 1 400                               | 1 300         | 1 300         | 1 800         | 1 400         | 1 000         | 850           | 960           |
| Other Transportation   | 4 300                               | 3 900         | 3 400         | 4 900         | 4 800         | 5 900         | 5 200         | 5 100         |
| Off-Road Gasoline  | 1 400                               | 1 300         | 1 400         | 1 400         | 1 400         | 1 800         | 1 400         | 1 500         |
| Off-Road Diesel  | 2 900                               | 2 500         | 1 600         | 3 300         | 3 300         | 4 000         | 3 600         | 3 300         |
| Pipeline Transport   | 26.1                                | 108           | 338           | 229           | 156           | 152           | 201           | 228           |
| <b>c. Fugitive Sources</b>   | <b>430</b>                          | <b>500</b>    | <b>390</b>    | <b>360</b>    | <b>340</b>    | <b>290</b>    | <b>280</b>    | <b>260</b>    |
| Coal Mining  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| Oil and Natural Gas  | 430                                 | 500           | 390           | 360           | 340           | 290           | 280           | 260           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>14 500</b>                       | <b>12 100</b> | <b>12 400</b> | <b>10 100</b> | <b>9 860</b>  | <b>11 000</b> | <b>10 300</b> | <b>10 800</b> |
| <b>a. Mineral Products</b>   | <b>1 900</b>                        | <b>2 000</b>  | <b>2 100</b>  | <b>1 600</b>  | <b>1 800</b>  | <b>1 800</b>  | <b>2 000</b>  | <b>1 800</b>  |
| Cement Production  | 1 400                               | 1 200         | 1 300         | 1 100         | 1 200         | 1 200         | 1 400         | 1 200         |
| Lime Production  | 272                                 | 430           | 465           | 353           | 423           | 441           | 446           | 408           |
| Mineral Products Use   | 250                                 | 300           | 290           | 180           | 120           | 150           | 180           | 180           |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| Adipic Acid Production   | -                                   | -             | -             | -             | -             | -             | -             | -             |
| <b>c. Metal Production</b>   | <b>10 900</b>                       | <b>8 090</b>  | <b>7 560</b>  | <b>6 330</b>  | <b>6 070</b>  | <b>6 010</b>  | <b>5 630</b>  | <b>6 000</b>  |
| Iron and Steel Production  | -                                   | 17            | -             | 22            | 35.1          | 36.3          | 30.8          | 16.2          |
| Aluminum Production  | 8 660                               | 6 870         | 7 460         | 6 290         | 6 020         | 5 960         | 5 580         | 5 960         |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | 2 280                               | 1 210         | 103           | 19.7          | 13            | 12.3          | 15.5          | 21.7          |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>37</b>                           | <b>760</b>    | <b>1 100</b>  | <b>1 200</b>  | <b>1 200</b>  | <b>1 300</b>  | <b>1 300</b>  | <b>1 400</b>  |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>1 500</b>                        | <b>1 200</b>  | <b>1 600</b>  | <b>840</b>    | <b>710</b>    | <b>1 800</b>  | <b>1 300</b>  | <b>1 500</b>  |
| <b>f. Other Product Manufacture and Use</b>  | <b>43</b>                           | <b>100</b>    | <b>85</b>     | <b>59</b>     | <b>56</b>     | <b>60</b>     | <b>77</b>     | <b>68</b>     |
| <b>AGRICULTURE</b>   | <b>7 700</b>                        | <b>7 700</b>  | <b>7 900</b>  | <b>7 800</b>  | <b>7 800</b>  | <b>7 700</b>  | <b>8 000</b>  | <b>7 800</b>  |
| <b>a. Enteric Fermentation</b>   | <b>3 300</b>                        | <b>3 200</b>  | <b>3 300</b>  | <b>3 100</b>  | <b>3 000</b>  | <b>3 000</b>  | <b>2 900</b>  | <b>2 900</b>  |
| <b>b. Manure Management</b>  | <b>1 700</b>                        | <b>1 800</b>  | <b>1 800</b>  | <b>1 700</b>  |
| <b>c. Agriculture Soils</b>  | <b>2 500</b>                        | <b>2 400</b>  | <b>2 600</b>  | <b>2 800</b>  | <b>2 900</b>  | <b>2 800</b>  | <b>3 100</b>  | <b>3 000</b>  |
| Direct Sources   | 2 100                               | 2 100         | 2 200         | 2 400         | 2 400         | 2 300         | 2 600         | 2 500         |
| Indirect Sources   | 400                                 | 400           | 400           | 400           | 400           | 400           | 500           | 400           |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>0.4</b>                          | <b>0.2</b>    | <b>0.3</b>    | <b>0.2</b>    | <b>0.3</b>    | <b>0.2</b>    | <b>0.2</b>    | <b>0.2</b>    |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>200</b>                          | <b>300</b>    | <b>200</b>    | <b>200</b>    | <b>200</b>    | <b>200</b>    | <b>300</b>    | <b>300</b>    |
| <b>WASTE</b>   | <b>6 900</b>                        | <b>6 900</b>  | <b>7 200</b>  | <b>7 000</b>  | <b>6 000</b>  | <b>5 600</b>  | <b>5 100</b>  | <b>5 300</b>  |
| <b>a. Solid Waste Disposal on Land</b>   | <b>6 300</b>                        | <b>6 400</b>  | <b>6 700</b>  | <b>6 500</b>  | <b>5 400</b>  | <b>5 100</b>  | <b>4 600</b>  | <b>4 900</b>  |
| <b>b. Wastewater Handling</b>  | <b>270</b>                          | <b>240</b>    | <b>240</b>    | <b>250</b>    | <b>250</b>    | <b>260</b>    | <b>260</b>    | <b>260</b>    |
| <b>c. Waste Incineration</b>   | <b>340</b>                          | <b>260</b>    | <b>270</b>    | <b>250</b>    | <b>270</b>    | <b>260</b>    | <b>300</b>    | <b>130</b>    |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-11 2013 GHG Emission Summary for Quebec

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>63 300</b>    | <b>450</b>      | <b>11 000</b>          | <b>18</b>        | <b>5 400</b>           | <b>1 300</b>           | <b>1 200</b>           | <b>93</b>              |                        | <b>82 600</b>          |
| <b>ENERGY</b>  |  | <b>54 900</b>    | <b>97</b>       | <b>2 400</b>           | <b>5</b>         | <b>1 000</b>           | -                      | -                      | -                      | -                      | <b>58 800</b>          |
| <b>a. Stationary Combustion Sources</b>  |  | <b>20 900</b>    | <b>90</b>       | <b>2 000</b>           | <b>2</b>         | <b>500</b>             | -                      | -                      | -                      | -                      | <b>23 600</b>          |
| Public Electricity and Heat Production   |  | 364              | 0.04            | 1.1                    | 0.02             | 6                      | -                      | -                      | -                      | -                      | 371                    |
| Petroleum Refining Industries  |  | 2 170            | 0.04            | 0.9                    | 0.02             | 7                      | -                      | -                      | -                      | -                      | 2 200                  |
| Mining and Upstream Oil and Gas Production   |  | 1 070            | 0.03            | 0.67                   | 0.02             | 5                      | -                      | -                      | -                      | -                      | 1 080                  |
| Manufacturing Industries   |  | 9 720            | 0.5             | 10                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 9 840                  |
| Construction   |  | 359              | 0.01            | 0.17                   | 0.01             | 2                      | -                      | -                      | -                      | -                      | 362                    |
| Commercial and Institutional   |  | 4 050            | 0.08            | 2                      | 0.09             | 30                     | -                      | -                      | -                      | -                      | 4 080                  |
| Residential  |  | 2 750            | 90              | 2 000                  | 1                | 300                    | -                      | -                      | -                      | -                      | 5 280                  |
| Agriculture and Forestry   |  | 399              | 0.01            | 0.16                   | 0.02             | 5.5                    | -                      | -                      | -                      | -                      | 405                    |
| <b>b. Transport<sup>1</sup></b>  |  | <b>33 800</b>    | <b>4</b>        | <b>100</b>             | <b>3</b>         | <b>1 000</b>           | -                      | -                      | -                      | -                      | <b>34 900</b>          |
| Domestic Aviation  |  | 720              | 0.03            | 0.9                    | 0.02             | 6                      | -                      | -                      | -                      | -                      | 730                    |
| Road Transportation  |  | 26 800           | 2               | 50                     | 1.5              | 440                    | -                      | -                      | -                      | -                      | 27 300                 |
| Light-Duty Gasoline Vehicles   |  | 10 000           | 0.87            | 22                     | 0.53             | 160                    | -                      | -                      | -                      | -                      | 10 200                 |
| Light-Duty Gasoline Trucks   |  | 7 350            | 0.68            | 17                     | 0.38             | 110                    | -                      | -                      | -                      | -                      | 7 480                  |
| Heavy-Duty Gasoline Vehicles   |  | 883              | 0.03            | 0.76                   | 0.08             | 23                     | -                      | -                      | -                      | -                      | 907                    |
| Motorcycles  |  | 84.1             | 0.03            | 0.73                   | 0.0              | 0.46                   | -                      | -                      | -                      | -                      | 85.3                   |
| Light-Duty Diesel Vehicles   |  | 310              | 0.01            | 0.2                    | 0.03             | 8                      | -                      | -                      | -                      | -                      | 318                    |
| Light-Duty Diesel Trucks   |  | 362              | 0.01            | 0.2                    | 0.03             | 9                      | -                      | -                      | -                      | -                      | 371                    |
| Heavy-Duty Diesel Vehicles   |  | 7 760            | 0.3             | 8                      | 0.4              | 100                    | -                      | -                      | -                      | -                      | 7 900                  |
| Propane and Natural Gas Vehicles   |  | 42.3             | 0.06            | 1                      | 0.0              | 0.3                    | -                      | -                      | -                      | -                      | 44                     |
| Railways   |  | 780              | 0.04            | 1                      | 0.3              | 100                    | -                      | -                      | -                      | -                      | 880                    |
| Domestic Navigation  |  | 897              | 0.06            | 2                      | 0.2              | 60                     | -                      | -                      | -                      | -                      | 960                    |
| Other Transportation   |  | 4 630            | 2               | 50                     | 1                | 400                    | -                      | -                      | -                      | -                      | 5 100                  |
| Off-Road Gasoline  |  | 1 470            | 2               | 40                     | 0.03             | 10                     | -                      | -                      | -                      | -                      | 1 500                  |
| Off-Road Diesel  |  | 2 940            | 0.2             | 4                      | 1                | 400                    | -                      | -                      | -                      | -                      | 3 300                  |
| Pipeline Transport   |  | 220              | 0.22            | 5.5                    | 0.01             | 2                      | -                      | -                      | -                      | -                      | 228                    |
| <b>c. Fugitive Sources</b>   |  | <b>180</b>       | <b>2.8</b>      | <b>71</b>              | <b>0.02</b>      | <b>5</b>               | -                      | -                      | -                      | -                      | <b>260</b>             |
| Coal Mining  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Oil and Natural Gas  |  | 180              | 2.8             | 71                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 260                    |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>8 090</b>     | <b>-</b>        | <b>-</b>               | <b>0.2</b>       | <b>59.4</b>            | <b>1 300</b>           | <b>1 200</b>           | <b>93</b>              | <b>-</b>               | <b>10 800</b>          |
| <b>a. Mineral Products</b>   |  | <b>1 800</b>     | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>1 800</b>           |
| Cement Production  |  | 1 200            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 1 200                  |
| Lime Production  |  | 408              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 408                    |
| Mineral Products Use   |  | 180              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 180                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | <b>4 790</b>     | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>1 190</b>           | <b>27</b>              | <b>-</b>               | <b>6 000</b>           |
| Iron and Steel Production  |  | 16.2             | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 16.2                   |
| Aluminum Production  |  | 4 770            | -               | -                      | -                | -                      | -                      | 1 190                  | 5.38                   | -                      | 5 960                  |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | 21.7                   | -                      | 21.7                   |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>1 300</b>           | <b>-</b>               | <b>66</b>              | <b>-</b>               | <b>1 400</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>1 500</b>     | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>1 500</b>           |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>9</b>         | <b>-</b>        | <b>-</b>               | <b>0.2</b>       | <b>59</b>              | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>68</b>              |
| <b>AGRICULTURE</b>   |  | <b>-</b>         | <b>150</b>      | <b>3 900</b>           | <b>10</b>        | <b>4 000</b>           | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>7 800</b>           |
| <b>a. Enteric Fermentation</b>   |  | <b>-</b>         | <b>120</b>      | <b>2 900</b>           | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>2 900</b>           |
| <b>b. Manure Management</b>  |  | <b>-</b>         | <b>39</b>       | <b>970</b>             | <b>2.44</b>      | <b>727</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>1 700</b>           |
| <b>c. Agriculture Soils</b>  |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>9.9</b>       | <b>3 000</b>           | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>3 000</b>           |
| Direct Sources   |  | -                | -               | -                      | 8.4              | 2 500                  | -                      | -                      | -                      | -                      | 2 500                  |
| Indirect Sources   |  | -                | -               | -                      | 1                | 400                    | -                      | -                      | -                      | -                      | 400                    |
| <b>d. Field Burning of Agricultural Residues</b>   |  | <b>-</b>         | <b>0.01</b>     | <b>0.1</b>             | <b>0.0</b>       | <b>0.05</b>            | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>0.2</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>300</b>       | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>300</b>             |
| <b>WASTE</b>   |  | <b>94</b>        | <b>200</b>      | <b>5 000</b>           | <b>0.6</b>       | <b>200</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>5 300</b>           |
| <b>a. Solid Waste Disposal on Land</b>   |  | <b>-</b>         | <b>200</b>      | <b>4 900</b>           | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>4 900</b>           |
| <b>b. Wastewater Handling</b>  |  | <b>-</b>         | <b>4.3</b>      | <b>110</b>             | <b>0.5</b>       | <b>200</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>260</b>             |
| <b>c. Waste Incineration</b>   |  | <b>94</b>        | <b>0.1</b>      | <b>3</b>               | <b>0.1</b>       | <b>30</b>              | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>130</b>             |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–12 1990–2013 GHG Emission Summary for Ontario

| Greenhouse Gas Categories  |                                     |                |                |                |                |                |                |                |
|--|-------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|  | 1990                                | 2000           | 2005           | 2009           | 2010           | 2011           | 2012           | 2013           |
|  | <i>kt CO<sub>2</sub> equivalent</i> |                |                |                |                |                |                |                |
| <b>TOTAL</b>   | <b>182 000</b>                      | <b>211 000</b> | <b>211 000</b> | <b>171 000</b> | <b>178 000</b> | <b>175 000</b> | <b>171 000</b> | <b>171 000</b> |
| <b>ENERGY</b>  | <b>133 000</b>                      | <b>167 000</b> | <b>163 000</b> | <b>131 000</b> | <b>137 000</b> | <b>135 000</b> | <b>129 000</b> | <b>131 000</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>83 800</b>                       | <b>106 000</b> | <b>96 600</b>  | <b>70 000</b>  | <b>73 900</b>  | <b>72 200</b>  | <b>69 400</b>  | <b>68 400</b>  |
| Public Electricity and Heat Production   | 25 800                              | 43 400         | 34 500         | 14 900         | 19 800         | 14 200         | 14 200         | 10 900         |
| Petroleum Refining Industries  | 6 100                               | 6 800          | 6 900          | 6 400          | 6 400          | 6 000          | 6 400          | 6 100          |
| Mining and Upstream Oil and Gas Production   | 593                                 | 505            | 613            | 654            | 819            | 804            | 906            | 622            |
| Manufacturing Industries   | 22 000                              | 20 300         | 19 000         | 15 100         | 15 000         | 16 300         | 16 100         | 16 100         |
| Construction   | 571                                 | 440            | 637            | 462            | 553            | 411            | 429            | 428            |
| Commercial and Institutional   | 9 140                               | 13 100         | 12 800         | 11 400         | 10 900         | 11 800         | 10 900         | 11 900         |
| Residential  | 18 800                              | 20 100         | 21 200         | 20 100         | 19 400         | 21 000         | 18 800         | 20 700         |
| Agriculture and Forestry   | 775                                 | 907            | 1 030          | 1 040          | 1 100          | 1 640          | 1 670          | 1 640          |
| <b>b. Transport<sup>1</sup></b>  | <b>48 200</b>                       | <b>60 400</b>  | <b>64 800</b>  | <b>59 000</b>  | <b>61 300</b>  | <b>61 000</b>  | <b>58 500</b>  | <b>61 200</b>  |
| Domestic Aviation  | 2 200                               | 2 400          | 2 200          | 1 900          | 1 900          | 1 900          | 2 200          | 2 300          |
| Road Transportation  | 35 300                              | 42 400         | 47 400         | 45 900         | 46 700         | 45 900         | 44 900         | 46 100         |
| Light-Duty Gasoline Vehicles   | 18 800                              | 16 900         | 16 600         | 16 000         | 16 200         | 15 800         | 15 200         | 15 700         |
| Light-Duty Gasoline Trucks   | 7 540                               | 13 600         | 16 800         | 16 200         | 16 300         | 15 900         | 15 300         | 15 800         |
| Heavy-Duty Gasoline Vehicles   | 1 630                               | 1 100          | 1 360          | 1 380          | 1 420          | 1 390          | 1 360          | 1 420          |
| Motorcycles  | 44.6                                | 40.2           | 67.2           | 68.6           | 70.3           | 69.2           | 67.3           | 70.3           |
| Light-Duty Diesel Vehicles   | 151                                 | 158            | 197            | 252            | 274            | 292            | 301            | 323            |
| Light-Duty Diesel Trucks   | 143                                 | 359            | 423            | 431            | 438            | 429            | 417            | 432            |
| Heavy-Duty Diesel Vehicles   | 6 450                               | 9 890          | 11 700         | 11 100         | 11 500         | 11 700         | 11 800         | 12 000         |
| Propane and Natural Gas Vehicles   | 550                                 | 380            | 350            | 410            | 420            | 450            | 510            | 360            |
| Railways   | 1 800                               | 1 700          | 1 600          | 1 200          | 1 300          | 1 300          | 1 300          | 1 300          |
| Domestic Navigation  | 950                                 | 800            | 880            | 610            | 1 100          | 800            | 1 000          | 1 200          |
| Other Transportation   | 7 900                               | 13 000         | 13 000         | 9 400          | 10 000         | 11 000         | 9 200          | 10 000         |
| Off-Road Gasoline  | 2 300                               | 3 700          | 3 700          | 3 100          | 3 400          | 3 200          | 1 700          | 2 700          |
| Off-Road Diesel  | 3 300                               | 5 700          | 6 000          | 5 100          | 6 000          | 7 000          | 6 600          | 6 500          |
| Pipeline Transport   | 2 280                               | 3 640          | 3 070          | 1 220          | 897            | 896            | 844            | 959            |
| <b>c. Fugitive Sources</b>   | <b>1 600</b>                        | <b>1 500</b>   | <b>1 500</b>   | <b>1 500</b>   | <b>1 400</b>   | <b>1 400</b>   | <b>1 300</b>   | <b>1 300</b>   |
| Coal Mining  | -                                   | -              | -              | -              | -              | -              | -              | -              |
| Oil and Natural Gas  | 1 600                               | 1 500          | 1 500          | 1 500          | 1 400          | 1 400          | 1 300          | 1 300          |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                            | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>30 300</b>                       | <b>24 800</b>  | <b>28 100</b>  | <b>20 700</b>  | <b>22 000</b>  | <b>20 800</b>  | <b>22 600</b>  | <b>20 500</b>  |
| <b>a. Mineral Products</b>   | <b>4 100</b>                        | <b>5 000</b>   | <b>4 900</b>   | <b>3 300</b>   | <b>3 500</b>   | <b>3 600</b>   | <b>3 900</b>   | <b>3 600</b>   |
| Cement Production  | 2 400                               | 3 600          | 3 700          | 2 500          | 2 700          | 2 700          | 2 900          | 2 700          |
| Lime Production  | 1 090                               | 906            | 797            | 519            | 572            | 596            | 604            | 551            |
| Mineral Products Use   | 640                                 | 550            | 380            | 320            | 230            | 300            | 370            | 380            |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>10 000</b>                       | <b>870</b>     | <b>2 500</b>   | <b>640</b>     | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       |
| Adipic Acid Production   | 10 000                              | 870            | 2 500          | 640            | -              | -              | -              | -              |
| <b>c. Metal Production</b>   | <b>10 900</b>                       | <b>12 900</b>  | <b>11 300</b>  | <b>8 170</b>   | <b>9 160</b>   | <b>9 990</b>   | <b>10 000</b>  | <b>7 710</b>   |
| Iron and Steel Production  | 10 200                              | 11 500         | 10 200         | 8 000          | 8 990          | 9 820          | 9 810          | 7 520          |
| Aluminum Production  | -                                   | -              | -              | -              | -              | -              | -              | -              |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | 687                                 | 1 450          | 1 130          | 164            | 168            | 170            | 232            | 191            |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>1 000</b>                        | <b>1 500</b>   | <b>2 000</b>   | <b>2 100</b>   | <b>2 100</b>   | <b>2 200</b>   | <b>2 300</b>   | <b>2 300</b>   |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>3 900</b>                        | <b>4 400</b>   | <b>7 200</b>   | <b>6 400</b>   | <b>7 100</b>   | <b>4 900</b>   | <b>6 200</b>   | <b>6 700</b>   |
| <b>f. Other Product Manufacture and Use</b>  | <b>64</b>                           | <b>160</b>     | <b>140</b>     | <b>97</b>      | <b>93</b>      | <b>98</b>      | <b>130</b>     | <b>110</b>     |
| <b>AGRICULTURE</b>   | <b>11 000</b>                       | <b>10 000</b>  | <b>10 000</b>  | <b>10 000</b>  | <b>11 000</b>  | <b>10 000</b>  | <b>9 900</b>   | <b>10 000</b>  |
| <b>a. Enteric Fermentation</b>   | <b>4 400</b>                        | <b>4 300</b>   | <b>4 300</b>   | <b>3 700</b>   | <b>3 700</b>   | <b>3 600</b>   | <b>3 600</b>   | <b>3 600</b>   |
| <b>b. Manure Management</b>  | <b>2 100</b>                        | <b>2 200</b>   | <b>2 300</b>   | <b>1 900</b>   |
| <b>c. Agriculture Soils</b>  | <b>3 900</b>                        | <b>3 600</b>   | <b>3 600</b>   | <b>4 500</b>   | <b>4 800</b>   | <b>4 300</b>   | <b>4 200</b>   | <b>4 600</b>   |
| Direct Sources   | 3 300                               | 3 100          | 3 100          | 3 900          | 4 100          | 3 700          | 3 600          | 3 900          |
| Indirect Sources   | 600                                 | 600            | 500            | 700            | 700            | 600            | 600            | 700            |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>4</b>                            | <b>2</b>       | <b>0.6</b>     | <b>0.5</b>     | <b>0.5</b>     | <b>0.3</b>     | <b>0.4</b>     | <b>0.3</b>     |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>200</b>                          | <b>300</b>     | <b>200</b>     | <b>200</b>     | <b>200</b>     | <b>200</b>     | <b>200</b>     | <b>200</b>     |
| <b>WASTE</b>   | <b>7 500</b>                        | <b>8 600</b>   | <b>9 600</b>   | <b>9 400</b>   | <b>9 100</b>   | <b>9 300</b>   | <b>9 200</b>   | <b>9 000</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | <b>7 100</b>                        | <b>8 000</b>   | <b>9 000</b>   | <b>8 800</b>   | <b>8 500</b>   | <b>8 700</b>   | <b>8 600</b>   | <b>8 400</b>   |
| <b>b. Wastewater Handling</b>  | <b>230</b>                          | <b>280</b>     | <b>300</b>     | <b>310</b>     | <b>310</b>     | <b>310</b>     | <b>310</b>     | <b>320</b>     |
| <b>c. Waste Incineration</b>   | <b>260</b>                          | <b>330</b>     | <b>290</b>     | <b>290</b>     | <b>280</b>     | <b>270</b>     | <b>270</b>     | <b>280</b>     |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-13 2013 GHG Emission Summary for Ontario

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>144 000</b>   | <b>620</b>      | <b>16 000</b>          | <b>28</b>        | <b>8 400</b>           | <b>2 300</b>           | -                      | <b>250</b>             | -                      | <b>171 000</b>         |
| <b>ENERGY</b>  |  | <b>126 000</b>   | <b>110</b>      | <b>2 600</b>           | <b>8</b>         | <b>2 000</b>           | -                      | -                      | -                      | -                      | <b>131 000</b>         |
| <b>a. Stationary Combustion Sources</b>  |  | <b>66 400</b>    | <b>60</b>       | <b>1 000</b>           | <b>2</b>         | <b>600</b>             | -                      | -                      | -                      | -                      | <b>68 400</b>          |
| Public Electricity and Heat Production   |  | 10 800           | 2               | 51                     | 0.3              | 80                     | -                      | -                      | -                      | -                      | 10 900                 |
| Petroleum Refining Industries  |  | 6 090            | 0.05            | 1                      | 0.03             | 9                      | -                      | -                      | -                      | -                      | 6 100                  |
| Mining and Upstream Oil and Gas Production   |  | 614              | 0.01            | 0.24                   | 0.03             | 8                      | -                      | -                      | -                      | -                      | 622                    |
| Manufacturing Industries   |  | 16 000           | 0.6             | 20                     | 0.5              | 100                    | -                      | -                      | -                      | -                      | 16 100                 |
| Construction   |  | 424              | 0.01            | 0.18                   | 0.01             | 4                      | -                      | -                      | -                      | -                      | 428                    |
| Commercial and Institutional Residential   |  | 11 800           | 0.23            | 5.8                    | 0.3              | 80                     | -                      | -                      | -                      | -                      | 11 900                 |
| Residential  |  | 19 100           | 50              | 1 000                  | 1                | 300                    | -                      | -                      | -                      | -                      | 20 700                 |
| Agriculture and Forestry   |  | 1 630            | 0.03            | 0.76                   | 0.04             | 12                     | -                      | -                      | -                      | -                      | 1 640                  |
| <b>b. Transport<sup>1</sup></b>  |  | <b>59 200</b>    | <b>8</b>        | <b>200</b>             | <b>6</b>         | <b>2 000</b>           | -                      | -                      | -                      | -                      | <b>61 200</b>          |
| Domestic Aviation  |  | 2 240            | 0.08            | 2                      | 0.06             | 20                     | -                      | -                      | -                      | -                      | 2 300                  |
| Road Transportation  |  | 45 200           | 3               | 80                     | 2.8              | 840                    | -                      | -                      | -                      | -                      | 46 100                 |
| Light-Duty Gasoline Vehicles   |  | 15 300           | 1.2             | 29                     | 1                | 300                    | -                      | -                      | -                      | -                      | 15 700                 |
| Light-Duty Gasoline Trucks   |  | 15 500           | 1.2             | 29                     | 0.95             | 280                    | -                      | -                      | -                      | -                      | 15 800                 |
| Heavy-Duty Gasoline Vehicles   |  | 1 380            | 0.05            | 1.2                    | 0.12             | 37                     | -                      | -                      | -                      | -                      | 1 420                  |
| Motorcycles  |  | 69.1             | 0.03            | 0.84                   | 0.0              | 0.41                   | -                      | -                      | -                      | -                      | 70.3                   |
| Light-Duty Diesel Vehicles   |  | 315              | 0.01            | 0.2                    | 0.03             | 8                      | -                      | -                      | -                      | -                      | 323                    |
| Light-Duty Diesel Trucks   |  | 422              | 0.01            | 0.3                    | 0.03             | 10                     | -                      | -                      | -                      | -                      | 432                    |
| Heavy-Duty Diesel Vehicles   |  | 11 800           | 0.5             | 10                     | 0.7              | 200                    | -                      | -                      | -                      | -                      | 12 000                 |
| Propane and Natural Gas Vehicles   |  | 357              | 0.2             | 6                      | 0.01             | 2                      | -                      | -                      | -                      | -                      | 360                    |
| Railways   |  | 1 180            | 0.07            | 2                      | 0.5              | 100                    | -                      | -                      | -                      | -                      | 1 300                  |
| Domestic Navigation  |  | 1 210            | 0.1             | 3                      | 0.1              | 30                     | -                      | -                      | -                      | -                      | 1 200                  |
| Other Transportation   |  | 9 330            | 5               | 100                    | 2                | 700                    | -                      | -                      | -                      | -                      | 10 000                 |
| Off-Road Gasoline  |  | 2 640            | 3               | 80                     | 0.06             | 20                     | -                      | -                      | -                      | -                      | 2 700                  |
| Off-Road Diesel  |  | 5 760            | 0.3             | 8                      | 2                | 700                    | -                      | -                      | -                      | -                      | 6 500                  |
| Pipeline Transport   |  | 928              | 0.92            | 23                     | 0.03             | 8                      | -                      | -                      | -                      | -                      | 959                    |
| <b>c. Fugitive Sources</b>   |  | <b>290</b>       | <b>42</b>       | <b>1 000</b>           | <b>0.02</b>      | <b>7</b>               | -                      | -                      | -                      | -                      | <b>1 300</b>           |
| Coal Mining  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Oil and Natural Gas  |  | 290              | 42              | 1 000                  | 0.02             | 7                      | -                      | -                      | -                      | -                      | 1 300                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>17 900</b>    | -               | -                      | <b>0.33</b>      | <b>98.6</b>            | <b>2 300</b>           | -                      | <b>250</b>             | -                      | <b>20 500</b>          |
| <b>a. Mineral Products</b>   |  | <b>3 600</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>3 600</b>           |
| Cement Production  |  | 2 700            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 2 700                  |
| Lime Production  |  | 551              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 551                    |
| Mineral Products Use   |  | 380              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 380                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | <b>7 520</b>     | -               | -                      | -                | -                      | -                      | -                      | <b>191</b>             | -                      | <b>7 710</b>           |
| Iron and Steel Production  |  | 7 520            | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 7 520                  |
| Aluminum Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | 191                    | -                      | 191                    |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                      | -                | -                      | <b>2 300</b>           | -                      | <b>62</b>              | -                      | <b>2 300</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>6 700</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>6 700</b>           |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>10</b>        | -               | -                      | <b>0.33</b>      | <b>99</b>              | -                      | -                      | -                      | -                      | <b>110</b>             |
| <b>AGRICULTURE</b>   |  | -                | <b>180</b>      | <b>4 500</b>           | <b>20</b>        | <b>6 000</b>           | -                      | -                      | -                      | -                      | <b>10 000</b>          |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>140</b>      | <b>3 600</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>3 600</b>           |
| <b>b. Manure Management</b>  |  | -                | <b>35</b>       | <b>870</b>             | <b>3.47</b>      | <b>1 040</b>           | -                      | -                      | -                      | -                      | <b>1 900</b>           |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                      | <b>15</b>        | <b>4 600</b>           | -                      | -                      | -                      | -                      | <b>4 600</b>           |
| Direct Sources   |  | -                | -               | -                      | 13               | 3 900                  | -                      | -                      | -                      | -                      | 3 900                  |
| Indirect Sources   |  | -                | -               | -                      | 2                | 700                    | -                      | -                      | -                      | -                      | 700                    |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | <b>0.01</b>     | <b>0.2</b>             | <b>0.0</b>       | <b>0.07</b>            | -                      | -                      | -                      | -                      | <b>0.3</b>             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>200</b>       | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>200</b>             |
| <b>WASTE</b>   |  | <b>200</b>       | <b>340</b>      | <b>8 500</b>           | <b>1</b>         | <b>300</b>             | -                      | -                      | -                      | -                      | <b>9 000</b>           |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>340</b>      | <b>8 400</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>8 400</b>           |
| <b>b. Wastewater Handling</b>  |  | -                | <b>2.4</b>      | <b>60</b>              | <b>0.9</b>       | <b>300</b>             | -                      | -                      | -                      | -                      | <b>320</b>             |
| <b>c. Waste Incineration</b>   |  | <b>200</b>       | <b>0.01</b>     | <b>0.3</b>             | <b>0.3</b>       | <b>80</b>              | -                      | -                      | -                      | -                      | <b>280</b>             |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–14 1990–2013 GHG Emission for Manitoba

| Greenhouse Gas Categories  |                                     |               |               |               |               |               |               |               |
|--|-------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|  | 1990                                | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013          |
|  | <i>kt CO<sub>2</sub> equivalent</i> |               |               |               |               |               |               |               |
| <b>TOTAL</b>   | <b>18 700</b>                       | <b>21 100</b> | <b>20 700</b> | <b>19 900</b> | <b>19 600</b> | <b>19 400</b> | <b>20 700</b> | <b>21 400</b> |
| <b>ENERGY</b>  | <b>12 700</b>                       | <b>13 200</b> | <b>12 500</b> | <b>11 700</b> | <b>11 300</b> | <b>11 600</b> | <b>12 800</b> | <b>13 000</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>5 040</b>                        | <b>5 530</b>  | <b>4 610</b>  | <b>4 610</b>  | <b>3 970</b>  | <b>3 940</b>  | <b>3 910</b>  | <b>4 290</b>  |
| Public Electricity and Heat Production   | 523                                 | 1 010         | 338           | 192           | 87.3          | 119           | 109           | 115           |
| Petroleum Refining Industries  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| Mining and Upstream Oil and Gas Production   | 79.9                                | 22            | 115           | 268           | 176           | 103           | 111           | 122           |
| Manufacturing Industries   | 1 190                               | 1 240         | 1 440         | 1 430         | 1 250         | 1 220         | 1 250         | 1 190         |
| Construction   | 63.4                                | 61.9          | 85.8          | 76.6          | 106           | 113           | 109           | 124           |
| Commercial and Institutional   | 1 400                               | 1 670         | 1 420         | 1 390         | 1 200         | 1 230         | 1 190         | 1 400         |
| Residential  | 1 740                               | 1 470         | 1 160         | 1 130         | 1 060         | 1 120         | 1 110         | 1 280         |
| Agriculture and Forestry   | 42.6                                | 63.8          | 45.6          | 114           | 79.7          | 37.7          | 42.6          | 48.2          |
| <b>b. Transport<sup>1</sup></b>  | <b>7 200</b>                        | <b>7 290</b>  | <b>7 690</b>  | <b>6 760</b>  | <b>7 060</b>  | <b>7 250</b>  | <b>8 500</b>  | <b>8 220</b>  |
| Domestic Aviation  | 480                                 | 550           | 560           | 460           | 470           | 420           | 480           | 490           |
| Road Transportation  | 3 790                               | 4 450         | 4 720         | 4 900         | 5 210         | 5 120         | 5 600         | 5 720         |
| Light-Duty Gasoline Vehicles   | 1 630                               | 1 320         | 1 150         | 1 090         | 1 160         | 1 120         | 1 300         | 1 320         |
| Light-Duty Gasoline Trucks   | 856                                 | 1 500         | 1 640         | 1 550         | 1 660         | 1 610         | 1 860         | 1 910         |
| Heavy-Duty Gasoline Vehicles   | 345                                 | 214           | 231           | 229           | 248           | 243           | 284           | 294           |
| Motorcycles  | 7.19                                | 4.45          | 8.32          | 8.24          | 8.93          | 8.74          | 10.2          | 10.6          |
| Light-Duty Diesel Vehicles   | 14.6                                | 10.7          | 11.1          | 13.6          | 15.4          | 15.7          | 18.6          | 19.8          |
| Light-Duty Diesel Trucks   | 40.5                                | 90.9          | 101           | 111           | 120           | 118           | 135           | 137           |
| Heavy-Duty Diesel Vehicles   | 836                                 | 1 270         | 1 560         | 1 880         | 1 980         | 1 990         | 1 980         | 2 010         |
| Propane and Natural Gas Vehicles   | 62                                  | 37            | 14            | 17            | 13            | 10            | 12            | 14            |
| Railways   | 610                                 | 320           | 300           | 530           | x             | x             | x             | x             |
| Domestic Navigation  | 0.02                                | 1.2           | 2.4           | 6             | x             | x             | x             | x             |
| Other Transportation   | 2 300                               | 2 000         | 2 100         | 860           | 750           | 1 000         | 1 800         | 1 400         |
| Off-Road Gasoline  | 460                                 | 440           | 380           | 330           | 450           | 340           | 690           | 690           |
| Off-Road Diesel  | 1 000                               | 690           | 1 100         | 440           | 290           | 630           | 1 100         | 640           |
| Pipeline Transport   | 848                                 | 829           | 601           | 102           | 17.9          | 32.3          | 13.2          | 102           |
| <b>c. Fugitive Sources</b>   | <b>450</b>                          | <b>410</b>    | <b>210</b>    | <b>300</b>    | <b>300</b>    | <b>370</b>    | <b>430</b>    | <b>450</b>    |
| Coal Mining  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| Oil and Natural Gas  | 450                                 | 410           | 210           | 300           | 300           | 370           | 430           | 450           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>459</b>                          | <b>609</b>    | <b>659</b>    | <b>662</b>    | <b>823</b>    | <b>840</b>    | <b>682</b>    | <b>701</b>    |
| <b>a. Mineral Products</b>   | <b>220</b>                          | <b>80</b>     | <b>69</b>     | <b>56</b>     | <b>62</b>     | <b>66</b>     | <b>69</b>     | <b>64</b>     |
| Cement Production  | 150                                 | -             | -             | -             | -             | -             | -             | -             |
| Lime Production  | 58.1                                | 68.9          | 58.8          | 44.7          | 53.6          | 55.8          | 56.5          | 51.6          |
| Mineral Products Use   | 11                                  | 11            | 10            | 12            | 8.4           | 10            | 13            | 13            |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| Adipic Acid Production   | -                                   | -             | -             | -             | -             | -             | -             | -             |
| <b>c. Metal Production</b>   | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| Iron and Steel Production  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| Aluminum Production  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                   | -             | -             | -             | -             | -             | -             | -             |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>4.3</b>                          | <b>150</b>    | <b>200</b>    | <b>200</b>    | <b>210</b>    | <b>220</b>    | <b>220</b>    | <b>230</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>230</b>                          | <b>370</b>    | <b>380</b>    | <b>390</b>    | <b>540</b>    | <b>550</b>    | <b>380</b>    | <b>390</b>    |
| <b>f. Other Product Manufacture and Use</b>  | <b>6.9</b>                          | <b>16</b>     | <b>13</b>     | <b>9.1</b>    | <b>8.8</b>    | <b>9.6</b>    | <b>12</b>     | <b>11</b>     |
| <b>AGRICULTURE</b>   | <b>4 800</b>                        | <b>6 400</b>  | <b>6 500</b>  | <b>6 400</b>  | <b>6 400</b>  | <b>5 800</b>  | <b>6 000</b>  | <b>6 700</b>  |
| <b>a. Enteric Fermentation</b>   | <b>1 900</b>                        | <b>2 700</b>  | <b>3 300</b>  | <b>2 800</b>  | <b>2 700</b>  | <b>2 500</b>  | <b>2 400</b>  | <b>2 500</b>  |
| <b>b. Manure Management</b>  | <b>490</b>                          | <b>720</b>    | <b>880</b>    | <b>790</b>    | <b>790</b>    | <b>770</b>    | <b>760</b>    | <b>780</b>    |
| <b>c. Agriculture Soils</b>  | <b>2 100</b>                        | <b>2 700</b>  | <b>2 100</b>  | <b>2 600</b>  | <b>2 700</b>  | <b>2 300</b>  | <b>2 600</b>  | <b>3 100</b>  |
| Direct Sources   | 1 700                               | 2 100         | 1 600         | 2 000         | 2 100         | 1 800         | 2 000         | 2 500         |
| Indirect Sources   | 400                                 | 600           | 500           | 600           | 600           | 500           | 600           | 700           |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>200</b>                          | <b>80</b>     | <b>10</b>     | <b>20</b>     | <b>20</b>     | <b>10</b>     | <b>20</b>     | <b>20</b>     |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>100</b>                          | <b>200</b>    | <b>200</b>    | <b>200</b>    | <b>200</b>    | <b>200</b>    | <b>200</b>    | <b>300</b>    |
| <b>WASTE</b>   | <b>730</b>                          | <b>940</b>    | <b>1 000</b>  | <b>1 100</b>  | <b>1 100</b>  | <b>1 100</b>  | <b>1 100</b>  | <b>1 000</b>  |
| <b>a. Solid Waste Disposal on Land</b>   | <b>700</b>                          | <b>900</b>    | <b>990</b>    | <b>1 100</b>  | <b>1 100</b>  | <b>1 100</b>  | <b>1 100</b>  | <b>1 000</b>  |
| <b>b. Wastewater Handling</b>  | <b>36</b>                           | <b>40</b>     | <b>41</b>     | <b>42</b>     | <b>42</b>     | <b>42</b>     | <b>43</b>     | <b>43</b>     |
| <b>c. Waste Incineration</b>   | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-15 2013 GHG Emission Summary for Manitoba

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>12 900</b>    | <b>180</b>      | <b>4 400</b>           | <b>13</b>        | <b>3 800</b>           | <b>230</b>             | -                      | <b>1.1</b>             | -                      | <b>21 400</b>          |
| <b>ENERGY</b>  |  | <b>12 200</b>    | <b>18</b>       | <b>460</b>             | <b>1</b>         | <b>300</b>             | -                      | -                      | -                      | -                      | <b>13 000</b>          |
| <b>a. Stationary Combustion Sources</b>  |  | <b>4 150</b>     | <b>4</b>        | <b>90</b>              | <b>0.1</b>       | <b>40</b>              | -                      | -                      | -                      | -                      | <b>4 290</b>           |
| Public Electricity and Heat Production   |  | 115              | 0.01            | 0.21                   | 0.0              | 0.6                    | -                      | -                      | -                      | -                      | 115                    |
| Petroleum Refining Industries  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Mining and Upstream Oil and Gas Production   |  | 119              | 0.0             | 0.04                   | 0.01             | 2                      | -                      | -                      | -                      | -                      | 122                    |
| Manufacturing Industries   |  | 1 180            | 0.05            | 1                      | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 190                  |
| Construction   |  | 123              | 0.0             | 0.06                   | 0.0              | 0.7                    | -                      | -                      | -                      | -                      | 124                    |
| Commercial and Institutional   |  | 1 390            | 0.03            | 0.67                   | 0.03             | 9                      | -                      | -                      | -                      | -                      | 1 400                  |
| Residential  |  | 1 170            | 4               | 90                     | 0.06             | 20                     | -                      | -                      | -                      | -                      | 1 280                  |
| Agriculture and Forestry   |  | 47.2             | 0.0             | 0.02                   | 0.0              | 0.94                   | -                      | -                      | -                      | -                      | 48.2                   |
| <b>b. Transport<sup>1</sup></b>  |  | <b>7 940</b>     | <b>1</b>        | <b>40</b>              | <b>0.8</b>       | <b>200</b>             | -                      | -                      | -                      | -                      | <b>8 220</b>           |
| Domestic Aviation  |  | 487              | 0.02            | 0.5                    | 0.01             | 4                      | -                      | -                      | -                      | -                      | 490                    |
| Road Transportation  |  | 5 610            | 0.4             | 10                     | 0.33             | 98                     | -                      | -                      | -                      | -                      | 5 720                  |
| Light-Duty Gasoline Vehicles   |  | 1 300            | 0.13            | 3.3                    | 0.08             | 24                     | -                      | -                      | -                      | -                      | 1 320                  |
| Light-Duty Gasoline Trucks   |  | 1 870            | 0.2             | 4.9                    | 0.1              | 31                     | -                      | -                      | -                      | -                      | 1 910                  |
| Heavy-Duty Gasoline Vehicles   |  | 287              | 0.01            | 0.32                   | 0.02             | 7.1                    | -                      | -                      | -                      | -                      | 294                    |
| Motorcycles  |  | 10.4             | 0.0             | 0.09                   | 0.0              | 0.06                   | -                      | -                      | -                      | -                      | 10.6                   |
| Light-Duty Diesel Vehicles   |  | 19.3             | 0.0             | 0.01                   | 0.0              | 0.5                    | -                      | -                      | -                      | -                      | 19.8                   |
| Light-Duty Diesel Trucks   |  | 134              | 0.0             | 0.09                   | 0.01             | 3                      | -                      | -                      | -                      | -                      | 137                    |
| Heavy-Duty Diesel Vehicles   |  | 1 980            | 0.08            | 2                      | 0.1              | 30                     | -                      | -                      | -                      | -                      | 2 010                  |
| Propane and Natural Gas Vehicles   |  | 13.8             | 0.01            | 0.1                    | 0.0              | 0.08                   | -                      | -                      | -                      | -                      | 14                     |
| Railways   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Domestic Navigation  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Other Transportation   |  | 1 330            | 1               | 20                     | 0.3              | 80                     | -                      | -                      | -                      | -                      | 1 400                  |
| Off-Road Gasoline  |  | 663              | 0.8             | 20                     | 0.02             | 5                      | -                      | -                      | -                      | -                      | 690                    |
| Off-Road Diesel  |  | 568              | 0.03            | 0.8                    | 0.2              | 70                     | -                      | -                      | -                      | -                      | 640                    |
| Pipeline Transport   |  | 98.4             | 0.1             | 2.5                    | 0.0              | 0.8                    | -                      | -                      | -                      | -                      | 102                    |
| <b>c. Fugitive Sources</b>   |  | <b>120</b>       | <b>13</b>       | <b>330</b>             | <b>0.0</b>       | <b>0.07</b>            | -                      | -                      | -                      | -                      | <b>450</b>             |
| Coal Mining  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Oil and Natural Gas  |  | 120              | 13              | 330                    | 0.0              | 0.07                   | -                      | -                      | -                      | -                      | 450                    |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>461</b>       | -               | -                      | <b>0.03</b>      | <b>9.22</b>            | <b>230</b>             | -                      | <b>1.1</b>             | -                      | <b>701</b>             |
| <b>a. Mineral Products</b>   |  | <b>64</b>        | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>64</b>              |
| Cement Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Lime Production  |  | 51.6             | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 51.6                   |
| Mineral Products Use   |  | 13               | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 13                     |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Iron and Steel Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Aluminum Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                      | -                | -                      | <b>230</b>             | -                      | <b>1.1</b>             | -                      | <b>230</b>             |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>390</b>       | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>390</b>             |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>2</b>         | -               | -                      | <b>0.03</b>      | <b>9.2</b>             | -                      | -                      | -                      | -                      | <b>11</b>              |
| <b>AGRICULTURE</b>   |  | -                | <b>120</b>      | <b>2 900</b>           | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>6 700</b>           |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>99</b>       | <b>2 500</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>2 500</b>           |
| <b>b. Manure Management</b>  |  | -                | <b>17</b>       | <b>420</b>             | <b>1.21</b>      | <b>360</b>             | -                      | -                      | -                      | -                      | <b>780</b>             |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                      | <b>10</b>        | <b>3 100</b>           | -                      | -                      | -                      | -                      | <b>3 100</b>           |
| Direct Sources   |  | -                | -               | -                      | 8.2              | 2 500                  | -                      | -                      | -                      | -                      | 2 500                  |
| Indirect Sources   |  | -                | -               | -                      | 2                | 700                    | -                      | -                      | -                      | -                      | 700                    |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | <b>0.6</b>      | <b>20</b>              | <b>0.02</b>      | <b>5</b>               | -                      | -                      | -                      | -                      | <b>20</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>300</b>       | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>300</b>             |
| <b>WASTE</b>   |  | -                | <b>41</b>       | <b>1 000</b>           | <b>0.08</b>      | <b>20</b>              | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>40</b>       | <b>1 000</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>1 000</b>           |
| <b>b. Wastewater Handling</b>  |  | -                | <b>0.78</b>     | <b>20</b>              | <b>0.08</b>      | <b>20</b>              | -                      | -                      | -                      | -                      | <b>43</b>              |
| <b>c. Waste Incineration</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–16 1990–2013 GHG Emission Summary from Saskatchewan

| Greenhouse Gas Categories  |                                     |               |               |               |               |               |               |               |
|--|-------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|  | 1990                                | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013          |
|  | <i>kt CO<sub>2</sub> equivalent</i> |               |               |               |               |               |               |               |
| <b>TOTAL</b>   | <b>45 000</b>                       | <b>68 100</b> | <b>69 500</b> | <b>70 200</b> | <b>69 800</b> | <b>69 200</b> | <b>71 700</b> | <b>74 800</b> |
| <b>ENERGY</b>  | <b>36 300</b>                       | <b>55 800</b> | <b>55 100</b> | <b>56 700</b> | <b>57 100</b> | <b>56 000</b> | <b>57 600</b> | <b>59 500</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>20 300</b>                       | <b>27 000</b> | <b>27 600</b> | <b>29 400</b> | <b>29 600</b> | <b>29 100</b> | <b>29 300</b> | <b>29 700</b> |
| Public Electricity and Heat Production   | 11 200                              | 14 600        | 15 300        | 16 500        | 16 300        | 15 700        | 16 200        | 16 000        |
| Petroleum Refining Industries  | 620                                 | 630           | 780           | 950           | 1 100         | 980           | 1 200         | 1 100         |
| Mining and Upstream Oil and Gas Production   | 4 150                               | 6 750         | 7 540         | 7 420         | 7 710         | 8 010         | 7 490         | 7 810         |
| Manufacturing Industries   | 792                                 | 1 100         | 533           | 556           | 628           | 705           | 808           | 882           |
| Construction   | 70.4                                | 49.1          | 42            | 49.1          | 70.8          | 55.7          | 37.3          | 35.7          |
| Commercial and Institutional   | 985                                 | 1 650         | 1 490         | 1 610         | 1 380         | 1 280         | 1 110         | 1 200         |
| Residential  | 2 180                               | 1 980         | 1 660         | 1 830         | 1 970         | 1 820         | 1 770         | 1 890         |
| Agriculture and Forestry   | 296                                 | 272           | 257           | 533           | 531           | 615           | 661           | 772           |
| <b>b. Transport<sup>1</sup></b>  | <b>9 330</b>                        | <b>11 200</b> | <b>11 800</b> | <b>14 300</b> | <b>15 000</b> | <b>14 400</b> | <b>15 200</b> | <b>16 600</b> |
| Domestic Aviation  | 260                                 | 220           | 190           | 180           | 190           | 190           | 220           | 230           |
| Road Transportation  | 4 100                               | 5 700         | 5 870         | 7 050         | 7 290         | 7 210         | 7 590         | 7 770         |
| Light-Duty Gasoline Vehicles   | 1 240                               | 1 330         | 1 080         | 1 330         | 1 370         | 1 270         | 1 380         | 1 450         |
| Light-Duty Gasoline Trucks   | 902                                 | 1 790         | 1 810         | 2 240         | 2 310         | 2 140         | 2 330         | 2 450         |
| Heavy-Duty Gasoline Vehicles   | 596                                 | 372           | 360           | 462           | 481           | 449           | 493           | 524           |
| Motorcycles  | 2.29                                | 6.14          | 7.33          | 9.41          | 9.81          | 9.15          | 10            | 10.7          |
| Light-Duty Diesel Vehicles   | 10.1                                | 10.6          | 11.2          | 16            | 17.2          | 16.7          | 18.7          | 20.4          |
| Light-Duty Diesel Trucks   | 58.4                                | 209           | 233           | 306           | 319           | 300           | 329           | 346           |
| Heavy-Duty Diesel Vehicles   | 1 230                               | 1 950         | 2 360         | 2 670         | 2 770         | 3 020         | 3 030         | 2 960         |
| Propane and Natural Gas Vehicles   | 65                                  | 26            | 11            | 12            | 11            | 10            | 13            | 9.7           |
| Railways   | 590                                 | 410           | x             | x             | x             | x             | x             | x             |
| Domestic Navigation  | 0.1                                 | -             | x             | x             | x             | x             | x             | x             |
| Other Transportation   | 4 400                               | 4 900         | 5 300         | 6 600         | 6 900         | 6 300         | 6 900         | 7 900         |
| Off-Road Gasoline  | 1 200                               | 690           | 920           | 1 300         | 1 500         | 980           | 1 500         | 1 600         |
| Off-Road Diesel  | 1 600                               | 1 900         | 2 500         | 3 000         | 3 200         | 3 300         | 3 300         | 4 300         |
| Pipeline Transport   | 1 590                               | 2 340         | 1 900         | 2 290         | 2 170         | 2 070         | 2 040         | 2 030         |
| <b>c. Fugitive Sources</b>   | <b>6 700</b>                        | <b>18 000</b> | <b>16 000</b> | <b>13 000</b> | <b>12 000</b> | <b>12 000</b> | <b>13 000</b> | <b>13 000</b> |
| Coal Mining  | 20                                  | 20            | 20            | 20            | 20            | 20            | 20            | 20            |
| Oil and Natural Gas  | 6 700                               | 18 000        | 16 000        | 13 000        | 12 000        | 12 000        | 13 000        | 13 000        |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                            | <b>0.09</b>   |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>318</b>                          | <b>640</b>    | <b>789</b>    | <b>712</b>    | <b>725</b>    | <b>891</b>    | <b>829</b>    | <b>877</b>    |
| <b>a. Mineral Products</b>   | <b>98</b>                           | <b>16</b>     | <b>12</b>     | <b>12</b>     | <b>8.5</b>    | <b>12</b>     | <b>18</b>     | <b>18</b>     |
| Cement Production  | 88                                  | -             | -             | -             | -             | -             | -             | -             |
| Lime Production  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| Mineral Products Use   | 10                                  | 16            | 12            | 12            | 8.5           | 12            | 18            | 18            |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| Adipic Acid Production   | -                                   | -             | -             | -             | -             | -             | -             | -             |
| <b>c. Metal Production</b>   | <b>-</b>                            | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      |
| Iron and Steel Production  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| Aluminum Production  | -                                   | -             | -             | -             | -             | -             | -             | -             |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                   | -             | -             | -             | -             | -             | -             | -             |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>1.8</b>                          | <b>140</b>    | <b>180</b>    | <b>200</b>    | <b>200</b>    | <b>210</b>    | <b>220</b>    | <b>230</b>    |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>210</b>                          | <b>470</b>    | <b>580</b>    | <b>490</b>    | <b>510</b>    | <b>660</b>    | <b>580</b>    | <b>620</b>    |
| <b>f. Other Product Manufacture and Use</b>  | <b>6.2</b>                          | <b>14</b>     | <b>11</b>     | <b>7.8</b>    | <b>7.9</b>    | <b>9.1</b>    | <b>12</b>     | <b>12</b>     |
| <b>AGRICULTURE</b>   | <b>7 900</b>                        | <b>11 000</b> | <b>13 000</b> | <b>12 000</b> | <b>11 000</b> | <b>11 000</b> | <b>12 000</b> | <b>13 000</b> |
| <b>a. Enteric Fermentation</b>   | <b>3 300</b>                        | <b>4 700</b>  | <b>6 100</b>  | <b>5 200</b>  | <b>4 900</b>  | <b>4 800</b>  | <b>4 900</b>  | <b>4 800</b>  |
| <b>b. Manure Management</b>  | <b>790</b>                          | <b>1 100</b>  | <b>1 400</b>  | <b>1 200</b>  | <b>1 200</b>  | <b>1 100</b>  | <b>1 200</b>  | <b>1 200</b>  |
| <b>c. Agriculture Soils</b>  | <b>3 500</b>                        | <b>4 700</b>  | <b>4 700</b>  | <b>4 900</b>  | <b>4 500</b>  | <b>4 900</b>  | <b>5 600</b>  | <b>6 600</b>  |
| Direct Sources   | 2 900                               | 3 700         | 3 700         | 3 900         | 3 500         | 3 800         | 4 400         | 5 100         |
| Indirect Sources   | 600                                 | 900           | 1 000         | 1 000         | 1 000         | 1 000         | 1 000         | 1 000         |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>70</b>                           | <b>50</b>     | <b>30</b>     | <b>30</b>     | <b>20</b>     | <b>20</b>     | <b>20</b>     | <b>30</b>     |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>200</b>                          | <b>400</b>    | <b>400</b>    | <b>600</b>    | <b>600</b>    | <b>600</b>    | <b>700</b>    | <b>900</b>    |
| <b>WASTE</b>   | <b>590</b>                          | <b>750</b>    | <b>820</b>    | <b>860</b>    | <b>890</b>    | <b>900</b>    | <b>920</b>    | <b>850</b>    |
| <b>a. Solid Waste Disposal on Land</b>   | <b>550</b>                          | <b>710</b>    | <b>780</b>    | <b>820</b>    | <b>840</b>    | <b>860</b>    | <b>870</b>    | <b>810</b>    |
| <b>b. Wastewater Handling</b>  | <b>40</b>                           | <b>42</b>     | <b>41</b>     | <b>42</b>     | <b>43</b>     | <b>43</b>     | <b>44</b>     | <b>45</b>     |
| <b>c. Waste Incineration</b>   | <b>0.51</b>                         | <b>-</b>      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-17 2013 GHG Emission Summary for Saskatchewan

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>48 300</b>    | <b>710</b>      | <b>18 000</b>          | <b>28</b>        | <b>8 300</b>           | <b>220</b>             | <b>-</b>               | <b>0.91</b>            | <b>-</b>               | <b>74 800</b>          |
| <b>ENERGY</b>  |  | <b>46 800</b>    | <b>470</b>      | <b>12 000</b>          | <b>3</b>         | <b>900</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>59 500</b>          |
| <b>a. Stationary Combustion Sources</b>  |  | <b>29 200</b>    | <b>10</b>       | <b>300</b>             | <b>0.7</b>       | <b>200</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>29 700</b>          |
| Public Electricity and Heat Production   |  | 15 900           | 1               | 26                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 16 000                 |
| Petroleum Refining Industries  |  | 1 130            | 0.02            | 0.5                    | 0.02             | 5                      | -                      | -                      | -                      | -                      | 1 100                  |
| Mining and Upstream Oil and Gas Production   |  | 7 510            | 9.8             | 250                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 7 810                  |
| Manufacturing Industries   |  | 866              | 0.06            | 2                      | 0.05             | 10                     | -                      | -                      | -                      | -                      | 882                    |
| Construction   |  | 35.4             | 0.0             | 0.02                   | 0.0              | 0.2                    | -                      | -                      | -                      | -                      | 35.7                   |
| Commercial and Institutional   |  | 1 190            | 0.02            | 0.59                   | 0.03             | 8                      | -                      | -                      | -                      | -                      | 1 200                  |
| Residential  |  | 1 820            | 2               | 50                     | 0.06             | 20                     | -                      | -                      | -                      | -                      | 1 890                  |
| Agriculture and Forestry   |  | 767              | 0.01            | 0.35                   | 0.02             | 4.6                    | -                      | -                      | -                      | -                      | 772                    |
| <b>b. Transport<sup>1</sup></b>  |  | <b>15 800</b>    | <b>5</b>        | <b>100</b>             | <b>2</b>         | <b>700</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>16 600</b>          |
| Domestic Aviation  |  | 229              | 0.02            | 0.5                    | 0.01             | 2                      | -                      | -                      | -                      | -                      | 230                    |
| Road Transportation  |  | 7 620            | 0.6             | 20                     | 0.45             | 130                    | -                      | -                      | -                      | -                      | 7 770                  |
| Light-Duty Gasoline Vehicles   |  | 1 420            | 0.16            | 4.1                    | 0.09             | 27                     | -                      | -                      | -                      | -                      | 1 450                  |
| Light-Duty Gasoline Trucks   |  | 2 410            | 0.28            | 7.1                    | 0.13             | 39                     | -                      | -                      | -                      | -                      | 2 450                  |
| Heavy-Duty Gasoline Vehicles   |  | 512              | 0.03            | 0.74                   | 0.04             | 11                     | -                      | -                      | -                      | -                      | 524                    |
| Motorcycles  |  | 10.5             | 0.0             | 0.1                    | 0.0              | 0.06                   | -                      | -                      | -                      | -                      | 10.7                   |
| Light-Duty Diesel Vehicles   |  | 19.9             | 0.0             | 0.01                   | 0.0              | 0.5                    | -                      | -                      | -                      | -                      | 20.4                   |
| Light-Duty Diesel Trucks   |  | 337              | 0.01            | 0.2                    | 0.03             | 8                      | -                      | -                      | -                      | -                      | 346                    |
| Heavy-Duty Diesel Vehicles   |  | 2 900            | 0.1             | 3                      | 0.2              | 50                     | -                      | -                      | -                      | -                      | 2 960                  |
| Propane and Natural Gas Vehicles   |  | 9.43             | 0.01            | 0.2                    | 0.0              | 0.06                   | -                      | -                      | -                      | -                      | 9.7                    |
| Railways   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Domestic Navigation  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Other Transportation   |  | 7 330            | 4               | 100                    | 2                | 500                    | -                      | -                      | -                      | -                      | 7 900                  |
| Off-Road Gasoline  |  | 1 560            | 2               | 50                     | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 600                  |
| Off-Road Diesel  |  | 3 820            | 0.2             | 5                      | 2                | 500                    | -                      | -                      | -                      | -                      | 4 300                  |
| Pipeline Transport   |  | 1 960            | 2               | 51                     | 0.05             | 20                     | -                      | -                      | -                      | -                      | 2 030                  |
| <b>c. Fugitive Sources</b>   |  | <b>1 800</b>     | <b>450</b>      | <b>11 000</b>          | <b>0.02</b>      | <b>6</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>13 000</b>          |
| Coal Mining  |  | -                | 0.7             | 20                     | -                | -                      | -                      | -                      | -                      | -                      | 20                     |
| Oil and Natural Gas  |  | 1 800            | 450             | 11 000                 | 0.02             | 6                      | -                      | -                      | -                      | -                      | 13 000                 |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | <b>0.09</b>      | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>0.09</b>            |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>644</b>       | <b>-</b>        | <b>-</b>               | <b>0.03</b>      | <b>8.08</b>            | <b>220</b>             | <b>-</b>               | <b>0.91</b>            | <b>-</b>               | <b>877</b>             |
| <b>a. Mineral Products</b>   |  | <b>18</b>        | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>18</b>              |
| Cement Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Lime Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Mineral Products Use   |  | 18               | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 18                     |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               |
| Iron and Steel Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Aluminum Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>220</b>             | <b>-</b>               | <b>0.91</b>            | <b>-</b>               | <b>230</b>             |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>620</b>       | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>620</b>             |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>3</b>         | <b>-</b>        | <b>-</b>               | <b>0.03</b>      | <b>8.1</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>12</b>              |
| <b>AGRICULTURE</b>   |  | <b>1 000</b>     | <b>210</b>      | <b>5 200</b>           | <b>20</b>        | <b>7 000</b>           | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>13 000</b>          |
| <b>a. Enteric Fermentation</b>   |  | <b>-</b>         | <b>190</b>      | <b>4 800</b>           | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>4 800</b>           |
| <b>b. Manure Management</b>  |  | <b>-</b>         | <b>14</b>       | <b>340</b>             | <b>2.71</b>      | <b>809</b>             | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>1 200</b>           |
| <b>c. Agriculture Soils</b>  |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>22</b>        | <b>6 600</b>           | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>6 600</b>           |
| Direct Sources   |  | -                | -               | -                      | 17               | 5 100                  | -                      | -                      | -                      | -                      | 5 100                  |
| Indirect Sources   |  | -                | -               | -                      | 5                | 1 000                  | -                      | -                      | -                      | -                      | 1 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   |  | <b>-</b>         | <b>0.9</b>      | <b>20</b>              | <b>0.02</b>      | <b>7</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>30</b>              |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>900</b>       | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>900</b>             |
| <b>WASTE</b>   |  | <b>-</b>         | <b>33</b>       | <b>830</b>             | <b>0.07</b>      | <b>20</b>              | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>850</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |  | <b>-</b>         | <b>32</b>       | <b>810</b>             | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>810</b>             |
| <b>b. Wastewater Handling</b>  |  | <b>-</b>         | <b>0.96</b>     | <b>24</b>              | <b>0.07</b>      | <b>20</b>              | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>45</b>              |
| <b>c. Waste Incineration</b>   |  | <b>-</b>         | <b>-</b>        | <b>-</b>               | <b>-</b>         | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               | <b>-</b>               |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–18 1990–2013 GHG Emission Summary for Alberta

| Greenhouse Gas Categories  |                                     |                |                |                |                |                |                |                |
|--|-------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|  | 1990                                | 2000           | 2005           | 2009           | 2010           | 2011           | 2012           | 2013           |
|  | <i>kt CO<sub>2</sub> equivalent</i> |                |                |                |                |                |                |                |
| <b>TOTAL</b>   | <b>175 000</b>                      | <b>232 000</b> | <b>234 000</b> | <b>235 000</b> | <b>243 000</b> | <b>247 000</b> | <b>258 000</b> | <b>267 000</b> |
| <b>ENERGY</b>  | <b>153 000</b>                      | <b>202 000</b> | <b>201 000</b> | <b>204 000</b> | <b>212 000</b> | <b>215 000</b> | <b>223 000</b> | <b>233 000</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>96 900</b>                       | <b>128 000</b> | <b>130 000</b> | <b>134 000</b> | <b>137 000</b> | <b>141 000</b> | <b>146 000</b> | <b>152 000</b> |
| Public Electricity and Heat Production   | 39 800                              | 50 300         | 52 000         | 48 900         | 49 100         | 48 800         | 44 700         | 46 700         |
| Petroleum Refining Industries  | 2 900                               | 2 900          | 4 000          | 3 200          | 3 500          | 3 500          | 4 100          | 4 300          |
| Mining and Upstream Oil and Gas Production   | 31 000                              | 48 900         | 51 000         | 57 900         | 60 000         | 61 300         | 70 200         | 72 900         |
| Manufacturing Industries   | 10 500                              | 11 700         | 8 990          | 9 330          | 10 500         | 11 700         | 11 200         | 12 200         |
| Construction   | 238                                 | 175            | 170            | 120            | 163            | 255            | 282            | 301            |
| Commercial and Institutional   | 5 040                               | 5 460          | 5 620          | 5 640          | 5 550          | 5 910          | 6 240          | 6 270          |
| Residential  | 6 910                               | 8 550          | 7 670          | 8 810          | 8 390          | 8 910          | 8 820          | 8 840          |
| Agriculture and Forestry   | 477                                 | 366            | 240            | 248            | 195            | 213            | 205            | 209            |
| <b>b. Transport<sup>1</sup></b>  | <b>22 600</b>                       | <b>30 700</b>  | <b>34 800</b>  | <b>35 500</b>  | <b>40 500</b>  | <b>40 000</b>  | <b>41 300</b>  | <b>44 200</b>  |
| Domestic Aviation  | 1 100                               | 1 300          | 1 300          | 1 300          | 1 300          | 1 200          | 1 400          | 1 500          |
| Road Transportation  | 13 600                              | 16 700         | 19 700         | 21 600         | 22 000         | 21 500         | 22 500         | 23 700         |
| Light-Duty Gasoline Vehicles   | 4 550                               | 3 780          | 3 580          | 3 730          | 3 830          | 3 520          | 3 700          | 3 960          |
| Light-Duty Gasoline Trucks   | 3 340                               | 5 580          | 6 680          | 6 940          | 7 120          | 6 560          | 6 890          | 7 390          |
| Heavy-Duty Gasoline Vehicles   | 1 620                               | 1 210          | 1 680          | 1 830          | 1 900          | 1 770          | 1 880          | 2 030          |
| Motorcycles  | 24.7                                | 27.4           | 37.2           | 40.6           | 42.1           | 39.1           | 41.5           | 44.9           |
| Light-Duty Diesel Vehicles   | 32.4                                | 23.5           | 30.9           | 36.7           | 39.3           | 39.3           | 44             | 47.8           |
| Light-Duty Diesel Trucks   | 176                                 | 466            | 625            | 648            | 670            | 644            | 699            | 732            |
| Heavy-Duty Diesel Vehicles   | 3 230                               | 5 360          | 6 960          | 8 250          | 8 340          | 8 800          | 9 100          | 9 370          |
| Propane and Natural Gas Vehicles   | 640                                 | 270            | 120            | 110            | 83             | 95             | 96             | 95             |
| Railways   | 1 800                               | 1 800          | x              | 1 300          | 2 200          | x              | x              | x              |
| Domestic Navigation  | 0.32                                | -              | x              | 7.9            | 7.9            | x              | x              | x              |
| Other Transportation   | 6 100                               | 11 000         | 11 000         | 11 000         | 15 000         | 15 000         | 14 000         | 16 000         |
| Off-Road Gasoline  | 1 500                               | 1 400          | 1 000          | 520            | 500            | 410            | 510            | 900            |
| Off-Road Diesel  | 3 300                               | 6 700          | 6 700          | 9 300          | 13 000         | 13 000         | 12 000         | 13 000         |
| Pipeline Transport   | 1 300                               | 2 730          | 3 210          | 1 570          | 1 560          | 1 680          | 1 820          | 2 140          |
| <b>c. Fugitive Sources</b>   | <b>34 000</b>                       | <b>43 000</b>  | <b>36 000</b>  | <b>34 000</b>  | <b>34 000</b>  | <b>35 000</b>  | <b>36 000</b>  | <b>37 000</b>  |
| Coal Mining  | 400                                 | 300            | 300            | 300            | 400            | 300            | 300            | 300            |
| Oil and Natural Gas  | 33 000                              | 43 000         | 36 000         | 34 000         | 34 000         | 34 000         | 36 000         | 37 000         |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>                            | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>6 080</b>                        | <b>9 560</b>   | <b>11 500</b>  | <b>11 500</b>  | <b>11 700</b>  | <b>12 300</b>  | <b>15 300</b>  | <b>13 500</b>  |
| <b>a. Mineral Products</b>   | <b>1 100</b>                        | <b>1 400</b>   | <b>1 500</b>   | <b>1 100</b>   | <b>1 200</b>   | <b>1 200</b>   | <b>1 300</b>   | <b>1 200</b>   |
| Cement Production  | 790                                 | 1 000          | 1 100          | 830            | 910            | 910            | 990            | 900            |
| Lime Production  | 104                                 | 146            | 120            | 91.4           | 110            | 114            | 116            | 106            |
| Mineral Products Use   | 210                                 | 240            | 250            | 160            | 140            | 170            | 160            | 160            |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>                            | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       |
| Adipic Acid Production   | -                                   | -              | -              | -              | -              | -              | -              | -              |
| <b>c. Metal Production</b>   | <b>-</b>                            | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       |
| Iron and Steel Production  | -                                   | -              | -              | -              | -              | -              | -              | -              |
| Aluminum Production  | -                                   | -              | -              | -              | -              | -              | -              | -              |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -                                   | -              | -              | -              | -              | -              | -              | -              |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>1.6</b>                          | <b>460</b>     | <b>700</b>     | <b>820</b>     | <b>820</b>     | <b>850</b>     | <b>880</b>     | <b>920</b>     |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>5 000</b>                        | <b>7 700</b>   | <b>9 300</b>   | <b>9 600</b>   | <b>9 700</b>   | <b>10 000</b>  | <b>13 000</b>  | <b>11 000</b>  |
| <b>f. Other Product Manufacture and Use</b>  | <b>16</b>                           | <b>42</b>      | <b>37</b>      | <b>28</b>      | <b>27</b>      | <b>31</b>      | <b>41</b>      | <b>40</b>      |
| <b>AGRICULTURE</b>   | <b>14 000</b>                       | <b>19 000</b>  | <b>20 000</b>  | <b>18 000</b>  | <b>17 000</b>  | <b>17 000</b>  | <b>18 000</b>  | <b>19 000</b>  |
| <b>a. Enteric Fermentation</b>   | <b>7 800</b>                        | <b>11 000</b>  | <b>12 000</b>  | <b>10 000</b>  | <b>9 600</b>   | <b>9 400</b>   | <b>9 500</b>   | <b>9 600</b>   |
| <b>b. Manure Management</b>  | <b>1 800</b>                        | <b>2 500</b>   | <b>2 600</b>   | <b>2 300</b>   | <b>2 200</b>   | <b>2 100</b>   | <b>2 100</b>   | <b>2 200</b>   |
| <b>c. Agriculture Soils</b>  | <b>4 200</b>                        | <b>4 800</b>   | <b>4 600</b>   | <b>4 600</b>   | <b>5 000</b>   | <b>5 400</b>   | <b>5 700</b>   | <b>6 100</b>   |
| Direct Sources   | 3 400                               | 3 800          | 3 600          | 3 600          | 3 900          | 4 200          | 4 500          | 4 800          |
| Indirect Sources   | 800                                 | 1 000          | 1 000          | 1 000          | 1 000          | 1 000          | 1 000          | 1 000          |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>4</b>                            | <b>0.2</b>     | <b>0.7</b>     | <b>0.4</b>     | <b>0.4</b>     | <b>0.7</b>     | <b>0.6</b>     | <b>1</b>       |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>300</b>                          | <b>400</b>     | <b>400</b>     | <b>600</b>     | <b>600</b>     | <b>600</b>     | <b>700</b>     | <b>800</b>     |
| <b>WASTE</b>   | <b>1 300</b>                        | <b>1 500</b>   | <b>1 900</b>   | <b>2 100</b>   | <b>2 000</b>   | <b>2 000</b>   | <b>2 100</b>   | <b>2 300</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | <b>1 200</b>                        | <b>1 400</b>   | <b>1 800</b>   | <b>2 000</b>   | <b>1 900</b>   | <b>1 900</b>   | <b>2 000</b>   | <b>2 100</b>   |
| <b>b. Wastewater Handling</b>  | <b>68</b>                           | <b>86</b>      | <b>95</b>      | <b>110</b>     | <b>110</b>     | <b>110</b>     | <b>110</b>     | <b>120</b>     |
| <b>c. Waste Incineration</b>   | <b>11</b>                           | <b>33</b>      | <b>33</b>      | <b>7.4</b>     | <b>17</b>      | <b>22</b>      | <b>43</b>      | <b>46</b>      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-19 2013 GHG Emission Summary for Alberta

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>212 000</b>   | <b>1 700</b>    | <b>44 000</b>          | <b>36</b>        | <b>11 000</b>          | <b>920</b>             | -                      | <b>3.6</b>             | -                      | <b>267 000</b>         |
| <b>ENERGY</b>  |  | <b>199 000</b>   | <b>1 200</b>    | <b>31 000</b>          | <b>10</b>        | <b>3 000</b>           | -                      | -                      | -                      | -                      | <b>233 000</b>         |
| <b>a. Stationary Combustion Sources</b>  |  | <b>149 000</b>   | <b>70</b>       | <b>2 000</b>           | <b>3</b>         | <b>900</b>             | -                      | -                      | -                      | -                      | <b>152 000</b>         |
| Public Electricity and Heat Production   |  | 46 400           | 2               | 51                     | 0.9              | 300                    | -                      | -                      | -                      | -                      | 46 700                 |
| Petroleum Refining Industries  |  | 4 280            | 0.04            | 1                      | 0.04             | 10                     | -                      | -                      | -                      | -                      | 4 300                  |
| Mining and Upstream Oil and Gas Production   |  | 71 100           | 54              | 1 400                  | 1                | 400                    | -                      | -                      | -                      | -                      | 72 900                 |
| Manufacturing Industries   |  | 12 000           | 0.5             | 10                     | 0.4              | 100                    | -                      | -                      | -                      | -                      | 12 200                 |
| Construction   |  | 297              | 0.01            | 0.13                   | 0.01             | 3                      | -                      | -                      | -                      | -                      | 301                    |
| Commercial and Institutional   |  | 6 230            | 0.12            | 2.9                    | 0.1              | 40                     | -                      | -                      | -                      | -                      | 6 270                  |
| Residential  |  | 8 540            | 9               | 200                    | 0.3              | 80                     | -                      | -                      | -                      | -                      | 8 840                  |
| Agriculture and Forestry   |  | 208              | 0.0             | 0.1                    | 0.0              | 1.5                    | -                      | -                      | -                      | -                      | 209                    |
| <b>b. Transport<sup>1</sup></b>  |  | <b>41 900</b>    | <b>6</b>        | <b>100</b>             | <b>7</b>         | <b>2 000</b>           | -                      | -                      | -                      | -                      | <b>44 200</b>          |
| Domestic Aviation  |  | 1 520            | 0.06            | 1                      | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 500                  |
| Road Transportation  |  | 23 200           | 2               | 40                     | 1.3              | 390                    | -                      | -                      | -                      | -                      | 23 700                 |
| Light-Duty Gasoline Vehicles   |  | 3 890            | 0.39            | 9.7                    | 0.22             | 67                     | -                      | -                      | -                      | -                      | 3 960                  |
| Light-Duty Gasoline Trucks   |  | 7 270            | 0.7             | 17                     | 0.35             | 100                    | -                      | -                      | -                      | -                      | 7 390                  |
| Heavy-Duty Gasoline Vehicles   |  | 1 980            | 0.07            | 1.9                    | 0.17             | 50                     | -                      | -                      | -                      | -                      | 2 030                  |
| Motorcycles  |  | 44.3             | 0.02            | 0.39                   | 0.0              | 0.25                   | -                      | -                      | -                      | -                      | 44.9                   |
| Light-Duty Diesel Vehicles   |  | 46.6             | 0.0             | 0.02                   | 0.0              | 1                      | -                      | -                      | -                      | -                      | 47.8                   |
| Light-Duty Diesel Trucks   |  | 714              | 0.02            | 0.5                    | 0.06             | 20                     | -                      | -                      | -                      | -                      | 732                    |
| Heavy-Duty Diesel Vehicles   |  | 9 210            | 0.4             | 10                     | 0.5              | 200                    | -                      | -                      | -                      | -                      | 9 370                  |
| Propane and Natural Gas Vehicles   |  | 92.2             | 0.1             | 3                      | 0.0              | 0.6                    | -                      | -                      | -                      | -                      | 95                     |
| Railways   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Domestic Navigation  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -                      | -                      | x                      |
| Other Transportation   |  | 14 400           | 4               | 90                     | 5                | 1 000                  | -                      | -                      | -                      | -                      | 16 000                 |
| Off-Road Gasoline  |  | 869              | 1               | 30                     | 0.02             | 6                      | -                      | -                      | -                      | -                      | 900                    |
| Off-Road Diesel  |  | 11 500           | 0.6             | 20                     | 5                | 1 000                  | -                      | -                      | -                      | -                      | 13 000                 |
| Pipeline Transport   |  | 2 070            | 2               | 51                     | 0.05             | 20                     | -                      | -                      | -                      | -                      | 2 140                  |
| <b>c. Fugitive Sources</b>   |  | <b>7 500</b>     | <b>1 200</b>    | <b>29 000</b>          | <b>0.07</b>      | <b>20</b>              | -                      | -                      | -                      | -                      | <b>37 000</b>          |
| Coal Mining  |  | -                | 10              | 300                    | -                | -                      | -                      | -                      | -                      | -                      | 300                    |
| Oil and Natural Gas  |  | 7 500            | 1 200           | 29 000                 | 0.07             | 20                     | -                      | -                      | -                      | -                      | 37 000                 |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>12 600</b>    | -               | -                      | <b>0.1</b>       | <b>29.3</b>            | <b>920</b>             | -                      | <b>3.6</b>             | -                      | <b>13 500</b>          |
| <b>a. Mineral Products</b>   |  | <b>1 200</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 200</b>           |
| Cement Production  |  | 900              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 900                    |
| Lime Production  |  | 106              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 106                    |
| Mineral Products Use   |  | 160              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 160                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Iron and Steel Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Aluminum Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                      | -                | -                      | <b>920</b>             | -                      | <b>3.6</b>             | -                      | <b>920</b>             |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>11 000</b>    | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>11 000</b>          |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>10</b>        | -               | -                      | <b>0.1</b>       | <b>29</b>              | -                      | -                      | -                      | -                      | <b>40</b>              |
| <b>AGRICULTURE</b>   |  | <b>1 000</b>     | <b>410</b>      | <b>10 000</b>          | <b>30</b>        | <b>7 000</b>           | -                      | -                      | -                      | -                      | <b>19 000</b>          |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>380</b>      | <b>9 600</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>9 600</b>           |
| <b>b. Manure Management</b>  |  | -                | <b>29</b>       | <b>720</b>             | <b>4.82</b>      | <b>1 440</b>           | -                      | -                      | -                      | -                      | <b>2 200</b>           |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                      | <b>20</b>        | <b>6 100</b>           | -                      | -                      | -                      | -                      | <b>6 100</b>           |
| Direct Sources   |  | -                | -               | -                      | 16               | 4 800                  | -                      | -                      | -                      | -                      | 4 800                  |
| Indirect Sources   |  | -                | -               | -                      | 4                | 1 000                  | -                      | -                      | -                      | -                      | 1 000                  |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | <b>0.03</b>     | <b>0.8</b>             | <b>0.0</b>       | <b>0.2</b>             | -                      | -                      | -                      | -                      | <b>1</b>               |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>800</b>       | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>800</b>             |
| <b>WASTE</b>   |  | <b>29</b>        | <b>85</b>       | <b>2 100</b>           | <b>0.3</b>       | <b>90</b>              | -                      | -                      | -                      | -                      | <b>2 300</b>           |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>84</b>       | <b>2 100</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>2 100</b>           |
| <b>b. Wastewater Handling</b>  |  | -                | <b>1.6</b>      | <b>40</b>              | <b>0.3</b>       | <b>80</b>              | -                      | -                      | -                      | -                      | <b>120</b>             |
| <b>c. Waste Incineration</b>   |  | <b>29</b>        | <b>0.0</b>      | <b>0.07</b>            | <b>0.06</b>      | <b>20</b>              | -                      | -                      | -                      | -                      | <b>46</b>              |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–20 1990–2013 GHG Emission Summary for British Columbia

| Greenhouse Gas Categories  |               |               |               |               |               |               |               |               |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|  | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013          |
| <i>kt CO<sub>2</sub> equivalent</i>  |               |               |               |               |               |               |               |               |
| <b>TOTAL</b>   | <b>51 900</b> | <b>64 900</b> | <b>64 400</b> | <b>60 700</b> | <b>60 200</b> | <b>60 500</b> | <b>61 900</b> | <b>62 800</b> |
| <b>ENERGY</b>  | <b>42 400</b> | <b>52 400</b> | <b>52 100</b> | <b>49 000</b> | <b>49 000</b> | <b>49 500</b> | <b>51 100</b> | <b>52 200</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>19 500</b> | <b>22 600</b> | <b>21 700</b> | <b>20 700</b> | <b>20 200</b> | <b>21 600</b> | <b>21 900</b> | <b>22 100</b> |
| Public Electricity and Heat Production   | 807           | 1 940         | 1 340         | 1 340         | 1 230         | 779           | 508           | 832           |
| Petroleum Refining Industries  | 1 200         | 420           | 500           | 580           | 630           | 520           | 570           | 520           |
| Mining and Upstream Oil and Gas Production   | 2 690         | 3 530         | 5 410         | 7 130         | 7 360         | 8 110         | 8 720         | 8 770         |
| Manufacturing Industries   | 6 520         | 7 850         | 6 360         | 4 040         | 4 060         | 4 180         | 4 290         | 4 430         |
| Construction   | 307           | 76.7          | 112           | 63.1          | 81.9          | 188           | 191           | 162           |
| Commercial and Institutional   | 2 850         | 3 460         | 3 030         | 2 760         | 2 510         | 2 830         | 2 820         | 2 590         |
| Residential  | 4 740         | 4 970         | 4 840         | 4 750         | 3 980         | 4 760         | 4 430         | 4 370         |
| Agriculture and Forestry   | 323           | 319           | 72.6          | 46.7          | 307           | 278           | 385           | 383           |
| <b>b. Transport<sup>1</sup></b>  | <b>18 800</b> | <b>24 200</b> | <b>25 100</b> | <b>23 400</b> | <b>24 000</b> | <b>22 500</b> | <b>23 900</b> | <b>24 800</b> |
| Domestic Aviation  | 1 300         | 1 600         | 1 600         | 1 300         | 1 200         | 1 100         | 1 300         | 1 300         |
| Road Transportation  | 11 500        | 14 800        | 15 500        | 15 700        | 15 600        | 15 300        | 14 700        | 15 900        |
| Light-Duty Gasoline Vehicles   | 3 770         | 4 420         | 4 200         | 4 140         | 3 970         | 3 640         | 3 610         | 3 880         |
| Light-Duty Gasoline Trucks   | 2 160         | 4 490         | 4 780         | 4 740         | 4 550         | 4 180         | 4 160         | 4 470         |
| Heavy-Duty Gasoline Vehicles   | 2 250         | 1 840         | 1 790         | 1 850         | 1 790         | 1 660         | 1 660         | 1 810         |
| Motorcycles  | 19.4          | 17.8          | 29.1          | 30            | 29            | 26.9          | 26.9          | 29.2          |
| Light-Duty Diesel Vehicles   | 34.7          | 51.3          | 64            | 78.8          | 83.5          | 81.6          | 84.9          | 93.7          |
| Light-Duty Diesel Trucks   | 40.5          | 72.7          | 59.1          | 63.5          | 63.9          | 59.3          | 59.8          | 64.2          |
| Heavy-Duty Diesel Vehicles   | 2 460         | 3 630         | 4 420         | 4 580         | 4 900         | 5 470         | 4 860         | 5 400         |
| Propane and Natural Gas Vehicles   | 790           | 330           | 190           | 210           | 220           | 210           | 210           | 180           |
| Railways   | 1 400         | 1 300         | 430           | 450           | 520           | 680           | 690           | 540           |
| Domestic Navigation  | 1 000         | 1 200         | 2 500         | 2 700         | 2 700         | 2 300         | 2 700         | 2 200         |
| Other Transportation   | 3 500         | 5 200         | 5 000         | 3 300         | 3 900         | 3 100         | 4 600         | 4 800         |
| Off-Road Gasoline  | 360           | 500           | 450           | 260           | 350           | 430           | 730           | 400           |
| Off-Road Diesel  | 2 300         | 3 000         | 3 600         | 2 200         | 2 700         | 1 800         | 3 100         | 3 400         |
| Pipeline Transport   | 863           | 1 670         | 998           | 876           | 843           | 813           | 806           | 936           |
| <b>c. Fugitive Sources</b>   | <b>4 100</b>  | <b>5 700</b>  | <b>5 300</b>  | <b>4 900</b>  | <b>4 900</b>  | <b>5 400</b>  | <b>5 200</b>  | <b>5 400</b>  |
| Coal Mining  | 800           | 800           | 1 000         | 800           | 900           | 900           | 1 000         | 1 000         |
| Oil and Natural Gas  | 3 300         | 4 900         | 4 400         | 4 200         | 3 900         | 4 500         | 4 200         | 4 300         |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>2 870</b>  | <b>4 670</b>  | <b>4 350</b>  | <b>3 980</b>  | <b>3 700</b>  | <b>3 450</b>  | <b>3 630</b>  | <b>3 440</b>  |
| <b>a. Mineral Products</b>   | <b>870</b>    | <b>1 400</b>  | <b>1 500</b>  | <b>1 100</b>  | <b>1 200</b>  | <b>1 200</b>  | <b>1 300</b>  | <b>1 200</b>  |
| Cement Production  | 650           | 1 100         | 1 300         | 910           | 990           | 990           | 1 100         | 980           |
| Lime Production  | 162           | 218           | 181           | 137           | 165           | 172           | 174           | 159           |
| Mineral Products Use   | 62            | 58            | 51            | 32            | 25            | 25            | 21            | 22            |
| <b>b. Chemical Industry<sup>2</sup></b>  | -             | -             | -             | -             | -             | -             | -             | -             |
| Adipic Acid Production   | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>c. Metal Production</b>   | <b>1 670</b>  | <b>2 030</b>  | <b>1 220</b>  | <b>1 250</b>  | <b>848</b>    | <b>848</b>    | <b>886</b>    | <b>759</b>    |
| Iron and Steel Production  | -             | -             | -             | -             | -             | -             | -             | -             |
| Aluminum Production  | 1 670         | 2 030         | 1 220         | 1 250         | 847           | 847           | 885           | 758           |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -             | 0.68          | 1.46          | 0.57          | 0.53          | 0.52          | 0.55          | 0.56          |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>57</b>     | <b>560</b>    | <b>820</b>    | <b>910</b>    | <b>930</b>    | <b>930</b>    | <b>990</b>    | <b>1 000</b>  |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>260</b>    | <b>630</b>    | <b>780</b>    | <b>710</b>    | <b>710</b>    | <b>450</b>    | <b>450</b>    | <b>460</b>    |
| <b>f. Other Product Manufacture and Use</b>  | <b>20</b>     | <b>57</b>     | <b>47</b>     | <b>33</b>     | <b>32</b>     | <b>34</b>     | <b>43</b>     | <b>39</b>     |
| <b>AGRICULTURE</b>   | <b>2 400</b>  | <b>2 700</b>  | <b>2 900</b>  | <b>2 300</b>  | <b>2 300</b>  | <b>2 300</b>  | <b>2 200</b>  | <b>2 300</b>  |
| <b>a. Enteric Fermentation</b>   | <b>1 400</b>  | <b>1 700</b>  | <b>1 800</b>  | <b>1 400</b>  | <b>1 400</b>  | <b>1 300</b>  | <b>1 300</b>  | <b>1 400</b>  |
| <b>b. Manure Management</b>  | <b>430</b>    | <b>510</b>    | <b>530</b>    | <b>470</b>    | <b>460</b>    | <b>460</b>    | <b>450</b>    | <b>460</b>    |
| <b>c. Agriculture Soils</b>  | <b>500</b>    | <b>450</b>    | <b>480</b>    | <b>430</b>    | <b>450</b>    | <b>440</b>    | <b>410</b>    | <b>470</b>    |
| Direct Sources   | 400           | 340           | 360           | 330           | 350           | 340           | 320           | 370           |
| Indirect Sources   | 100           | 100           | 100           | 100           | 100           | 100           | 90            | 100           |
| <b>d. Field Burning of Agricultural Residues</b>   | -             | -             | -             | -             | -             | -             | -             | -             |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>30</b>     | <b>40</b>     | <b>20</b>     | <b>10</b>     | <b>10</b>     | <b>30</b>     | <b>20</b>     | <b>20</b>     |
| <b>WASTE</b>   | <b>4 300</b>  | <b>5 100</b>  | <b>5 100</b>  | <b>5 400</b>  | <b>5 300</b>  | <b>5 300</b>  | <b>5 000</b>  | <b>4 800</b>  |
| <b>a. Solid Waste Disposal on Land</b>   | <b>4 100</b>  | <b>4 800</b>  | <b>4 900</b>  | <b>5 200</b>  | <b>5 100</b>  | <b>5 100</b>  | <b>4 800</b>  | <b>4 600</b>  |
| <b>b. Wastewater Handling</b>  | <b>96</b>     | <b>130</b>    | <b>130</b>    | <b>130</b>    | <b>140</b>    | <b>140</b>    | <b>140</b>    | <b>140</b>    |
| <b>c. Waste Incineration</b>   | <b>81</b>     | <b>87</b>     | <b>79</b>     | <b>70</b>     | <b>67</b>     | <b>66</b>     | <b>64</b>     | <b>62</b>     |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-21 2013 GHG Emission Summary for British Columbia

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                        |                        |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>        | NF <sub>3</sub>        | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>49 200</b>    | <b>400</b>      | <b>10 000</b>          | <b>7.1</b>       | <b>2 100</b>           | <b>980</b>             | <b>410</b>             | <b>42</b>              |                        | <b>62 800</b>          |
| <b>ENERGY</b>  |  | <b>47 200</b>    | <b>150</b>      | <b>3 700</b>           | <b>4</b>         | <b>1 000</b>           | -                      | -                      | -                      | -                      | <b>52 200</b>          |
| <b>a. Stationary Combustion Sources</b>  |  | <b>20 900</b>    | <b>30</b>       | <b>800</b>             | <b>1</b>         | <b>300</b>             | -                      | -                      | -                      | -                      | <b>22 100</b>          |
| Public Electricity and Heat Production   |  | 814              | 0.18            | 4.5                    | 0.05             | 10                     | -                      | -                      | -                      | -                      | 832                    |
| Petroleum Refining Industries  |  | 518              | 0.01            | 0.2                    | 0.0              | 0.9                    | -                      | -                      | -                      | -                      | 520                    |
| Mining and Upstream Oil and Gas Production   |  | 8 260            | 18              | 440                    | 0.2              | 70                     | -                      | -                      | -                      | -                      | 8 770                  |
| Manufacturing Industries   |  | 4 240            | 0.8             | 20                     | 0.6              | 200                    | -                      | -                      | -                      | -                      | 4 430                  |
| Construction   |  | 161              | 0.0             | 0.07                   | 0.0              | 1                      | -                      | -                      | -                      | -                      | 162                    |
| Commercial and Institutional   |  | 2 580            | 0.05            | 1.3                    | 0.05             | 20                     | -                      | -                      | -                      | -                      | 2 590                  |
| Residential  |  | 3 930            | 10              | 400                    | 0.2              | 70                     | -                      | -                      | -                      | -                      | 4 370                  |
| Agriculture and Forestry   |  | 381              | 0.01            | 0.18                   | 0.01             | 2.2                    | -                      | -                      | -                      | -                      | 383                    |
| <b>b. Transport<sup>1</sup></b>  |  | <b>23 700</b>    | <b>3</b>        | <b>70</b>              | <b>3</b>         | <b>1 000</b>           | -                      | -                      | -                      | -                      | <b>24 800</b>          |
| Domestic Aviation  |  | 1 310            | 0.07            | 2                      | 0.04             | 10                     | -                      | -                      | -                      | -                      | 1 300                  |
| Road Transportation  |  | 15 500           | 1               | 30                     | 1.3              | 400                    | -                      | -                      | -                      | -                      | 15 900                 |
| Light-Duty Gasoline Vehicles   |  | 3 760            | 0.31            | 7.8                    | 0.39             | 120                    | -                      | -                      | -                      | -                      | 3 880                  |
| Light-Duty Gasoline Trucks   |  | 4 320            | 0.34            | 8.6                    | 0.47             | 140                    | -                      | -                      | -                      | -                      | 4 470                  |
| Heavy-Duty Gasoline Vehicles   |  | 1 760            | 0.07            | 1.7                    | 0.15             | 44                     | -                      | -                      | -                      | -                      | 1 810                  |
| Motorcycles  |  | 28.7             | 0.01            | 0.34                   | 0.0              | 0.16                   | -                      | -                      | -                      | -                      | 29.2                   |
| Light-Duty Diesel Vehicles   |  | 91.4             | 0.0             | 0.05                   | 0.01             | 2                      | -                      | -                      | -                      | -                      | 93.7                   |
| Light-Duty Diesel Trucks   |  | 62.6             | 0.0             | 0.04                   | 0.01             | 2                      | -                      | -                      | -                      | -                      | 64.2                   |
| Heavy-Duty Diesel Vehicles   |  | 5 310            | 0.2             | 6                      | 0.3              | 90                     | -                      | -                      | -                      | -                      | 5 400                  |
| Propane and Natural Gas Vehicles   |  | 175              | 0.2             | 5                      | 0.0              | 1                      | -                      | -                      | -                      | -                      | 180                    |
| Railways   |  | 478              | 0.03            | 0.7                    | 0.2              | 60                     | -                      | -                      | -                      | -                      | 540                    |
| Domestic Navigation  |  | 2 100            | 0.2             | 4                      | 0.3              | 100                    | -                      | -                      | -                      | -                      | 2 200                  |
| Other Transportation   |  | 4 330            | 2               | 40                     | 1                | 400                    | -                      | -                      | -                      | -                      | 4 800                  |
| Off-Road Gasoline  |  | 382              | 0.5             | 10                     | 0.01             | 3                      | -                      | -                      | -                      | -                      | 400                    |
| Off-Road Diesel  |  | 3 040            | 0.2             | 4                      | 1                | 400                    | -                      | -                      | -                      | -                      | 3 400                  |
| Pipeline Transport   |  | 907              | 0.89            | 22                     | 0.02             | 7                      | -                      | -                      | -                      | -                      | 936                    |
| <b>c. Fugitive Sources</b>   |  | <b>2 600</b>     | <b>110</b>      | <b>2 800</b>           | <b>0.0</b>       | <b>1</b>               | -                      | -                      | -                      | -                      | <b>5 400</b>           |
| Coal Mining  |  | -                | 40              | 1 000                  | -                | -                      | -                      | -                      | -                      | -                      | 1 000                  |
| Oil and Natural Gas  |  | 2 600            | 68              | 1 700                  | 0.0              | 1                      | -                      | -                      | -                      | -                      | 4 300                  |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>1 980</b>     | -               | -                      | <b>0.11</b>      | <b>33.4</b>            | <b>980</b>             | <b>410</b>             | <b>42</b>              | -                      | <b>3 440</b>           |
| <b>a. Mineral Products</b>   |  | <b>1 200</b>     | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>1 200</b>           |
| Cement Production  |  | 980              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 980                    |
| Lime Production  |  | 159              | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 159                    |
| Mineral Products Use   |  | 22               | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | 22                     |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>c. Metal Production</b>   |  | <b>351</b>       | -               | -                      | -                | -                      | -                      | <b>407</b>             | <b>0.56</b>            | -                      | <b>759</b>             |
| Iron and Steel Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| Aluminum Production  |  | 351              | -               | -                      | -                | -                      | -                      | 407                    | 0.01                   | -                      | 758                    |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | 0.56                   | -                      | 0.56                   |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                      | -                | -                      | <b>980</b>             | -                      | <b>41</b>              | -                      | <b>1 000</b>           |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>460</b>       | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>460</b>             |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>5</b>         | -               | -                      | <b>0.11</b>      | <b>33</b>              | -                      | -                      | -                      | -                      | <b>39</b>              |
| <b>AGRICULTURE</b>   |  | -                | <b>64</b>       | <b>1 600</b>           | <b>2</b>         | <b>700</b>             | -                      | -                      | -                      | -                      | <b>2 300</b>           |
| <b>a. Enteric Fermentation</b>   |  | -                | <b>54</b>       | <b>1 400</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>1 400</b>           |
| <b>b. Manure Management</b>  |  | -                | <b>9.4</b>      | <b>230</b>             | <b>0.75</b>      | <b>224</b>             | -                      | -                      | -                      | -                      | <b>460</b>             |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                      | <b>1.6</b>       | <b>470</b>             | -                      | -                      | -                      | -                      | <b>470</b>             |
| Direct Sources   |  | -                | -               | -                      | 1.2              | 370                    | -                      | -                      | -                      | -                      | 370                    |
| Indirect Sources   |  | -                | -               | -                      | 0.3              | 100                    | -                      | -                      | -                      | -                      | 100                    |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | -                      |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | <b>20</b>        | -               | -                      | -                | -                      | -                      | -                      | -                      | -                      | <b>20</b>              |
| <b>WASTE</b>   |  | <b>54</b>        | <b>190</b>      | <b>4 700</b>           | <b>0.3</b>       | <b>90</b>              | -                      | -                      | -                      | -                      | <b>4 800</b>           |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>190</b>      | <b>4 600</b>           | -                | -                      | -                      | -                      | -                      | -                      | <b>4 600</b>           |
| <b>b. Wastewater Handling</b>  |  | -                | <b>2.1</b>      | <b>53</b>              | <b>0.3</b>       | <b>90</b>              | -                      | -                      | -                      | -                      | <b>140</b>             |
| <b>c. Waste Incineration</b>   |  | <b>54</b>        | -               | -                      | <b>0.03</b>      | <b>8</b>               | -                      | -                      | -                      | -                      | <b>62</b>              |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–22 1990–2013 GHG Emission Summary for Yukon

| Greenhouse Gas Categories  |             |             |             |             |             |             |             |             |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|  | 1990        | 2000        | 2005        | 2009        | 2010        | 2011        | 2012        | 2013        |
| <i>kt CO<sub>2</sub> equivalent</i>  |             |             |             |             |             |             |             |             |
| <b>TOTAL</b>   | <b>539</b>  | <b>507</b>  | <b>467</b>  | <b>353</b>  | <b>350</b>  | <b>390</b>  | <b>400</b>  | <b>358</b>  |
| <b>ENERGY</b>  | <b>536</b>  | <b>497</b>  | <b>453</b>  | <b>339</b>  | <b>334</b>  | <b>374</b>  | <b>383</b>  | <b>341</b>  |
| <b>a. Stationary Combustion Sources</b>  | <b>220</b>  | <b>249</b>  | <b>203</b>  | <b>133</b>  | <b>135</b>  | <b>153</b>  | <b>145</b>  | <b>117</b>  |
| Public Electricity and Heat Production   | 94.4        | 22.3        | 23.1        | 17.2        | 18.8        | 27.8        | 18.6        | 17.7        |
| Petroleum Refining Industries  | -           | -           | -           | -           | -           | -           | -           | -           |
| Mining and Upstream Oil and Gas Production   | 8.84        | 136         | 84.9        | 16.8        | 25.4        | 19.4        | 20.5        | 4.95        |
| Manufacturing Industries   | 6.03        | -           | -           | 17          | 14.8        | 14.8        | 14.5        | 15          |
| Construction   | 3.55        | 2.63        | 1.58        | 1.53        | 1.82        | 1.72        | 1.54        | 1.54        |
| Commercial and Institutional   | 77          | 51.4        | 35.3        | 54.4        | 43.1        | 60.7        | 64.3        | 56.9        |
| Residential  | 29.5        | 35.8        | 49.7        | 25.7        | 30.7        | 28.8        | 25.2        | 21          |
| Agriculture and Forestry   | 1.09        | 1.11        | 8.27        | -           | -           | -           | -           | -           |
| <b>b. Transport<sup>1</sup></b>  | <b>315</b>  | <b>240</b>  | <b>241</b>  | <b>196</b>  | <b>189</b>  | <b>209</b>  | <b>228</b>  | <b>224</b>  |
| Domestic Aviation  | 34          | 32          | 34          | 35          | 39          | 39          | 47          | 45          |
| Road Transportation  | 181         | 158         | 145         | 120         | 115         | 124         | 130         | 130         |
| Light-Duty Gasoline Vehicles   | 80.3        | 48.3        | 29          | 20          | 19.6        | 18.1        | 19.2        | 19.6        |
| Light-Duty Gasoline Trucks   | 30.7        | 38.1        | 31.2        | 21.6        | 21.1        | 19.6        | 20.9        | 21.3        |
| Heavy-Duty Gasoline Vehicles   | 10.1        | 6.47        | 4.97        | 3.53        | 3.52        | 3.29        | 3.54        | 3.63        |
| Motorcycles  | 0.51        | 0.33        | 0.27        | 0.2         | 0.2         | 0.18        | 0.2         | 0.2         |
| Light-Duty Diesel Vehicles   | 0.78        | 0.46        | 0.32        | 0.23        | 0.24        | 0.23        | 0.25        | 0.27        |
| Light-Duty Diesel Trucks   | 0.62        | 2.44        | x           | x           | x           | x           | x           | x           |
| Heavy-Duty Diesel Vehicles   | 56.2        | 60.8        | 76.3        | 72          | 67.7        | 79.5        | 83.4        | 82.2        |
| Propane and Natural Gas Vehicles   | 1.5         | 1.2         | x           | x           | x           | x           | x           | x           |
| Railways   | -           | -           | x           | x           | x           | x           | x           | x           |
| Domestic Navigation  | -           | -           | x           | x           | x           | x           | x           | x           |
| Other Transportation   | 100         | 50          | 61          | 42          | 35          | 47          | 50          | 49          |
| Off-Road Gasoline  | 11          | 12          | x           | x           | x           | x           | x           | x           |
| Off-Road Diesel  | 90          | 38          | 58          | 40          | 34          | x           | x           | x           |
| Pipeline Transport   | -           | -           | x           | x           | x           | x           | x           | x           |
| <b>c. Fugitive Sources</b>   | <b>-</b>    | <b>7.8</b>  | <b>10</b>   | <b>9.8</b>  | <b>11</b>   | <b>11</b>   | <b>10</b>   | <b>0.09</b> |
| Coal Mining  | -           | -           | -           | -           | -           | -           | -           | -           |
| Oil and Natural Gas  | -           | 7.8         | 10          | 9.8         | 11          | 11          | 10          | 0.09        |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>    |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>1.68</b> | <b>6.96</b> | <b>9.82</b> | <b>11.2</b> | <b>11.7</b> | <b>12.6</b> | <b>13.2</b> | <b>13.1</b> |
| <b>a. Mineral Products</b>   | <b>0.13</b> | <b>-</b>    | <b>-</b>    | <b>-</b>    | <b>-</b>    | <b>-</b>    | <b>0.0</b>  | <b>0.0</b>  |
| Cement Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| Lime Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| Mineral Products Use   | 0.13        | -           | -           | -           | -           | -           | 0.0         | 0.0         |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>    |
| Adipic Acid Production   | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>c. Metal Production</b>   | <b>-</b>    |
| Iron and Steel Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| Aluminum Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>-</b>    | <b>6.2</b>  | <b>9.2</b>  | <b>10</b>   | <b>11</b>   | <b>11</b>   | <b>12</b>   | <b>12</b>   |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>1.4</b>  | <b>0.35</b> | <b>0.28</b> | <b>0.56</b> | <b>0.85</b> | <b>1.1</b>  | <b>1.1</b>  | <b>0.42</b> |
| <b>f. Other Product Manufacture and Use</b>  | <b>0.17</b> | <b>0.43</b> | <b>0.36</b> | <b>0.25</b> | <b>0.25</b> | <b>0.28</b> | <b>0.37</b> | <b>0.34</b> |
| <b>AGRICULTURE</b>   | <b>-</b>    |
| <b>a. Enteric Fermentation</b>   | <b>-</b>    |
| <b>b. Manure Management</b>  | <b>-</b>    |
| <b>c. Agriculture Soils</b>  | <b>-</b>    |
| Direct Sources   | -           | -           | -           | -           | -           | -           | -           | -           |
| Indirect Sources   | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>-</b>    |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>-</b>    |
| <b>WASTE</b>   | <b>2</b>    | <b>2.8</b>  | <b>3.2</b>  | <b>3.5</b>  | <b>3.6</b>  | <b>3.7</b>  | <b>3.8</b>  | <b>3.9</b>  |
| <b>a. Solid Waste Disposal on Land</b>   | <b>0.74</b> | <b>1.4</b>  | <b>1.7</b>  | <b>1.9</b>  | <b>2</b>    | <b>2.1</b>  | <b>2.1</b>  | <b>2.2</b>  |
| <b>b. Wastewater Handling</b>  | <b>1.3</b>  | <b>1.5</b>  | <b>1.5</b>  | <b>1.6</b>  | <b>1.6</b>  | <b>1.7</b>  | <b>1.7</b>  | <b>1.7</b>  |
| <b>c. Waste Incineration</b>   | <b>-</b>    |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-23 2013 GHG Emission Summary for Yukon

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                              |                  |                               |                        |                        |                                  |                                  |                        |
|--|--|------------------|-----------------|------------------------------|------------------|-------------------------------|------------------------|------------------------|----------------------------------|----------------------------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>              | N <sub>2</sub> O | N <sub>2</sub> O              | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>                  | NF <sub>3</sub>                  | TOTAL                  |
| Unit   |  | kt               | kt              | 25<br>kt CO <sub>2</sub> eq. | kt               | 298<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | 22 800<br>kt CO <sub>2</sub> eq. | 17 200<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>332</b>       | <b>0.15</b>     | <b>3.7</b>                   | <b>0.03</b>      | <b>10</b>                     | <b>12</b>              | -                      | -                                | -                                | <b>358</b>             |
| <b>ENERGY</b>  |  | <b>331</b>       | <b>0.02</b>     | <b>0.51</b>                  | <b>0.03</b>      | <b>9</b>                      | -                      | -                      | -                                | -                                | <b>341</b>             |
| <b>a. Stationary Combustion Sources</b>  |  | <b>116</b>       | <b>0.0</b>      | <b>0.05</b>                  | <b>0.01</b>      | <b>1</b>                      | -                      | -                      | -                                | -                                | <b>117</b>             |
| Public Electricity and Heat Production   |  | 16.9             | 0.0             | 0.02                         | 0.0              | 0.8                           | -                      | -                      | -                                | -                                | 17.7                   |
| Petroleum Refining Industries  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Mining and Upstream Oil and Gas Production   |  | 4.85             | 0.0             | 0.0                          | 0.0              | 0.1                           | -                      | -                      | -                                | -                                | 4.95                   |
| Manufacturing Industries   |  | 15               | 0.0             | 0.0                          | 0.0              | 0.05                          | -                      | -                      | -                                | -                                | 15                     |
| Construction   |  | 1.53             | 0.0             | 0.0                          | 0.0              | 0.02                          | -                      | -                      | -                                | -                                | 1.54                   |
| Commercial and Institutional Residential   |  | 56.5             | 0.0             | 0.02                         | 0.0              | 0.4                           | -                      | -                      | -                                | -                                | 56.9                   |
| Residential  |  | 20.9             | 0.0             | 0.01                         | 0.0              | 0.1                           | -                      | -                      | -                                | -                                | 21                     |
| Agriculture and Forestry   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>b. Transport<sup>1</sup></b>  |  | <b>216</b>       | <b>0.01</b>     | <b>0.4</b>                   | <b>0.03</b>      | <b>8</b>                      | -                      | -                      | -                                | -                                | <b>224</b>             |
| Domestic Aviation  |  | 44.6             | 0.0             | 0.09                         | 0.0              | 0.4                           | -                      | -                      | -                                | -                                | 45                     |
| Road Transportation  |  | 128              | 0.01            | 0.2                          | 0.01             | 2.1                           | -                      | -                      | -                                | -                                | 130                    |
| Light-Duty Gasoline Vehicles   |  | 19.3             | 0.0             | 0.05                         | 0.0              | 0.33                          | -                      | -                      | -                                | -                                | 19.6                   |
| Light-Duty Gasoline Trucks   |  | 20.9             | 0.0             | 0.06                         | 0.0              | 0.33                          | -                      | -                      | -                                | -                                | 21.3                   |
| Heavy-Duty Gasoline Vehicles   |  | 3.54             | 0.0             | 0.0                          | 0.0              | 0.09                          | -                      | -                      | -                                | -                                | 3.63                   |
| Motorcycles  |  | 0.2              | 0.0             | 0.0                          | 0.0              | 0.0                           | -                      | -                      | -                                | -                                | 0.2                    |
| Light-Duty Diesel Vehicles   |  | 0.26             | 0.0             | 0.0                          | 0.0              | 0.01                          | -                      | -                      | -                                | -                                | 0.27                   |
| Light-Duty Diesel Trucks   |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Heavy-Duty Diesel Vehicles   |  | 80.9             | 0.0             | 0.08                         | 0.0              | 1                             | -                      | -                      | -                                | -                                | 82.2                   |
| Propane and Natural Gas Vehicles   |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Railways   |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Domestic Navigation  |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Other Transportation   |  | 43.4             | 0.0             | 0.07                         | 0.02             | 5                             | -                      | -                      | -                                | -                                | 49                     |
| Off-Road Gasoline  |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Off-Road Diesel  |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Pipeline Transport   |  | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| <b>c. Fugitive Sources</b>   |  | <b>0.0</b>       | <b>0.0</b>      | <b>0.09</b>                  | -                | -                             | -                      | -                      | -                                | -                                | <b>0.09</b>            |
| Coal Mining  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Oil and Natural Gas  |  | 0.0              | 0.0             | 0.09                         | -                | -                             | -                      | -                      | -                                | -                                | 0.09                   |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>0.5</b>       | -               | -                            | <b>0.0</b>       | <b>0.27</b>                   | <b>12</b>              | -                      | -                                | -                                | <b>13.1</b>            |
| <b>a. Mineral Products</b>   |  | <b>0.0</b>       | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>0.0</b>             |
| Cement Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Lime Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Mineral Products Use   |  | 0.0              | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | 0.0                    |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Adipic Acid Production   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Iron and Steel Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Aluminum Production  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                            | -                | -                             | <b>12</b>              | -                      | -                                | -                                | <b>12</b>              |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | <b>0.42</b>      | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>0.42</b>            |
| <b>f. Other Product Manufacture and Use</b>  |  | <b>0.07</b>      | -               | -                            | <b>0.0</b>       | <b>0.27</b>                   | -                      | -                      | -                                | -                                | <b>0.34</b>            |
| <b>AGRICULTURE</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>a. Enteric Fermentation</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>b. Manure Management</b>  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Direct Sources   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Indirect Sources   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>WASTE</b>   |  | -                | <b>0.13</b>     | <b>3.2</b>                   | <b>0.0</b>       | <b>0.7</b>                    | -                      | -                      | -                                | -                                | <b>3.9</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>0.09</b>     | <b>2.2</b>                   | -                | -                             | -                      | -                      | -                                | -                                | <b>2.2</b>             |
| <b>b. Wastewater Handling</b>  |  | -                | <b>0.04</b>     | <b>1</b>                     | <b>0.0</b>       | <b>0.7</b>                    | -                      | -                      | -                                | -                                | <b>1.7</b>             |
| <b>c. Waste Incineration</b>   |  | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's Fourth Assessment Report provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–24 1999–2013 GHG Emission Summary for Northwest Territories

| Greenhouse Gas Categories  |              |              |              |              |              |              |              |              |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|  | 1990         | 2000         | 2005         | 2009         | 2010         | 2011         | 2012         | 2013         |
| <i>kt CO<sub>2</sub> equivalent</i>  |              |              |              |              |              |              |              |              |
| <b>TOTAL</b>   | <b>1 230</b> | <b>1 500</b> | <b>1 660</b> | <b>1 240</b> | <b>1 360</b> | <b>1 430</b> | <b>1 560</b> | <b>1 460</b> |
| <b>ENERGY</b>  | <b>1 220</b> | <b>1 480</b> | <b>1 640</b> | <b>1 220</b> | <b>1 340</b> | <b>1 420</b> | <b>1 550</b> | <b>1 440</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>603</b>   | <b>863</b>   | <b>724</b>   | <b>657</b>   | <b>657</b>   | <b>634</b>   | <b>769</b>   | <b>710</b>   |
| Public Electricity and Heat Production   | 91.6         | 111          | 98.7         | 69.2         | 66.7         | x            | x            | x            |
| Petroleum Refining Industries  | -            | -            | -            | -            | -            | -            | -            | -            |
| Mining and Upstream Oil and Gas Production   | 235          | 469          | 381          | 364          | 402          | 370          | 451          | 388          |
| Manufacturing Industries   | -            | -            | x            | x            | x            | x            | x            | x            |
| Construction   | 0.83         | 0.28         | x            | x            | x            | x            | x            | x            |
| Commercial and Institutional   | 192          | 168          | 141          | 110          | 101          | 102          | 162          | 162          |
| Residential  | 83.9         | 114          | 101          | 114          | 87.7         | 95.6         | 88           | 91.5         |
| Agriculture and Forestry   | 0.02         | 0.13         | 1.54         | -            | -            | -            | -            | -            |
| <b>b. Transport<sup>1</sup></b>  | <b>605</b>   | <b>598</b>   | <b>898</b>   | <b>552</b>   | <b>672</b>   | <b>769</b>   | <b>755</b>   | <b>710</b>   |
| Domestic Aviation  | 130          | 150          | 240          | 140          | 120          | 120          | 140          | 130          |
| Road Transportation  | 225          | 221          | 254          | 212          | 188          | 243          | 229          | 204          |
| Light-Duty Gasoline Vehicles   | 39           | 39.5         | 25.3         | 36.1         | 37.6         | 38.2         | 38.9         | 32.4         |
| Light-Duty Gasoline Trucks   | 27.9         | 27.7         | 22.3         | 31.9         | 33.1         | 33.7         | 34.4         | 28.7         |
| Heavy-Duty Gasoline Vehicles   | 3.43         | 3.87         | 2.95         | 4.5          | 4.68         | 4.81         | 4.91         | 4.14         |
| Motorcycles  | 0.23         | 0.25         | 0.23         | 0.34         | 0.35         | 0.36         | 0.37         | 0.32         |
| Light-Duty Diesel Vehicles   | 0.38         | 0.42         | 0.3          | 0.48         | 0.51         | 0.53         | 0.56         | 0.48         |
| Light-Duty Diesel Trucks   | 1.44         | 1.68         | x            | x            | x            | x            | x            | x            |
| Heavy-Duty Diesel Vehicles   | 152          | 147          | 201          | 136          | 109          | 162          | 147          | 136          |
| Propane and Natural Gas Vehicles   | 1.1          | 0.58         | x            | x            | x            | x            | x            | x            |
| Railways   | 3.3          | 3.9          | x            | x            | x            | 9.7          | x            | x            |
| Domestic Navigation  | 4.5          | -            | x            | x            | x            | 0.3          | x            | x            |
| Other Transportation   | 250          | 230          | 400          | 200          | 360          | 390          | 370          | 360          |
| Off-Road Gasoline  | 23           | 28           | 16           | 23           | 20           | 19           | 27           | 17           |
| Off-Road Diesel  | 220          | 190          | 380          | 170          | 340          | 370          | 350          | 340          |
| Pipeline Transport   | 4.54         | 5.7          | 2.76         | 2.53         | 2.53         | 1.92         | 2.53         | 2.25         |
| <b>c. Fugitive Sources</b>   | <b>14</b>    | <b>21</b>    | <b>18</b>    | <b>14</b>    | <b>15</b>    | <b>14</b>    | <b>24</b>    | <b>20</b>    |
| Coal Mining  | -            | -            | -            | -            | -            | -            | -            | -            |
| Oil and Natural Gas  | 14           | 21           | 18           | 14           | 15           | 14           | 24           | 20           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>     |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>6.15</b>  | <b>8.6</b>   | <b>10.1</b>  | <b>9.37</b>  | <b>8.97</b>  | <b>9.43</b>  | <b>9.57</b>  | <b>10.3</b>  |
| <b>a. Mineral Products</b>   | <b>0.01</b>  | <b>0.04</b>  | <b>0.16</b>  | <b>0.07</b>  | <b>0.03</b>  | <b>0.04</b>  | <b>0.02</b>  | <b>0.02</b>  |
| Cement Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| Lime Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| Mineral Products Use   | 0.01         | 0.04         | 0.16         | 0.07         | 0.03         | 0.04         | 0.02         | 0.02         |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>     |
| Adipic Acid Production   | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>c. Metal Production</b>   | <b>-</b>     |
| Iron and Steel Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| Aluminum Production  | -            | -            | -            | -            | -            | -            | -            | -            |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>3.2</b>   | <b>3.9</b>   | <b>5.8</b>   | <b>6.7</b>   | <b>6.5</b>   | <b>6.6</b>   | <b>6.8</b>   | <b>7</b>     |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>2.4</b>   | <b>4.1</b>   | <b>3.6</b>   | <b>2.3</b>   | <b>2.1</b>   | <b>2.4</b>   | <b>2.3</b>   | <b>2.8</b>   |
| <b>f. Other Product Manufacture and Use</b>  | <b>0.53</b>  | <b>0.57</b>  | <b>0.49</b>  | <b>0.33</b>  | <b>0.32</b>  | <b>0.38</b>  | <b>0.49</b>  | <b>0.44</b>  |
| <b>AGRICULTURE</b>   | <b>-</b>     |
| <b>a. Enteric Fermentation</b>   | <b>-</b>     |
| <b>b. Manure Management</b>  | <b>-</b>     |
| <b>c. Agriculture Soils</b>  | <b>-</b>     |
| Direct Sources   | -            | -            | -            | -            | -            | -            | -            | -            |
| Indirect Sources   | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>-</b>     |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>-</b>     |
| <b>WASTE</b>   | <b>5.1</b>   | <b>5.2</b>   | <b>6</b>     | <b>6.3</b>   | <b>6.4</b>   | <b>6.5</b>   | <b>6.6</b>   | <b>6.7</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | <b>2.4</b>   | <b>2.5</b>   | <b>3.1</b>   | <b>3.4</b>   | <b>3.5</b>   | <b>3.5</b>   | <b>3.6</b>   | <b>3.7</b>   |
| <b>b. Wastewater Handling</b>  | <b>2.8</b>   | <b>2.8</b>   | <b>3</b>     | <b>2.9</b>   | <b>2.9</b>   | <b>2.9</b>   | <b>2.9</b>   | <b>3</b>     |
| <b>c. Waste Incineration</b>   | <b>-</b>     |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-25 2013 GHG Emission Summary for Northwest Territories

| Greenhouse Gas Categories  |      | Greenhouse Gases |                 |                              |                  |                               |                        |                        |                                  |                                  |                        |
|--|------|------------------|-----------------|------------------------------|------------------|-------------------------------|------------------------|------------------------|----------------------------------|----------------------------------|------------------------|
| Global Warming Potential   |      | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>              | N <sub>2</sub> O | N <sub>2</sub> O              | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub>                  | NF <sub>3</sub>                  | TOTAL                  |
| Unit   |      | kt               | kt              | 25<br>kt CO <sub>2</sub> eq. | kt               | 298<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | 22 800<br>kt CO <sub>2</sub> eq. | 17 200<br>kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |      | <b>1 370</b>     | <b>0.66</b>     | <b>17</b>                    | <b>0.2</b>       | <b>58</b>                     | <b>7</b>               | -                      | -                                | -                                | <b>1 460</b>           |
| <b>ENERGY</b>  |      | <b>1 370</b>     | <b>0.43</b>     | <b>11</b>                    | <b>0.2</b>       | <b>60</b>                     | -                      | -                      | -                                | -                                | <b>1 440</b>           |
| <b>a. Stationary Combustion Sources</b>  |      | <b>695</b>       | <b>0.02</b>     | <b>0.6</b>                   | <b>0.05</b>      | <b>10</b>                     | -                      | -                      | -                                | -                                | <b>710</b>             |
| Public Electricity and Heat Production   | x    | x                | x               | x                            | x                | x                             | -                      | -                      | -                                | -                                | x                      |
| Petroleum Refining Industries  | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Mining and Upstream Oil and Gas Production   | 378  | 0.02             | 0.43            | 0.03                         | 10               | -                             | -                      | -                      | -                                | -                                | 388                    |
| Manufacturing Industries   | x    | x                | x               | x                            | x                | -                             | -                      | -                      | -                                | -                                | x                      |
| Construction   | x    | x                | x               | x                            | x                | -                             | -                      | -                      | -                                | -                                | x                      |
| Commercial and Institutional   | 161  | 0.0              | 0.06            | 0.0                          | 1                | -                             | -                      | -                      | -                                | -                                | 162                    |
| Residential  | 91.1 | 0.0              | 0.03            | 0.0                          | 0.4              | -                             | -                      | -                      | -                                | -                                | 91.5                   |
| Agriculture and Forestry   | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>b. Transport<sup>1</sup></b>  |      | <b>665</b>       | <b>0.06</b>     | <b>1</b>                     | <b>0.1</b>       | <b>40</b>                     | -                      | -                      | -                                | -                                | <b>710</b>             |
| Domestic Aviation  | 131  | 0.01             | 0.3             | 0.0                          | 1                | -                             | -                      | -                      | -                                | -                                | 130                    |
| Road Transportation  | 201  | 0.01             | 0.3             | 0.01                         | 3.3              | -                             | -                      | -                      | -                                | -                                | 204                    |
| Light-Duty Gasoline Vehicles   | 31.8 | 0.0              | 0.09            | 0.0                          | 0.55             | -                             | -                      | -                      | -                                | -                                | 32.4                   |
| Light-Duty Gasoline Trucks   | 28.2 | 0.0              | 0.08            | 0.0                          | 0.43             | -                             | -                      | -                      | -                                | -                                | 28.7                   |
| Heavy-Duty Gasoline Vehicles   | 4.05 | 0.0              | 0.01            | 0.0                          | 0.08             | -                             | -                      | -                      | -                                | -                                | 4.14                   |
| Motorcycles  | 0.31 | 0.0              | 0.0             | 0.0                          | 0.0              | -                             | -                      | -                      | -                                | -                                | 0.32                   |
| Light-Duty Diesel Vehicles   | 0.47 | 0.0              | 0.0             | 0.0                          | 0.01             | -                             | -                      | -                      | -                                | -                                | 0.48                   |
| Light-Duty Diesel Trucks   | x    | x                | x               | x                            | x                | -                             | -                      | -                      | -                                | -                                | x                      |
| Heavy-Duty Diesel Vehicles   | 133  | 0.01             | 0.1             | 0.01                         | 2                | -                             | -                      | -                      | -                                | -                                | 136                    |
| Propane and Natural Gas Vehicles   | x    | x                | x               | x                            | x                | -                             | -                      | -                      | -                                | -                                | x                      |
| Railways   | x    | x                | x               | x                            | x                | -                             | -                      | -                      | -                                | -                                | x                      |
| Domestic Navigation  | x    | x                | x               | x                            | x                | -                             | -                      | -                      | -                                | -                                | x                      |
| Other Transportation   | 322  | 0.04             | 0.9             | 0.1                          | 40               | -                             | -                      | -                      | -                                | -                                | 360                    |
| Off-Road Gasoline  | 16.5 | 0.02             | 0.5             | 0.0                          | 0.1              | -                             | -                      | -                      | -                                | -                                | 17                     |
| Off-Road Diesel  | 304  | 0.02             | 0.4             | 0.1                          | 40               | -                             | -                      | -                      | -                                | -                                | 340                    |
| Pipeline Transport   | 2.15 | 0.0              | 0.0             | 0.0                          | 0.1              | -                             | -                      | -                      | -                                | -                                | 2.25                   |
| <b>c. Fugitive Sources</b>   |      | <b>11</b>        | <b>0.34</b>     | <b>8.6</b>                   | <b>0.0</b>       | <b>0.01</b>                   | -                      | -                      | -                                | -                                | <b>20</b>              |
| Coal Mining  | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Oil and Natural Gas  | 11   | 0.34             | 8.6             | 0.0                          | 0.01             | -                             | -                      | -                      | -                                | -                                | 20                     |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |      | <b>2.97</b>      | -               | -                            | <b>0.0</b>       | <b>0.32</b>                   | <b>7</b>               | -                      | -                                | -                                | <b>10.3</b>            |
| <b>a. Mineral Products</b>   |      | <b>0.02</b>      | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>0.02</b>            |
| Cement Production  | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Lime Production  | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Mineral Products Use   | 0.02 | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | 0.02                   |
| <b>b. Chemical Industry<sup>2</sup></b>  |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Adipic Acid Production   | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>c. Metal Production</b>   |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Iron and Steel Production  | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Aluminum Production  | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |      | -                | -               | -                            | -                | -                             | <b>7</b>               | -                      | -                                | -                                | <b>7</b>               |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |      | <b>2.8</b>       | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | <b>2.8</b>             |
| <b>f. Other Product Manufacture and Use</b>  |      | <b>0.1</b>       | -               | -                            | <b>0.0</b>       | <b>0.32</b>                   | -                      | -                      | -                                | -                                | <b>0.44</b>            |
| <b>AGRICULTURE</b>   |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>a. Enteric Fermentation</b>   |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>b. Manure Management</b>  |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>c. Agriculture Soils</b>  |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Direct Sources   | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| Indirect Sources   | -    | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>d. Field Burning of Agricultural Residues</b>   |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |
| <b>WASTE</b>   |      | -                | <b>0.23</b>     | <b>5.8</b>                   | <b>0.0</b>       | <b>0.8</b>                    | -                      | -                      | -                                | -                                | <b>6.7</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |      | -                | <b>0.15</b>     | <b>3.7</b>                   | -                | -                             | -                      | -                      | -                                | -                                | <b>3.7</b>             |
| <b>b. Wastewater Handling</b>  |      | -                | <b>0.09</b>     | <b>2.1</b>                   | <b>0.0</b>       | <b>0.8</b>                    | -                      | -                      | -                                | -                                | <b>3</b>               |
| <b>c. Waste Incineration</b>   |      | -                | -               | -                            | -                | -                             | -                      | -                      | -                                | -                                | -                      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–26 1999–2013 GHG Emission Summary for Nunavut

| Greenhouse Gas Categories  |             |             |             |             |             |             |             |             |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|  | 1990        | 2000        | 2005        | 2009        | 2010        | 2011        | 2012        | 2013        |
| <i>kt CO<sub>2</sub> equivalent</i>  |             |             |             |             |             |             |             |             |
| <b>TOTAL</b>   | <b>261</b>  | <b>382</b>  | <b>345</b>  | <b>433</b>  | <b>421</b>  | <b>227</b>  | <b>229</b>  | <b>221</b>  |
| <b>ENERGY</b>  | <b>256</b>  | <b>377</b>  | <b>338</b>  | <b>425</b>  | <b>414</b>  | <b>219</b>  | <b>221</b>  | <b>212</b>  |
| <b>a. Stationary Combustion Sources</b>  | <b>109</b>  | <b>92.9</b> | <b>133</b>  | <b>125</b>  | <b>125</b>  | <b>76.2</b> | <b>76.5</b> | <b>71.7</b> |
| Public Electricity and Heat Production   | 109         | 80.6        | 125         | 125         | 125         | x           | x           | x           |
| Petroleum Refining Industries  | -           | -           | -           | -           | -           | x           | x           | x           |
| Mining and Upstream Oil and Gas Production   | -           | 0.77        | 0.26        | x           | x           | -           | -           | -           |
| Manufacturing Industries   | -           | -           | x           | x           | x           | x           | x           | x           |
| Construction   | -           | -           | x           | x           | x           | x           | x           | x           |
| Commercial and Institutional   | -           | 6.17        | 8.22        | -           | -           | -           | -           | -           |
| Residential  | -           | 5.38        | -           | -           | -           | -           | -           | -           |
| Agriculture and Forestry   | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>b. Transport<sup>1</sup></b>  | <b>147</b>  | <b>284</b>  | <b>205</b>  | <b>300</b>  | <b>288</b>  | <b>143</b>  | <b>144</b>  | <b>140</b>  |
| Domestic Aviation  | 110         | 130         | 140         | 110         | 120         | 120         | 140         | 140         |
| Road Transportation  | 20.4        | 25.3        | 25.4        | 30          | 33.2        | 13.2        | 7.49        | 0.65        |
| Light-Duty Gasoline Vehicles   | 4.14        | 5.3         | 3.79        | 4.64        | 4.6         | -           | -           | -           |
| Light-Duty Gasoline Trucks   | 8.98        | 12.6        | 11.4        | 14          | 13.8        | -           | -           | -           |
| Heavy-Duty Gasoline Vehicles   | 0.14        | 0.19        | 0.19        | 0.28        | 0.31        | -           | -           | -           |
| Motorcycles  | 0.02        | 0.03        | 0.03        | 0.04        | 0.04        | -           | -           | -           |
| Light-Duty Diesel Vehicles   | 0.04        | 0.06        | 0.06        | 0.07        | 0.07        | -           | -           | -           |
| Light-Duty Diesel Trucks   | 0.49        | 0.72        | 0.75        | 0.87        | 0.88        | -           | -           | -           |
| Heavy-Duty Diesel Vehicles   | 5.48        | 5.87        | 8.6         | 9.64        | 12.8        | 12.4        | 6.84        | -           |
| Propane and Natural Gas Vehicles   | 1.1         | 0.58        | 0.65        | 0.46        | 0.65        | 0.77        | 0.65        | 0.65        |
| Railways   | -           | -           | x           | x           | x           | x           | x           | x           |
| Domestic Navigation  | -           | -           | x           | x           | x           | x           | x           | x           |
| Other Transportation   | 16          | 130         | 41          | 160         | 140         | 5.9         | -           | -           |
| Off-Road Gasoline  | -           | 2.2         | -           | 0.9         | 0.53        | -           | -           | -           |
| Off-Road Diesel  | 16          | 130         | 41          | 160         | 140         | x           | x           | x           |
| Pipeline Transport   | -           | -           | x           | x           | x           | x           | x           | x           |
| <b>c. Fugitive Sources</b>   | <b>-</b>    |
| Coal Mining  | -           | -           | -           | -           | -           | -           | -           | -           |
| Oil and Natural Gas  | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>    |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>1.41</b> | <b>1.67</b> | <b>2.38</b> | <b>2.78</b> | <b>2.79</b> | <b>3</b>    | <b>3.33</b> | <b>3.59</b> |
| <b>a. Mineral Products</b>   | <b>0.01</b> | <b>0.04</b> | <b>0.16</b> | <b>0.07</b> | <b>0.03</b> | <b>0.04</b> | <b>0.02</b> | <b>0.02</b> |
| Cement Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| Lime Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| Mineral Products Use   | 0.01        | 0.04        | 0.16        | 0.07        | 0.03        | 0.04        | 0.02        | 0.02        |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>    |
| Adipic Acid Production   | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>c. Metal Production</b>   | <b>-</b>    |
| Iron and Steel Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| Aluminum Production  | -           | -           | -           | -           | -           | -           | -           | -           |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>1</b>    | <b>1.2</b>  | <b>1.9</b>  | <b>2.5</b>  | <b>2.5</b>  | <b>2.7</b>  | <b>3</b>    | <b>3.3</b>  |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>-</b>    |
| <b>f. Other Product Manufacture and Use</b>  | <b>0.35</b> | <b>0.39</b> | <b>0.34</b> | <b>0.24</b> | <b>0.23</b> | <b>0.24</b> | <b>0.3</b>  | <b>0.26</b> |
| <b>AGRICULTURE</b>   | <b>-</b>    |
| <b>a. Enteric Fermentation</b>   | <b>-</b>    |
| <b>b. Manure Management</b>  | <b>-</b>    |
| <b>c. Agriculture Soils</b>  | <b>-</b>    |
| Direct Sources   | -           | -           | -           | -           | -           | -           | -           | -           |
| Indirect Sources   | -           | -           | -           | -           | -           | -           | -           | -           |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>-</b>    |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>-</b>    |
| <b>WASTE</b>   | <b>3.4</b>  | <b>3.6</b>  | <b>4.2</b>  | <b>4.8</b>  | <b>4.9</b>  | <b>5.1</b>  | <b>5.2</b>  | <b>5.4</b>  |
| <b>a. Solid Waste Disposal on Land</b>   | <b>1.6</b>  | <b>1.7</b>  | <b>2.2</b>  | <b>2.6</b>  | <b>2.7</b>  | <b>2.8</b>  | <b>2.9</b>  | <b>3</b>    |
| <b>b. Wastewater Handling</b>  | <b>1.8</b>  | <b>1.9</b>  | <b>2.1</b>  | <b>2.2</b>  | <b>2.3</b>  | <b>2.3</b>  | <b>2.3</b>  | <b>2.4</b>  |
| <b>c. Waste Incineration</b>   | <b>-</b>    |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10-27 2013 GHG Emission Summary for Nunavut

| Greenhouse Gas Categories  |  | Greenhouse Gases |                 |                        |                  |                        |                        |                        |                 |                 |                        |
|--|--|------------------|-----------------|------------------------|------------------|------------------------|------------------------|------------------------|-----------------|-----------------|------------------------|
| Global Warming Potential   |  | CO <sub>2</sub>  | CH <sub>4</sub> | CH <sub>4</sub>        | N <sub>2</sub> O | N <sub>2</sub> O       | HFCs <sup>4</sup>      | PFCs <sup>4</sup>      | SF <sub>6</sub> | NF <sub>3</sub> | TOTAL                  |
| Unit   |  | kt               | kt              | kt CO <sub>2</sub> eq. | kt               | kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | kt CO <sub>2</sub> eq. | 22 800          | 17 200          | kt CO <sub>2</sub> eq. |
| <b>TOTAL</b>   |  | <b>208</b>       | <b>0.2</b>      | <b>4.9</b>             | <b>0.02</b>      | <b>5.1</b>             | <b>3.3</b>             | -                      | -               | -               | <b>221</b>             |
| <b>ENERGY</b>  |  | <b>207</b>       | <b>0.01</b>     | <b>0.17</b>            | <b>0.01</b>      | <b>4</b>               | -                      | -                      | -               | -               | <b>212</b>             |
| <b>a. Stationary Combustion Sources</b>  |  | <b>68.6</b>      | <b>0.0</b>      | <b>0.08</b>            | <b>0.01</b>      | <b>3</b>               | -                      | -                      | -               | -               | <b>71.7</b>            |
| Public Electricity and Heat Production   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| Petroleum Refining Industries  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| Mining and Upstream Oil and Gas Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Manufacturing Industries   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| Construction   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| Commercial and Institutional   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Residential  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Agriculture and Forestry   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>b. Transport<sup>1</sup></b>  |  | <b>139</b>       | <b>0.0</b>      | <b>0.09</b>            | <b>0.0</b>       | <b>1</b>               | -                      | -                      | -               | -               | <b>140</b>             |
| Domestic Aviation  |  | 138              | 0.0             | 0.08                   | 0.0              | 1                      | -                      | -                      | -               | -               | 140                    |
| Road Transportation  |  | 0.64             | 0.0             | 0.01                   | 0.0              | 0.0                    | -                      | -                      | -               | -               | 0.65                   |
| Light-Duty Gasoline Vehicles   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Light-Duty Gasoline Trucks   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Heavy-Duty Gasoline Vehicles   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Motorcycles  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Light-Duty Diesel Vehicles   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Light-Duty Diesel Trucks   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Heavy-Duty Diesel Vehicles   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Propane and Natural Gas Vehicles   |  | 0.64             | 0.0             | 0.01                   | 0.0              | 0.0                    | -                      | -                      | -               | -               | 0.65                   |
| Railways   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| Domestic Navigation  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| Other Transportation   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Off-Road Gasoline  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Off-Road Diesel  |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| Pipeline Transport   |  | x                | x               | x                      | x                | x                      | -                      | -                      | -               | -               | x                      |
| <b>c. Fugitive Sources</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Coal Mining  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Oil and Natural Gas  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  |  | <b>0.02</b>      | -               | -                      | <b>0.0</b>       | <b>0.26</b>            | <b>3.3</b>             | -                      | -               | -               | <b>3.59</b>            |
| <b>a. Mineral Products</b>   |  | <b>0.02</b>      | -               | -                      | -                | -                      | -                      | -                      | -               | -               | <b>0.02</b>            |
| Cement Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Lime Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Mineral Products Use   |  | 0.02             | -               | -                      | -                | -                      | -                      | -                      | -               | -               | 0.02                   |
| <b>b. Chemical Industry<sup>2</sup></b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Adipic Acid Production   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>c. Metal Production</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Iron and Steel Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Aluminum Production  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> |  | -                | -               | -                      | -                | -                      | <b>3.3</b>             | -                      | -               | -               | <b>3.3</b>             |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>f. Other Product Manufacture and Use</b>  |  | -                | -               | -                      | <b>0.0</b>       | <b>0.26</b>            | -                      | -                      | -               | -               | <b>0.26</b>            |
| <b>AGRICULTURE</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>a. Enteric Fermentation</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>b. Manure Management</b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>c. Agriculture Soils</b>  |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Direct Sources   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| Indirect Sources   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>d. Field Burning of Agricultural Residues</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |
| <b>WASTE</b>   |  | -                | <b>0.19</b>     | <b>4.7</b>             | <b>0.0</b>       | <b>0.7</b>             | -                      | -                      | -               | -               | <b>5.4</b>             |
| <b>a. Solid Waste Disposal on Land</b>   |  | -                | <b>0.12</b>     | <b>3</b>               | -                | -                      | -                      | -                      | -               | -               | <b>3</b>               |
| <b>b. Wastewater Handling</b>  |  | -                | <b>0.07</b>     | <b>1.7</b>             | <b>0.0</b>       | <b>0.7</b>             | -                      | -                      | -               | -               | <b>2.4</b>             |
| <b>c. Waste Incineration</b>   |  | -                | -               | -                      | -                | -                      | -                      | -                      | -               | -               | -                      |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990-1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

4. IPCC's *Fourth Assessment Report* provides global warming potentials (GWPs) for the various species of HFCs and PFCs. Chapter 1, Table 1-1 of this report provides a list of GWPs used.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

Note that the 2013 estimates are based on preliminary energy data; these data, though the best available information at the time of publication, are subject to revision in the next submission year.

Table A10–28 1990–1998 GHG Emission Summary for Northwest Territories and Nunavut

| Greenhouse Gas Categories  |              |              |              |              |              |              |              |              |              |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|  | 1990         | 1991         | 1992         | 1993         | 1994         | 1995         | 1996         | 1997         | 1998         |
| <i>kt CO<sub>2</sub> equivalent</i>  |              |              |              |              |              |              |              |              |              |
| <b>TOTAL</b>   | <b>1 640</b> | <b>1 600</b> | <b>1 400</b> | <b>1 680</b> | <b>1 840</b> | <b>1 970</b> | <b>1 920</b> | <b>1 740</b> | <b>1 580</b> |
| <b>ENERGY</b>  | <b>1 630</b> | <b>1 580</b> | <b>1 390</b> | <b>1 650</b> | <b>1 730</b> | <b>1 880</b> | <b>1 910</b> | <b>1 720</b> | <b>1 560</b> |
| <b>a. Stationary Combustion Sources</b>  | <b>921</b>   | <b>991</b>   | <b>853</b>   | <b>950</b>   | <b>1 010</b> | <b>1 160</b> | <b>1 030</b> | <b>981</b>   | <b>740</b>   |
| Public Electricity and Heat Production   | 163          | 163          | 132          | 142          | 146          | 162          | 124          | 135          | 181          |
| Petroleum Refining Industries  | 7.5          | 5.8          | 7            | 5.1          | 12           | 10           | 4            | -            | -            |
| Mining and Upstream Oil and Gas Production   | 311          | 237          | 129          | 172          | 244          | 357          | 305          | 294          | 262          |
| Manufacturing Industries   | 25.8         | 16.3         | 18.4         | 8.33         | 13.5         | 20           | -            | -            | -            |
| Construction   | 5.72         | 5.29         | 5.68         | 3.15         | 3.74         | 20.6         | 0.68         | 0.7          | 0.53         |
| Commercial and Institutional   | 250          | 367          | 357          | 389          | 401          | 474          | 405          | 371          | 207          |
| Residential  | 155          | 188          | 192          | 229          | 188          | 117          | 195          | 181          | 88.7         |
| Agriculture and Forestry   | 2.48         | 8.99         | 12           | 2.04         | 2.04         | 0.01         | -            | 0.01         | 0.02         |
| <b>b. Transport<sup>1</sup></b>  | <b>616</b>   | <b>486</b>   | <b>448</b>   | <b>604</b>   | <b>659</b>   | <b>654</b>   | <b>819</b>   | <b>732</b>   | <b>814</b>   |
| Domestic Aviation  | 240          | 210          | 220          | 230          | 240          | 220          | 230          | 230          | 230          |
| Road Transportation  | 120          | 105          | 103          | 116          | 137          | 148          | 164          | 159          | 224          |
| Light-Duty Gasoline Vehicles   | 32.9         | 31.6         | 31.4         | 39.7         | 41.4         | 36.9         | 39.5         | 40           | 38.8         |
| Light-Duty Gasoline Trucks   | 14.2         | 14.6         | 15.4         | 20.6         | 23.6         | 22.7         | 25.9         | 29.3         | 28.9         |
| Heavy-Duty Gasoline Vehicles   | 4.69         | 3.91         | 3.56         | 4.29         | 3.72         | 3.57         | 3.8          | 3.53         | 3.51         |
| Motorcycles  | 0.21         | 0.2          | 0.2          | 0.25         | 0.26         | 0.23         | 0.26         | 0.27         | 0.23         |
| Light-Duty Diesel Vehicles   | 0.32         | 0.31         | 0.31         | 0.39         | 0.4          | 0.36         | 0.39         | 0.39         | 0.38         |
| Light-Duty Diesel Trucks   | 0.24         | 0.26         | 0.29         | 0.4          | 0.51         | 0.5          | 0.94         | 1.65         | 1.66         |
| Heavy-Duty Diesel Vehicles   | 66.2         | 52.6         | 49           | 47.6         | 60.9         | 79.8         | 90.5         | 81.2         | 148          |
| Propane and Natural Gas Vehicles   | 1.5          | 1.5          | 2.9          | 2.3          | 5.9          | 4            | 2.3          | 2.2          | 2.2          |
| Railways   | 2.6          | 2            | 2.1          | 2.2          | 1.5          | 2.5          | 1.2          | 2.7          | 2.4          |
| Domestic Navigation  | 0.15         | 0.24         | 0.59         | 0.51         | 0.11         | 71           | -            | -            | -            |
| Other Transportation   | 250          | 170          | 130          | 250          | 280          | 210          | 420          | 340          | 360          |
| Off-Road Gasoline  | 52           | 42           | 43           | 62           | 60           | 46           | 62           | 63           | 38           |
| Off-Road Diesel  | 200          | 130          | 83           | 190          | 220          | 170          | 360          | 280          | 320          |
| Pipeline Transport   | -            | -            | -            | -            | 2.3          | 0.14         | 0.09         | 0.04         | -            |
| <b>c. Fugitive Sources</b>   | <b>97</b>    | <b>100</b>   | <b>89</b>    | <b>94</b>    | <b>65</b>    | <b>65</b>    | <b>60</b>    | <b>12</b>    | <b>10</b>    |
| Coal Mining  | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| Oil and Natural Gas  | 97           | 100          | 89           | 94           | 65           | 65           | 60           | 12           | 10           |
| <b>d. CO<sub>2</sub> Transport and Storage</b>   | <b>-</b>     |
| <b>INDUSTRIAL PROCESSES AND PRODUCT USE</b>  | <b>3.4</b>   | <b>11.7</b>  | <b>2.53</b>  | <b>24.7</b>  | <b>104</b>   | <b>85.7</b>  | <b>1.98</b>  | <b>2.73</b>  | <b>2.99</b>  |
| <b>a. Mineral Products</b>   | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>0.02</b>  | <b>0.02</b>  | <b>0.04</b>  | <b>-</b>     | <b>-</b>     |
| Cement Production  | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| Lime Production  | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| Mineral Products Use   | -            | -            | -            | -            | 0.02         | 0.02         | 0.04         | -            | -            |
| <b>b. Chemical Industry<sup>2</sup></b>  | <b>-</b>     |
| Adipic Acid Production   | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>c. Metal Production</b>   | <b>-</b>     |
| Iron and Steel Production  | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| Aluminum Production  | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| SF <sub>6</sub> Used in Magnesium Smelters and Casters   | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>d. Production and Consumption of Halocarbons, SF<sub>6</sub> and NF<sub>3</sub><sup>3</sup></b> | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>-</b>     | <b>0.7</b>   | <b>1.3</b>   | <b>1.9</b>   | <b>2.1</b>   |
| <b>e. Non-Energy Products from Fuels and Solvent Use</b>   | <b>3</b>     | <b>11</b>    | <b>2.2</b>   | <b>24</b>    | <b>100</b>   | <b>85</b>    | <b>0.2</b>   | <b>0.37</b>  | <b>0.03</b>  |
| <b>f. Other Product Manufacture and Use</b>  | <b>0.37</b>  | <b>0.36</b>  | <b>0.3</b>   | <b>0.34</b>  | <b>0.38</b>  | <b>0.46</b>  | <b>0.47</b>  | <b>0.5</b>   | <b>0.86</b>  |
| <b>AGRICULTURE</b>   | <b>-</b>     |
| <b>a. Enteric Fermentation</b>   | <b>-</b>     |
| <b>b. Manure Management</b>  | <b>-</b>     |
| <b>c. Agriculture Soils</b>  | <b>-</b>     |
| Direct Sources   | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| Indirect Sources   | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| <b>d. Field Burning of Agricultural Residues</b>   | <b>-</b>     |
| <b>e. Liming, Urea Application and Other Carbon-containing Fertilizers</b>                         | <b>-</b>     |
| <b>WASTE</b>   | <b>5.9</b>   | <b>6.2</b>   | <b>6.5</b>   | <b>6.8</b>   | <b>7.1</b>   | <b>7.4</b>   | <b>7.7</b>   | <b>8</b>     | <b>8.2</b>   |
| <b>a. Solid Waste Disposal on Land</b>   | <b>2</b>     | <b>2.2</b>   | <b>2.3</b>   | <b>2.5</b>   | <b>2.7</b>   | <b>2.9</b>   | <b>3.2</b>   | <b>3.4</b>   | <b>3.7</b>   |
| <b>b. Wastewater Handling</b>  | <b>3.9</b>   | <b>4.1</b>   | <b>4.2</b>   | <b>4.2</b>   | <b>4.4</b>   | <b>4.5</b>   | <b>4.5</b>   | <b>4.6</b>   | <b>4.6</b>   |
| <b>c. Waste Incineration</b>   | <b>-</b>     |

## Notes:

1. Emissions from ethanol and biodiesel are included in the Transport categories using gasoline and diesel respectively.

2. Emissions from the Ammonia Production, Nitric Acid Production and Petrochemical Production categories are included in Non-Energy Products from Fuels and Solvent Use within the provincial/territorial tables as CO<sub>2</sub> eq values.

3. Emission estimates from consumption of PFCs and NF<sub>3</sub>, as well as emissions of SF<sub>6</sub> from semi-conductor manufacturing, are only available at the national level. HFC and PFC consumption began in 1995; HFC emissions occurring as a by-product of HCFC production (HCFC-22 exclusively) only occurred in Canada from 1990–1992 and PFC emissions prior to 1995 are the result of by-product CF<sub>4</sub> emissions from the use of NF<sub>3</sub>.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

x Indicates data has been suppressed to respect confidentiality

# Annex 11

## Electricity in Canada: Summary and Intensity Tables

This annex presents detailed greenhouse gas (GHG) information related to the generation of electricity by the Public Electricity and Heat Production category (IPCC Category 1.A.1.a), on a national and provincial level.

The Canadian electricity generation industry produces electricity by transforming the energy in falling water, coal, natural gas, refined petroleum products (RPPs), other miscellaneous fuels, biomass, nuclear, wind and solar resources. The process of supplying electricity to the public involves not only power generation at the plant, but also distribution through the electricity grid. The efficiency of the transmission system has an impact on the amount of electricity available to consumers. GHG emission estimates and electricity generation values are therefore based on activities that occur at the generating plant, and efforts have been made to include the impact of the transmission and distribution infrastructure (including sulphur hexafluoride (SF<sub>6</sub>) emissions associated with switchgear and other electrical equipment, which is accounted for in the Industrial Processes and Product Use Sector).

The electricity generation industry in Canada is composed of entities whose main activity is the production of electricity (main activity producers) and those who generate either partially or wholly for their own use (autoproducers). Main activity producers sell their electricity to the grid, and can be either public or private generators. Autoproducers are generally private companies that are generating electricity either to feed their operations or as a by-product of their operation. They may sell some or all of their electricity to the grid.

The analysis in this section only includes main activity producers. This analysis relies on a variety of data sources; fuel consumption and electricity production data are published by Statistics Canada in the *Report on Energy Supply and Demand in Canada* (RES<sub>D</sub>) (Statistics Canada 57-003-X), in the publication *Electric Power Generation, Transmission and Distribution* (EPG<sub>TD</sub>) (Statistics Canada 57-202-X) and online via CANSIM (Tables 127-0006, 127-0007 and 127-0008).

Electricity generation intensity values were derived for each fuel type using GHG emission estimates and electricity generation data. The methodology used to develop the GHG emissions is discussed in Chapter 3 and Annex 3.1 of this report. GHG emissions are based on the total fuel consumed by the public utility sector, as provided in the RES<sub>D</sub>,<sup>1</sup> while generation data are from CANSIM (2005–2013) and the EPG<sub>TD</sub> publication (1990–2004).

A “consumption intensity” indicator was also derived to reflect the GHG emissions intensity of electricity as it is delivered to the consumer, as opposed to deliveries to the electricity grid as in the case of the generation intensity indicator. Accordingly, electric energy losses in transmission and distribution are subtracted from overall total electricity generation, while SF<sub>6</sub> emissions associated with equipment used in electricity transmission and distribution are added to overall total GHG emissions. The electric energy losses in transmission and distribution are taken to be the utility sector’s share of “unallocated energy,” as presented in Table A11–1 to Table A11–13 and calculated from data provided by CANSIM 127-0008. Likewise, the SF<sub>6</sub> emission values are based on the electric utility sector’s share of total SF<sub>6</sub> emissions from equipment used in electricity transmission and distribution.

Electricity intensity values for Canada, the provinces and the territories are provided in Table A11–1 to Table A11–13.

---

<sup>1</sup> Occasionally, Statistics Canada revises some of its historic data, which can affect the values provided in Table A11–1 to Table A11–13.

Table A11–1 Electricity Generation and GHG Emission Details for Canada<sup>1</sup>

|   | 1990           | 2000           | 2005           | 2009           | 2010           | 2011           | 2012           | 2013 <sup>2</sup> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |                |                |                |                |                |                |                |                   |
| <i>kt CO<sub>2</sub> eq</i>   |                |                |                |                |                |                |                |                   |
| <b>Combustion</b>   | <b>94 700</b>  | <b>132 000</b> | <b>127 000</b> | <b>102 300</b> | <b>103 000</b> | <b>95 600</b>  | <b>89 700</b>  | <b>88 300</b>     |
| Coal  | 80 500         | 108 000        | 97 400         | 77 800         | 78 700         | 68 600         | 63 300         | 63 800            |
| Natural Gas   | 2 720          | 13 800         | 15 300         | 14 900         | 18 600         | 21 700         | 21 500         | 19 400            |
| Other Fuels <sup>4</sup>  | 11 500         | 10 490         | 14 100         | 9 630          | 5 870          | 5 310          | 4 930          | 5 070             |
| <b>Other Emissions<sup>5</sup></b>                                    | –              | <b>27.3</b>    | <b>52</b>      | <b>73</b>      | <b>54</b>      | <b>61</b>      | <b>82</b>      | <b>63</b>         |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>94 700</b>  | <b>132 000</b> | <b>127 000</b> | <b>102 000</b> | <b>103 000</b> | <b>95 700</b>  | <b>89 800</b>  | <b>88 300</b>     |
| <b>Electricity Generation<sup>8,9</sup></b>                           |                |                |                |                |                |                |                |                   |
| <i>GWh</i>  |                |                |                |                |                |                |                |                   |
| <b>Combustion</b>   | <b>101 000</b> | <b>146 000</b> | <b>140 000</b> | <b>113 000</b> | <b>117 000</b> | <b>119 000</b> | <b>107 000</b> | <b>104 000</b>    |
| Coal  | 82 200         | 106 000        | 93 900         | 73 600         | 74 300         | 70 200         | 60 200         | 60 900            |
| Natural Gas   | 4 140          | 26 600         | 29 800         | 28 400         | 33 600         | 41 500         | 39 400         | 35 600            |
| Other Fuels   | 14 800         | 13 400         | 16 700         | 11 000         | 8 650          | 7 170          | 7 140          | 7 900             |
| Refined Petroleum Products  | 14 700         | 10 600         | 10 800         | 5 400          | 3 010          | 2 310          | 2 320          | 2 150             |
| Biomass   | 14.4           | 1 830          | 1 780          | 2 080          | 2 310          | 2 150          | 1 990          | 2 050             |
| Other   | 91             | 960            | 4 100          | 3 500          | 3 300          | 2 700          | 2 800          | 3 700             |
| <b>Steam from Waste Heat</b>  | –              | –              | <b>32.4</b>    | <b>5 520</b>   | <b>7 090</b>   | <b>6 440</b>   | <b>7 530</b>   | <b>7 110</b>      |
| <b>Nuclear</b>  | <b>68 800</b>  | <b>68 700</b>  | <b>86 800</b>  | <b>85 000</b>  | <b>85 500</b>  | <b>88 300</b>  | <b>89 500</b>  | <b>82 400</b>     |
| <b>Hydro</b>  | <b>263 000</b> | <b>323 000</b> | <b>327 000</b> | <b>334 000</b> | <b>321 000</b> | <b>342 000</b> | <b>345 000</b> | <b>357 000</b>    |
| <b>Other Renewables<sup>10</sup></b>                                  | <b>26.2</b>    | <b>264</b>     | <b>1 580</b>   | <b>6 610</b>   | <b>8 780</b>   | <b>10 370</b>  | <b>11 500</b>  | <b>11 800</b>     |
| <b>Other Generation<sup>11</sup></b>                                  | –              | –              | –              | <b>1 920</b>   | <b>2 980</b>   | <b>2 510</b>   | <b>2 720</b>   | <b>2 440</b>      |
| <b>Overall Total<sup>7</sup></b>                                      | <b>433 000</b> | <b>539 000</b> | <b>556 000</b> | <b>546 000</b> | <b>542 000</b> | <b>568 000</b> | <b>563 000</b> | <b>565 000</b>    |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |                |                |                |                |                |                |                |                   |
| <i>g GHG / kWh electricity generated</i>                              |                |                |                |                |                |                |                |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>220</b>     | <b>240</b>     | <b>220</b>     | <b>180</b>     | <b>190</b>     | <b>170</b>     | <b>160</b>     | <b>150</b>        |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.004</b>   | <b>0.009</b>   | <b>0.01</b>    | <b>0.009</b>   | <b>0.01</b>    | <b>0.01</b>    | <b>0.01</b>    | <b>0.01</b>       |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.004</b>   | <b>0.005</b>   | <b>0.005</b>   | <b>0.004</b>   | <b>0.004</b>   | <b>0.003</b>   | <b>0.003</b>   | <b>0.003</b>      |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>220</b>     | <b>240</b>     | <b>220</b>     | <b>180</b>     | <b>190</b>     | <b>170</b>     | <b>160</b>     | <b>150</b>        |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>31 000</b>  | <b>42 000</b>  | <b>37 000</b>  | <b>57 000</b>  | <b>52 000</b>  | <b>57 000</b>  | <b>46 000</b>  | <b>29 000</b>     |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | <b>200</b>     | <b>200</b>     | <b>160</b>     | <b>180</b>     | <b>180</b>     | <b>140</b>     | <b>180</b>     | <b>210</b>        |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>240</b>     | <b>260</b>     | <b>240</b>     | <b>210</b>     | <b>210</b>     | <b>190</b>     | <b>170</b>     | <b>160</b>        |

## Notes:

1. Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
2. Preliminary data.
3. Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
4. Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
5. GHG emissions from on-site combustion of fuel not directly related to electricity generation.
6. GHG emissions from the flooding of land for hydro dams are not included.
7. Totals may not add up to overall total due to rounding.
8. Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
9. Taken from the *Electric Power Generation, Transmission and Distribution* (EPGTD) publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
10. Other Renewables - includes electricity generation by wind, tidal and solar.
11. NAICS category 221119, Other Electric Power Generation.
12. Intensity values have been rounded so as to present the estimated level of accuracy.
13. Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
14. Includes transmission line losses, metering differences and other losses.
15. The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
16. Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1

Table A11-2 Electricity Generation and GHG Emission Details for Newfoundland and Labrador<sup>1</sup>

|   | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013 <sup>2</sup> |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>kt CO<sub>2</sub> eq</i>   |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | 1 650         | 823           | 865           | 829           | 747           | 866           | 851           | 866               |
| Coal  | -             | -             | -             | -             | -             | -             | -             | -                 |
| Natural Gas   | -             | -             | -             | -             | -             | -             | -             | -                 |
| Other Fuels <sup>4</sup>  | 1 650         | 823           | 865           | 829           | 747           | 866           | 851           | 866               |
| <b>Other Emissions<sup>5</sup></b>                                    | -             | -             | -             | -             | -             | -             | -             | -                 |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>1 650</b>  | <b>823</b>    | <b>865</b>    | <b>829</b>    | <b>747</b>    | <b>866</b>    | <b>851</b>    | <b>866</b>        |
| <b>Electricity Generation<sup>8,9</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>GWh</i>  |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | 2 090         | 1 020         | 1 360         | 1 060         | 916           | 1 009         | 970           | 1 090             |
| Coal  | -             | -             | -             | -             | -             | -             | -             | -                 |
| Natural Gas   | -             | -             | -             | -             | -             | -             | -             | -                 |
| Other Fuels   | 2 090         | 1 020         | 1 360         | 1 060         | 916           | 1 009         | 970           | 1 090             |
| <b>Steam from Waste Heat</b>  | -             | -             | -             | -             | -             | -             | -             | -                 |
| <b>Nuclear</b>  | -             | -             | -             | -             | -             | -             | -             | -                 |
| <b>Hydro</b>  | 34 300        | 41 800        | 38 900        | 35 900        | 39 400        | 39 100        | 41 300        | 40 500            |
| <b>Other Renewables<sup>10</sup></b>                                  | 0             | -             | -             | 102           | 183           | 198           | 195           | 192               |
| <b>Other Generation<sup>11</sup></b>                                  | -             | -             | -             | -             | -             | -             | -             | -                 |
| <b>Overall Total<sup>7</sup></b>                                      | <b>36 400</b> | <b>42 800</b> | <b>40 300</b> | <b>37 100</b> | <b>40 500</b> | <b>40 300</b> | <b>42 500</b> | <b>41 800</b>     |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |               |               |               |               |               |               |               |                   |
| <i>g GHG / kWh electricity generated</i>                              |               |               |               |               |               |               |               |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | 45            | 19            | 21            | 22            | 18            | 21            | 20            | 21                |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | 0.0006        | 0.0002        | 0.0003        | 0.0003        | 0.0003        | 0.0004        | 0.0003        | 0.0003            |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | 0.001         | 0.0005        | 0.001         | 0.001         | 0.001         | 0.001         | 0.001         | 0.0               |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | 45            | 19            | 21            | 22            | 18            | 21            | 20            | 21                |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | 990           | 1300          | 810           | 1100          | 1300          | 1300          | 1300          | 1400              |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | 0.94          | 0.92          | 0.50          | 0.92          | 0.54          | 0.83          | 1.0           | 1.4               |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>46</b>     | <b>20</b>     | <b>22</b>     | <b>23</b>     | <b>19</b>     | <b>22</b>     | <b>21</b>     | <b>21</b>         |

## Notes:

1. Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
2. Preliminary data.
3. Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
4. Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
5. GHG emissions from on-site combustion of fuel not directly related to electricity generation.
6. GHG emissions from the flooding of land for hydro dams are not included.
7. Totals may not add up to overall total due to rounding.
8. Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
9. Taken from the *Electric Power Generation, Transmission and Distribution* (EPGTD) publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
10. Other Renewables - includes electricity generation by wind, tidal and solar.
11. NAICS category 221119, Other Electric Power Generation.
12. Intensity values have been rounded so as to present the estimated level of accuracy.
13. Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
14. Includes transmission line losses, metering differences and other losses.
15. The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
16. Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1

Table A11–3 Electricity Generation and GHG Emission Details for Prince Edward Island<sup>1</sup>

|   | 1990        | 2000        | 2005        | 2009        | 2010        | 2011        | 2012        | 2013 <sup>2</sup> |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |             |             |             |             |             |             |             |                   |
| <i>kt CO<sub>2</sub> eq</i>   |             |             |             |             |             |             |             |                   |
| <b>Combustion</b>   | 104         | 53.0        | 4.76        | 6.04        | 1.59        | 1.23        | 10.8        | 3.9               |
| Coal  | –           | –           | –           | –           | –           | –           | –           | –                 |
| Natural Gas   | –           | –           | –           | –           | –           | –           | –           | –                 |
| Other Fuels <sup>4</sup>  | 104         | 53.0        | 4.76        | 6.04        | 1.59        | 1.23        | 10.8        | 3.9               |
| <b>Other Emissions<sup>5</sup></b>                                    | –           | –           | –           | –           | –           | –           | –           | –                 |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>104</b>  | <b>53.0</b> | <b>4.76</b> | <b>6.04</b> | <b>1.59</b> | <b>1.23</b> | <b>10.8</b> | <b>3.9</b>        |
| <b>Electricity Generation<sup>8,9</sup></b>                           |             |             |             |             |             |             |             |                   |
| <i>GWh</i>  |             |             |             |             |             |             |             |                   |
| <b>Combustion</b>   | 81.1        | 48.1        | 6.31        | 7.32        | 3.78        | 4.81        | 14.5        | 8.2               |
| Coal  | –           | –           | –           | –           | –           | –           | –           | –                 |
| Natural Gas   | –           | –           | –           | –           | –           | –           | –           | –                 |
| Other Fuels   | 81.1        | 48.1        | 6.31        | 7.32        | 3.78        | 4.81        | 14.5        | 8.2               |
| <b>Steam from Waste Heat</b>  | –           | –           | –           | –           | –           | –           | –           | –                 |
| <b>Nuclear</b>  | –           | –           | –           | –           | –           | –           | –           | –                 |
| <b>Hydro</b>  | –           | –           | –           | –           | –           | –           | –           | –                 |
| <b>Other Renewables<sup>10</sup></b>                                  | –           | –           | 40.1        | 347         | 458         | 488         | 468         | 499               |
| <b>Other Generation<sup>11</sup></b>                                  | –           | –           | –           | –           | –           | –           | –           | –                 |
| <b>Overall Total<sup>7</sup></b>                                      | <b>81.1</b> | <b>48.1</b> | <b>46.4</b> | <b>355</b>  | <b>461</b>  | <b>492</b>  | <b>482</b>  | <b>507</b>        |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |             |             |             |             |             |             |             |                   |
| <i>g GHG / kWh electricity generated</i>                              |             |             |             |             |             |             |             |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | 1 300       | 1 100       | 100         | 17          | 3.4         | 2.5         | 22          | 8                 |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | 0.02        | 0.01        | 0.001       | 0.0002      | 0.00004     | 0.00006     | 0.0005      | 0.0002            |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | 0.03        | 0.02        | 0.002       | 0.0003      | 0.0001      | 0.0001      | 0.0004      | 0.0001            |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | 1 300       | 1 100       | 100         | 17          | 3.4         | 2.5         | 22          | 8                 |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | unk         | unk         | unk         | 22          | 8.6         | 21          | 20          | 20                |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | 0           | 0           | –           | –           | –           | 0           | 0           | 0                 |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | *           | *           | *           | *           | *           | *           | *           | *                 |

## Notes:

- Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
- Preliminary data.
- Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
- Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
- GHG emissions from on-site combustion of fuel not directly related to electricity generation.
- GHG emissions from the flooding of land for hydro dams are not included.
- Totals may not add up to overall total due to rounding.
- Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
- Taken from the *Electric Power Generation, Transmission and Distribution (EPGTD)* publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
- Other Renewables - includes electricity generation by wind, tidal and solar.
- NAICS category 221119, Other Electric Power Generation.
- Intensity values have been rounded so as to present the estimated level of accuracy.
- Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
- Includes transmission line losses, metering differences and other losses.
- The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
- Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - unk Indicates unknown as appropriate data were unavailable
  - \* Due to the high level of imports from New Brunswick, values for New Brunswick are more indicative of GHG consumption intensity.

Table A11-4 Electricity Generation and GHG Emission Details for Nova Scotia<sup>1</sup>

|   | 1990         | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013 <sup>2</sup> |
|---|--------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |              |               |               |               |               |               |               |                   |
| <i>kt CO<sub>2</sub> eq</i>   |              |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>6 940</b> | <b>9 670</b>  | <b>11 000</b> | <b>9 770</b>  | <b>8 860</b>  | <b>8 520</b>  | <b>7 680</b>  | <b>7 310</b>      |
| Coal  | x            | 8 260         | 5 470         | 6 750         | 6 410         | 6 170         | 5 170         | 5 160             |
| Natural Gas   | -            | -             | x             | x             | x             | x             | x             | x                 |
| Other Fuels <sup>4</sup>  | x            | 1 420         | x             | x             | x             | x             | x             | x                 |
| <b>Other Emissions<sup>5</sup></b>                                    | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>          |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>6 940</b> | <b>9 670</b>  | <b>11 000</b> | <b>9 770</b>  | <b>8 860</b>  | <b>8 520</b>  | <b>7 680</b>  | <b>7 310</b>      |
| <b>Electricity Generation<sup>8,9</sup></b>                           |              |               |               |               |               |               |               |                   |
| <i>GWh</i>  |              |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>8 440</b> | <b>10 500</b> | <b>11 100</b> | <b>10 200</b> | <b>10 300</b> | <b>9 500</b>  | <b>9 210</b>  | <b>8 770</b>      |
| Coal  | 6 020        | 8 850         | 6 770         | 6 960         | 6 790         | 6 020         | 5 390         | 5 500             |
| Natural Gas   | -            | -             | 181           | 1 610         | 2 270         | 2 430         | 2 260         | 1 370             |
| Other Fuels   | 2 430        | 1 610         | 4 110         | 1 660         | 1 270         | 1 050         | 1 560         | 1 890             |
| <b>Steam from Waste Heat</b>  | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>          |
| <b>Nuclear</b>  | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>          |
| <b>Hydro</b>  | <b>1 120</b> | <b>887</b>    | <b>1 040</b>  | <b>1 040</b>  | <b>969</b>    | <b>1 070</b>  | <b>806</b>    | <b>964</b>        |
| <b>Other Renewables<sup>10</sup></b>                                  | <b>26.1</b>  | <b>0</b>      | <b>113</b>    | <b>184</b>    | <b>414</b>    | <b>809</b>    | <b>827</b>    | <b>780</b>        |
| <b>Other Generation<sup>11</sup></b>                                  | <b>-</b>     | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>-</b>          |
| <b>Overall Total<sup>7</sup></b>                                      | <b>9 590</b> | <b>11 300</b> | <b>12 200</b> | <b>11 500</b> | <b>11 700</b> | <b>11 400</b> | <b>10 800</b> | <b>10 500</b>     |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |              |               |               |               |               |               |               |                   |
| <i>g GHG / kWh electricity generated</i>                              |              |               |               |               |               |               |               |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>720</b>   | <b>840</b>    | <b>880</b>    | <b>820</b>    | <b>750</b>    | <b>740</b>    | <b>700</b>    | <b>690</b>        |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.007</b> | <b>0.009</b>  | <b>0.02</b>   | <b>0.03</b>   | <b>0.04</b>   | <b>0.04</b>   | <b>0.04</b>   | <b>0.03</b>       |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.01</b>  | <b>0.01</b>   | <b>0.01</b>   | <b>0.01</b>   | <b>0.01</b>   | <b>0.01</b>   | <b>0.01</b>   | <b>0.01</b>       |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>720</b>   | <b>840</b>    | <b>880</b>    | <b>820</b>    | <b>760</b>    | <b>750</b>    | <b>710</b>    | <b>690</b>        |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>580</b>   | <b>830</b>    | <b>770</b>    | <b>710</b>    | <b>670</b>    | <b>640</b>    | <b>1 200</b>  | <b>600</b>        |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | <b>23</b>    | <b>23</b>     | <b>29</b>     | <b>17</b>     | <b>27</b>     | <b>33</b>     | <b>22</b>     | <b>36</b>         |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>770</b>   | <b>910</b>    | <b>940</b>    | <b>880</b>    | <b>800</b>    | <b>800</b>    | <b>800</b>    | <b>740</b>        |

## Notes:

1. Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
2. Preliminary data.
3. Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
4. Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
5. GHG emissions from on-site combustion of fuel not directly related to electricity generation.
6. GHG emissions from the flooding of land for hydro dams are not included.
7. Totals may not add up to overall total due to rounding.
8. Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
9. Taken from the *Electric Power Generation, Transmission and Distribution (EPGTD)* publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
10. Other Renewables - includes electricity generation by wind, tidal and solar.
11. NAICS category 221119, Other Electric Power Generation.
12. Intensity values have been rounded so as to present the estimated level of accuracy.
13. Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
14. Includes transmission line losses, metering differences and other losses.
15. The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
16. Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1

Table A11–5 Electricity Generation and GHG Emission Details for New Brunswick<sup>1</sup>

|   | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012         | 2013 <sup>2</sup> |
|---|---------------|---------------|---------------|---------------|---------------|---------------|--------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |               |               |               |               |               |               |              |                   |
| <i>kt CO<sub>2</sub> eq</i>   |               |               |               |               |               |               |              |                   |
| <b>Combustion</b>   | <b>6 030</b>  | <b>9 010</b>  | <b>8 100</b>  | <b>7 080</b>  | <b>5 360</b>  | <b>4 950</b>  | <b>4 080</b> | <b>4 220</b>      |
| Coal  | 1 180         | 3 170         | 2 940         | 2 330         | 2 110         | x             | x            | x                 |
| Natural Gas   | –             | –             | x             | x             | x             | x             | x            | x                 |
| Other Fuels <sup>4</sup>  | 4 840         | 5 840         | x             | x             | x             | 1 620         | 1 330        | 1 150             |
| <b>Other Emissions<sup>5</sup></b>                                    | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>     | <b>–</b>          |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>6 030</b>  | <b>9 010</b>  | <b>8 100</b>  | <b>7 080</b>  | <b>5 360</b>  | <b>4 950</b>  | <b>4 080</b> | <b>4 220</b>      |
| <b>Electricity Generation<sup>8,9</sup></b>                           |               |               |               |               |               |               |              |                   |
| <i>GWh</i>  |               |               |               |               |               |               |              |                   |
| <b>Combustion</b>   | <b>7 630</b>  | <b>11 000</b> | <b>12 100</b> | <b>8 660</b>  | <b>6 220</b>  | <b>6 040</b>  | <b>5 160</b> | <b>5 310</b>      |
| Coal  | 1 270         | 3 820         | 2 920         | 2 770         | 2 080         | 2 340         | 1 900        | 2 250             |
| Natural Gas   | –             | –             | 1 970         | 1 840         | 1 840         | 1 960         | 1 780        | 1 770             |
| Other Fuels   | 6 360         | 7 210         | 7 210         | 4 050         | 2 300         | 1 740         | 1 490        | 1 290             |
| <b>Steam from Waste Heat</b>  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>617</b>    | <b>681</b>    | <b>666</b>    | <b>551</b>   | <b>581</b>        |
| <b>Nuclear</b>  | <b>5 340</b>  | <b>3 960</b>  | <b>4 380</b>  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>414</b>   | <b>4 481</b>      |
| <b>Hydro</b>  | <b>3 460</b>  | <b>3 220</b>  | <b>3 820</b>  | <b>2 970</b>  | <b>3 330</b>  | <b>3 840</b>  | <b>2 860</b> | <b>3 400</b>      |
| <b>Other Renewables<sup>10</sup></b>                                  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>270</b>    | <b>389</b>    | <b>693</b>    | <b>733</b>   | <b>737</b>        |
| <b>Other Generation<sup>11</sup></b>                                  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>     | <b>–</b>          |
| <b>Overall Total<sup>7</sup></b>                                      | <b>16 400</b> | <b>18 200</b> | <b>20 300</b> | <b>12 500</b> | <b>10 600</b> | <b>11 200</b> | <b>9 700</b> | <b>14 500</b>     |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |               |               |               |               |               |               |              |                   |
| <i>g GHG / kWh electricity generated</i>                              |               |               |               |               |               |               |              |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>360</b>    | <b>490</b>    | <b>400</b>    | <b>560</b>    | <b>500</b>    | <b>440</b>    | <b>420</b>   | <b>290</b>        |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.004</b>  | <b>0.005</b>  | <b>0.01</b>   | <b>0.03</b>   | <b>0.03</b>   | <b>0.03</b>   | <b>0.03</b>  | <b>0.02</b>       |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.007</b>  | <b>0.009</b>  | <b>0.007</b>  | <b>0.009</b>  | <b>0.008</b>  | <b>0.007</b>  | <b>0.007</b> | <b>0.004</b>      |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>370</b>    | <b>490</b>    | <b>400</b>    | <b>570</b>    | <b>510</b>    | <b>440</b>    | <b>420</b>   | <b>290</b>        |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>990</b>    | <b>1 300</b>  | <b>1 100</b>  | <b>530</b>    | <b>390</b>    | <b>160</b>    | <b>unk</b>   | <b>443</b>        |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | <b>0.71</b>   | <b>0.70</b>   | <b>–</b>      | <b>0.50</b>   | <b>0.35</b>   | <b>0.61</b>   | <b>0.53</b>  | <b>0.82</b>       |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>390</b>    | <b>530</b>    | <b>420</b>    | <b>590</b>    | <b>520</b>    | <b>450</b>    | <b>unk</b>   | <b>300</b>        |

## Notes:

- Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
- Preliminary data.
- Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
- Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
- GHG emissions from on-site combustion of fuel not directly related to electricity generation.
- GHG emissions from the flooding of land for hydro dams are not included.
- Totals may not add up to overall total due to rounding.
- Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
- Taken from the *Electric Power Generation, Transmission and Distribution (EPGTD)* publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
- Other Renewables - includes electricity generation by wind, tidal and solar.
- NAICS category 221119, Other Electric Power Generation.
- Intensity values have been rounded so as to present the estimated level of accuracy.
- Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
- Includes transmission line losses, metering differences and other losses.
- The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
- Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - x Indicates data not shown due to statistical limitations
  - unk Indicates unknown as appropriate data were unavailable

Table A11-6 Electricity Generation and GHG Emission Details for Quebec<sup>1</sup>

|   | 1990           | 2000           | 2005           | 2009           | 2010           | 2011           | 2012           | 2013 <sup>2</sup> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |                |                |                |                |                |                |                |                   |
| <i>kt CO<sub>2</sub> eq</i>   |                |                |                |                |                |                |                |                   |
| <b>Combustion</b>   | 1 500          | 763            | 1 312          | 1 185          | 430            | 405            | 488            | 371               |
| Coal  | –              | –              | –              | –              | –              | –              | –              | –                 |
| Natural Gas   | x              | x              | x              | x              | x              | x              | x              | x                 |
| Other Fuels <sup>4</sup>  | x              | x              | x              | x              | x              | x              | x              | x                 |
| <b>Other Emissions<sup>5</sup></b>                                    | –              | 2.5            | 4.6            | –              | –              | –              | –              | –                 |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>1 500</b>   | <b>765</b>     | <b>1 317</b>   | <b>1 185</b>   | <b>430</b>     | <b>405</b>     | <b>488</b>     | <b>371</b>        |
| <b>Electricity Generation<sup>8,9</sup></b>                           |                |                |                |                |                |                |                |                   |
| <i>GWh</i>  |                |                |                |                |                |                |                |                   |
| <b>Combustion</b>   | 1 980          | 1 150          | 1 390          | 1 690          | 1 510          | 1 360          | 1 260          | 1 140             |
| Coal  | –              | –              | –              | –              | –              | –              | –              | –                 |
| Natural Gas   | –              | 191            | 212            | 211            | 200            | 198            | 191            | 14                |
| Other Fuels   | 1 980          | 961            | 1 170          | 1 480          | 1 310          | 1 170          | 1 070          | 1 130             |
| <b>Steam from Waste Heat</b>  | –              | –              | –              | –              | –              | –              | –              | –                 |
| <b>Nuclear</b>  | 4 070          | 4 890          | 4 480          | 3 600          | 3 550          | 3 530          | 4 210          | 0                 |
| <b>Hydro</b>  | 112 000        | 153 000        | 155 000        | 170 000        | 161 000        | 170 000        | 171 000        | 182 000           |
| <b>Other Renewables<sup>10</sup></b>                                  | –              | 173            | 416            | 1 320          | 1 550          | 1 000          | 1 011          | 1 031             |
| <b>Other Generation<sup>11</sup></b>                                  | –              | –              | –              | –              | –              | –              | –              | –                 |
| <b>Overall Total<sup>7</sup></b>                                      | <b>118 000</b> | <b>160 000</b> | <b>161 000</b> | <b>177 000</b> | <b>168 000</b> | <b>176 000</b> | <b>178 000</b> | <b>184 000</b>    |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |                |                |                |                |                |                |                |                   |
| <i>g GHG / kWh electricity generated</i>                              |                |                |                |                |                |                |                |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | 13             | 3.5            | 3.7            | 3.6            | 2.5            | 2.3            | 2.7            | 2.0               |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | 0.0004         | 0.0005         | 0.0009         | 0.0007         | 0.0004         | 0.0002         | 0.0004         | 0.0002            |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | 0.0003         | 0.0002         | 0.0005         | 0.0004         | 0.0001         | 0.0001         | 0.0001         | 0.0001            |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | 13             | 3.6            | 3.9            | 3.7            | 2.6            | 2.3            | 2.7            | 2.0               |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | 7 300          | 13 000         | 9 100          | 11 000         | 13 000         | 11 000         | 12 000         | 8 000             |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | 37             | 36             | 30             | 34             | 31             | 30             | 53             | 66                |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | 14             | 4.1            | 4.3            | 4.1            | 3.0            | 2.6            | 3.3            | 2.5               |

## Notes:

- Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
- Preliminary data.
- Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
- Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
- GHG emissions from on-site combustion of fuel not directly related to electricity generation.
- GHG emissions from the flooding of land for hydro dams are not included.
- Totals may not add up to overall total due to rounding.
- Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
- Taken from the *Electric Power Generation, Transmission and Distribution* (EPGD) publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
- Other Renewables - includes electricity generation by wind, tidal and solar.
- NAICS category 221119, Other Electric Power Generation.
- Intensity values have been rounded so as to present the estimated level of accuracy.
- Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
- Includes transmission line losses, metering differences and other losses.
- The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
- Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - x Indicates data not shown due to statistical limitations

Table A11–7 Electricity Generation and GHG Emission Details for Ontario<sup>1</sup>

|   | 1990           | 2000           | 2005           | 2009           | 2010           | 2011           | 2012           | 2013 <sup>2</sup> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |                |                |                |                |                |                |                |                   |
| <i>kt CO<sub>2</sub> eq</i>   |                |                |                |                |                |                |                |                   |
| <b>Combustion</b>   | 26 000         | 43 800         | 35 200         | 15 700         | 20 100         | 14 500         | 14 400         | 11 200            |
| Coal  | 24 600         | 38 000         | 28 100         | 9 740          | 12 300         | 4 200          | 4 260          | 3 070             |
| Natural Gas   | x              | x              | x              | x              | x              | x              | x              | x                 |
| Other Fuels <sup>4</sup>  | x              | x              | x              | x              | x              | x              | x              | x                 |
| <b>Other Emissions<sup>5</sup></b>                                    | –              | 0.77           | 1.4            | 21             | 0.23           | 0.23           | –              | –                 |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>26 000</b>  | <b>43 800</b>  | <b>35 200</b>  | <b>15 700</b>  | <b>20 100</b>  | <b>14 500</b>  | <b>14 400</b>  | <b>11 200</b>     |
| <b>Electricity Generation<sup>8,9</sup></b>                           |                |                |                |                |                |                |                |                   |
| <i>GWh</i>  |                |                |                |                |                |                |                |                   |
| <b>Combustion</b>   | 29 200         | 52 200         | 40 900         | 19 600         | 27 200         | 25 100         | 23 800         | 18 500            |
| Coal  | 27 800         | 40 800         | 29 400         | 9 570          | 12 300         | 3 900          | 4 100          | 2 850             |
| Natural Gas   | 3.18           | 10 200         | 10 000         | 9 120          | 14 100         | 20 400         | 19 000         | 14 900            |
| Other Fuels   | 1 430          | 1 140          | 1 440          | 947            | 864            | 782            | 703            | 722               |
| <b>Steam from Waste Heat</b>  | –              | –              | –              | 2 580          | 3 630          | 3 500          | 4 250          | 3 330             |
| <b>Nuclear</b>  | 59 400         | 59 800         | 78 000         | 81 400         | 82 000         | 84 800         | 84 900         | 77 900            |
| <b>Hydro</b>  | 38 700         | 36 600         | 34 600         | 38 700         | 31 800         | 34 600         | 33 000         | 36 900            |
| <b>Other Renewables<sup>10</sup></b>                                  | –              | 1.22           | 26.0           | 2 100          | 3 190          | 3 420          | 4 320          | 4 680             |
| <b>Other Generation<sup>11</sup></b>                                  | –              | –              | –              | –              | –              | –              | –              | –                 |
| <b>Overall Total<sup>7</sup></b>                                      | <b>127 000</b> | <b>149 000</b> | <b>153 000</b> | <b>144 000</b> | <b>148 000</b> | <b>151 000</b> | <b>150 000</b> | <b>141 000</b>    |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |                |                |                |                |                |                |                |                   |
| <i>g GHG / kWh electricity generated</i>                              |                |                |                |                |                |                |                |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | 200            | 290            | 220            | 100            | 130            | 93             | 93             | 76                |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | 0.002          | 0.01           | 0.01           | 0.010          | 0.01           | 0.02           | 0.02           | 0.01              |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | 0.003          | 0.005          | 0.004          | 0.002          | 0.003          | 0.002          | 0.002          | 0.002             |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | 200            | 290            | 220            | 100            | 130            | 94             | 94             | 77                |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | 10 000         | 12 000         | 12 000         | 21 000         | 15 000         | 16 000         | 15 000         | 9 000             |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | 76             | 75             | 50             | 60             | 59             | 38             | 56             | 62                |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>220</b>     | <b>320</b>     | <b>240</b>     | <b>120</b>     | <b>150</b>     | <b>110</b>     | <b>110</b>     | <b>80</b>         |

## Notes:

1. Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
2. Preliminary data.
3. Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
4. Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
5. GHG emissions from on-site combustion of fuel not directly related to electricity generation.
6. GHG emissions from the flooding of land for hydro dams are not included.
7. Totals may not add up to overall total due to rounding.
8. Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
9. Taken from the *Electric Power Generation, Transmission and Distribution (EPGTD)* publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
10. Other Renewables - includes electricity generation by wind, tidal and solar.
11. NAICS category 221119, Other Electric Power Generation.
12. Intensity values have been rounded so as to present the estimated level of accuracy.
13. Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
14. Includes transmission line losses, metering differences and other losses.
15. The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
16. Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - x Indicates data not shown due to statistical limitations

Table A11-8 Electricity Generation and GHG Emission Details for Manitoba<sup>1</sup>

|   | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013 <sup>2</sup> |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>kt CO<sub>2</sub> eq</i>   |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>523</b>    | <b>1 004</b>  | <b>329</b>    | <b>181</b>    | <b>75.5</b>   | <b>107</b>    | <b>88.2</b>   | <b>99.6</b>       |
| Coal  | x             | x             | x             | x             | x             | x             | x             | x                 |
| Natural Gas   | x             | x             | x             | x             | x             | x             | x             | x                 |
| Other Fuels <sup>4</sup>  | 51.0          | 12.2          | 15.8          | 11.3          | 11.5          | 12.9          | 12.9          | 1.7               |
| <b>Other Emissions<sup>5</sup></b>                                    | <b>-</b>      | <b>4.8</b>    | <b>8.8</b>    | <b>11</b>     | <b>12</b>     | <b>12</b>     | <b>21</b>     | <b>16</b>         |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>523</b>    | <b>1 008</b>  | <b>338</b>    | <b>192</b>    | <b>87</b>     | <b>119</b>    | <b>109</b>    | <b>115</b>        |
| <b>Electricity Generation<sup>8,9</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>GWh</i>  |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>399</b>    | <b>881</b>    | <b>447</b>    | <b>195</b>    | <b>84</b>     | <b>106</b>    | <b>94</b>     | <b>91</b>         |
| Coal  | 375           | 869           | 421           | 140           | 44.4          | 49.7          | 51.5          | 65.4              |
| Natural Gas   | 0.904         | -             | 10.6          | 39.4          | 22.9          | 41.1          | 27.4          | 24.0              |
| Other Fuels   | 22.4          | 12.4          | 15.1          | 14.9          | 17.0          | 15.3          | 15.2          | 1.5               |
| <b>Steam from Waste Heat</b>  | <b>-</b>          |
| <b>Nuclear</b>  | <b>-</b>          |
| <b>Hydro</b>  | <b>19 800</b> | <b>31 500</b> | <b>36 400</b> | <b>33 500</b> | <b>33 300</b> | <b>34 200</b> | <b>32 200</b> | <b>35 300</b>     |
| <b>Other Renewables<sup>10</sup></b>                                  | <b>-</b>      | <b>-</b>      | <b>53.4</b>   | <b>365</b>    | <b>343</b>    | <b>747</b>    | <b>877</b>    | <b>868</b>        |
| <b>Other Generation<sup>11</sup></b>                                  | <b>-</b>          |
| <b>Overall Total<sup>7</sup></b>                                      | <b>20 200</b> | <b>32 400</b> | <b>36 900</b> | <b>34 100</b> | <b>33 700</b> | <b>35 100</b> | <b>33 200</b> | <b>36 300</b>     |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |               |               |               |               |               |               |               |                   |
| <i>g GHG / kWh electricity generated</i>                              |               |               |               |               |               |               |               |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>26</b>     | <b>31</b>     | <b>9.1</b>    | <b>5.6</b>    | <b>2.6</b>    | <b>3.4</b>    | <b>3.2</b>    | <b>3.2</b>        |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.0005</b> | <b>0.0004</b> | <b>0.0002</b> | <b>0.0002</b> | <b>0.0001</b> | <b>0.0004</b> | <b>0.0002</b> | <b>0.0002</b>     |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.001</b>  | <b>0.001</b>  | <b>0.0002</b> | <b>0.0001</b> | <b>0.0001</b> | <b>0.0001</b> | <b>0.0001</b> | <b>0.0001</b>     |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>26</b>     | <b>31</b>     | <b>9.1</b>    | <b>5.6</b>    | <b>2.6</b>    | <b>3.4</b>    | <b>3.3</b>    | <b>3.2</b>        |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>2 100</b>  | <b>3 750</b>  | <b>1 900</b>  | <b>4 700</b>  | <b>4 600</b>  | <b>4 600</b>  | <b>3 600</b>  | <b>3 800</b>      |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | <b>4.3</b>    | <b>4.2</b>    | <b>4.0</b>    | <b>3.0</b>    | <b>4.3</b>    | <b>6.0</b>    | <b>1.3</b>    | <b>1.2</b>        |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>29</b>     | <b>35</b>     | <b>9.7</b>    | <b>6.6</b>    | <b>3.1</b>    | <b>4.1</b>    | <b>3.7</b>    | <b>3.6</b>        |

## Notes:

1. Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
2. Preliminary data.
3. Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
4. Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
5. GHG emissions from on-site combustion of fuel not directly related to electricity generation.
6. GHG emissions from the flooding of land for hydro dams are not included.
7. Totals may not add up to overall total due to rounding.
8. Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
9. Taken from the *Electric Power Generation, Transmission and Distribution* (EPGD) publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
10. Other Renewables - includes electricity generation by wind, tidal and solar.
11. NAICS category 221119, Other Electric Power Generation.
12. Intensity values have been rounded so as to present the estimated level of accuracy.
13. Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
14. Includes transmission line losses, metering differences and other losses.
15. The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
16. Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - x Indicates data not shown due to statistical limitations

Table A11–9 Electricity Generation and GHG Emission Details for Saskatchewan<sup>1</sup>

|   | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013 <sup>2</sup> |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>kt CO<sub>2</sub> eq</i>   |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>11 200</b> | <b>14 600</b> | <b>15 300</b> | <b>16 500</b> | <b>16 200</b> | <b>15 700</b> | <b>16 200</b> | <b>16 000</b>     |
| Coal  | x             | x             | x             | x             | x             | x             | x             | x                 |
| Natural Gas   | x             | x             | x             | x             | x             | x             | x             | x                 |
| Other Fuels <sup>4</sup>  | 6.78          | 10.9          | 4.51          | 0.845         | 0.280         | 7.20          | 6.64          | 0.28              |
| <b>Other Emissions<sup>5</sup></b>                                    | <b>–</b>      | <b>10</b>     | <b>18</b>     | <b>29</b>     | <b>30</b>     | <b>30</b>     | <b>31</b>     | <b>35</b>         |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>11 200</b> | <b>14 600</b> | <b>15 300</b> | <b>16 500</b> | <b>16 300</b> | <b>15 700</b> | <b>16 200</b> | <b>16 000</b>     |
| <b>Electricity Generation<sup>8,9</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>GWh</i>  |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>9 660</b>  | <b>14 100</b> | <b>14 800</b> | <b>16 700</b> | <b>15 100</b> | <b>14 900</b> | <b>15 200</b> | <b>16 600</b>     |
| Coal  | 9 340         | 11 400        | 12 200        | 13 100        | 12 100        | 11 600        | 11 400        | 11 800            |
| Natural Gas   | 308           | 2 660         | 2 610         | 3 570         | 3 040         | 3 260         | 3 800         | 4 810             |
| Other Fuels   | 8.78          | 12.5          | 12.0          | 15.3          | 17.7          | 10.0          | 9.30          | 12.42             |
| <b>Steam from Waste Heat</b>  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>360</b>    | <b>628</b>    | <b>685</b>    | <b>815</b>    | <b>1 227</b>      |
| <b>Nuclear</b>  | <b>–</b>          |
| <b>Hydro</b>  | <b>4 210</b>  | <b>3 050</b>  | <b>4 570</b>  | <b>2 960</b>  | <b>3 870</b>  | <b>4 640</b>  | <b>4 240</b>  | <b>4 450</b>      |
| <b>Other Renewables<sup>10</sup></b>                                  | <b>–</b>      | <b>–</b>      | <b>91.9</b>   | <b>579</b>    | <b>507</b>    | <b>608</b>    | <b>655</b>    | <b>640</b>        |
| <b>Other Generation<sup>11</sup></b>                                  | <b>–</b>          |
| <b>Overall Total<sup>7</sup></b>                                      | <b>13 900</b> | <b>17 100</b> | <b>19 500</b> | <b>20 600</b> | <b>20 100</b> | <b>20 800</b> | <b>21 000</b> | <b>22 900</b>     |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |               |               |               |               |               |               |               |                   |
| <i>g GHG / kWh electricity generated</i>                              |               |               |               |               |               |               |               |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>800</b>    | <b>850</b>    | <b>780</b>    | <b>790</b>    | <b>800</b>    | <b>750</b>    | <b>770</b>    | <b>690</b>        |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.02</b>   | <b>0.03</b>   | <b>0.03</b>   | <b>0.03</b>   | <b>0.04</b>   | <b>0.03</b>   | <b>0.04</b>   | <b>0.04</b>       |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.02</b>       |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>810</b>    | <b>850</b>    | <b>790</b>    | <b>800</b>    | <b>810</b>    | <b>750</b>    | <b>770</b>    | <b>700</b>        |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>1 300</b>  | <b>1 700</b>  | <b>1 400</b>  | <b>2 700</b>  | <b>1 300</b>  | <b>1 100</b>  | <b>1 200</b>  | <b>2 100</b>      |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | <b>1.8</b>    | <b>1.7</b>    | <b>1.3</b>    | <b>0.59</b>   | <b>1.3</b>    | <b>1.2</b>    | <b>0.75</b>   | <b>0.91</b>       |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>890</b>    | <b>950</b>    | <b>850</b>    | <b>920</b>    | <b>860</b>    | <b>790</b>    | <b>820</b>    | <b>770</b>        |

## Notes:

- Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
- Preliminary data.
- Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
- Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
- GHG emissions from on-site combustion of fuel not directly related to electricity generation.
- GHG emissions from the flooding of land for hydro dams are not included.
- Totals may not add up to overall total due to rounding.
- Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
- Taken from the *Electric Power Generation, Transmission and Distribution* (EPGTD) publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
- Other Renewables - includes electricity generation by wind, tidal and solar.
- NAICS category 221119, Other Electric Power Generation.
- Intensity values have been rounded so as to present the estimated level of accuracy.
- Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
- Includes transmission line losses, metering differences and other losses.
- The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
- Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - x Indicates data not shown due to statistical limitations

Table A11-10 Electricity Generation and GHG Emission Details for Alberta<sup>1</sup>

|   | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013 <sup>2</sup> |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>kt CO<sub>2</sub> eq</i>   |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>39 800</b> | <b>50 300</b> | <b>52 400</b> | <b>49 200</b> | <b>49 300</b> | <b>49 200</b> | <b>45 000</b> | <b>46 900</b>     |
| Coal  | x             | x             | x             | x             | x             | x             | x             | x                 |
| Natural Gas   | x             | x             | x             | x             | x             | x             | x             | x                 |
| Other Fuels <sup>4</sup>  | 11.9          | 337           | 408.1         | 359.5         | 244.0         | 373.0         | 319.8         | 216.9             |
| <b>Other Emissions<sup>5</sup></b>                                    | <b>-</b>      | <b>5.7</b>    | <b>10</b>     | <b>5.1</b>    | <b>5.6</b>    | <b>13</b>     | <b>23</b>     | <b>6</b>          |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>39 800</b> | <b>50 300</b> | <b>52 400</b> | <b>49 300</b> | <b>49 300</b> | <b>49 200</b> | <b>45 000</b> | <b>46 900</b>     |
| <b>Electricity Generation<sup>8,9</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>GWh</i>  |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>39 900</b> | <b>51 300</b> | <b>54 200</b> | <b>51 500</b> | <b>51 700</b> | <b>58 800</b> | <b>49 100</b> | <b>50 800</b>     |
| Coal  | 37 300        | 40 700        | 42 200        | 41 000        | 41 000        | 46 300        | 37 300        | 38 500            |
| Natural Gas   | 2 510         | 10 200        | 11 600        | 9 970         | 10 200        | 12 100        | 11 300        | 11 800            |
| Other Fuels   | 21.6          | 443           | 424           | 548           | 501           | 494           | 595           | 570               |
| <b>Steam from Waste Heat</b>  | <b>-</b>      | <b>-</b>      | <b>32.4</b>   | <b>1 310</b>  | <b>1 500</b>  | <b>1 550</b>  | <b>1 890</b>  | <b>1 890</b>      |
| <b>Nuclear</b>  | <b>-</b>          |
| <b>Hydro</b>  | <b>2 060</b>  | <b>1 760</b>  | <b>2 240</b>  | <b>1 620</b>  | <b>1 480</b>  | <b>1 970</b>  | <b>2 570</b>  | <b>1 990</b>      |
| <b>Other Renewables<sup>10</sup></b>                                  | <b>-</b>      | <b>88.9</b>   | <b>837</b>    | <b>1 340</b>  | <b>1 630</b>  | <b>2 220</b>  | <b>2 290</b>  | <b>2 260</b>      |
| <b>Other Generation<sup>11</sup></b>                                  | <b>-</b>          |
| <b>Overall Total<sup>7</sup></b>                                      | <b>41 900</b> | <b>53 200</b> | <b>57 300</b> | <b>55 800</b> | <b>56 400</b> | <b>64 600</b> | <b>55 900</b> | <b>56 900</b>     |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |               |               |               |               |               |               |               |                   |
| <i>g GHG / kWh electricity generated</i>                              |               |               |               |               |               |               |               |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>940</b>    | <b>940</b>    | <b>900</b>    | <b>870</b>    | <b>860</b>    | <b>750</b>    | <b>790</b>    | <b>820</b>        |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.02</b>   | <b>0.04</b>   | <b>0.03</b>   | <b>0.03</b>   | <b>0.03</b>   | <b>0.03</b>   | <b>0.04</b>   | <b>0.04</b>       |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.02</b>   | <b>0.02</b>   | <b>0.02</b>   | <b>0.02</b>   | <b>0.02</b>   | <b>0.01</b>   | <b>0.02</b>   | <b>0.02</b>       |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>950</b>    | <b>950</b>    | <b>910</b>    | <b>880</b>    | <b>870</b>    | <b>760</b>    | <b>800</b>    | <b>820</b>        |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>3 400</b>  | <b>4 100</b>  | <b>4 900</b>  | <b>10 800</b> | <b>9 800</b>  | <b>16 500</b> | <b>8 000</b>  | <b>0</b>          |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | <b>1.6</b>    | <b>1.6</b>    | <b>0.43</b>   | <b>2.1</b>    | <b>1.01</b>   | <b>1.16</b>   | <b>3.1</b>    | <b>3.6</b>        |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>1 000</b>  | <b>1 000</b>  | <b>990</b>    | <b>1 100</b>  | <b>1 100</b>  | <b>1 000</b>  | <b>930</b>    | <b>820</b>        |

## Notes:

- Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
- Preliminary data.
- Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
- Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
- GHG emissions from on-site combustion of fuel not directly related to electricity generation.
- GHG emissions from the flooding of land for hydro dams are not included.
- Totals may not add up to overall total due to rounding.
- Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
- Taken from the *Electric Power Generation, Transmission and Distribution* (EPGTD) publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
- Other Renewables - includes electricity generation by wind, tidal and solar.
- NAICS category 221119, Other Electric Power Generation.
- Intensity values have been rounded so as to present the estimated level of accuracy.
- Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
- Includes transmission line losses, metering differences and other losses.
- The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
- Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - x Indicates data not shown due to statistical limitations

Table A11–11 Electricity Generation and GHG Emission Details for British Columbia<sup>1</sup>

|   | 1990          | 2000          | 2005          | 2009          | 2010          | 2011          | 2012          | 2013 <sup>2</sup> |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>kt CO<sub>2</sub> eq</i>   |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>807</b>    | <b>2 200</b>  | <b>1 980</b>  | <b>1 720</b>  | <b>1 830</b>  | <b>1 337</b>  | <b>856</b>    | <b>1 209</b>      |
| Coal  | –             | –             | –             | –             | –             | –             | –             | –                 |
| Natural Gas   | x             | x             | x             | x             | x             | x             | x             | x                 |
| Other Fuels <sup>4</sup>  | x             | x             | x             | x             | x             | x             | x             | x                 |
| <b>Other Emissions<sup>5</sup></b>                                    | <b>–</b>      | <b>2.5</b>    | <b>4.6</b>    | <b>5.8</b>    | <b>6.0</b>    | <b>6.5</b>    | <b>7.2</b>    | <b>6.7</b>        |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>807</b>    | <b>2 210</b>  | <b>1 990</b>  | <b>1 720</b>  | <b>1 840</b>  | <b>1 340</b>  | <b>863</b>    | <b>1 216</b>      |
| <b>Electricity Generation<sup>8,9</sup></b>                           |               |               |               |               |               |               |               |                   |
| <i>GWh</i>  |               |               |               |               |               |               |               |                   |
| <b>Combustion</b>   | <b>1 390</b>  | <b>3 930</b>  | <b>3 820</b>  | <b>3 020</b>  | <b>3 050</b>  | <b>1 860</b>  | <b>1 540</b>  | <b>1 880</b>      |
| Coal  | –             | –             | –             | –             | –             | –             | –             | –                 |
| Natural Gas   | 1 310         | 3 350         | 3 140         | 2 030         | 1 850         | 1 150         | 1 032         | 892               |
| Other Fuels   | 79.4          | 585           | 689           | 993           | 1 210         | 700           | 513           | 986               |
| <b>Steam from Waste Heat</b>  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>648</b>    | <b>651</b>    | <b>38.8</b>   | <b>27.6</b>   | <b>80.2</b>       |
| <b>Nuclear</b>  | <b>–</b>          |
| <b>Hydro</b>  | <b>46 400</b> | <b>50 800</b> | <b>50 300</b> | <b>46 300</b> | <b>45 000</b> | <b>51 700</b> | <b>55 800</b> | <b>50 500</b>     |
| <b>Other Renewables<sup>10</sup></b>                                  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>123</b>    | <b>187</b>    | <b>158</b>    | <b>152</b>        |
| <b>Other Generation<sup>11</sup></b>                                  | <b>–</b>      | <b>–</b>      | <b>–</b>      | <b>1 920</b>  | <b>2 980</b>  | <b>2 510</b>  | <b>2 720</b>  | <b>2 440</b>      |
| <b>Overall Total<sup>7</sup></b>                                      | <b>47 800</b> | <b>54 700</b> | <b>54 100</b> | <b>51 900</b> | <b>51 800</b> | <b>56 300</b> | <b>60 300</b> | <b>55 000</b>     |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |               |               |               |               |               |               |               |                   |
| <i>g GHG / kWh electricity generated</i>                              |               |               |               |               |               |               |               |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>17</b>     | <b>35</b>     | <b>24</b>     | <b>25</b>     | <b>23</b>     | <b>13</b>     | <b>8.2</b>    | <b>14.8</b>       |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.004</b>  | <b>0.009</b>  | <b>0.007</b>  | <b>0.007</b>  | <b>0.007</b>  | <b>0.004</b>  | <b>0.003</b>  | <b>0.003</b>      |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.0006</b> | <b>0.001</b>  | <b>0.0015</b> | <b>0.0013</b> | <b>0.0015</b> | <b>0.0011</b> | <b>0.0007</b> | <b>0.0009</b>     |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>17</b>     | <b>35</b>     | <b>25</b>     | <b>26</b>     | <b>24</b>     | <b>14</b>     | <b>8.4</b>    | <b>15.1</b>       |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>2 200</b>  | <b>2 300</b>  | <b>2 100</b>  | <b>2 200</b>  | <b>1 900</b>  | <b>810</b>    | <b>900</b>    | <b>2 400</b>      |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | <b>57</b>     | <b>56</b>     | <b>48</b>     | <b>58</b>     | <b>59</b>     | <b>27</b>     | <b>45</b>     | <b>41</b>         |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>19</b>     | <b>38</b>     | <b>27</b>     | <b>28</b>     | <b>26</b>     | <b>15</b>     | <b>9.3</b>    | <b>16.6</b>       |

## Notes:

- Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
- Preliminary data.
- Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
- Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
- GHG emissions from on-site combustion of fuel not directly related to electricity generation.
- GHG emissions from the flooding of land for hydro dams are not included.
- Totals may not add up to overall total due to rounding.
- Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
- Taken from the *Electric Power Generation, Transmission and Distribution (EPGTD)* publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
- Other Renewables - includes electricity generation by wind, tidal and solar.
- NAICS category 221119, Other Electric Power Generation.
- Intensity values have been rounded so as to present the estimated level of accuracy.
- Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
- Includes transmission line losses, metering differences and other losses.
- The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
- Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1
  - x Indicates data not shown due to statistical limitations

Table A11-12 Electricity Generation and GHG Emission Details for Yukon<sup>1</sup>

|   | 1990         | 2000         | 2005         | 2009         | 2010         | 2011         | 2012         | 2013 <sup>2</sup> |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |              |              |              |              |              |              |              |                   |
| <i>kt CO<sub>2</sub> eq</i>   |              |              |              |              |              |              |              |                   |
| <b>Combustion</b>   | <b>94.5</b>  | <b>22.3</b>  | <b>23.1</b>  | <b>17.2</b>  | <b>18.9</b>  | <b>27.9</b>  | <b>18.6</b>  | <b>17.7</b>       |
| Coal  | –            | –            | –            | –            | –            | –            | –            | –                 |
| Natural Gas   | –            | –            | –            | –            | –            | –            | –            | –                 |
| Other Fuels <sup>4</sup>  | 94.5         | 22.3         | 23.1         | 17.2         | 18.9         | 27.9         | 18.6         | 17.7              |
| <b>Other Emissions<sup>5</sup></b>                                    | –            | –            | –            | –            | –            | –            | –            | –                 |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>94.5</b>  | <b>22.3</b>  | <b>23.1</b>  | <b>17.2</b>  | <b>18.9</b>  | <b>27.9</b>  | <b>18.6</b>  | <b>17.7</b>       |
| <b>Electricity Generation<sup>8,9</sup></b>                           |              |              |              |              |              |              |              |                   |
| <i>GWh</i>  |              |              |              |              |              |              |              |                   |
| <b>Combustion</b>   | <b>62.1</b>  | <b>36.7</b>  | <b>22.4</b>  | <b>22.6</b>  | <b>25.0</b>  | <b>36.9</b>  | <b>24.4</b>  | <b>23.3</b>       |
| Coal  | –            | –            | –            | –            | –            | –            | –            | –                 |
| Natural Gas   | –            | –            | –            | –            | –            | –            | –            | –                 |
| Other Fuels   | 62.1         | 36.7         | 22.4         | 22.6         | 25.0         | 36.9         | 24.4         | 23.3              |
| <b>Steam from Waste Heat</b>  | –            | –            | –            | –            | –            | –            | –            | –                 |
| <b>Nuclear</b>  | –            | –            | –            | –            | –            | –            | –            | –                 |
| <b>Hydro</b>  | <b>423</b>   | <b>261</b>   | <b>320</b>   | <b>379</b>   | <b>380</b>   | <b>388</b>   | <b>430</b>   | <b>425</b>        |
| <b>Other Renewables<sup>10</sup></b>                                  | –            | <b>0.388</b> | <b>0.890</b> | <b>0.228</b> | <b>0</b>     | <b>0.402</b> | <b>0.445</b> | <b>0.277</b>      |
| <b>Other Generation<sup>11</sup></b>                                  | –            | –            | –            | –            | –            | –            | –            | –                 |
| <b>Overall Total<sup>7</sup></b>                                      | <b>485</b>   | <b>298</b>   | <b>344</b>   | <b>402</b>   | <b>405</b>   | <b>425</b>   | <b>455</b>   | <b>449</b>        |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |              |              |              |              |              |              |              |                   |
| <i>g GHG / kWh electricity generated</i>                              |              |              |              |              |              |              |              |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | <b>190</b>   | <b>72</b>    | <b>64</b>    | <b>41</b>    | <b>45</b>    | <b>63</b>    | <b>63</b>    | <b>38</b>         |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | <b>0.009</b> | <b>0.004</b> | <b>0.003</b> | <b>0.002</b> | <b>0.002</b> | <b>0.003</b> | <b>0.002</b> | <b>0.002</b>      |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | <b>0.03</b>  | <b>0.01</b>       |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | <b>190</b>   | <b>75</b>    | <b>67</b>    | <b>43</b>    | <b>47</b>    | <b>66</b>    | <b>41</b>    | <b>39</b>         |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | <b>47</b>    | <b>24</b>    | <b>45</b>    | <b>29</b>    | <b>33</b>    | <b>51</b>    | <b>58</b>    | <b>55</b>         |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | –            | –            | –            | –            | –            | –            | –            | –                 |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>220</b>   | <b>81</b>    | <b>77</b>    | <b>46</b>    | <b>51</b>    | <b>74</b>    | <b>47</b>    | <b>45</b>         |

## Notes:

1. Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
2. Preliminary data.
3. Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
4. Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
5. GHG emissions from on-site combustion of fuel not directly related to electricity generation.
6. GHG emissions from the flooding of land for hydro dams are not included.
7. Totals may not add up to overall total due to rounding.
8. Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
9. Taken from the *Electric Power Generation, Transmission and Distribution* (EPGD) publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
10. Other Renewables - includes electricity generation by wind, tidal and solar.
11. NAICS category 221119, Other Electric Power Generation.
12. Intensity values have been rounded so as to present the estimated level of accuracy.
13. Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
14. Includes transmission line losses, metering differences and other losses.
15. The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
16. Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1

Table A11–13 Electricity Generation and GHG Emission Details for the Northwest Territories and Nunavut<sup>1</sup>

|   | 1990       | 2000       | 2005       | 2009       | 2010       | 2011       | 2012       | 2013 <sup>2</sup> |
|---|------------|------------|------------|------------|------------|------------|------------|-------------------|
| <b>Greenhouse Gas Emissions<sup>3</sup></b>                           |            |            |            |            |            |            |            |                   |
| <i>kt CO<sub>2</sub> eq</i>   |            |            |            |            |            |            |            |                   |
| <b>Combustion</b>   | 164        | 190        | 219        | 195        | 192        | 142        | 143        | 140               |
| Coal  | –          | –          | –          | –          | –          | –          | –          | –                 |
| Natural Gas   | –          | 8.25       | 27.7       | 19.7       | 19.7       | 17.2       | 4.48       | 4.73              |
| Other Fuels <sup>4</sup>  | 164        | 182        | 191        | 175        | 173        | 125        | 139        | 135               |
| <b>Other Emissions<sup>5</sup></b>                                    | –          | 1.5        | 4.6        | –          | 1.5        | –          | –          | –                 |
| <b>Overall Total<sup>6,7</sup></b>                                    | <b>164</b> | <b>191</b> | <b>224</b> | <b>195</b> | <b>194</b> | <b>142</b> | <b>143</b> | <b>140</b>        |
| <b>Electricity Generation<sup>8,9</sup></b>                           |            |            |            |            |            |            |            |                   |
| <i>GWh</i>  |            |            |            |            |            |            |            |                   |
| <b>Combustion</b>   | 227        | 195        | 219        | 251        | 247        | 181        | 181        | 183               |
| Coal  | –          | –          | –          | –          | –          | –          | –          | –                 |
| Natural Gas   | –          | 15.8       | 23.3       | 27.5       | 27.5       | 23.7       | 5.63       | 5.77              |
| Other Fuels   | 227        | 179        | 196        | 223        | 220        | 157        | 175        | 177               |
| <b>Steam from Waste Heat</b>  | –          | –          | –          | –          | –          | –          | –          | –                 |
| <b>Nuclear</b>  | –          | –          | –          | –          | –          | –          | –          | –                 |
| <b>Hydro</b>  | 226        | 247        | 259        | 254        | 254        | 260        | 253        | 263               |
| <b>Other Renewables<sup>10</sup></b>                                  | –          | –          | –          | –          | –          | –          | –          | –                 |
| <b>Other Generation<sup>11</sup></b>                                  | –          | –          | –          | –          | –          | –          | –          | –                 |
| <b>Overall Total<sup>7</sup></b>                                      | <b>453</b> | <b>442</b> | <b>478</b> | <b>504</b> | <b>501</b> | <b>442</b> | <b>434</b> | <b>446</b>        |
| <b>Greenhouse Gas Intensity<sup>12</sup></b>                          |            |            |            |            |            |            |            |                   |
| <i>g GHG / kWh electricity generated</i>                              |            |            |            |            |            |            |            |                   |
| <b>CO<sub>2</sub> intensity (g CO<sub>2</sub> / kWh)</b>              | 350        | 350        | 450        | 370        | 370        | 310        | 320        | 300               |
| <b>CH<sub>4</sub> intensity (g CH<sub>4</sub> / kWh)</b>              | 0.02       | 0.02       | 0.03       | 0.02       | 0.02       | 0.02       | 0.02       | 0.02              |
| <b>N<sub>2</sub>O intensity (g N<sub>2</sub>O / kWh)</b>              | 0.05       | 0.06       | 0.06       | 0.05       | 0.05       | 0.04       | 0.05       | 0.04              |
| <b>Generation Intensity (g CO<sub>2</sub> eq / kWh)<sup>7</sup></b>   | 360        | 430        | 470        | 390        | 380        | 320        | 330        | 310               |
| <b>Unallocated Energy (GWh)<sup>13,14</sup></b>                       | 21         | 21         | 50         | 28         | 41         | 38         | 21         | 30                |
| <b>SF<sub>6</sub> Emissions (kt CO<sub>2</sub> eq)<sup>15</sup></b>   | –          | –          | –          | –          | –          | –          | –          | –                 |
| <b>Consumption Intensity (g CO<sub>2</sub> eq / kWh)<sup>16</sup></b> | <b>380</b> | <b>450</b> | <b>520</b> | <b>410</b> | <b>420</b> | <b>350</b> | <b>350</b> | <b>340</b>        |

## Notes:

1. Data presented include emissions, generation and intensity for facilities classified under NAICS code 22111 - Electric Power Generation.
2. Preliminary data.
3. Emissions based on data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-X, Statistics Canada.
4. Includes GHG emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.
5. GHG emissions from on-site combustion of fuel not directly related to electricity generation.
6. GHG emissions from the flooding of land for hydro dams are not included.
7. Totals may not add up to overall total due to rounding.
8. Taken from CANSIM Tables 127-0006 and 127-0007 (for 2005-2013).
9. Taken from the *Electric Power Generation, Transmission and Distribution (EPGTD)* publication, Catalogue No. 57-202-X, Statistics Canada (for 1990-2004).
10. Other Renewables - includes electricity generation by wind, tidal and solar.
11. NAICS category 221119, Other Electric Power Generation.
12. Intensity values have been rounded so as to present the estimated level of accuracy.
13. Adapted from Statistics Canada CANSIM Table 127-0008 (2005-2013) or Cat. No. 57-202-X (1990-2004).
14. Includes transmission line losses, metering differences and other losses.
15. The electric utility sector's share of emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF<sub>6</sub>).
16. Consumption intensity values are impacted by unallocated energy and SF<sub>6</sub> transmission emissions.
  - Indicates no emissions or no electricity generation
  - 0 Indicates emissions or electricity generation value less than 0.1

# References

## Annex 11, Electricity in Canada: Summary and Intensity Tables

Statistics Canada. *Electric Power Generation, Transmission and Distribution (annual)*. Catalogue No. 57-202-X.

Statistics Canada. *Report on Energy Supply and Demand in Canada (annual)*. Catalogue No. 57-003-X.

Statistics Canada. No date. *Table 127-0006: Electricity generated from fuels, by electric utility thermal plants (annual)*. CANSIM 2005-2013 [accessed 2015 January].

Statistics Canada. No date. *Table 127-0007: Electric power generation, by class of electricity producer (annual)*. CANSIM 2005-2013 [accessed 2015 January].

Statistics Canada. No date. *Table 127-0008: Supply and disposition of electric power, electric utilities and industry (annual)*. CANSIM 2005-2013 [accessed 2015 January].