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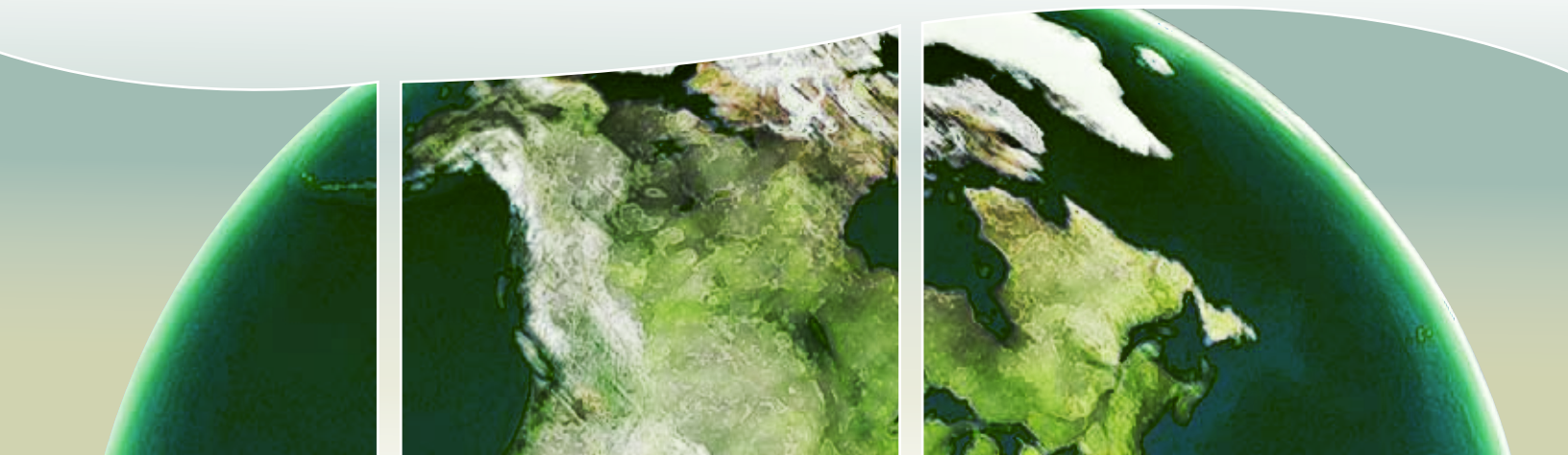
National Inventory Report

1990-2009

GREENHOUSE GAS SOURCES
AND SINKS IN CANADA

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

Part 3



Canada 

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List of Acronyms, Abbreviations and Units

AAC	Aluminum Association of Canada
AAFC	Agriculture and Agri-Food Canada
AC	air conditioning
AEUB	Alberta Energy and Utilities Board
AGEM	Aviation Greenhouse Gas Emission Model
Al	aluminium
Al ₂ O ₃	alumina
API	American Petroleum Institute
ASH	manure ash content
ATV	all-terrain vehicle
AWMS	animal waste management system
BADA	Base of Aircraft Data
B ₀	maximum methane production potential
B ₁₀₀	100% biodiesel
BOD	biochemical oxygen demand
BOF	basic oxygen furnace
BOD ₅	five-day biochemical oxygen demand
C	carbon
CAC	Criteria Air Contaminant
CaC ₂	calcium carbide
CaCO ₃	calcium carbonate; limestone
CaMg(CO ₃) ₂	dolomite (also CaCO ₃ ·MgCO ₃)
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
CCFM	Canadian Council of Forest Ministers
CEA	Canadian Electricity Association
CEPA 1999	<i>Canadian Environmental Protection Act, 1999</i>
CF ₄	carbon tetrafluoride
C ₂ F ₆	carbon hexafluoride
CFC	chlorofluorocarbon
CFS	Canadian Forest Service
CGA	Canadian Gas Association
CH ₃ OH	methanol
CH ₄	methane
C ₂ H ₆	ethane
C ₃ H ₈	propane
C ₄ H ₁₀	butane
C ₂ H ₄	Ethylene
C ₆ H ₆	Benzene
CIEEDAC	Canadian Industrial Energy End-Use Data Analysis Centre
CKD	cement kiln dust
CO	carbon monoxide

CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
COD	chemical oxygen demand
CORINAIR	The Core Inventory of Air Emissions in Europe
CPPI	Canadian Petroleum Products Institute
CRF	Common Reporting Format
CSPA	Canadian Steel Producers Association
CT	conventional tillage
CTS	crop and tillage system
CVS	Canadian Vehicle Survey
DE	digestible energy
DM	dry matter
DMI	dry matter intake
DOC	degradable organic carbon
DOCF	degradable organic carbon dissimilated
DOM	dead organic matter
EAF	electric arc furnace
EC	Environment Canada
EDC	ethylene dichloride
EF	emission factor
EF _{BASE}	basic emission factor
EMEP	European Monitoring and Evaluation Programme
EPA	Environmental Protection Agency (United States)
EPGTD	Electric Power Generation, Transmission and Distribution
eq	equivalent
ERCB	Energy Resources Conservation Board
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
FLSL	forest land converted to settlement
FLWL	forest land converted to wetland
FOI	Swedish Defence Research Agency
FTA	fraction of BOD in sludge that degrades anaerobically
FTILL	tillage ratio factor
g	gram
GCD	great-circle distance
GCV	gross calorific value
GDP	gross domestic product
GE	gross energy
Gg	gigagram
GHG	greenhouse gas
GHGRP	Greenhouse gas reporting program
GHV	gross heating value
GIS	geographic information system
GL	gigalitre
Gt	gigatonne
GTIS	Global Trade Information Services

GVWR	gross vehicle weight rating
GWP	global warming potential
H ₂	hydrogen
H ₂ O	water
ha	hectare
HCFC	hydrochlorofluorocarbon
HCl	hydrochloric acid
HDD	heating degree-day
HDDT	heavy-duty diesel truck
HDDV	heavy-duty diesel vehicle
HDGV	heavy-duty gasoline vehicle
HE	harvest emissions
HFC	hydrofluorocarbon
HHV	higher heating value
HM	heavy metal
HNO ₃	nitric acid
HRAI	Heating, Refrigeration and Air Conditioning Institute of Canada
HSS	horizontal stud Söderberg
HWP	harvested wood product
HWP-C	carbon stored in harvested wood products
IAI	International Aluminium Institute
ICAO	International Civil Aviation Organization
IE	included elsewhere
IEA	International Energy Agency
I/M	inspection and maintenance
IPCC	Intergovernmental Panel on Climate Change
IT	intensive tillage
ITL	International Transaction Log
KAR	kilometre accumulation rate
k	methane generation rate constant
K ₂ CO ₃	potassium carbonate
kg	kilogram
kha	kilohectare
kPa	kilopascal
kt	kilotonne
kWh	kilowatt-hour
L	litre
L ₀	methane generation potential
lb.	pound
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 gas
LTO	landing and takeoff
LULUCF	Land Use, Land-use Change and Forestry
m	metre
m ³	cubic metre

MAI	mean annual increment
MARS	Monitoring, Accounting and Reporting System
MC	motorcycle
MCED	Manufacturing, Construction and Energy Division of Statistics Canada
MCF	methane conversion factor (Agriculture)
MCF	methane correction factor (Waste)
Mg	magnesium; also megagram
MgCO ₃	magnesite; magnesium carbonate
MGEM	Mobile Greenhouse Gas Emission Model
MGEM07	Mobile Greenhouse Gas Emission Model 2007
MgO	magnesia; dolomitic lime
Mha	megahectare, equivalent to a million hectares
ML	megalitre
mol	mole
MMIC	Motorcycle & Moped Industry Council
MODTF	Modeling and Database Task Force
mol	mole
MS	manure system distribution factor
MSW	municipal solid waste
Mt	megatonne
MTOW	maximum takeoff weight
mV	millivolt
MW	megawatt
N	nitrogen
N ₂	nitrogen gas
Na ₂ CO ₃	sodium carbonate; soda ash
Na ₃ AlF ₆	cryolite
NA	not applicable
N/A	not available
NAICS	North American Industry Classification System
NCV	net calorific value
NE	not estimated
NEB	National Energy Board
NGL	natural gas liquid
NH ₃	ammonia
NH ₄ ⁺	ammonium
NH ₄ NO ₃	ammonium nitrate
NHTSA	National Highway Traffic Safety Administration (United States)
NIR	National Inventory Report
NMVOC	non-methane volatile organic compound
N ₂ O	nitrous oxide
NO	nitric oxide; also used for not occurring
NO ₂	nitrogen dioxide
NO ₃	nitrate
NO _x	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 ₂	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
PFC	perfluorocarbon
PJ	petajoule
PKT	passenger kilometres travelled
POP	persistent organic pollutant
ppb	part per billion
ppbv	part per billion by volume
P/PE	precipitation/potential evapotranspiration
ppm	part per million
QA	quality assurance
QC	quality control
RA	reference approach
RES D	Report on Energy Supply and Demand in Canada
RPP	refined petroleum product
RT	reduced tillage
SA	sectoral approach
SAGE	System for assessing Aviation's Global Emissions
SAN	styrene-acrylonitrile resin
SBR	styrene-butadiene
SCR	selective catalytic reduction
SF ₆	sulphur hexafluoride
SIC	Standard Industrial Classification
SiC	silicon carbide
SLC	Soil Landscapes of Canada
SMR	steam methane reforming
SO ₂	sulphur dioxide
SO _x	sulphur oxides
SOC	soil organic carbon
STC	Statistics Canada
SUV	sport utility vehicle
t	tonne
TC	Transport Canada
t-km	tonne-kilometre
TKT	tonne-kilometres travelled
TJ	terajoule
TWh	terrawatt-hour
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UPCIS	Use Patterns and Controls Implementation Section
UOG	upstream oil and gas
VCM	vinyl chloride monomer
VKT	vehicle kilometres travelled
VSS	vertical stud Söderberg
VOC	volatile organic compound
VS	volatile solids
WMO	World Meteorological Organization
wt	weight

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Annex 12

Canada's Greenhouse Gas Emission Tables, 1990–2009

This annex contains summary tables (Table A12–1 to Table A12–22) illustrating national GHG emissions by year, by gas, and by sector.

Table A12–1 GHG Source/Sink Category Description

ENERGY	
a. Stationary Combustion Sources	
Electricity and Heat Generation	Emissions from fuel consumed by:
Electricity Generation	Utility electricity generation
Heat Generation	Steam generation (for sale)
Fossil Fuel Production and Refining	Emissions from fuel consumed by:
Petroleum Refining and Upgrading	Petroleum refining and oil sands upgrading industries
Fossil Fuel Production	Natural gas production and some conventional and unconventional oil production industries (some refining is included)
Mining & Oil and Gas Extraction	Emissions from commercial fuel sold to:
	Metal and non metal mines, stone quarries, and gravel pits
	Oil and gas extraction industries
	Mineral exploration and contract drilling operations
Manufacturing Industries	Emissions from fuel consumed by the following industries:
	Iron and Steel (steel foundries, casting and rolling mills)
	Non-ferrous metals (aluminium, magnesium, and other production)
	Chemical (fertilizer manufacturing, organic and inorganic chemical manufacturing)
	Pulp and Paper (primarily pulp, paper, and paper product manufacturers)
	Cement production
	Other manufacturing industries not listed (such as automobile manufacturing, textiles, food and beverage industries)
Construction	Emissions from fuels consumed by the construction industry - buildings, highways etc.
Commercial & Institutional	Emissions from fuel consumed by:
	Service industries related to mining, communication, wholesale and retail trade, finance and insurance, real estate, education, etc.)
	Federal, provincial, and municipal establishment
	National Defence and Canadian Coast Guard
	Train stations, airports, and warehouses
Residential	Emissions from fuel consumed for personal residences (homes, apartment hotels, condominiums, and farm house)
Agriculture & Forestry	Emissions from fuel consumed by:
	Forestry and logging service industry
	Agricultural, hunting, and trapping industry (excluding food processing, farm machinery manufacturing, and repair)
b. Transportation	Emissions resulting from the:
Domestic Aviation	-consumption of fossil fuels by Canadian registered airlines flying domestically
Road Transportation	-consumption of fossil fuels (including non-CO ₂ emissions from biofuels) by vehicles licensed to operate on roads
Railways	-consumption of fossil fuels (including non-CO ₂ emissions from biofuels) by Canadian railways
Domestic Marine	-consumption of fossil fuels (including non-CO ₂ emissions from biofuels) by Canadian registered marine vessels fuelled domestically
Others - Off Road	-consumption of fossil fuels (including non-CO ₂ emissions from biofuels) by combustion devices not licensed to operate on roads
Others - Pipelines	-transportation and distribution of crude oil, natural gas, and other products
c. Fugitive Sources	Intentional and unintentional releases of greenhouse gases from the following activities:
Coal Mining	Underground and surface mining
Oil and Natural Gas	Conventional and unconventional oil and gas exploration, production, transportation, and distribution
INDUSTRIAL PROCESSES	
a. Mineral Products	Emissions resulting from the following process activities:
b. Chemical Industry	Production of cement and lime; use of soda ash, limestone & dolomite, and magnesite
	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, magnesium production and casting
d. Production and Consumption of Halocarbons and SF₆	Production of HCFC-22; use of HFCs and/or PFCs in AC units, refrigeration units, fire extinguishers, aerosol cans, solvents, foam blowing, semiconductor manufacturing and electronics industry; use of SF ₆ in electrical equipment and semiconductors
e. Other & Undifferentiated Production	Non-energy use of fossil fuels mostly in chemical / petrochemical activities
SOLVENT & OTHER PRODUCT USE	
	Emissions resulting from the use of N ₂ O as anaesthetic and propellant
AGRICULTURE	
a. Enteric Fermentation	Emissions resulting from the eructation of CH ₄ during the digestion of plant material by (mainly) ruminants
b. Manure Management	Emissions resulting from the release of CH ₄ and N ₂ O due to microbial activity during the storage of feces, urine and bedding materials from the cleaning of barns and pens
c. Agricultural Soils	
Direct sources	Direct N ₂ O emissions from synthetic fertilizer, manure on cropland, crop residue, tillage, summerfallow, irrigation, and cultivation of organic soils
Manure on Pasture, Range, and Paddock	Direct N ₂ O emissions from manure deposited on pasture, range, and paddock
Indirect Sources	Indirect N ₂ O emissions from volatilization and leaching of animal manure nitrogen, synthetic fertilizer nitrogen, and crop residue nitrogen
d. Field Burning of Agricultural Residues	CH ₄ and N ₂ O emissions from crop residue burning
WASTE	
a. Solid Waste Disposal on Land	Emissions resulting from:
b. Wastewater Handling	Municipal solid waste management sites (landfills) and dedicated wood waste landfills
c. Waste Incineration	Domestic and industrial wastewater treatment
	Municipal solid waste and sewage sludge incineration
LAND USE, LAND-USE CHANGE AND FORESTRY	
a. Forest Land	Emissions and removals resulting from:
	Managed forests and lands converted to forests; includes growth, natural and anthropogenic disturbances (fire, harvest, insects).
b. Cropland	Management practices on lands in annual crops, summerfallow and perennial crops (forage, specialty crops, orchards); residual emissions from lands converted to cropland.
c. Grassland	Managed agricultural grassland.
d. Wetlands	Peatlands disturbed for peat harvesting, 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
LAND USE, LAND-USE CHANGE AND FORESTRY ACTIVITIES UNDER THE KYOTO PROTOCOL	
Activities under the Kyoto Protocol	
a. Article 3.3	
Afforestation/Reforestation	Human induced, permanent conversion of non-forest land to forest land
Deforestation	Human induced, permanent conversion of forest land to other land categories (excludes harvest and regrowth on forest land)
b. Article 3.4	
Cropland Management	Management practices on lands in annual crops, summerfallow and perennial crops (forage, specialty crops, orchards).

Table A12-2 Canada's 1990-2009 GHG Emissions by Sector

A12

Greenhouse Gas Categories	1990	2000	2004	2005	2006	2007	2008	2009
	kt CO ₂ equivalent							
TOTAL¹	590 000	716 000	742 000	731 000	719 000	748 000	732 000	690 000
ENERGY	468 000	586 000	605 000	595 000	583 000	613 000	597 000	566 000
a. Stationary Combustion Sources	279 000	343 000	352 000	339 000	327 000	353 000	339 000	315 000
Electricity and Heat Generation	91 600	127 000	123 000	123 000	115 000	122 000	116 000	97 900
Fossil Fuel Production and Refining	51 000	67 000	73 000	66 000	66 000	71 000	69 000	64 000
Petroleum Refining and Upgrading	18 000	16 000	20 000	19 000	19 000	21 000	20 000	20 000
Fossil Fuel Production	34 000	50 000	53 000	48 000	48 000	49 000	49 000	44 000
Mining & Oil and Gas Extraction	6 650	12 400	17 800	18 600	20 500	27 200	27 600	31 300
Manufacturing Industries	56 000	56 000	53 100	48 800	48 500	50 900	43 700	42 600
Iron and Steel	5 270	6 330	5 720	5 770	5 230	5 930	4 750	4 030
Non Ferrous Metals	3 260	3 220	3 260	3 290	3 250	3 510	3 680	3 120
Chemical	8 220	10 000	7 890	7 040	8 140	8 570	7 270	7 570
Pulp and Paper	14 400	12 000	10 300	7 920	6 660	6 670	5 160	4 510
Cement	3 820	4 240	4 760	5 020	5 200	4 840	4 630	3 610
Other Manufacturing	21 000	20 200	21 200	19 800	20 100	21 400	18 200	19 700
Construction	1 870	1 070	1 340	1 360	1 300	1 290	1 260	1 080
Commercial & Institutional	25 700	33 100	37 700	36 700	33 400	34 900	35 200	36 000
Residential	43 000	45 000	43 000	42 000	40 000	44 000	43 000	41 000
Agriculture & Forestry	2 390	2 540	2 090	1 970	1 910	2 240	2 260	2 050
b. Transport²	146 000	180 000	189 000	193 000	192 000	197 000	196 000	190 000
Civil Aviation (Domestic Aviation)	7 200	7 500	7 700	7 700	7 800	7 800	7 800	7 200
Road Transportation	96 700	118 000	129 000	130 000	131 000	133 000	132 000	131 000
Light-Duty Gasoline Vehicles	45 500	41 900	41 200	40 000	40 000	40 200	39 700	41 400
Light-Duty Gasoline Trucks	20 300	36 300	41 400	42 500	42 700	43 000	42 600	41 300
Heavy-Duty Gasoline Vehicles	7 440	5 460	6 620	6 540	6 650	6 810	6 840	6 990
Motorcycles	152	161	247	254	258	263	264	245
Light-Duty Diesel Vehicles	469	466	569	574	580	617	652	663
Light-Duty Diesel Trucks	702	1 660	1 830	1 930	1 960	2 020	2 020	1 940
Heavy-Duty Diesel Vehicles	20 000	30 900	36 000	37 600	38 500	39 600	39 200	38 200
Propane & Natural Gas Vehicles	2 200	1 100	860	720	790	830	880	780
Railways	7 000	7 000	6 000	6 000	6 000	7 000	7 000	7 000
Navigation (Domestic Marine)	5 000	5 100	6 600	6 400	5 800	6 100	5 900	5 100
Other Transportation	30 000	43 000	41 000	43 000	41 000	43 000	43 000	40 000
Off-Road Gasoline	7 800	8 800	9 000	8 300	7 600	8 100	7 400	7 600
Off-Road Diesel	16 000	23 000	23 000	24 000	24 000	26 000	28 000	26 000
Pipelines	6 850	11 200	8 470	10 100	9 610	8 940	7 460	6 320
c. Fugitive Sources	42 100	63 000	64 000	63 100	64 300	62 800	62 300	60 700
Coal Mining	2 000	900	700	700	700	800	800	700
Oil and Natural Gas	40 200	62 100	63 400	62 400	63 600	62 100	61 500	60 000
Oil	4 190	5 440	5 940	5 650	5 730	5 830	5 550	5 530
Natural Gas	11 400	17 700	18 700	19 200	19 700	19 700	19 700	19 400
Venting	20 200	33 500	33 100	32 100	32 100	31 300	30 700	28 700
Flaring	4 400	5 400	5 600	5 500	6 000	5 300	5 500	6 400
INDUSTRIAL PROCESSES	56 800	53 500	58 100	57 200	56 500	55 500	54 500	46 300
a. Mineral Products	8 300	9 600	9 500	9 500	9 600	9 300	8 600	6 800
Cement Production	5 400	6 700	7 100	7 200	7 300	7 300	6 600	5 100
Lime Production	1 800	1 900	1 800	1 700	1 600	1 600	1 500	1 200
Mineral Product Use ³	1 090	1 020	578	589	630	403	489	449
b. Chemical Industry	17 000	9 000	11 000	10 000	9 100	8 900	10 000	8 100
Ammonia Production	5 000	6 800	6 800	6 300	6 600	6 200	6 700	6 200
Nitric Acid Production	1 010	1 230	1 230	1 250	1 230	1 130	1 230	1 150
Adipic Acid Production	11 000	900	3 100	2 600	1 200	1 500	2 400	660
Petrochemical Production ⁴	110	97	98	79	81	81	73	63
c. Metal Production	22 600	22 500	19 900	19 600	20 100	18 800	18 500	15 000
Iron and Steel Production	10 200	11 500	10 400	10 100	11 000	11 000	10 600	7 650
Aluminum Production	9 300	8 200	7 300	8 200	7 700	7 300	7 400	7 200
SF ₆ Used in Magnesium Smelters and Casters	3 110	2 780	2 190	1 290	1 390	522	462	193
d. Production and Consumption of Halocarbons and SF₆⁵	990	3 200	5 000	5 400	5 200	5 700	5 700	7 000
e. Other & Undifferentiated Production	8 000	9 200	13 000	12 000	13 000	13 000	11 000	9 400
SOLVENT & OTHER PRODUCT USE	180	250	220	180	330	330	340	260
AGRICULTURE	47 000	55 000	58 000	58 000	57 000	57 000	58 000	56 000
a. Enteric Fermentation	16 000	20 000	21 000	22 000	21 000	21 000	20 000	19 000
b. Manure Management	5 700	6 900	7 300	7 500	7 300	7 100	6 800	6 600
c. Agriculture Soils	25 000	29 000	29 000	28 000	29 000	30 000	31 000	30 000
Direct Sources	14 000	15 000	15 000	15 000	15 000	16 000	17 000	16 000
Pasture, Range and Paddock Manure	2 200	3 100	3 300	3 400	3 300	3 200	3 200	3 000
Indirect Sources	9 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000
d. Field Burning of Agricultural Residues	210	120	32	41	44	35	45	45
WASTE	19 000	20 000	21 000	21 000	22 000	22 000	21 000	22 000
a. Solid Waste Disposal on Land	18 000	19 000	20 000	20 000	21 000	20 000	20 000	20 000
b. Wastewater Handling	780	930	970	980	990	1 000	1 000	1 000
c. Waste Incineration	400	250	230	240	240	250	250	260
Land Use, Land-use Change and Forestry	-67 000	-62 000	97 000	54 000	65 000	51 000	-17 000	-12 000
a. Forest Land	-93 000	-74 000	88 000	46 000	58 000	45 000	-22 000	-17 000
b. Cropland	11 000	-140	-3 400	-4 300	-4 800	-5 400	-6 300	-6 900
c. Grassland	-	-	-	-	-	-	-	-
d. Wetlands	5 000	3 000	3 000	3 000	3 000	3 000	3 000	2 000
e. Settlements	9 000	9 000	9 000	9 000	9 000	9 000	9 000	9 000
LAND USE, LAND-USE CHANGE AND FORESTRY								
Activities under the Kyoto Protocol								
a. Article 3.3								
Afforestation / reforestation	NA	NA	NA	NA	NA	NA	-738	-797
Deforestation	NA	NA	NA	NA	NA	NA	14 533	14 699
b. Article 3.4								
Cropland Management	3 732	NA	NA	NA	NA	NA	-11 711	-12 406

Notes:

1. National totals exclude all GHGs from the Land Use, Land-use Change and Forestry sector. The estimates for LULUCF activities under the Kyoto Protocol will be accounted for over the five years (2008-2012) of the first commitment period under the Protocol.

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-3 2009 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	542 000	4 400	92 000	150	47 000	6 800	2 200	390	690 000
ENERGY	507 000	2 300	49 000	30	10 000				566 000
a. Stationary Combustion Sources	308 000	200	4 000	8	2 000				315 000
Electricity and Heat Generation	97 200	4.9	100	2	600				97 900
Fossil Fuel Production and Refining	61 400	90	2 000	1	300				64 000
Petroleum Refining and Upgrading	20 000	0.3	6	0.08	20				20 000
Fossil Fuel Production	41 500	90	2 000	0.9	300				44 000
Mining & Oil and Gas Extraction	31 100	0.6	10	0.7	200				31 300
Manufacturing Industries	41 900	2	50	2	600				42 600
Iron and Steel	3 980	0.2	4	0.1	40				4 030
Non Ferrous Metals	3 110	0.07	1	0.04	10				3 120
Chemical	7 520	0.15	3.2	0.1	40				7 570
Pulp and Paper	4 120	2	30	1	400				4 510
Cement	3 610	0.07	1	0.02	7				3 610
Other Manufacturing	19 600	0.4	8	0.4	100				19 700
Construction	1 070	0.02	0.4	0.03	9				1 080
Commercial & Institutional	35 800	0.6	10	0.7	200				36 000
Residential	37 900	100	2 000	2	600				41 000
Agriculture & Forestry	2 040	0.04	0.8	0.06	20				2 050
b. Transport²	182 000	30	600	30	8 000				190 000
Civil Aviation (Domestic Aviation)	7 080	0.4	8	0.2	70				7 200
Road Transportation	128 000	10	220	12	3 700				131 000
Light-Duty Gasoline Vehicles	39 900	3.8	79	4.6	1 400				41 400
Light-Duty Gasoline Trucks	39 800	3.8	79	4.7	1 500				41 300
Heavy-Duty Gasoline Vehicles	6 810	0.30	6.3	0.53	170				6 990
Motorcycles	242	0.10	2.0	0.00	1.4				245
Light-Duty Diesel Vehicles	647	0.01	0.3	0.05	20				663
Light-Duty Diesel Trucks	1 890	0.05	1	0.2	50				1 940
Heavy-Duty Diesel Vehicles	37 500	2	30	2	600				38 200
Propane & Natural Gas Vehicles	764	0.7	20	0.02	5				780
Railways	6 110	0.3	7	3	800				7 000
Navigation (Domestic Marine)	4 770	0.4	7	0.9	300				5 100
Other Transportation	36 000	20	300	10	3 000				40 000
Off-Road Gasoline	7 400	9	200	0.2	50				7 600
Off-Road Diesel	23 000	1	30	9	3 000				26 000
Pipelines	6 140	6.2	130	0.2	50				6 320
c. Fugitive Sources	17 000	2 100	44 000	0.1	40				60 700
Coal Mining		30	700						700
Oil and Natural Gas	16 700	2 060	43 200	0.1	40				60 000
Oil	200	252	5 300	0.1	30				5 530
Natural Gas	67.3	920	19 300	-	-				19 400
Venting	10 200	881	18 500	0.01	4				28 700
Flaring	6 300	4.2	88	0.03	9				6 400
INDUSTRIAL PROCESSES	35 000	2.6	55	5.87	1 820	6 800	2 200	390	46 300
a. Mineral Products	6 800								6 800
Cement Production	5 100								5 100
Lime Production	1 200								1 200
Mineral Product Use ³	449								449
b. Chemical Industry	6 200	2.6	55	5.87	1 820				8 100
Ammonia Production	6 200								6 200
Nitric Acid Production				3.71	1 150				1 150
Adipic Acid Production	-	-	-	2.1	660				660
Petrochemical Production ⁴		2.6	55	0.02	7.3				63
c. Metal Production	12 700						2 200	207	15 000
Iron and Steel Production	7 650								7 650
Aluminum Production	5 000						2 200	13.7	7 200
SF ₆ Used in Magnesium Smelters and Casters								193	193
d. Production and Consumption of Halocarbons and SF₆⁵						6 800	9	180	7 000
e. Other & Undifferentiated Production	9 400								9 400
SOLVENT & OTHER PRODUCT USE				0.84	260				260
AGRICULTURE		1 000	22 000	110	34 000				56 000
a. Enteric Fermentation		920	19 000						19 000
b. Manure Management		130	2 700	13	3 900				6 600
c. Agriculture Soils				97	30 000				30 000
Direct Sources				52	16 000				16 000
Pasture, Range and Paddock Manure				9.7	3 000				3 000
Indirect Sources				40	10 000				10 000
d. Field Burning of Agricultural Residues		1.5	33	0.04	12				45
WASTE	200	980	21 000	2	700				22 000
a. Solid Waste Disposal on Land		970	20 000						20 000
b. Wastewater Handling		16	340	2	700				1 000
c. Waste Incineration	200	0.08	2	0.2	50				260
Land Use, Land-use Change and Forestry	-22 000	280	5 800	12	3 600				-12 000
a. Forest Land	-26 000	270	5 600	11	3 500				-17 000
b. Cropland	-7 100	5	100	0.2	70				-6 900
c. Grassland									
d. Wetlands	2 000	0		0					2 000
e. Settlements	9 000	6	100	0.2	70				9 000
LAND USE, LAND-USE CHANGE AND FORESTRY Activities under the Kyoto Protocol									
a. Article 3.3									
Afforestation / reforestation	-797	-	-	-	-				-797
Deforestation	14 332	10.8	225.8	0.5	140.5				14 699
b. Article 3.4									
Cropland Management	-12 406			0	0				-12 406

Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry sector. The estimates for LULUCF activities under the Kyoto Protocol will be accounted for over the five years (2008-2012) of the first commitment period under the Protocol.
- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
- The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.
- The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.
- Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-4 2008 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories		Greenhouse Gases									
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL	
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	
TOTAL ¹		577 000	4 500	95 000	170	51 000	5 500	2 200	670	732 000	
ENERGY		535 000	2 400	51 000	40	10 000				597 000	
a.	Stationary Combustion Sources	331 000	200	5 000	9	3 000				339 000	
	Electricity and Heat Generation	115 000	5.7	120	2	700				116 000	
	Fossil Fuel Production and Refining	66 500	100	2 000	1	400				69 000	
	Petroleum Refining and Upgrading	20 000	0.3	7	0.1	40				20 000	
	Fossil Fuel Production	46 200	100	2 000	1	300				49 000	
	Mining & Oil and Gas Extraction	27 400	0.5	10	0.6	200				27 600	
	Manufacturing Industries	43 100	3	50	2	600				43 700	
	Iron and Steel	4 700	0.2	5	0.2	50				4 750	
	Non Ferrous Metals	3 660	0.08	2	0.05	20				3 680	
	Chemical	7 230	0.15	3.1	0.1	40				7 270	
	Pulp and Paper	4 740	2	40	1	400				5 160	
	Cement	4 620	0.09	2	0.03	10				4 630	
	Other Manufacturing	18 100	0.4	7	0.4	100				18 200	
	Construction	1 250	0.02	0.5	0.03	10				1 260	
	Commercial & Institutional	34 900	0.6	10	0.7	200				35 200	
	Residential	40 400	100	2 000	2	600				43 000	
	Agriculture & Forestry	2 230	0.04	0.8	0.07	20				2 260	
	b.	Transport ²	187 000	30	600	30	9 000				196 000
		Civil Aviation (Domestic Aviation)	7 690	0.4	8	0.2	70				7 800
		Road Transportation	128 000	11	220	13	4 100				132 000
Light-Duty Gasoline Vehicles		38 100	3.7	78	4.8	1 500				39 700	
Light-Duty Gasoline Trucks		40 800	4.0	84	5.5	1 700				42 600	
Heavy-Duty Gasoline Vehicles		6 670	0.33	7.0	0.52	160				6 840	
Motorcycles		260	0.10	2.2	0.00	1.5				264	
Light-Duty Diesel Vehicles		636	0.01	0.3	0.05	20				652	
Light-Duty Diesel Trucks		1 970	0.05	1	0.2	50				2 020	
Heavy-Duty Diesel Vehicles		38 500	2	30	2	600				39 200	
Propane & Natural Gas Vehicles		857	0.8	20	0.02	5				880	
Railways		6 320	0.3	7	3	800				7 000	
Navigation (Domestic Marine)		5 530	0.4	9	1	300				5 900	
Other Transportation		40 000	20	400	10	3 000				43 000	
Off-Road Gasoline		7 200	9	200	0.2	50				7 400	
Off-Road Diesel		25 000	1	30	10	3 000				28 000	
Pipelines		7 240	7.3	150	0.2	60				7 460	
c.		Fugitive Sources	16 000	2 200	46 000	0.1	40				62 300
		Coal Mining		40	800						800
		Oil and Natural Gas	16 400	2 150	45 100	0.1	40				61 500
	Oil	210	253	5 310	0.1	30				5 550	
	Natural Gas	68.3	936	19 700	-	-				19 700	
	Venting	10 700	955	20 100	0.01	4				30 700	
	Flaring	5 400	3.7	78	0.01	4				5 500	
	INDUSTRIAL PROCESSES	42 000	3.1	64	11.8	3 650	5 500	2 200	670	54 500	
a.	Mineral Products	8 600								8 600	
	Cement Production	6 600								6 600	
	Lime Production	1 500								1 500	
	Mineral Product Use ³	489								489	
b.	Chemical Industry	6 700	3.1	64	11.8	3 650				10 000	
	Ammonia Production	6 700								6 700	
	Nitric Acid Production				3.96	1 230				1 230	
	Adipic Acid Production	-	-	-	7.8	2 400	-	-	-	2 400	
c.	Petrochemical Production ⁴		3.1	64	0.03	9.0				73	
	Metal Production	15 800						2 200	465	18 500	
	Iron and Steel Production	10 600								10 600	
	Aluminum Production	5 200						2 200	3.74	7 400	
d.	SF ₆ Used in Magnesium Smelters and Casters								462	462	
	Production and Consumption of Halocarbons and SF ₆ ⁵						5 500	4	210	5 700	
e.	Other & Undifferentiated Production	11 000								11 000	
SOLVENT & OTHER PRODUCT USE					1.1	340				340	
AGRICULTURE			1 100	23 000	110	35 000				58 000	
a.	Enteric Fermentation		960	20 000						20 000	
b.	Manure Management		130	2 800						6 800	
c.	Agriculture Soils				100	31 000				31 000	
	Direct Sources				54	17 000				17 000	
	Pasture, Range and Paddock Manure				10	3 200				3 200	
	Indirect Sources				40	10 000				10 000	
d.	Field Burning of Agricultural Residues	-	1.6	33	0.04	13	-	-	-	45	
WASTE		200	970	20 000	2	700				21 000	
a.	Solid Waste Disposal on Land		960	20 000		-				20 000	
b.	Wastewater Handling		16	340	2	700				1 000	
c.	Waste Incineration	200	0.08	2	0.2	50				250	
Land Use, Land-use Change and Forestry		-24 000	200	4 300	8.6	2 700				-17 000	
a.	Forest Land	-29 000	190	4 100	8.2	2 500				-22 000	
b.	Cropland	-6 400	5	100	0.2	70				-6 300	
c.	Grassland	-	-	-	-	-				0	
d.	Wetlands	3 000	0	-	0	-				3 000	
e.	Settlements	9 000	6	100	0.2	60				9 000	
LAND USE, LAND-USE CHANGE AND FORESTRY											
Activities under the Kyoto Protocol											
a.	Article 3.3										
	Afforestation / reforestation	-738	-	-	-	-				-738	
	Deforestation	14 171	10.7	224.1	0.4	137.9				14 533	
b.	Article 3.4										
	Cropland Management	-11 712	0	-	0	1				-11 711	

Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry sector. The estimates for LULUCF activities under the Kyoto Protocol will be accounted for over the five years (2008-2012) of the first commitment period under the Protocol.
- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
- The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.
- The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.
- Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–5 2007 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	594 000	4 600	97 000	160	49 000	5 400	2 200	770	748 000
ENERGY	549 000	2 500	52 000	40	10 000				613 000
a. Stationary Combustion Sources	346 000	200	5 000	9	3 000				353 000
Electricity and Heat Generation	122 000	6.0	130	2	700				122 000
Fossil Fuel Production and Refining	68 100	100	2 000	1	400				71 000
Petroleum Refining and Upgrading	21 000	0.3	6	0.1	40				21 000
Fossil Fuel Production	46 900	100	2 000	1	300				49 000
Mining & Oil and Gas Extraction	27 000	0.5	10	0.6	200				27 200
Manufacturing Industries	50 200	3	60	2	700				50 900
Iron and Steel	5 860	0.3	5	0.2	60				5 930
Non Ferrous Metals	3 490	0.08	2	0.05	20				3 510
Chemical	8 520	0.18	3.7	0.1	50				8 570
Pulp and Paper	6 220	2	40	1	400				6 670
Cement	4 830	0.09	2	0.04	10				4 840
Other Manufacturing	21 200	0.4	9	0.4	100				21 400
Construction	1 280	0.02	0.5	0.03	10				1 290
Commercial & Institutional	34 700	0.6	10	0.7	200				34 900
Residential	41 000	100	2 000	2	600				44 000
Agriculture & Forestry	2 220	0.04	0.8	0.07	20				2 240
b. Transport²	188 000	30	700	30	9 000				197 000
Civil Aviation (Domestic Aviation)	7 760	0.3	7	0.2	70				7 800
Road Transportation	128 000	11	230	15	4 600				133 000
Light-Duty Gasoline Vehicles	38 400	3.9	82	5.5	1 700				40 200
Light-Duty Gasoline Trucks	40 900	4.1	87	6.4	2 000				43 000
Heavy-Duty Gasoline Vehicles	6 650	0.35	7.3	0.51	160				6 810
Motorcycles	260	0.10	2.2	0.00	1.5				263
Light-Duty Diesel Vehicles	601	0.01	0.3	0.05	20				617
Light-Duty Diesel Trucks	1 970	0.05	1	0.2	50				2 020
Heavy-Duty Diesel Vehicles	38 900	2	30	2	600				39 600
Propane & Natural Gas Vehicles	812	0.7	20	0.02	5				830
Railways	6 010	0.3	7	2	800				7 000
Navigation (Domestic Marine)	5 740	0.4	9	1	400				6 100
Other Transportation	40 000	20	400	10	3 000				43 000
Off-Road Gasoline	7 900	10	200	0.2	50				8 100
Off-Road Diesel	23 000	1	30	10	3 000				26 000
Pipelines	8 680	8.8	180	0.2	70				8 940
c. Fugitive Sources	16 000	2 200	47 000	0.1	40				62 800
Coal Mining		40	800						800
Oil and Natural Gas	15 600	2 210	46 400	0.1	40				62 100
Oil	220	266	5 580	0.1	30				5 830
Natural Gas	65.5	933	19 600	-	-				19 700
Venting	10 100	1 010	21 100	0.01	4				31 300
Flaring	5 200	3.6	76	0.01	2				5 300
INDUSTRIAL PROCESSES	44 000	3.4	71	8.49	2 630	5 400	2 200	770	55 500
a. Mineral Products	9 300								9 300
Cement Production	7 300								7 300
Lime Production	1 600								1 600
Mineral Product Use ³	403								403
b. Chemical Industry	6 200	3.4	71	8.49	2 630				8 900
Ammonia Production	6 200								6 200
Nitric Acid Production				3.65	1 130				1 130
Adipic Acid Production	-	-	-	4.8	1 500	-	-	-	1 500
Petrochemical Production ⁴		3.4	71	0.03	10				81
c. Metal Production	16 100						2 200	535	18 800
Iron and Steel Production	11 000								11 000
Aluminum Production	5 100						2 200	12.4	7 300
SF ₆ Used in Magnesium Smelters and Casters								522	522
d. Production and Consumption of Halocarbons and SF₆⁵						5 400	4	240	5 700
e. Other & Undifferentiated Production	13 000								13 000
SOLVENT & OTHER PRODUCT USE				1.1	330				330
AGRICULTURE		1 100	24 000	110	34 000				57 000
a. Enteric Fermentation		990	21 000						21 000
b. Manure Management		140	3 000	13	4 100				7 100
c. Agriculture Soils				95	30 000				30 000
Direct Sources				50	16 000				16 000
Pasture, Range and Paddock Manure				10	3 200				3 200
Indirect Sources				30	10 000				10 000
d. Field Burning of Agricultural Residues		1.2	25	0.03	9.7				35
WASTE	190	980	21 000	2	700				22 000
a. Solid Waste Disposal on Land		960	20 000						20 000
b. Wastewater Handling		16	330	2	700				1 000
c. Waste Incineration	190	0.07	2	0.2	50				250
Land Use, Land-use Change and Forestry	40 000	330	7 000	14	4 400				51 000
a. Forest Land	34 000	320	6 800	14	4 200				45 000
b. Cropland	-5 600	5	100	0.2	80				-5 400
c. Grassland									
d. Wetlands	3 000	0		0					3 000
e. Settlements	9 000	6	100	0.2	70				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-6 2006 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
	Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹		564 000	4 700	98 000	150	48 000	5 000	2 600	719 000
ENERGY		519 000	2 500	53 000	40	10 000			583 000
a. Stationary Combustion Sources		320 000	200	5 000	8	3 000			327 000
Electricity and Heat Generation		114 000	5.3	110	2	700			115 000
Fossil Fuel Production and Refining		63 900	100	2 000	1	400			66 000
Petroleum Refining and Upgrading		19 000	0.3	6	0.1	40			19 000
Fossil Fuel Production		45 300	100	2 000	1	300			48 000
Mining & Oil and Gas Extraction		20 400	0.4	8	0.5	100			20 500
Manufacturing Industries		47 900	3	60	2	600			48 500
Iron and Steel		5 170	0.2	5	0.2	60			5 230
Non Ferrous Metals		3 240	0.07	2	0.05	10			3 250
Chemical		8 100	0.17	3.6	0.1	40			8 140
Pulp and Paper		6 250	2	40	1	400			6 660
Cement		5 190	0.1	2	0.04	10			5 200
Other Manufacturing		19 900	0.4	8	0.4	100			20 100
Construction		1 290	0.02	0.5	0.03	10			1 300
Commercial & Institutional		33 200	0.6	10	0.7	200			33 400
Residential		37 300	100	2 000	2	500			40 000
Agriculture & Forestry		1 890	0.03	0.7	0.06	20			1 910
b. Transport²		183 000	30	700	30	9 000			192 000
Civil Aviation (Domestic Aviation)		7 770	0.3	6	0.2	70			7 800
Road Transportation		126 000	11	230	16	4 900			131 000
Light-Duty Gasoline Vehicles		38 100	4.0	83	6.0	1 900			40 000
Light-Duty Gasoline Trucks		40 400	4.1	87	7.1	2 200			42 700
Heavy-Duty Gasoline Vehicles		6 500	0.35	7.4	0.48	150			6 650
Motorcycles		254	0.11	2.2	0.00	1.5			258
Light-Duty Diesel Vehicles		565	0.01	0.2	0.05	10			580
Light-Duty Diesel Trucks		1 910	0.05	1	0.2	50			1 960
Heavy-Duty Diesel Vehicles		37 800	2	30	2	600			38 500
Propane & Natural Gas Vehicles		770	0.7	20	0.02	5			790
Railways		5 660	0.3	7	2	700			6 000
Navigation (Domestic Marine)		5 380	0.4	8	1	400			5 800
Other Transportation		38 000	20	400	9	3 000			41 000
Off-Road Gasoline		7 300	9	200	0.2	50			7 600
Off-Road Diesel		21 000	1	20	9	3 000			24 000
Pipelines		9 340	9.4	200	0.3	80			9 610
c. Fugitive Sources		16 000	2 300	48 000	0.1	40			64 300
Coal Mining			30	700					700
Oil and Natural Gas		16 400	2 250	47 200	0.1	40			63 600
Oil		190	262	5 510	0.1	30			5 730
Natural Gas		65.8	936	19 700	-	-			19 700
Venting		10 200	1 040	21 900	0.01	5			32 100
Flaring		5 900	4.1	86	0.01	3			6 000
INDUSTRIAL PROCESSES		45 000	3.4	70	7.91	2 450	5 000	2 600	56 500
a. Mineral Products		9 600							9 600
Cement Production		7 300							7 300
Lime Production		1 600							1 600
Mineral Product Use ³		630							630
b. Chemical Industry		6 600	3.4	70	7.91	2 450			9 100
Ammonia Production		6 600							6 600
Nitric Acid Production					3.98	1 230			1 230
Adipic Acid Production		-	-	-	3.9	1 200			1 200
Petrochemical Production ⁴			3.4	70	0.03	10			81
c. Metal Production		16 100					2 600	1 410	20 100
Iron and Steel Production		11 000							11 000
Aluminum Production		5 100					2 600	13.1	7 700
SF ₆ Used in Magnesium Smelters and Casters								1 390	1 390
d. Production and Consumption of Halocarbons and SF₆⁵						5 000	5	190	5 200
e. Other & Undifferentiated Production		13 000							13 000
SOLVENT & OTHER PRODUCT USE				1.1	330				330
AGRICULTURE			1 200	24 000	110	33 000			57 000
a. Enteric Fermentation			1 000	21 000					21 000
b. Manure Management			150	3 100	14	4 200			7 300
c. Agriculture Soils					92	29 000			29 000
Direct Sources					48	15 000			15 000
Pasture, Range and Paddock Manure					11	3 300			3 300
Indirect Sources					30	10 000			10 000
d. Field Burning of Agricultural Residues			1.5	32	0.04	12			44
WASTE		190	990	21 000	2	700			22 000
a. Solid Waste Disposal on Land			980	21 000					21 000
b. Wastewater Handling			16	330	2	700			990
c. Waste Incineration		190	0.07	1	0.2	50			240
Land Use, Land-use Change and Forestry		54 000	320	6 800	14	4 200			65 000
a. Forest Land		47 000	310	6 600	13	4 100			58 000
b. Cropland		-5 000	5	100	0.2	80			-4 800
c. Grassland									
d. Wetlands		3 000	0		0				3 000
e. Settlements		9 000	6	100	0.2	70			9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–7 2005 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	573 000	4 700	98 000	160	50 000	5 200	3 300	1 500	731 000
ENERGY	530 000	2 500	53 000	40	10 000				595 000
a. Stationary Combustion Sources	331 000	200	5 000	9	3 000				339 000
Electricity and Heat Generation	122 000	5.6	120	2	700				123 000
Fossil Fuel Production and Refining	63 800	100	2 000	1	400				66 000
Petroleum Refining and Upgrading	19 000	0.3	7	0.1	40				19 000
Fossil Fuel Production	45 000	100	2 000	1	300				48 000
Mining & Oil and Gas Extraction	18 500	0.4	7	0.4	100				18 600
Manufacturing Industries	48 100	3	60	2	700				48 800
Iron and Steel	5 710	0.2	5	0.2	60				5 770
Non Ferrous Metals	3 280	0.08	2	0.05	20				3 290
Chemical	7 000	0.14	3.0	0.1	40				7 040
Pulp and Paper	7 450	2	40	1	400				7 920
Cement	5 000	0.1	2	0.04	10				5 020
Other Manufacturing	19 600	0.4	8	0.4	100				19 800
Construction	1 350	0.02	0.5	0.03	10				1 360
Commercial & Institutional	36 400	0.6	10	0.7	200				36 700
Residential	39 300	100	2 000	2	600				42 000
Agriculture & Forestry	1 950	0.03	0.7	0.06	20				1 970
b. Transport²	183 000	30	700	30	9 000				193 000
Civil Aviation (Domestic Aviation)	7 600	0.3	6	0.2	70				7 700
Road Transportation	125 000	11	230	17	5 300				130 000
Light-Duty Gasoline Vehicles	37 800	4.1	87	6.7	2 100				40 000
Light-Duty Gasoline Trucks	39 900	4.2	89	7.9	2 500				42 500
Heavy-Duty Gasoline Vehicles	6 390	0.37	7.7	0.46	140				6 540
Motorcycles	250	0.11	2.2	0.00	1.4				254
Light-Duty Diesel Vehicles	559	0.01	0.2	0.05	10				574
Light-Duty Diesel Trucks	1 880	0.05	1	0.2	50				1 930
Heavy-Duty Diesel Vehicles	37 000	2	30	2	600				37 600
Propane & Natural Gas Vehicles	706	0.7	10	0.01	4				720
Railways	5 480	0.3	6	2	700				6 000
Navigation (Domestic Marine)	6 050	0.4	9	1	400				6 400
Other Transportation	39 000	20	400	9	3 000				43 000
Off-Road Gasoline	8 000	10	200	0.2	50				8 300
Off-Road Diesel	22 000	1	20	9	3 000				24 000
Pipelines	9 780	9.8	210	0.3	80				10 100
c. Fugitive Sources	16 000	2 300	47 000	0.1	40				63 100
Coal Mining		30	700						700
Oil and Natural Gas	15 600	2 230	46 800	0.1	40				62 400
Oil	170	260	5 450	0.1	30				5 650
Natural Gas	61.3	909	19 100	-	-				19 200
Venting	9 950	1 050	22 100	0.01	5				32 100
Flaring	5 400	3.7	78	0.01	2				5 500
INDUSTRIAL PROCESSES	43 000	3.4	71	12.6	3 910	5 200	3 300	1 500	57 200
a. Mineral Products	9 500								9 500
Cement Production	7 200								7 200
Lime Production	1 700								1 700
Mineral Product Use ³	589								589
b. Chemical Industry	6 300	3.4	71	12.6	3 910				10 000
Ammonia Production	6 300								6 300
Nitric Acid Production				4.04	1 250				1 250
Adipic Acid Production	-	-	-	8.5	2 600				2 600
Petrochemical Production ⁴		3.4	71	0.03	7.7				79
c. Metal Production	15 000						3 300	1 310	19 600
Iron and Steel Production	10 100								10 100
Aluminum Production	4 800						3 300	17.6	8 200
SF ₆ Used in Magnesium Smelters and Casters								1 290	1 290
d. Production and Consumption of Halocarbons and SF₆⁵						5 200	5	180	5 400
e. Other & Undifferentiated Production	12 000								12 000
SOLVENT & OTHER PRODUCT USE				0.59	180				180
AGRICULTURE		1 200	25 000	110	33 000				58 000
a. Enteric Fermentation		1 000	22 000						22 000
b. Manure Management		150	3 100	14	4 300				7 500
c. Agriculture Soils				92	28 000				28 000
Direct Sources				47	15 000				15 000
Pasture, Range and Paddock Manure				11	3 400				3 400
Indirect Sources				30	10 000				10 000
d. Field Burning of Agricultural Residues		1.4	30	0.04	11				41
WASTE	190	970	20 000	2	700				21 000
a. Solid Waste Disposal on Land		960	20 000						20 000
b. Wastewater Handling		15	320	2	700				980
c. Waste Incineration	190	0.06	1	0.2	50				240
Land Use, Land-use Change and Forestry	44 000	270	5 700	11	3 600				54 000
a. Forest Land	37 000	260	5 500	11	3 400				46 000
b. Cropland	-4 500	5	100	0.2	70				-4 300
c. Grassland									
d. Wetlands	3 000	1	30	0.06	20				3 000
e. Settlements	9 000	6	100	0.2	70				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of ethylene; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-8 2004 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	583 000	4 700	98 000	160	51 000	4 700	3 100	2 500	742 000
ENERGY	539 000	2 500	53 000	40	10 000				605 000
a. Stationary Combustion Sources	344 000	200	5 000	9	3 000				352 000
Electricity and Heat Generation	122 000	5.3	110	2	700				123 000
Fossil Fuel Production and Refining	70 700	100	2 000	1	400				73 000
Petroleum Refining and Upgrading	20 000	0.4	8	0.1	40				20 000
Fossil Fuel Production	50 500	100	2 000	1	400				53 000
Mining & Oil and Gas Extraction	17 700	0.3	7	0.4	100				17 800
Manufacturing Industries	52 400	3	60	2	700				53 100
Iron and Steel	5 660	0.2	5	0.2	60				5 720
Non Ferrous Metals	3 240	0.07	2	0.05	20				3 260
Chemical	7 850	0.16	3.4	0.1	40				7 890
Pulp and Paper	9 820	2	40	2	500				10 300
Cement	4 750	0.09	2	0.04	10				4 760
Other Manufacturing	21 100	0.4	9	0.4	100				21 200
Construction	1 330	0.02	0.5	0.03	10				1 340
Commercial & Institutional	37 500	0.7	10	0.8	200				37 700
Residential	40 400	100	2 000	2	600				43 000
Agriculture & Forestry	2 070	0.04	0.7	0.06	20				2 090
b. Transport²	179 000	30	700	30	10 000				189 000
Civil Aviation (Domestic Aviation)	7 630	0.3	7	0.2	70				7 700
Road Transportation	123 000	12	240	19	5 800				129 000
Light-Duty Gasoline Vehicles	38 700	4.5	93	7.6	2 400				41 200
Light-Duty Gasoline Trucks	38 600	4.3	89	8.6	2 700				41 400
Heavy-Duty Gasoline Vehicles	6 470	0.40	8.4	0.45	140				6 620
Motorcycles	243	0.11	2.3	0.00	1.4				247
Light-Duty Diesel Vehicles	555	0.01	0.3	0.04	10				569
Light-Duty Diesel Trucks	1 790	0.05	1	0.1	40				1 830
Heavy-Duty Diesel Vehicles	35 400	2	30	2	600				36 000
Propane & Natural Gas Vehicles	842	0.7	20	0.02	5				860
Railways	5 220	0.3	6	2	700				6 000
Navigation (Domestic Marine)	6 230	0.5	10	1	400				6 600
Other Transportation	37 000	20	400	9	3 000				41 000
Off-Road Gasoline	8 700	10	200	0.2	60				9 000
Off-Road Diesel	20 000	1	20	8	3 000				23 000
Pipelines	8 230	8.3	170	0.2	70				8 470
c. Fugitive Sources	16 000	2 300	48 000	0.1	40				64 000
Coal Mining		30	700						700
Oil and Natural Gas	16 000	2 250	47 300	0.1	40				63 400
Oil	180	273	5 730	0.1	30				5 940
Natural Gas	57.4	887	18 600	-	-				18 700
Venting	10 300	1 090	22 900	0.02	5				33 100
Flaring	5 500	3.8	80	0.01	2				5 600
INDUSTRIAL PROCESSES	43 000	4.2	88	14.0	4 330	4 700	3 100	2 500	58 100
a. Mineral Products	9 500								9 500
Cement Production	7 100								7 100
Lime Production	1 800								1 800
Mineral Product Use ³	578								578
b. Chemical Industry	6 800	4.2	88	14.0	4 330				11 000
Ammonia Production	6 800								6 800
Nitric Acid Production				3.96	1 230				1 230
Adipic Acid Production	-	-	-	10	3 100	-	-	-	3 100
Petrochemical Production ⁴		4.2	88	0.03	9.8				98
c. Metal Production	14 600						3 000	2 220	19 900
Iron and Steel Production	10 400								10 400
Aluminum Production	4 200						3 000	31.9	7 300
SF ₆ Used in Magnesium Smelters and Casters								2 190	2 190
d. Production and Consumption of Halocarbons and SF₆⁵						4 700	20	230	5 000
e. Other & Undifferentiated Production	13 000								13 000
SOLVENT & OTHER PRODUCT USE				0.69	220				220
AGRICULTURE		1 200	25 000	110	33 000				58 000
a. Enteric Fermentation		1 000	21 000						21 000
b. Manure Management		150	3 100	14	4 200				7 300
c. Agriculture Soils				94	29 000				29 000
Direct Sources				49	15 000				15 000
Pasture, Range and Paddock Manure				11	3 300				3 300
Indirect Sources				30	10 000				10 000
d. Field Burning of Agricultural Residues		1.1	23	0.03	8.8				32
WASTE	180	960	20 000	2	700				21 000
a. Solid Waste Disposal on Land		950	20 000						20 000
b. Wastewater Handling		15	320	2	700				970
c. Waste Incineration	180	0.06	1	0.2	50				230
Land Use, Land-use Change and Forestry	81 000	460	9 700	19	6 000				97 000
a. Forest Land	73 000	450	9 500	19	5 900				88 000
b. Cropland	-3 600	5	100	0.2	70				-3 400
c. Grassland									
d. Wetlands	3 000	0.9	20	0.04	10				3 000
e. Settlements	9 000	6	100	0.2	70				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–9 2003 GHG Emission Summary for Canada

Greenhouse Gas Categories		Greenhouse Gases							
		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆
Global Warming Potential				21		310			
Unit		kt	kt	kt CO ₂ equivalent	kt	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	ENERGY	583 000	4 600	97 000	160	48 000	4 400	3 000	2 800
		542 000	2 500	53 000	40	10 000			
a. Stationary Combustion Sources		352 000	200	5 000	9	3 000			
		128 000	4.9	100	2	700			
	Electricity and Heat Generation	70 800	100	2 000	1	400			
	Fossil Fuel Production and Refining	21 000	0.3	7	0.1	40			
	Petroleum Refining and Upgrading	49 500	100	2 000	1	400			
	Fossil Fuel Production	17 700	0.4	7	0.4	100			
	Mining & Oil and Gas Extraction	52 300	3	60	2	700			
	Manufacturing Industries	5 730	0.2	5	0.2	60			
	Iron and Steel	3 200	0.07	1	0.05	10			
	Non Ferrous Metals	7 380	0.15	3.1	0.1	40			
	Chemical	9 990	2	40	1	400			
	Pulp and Paper	4 560	0.08	2	0.04	10			
	Cement	21 500	0.4	9	0.4	100			
	Other Manufacturing	1 280	0.02	0.5	0.03	9			
	Construction	37 500	0.7	10	0.8	200			
	Commercial & Institutional	42 500	100	2 000	2	600			
	Residential	2 170	0.04	0.8	0.06	20			
	Agriculture & Forestry	174 000	30	700	30	10 000			
b. Transport²		174 000	30	700	30	10 000			
		7 180	0.3	7	0.2	70			
	Civil Aviation (Domestic Aviation)	119 000	12	250	20	6 100			
	Road Transportation	38 900	4.7	99	8.4	2 600			
	Light-Duty Gasoline Vehicles	37 200	4.3	89	9.1	2 800			
	Light-Duty Gasoline Trucks	6 160	0.41	8.6	0.41	130			
	Heavy-Duty Gasoline Vehicles	226	0.10	2.2	0.00	1.3			
	Motorcycles	512	0.01	0.2	0.04	10			
	Light-Duty Diesel Vehicles	1 720	0.04	0.9	0.1	40			
	Light-Duty Diesel Trucks	33 100	1	30	2	500			
	Heavy-Duty Diesel Vehicles	795	0.7	10	0.02	5			
	Propane & Natural Gas Vehicles	5 130	0.3	6	2	700			
	Railways	5 820	0.4	9	1	300			
	Navigation (Domestic Marine)	37 000	20	400	9	3 000			
	Other Transportation	8 600	10	200	0.2	60			
	Off-Road Gasoline	20 000	1	20	8	3 000			
	Off-Road Diesel	8 790	8.8	190	0.2	70			
	Pipelines	16 000	2 300	47 000	0.1	40			
c. Fugitive Sources		16 000	2 300	47 000	0.1	40			
		16 300	2 220	46 700	0.1	40			
	Coal Mining	170	265	5 570	0.1	30			
	Oil and Natural Gas	55.5	873	18 300	-	-			
	Oil	10 500	1 080	22 700	0.02	5			
	Natural Gas	5 600	3.7	77	0.00	1			
	Venting								
	Flaring	40 000	3.7	78	7.61	2 360	4 400	3 000	2 800
INDUSTRIAL PROCESSES		40 000	3.7	78	7.61	2 360	4 400	3 000	2 800
a. Mineral Products		9 100							
		6 800							
	Cement Production	1 700							
	Lime Production	612							
	Mineral Product Use ³	6 100	3.7	78	7.61	2 360			
b. Chemical Industry		6 100	3.7	78	7.61	2 360			
		6 100							
	Ammonia Production				4.08	1 260			
	Nitric Acid Production				3.5	1 100			
	Adipic Acid Production				0.03	10			
	Petrochemical Production ⁴		3.7	78	0.03	10			
c. Metal Production		14 800							
		10 200							
	Iron and Steel Production	4 600							
	Aluminum Production						3 000	2 550	20 400
	SF ₆ Used in Magnesium Smelters and Casters							70.4	10 200
	SF ₆ Used in Magnesium Smelters and Casters							2 480	7 700
d. Production and Consumption of Halocarbons and SF₆⁵									
e. Other & Undifferentiated Production		10 000							
							4 400	20	230
SOLVENT & OTHER PRODUCT USE									
AGRICULTURE			1 100	24 000	100	32 000			
a. Enteric Fermentation			990	21 000					
b. Manure Management			150	3 100	13	4 200			
c. Agriculture Soils					91	28 000			
					47	15 000			
	Direct Sources				10	3 200			
	Pasture, Range and Paddock Manure				30	10 000			
	Indirect Sources								
d. Field Burning of Agricultural Residues			4.2	87	0.11	33			
WASTE		180	950	20 000	2	700			
a. Solid Waste Disposal on Land			930	20 000					
b. Wastewater Handling			15	320	2	600			
c. Waste Incineration		180	0.05	1	0.1	50			
Land Use, Land-use Change and Forestry		29 000	420	8 800	18	5 400			
a. Forest Land		20 000	410	8 500	17	5 300			
b. Cropland		-2 800	5	100	0.2	80			
c. Grassland									
d. Wetlands		3 000	0.7	20	0.03	10			
e. Settlements		8 000	6	100	0.2	60			

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-10 2002 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL ¹		564 000	4 600	96 000	150	46 000	3 900	3 000	3 200	715 000
ENERGY		524 000	2 500	52 000	40	10 000				589 000
a.	Stationary Combustion Sources	338 000	200	5 000	9	3 000				346 000
	Electricity and Heat Generation	123 000	4.6	96	2	700				123 000
	Fossil Fuel Production and Refining	71 400	100	2 000	1	400				74 000
	Petroleum Refining and Upgrading	21 000	0.3	7	0.1	40				21 000
	Fossil Fuel Production	50 700	100	2 000	1	400				54 000
	Mining & Oil and Gas Extraction	13 900	0.3	6	0.3	100				14 000
	Manufacturing Industries	51 700	3	60	2	700				52 400
	Iron and Steel	5 910	0.3	5	0.2	60				5 980
	Non Ferrous Metals	3 210	0.07	1	0.05	10				3 220
	Chemical	7 540	0.15	3.1	0.1	40				7 580
	Pulp and Paper	10 000	2	40	1	400				10 500
	Cement	4 570	0.08	2	0.04	10				4 590
	Other Manufacturing	20 400	0.4	9	0.4	100				20 500
	Construction	1 220	0.02	0.5	0.03	9				1 230
	Commercial & Institutional	35 000	0.6	10	0.7	200				35 200
	Residential	40 700	100	2 000	2	600				44 000
	Agriculture & Forestry	2 070	0.03	0.7	0.06	20				2 090
b.	Transport ²	170 000	30	700	30	9 000				180 000
	Civil Aviation (Domestic Aviation)	7 080	0.3	7	0.2	70				7 200
	Road Transportation	116 000	12	250	19	6 000				122 000
	Light-Duty Gasoline Vehicles	39 200	4.8	100	8.6	2 700				41 900
	Light-Duty Gasoline Trucks	35 900	4.1	86	8.8	2 700				38 700
	Heavy-Duty Gasoline Vehicles	5 970	0.44	9.2	0.37	120				6 090
	Motorcycles	206	0.10	2.1	0.00	1.2				209
	Light-Duty Diesel Vehicles	500	0.01	0.2	0.04	10				513
	Light-Duty Diesel Trucks	1 680	0.04	0.9	0.1	40				1 720
	Heavy-Duty Diesel Vehicles	31 800	1	30	2	500				32 300
	Propane & Natural Gas Vehicles	824	0.7	20	0.02	5				840
	Railways	5 150	0.3	6	2	700				6 000
	Navigation (Domestic Marine)	5 110	0.4	8	1	400				5 500
	Other Transportation	36 000	20	500	8	2 000				39 000
	Off-Road Gasoline	8 400	10	200	0.2	60				8 700
	Off-Road Diesel	17 000	1	20	7	2 000				20 000
	Pipelines	10 500	11	220	0.3	90				10 800
c.	Fugitive Sources	16 000	2 200	47 000	0.1	40				62 600
	Coal Mining		30	700						700
	Oil and Natural Gas	15 800	2 190	46 100	0.1	40				61 900
	Oil	180	256	5 390	0.1	30				5 600
	Natural Gas	51.8	857	18 000	-	-				18 000
	Venting	10 400	1 080	22 600	0.01	4				33 000
	Flaring	5 200	3.5	73	0.01	2				5 300
INDUSTRIAL PROCESSES		39 000	4.0	83	8.12	2 520	3 900	3 000	3 200	52 200
a.	Mineral Products	9 100								9 100
	Cement Production	6 700								6 700
	Lime Production	1 700								1 700
	Mineral Product Use ³	636								636
b.	Chemical Industry	6 200	4.0	83	8.12	2 520				8 800
	Ammonia Production	6 200								6 200
	Nitric Acid Production				4.05	1 260				1 260
	Adipic Acid Production	-	-	-	4.0	1 300	-	-	-	1 300
	Petrochemical Production ⁴		4.0	83	0.03	9.6				93
c.	Metal Production	14 800						3 000	3 020	20 800
	Iron and Steel Production	10 300								10 300
	Aluminum Production	4 400						3 000	80.2	7 500
	SF ₆ Used in Magnesium Smelters and Casters								2 940	2 940
d.	Production and Consumption of Halocarbons and SF ₆ ⁵						3 900	20	150	4 100
e.	Other & Undifferentiated Production	9 500								9 500
SOLVENT & OTHER PRODUCT USE					0.55	170				170
AGRICULTURE			1 100	24 000	97	30 000				54 000
a.	Enteric Fermentation		990	21 000						21 000
b.	Manure Management		150	3 100						7 200
c.	Agriculture Soils				84	26 000				26 000
	Direct Sources				43	13 000				13 000
	Pasture, Range and Paddock Manure				10	3 200				3 200
	Indirect Sources				30	10 000				10 000
d.	Field Burning of Agricultural Residues	-	3.5	73	0.09	28	-	-	-	100
WASTE		180	940	20 000	2	700				21 000
a.	Solid Waste Disposal on Land		920	19 000						19 000
b.	Wastewater Handling		15	310	2	600				960
c.	Waste Incineration	180	0.05	1	0.1	40				220
Land Use, Land-use Change and Forestry		69 000	550	11 000	23	7 100				87 000
a.	Forest Land	59 000	530	11 000	22	7 000				77 000
b.	Cropland	-1 800	5	100	0.3	80				-1 600
c.	Grassland	-	-	-	-	-				-
d.	Wetlands	3 000	0	-	0	-				3 000
e.	Settlements	9 000	6	100	0.2	60				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–11 2001 GHG Emission Summary for Canada

Greenhouse Gas Categories		Greenhouse Gases								
		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential				21		310				
Unit		kt	kt	kt CO ₂ equivalent	kt	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL ¹		557 000	4 600	96 000	150	46 000	3 500	3 500	2 700	709 000
ENERGY		517 000	2 500	53 000	40	10 000				583 000
a.	Stationary Combustion Sources	334 000	200	5 000	9	3 000				341 000
	Electricity and Heat Generation	127 000	4.9	100	2	700				128 000
	Fossil Fuel Production and Refining	67 300	100	2 000	1	400				70 000
	Petroleum Refining and Upgrading	18 000	0.3	6	0.1	40				18 000
	Fossil Fuel Production	49 700	100	2 000	1	400				53 000
	Mining & Oil and Gas Extraction	12 400	0.2	5	0.3	90				12 500
	Manufacturing Industries	51 800	3	50	2	600				52 500
	Iron and Steel	5 240	0.2	5	0.2	60				5 310
	Non Ferrous Metals	3 450	0.08	2	0.05	20				3 470
	Chemical	8 440	0.17	3.6	0.1	50				8 490
	Pulp and Paper	10 900	2	30	1	400				11 300
	Cement	4 180	0.07	2	0.04	10				4 190
	Other Manufacturing	19 600	0.4	8	0.4	100				19 800
	Construction	997	0.02	0.4	0.03	8				1 010
b.	Commercial & Institutional	32 800	0.6	10	0.7	200				33 100
	Residential	39 100	100	2 000	2	500				42 000
	Agriculture & Forestry	2 170	0.04	0.8	0.06	20				2 190
	Transport ²	168 000	30	700	30	9 000				178 000
	Civil Aviation (Domestic Aviation)	6 830	0.4	8	0.2	60				6 900
	Road Transportation	114 000	12	250	19	5 900				120 000
	Light-Duty Gasoline Vehicles	39 000	4.9	100	8.7	2 700				41 700
	Light-Duty Gasoline Trucks	34 400	3.9	83	8.4	2 600				37 000
	Heavy-Duty Gasoline Vehicles	6 100	0.48	10	0.36	110				6 220
	Motorcycles	181	0.10	2.0	0.00	1.1				184
	Light-Duty Diesel Vehicles	473	0.01	0.2	0.04	10				485
	Light-Duty Diesel Trucks	1 610	0.04	0.9	0.1	40				1 650
	Heavy-Duty Diesel Vehicles	31 500	1	30	1	500				32 000
	Propane & Natural Gas Vehicles	1 110	0.9	20	0.02	7				1 100
c.	Railways	5 680	0.3	7	2	700				6 000
	Navigation (Domestic Marine)	5 140	0.4	8	1	400				5 500
	Other Transportation	36 000	20	400	8	2 000				39 000
	Off-Road Gasoline	8 400	10	200	0.2	60				8 600
	Off-Road Diesel	18 000	1	20	7	2 000				20 000
	Pipelines	9 950	10	210	0.3	80				10 200
	Fugitive Sources	16 000	2 300	48 000	0.1	40				63 400
	Coal Mining		50	1 000						1 000
	Oil and Natural Gas	15 600	2 230	46 800	0.1	40				62 500
	Oil	170	265	5 580	0.1	30				5 780
	Natural Gas	50.9	852	17 900	-	-				17 900
	Venting	10 500	1 110	23 200	0.01	4				33 700
	Flaring	4 900	3.4	72	0.01	2				5 000
	INDUSTRIAL PROCESSES		40 000	4.1	87	6.76	2 100	3 500	3 500	2 700
a.	Mineral Products	9 000								9 000
	Cement Production	6 500								6 500
	Lime Production	1 600								1 600
	Mineral Product Use ³	844								844
b.	Chemical Industry	6 100	4.1	87	6.76	2 100				8 300
	Ammonia Production	6 100								6 100
	Nitric Acid Production				4.14	1 280				1 280
	Adipic Acid Production	-	-	-	2.6	800	-	-	-	800
c.	Petrochemical Production ⁴		4.1	87	0.03	8.5				95
	Metal Production	14 800						3 500	2 400	20 600
	Iron and Steel Production	10 600								10 600
	Aluminum Production	4 200						3 500	44.0	7 700
d.	SF ₆ Used in Magnesium Smelters and Casters								2 360	2 360
	Production and Consumption of Halocarbons and SF ₆ ⁵						3 500	30	280	3 800
e.	Other & Undifferentiated Production	9 600								9 600
SOLVENT & OTHER PRODUCT USE					0.70	220				220
AGRICULTURE			1 100	24 000	100	31 000				54 000
a.	Enteric Fermentation		980	21 000						21 000
b.	Manure Management		140	3 000						7 100
c.	Agriculture Soils				86	27 000				27 000
	Direct Sources				45	14 000				14 000
	Pasture, Range and Paddock Manure				10	3 200				3 200
	Indirect Sources				30	10 000				10 000
d.	Field Burning of Agricultural Residues	-	3.3	69	0.09	26	-	-	-	95
WASTE		200	930	19 000	2	700				20 000
a.	Solid Waste Disposal on Land		910	19 000		-				19 000
b.	Wastewater Handling		15	310	2	600				950
c.	Waste Incineration	200	0.04	0.9	0.2	50				250
Land Use, Land-use Change and Forestry		-63 000	140	3 000	6.0	1 900				-58 000
a.	Forest Land	-73 000	130	2 800	5.6	1 700				-68 000
b.	Cropland	-1 100	5	100	0.2	80				-870
c.	Grassland	-	-	-	-	-				-
d.	Wetlands	3 000	0	-	0	-				3 000
e.	Settlements	9 000	6	100	0.2	60				9 000

Notes:

1. National totals exclude all GHGs from the Land Use, Land-use Change and Forestry sector.
2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.
4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.
5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-12 2000 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential			21		310				
Unit	kt	kt	kt CO ₂ equivalent	kt	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	563 000	4 500	95 000	150	48 000	3 000	4 300	3 000	716 000
ENERGY	522 000	2 500	52 000	40	10 000				586 000
a. Stationary Combustion Sources	336 000	200	5 000	9	3 000				343 000
Electricity and Heat Generation	126 000	4.7	98	2	700				127 000
Fossil Fuel Production and Refining	63 700	100	2 000	1	400				67 000
Petroleum Refining and Upgrading	16 000	0.3	6	0.1	40				16 000
Fossil Fuel Production	47 300	100	2 000	1	400				50 000
Mining & Oil and Gas Extraction	12 300	0.2	5	0.3	90				12 400
Manufacturing Industries	55 300	3	60	2	700				56 000
Iron and Steel	6 260	0.3	6	0.2	60				6 330
Non Ferrous Metals	3 200	0.07	1	0.05	10				3 220
Chemical	9 980	0.20	4.2	0.2	50				10 000
Pulp and Paper	11 500	2	40	1	400				12 000
Cement	4 230	0.07	1	0.04	10				4 240
Other Manufacturing	20 100	0.4	8	0.4	100				20 200
Construction	1 060	0.02	0.4	0.03	8				1 070
Commercial & Institutional	32 800	0.6	10	0.7	200				33 100
Residential	42 200	100	2 000	2	600				45 000
Agriculture & Forestry	2 520	0.04	0.9	0.06	20				2 540
b. Transport²	170 000	40	700	30	10 000				180 000
Civil Aviation (Domestic Aviation)	7 380	0.4	8	0.2	70				7 500
Road Transportation	112 000	12	250	18	5 700				118 000
Light-Duty Gasoline Vehicles	39 200	5.2	110	8.5	2 600				41 900
Light-Duty Gasoline Trucks	33 700	4.0	84	8.1	2 500				36 300
Heavy-Duty Gasoline Vehicles	5 370	0.50	10	0.27	85				5 460
Motorcycles	158	0.09	2.0	0.00	0.94				161
Light-Duty Diesel Vehicles	455	0.01	0.2	0.04	10				466
Light-Duty Diesel Trucks	1 620	0.04	0.9	0.1	40				1 660
Heavy-Duty Diesel Vehicles	30 400	1	30	1	400				30 900
Propane & Natural Gas Vehicles	1 070	1	20	0.02	7				1 100
Railways	5 780	0.3	7	2	700				7 000
Navigation (Domestic Marine)	4 730	0.3	7	1	400				5 100
Other Transportation	40 000	20	500	9	3 000				43 000
Off-Road Gasoline	8 500	10	200	0.2	60				8 800
Off-Road Diesel	20 000	1	20	8	3 000				23 000
Pipelines	10 900	11	230	0.3	90				11 200
c. Fugitive Sources	16 000	2 200	47 000	0.1	40				63 000
Coal Mining		50	900						900
Oil and Natural Gas	16 000	2 190	46 000	0.1	40				62 100
Oil	130	252	5 280	0.1	30				5 440
Natural Gas	50.7	843	17 700	-	-				17 700
Venting	10 500	1 090	23 000	0.02	5				33 500
Flaring	5 300	3.8	80	0.00	0.7				5 400
INDUSTRIAL PROCESSES	41 000	4.2	89	6.90	2 140	3 000	4 300	3 000	53 500
a. Mineral Products	9 600								9 600
Cement Production	6 700								6 700
Lime Production	1 900								1 900
Mineral Product Use ³	1 020								1 020
b. Chemical Industry	6 800	4.2	89	6.90	2 140				9 000
Ammonia Production	6 800								6 800
Nitric Acid Production				3.97	1 230				1 230
Adipic Acid Production	-	-	-	2.9	900				900
Petrochemical Production ⁴		4.2	89	0.03	8.2				97
c. Metal Production	15 300						4 300	2 830	22 500
Iron and Steel Production	11 500								11 500
Aluminum Production	3 900						4 300	47.3	8 200
SF ₆ Used in Magnesium Smelters and Casters								2 780	2 780
d. Production and Consumption of Halocarbons and SF₆⁵						3 000	30	220	3 200
e. Other & Undifferentiated Production	9 200								9 200
SOLVENT & OTHER PRODUCT USE				0.80	250				250
AGRICULTURE		1 100	23 000	110	33 000				55 000
a. Enteric Fermentation		950	20 000						20 000
b. Manure Management		140	2 900	13	4 000				6 900
c. Agriculture Soils				92	29 000				29 000
Direct Sources				49	15 000				15 000
Pasture, Range and Paddock Manure				9.8	3 100				3 100
Indirect Sources				30	10 000				10 000
d. Field Burning of Agricultural Residues		4.1	86	0.11	33				120
WASTE	200	930	20 000	2	700				20 000
a. Solid Waste Disposal on Land		920	19 000						19 000
b. Wastewater Handling		14	300	2	600				930
c. Waste Incineration	200	0.04	0.8	0.2	50				250
Land Use, Land-use Change and Forestry	-65 000	72	1 500	3.0	940				-62 000
a. Forest Land	-76 000	61	1 300	2.6	800				-74 000
b. Cropland	-330	5	100	0.2	80				-140
c. Grassland									
d. Wetlands	3 000	0		0					3 000
e. Settlements	9 000	5	100	0.2	60				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–13 1999 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	540 000	4 400	92 000	160	48 000	2 500	4 600	2 500	690 000
ENERGY	499 000	2 400	50 000	40	10 000				561 000
a. Stationary Combustion Sources	314 000	200	5 000	8	3 000				321 000
Electricity and Heat Generation	115 000	3.8	79	2	700				116 000
Fossil Fuel Production and Refining	62 700	100	2 000	1	400				65 000
Petroleum Refining and Upgrading	16 000	0.3	6	0.1	40				17 000
Fossil Fuel Production	46 200	100	2 000	1	300				49 000
Mining & Oil and Gas Extraction	9 240	0.2	4	0.2	70				9 310
Manufacturing Industries	54 700	3	60	2	700				55 400
Iron and Steel	6 380	0.3	6	0.2	70				6 450
Non Ferrous Metals	3 260	0.06	1	0.05	10				3 270
Chemical	10 400	0.21	4.5	0.2	60				10 400
Pulp and Paper	11 600	2	40	1	400				12 100
Cement	4 200	0.07	2	0.04	10				4 210
Other Manufacturing	18 900	0.4	8	0.3	100				19 000
Construction	1 160	0.02	0.4	0.03	10				1 170
Commercial & Institutional	28 600	0.5	10	0.6	200				28 800
Residential	40 100	100	2 000	2	500				43 000
Agriculture & Forestry	2 630	0.04	0.8	0.06	20				2 650
b. Transport²	169 000	40	800	30	9 000				179 000
Civil Aviation (Domestic Aviation)	7 530	0.4	8	0.2	70				7 600
Road Transportation	111 000	12	260	18	5 700				117 000
Light-Duty Gasoline Vehicles	39 500	5.4	110	8.7	2 700				42 400
Light-Duty Gasoline Trucks	33 000	3.9	82	7.9	2 500				35 500
Heavy-Duty Gasoline Vehicles	5 290	0.53	11	0.25	76				5 380
Motorcycles	142	0.09	1.9	0.00	0.86				145
Light-Duty Diesel Vehicles	435	0.01	0.2	0.03	10				446
Light-Duty Diesel Trucks	1 520	0.04	0.8	0.1	40				1 560
Heavy-Duty Diesel Vehicles	29 600	1	30	1	400				30 000
Propane & Natural Gas Vehicles	1 460	1	20	0.03	9				1 500
Railways	5 640	0.3	7	2	700				6 000
Navigation (Domestic Marine)	4 600	0.3	7	1	400				5 000
Other Transportation	40 000	20	500	8	3 000				43 000
Off-Road Gasoline	9 100	10	200	0.2	60				9 400
Off-Road Diesel	19 000	1	20	8	2 000				21 000
Pipelines	12 200	12	260	0.3	100				12 500
c. Fugitive Sources	16 000	2 100	45 000	0.1	40				60 900
Coal Mining		50	1 000						1 000
Oil and Natural Gas	16 100	2 080	43 700	0.1	40				59 800
Oil	130	249	5 220	0.1	30				5 380
Natural Gas	46.9	809	17 000	-	-				17 000
Venting	10 600	1 020	21 400	0.01	4				32 100
Flaring	5 300	3.5	74	0.00	0.7				5 400
INDUSTRIAL PROCESSES	41 000	4.1	85	9.44	2 930	2 500	4 600	2 500	53 500
a. Mineral Products	9 500								9 500
Cement Production	6 600								6 600
Lime Production	1 900								1 900
Mineral Product Use ³	906								906
b. Chemical Industry	6 800	4.1	85	9.44	2 930				9 800
Ammonia Production	6 800								6 800
Nitric Acid Production				3.76	1 170				1 170
Adipic Acid Production	-	-	-	5.6	1 700	-	-	-	1 700
Petrochemical Production ⁴		4.1	85	0.03	9.5				95
c. Metal Production	15 400						4 600	2 320	22 300
Iron and Steel Production	11 400								11 400
Aluminum Production	3 900						4 600	53.5	8 600
SF ₆ Used in Magnesium Smelters and Casters								2 270	2 270
d. Production and Consumption of Halocarbons and SF₆⁵						2 500	20	210	2 700
e. Other & Undifferentiated Production	9 300								9 300
SOLVENT & OTHER PRODUCT USE				0.71	220				220
AGRICULTURE		1 100	22 000	100	32 000				55 000
a. Enteric Fermentation		930	19 000						19 000
b. Manure Management		130	2 800	12	3 900				6 700
c. Agriculture Soils				92	29 000				29 000
Direct Sources				50	15 000				15 000
Pasture, Range and Paddock Manure				9.4	2 900				2 900
Indirect Sources				30	10 000				10 000
d. Field Burning of Agricultural Residues		4.5	95	0.12	36				130
WASTE	200	940	20 000	2	700				21 000
a. Solid Waste Disposal on Land		920	19 000						19 000
b. Wastewater Handling		14	300	2	600				920
c. Waste Incineration	200	0.04	0.7	0.1	50				240
Land Use, Land-use Change and Forestry	-2 400	300	6 300	13	3 900				7 800
a. Forest Land	-15 000	290	6 000	12	3 700				-5 700
b. Cropland	820	6	100	0.3	80				1 000
c. Grassland									
d. Wetlands	4 000	2	30	0.07	20				4 000
e. Settlements	9 000	6	100	0.2	60				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-14 1998 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL ¹		524 000	4 400	93 000	160	50 000	1 900	5 600	2 500	677 000
ENERGY		484 000	2 400	51 000	40	10 000				546 000
a.	Stationary Combustion Sources	302 000	200	4 000	8	2 000				309 000
	Electricity and Heat Generation	117 000	3.8	80	2	700				118 000
	Fossil Fuel Production and Refining	52 600	90	2 000	1	300				55 000
	Petroleum Refining and Upgrading	17 000	0.3	6	0.1	40				17 000
	Fossil Fuel Production	35 600	90	2 000	0.9	300				38 000
	Mining & Oil and Gas Extraction	9 170	0.2	4	0.2	70				9 240
	Manufacturing Industries	53 900	3	50	2	600				54 600
	Iron and Steel	6 310	0.3	6	0.2	60				6 380
	Non Ferrous Metals	3 510	0.07	2	0.05	20				3 520
	Chemical	10 100	0.21	4.3	0.2	50				10 100
	Pulp and Paper	11 600	2	30	1	400				12 000
	Cement	3 900	0.07	1	0.04	10				3 910
	Other Manufacturing	18 500	0.4	8	0.3	100				18 600
	Construction	1 100	0.02	0.4	0.03	10				1 110
	Commercial & Institutional	27 100	0.5	10	0.6	200				27 200
	Residential	38 300	100	2 000	2	500				41 000
	Agriculture & Forestry	2 550	0.04	0.8	0.06	20				2 570
b.	Transport ²	164 000	40	800	30	9 000				174 000
	Civil Aviation (Domestic Aviation)	7 160	0.4	8	0.2	70				7 200
	Road Transportation	108 000	12	260	18	5 500				114 000
	Light-Duty Gasoline Vehicles	38 600	5.4	110	8.6	2 700				41 300
	Light-Duty Gasoline Trucks	31 000	3.6	77	7.4	2 300				33 300
	Heavy-Duty Gasoline Vehicles	5 750	0.64	14	0.23	72				5 840
	Motorcycles	145	0.11	2.2	0.00	0.89				148
	Light-Duty Diesel Vehicles	416	0.01	0.2	0.03	10				426
	Light-Duty Diesel Trucks	1 520	0.04	0.8	0.1	40				1 560
	Heavy-Duty Diesel Vehicles	29 000	1	30	1	400				29 400
	Propane & Natural Gas Vehicles	1 740	1	30	0.03	10				1 800
	Railways	5 320	0.3	6	2	700				6 000
	Navigation (Domestic Marine)	4 790	0.3	7	1	300				5 100
	Other Transportation	39 000	20	500	8	2 000				42 000
	Off-Road Gasoline	9 600	10	200	0.2	70				9 900
	Off-Road Diesel	17 000	1	20	7	2 000				19 000
	Pipelines	12 100	12	260	0.3	100				12 400
c.	Fugitive Sources	18 000	2 200	46 000	0.1	40				63 400
	Coal Mining		60	1 000						1 000
	Oil and Natural Gas	17 600	2 110	44 400	0.1	40				62 000
	Oil	120	251	5 270	0.1	30				5 420
	Natural Gas	52.5	827	17 400	-	-				17 400
	Venting	10 400	1 030	21 700	0.02	5				32 100
	Flaring	7 000	4.6	96	0.00	1				7 100
INDUSTRIAL PROCESSES		40 000	3.6	76	19.7	6 110	1 900	5 600	2 500	55 900
a.	Mineral Products	9 100								9 100
	Cement Production	6 400								6 400
	Lime Production	1 800								1 800
	Mineral Product Use ³	926								926
b.	Chemical Industry	6 600	3.6	76	19.7	6 110				13 000
	Ammonia Production	6 600								6 600
	Nitric Acid Production				3.34	1 040				1 040
	Adipic Acid Production	-	-	-	16	5 100	-	-	-	5 100
	Petrochemical Production ⁴		3.6	76	0.03	8.8				85
c.	Metal Production	15 100				-		5 600	2 260	23 000
	Iron and Steel Production	11 200								11 200
	Aluminum Production	4 000						5 600	59.1	9 600
	SF ₆ Used in Magnesium Smelters and Casters								2 210	2 210
d.	Production and Consumption of Halocarbons and SF ₆ ⁵						1 900	20	210	2 200
e.	Other & Undifferentiated Production	8 800								8 800
SOLVENT & OTHER PRODUCT USE					0.69	210				210
AGRICULTURE			1 100	23 000	100	32 000				55 000
a.	Enteric Fermentation		930	20 000						20 000
b.	Manure Management		140	2 800						6 700
c.	Agriculture Soils				91	28 000				28 000
	Direct Sources				49	15 000				15 000
	Pasture, Range and Paddock Manure				9.3	2 900				2 900
	Indirect Sources				30	10 000				10 000
d.	Field Burning of Agricultural Residues	-	6.2	130	0.16	50	-	-	-	180
WASTE		220	930	20 000	2	700				20 000
a.	Solid Waste Disposal on Land		920	19 000		-				19 000
b.	Wastewater Handling		14	300	2	600				900
c.	Waste Incineration	220	0.04	0.8	0.2	50				270
Land Use, Land-use Change and Forestry		92 000	720	15 000	30	9 400				120 000
a.	Forest Land	78 000	710	15 000	30	9 200				100 000
b.	Cropland	1 800	6	100	0.3	90				2 000
c.	Grassland	-	-	-	-	-				-
d.	Wetlands	3 000	1	20	0.04	10				3 000
e.	Settlements	8 000	5	100	0.2	60				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–15 1997 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	516 000	4 400	92 000	180	55 000	1 400	5 500	1 900	671 000
ENERGY	476 000	2 400	50 000	40	10 000				537 000
a. Stationary Combustion Sources	299 000	200	4 000	8	2 000				305 000
Electricity and Heat Generation	106 000	3.1	66	2	600				106 000
Fossil Fuel Production and Refining	49 200	70	2 000	0.9	300				51 000
Petroleum Refining and Upgrading	17 000	0.3	6	0.1	40				17 000
Fossil Fuel Production	32 400	70	2 000	0.8	200				34 000
Mining & Oil and Gas Extraction	10 000	0.2	4	0.2	70				10 100
Manufacturing Industries	56 400	3	50	2	600				57 100
Iron and Steel	6 560	0.3	6	0.2	70				6 630
Non Ferrous Metals	3 550	0.07	2	0.05	20				3 560
Chemical	9 170	0.19	4.0	0.2	50				9 220
Pulp and Paper	12 700	2	30	1	400				13 100
Cement	3 760	0.06	1	0.04	10				3 770
Other Manufacturing	20 600	0.4	9	0.4	100				20 700
Construction	1 240	0.02	0.4	0.03	10				1 250
Commercial & Institutional	29 700	0.5	10	0.6	200				29 900
Residential	43 500	90	2 000	2	500				46 000
Agriculture & Forestry	2 880	0.04	0.9	0.07	20				2 900
b. Transport²	161 000	40	800	30	9 000				171 000
Civil Aviation (Domestic Aviation)	6 980	0.3	7	0.2	70				7 100
Road Transportation	105 000	13	270	17	5 300				111 000
Light-Duty Gasoline Vehicles	39 900	5.7	120	8.8	2 700				42 800
Light-Duty Gasoline Trucks	28 800	3.4	72	6.8	2 100				31 000
Heavy-Duty Gasoline Vehicles	5 660	0.71	15	0.19	58				5 740
Motorcycles	124	0.10	2.1	0.00	0.77				127
Light-Duty Diesel Vehicles	402	0.01	0.2	0.03	10				412
Light-Duty Diesel Trucks	1 390	0.04	0.8	0.1	30				1 420
Heavy-Duty Diesel Vehicles	27 300	1	30	1	300				27 600
Propane & Natural Gas Vehicles	1 800	1	30	0.04	10				1 800
Railways	5 520	0.3	6	2	700				6 000
Navigation (Domestic Marine)	4 170	0.3	6	1	300				4 500
Other Transportation	39 000	20	500	8	3 000				42 000
Off-Road Gasoline	8 500	10	200	0.2	60				8 700
Off-Road Diesel	19 000	1	20	8	2 000				21 000
Pipelines	12 100	12	260	0.3	100				12 500
c. Fugitive Sources	16 000	2 200	45 000	0.1	40				61 300
Coal Mining		80	2 000						2 000
Oil and Natural Gas	16 100	2 070	43 600	0.1	40				59 700
Oil	120	258	5 410	0.1	30				5 570
Natural Gas	41.3	759	15 900	-	-				16 000
Venting	10 400	1 050	22 100	0.01	4				32 600
Flaring	5 500	3.6	75	0.00	0.7				5 600
INDUSTRIAL PROCESSES	40 000	3.8	80	35.3	11 000	1 400	5 500	1 900	59 900
a. Mineral Products	9 000								9 000
Cement Production	6 200								6 200
Lime Production	1 900								1 900
Mineral Product Use ³	929								929
b. Chemical Industry	6 600	3.8	80	35.3	11 000				18 000
Ammonia Production	6 600								6 600
Nitric Acid Production				3.41	1 060				1 060
Adipic Acid Production	-	-	-	32	9 900	-	-	-	9 900
Petrochemical Production ⁴		3.8	80	0.03	8.9				89
c. Metal Production	14 900						5 500	1 730	22 100
Iron and Steel Production	10 900								10 900
Aluminum Production	3 900						5 500	59.1	9 500
SF ₆ Used in Magnesium Smelters and Casters								1 670	1 670
d. Production and Consumption of Halocarbons and SF₆⁵						1 400	20	190	1 600
e. Other & Undifferentiated Production	9 600								9 600
SOLVENT & OTHER PRODUCT USE				0.74	230				230
AGRICULTURE		1 100	22 000	100	32 000				54 000
a. Enteric Fermentation		930	20 000						20 000
b. Manure Management		130	2 800	12	3 800				6 600
c. Agriculture Soils				90	28 000				28 000
Direct Sources				48	15 000				15 000
Pasture, Range and Paddock Manure				9.2	2 800				2 800
Indirect Sources				30	10 000				10 000
d. Field Burning of Agricultural Residues		5.5	120	0.14	44				160
WASTE	220	920	19 000	2	600				20 000
a. Solid Waste Disposal on Land		910	19 000						19 000
b. Wastewater Handling		14	290	2	600				890
c. Waste Incineration	220	0.03	0.7	0.2	50				280
Land Use, Land-use Change and Forestry	-75 000	87	1 800	3.7	1 100				-72 000
a. Forest Land	-89 000	75	1 600	3.2	980				-86 000
b. Cropland	2 700	6	100	0.3	90				2 900
c. Grassland									
d. Wetlands	3 000	0.1	3	0.01	1				3 000
e. Settlements	9 000	5	100	0.2	60				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-16 1996 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL ¹		504 000	4 300	90 000	180	56 000	850	5 600	1 900	658 000
ENERGY		465 000	2 300	48 000	30	10 000				524 000
a.	Stationary Combustion Sources	293 000	200	4 000	7	2 000				299 000
	Electricity and Heat Generation	94 500	2.6	54	2	600				95 100
	Fossil Fuel Production and Refining	53 000	80	2 000	1	300				55 000
	Petroleum Refining and Upgrading	18 000	0.3	6	0.1	40				18 000
	Fossil Fuel Production	34 600	80	2 000	0.8	300				37 000
	Mining & Oil and Gas Extraction	9 200	0.2	4	0.2	70				9 280
	Manufacturing Industries	56 500	3	50	2	600				57 100
	Iron and Steel	6 240	0.3	6	0.2	60				6 310
	Non Ferrous Metals	3 730	0.08	2	0.05	20				3 750
	Chemical	9 440	0.19	4.0	0.2	50				9 490
	Pulp and Paper	12 900	2	30	1	400				13 300
	Cement	3 850	0.07	1	0.03	10				3 870
	Other Manufacturing	20 300	0.4	9	0.4	100				20 400
	Construction	1 250	0.02	0.4	0.03	10				1 260
	Commercial & Institutional	29 300	0.5	10	0.6	200				29 500
	Residential	46 700	90	2 000	2	500				49 000
	Agriculture & Forestry	2 890	0.04	0.9	0.07	20				2 910
b.	Transport ²	155 000	40	800	30	8 000				165 000
	Civil Aviation (Domestic Aviation)	6 910	0.3	7	0.2	70				7 000
	Road Transportation	101 000	13	270	16	5 000				106 000
	Light-Duty Gasoline Vehicles	40 000	5.9	120	8.7	2 700				42 800
	Light-Duty Gasoline Trucks	26 400	3.2	68	6.1	1 900				28 400
	Heavy-Duty Gasoline Vehicles	5 750	0.77	16	0.16	50				5 820
	Motorcycles	117	0.11	2.3	0.00	0.75				120
	Light-Duty Diesel Vehicles	401	0.01	0.2	0.03	10				411
	Light-Duty Diesel Trucks	1 260	0.03	0.7	0.1	30				1 290
	Heavy-Duty Diesel Vehicles	25 300	1	30	0.9	300				25 600
	Propane & Natural Gas Vehicles	1 940	1	30	0.04	10				2 000
	Railways	5 450	0.3	6	2	700				6 000
	Navigation (Domestic Marine)	4 110	0.3	6	1	300				4 500
	Other Transportation	38 000	20	500	7	2 000				41 000
	Off-Road Gasoline	9 000	10	200	0.2	60				9 300
	Off-Road Diesel	17 000	0.9	20	7	2 000				19 000
	Pipelines	12 100	12	250	0.3	100				12 400
c.	Fugitive Sources	16 000	2 100	44 000	0.1	40				59 800
	Coal Mining		80	2 000						2 000
	Oil and Natural Gas	15 900	2 000	42 100	0.1	40				58 000
	Oil	120	247	5 180	0.1	30				5 330
	Natural Gas	46.3	783	16 400	-	-				16 500
	Venting	10 400	971	20 400	0.01	4				30 800
	Flaring	5 300	3.5	73	0.00	0.7				5 400
INDUSTRIAL PROCESSES		39 000	4.0	83	40.6	12 600	850	5 600	1 900	60 200
a.	Mineral Products	8 400								8 400
	Cement Production	5 800								5 800
	Lime Production	1 800								1 800
	Mineral Product Use ³	882								882
b.	Chemical Industry	6 500	4.0	83	40.6	12 600				19 000
	Ammonia Production	6 500								6 500
	Nitric Acid Production				3.57	1 110				1 110
	Adipic Acid Production	-	-	-	37	11 000	-	-	-	11 000
	Petrochemical Production ⁴		4.0	83	0.03	8.7				92
c.	Metal Production	15 000						5 600	1 700	22 300
	Iron and Steel Production	11 100								11 100
	Aluminum Production	3 900						5 600	59.1	9 500
	SF ₆ Used in Magnesium Smelters and Casters								1 640	1 640
d.	Production and Consumption of Halocarbons and SF ₆ ⁵						850	20	160	1 000
e.	Other & Undifferentiated Production	9 200								9 200
SOLVENT & OTHER PRODUCT USE					0.70	220				220
AGRICULTURE			1 100	23 000	100	32 000				54 000
a.	Enteric Fermentation		930	20 000						20 000
b.	Manure Management		130	2 800						6 500
c.	Agriculture Soils				90	28 000				28 000
	Direct Sources				49	15 000				15 000
	Pasture, Range and Paddock Manure				9.1	2 800				2 800
	Indirect Sources				30	10 000				10 000
d.	Field Burning of Agricultural Residues	-	5.4	110	0.14	44	-	-	-	160
WASTE		230	910	19 000	2	700				20 000
a.	Solid Waste Disposal on Land		900	19 000						19 000
b.	Wastewater Handling		14	290	2	600				870
c.	Waste Incineration	230	0.3	7	0.3	100				340
Land Use, Land-use Change and Forestry		-37 000	220	4 600	9.2	2 900				-30 000
a.	Forest Land	-52 000	210	4 400	8.8	2 700				-45 000
b.	Cropland	3 600	6	100	0.3	90				3 800
c.	Grassland	-	-	-	-	-				-
d.	Wetlands	3 000	0	-	0	-				3 000
e.	Settlements	8 000	5	100	0.2	60				8 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–17 1995 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential			21		310				
Unit	kt	kt	kt CO ₂ equivalent	kt	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	491 000	4 100	87 000	170	53 000	480	5 500	2 400	640 000
ENERGY	452 000	2 200	45 000	30	10 000				508 000
a. Stationary Combustion Sources	286 000	200	4 000	7	2 000				292 000
Electricity and Heat Generation	95 500	2.9	61	2	600				96 100
Fossil Fuel Production and Refining	52 000	80	2 000	0.9	300				54 000
Petroleum Refining and Upgrading	17 000	0.3	6	0.1	40				17 000
Fossil Fuel Production	35 000	80	2 000	0.8	300				37 000
Mining & Oil and Gas Extraction	8 450	0.2	4	0.2	70				8 520
Manufacturing Industries	55 200	2	50	2	600				55 800
Iron and Steel	5 980	0.3	5	0.2	60				6 050
Non Ferrous Metals	3 140	0.06	1	0.04	10				3 150
Chemical	10 200	0.21	4.3	0.2	50				10 200
Pulp and Paper	12 400	1	30	1	400				12 800
Cement	4 020	0.07	1	0.04	10				4 030
Other Manufacturing	19 400	0.4	8	0.3	100				19 500
Construction	1 160	0.02	0.4	0.03	10				1 170
Commercial & Institutional	28 700	0.5	10	0.6	200				28 900
Residential	42 000	100	2 000	2	500				45 000
Agriculture & Forestry	2 720	0.04	0.9	0.07	20				2 750
b. Transport²	152 000	40	700	30	8 000				160 000
Civil Aviation (Domestic Aviation)	6 550	0.4	8	0.2	60				6 600
Road Transportation	102 000	13	280	16	4 800				107 000
Light-Duty Gasoline Vehicles	41 000	6.3	130	8.7	2 700				43 800
Light-Duty Gasoline Trucks	25 400	3.2	67	5.8	1 800				27 300
Heavy-Duty Gasoline Vehicles	6 170	0.87	18	0.14	45				6 230
Motorcycles	121	0.12	2.6	0.00	0.79				125
Light-Duty Diesel Vehicles	419	0.01	0.2	0.03	10				429
Light-Duty Diesel Trucks	1 280	0.03	0.7	0.1	30				1 310
Heavy-Duty Diesel Vehicles	25 800	1	30	0.8	200				26 100
Propane & Natural Gas Vehicles	2 060	1	30	0.04	10				2 100
Railways	5 570	0.3	6	2	700				6 000
Navigation (Domestic Marine)	4 020	0.3	6	1	300				4 400
Other Transportation	33 000	20	400	6	2 000				36 000
Off-Road Gasoline	7 500	9	200	0.2	50				7 700
Off-Road Diesel	14 000	0.8	20	6	2 000				16 000
Pipelines	11 600	12	240	0.3	100				11 900
c. Fugitive Sources	15 000	1 900	41 000	0.1	40				55 600
Coal Mining		80	2 000						2 000
Oil and Natural Gas	14 700	1 870	39 200	0.1	40				53 900
Oil	120	238	5 000	0.1	30				5 150
Natural Gas	33.6	710	14 900	-	-				14 900
Venting	9 570	914	19 200	0.01	4				28 800
Flaring	5 000	3.3	69	0.00	0.3				5 100
INDUSTRIAL PROCESSES	39 000	3.9	81	37.9	11 700	480	5 500	2 400	58 900
a. Mineral Products	8 800								8 800
Cement Production	6 100								6 100
Lime Production	1 900								1 900
Mineral Product Use ³	877								877
b. Chemical Industry	6 500	3.9	81	37.9	11 700				18 000
Ammonia Production	6 500								6 500
Nitric Acid Production				3.24	1 000				1 000
Adipic Acid Production	-	-	-	35	11 000	-	-	-	11 000
Petrochemical Production ⁴		3.9	81	0.03	8.5				90
c. Metal Production	15 000						5 500	2 170	22 600
Iron and Steel Production	11 300								11 300
Aluminum Production	3 600						5 500	59.1	9 200
SF ₆ Used in Magnesium Smelters and Casters								2 110	2 110
d. Production and Consumption of Halocarbons and SF₆⁵						480	30	220	730
e. Other & Undifferentiated Production	8 400								8 400
SOLVENT & OTHER PRODUCT USE				0.69	210				210
AGRICULTURE		1 100	22 000	99	31 000				53 000
a. Enteric Fermentation		920	19 000						19 000
b. Manure Management		130	2 800	12	3 700				6 500
c. Agriculture Soils				86	27 000				27 000
Direct Sources				47	14 000				14 000
Pasture, Range and Paddock Manure				9.0	2 800				2 800
Indirect Sources				30	10 000				10 000
d. Field Burning of Agricultural Residues		5.8	120	0.15	46				170
WASTE	240	910	19 000	2	700				20 000
a. Solid Waste Disposal on Land		900	19 000						19 000
b. Wastewater Handling		14	290	2	600				860
c. Waste Incineration	240	0.3	7	0.3	100				350
Land Use, Land-use Change and Forestry	160 000	900	19 000	38	12 000				190 000
a. Forest Land	140 000	890	19 000	37	12 000				170 000
b. Cropland	4 500	7	100	0.3	100				4 700
c. Grassland									
d. Wetlands	3 000	0.02	0.5	0.00	0.3				3 000
e. Settlements	8 000	5	100	0.2	50				8 000

Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry sector.
- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
- The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.
- The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.
- Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-18 1994 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential Unit		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL ¹		478 000	4 000	83 000	170	53 000	-	6 000	2 600	622 000
ENERGY		441 000	2 000	43 000	30	10 000				493 000
a.	Stationary Combustion Sources	278 000	200	4 000	7	2 000				285 000
	Electricity and Heat Generation	92 200	2.5	53	2	500				92 800
	Fossil Fuel Production and Refining	50 500	80	2 000	0.9	300				52 000
	Petroleum Refining and Upgrading	16 000	0.2	5	0.1	30				16 000
	Fossil Fuel Production	34 100	80	2 000	0.8	300				36 000
	Mining & Oil and Gas Extraction	7 980	0.2	4	0.2	50				8 040
	Manufacturing Industries	53 500	2	50	2	600				54 100
	Iron and Steel	6 260	0.3	6	0.2	60				6 330
	Non Ferrous Metals	3 340	0.07	2	0.05	20				3 350
	Chemical	9 900	0.20	4.3	0.2	50				9 960
	Pulp and Paper	12 500	2	30	1	400				12 900
	Cement	3 940	0.07	1	0.03	10				3 960
	Other Manufacturing	17 500	0.4	8	0.3	100				17 600
	Construction	1 380	0.02	0.5	0.03	10				1 390
	Commercial & Institutional	27 100	0.5	10	0.6	200				27 300
	Residential	43 300	100	2 000	2	500				46 000
	Agriculture & Forestry	2 510	0.04	0.8	0.06	20				2 530
b.	Transport ²	148 000	30	700	20	8 000				156 000
	Civil Aviation (Domestic Aviation)	6 180	0.3	7	0.2	60				6 200
	Road Transportation	101 000	14	280	15	4 600				106 000
	Light-Duty Gasoline Vehicles	41 600	6.6	140	8.5	2 600				44 400
	Light-Duty Gasoline Trucks	24 700	3.2	68	5.4	1 700				26 500
	Heavy-Duty Gasoline Vehicles	6 610	0.96	20	0.16	49				6 680
	Motorcycles	125	0.13	2.7	0.00	0.82				129
	Light-Duty Diesel Vehicles	435	0.01	0.2	0.03	10				446
	Light-Duty Diesel Trucks	1 110	0.03	0.6	0.08	30				1 140
	Heavy-Duty Diesel Vehicles	24 400	1	30	0.7	200				24 700
	Propane & Natural Gas Vehicles	1 880	1	30	0.04	10				1 900
	Railways	6 150	0.3	7	3	800				7 000
	Navigation (Domestic Marine)	4 310	0.3	6	1	300				4 700
	Other Transportation	30 000	20	400	6	2 000				33 000
	Off-Road Gasoline	6 900	8	200	0.2	50				7 100
	Off-Road Diesel	13 000	0.7	20	5	2 000				15 000
	Pipelines	10 400	10	220	0.3	90				10 700
c.	Fugitive Sources	14 000	1 800	38 000	0.1	40				52 600
	Coal Mining		80	2 000						2 000
	Oil and Natural Gas	14 200	1 750	36 700	0.1	40				50 900
	Oil	110	221	4 640	0.1	30				4 780
	Natural Gas	30.9	680	14 300	-	-				14 300
	Venting	9 300	841	17 700	0.01	4				27 000
	Flaring	4 700	3.1	66	0.00	1				4 800
INDUSTRIAL PROCESSES		37 000	4.0	84	38.5	11 900	-	6 000	2 600	57 700
a.	Mineral Products	8 100								8 100
	Cement Production	5 400								5 400
	Lime Production	1 800								1 800
	Mineral Product Use ³	842								842
b.	Chemical Industry	5 800	4.0	84	38.5	11 900				18 000
	Ammonia Production	5 800								5 800
	Nitric Acid Production				3.08	956				956
	Adipic Acid Production	-	-	-	35	11 000	-	-	-	11 000
	Petrochemical Production ⁴		4.0	84	0.03	8.2				92
c.	Metal Production	14 700						6 000	2 340	23 000
	Iron and Steel Production	10 900								10 900
	Aluminum Production	3 800						6 000	59.1	9 800
	SF ₆ Used in Magnesium Smelters and Casters								2 280	2 280
d.	Production and Consumption of Halocarbons and SF ₆ ⁵						-	-	220	220
e.	Other & Undifferentiated Production	8 600								8 600
SOLVENT & OTHER PRODUCT USE					0.57	180				180
AGRICULTURE			1 000	21 000	97	30 000				51 000
a.	Enteric Fermentation		870	18 000						18 000
b.	Manure Management		120	2 600						6 200
c.	Agriculture Soils				85	26 000				26 000
	Direct Sources				46	14 000				14 000
	Pasture, Range and Paddock Manure				8.5	2 600				2 600
	Indirect Sources				30	9 000				9 000
d.	Field Burning of Agricultural Residues	-	5.6	120	0.14	45	-	-	-	160
WASTE		240	920	19 000	2	700				20 000
a.	Solid Waste Disposal on Land		900	19 000						19 000
b.	Wastewater Handling		13	280	2	600				840
c.	Waste Incineration	240	0.3	6	0.3	100				350
Land Use, Land-use Change and Forestry		-33 000	280	5 900	12	3 700				-24 000
a.	Forest Land	-51 000	270	5 600	11	3 500				-41 000
b.	Cropland	5 900	8	200	0.4	100				6 200
c.	Grassland	-	-	-	-	-				-
d.	Wetlands	3 000	0.00	0.00	0.00	0.00				3 000
e.	Settlements	8 000	5	100	0.2	50				8 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–19 1993 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	463 000	3 800	81 000	160	49 000	-	6 500	2 500	602 000
ENERGY	426 000	2 000	41 000	30	9 000	-	-	-	477 000
a. Stationary Combustion Sources	273 000	200	4 000	7	2 000	-	-	-	279 000
Electricity and Heat Generation	90 000	2.5	52	2	500	-	-	-	90 600
Fossil Fuel Production and Refining	50 100	70	2 000	0.9	300	-	-	-	52 000
Petroleum Refining and Upgrading	17 000	0.3	6	0.1	40	-	-	-	18 000
Fossil Fuel Production	32 700	70	2 000	0.8	200	-	-	-	34 000
Mining & Oil and Gas Extraction	7 800	0.2	4	0.2	50	-	-	-	7 860
Manufacturing Industries	50 100	2	50	2	500	-	-	-	50 700
Iron and Steel	5 610	0.3	5	0.2	60	-	-	-	5 670
Non Ferrous Metals	2 750	0.06	1	0.04	10	-	-	-	2 760
Chemical	8 430	0.17	3.6	0.1	50	-	-	-	8 480
Pulp and Paper	12 600	1	30	1	300	-	-	-	12 900
Cement	3 350	0.06	1	0.03	9	-	-	-	3 360
Other Manufacturing	17 300	0.4	8	0.3	100	-	-	-	17 400
Construction	1 370	0.02	0.5	0.03	10	-	-	-	1 380
Commercial & Institutional	27 800	0.5	10	0.6	200	-	-	-	28 000
Residential	42 500	100	2 000	2	500	-	-	-	45 000
Agriculture & Forestry	3 000	0.05	1	0.07	20	-	-	-	3 030
b. Transport²	141 000	30	700	20	7 000	-	-	-	149 000
Civil Aviation (Domestic Aviation)	5 920	0.3	7	0.2	60	-	-	-	6 000
Road Transportation	95 400	14	280	14	4 300	-	-	-	99 900
Light-Duty Gasoline Vehicles	42 100	6.9	140	8.0	2 500	-	-	-	44 700
Light-Duty Gasoline Trucks	23 000	3.1	66	4.8	1 500	-	-	-	24 600
Heavy-Duty Gasoline Vehicles	6 150	0.94	20	0.16	49	-	-	-	6 220
Motorcycles	133	0.13	2.8	0.00	0.86	-	-	-	137
Light-Duty Diesel Vehicles	446	0.01	0.3	0.03	10	-	-	-	457
Light-Duty Diesel Trucks	942	0.03	0.5	0.07	20	-	-	-	965
Heavy-Duty Diesel Vehicles	20 600	1	20	0.6	200	-	-	-	20 800
Propane & Natural Gas Vehicles	1 990	1	30	0.04	10	-	-	-	2 000
Railways	5 950	0.3	7	2	800	-	-	-	7 000
Navigation (Domestic Marine)	4 150	0.3	6	1	300	-	-	-	4 500
Other Transportation	30 000	20	400	6	2 000	-	-	-	32 000
Off-Road Gasoline	6 400	8	200	0.1	40	-	-	-	6 700
Off-Road Diesel	13 000	0.7	20	5	2 000	-	-	-	15 000
Pipelines	10 000	10	210	0.3	80	-	-	-	10 300
c. Fugitive Sources	13 000	1 700	37 000	0.1	30	-	-	-	49 300
Coal Mining	-	90	2 000	-	-	-	-	-	2 000
Oil and Natural Gas	12 700	1 650	34 700	0.1	30	-	-	-	47 500
Oil	110	217	4 550	0.1	30	-	-	-	4 690
Natural Gas	28.6	640	13 400	-	-	-	-	-	13 500
Venting	8 010	794	16 700	-	-	-	-	-	24 700
Flaring	4 500	3.0	64	0.00	0.7	-	-	-	4 600
INDUSTRIAL PROCESSES	36 000	3.9	82	32.7	10 100	-	6 500	2 500	55 700
a. Mineral Products	7 200	-	-	-	-	-	-	-	7 200
Cement Production	4 600	-	-	-	-	-	-	-	4 600
Lime Production	1 800	-	-	-	-	-	-	-	1 800
Mineral Product Use ³	855	-	-	-	-	-	-	-	855
b. Chemical Industry	5 700	3.9	82	32.7	10 100	-	-	-	16 000
Ammonia Production	5 700	-	-	-	-	-	-	-	5 700
Nitric Acid Production	-	-	-	3.40	1 050	-	-	-	1 050
Adipic Acid Production	-	-	-	29	9 100	-	-	-	9 100
Petrochemical Production ⁴	-	3.9	82	0.03	8.2	-	-	-	90
c. Metal Production	15 700	-	-	-	-	6 500	2 270	-	24 400
Iron and Steel Production	11 800	-	-	-	-	-	-	-	11 800
Aluminum Production	3 900	-	-	-	-	6 500	59.1	-	10 000
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	2 210	2 210
d. Production and Consumption of Halocarbons and SF₆⁵	-	-	-	-	-	-	-	220	220
e. Other & Undifferentiated Production	7 900	-	-	-	-	-	-	-	7 900
SOLVENT & OTHER PRODUCT USE	-	-	-	0.51	160	-	-	-	160
AGRICULTURE	-	970	20 000	93	29 000	-	-	-	49 000
a. Enteric Fermentation	-	840	18 000	-	-	-	-	-	18 000
b. Manure Management	-	120	2 600	11	3 400	-	-	-	6 000
c. Agriculture Soils	-	-	-	82	25 000	-	-	-	25 000
Direct Sources	-	-	-	45	14 000	-	-	-	14 000
Pasture, Range and Paddock Manure	-	-	-	8.1	2 500	-	-	-	2 500
Indirect Sources	-	-	-	30	9 000	-	-	-	9 000
d. Field Burning of Agricultural Residues	-	5.3	110	0.14	43	-	-	-	160
WASTE	250	910	19 000	2	600	-	-	-	20 000
a. Solid Waste Disposal on Land	-	900	19 000	-	-	-	-	-	19 000
b. Wastewater Handling	-	13	280	2	500	-	-	-	830
c. Waste Incineration	250	0.3	7	0.3	100	-	-	-	360
Land Use, Land-use Change and Forestry	-31 000	300	6 300	13	3 900	-	-	-	-20 000
a. Forest Land	-52 000	290	6 000	12	3 700	-	-	-	-42 000
b. Cropland	7 700	10	200	0.4	100	-	-	-	8 100
c. Grassland	-	-	-	-	-	-	-	-	-
d. Wetlands	5 000	0.2	4	0.01	2	-	-	-	5 000
e. Settlements	8 000	5	100	0.2	50	-	-	-	9 000

Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry sector.
- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
- The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.
- The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.
- Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-20 1992 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential			21		310				
Unit	kt	kt	kt CO ₂ equivalent	kt	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	464 000	3 700	78 000	180	56 000	660	6 600	2 700	608 000
ENERGY	428 000	1 900	39 000	30	9 000				476 000
a. Stationary Combustion Sources	278 000	200	4 000	7	2 000				284 000
Electricity and Heat Generation	98 600	2.3	48	2	600				99 200
Fossil Fuel Production and Refining	49 700	70	2 000	0.9	300				52 000
Petroleum Refining and Upgrading	17 000	0.3	6	0.1	40				17 000
Fossil Fuel Production	32 700	70	2 000	0.8	200				34 000
Mining & Oil and Gas Extraction	5 340	0.1	3	0.1	40				5 380
Manufacturing Industries	52 300	2	50	2	600				52 900
Iron and Steel	5 540	0.3	6	0.2	60				5 610
Non Ferrous Metals	2 850	0.06	1	0.04	10				2 870
Chemical	8 510	0.17	3.6	0.1	50				8 560
Pulp and Paper	12 600	1	30	1	300				13 000
Cement	3 340	0.06	1	0.03	10				3 360
Other Manufacturing	19 500	0.4	9	0.4	100				19 600
Construction	1 730	0.03	0.6	0.06	20				1 750
Commercial & Institutional	26 800	0.5	10	0.5	200				26 900
Residential	40 500	90	2 000	2	500				43 000
Agriculture & Forestry	3 200	0.05	1	0.08	20				3 230
b. Transport²	138 000	30	700	20	7 000				145 000
Civil Aviation (Domestic Aviation)	6 270	0.3	7	0.2	60				6 300
Road Transportation	93 000	14	300	12	3 700				96 900
Light-Duty Gasoline Vehicles	42 200	7.2	150	6.9	2 100				44 500
Light-Duty Gasoline Trucks	21 300	3.1	66	4.0	1 200				22 600
Heavy-Duty Gasoline Vehicles	6 280	0.99	21	0.17	51				6 350
Motorcycles	136	0.14	2.9	0.00	0.89				140
Light-Duty Diesel Vehicles	444	0.01	0.3	0.03	10				454
Light-Duty Diesel Trucks	795	0.02	0.5	0.06	20				814
Heavy-Duty Diesel Vehicles	19 200	1	20	0.6	200				19 400
Propane & Natural Gas Vehicles	2 630	2	30	0.05	20				2 700
Railways	5 970	0.3	7	2	800				7 000
Navigation (Domestic Marine)	4 750	0.3	7	1	300				5 100
Other Transportation	28 000	20	400	6	2 000				30 000
Off-Road Gasoline	6 300	7	200	0.1	40				6 500
Off-Road Diesel	12 000	0.7	10	5	2 000				14 000
Pipelines	9 530	9.6	200	0.3	80				9 810
c. Fugitive Sources	12 000	1 700	35 000	0.1	30				46 800
Coal Mining		90	2 000						2 000
Oil and Natural Gas	12 000	1 570	32 900	0.1	30				45 000
Oil	110	215	4 520	0.1	30				4 660
Natural Gas	25.6	604	12 700	-	-				12 700
Venting	7 710	745	15 700	-	-				23 400
Flaring	4 200	2.7	58	0.00	0.7				4 300
INDUSTRIAL PROCESSES	36 000	4.3	90	59.3	18 400	660	6 600	2 700	64 200
a. Mineral Products	7 400								7 400
Cement Production	4 500								4 500
Lime Production	1 800								1 800
Mineral Product Use ³	1 100								1 100
b. Chemical Industry	5 100	4.3	90	59.3	18 400				24 000
Ammonia Production	5 100								5 100
Nitric Acid Production				3.50	1 080				1 080
Adipic Acid Production	-	-	-	32	10 000	-	-	-	10 000
Petrochemical Production ⁴		4.3	90	24	7 300				7 400
c. Metal Production	15 500						6 600	2 460	24 500
Iron and Steel Production	12 200								12 200
Aluminum Production	3 300						6 600	59.1	9 900
SF ₆ Used in Magnesium Smelters and Casters								2 400	2 400
d. Production and Consumption of Halocarbons and SF₆⁵						660		220	880
e. Other & Undifferentiated Production	7 900								7 900
SOLVENT & OTHER PRODUCT USE				0.46	140				140
AGRICULTURE		960	20 000	89	28 000				48 000
a. Enteric Fermentation		830	17 000						17 000
b. Manure Management		120	2 600	11	3 300				6 000
c. Agriculture Soils				78	24 000				24 000
Direct Sources				43	13 000				13 000
Pasture, Range and Paddock Manure				7.9	2 400				2 400
Indirect Sources				30	9 000				9 000
d. Field Burning of Agricultural Residues		4.8	100	0.12	38				140
WASTE	260	900	19 000	2	700				20 000
a. Solid Waste Disposal on Land		880	19 000						19 000
b. Wastewater Handling		13	280	2	500				810
c. Waste Incineration	260	0.5	10	0.4	100				400
Land Use, Land-use Change and Forestry	-93 000	90	1 900	3.7	1 200				-90 000
a. Forest Land	-120 000	74	1 500	3.1	950				-110 000
b. Cropland	8 800	10	200	0.5	100				9 100
c. Grassland									
d. Wetlands	5 000	0.8	20	0.03	10				5 000
e. Settlements	9 000	5	100	0.2	50				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12–21 1991 GHG Emission Summary for Canada

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential Unit	kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	450 000	3 500	74 000	150	48 000	840	6 900	3 900	583 000
ENERGY	414 000	1 700	36 000	30	8 000				458 000
a. Stationary Combustion Sources	268 000	200	4 000	7	2 000				274 000
Electricity and Heat Generation	92 200	1.7	35	2	500				92 700
Fossil Fuel Production and Refining	47 300	70	1 000	0.9	300				49 000
Petroleum Refining and Upgrading	17 000	0.3	6	0.1	40				17 000
Fossil Fuel Production	30 500	70	1 000	0.8	200				32 000
Mining & Oil and Gas Extraction	5 490	0.1	3	0.1	40				5 520
Manufacturing Industries	53 300	2	50	2	500				53 900
Iron and Steel	5 220	0.3	5	0.2	60				5 290
Non Ferrous Metals	2 630	0.06	1	0.04	10				2 640
Chemical	8 560	0.17	3.6	0.1	50				8 610
Pulp and Paper	13 700	1	30	1	300				14 000
Cement	3 340	0.06	1	0.03	10				3 350
Other Manufacturing	19 900	0.4	9	0.4	100				20 000
Construction	1 610	0.03	0.6	0.05	20				1 620
Commercial & Institutional	26 200	0.5	10	0.5	200				26 300
Residential	39 400	90	2 000	2	500				42 000
Agriculture & Forestry	2 700	0.04	0.8	0.06	20				2 720
b. Transport²	135 000	30	600	20	6 000				142 000
Civil Aviation (Domestic Aviation)	6 260	0.4	8	0.2	60				6 300
Road Transportation	91 200	14	290	11	3 500				94 900
Light-Duty Gasoline Vehicles	42 000	7.2	150	6.7	2 100				44 300
Light-Duty Gasoline Trucks	19 900	3.0	62	3.7	1 100				21 100
Heavy-Duty Gasoline Vehicles	6 570	1.1	22	0.18	55				6 650
Motorcycles	140	0.14	3.0	0.00	0.91				144
Light-Duty Diesel Vehicles	445	0.01	0.3	0.03	10				456
Light-Duty Diesel Trucks	722	0.02	0.4	0.05	20				739
Heavy-Duty Diesel Vehicles	19 000	1	20	0.6	200				19 200
Propane & Natural Gas Vehicles	2 280	1	30	0.04	10				2 300
Railways	5 710	0.3	7	2	700				6 000
Navigation (Domestic Marine)	4 900	0.4	7	1	300				5 200
Other Transportation	26 000	20	300	6	2 000				29 000
Off-Road Gasoline	6 400	8	200	0.1	40				6 600
Off-Road Diesel	13 000	0.7	10	5	2 000				14 000
Pipelines	7 370	7.4	160	0.2	60				7 590
c. Fugitive Sources	11 000	1 500	32 000	0.1	30				43 100
Coal Mining		100	2 000						2 000
Oil and Natural Gas	11 100	1 420	29 800	0.1	30				41 000
Oil	100	200	4 200	0.1	30				4 330
Natural Gas	23.6	563	11 800	-	-				11 800
Venting	6 900	654	13 700	-	-				20 600
Flaring	4 100	2.5	53	0.00	0.4				4 200
INDUSTRIAL PROCESSES	36 000	4.4	92	35.7	11 100	840	6 900	3 900	58 500
a. Mineral Products	7 300								7 300
Cement Production	4 400								4 400
Lime Production	1 800								1 800
Mineral Product Use ³	1 090								1 090
b. Chemical Industry	4 900	4.4	92	35.7	11 100				16 000
Ammonia Production	4 900								4 900
Nitric Acid Production				3.41	1 060				1 060
Adipic Acid Production	-	-	-	32	10 000	-	-	-	10 000
Petrochemical Production ⁴		4.4	92	0.03	8.0				100
c. Metal Production	15 100						6 900	3 650	25 700
Iron and Steel Production	11 900								11 900
Aluminum Production	3 100						6 900	59.1	10 000
SF ₆ Used in Magnesium Smelters and Casters								3 590	3 590
d. Production and Consumption of Halocarbons and SF₆⁵						840		220	1 100
e. Other & Undifferentiated Production	8 400								8 400
SOLVENT & OTHER PRODUCT USE				0.55	170				170
AGRICULTURE		920	19 000	88	27 000				47 000
a. Enteric Fermentation		790	17 000						17 000
b. Manure Management		120	2 500	10	3 200				5 700
c. Agriculture Soils				77	24 000				24 000
Direct Sources				43	13 000				13 000
Pasture, Range and Paddock Manure				7.3	2 300				2 300
Indirect Sources				30	9 000				9 000
d. Field Burning of Agricultural Residues		5.8	120	0.15	47				170
WASTE	250	880	19 000	2	700				19 000
a. Solid Waste Disposal on Land		870	18 000						18 000
b. Wastewater Handling		13	270	2	500				800
c. Waste Incineration	250	0.5	10	0.4	100				390
Land Use, Land-use Change and Forestry	-50 000	250	5 300	11	3 300				-41 000
a. Forest Land	-75 000	240	5 000	9.9	3 100				-67 000
b. Cropland	11 000	10	200	0.5	200				11 000
c. Grassland									
d. Wetlands	5 000	0.5	10	0.02	7				5 000
e. Settlements	9 000	5	100	0.2	60				9 000

Notes:

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

2. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

3. The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.

5. Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Table A12-22 1990 GHG Emission Summary for Canada

A12

Greenhouse Gas Categories	Greenhouse Gases								
	CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Global Warming Potential			21		310				
Unit	kt	kt	kt CO ₂ equivalent	kt	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL¹	458 000	3 400	72 000	160	49 000	770	6 500	3 400	590 000
ENERGY	424 000	1 700	35 000	30	8 000				468 000
a. Stationary Combustion Sources	273 000	200	4 000	7	2 000				279 000
Electricity and Heat Generation	91 000	1.8	37	2	500				91 600
Fossil Fuel Production and Refining	49 600	80	2 000	0.9	300				51 000
Petroleum Refining and Upgrading	18 000	0.3	6	0.1	40				18 000
Fossil Fuel Production	31 900	80	2 000	0.8	300				34 000
Mining & Oil and Gas Extraction	6 610	0.1	3	0.1	40				6 650
Manufacturing Industries	55 400	2	50	2	600				56 000
Iron and Steel	5 210	0.2	5	0.2	60				5 270
Non Ferrous Metals	3 240	0.07	1	0.05	10				3 260
Chemical	8 170	0.17	3.5	0.1	40				8 220
Pulp and Paper	14 100	1	30	1	300				14 400
Cement	3 810	0.07	1	0.04	10				3 820
Other Manufacturing	20 900	0.4	9	0.4	100				21 000
Construction	1 850	0.03	0.7	0.05	20				1 870
Commercial & Institutional	25 500	0.5	10	0.5	200				25 700
Residential	40 900	100	2 000	2	500				43 000
Agriculture & Forestry	2 370	0.04	0.8	0.05	20				2 390
b. Transport²	139 000	30	700	20	6 000				146 000
Civil Aviation (Domestic Aviation)	7 150	0.5	10	0.2	70				7 200
Road Transportation	93 200	14	300	10	3 200				96 700
Light-Duty Gasoline Vehicles	43 400	7.7	160	6.2	1 900				45 500
Light-Duty Gasoline Trucks	19 200	3.0	64	3.2	990				20 300
Heavy-Duty Gasoline Vehicles	7 350	1.2	26	0.21	65				7 440
Motorcycles	148	0.15	3.1	0.00	0.96				152
Light-Duty Diesel Vehicles	458	0.01	0.3	0.03	10				469
Light-Duty Diesel Trucks	686	0.02	0.4	0.05	20				702
Heavy-Duty Diesel Vehicles	19 800	1	20	0.6	200				20 000
Propane & Natural Gas Vehicles	2 170	1	30	0.04	10				2 200
Railways	6 160	0.3	7	3	800				7 000
Navigation (Domestic Marine)	4 690	0.3	7	1	300				5 000
Other Transportation	28 000	20	300	6	2 000				30 000
Off-Road Gasoline	7 600	9	200	0.2	50				7 800
Off-Road Diesel	14 000	0.8	20	6	2 000				16 000
Pipelines	6 650	6.7	140	0.2	60				6 850
c. Fugitive Sources	11 000	1 500	31 000	0.1	30				42 100
Coal Mining		90	2 000						2 000
Oil and Natural Gas	11 500	1 370	28 700	0.1	30				40 200
Oil	95	193	4 060	0.1	30				4 190
Natural Gas	22.6	543	11 400	-	-				11 400
Venting	6 990	627	13 200	-	-				20 200
Flaring	4 400	2.6	54	0.00	0.4				4 400
INDUSTRIAL PROCESSES	34 000	4.7	99	37.9	11 700	770	6 500	3 400	56 800
a. Mineral Products	8 300								8 300
Cement Production	5 400								5 400
Lime Production	1 800								1 800
Mineral Product Use ³	1 090								1 090
b. Chemical Industry	5 000	4.7	99	37.9	11 700				17 000
Ammonia Production	5 000								5 000
Nitric Acid Production				3.27	1 010				1 010
Adipic Acid Production	-	-	-	35	11 000	-	-	-	11 000
Petrochemical Production ⁴		4.7	99	0.03	8.0				110
c. Metal Production	12 900						6 500	3 170	22 600
Iron and Steel Production	10 200								10 200
Aluminum Production	2 700						6 500	59.1	9 300
SF ₆ Used in Magnesium Smelters and Casters								3 110	3 110
d. Production and Consumption of Halocarbons and SF₆⁵						770		220	990
e. Other & Undifferentiated Production	8 000								8 000
SOLVENT & OTHER PRODUCT USE				0.58	180				180
AGRICULTURE		900	19 000	90	28 000				47 000
a. Enteric Fermentation		780	16 000						16 000
b. Manure Management		120	2 500	10	3 100				5 700
c. Agriculture Soils				80	25 000				25 000
Direct Sources				44	14 000				14 000
Pasture, Range and Paddock Manure				7.1	2 200				2 200
Indirect Sources				30	9 000				9 000
d. Field Burning of Agricultural Residues		7.1	150	0.18	57				210
WASTE	270	870	18 000	2	600				19 000
a. Solid Waste Disposal on Land		850	18 000						18 000
b. Wastewater Handling		13	270	2	500				780
c. Waste Incineration	270	0.4	9	0.4	100				400
Land Use, Land-use Change and Forestry	-73 000	160	3 300	6.6	2 100				-67 000
a. Forest Land	-98 000	140	3 000	5.9	1 800				-93 000
b. Cropland	11 000	10	300	0.5	200				11 000
c. Grassland									
d. Wetlands	5 000	0.3	7	0.01	4				5 000
e. Settlements	9 000	5	100	0.2	50				9 000

Notes:

- National totals exclude all GHGs from the Land Use, Land-use Change and Forestry sector.
- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
- The category Mineral Product Use includes CO₂ emissions coming from the use of limestone & dolomite, soda ash, and magnesite.
- The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are in Other & Undifferentiated Production.
- Production of HFCs (HCFC-22 exclusively) only occurred in Canada from 1990-1992. HFC consumption began in 1995.

Annex 13

Electricity in Canada: Summary and Intensity Tables

This annex presents detailed greenhouse gas (GHG) information related to the generation of electricity by public utilities on a national and provincial level. The GHG emissions presented in this annex include stationary combustion sources only and are a subcategory of the Public Electricity and Heat Production category (CRF Category 1.A.1.a). Additional information on the contribution of non-utility industrial generators of electricity has also been included.

The Canadian electricity generation industry is composed of utility, non-utility and industrial generators that produce electricity by transforming the energy in water, coal, natural gas, refined petroleum products (RPPs), miscellaneous other 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 the sulphur hexafluoride [SF₆] emissions associated with transformer stations).

The analysis in this section relies on a variety of data sources. Fuel consumption and electricity production data are published by Statistics Canada in the *Report on Energy Supply–Demand in Canada* (RES_D) (Statistics Canada #57-003-XIB), the *Electric Power Generation, Transmission and Distribution* (EPG_{TD}) publication (Statistics Canada #57-

202-XIB) the *Energy Statistics Handbook* (Statistics Canada #57-601-XIE) and online via CANSIM (Table 127-0007).

Generation data for 2008 and 2009 were obtained from CANSIM. The regional analysis and discussion is further supported by reviewing and incorporating data published in annual reports prepared by the major power producers in each province or territory. Data from the Environment Canada Greenhouse Gas Emissions Reporting Program (GHGRP 2010) are also used in the analysis and for comparison purposes.

A13.1. Methodology and Limitations

GHG emissions resulting from the combustion of fuel for electricity generation by public utilities are presented in the tables in this annex. Detailed data on industrial contributions to the electricity grid are available; however, fuel consumption data associated with this specific area of electricity production are not currently available in the EPG_{TD}. Nevertheless, the contribution of industry-generated electricity to the Canadian total is on average less than 9% and is not considered to be a major factor in the trends discussion. See Section A13.6 (Industrial Generation of Electricity) for a review of non-utility contributions to the overall electricity supply mix.

The information presented in this annex also excludes the emissions associated with heat and steam generation. Emissions and trends for the Electricity and Heat Generation subsector are covered briefly in *Greenhouse Gas Emission Trends, 1990–2009* (Chapter 2) and the *Energy Sector* (Chapter 3). GHG emissions by gas for the combined utility and heat and steam sectors are presented in Canada's *Greenhouse Gas Emission Tables, 1990–2009* (Annex 12) and the *Provincial/Territorial Greenhouse Gas Emission Tables, 1990–2009* (Annex 15). Industrially generated electricity emissions have been allocated to the industrial subsectors.

Electricity 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 2 of this report. GHG emissions are based on the total fuel consumed by the utility sector, as provided in the RES_D, while the net electricity generation presented herein is from the EPG_{TD} and CANSIM (as available). For the 1990–1997 period, net electricity generation was calculated from gross electricity

generation values provided in the EPGTD.

Transmission and distribution impacts (inefficiencies and SF₆ emissions) are included in the calculation of the "Consumption Intensity," a factor developed to better reflect the GHG emissions at a consumer level rather than the generation level. However, the "Generation Intensity" factors do not include transmission and distribution effects and are comparable to those published in previous years. The Transmission & Distribution losses presented in Table A13-1 to Table A13-2 were calculated from CANSIM 127-0008, assuming unallocated energy was equivalent to inefficiencies in the grid. Due to the methods employed by Statistics Canada, this assumption may or may not hold true for every province and territory.

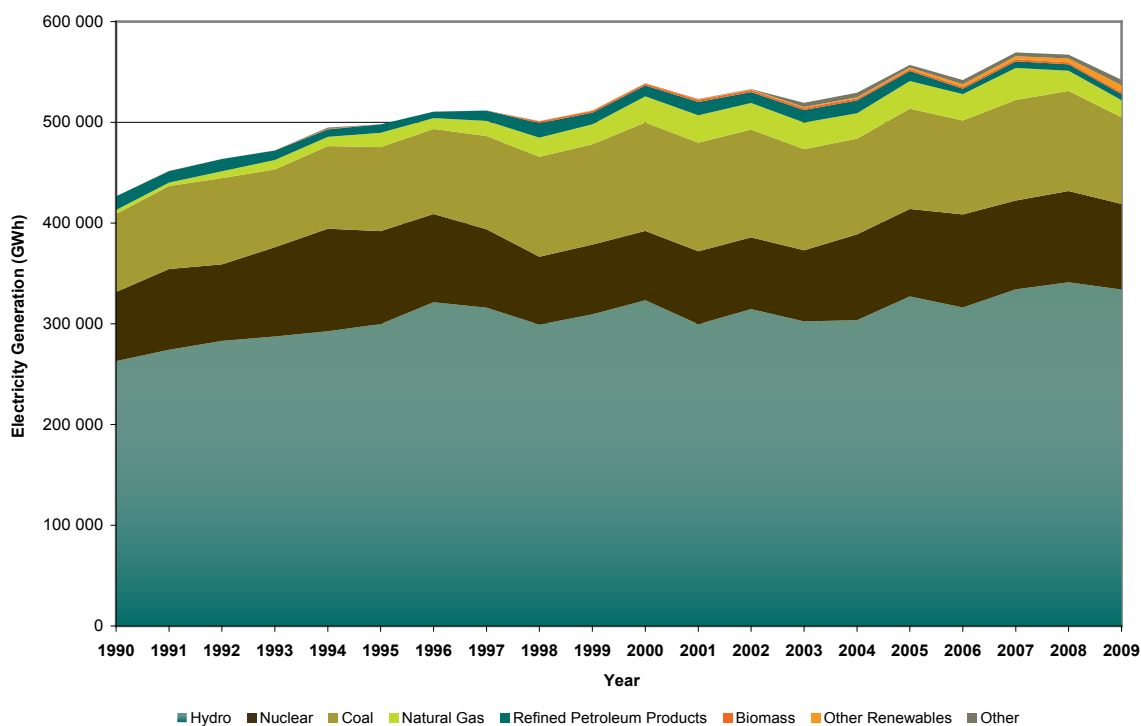
A13.2. National Trends

Public utility-generated electricity has increased by 27% since 1990, while GHG emissions associated with this sector have increased by 7% over the same period. GHG intensity is down—from 220 g CO₂ eq/kWh in 1990 to 200 g CO₂ eq/kWh in 2008. CO₂ intensity is at its lowest level ever, largely due to increasing hydro and nuclear generation, and fuel switching from RPPs to natural gas. Fluctuations in electricity generation over time (Figure A13-1) primarily

depend on changes in demand, since electricity is generated to meet an instantaneous need and, once generated, cannot be stored effectively. Decreasing electrical demand can occur via action by the final consumer (through conservation and outreach programs), new technology (higher-efficiency appliances), weather or through market and/or economic restructuring, plant shutdowns or strike actions. Overall generation continues to decrease over the short term as economic conditions affected demand, primarily in Ontario. Generation decreased by 4% from 2008 and 5% from 2007.

As shown in Figure A13-1, hydroelectric resources supply the majority of Canada's electricity, contributing 62% of total generation in 2009, about the same as in 1990. Hydroelectric generation is essentially free of direct GHG emissions except for the CH₄ emissions that result from the flooding of lands to build reservoirs. Hydro resources are primarily concentrated in Labrador, Quebec, British Columbia and Manitoba. Since 1990, the contribution of hydro generation to the total supply mix has been relatively stable, with yearly fluctuations directly related to hydraulic conditions.

Figure A13-1 Utility-generated Electricity by Source



Nuclear power is Canada's second-largest source of emission-free electricity,¹ contributing approximately 16% of total generation in 2009, about even with 1990. Nuclear generation peaked in 1996 with 102 000 gigawatt hours (GWh) and then declined in subsequent years due to reactor maintenance and shutdowns triggered by safety concerns. In 2009, nuclear power stations generated 85 000 GWh, the vast majority of it (96%) in Ontario. Nuclear power plants also operate in Quebec and New Brunswick, and significant efforts have been made to recover nuclear generation capacity in Canada since 2003. Overall, nuclear generation was down about 6% in 2009 compared to 2008, due mainly to lower demand in Ontario and no nuclear generation in New Brunswick in 2009 due to reactor refurbishment.

Coal provided approximately 16% of the electricity generated in Canada in 2009, totalling 86 200 GWh, an increase of 11% from 1990. Coal-fired generation was responsible for about 77% of Canada's electricity-related GHG emissions in 2009 and is the primary fuel in Alberta and Saskatchewan. Coal also contributes significantly to the power supply in Ontario and Nova Scotia (see Figure A13–4 below for generation sources by region). The gradual increase in coal generation is primarily due to increasing demand, while annual variations usually depend on fluctuations in hydro generation; that is, in years with lower water levels, coal use increases to compensate. In Ontario, coal use also increased in years with lower nuclear generation. Coal-based electricity in Canada was responsible for 75 megatonnes (Mt) of GHG emissions, a 2.5 Mt decrease from 1990 and a decrease of 16.2 Mt from 2008.

The use of natural gas for electricity generation has increased significantly since 1990, and it now generates about three times as much as RPPs in its contribution to total supply. In 2009, its share of the generation mix was 3%—about five times that in 1990. Natural gas-fired generators are part of the generation mix in most regions of the country, with Ontario and Alberta leading in natural gas-fired generation, followed by British Columbia and Saskatchewan. In Quebec and the Atlantic provinces, gas has been available only since 2000, but it is already being used in several new plants and a few retrofitted oil plants. Because natural gas generators are relatively easy to fire up but cost more than coal, they are generally used to supplement the base load supply (hydro, coal or nuclear) at peak

times to meet fluctuations in demand. Since the GHG emissions from natural gas generation per kilowatt-hour are about half those from coal, any displacement of coal by natural gas results in fewer GHG emissions. The use and installation of co-generation units has also been increasing and has had a positive impact on the amount of usable power being captured per unit of fuel combusted. Total GHG emissions from natural gas in 2009 were 15.7 Mt, an increase of 13 Mt from 1990 and a decrease of 2 Mt from 2008.

RPPs such as heavy fuel oil and diesel were used to generate 5900 GWh of electricity in 2009, a significant 57% decrease from 1990. RPP-fired generation made up about 1% of Canada's total electricity production for 2009. RPPs are used for electricity generation primarily in Newfoundland and Labrador, Nova Scotia, and New Brunswick, where they made up 2.6%, 3.0% and 30%, respectively, of those provinces' supply mixes in 2009. These percentages vary from year to year, depending on the price of RPPs relative to the price of coal, overall demand and provincial policies. High oil prices make RPP-fired generation a more expensive option than natural gas to meet demand.

Biomass sources, in particular wood and wood wastes, contributed about 0.4% to the overall utility electrical-generation supply in 2009, with generation mainly located in British Columbia, Alberta and New Brunswick. Biomass combustion plays a greater role in industrial electricity generation. CO₂ emissions from biomass are considered carbon-neutral and are not included in the GHG totals.

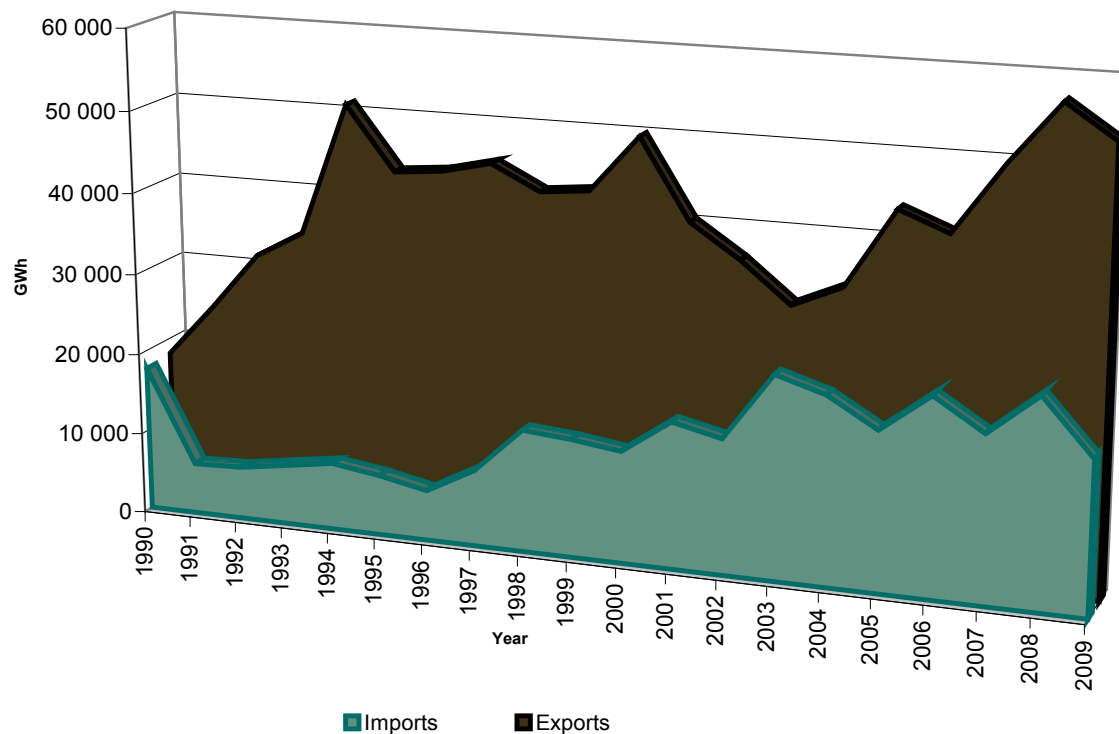
Electricity generation from renewable sources like wind and tidal power continue to increase at a significant rate. New large-scale wind farm installations helped increase power generation by 74% from 2008 and 322% from 2005. Wind and tidal generation has surpassed RPP-fired generation, and provincial programs for increased renewable content (from wind and other sources) in the electrical supply grid will continue to play a role in 2010 and beyond as more projects come on line. The Canadian Wind Energy Association (CanWEA) reports that Canada's installed capacity grew to 3319 megawatts (MW) in 2009, with wind developments operating in every province for the first time ever.

A13.3. Imports and Exports

Overall electricity (utility and industrial) generation in 2009 grew to over 574 000 GWh, an increase of 23% from

1 The inventory analysis does not consider emissions related to uranium mining, processing or disposal of waste fuel.

Figure A13-2 Canadian Electricity Imports and Exports from the United States



1990 and significantly lower than the previous high of 603 000 GWh observed in 2007 (Statistics Canada 57-601-XIE). The interconnectedness of the electricity grid with the United States and varying requirements in different regions of the country allows the easy import of cheap electricity and the export of excess electricity for profit.

As shown in Figure A13-2, electricity exports grew by 193% between 1990 and 2009, from 18 000 GWh to over 53 000 GWh. Imports have also increased, although at a significantly lower rate (5% between 1990 and 2009). This small increase in imports is mainly due to decreased demand as a result of the economic recession. In 2008, imports had grown by 43% from 1990. Interprovincial trade is also a factor in electricity generation and consumption. Prince Edward Island imports 88% of its electricity due to few local generating options and a well-established link with New Brunswick. Thanks to its abundant hydro resources, Canada is largely a net electricity exporter. As such, fluctuations over time have as much to do with economics and international demand as with hydraulic conditions.

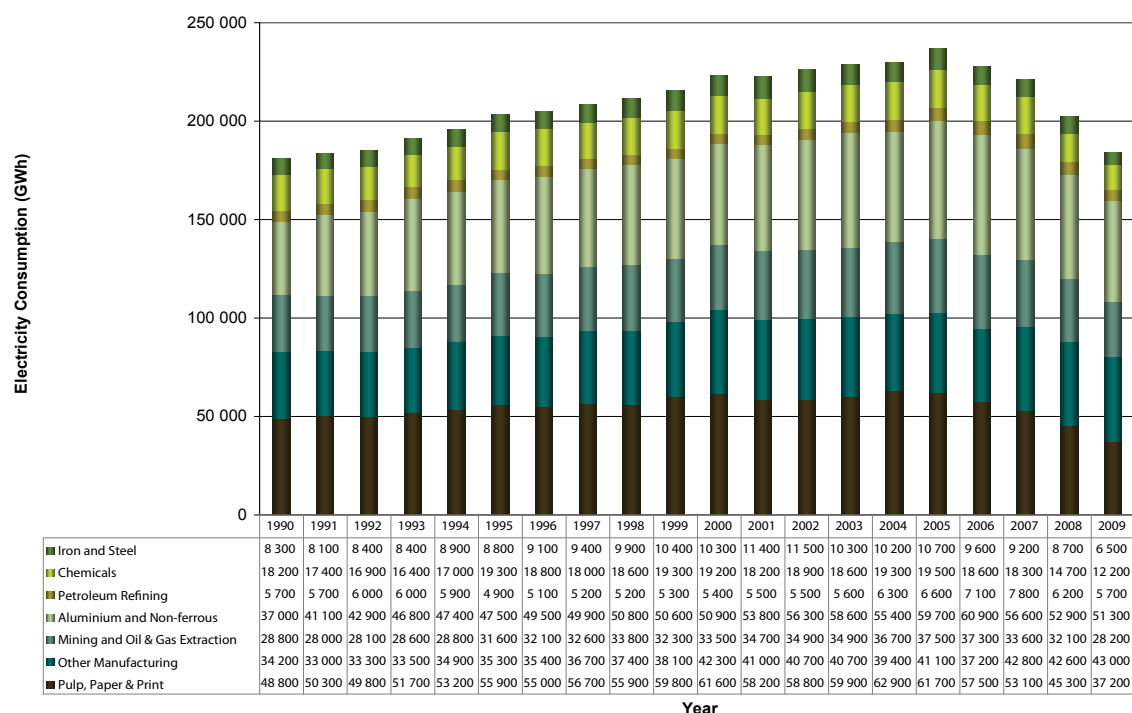
A13.4. Sectoral Discussion

The major consumers of electricity in Canada for 2009 are (in order of decreasing consumption) the Manufacturing Industries (including mining and oil & gas extraction), Residential, and Commercial/Institutional & Public Administration (Statistics Canada 57-601-XIE). Since 1990, all subsectors' overall consumption has increased, while their consumption as a percentage of the whole has remained virtually unchanged.

Manufacturing Industries

Electricity consumption for selected manufacturing sectors is presented in Figure A13-3. The long-term trend is skewed by the economic recession in 2008-2009. Over the long term, consumption decreased in four of seven subsectors. The shift from a resource-based economy, the rise of the automotive and electronics sector, and the growth of the service/IT industry have all had impacts on electricity consumption. Since 2006, six of the seven subsectors showed a decrease in electrical consumption, primarily a response to economic factors. The Pulp, Paper and Print subsector showed the largest decrease in electricity consumption while the Other Manufacturing subsector

Figure A13–3 Electricity Consumption by Manufacturing Industry



showed the largest increase. The short-term changes can usually be attributed to economic factors rather than to structural changes, although the recession had a significant impact in 2008 and 2009.

The Aluminium and Non-ferrous Metals subsector has shown significant growth since 1990, increasing 39% despite the recession. Increased global demand for these products has been the main reason for the increased consumption. The aluminium subsector uses significant amounts of electricity in its processes, and demand is closely related to production. Consumption has decreased since 2006 likely as a result of economic factors. The Mining and Oil & Gas Extraction subsector has grown steadily since 1990, with a decline from 2008 to 2009. This subsector includes oil sands mining as well as primary metals (i.e. zinc, bauxite, nickel, copper). The growth of the oil sands, plus surging global demand primarily for metals in the last five years on the global market are the key drivers behind the growth in electrical consumption. The short-term changes in demand in this subsector are similar to those identified in the aluminium subsector. The “Other Manufacturing” subsector includes many industries, and of particular interest are the automotive and electronics manufacturing categories. Electricity consumption has been changing annually since 2000 as the subsector deals

with difficult economic conditions brought about by the effects of the dot-com bust, the 9/11 terrorist attacks and the recession. In recent years, the Pulp, Paper & Print subsector has faced the greatest economic difficulties. Strikes and plant closures have consistently reduced electricity demand since 2006.

Residential Subsector

The Residential subsector is a major consumer of electricity, with demand increasing 23% between 1990 and 2009 and 14% since 2001. At the same time, the number of homes in Canada increased by 33% between 1990 and 2008 (the last year for which data are available) and 11% between 2001 and 2008. Electricity consumption by this subsector can be affected by weather but also by economic prosperity. Growth in demand was low to moderate during the recession that appeared in the early 1990s, but consumption increased significantly after 1999. The rise in home computer usage, air conditioners and home electronics purchased due to increases in disposable income has helped to push consumption higher, while energy efficiency gains have been realized in new appliances (via programs like EnergyStar). The trend towards larger homes means more energy used for heating, cooling and lighting, with the average size of a housing unit increasing by about 12 m² from 1990 (NRCAN 2010).

Electricity consumption by the Residential subsector decreased by 0.1% between 2008 and 2009. In 2004 and 2005, there was full-scale implementation of significant and successful efforts at GHG reductions and electricity conservation, through campaigns such as the One-Tonne Challenge, Project Porchlight and utility-organized conservation programs. The decreased demand observed in 2009 was mainly due to a 5.5% decrease in electricity demand in Ontario, while most other provinces exhibited small increases.

Commercial/Institutional and Public Administration Subsectors

Electricity consumption by the Commercial/Institutional and Public Administration subsectors decreased by 4% (from 150 terawatt hours (TWh) to 144 TWh) between 2008 and 2009. Over the long term, electricity consumption by these subsectors has grown by 33%, in part due to growth in the service and information technology (IT) sectors through structural changes in Canada's economy. These subsectors have also meant an increase in the number of commercial buildings and floor space, which has meant larger areas to heat and cool, while computers, printers and other electrical appliances have become commonplace. Commercial and Institutional floor space increased 37% between 1990 and 2008 (the last year for which data are available) and 14% between 2001 and 2008 (NRCan 2010).

A13.5. Regional Discussion

Figure A13–4 provides a breakdown of electricity generation by region and by source for 1990 and 2009.² Coal-fired sources predominate in Alberta and Saskatchewan, due in no small part to easy and reliable access to abundant coal resources. Hydro provides the majority of electricity generation in the provinces of Quebec, British Columbia, Manitoba, and Newfoundland and Labrador. In Ontario and the Atlantic region, the electricity generation mix is fairly diverse, with nuclear power providing the greatest percentage of the supply in Ontario. In terms of total generation, Quebec and Ontario have by far the highest generation totals—combined, they produced 321 000 GWh (59%) of Canada's electricity supply in 2009. They are followed by Alberta (about 54 000 GWh), British Columbia (about 49 900 GWh), and Newfoundland and

Labrador (41 500 GWh). Overall generation has increased in all provinces except, for the first time, the Atlantic region. Since 1990, generation in Saskatchewan and Manitoba has grown by 57% and 70%, respectively. In Manitoba, this growth was based on new hydro developments, while in Saskatchewan the increase was due to expanded use of coal and natural gas to meet demand. Generation in Alberta and Quebec grew 36% and 50%, respectively. In Ontario, a 15% increase in generation was met with increased nuclear power over the period, plus a significant increase in the use of natural gas. In British Columbia and in Newfoundland and Labrador, electricity generation increased by 4% and 14%, respectively.

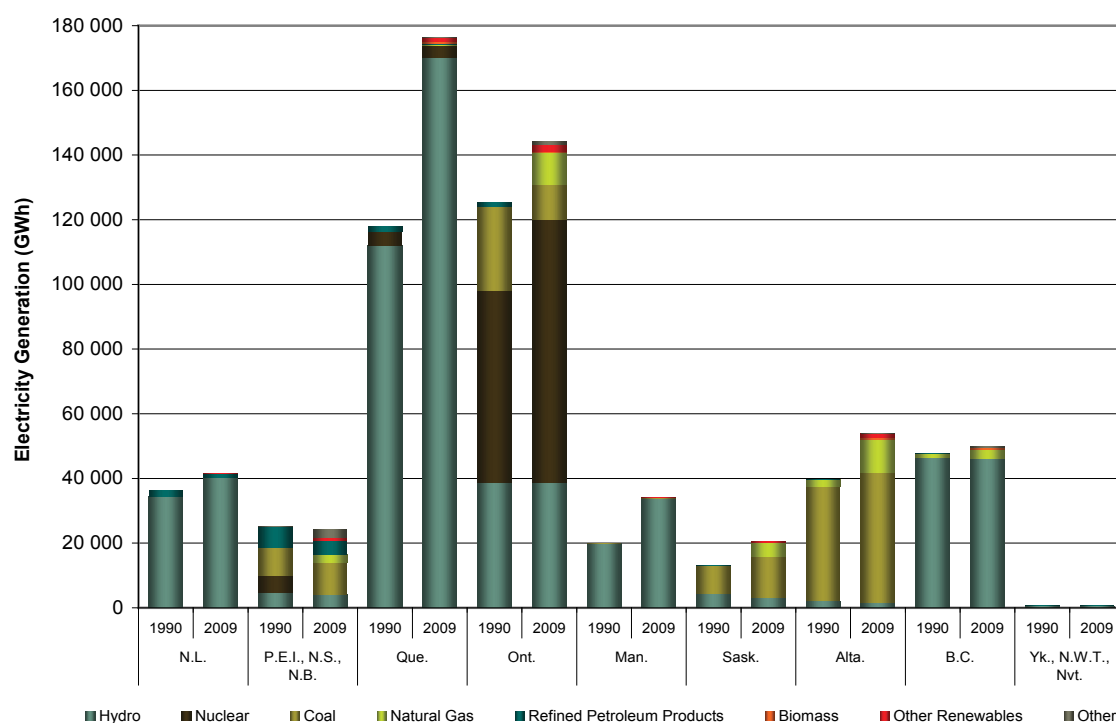
Overall, zero-GHG-emitting electricity sources (nuclear, hydro, biomass, wind and tidal) continue to provide about three quarters of the electricity in Canada. The contribution of Other Renewables (mostly new wind installations) has increased over 300% in the last five years and will likely increase further in 2010 due to federal and provincial incentive programs and increased public acceptance.

Since public utilities are limited in their ability to increase electricity rates for consumers, economic factors can play a major role in fuel consumption. For example, natural gas-fuelled generation increased by about 550% between 1990 and 2000 and remained constant between 2000 and 2005. Natural gas-based generation was lower between 2002 and 2004, due in part to higher natural gas prices, while generation in 2006 was lower due to softer demand. The rapid valuation of the Canadian currency in 2004, however, had the effect of lowering natural gas costs, as these prices are based on international markets and foreign currency. Similar impacts can be inferred for coal, RPPs, and "other fuel" generation. With increasing oil costs, the usage of lower-priced and subsequently lower-grade fuels like coal and those included in the "other fuel" category have increased while RPP usage has decreased due to the limited ability of public utilities to pass on rising fuel costs.

The main reason behind the 18-Mt decrease in GHG emissions from this sector is the recession experienced in late 2008 and 2009. The majority of the decrease between 2008 and 2009 was observed in Ontario (11.9 Mt) and Alberta (5.5 Mt). In Ontario, increased generation from renewable sources, and lower demand, resulted in less coal-fired generation and significantly lower emissions.

² Owing to their relatively small contribution to Canadian supply, the Atlantic provinces have been grouped together, as have the territories.

Figure A13–4 Electricity Generation by Region and Source, 1990 and 2009



A13.6. Industrial Generation of Electricity

Overall electricity generation in Canada has increased by 27% since 1990, with industrial electricity generation making up 7% of that increase. However, within the industrial electricity industry, generation has increased approximately 23% since 1990.

Electricity generated by industry consists of three main source types: hydro, renewables such as wind and tidal power, and combustion generation. Combustion generation consists of natural gas, biomass, RPPs and other fuel combustion. In 1990, coal made up a minor fraction of the industrial combustion-generation mix but this has been reduced to zero in 2009. Nuclear power has never been part of the industrial electricity generation mix. Hydro generation remains the largest contributor to the industrial electricity generation mix. The majority occurs in British Columbia and Quebec, with smaller contributions from Labrador and Ontario. This is consistent in both 1990 and 2009. Since 1990, overall industrial hydro generation increased 2%; however, in 1990 it was 76% of the overall generation mix, while in 2009 it decreased to 63%.

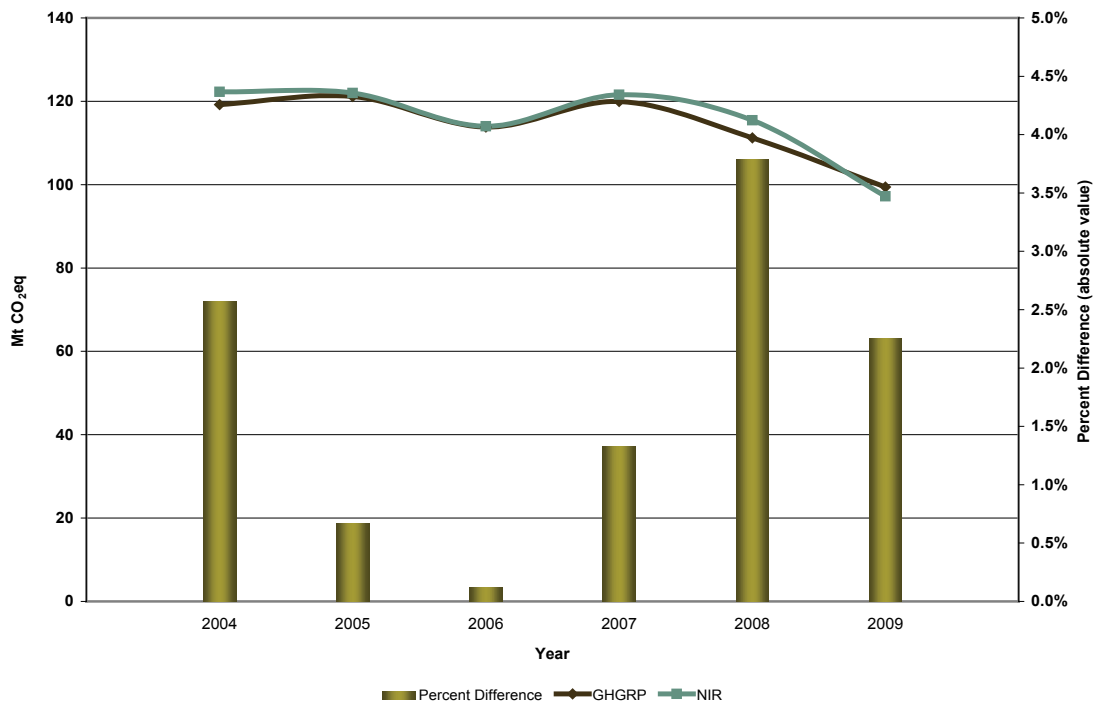
Natural gas usage for industrial electricity generation has increased 82% since 1990, when it represented 11% of the generation mix. In 2009, natural gas-based generation increased to 16% of industrial supply. However, natural gas usage fluctuates from year to year, as does RPP usage. The 2009 value for RPPs is 57% lower than the 2008 value, and 39% lower than 1990. Fluctuations in RPP and natural gas usage are generally a result of changes in the market values of these fuels relative to each other.

Industrial electricity generation from renewable sources other than hydro was observed for the first time in 2004 and has stayed relatively consistent since that time. In 2009, other renewables made up less than 1% of the supply mix for industrial generation.

A13.7. Greenhouse Gas Emissions Reporting Program

The Government of Canada established the GHGRP in March 2004, to collect GHG emissions information annually from Canadian facilities on a mandatory basis. This program is part of Canada's ongoing effort to develop, in collaboration with the provinces and territories, a har-

Figure A13–5 Utility-generated Electricity by Source



monized and efficient mandatory GHG reporting system that minimizes duplication and the reporting burden, for industry and governments alike. The program's four main objectives are as follows: provide Canadians with timely information on GHG emissions, validate estimates presented in the National Greenhouse Gas Inventory, support provincial and territorial requirements for GHG emissions information, and support the development of regulations.

Figure A13–5 illustrates the differences between the GHGRP electric utility values and those included in the National Inventory Report (NIR).

Overall, the two sets of estimates convey the same trends and use similar methods. Over the past six years, the largest discrepancy between the two sets of estimates is only 3.8%, with the smallest at 0.1%. In general, the NIR estimates are higher than those compiled from the GHGRP, with the exception of preliminary data for 2009. These differences are the result of a combination of influences, particularly methodology choices and classification.

High-emitting facilities that report under the GHGRP (such as electric utilities) have access to detailed information on fuel quantities and quality. Some facilities also use Continuous Emissions Monitoring System (CEMS) devices, which can track GHG emissions. Comparatively, the NIR

uses aggregated statistical data from Statistics Canada that, although reasonable, cannot be expected to be as accurate at a facility level. Also, NIR emission factors used for coal are averaged, whereas carbon-content fluctuations can be addressed by a facility through either regular testing or CEMS monitoring. The combination of these factors can result in differences as high as 20% for a given facility.³

Under the GHGRP, facilities categorize themselves based on the North American Industrial Classification System (NAICS). For electric utilities, the NAICS code is 221112. The selection of the NAICS code for reporting purposes is left up to the individual facility, which can cause inconsistencies when energy data are collected by Statistics Canada via different energy-related surveys. In these cases, the electric utility subsector may be under- or over-represented when compared to national statistics published by Statistics Canada and used in the development of the NIR GHG estimates.

³ Based on internal Environment Canada investigation.

A13.8. GHG Emission Intensities

The quantity of GHG emissions per megawatt-hour for a specific fuel (or for a specific fuel and generation type) is known as emission intensity and can be measured in tonnes of carbon dioxide equivalent emissions per gigawatt-hour (t CO₂ eq/GWh). Emission intensities vary according to the specific type of fuel used, the quality of that fuel, the conversion technology used and the efficiency of the combustion unit. Coal-fired electricity generally has the highest emission intensity; its emission intensity varies with the type of coal, although it is usually in the range of 1000 t CO₂ eq/GWh. The intensity of RPPs also varies with fuel type and technology, ranging from 600 to 800 t CO₂ eq/GWh, and reflects the variability of this category. Natural gas generators tend to produce around 500 t CO₂ eq/GWh, although the value could be substan-

tially lower for cogeneration plants.

On a regional basis, GHG intensities give a quick glimpse into the wide variation of supply mixes in each province and region. Alberta, with a generation system that is predominantly coal-based, has the highest GHG intensity in Canada, although its GHG intensity has been decreasing as a result of the increased use of natural gas, biomass and other renewable sources of energy. The Atlantic region, with a mix of RPPs, coal and nuclear has a lower GHG intensity than Alberta, whereas Quebec, Manitoba and British Columbia, where generation is dominated by hydro, have the lowest GHG intensities. With its mix of hydro, nuclear and fossil fuels, Ontario lies between the two and is very close to the Canadian average.

Electricity generation and GHG emissions details for Canada and the provinces and territories are provided in Table A13–11 to Table A13–12.

Table A13–1 Electricity Generation and GHG Emission Details for Canada¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
<i>kt CO₂ eq</i>											
Overall Total^{4,5}	91 600	126 900	128 000	123 300	128 600	123 100	122 800	114 800	122 400	116 200	97 900
Electricity Generation⁶											
<i>GWh</i>											
Coal	77 400	107 700	107 800	106 900	100 400	94 900	99 700	93 200	99 900	99 500	86 200
Refined Petroleum Products ⁷	13 630	10 810	13 250	10 790	12 560	12 800	10 040	5 420	6 470	6 320	5 920
Natural Gas	3 900	25 900	27 300	26 400	26 200	25 300	27 300	26 100	31 800	19 900	17 000
Nuclear	68 800	68 700	72 400	71 300	70 700	85 200	86 800	92 400	88 200	90 600	85 000
Hydro	262 900	323 500	299 600	314 600	302 400	303 600	327 200	316 100	334 200	341 200	333 900
Biomass	10	1 910	2 120	2 180	2 140	2 000	1 860	2 010	2 050	2 090	2 080
Other Renewables ⁸	30	260	370	430	700	970	1 580	2 470	3 050	3 820	6 660
Other ⁹	80	170	420	490	4 190	4 560	2 600	4 120	3 660	3 810	5 450
Overall Total	426 700	538 900	523 200	533 000	519 300	529 400	557 000	542 000	569 300	567 300	542 200
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	210	230	240	230	250	230	220	210	210	200	180
CH ₄ intensity (g CH ₄ / kWh)	0.004	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.011	0.010	0.009
N ₂ O intensity (g N ₂ O/ kWh)	0.004	0.004	0.005	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.003
Generation Intensity (g CO₂ eq / kWh)	210	240	240	230	250	230	220	210	220	200	180
Transmission & Distribution Losses (%) ¹⁰	7.74	8.50	8.04	8.50	6.63	6.34	7.13	7.51	6.95	8.72	9.05
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	207	204	266	139	217	226	168	181	235	201	180
Consumption Intensity (g CO₂ eq / kWh)¹²	230	260	260	250	260	250	240	230	230	220	200

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13-2 Electricity Generation and GHG Emission Details for Newfoundland and Labrador¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	1 600	800	1 700	1 800	1 500	1 300	1 100	600	1 100	900	900
Electricity Generation⁶											
	<i>GWh</i>										
Coal	0	0	0	0	0	0	0	0	0	0	0
Refined Petroleum Products ⁷	1 960	1 020	2 150	2 430	2 000	1 700	1 360	770	1 290	1 130	1 060
Natural Gas	0	0	0	0	0	0	0	0	0	0	0
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	34 300	41 800	37 400	40 100	38 400	38 100	38 900	40 100	38 500	41 100	40 300
Biomass	10	0	0	0	0	0	0	0	0	0	0
Other Renewables ⁸	0	0	0	0	0	0	0	0	0	8	100
Other ⁹	0	0	0	0	0	0	0	0	0	0	0
Overall Total	36 300	42 800	39 600	42 500	40 400	39 800	40 300	40 800	39 800	42 300	41 500
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	40	0	0	40	40	30	30	20	30	20	20
CH ₄ intensity (g CH ₄ / kWh)	0.0006	0.0000	0.0000	0.0005	0.0004	0.0004	0.0003	0.0002	0.0003	0.0002	0.0002
N ₂ O intensity (g N ₂ O/ kWh)	0.0012	0.0000	0.0000	0.0009	0.0008	0.0007	0.0005	0.0003	0.0006	0.0004	0.0004
Generation Intensity (g CO₂ eq / kWh)	45	19	42	43	38	32	27	15	27	21	21
Transmission & Distribution Losses (%) ¹⁰	7.74	8.50	8.04	8.50	6.63	6.34	7.13	7.51	6.95	8.72	9.05
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	207	204	266	139	217	226	168	181	235	201	180
Consumption Intensity (g CO₂ eq / kWh)¹²	55	26	53	51	46	41	33	21	35	28	27

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13–3 Electricity Generation and GHG Emission Details for Prince Edward Island¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
<i>kt CO₂ eq</i>											
Overall Total^{4,5}	100	60	50	30	40	20	10	10	NA	1.0	0.3
Electricity Generation⁶											
<i>GWh</i>											
Coal	0	0	0	0	0	0	0	0	0	0	0
Refined Petroleum Products ⁷	81	48	44	19	43	13	6	6	5	2	3
Natural Gas	0	0	0	0	0	0	0	0	0	0	0
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0	0	0	3	2
Other Renewables ⁸	0	0	5	19	20	35	40	33	112	181	350
Other ⁹	0	0	0	0	0	0	0	0	0	2	2
Overall Total	80	50	50	40	60	50	50	40	120	190	360
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	1,270	1,170	1,030	750	670	380	250	200	NA	3	1
CH ₄ intensity (g CH ₄ / kWh)	0.02	0.01	0.01	0.008	0.008	0.004	0.003	0.003	NA	0.000	0.000
N ₂ O intensity (g N ₂ O/ kWh)	0.03	0.02	0.02	0.02	0.01	0.008	0.005	0.004	NA	0.000	0.000
Generation Intensity (g CO₂ eq / kWh)	1 280	1 180	1 040	760	680	380	260	200	NA	3	1
Transmission & Distribution Losses (%) ¹⁰	11.80	7.80	12.06	25.57	19.72	18.32	8.32	7.22	5.94	5.82	7.20
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumption Intensity (g CO₂ eq / kWh)¹²	1 430	1 270	1 160	950	810	450	280	210	NA	3	1

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13-4 Electricity Generation and GHG Emission Details for Nova Scotia¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	6 900	9 400	9 100	7 800	8 800	10 500	9 900	9 200	9 700	10 000	9 700
Electricity Generation⁶											
	<i>GWh</i>										
Coal	7 640	8 960	9 810	8 140	6 880	6 310	6 500	6 450	7 890	7 410	7 020
Refined Petroleum Products ⁷	300	1 500	1 060	460	2 000	1 890	1 830	870	460	350	340
Natural Gas	0	0	0	2 310	150	100	220	310	760	1 210	1 170
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	1 120	890	680	1 000	1 050	860	1 040	980	890	1 060	1 040
Biomass	0	200	200	180	190	180	170	160	150	140	120
Other Renewables ⁸	30	80	30	30	30	30	110	130	180	160	180
Other ⁹	0	0	0	0	2 030	3 160	2 510	2 480	2 000	1 640	1 570
Overall Total	9 100	11 600	11 800	12 100	12 300	12 500	12 400	11 400	12 300	12 000	11 500
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	750	810	770	640	710	830	790	810	790	830	850
CH ₄ intensity (g CH ₄ / kWh)	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.021	0.025	0.030
N ₂ O intensity (g N ₂ O/ kWh)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Generation Intensity (g CO₂ eq / kWh)	760	810	780	640	720	840	800	810	790	840	850
Transmission & Distribution Losses (%) ¹⁰	6.70	7.42	6.74	5.31	6.43	6.11	6.35	7.45	9.05	5.96	6.19
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	24.0	23.6	30.8	16.0	25.1	40.3	30.8	20.6	30.3	24.7	17.6
Consumption Intensity (g CO₂ eq / kWh)¹²	810	880	830	680	760	890	850	870	860	890	910

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13–5 Electricity Generation and GHG Emission Details for New Brunswick¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	5 800	8 800	10 200	8 800	8 500	9 700	9 900	7 200	7 300	7 400	6 900
Electricity Generation⁶											
	<i>GWh</i>										
Coal	1 010	3 930	3 980	3 660	3 890	3 300	3 090	3 070	2 980	2 840	2 720
Refined Petroleum Products ⁷	6 150	7 100	8 190	6 370	5 110	6 430	6 420	3 270	3 710	3 540	3 770
Natural Gas	0	0	0	590	1 130	1 740	1 430	2 430	1 890	1 430	1 630
Nuclear	5 340	3 960	4 520	3 760	4 740	4 300	4 380	4 370	4 120	1 130	0
Hydro	3 460	3 220	2 070	2 190	3 160	2 950	3 820	3 710	2 790	3 540	2 970
Biomass	0	0	0	0	0	0	0	0	0	0	0
Other Renewables ⁸	0	0	0	0	0	0	0	0	0	0	270
Other ⁹	30	0	0	160	150	900	1 160	640	790	1 130	1 160
Overall Total	16 000	18 200	18 800	16 700	18 200	19 600	20 300	17 500	16 300	13 600	12 500
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	365	472	538	513	458	444	440	406	445	542	545
CH ₄ intensity (g CH ₄ / kWh)	0.004	0.005	0.006	0.010	0.013	0.014	0.018	0.019	0.018	0.022	0.020
N ₂ O intensity (g N ₂ O/ kWh)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Generation Intensity (g CO₂ eq / kWh)	365	480	540	530	470	490	490	410	450	550	550
Transmission & Distribution Losses (%) ¹⁰	6.63	9.07	7.03	7.00	7.41	4.92	6.96	5.76	10.82	2.17	5.14
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	0.74	0.73	0.95	0.50	0.78	0.07	0.00	0.98	0.53	0.75	0.52
Consumption Intensity (g CO₂ eq / kWh)¹²	390	520	580	560	500	520	520	430	500	560	580

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13-6 Electricity Generation and GHG Emission Details for Quebec¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	1 440	360	380	250	1 560	1 330	520	680	2 070	360	400
Electricity Generation⁶											
	<i>GWh</i>										
Coal	0	0	0	0	0	0	0	0	0	0	0
Refined Petroleum Products ⁷	1 800	400	500	400	2 300	2 000	1 000	100	200	200	300
Natural Gas	0	200	200	200	300	100	200	1 700	4 800	300	500
Nuclear	4 100	4 900	4 700	4 500	3 500	4 900	4 500	4 600	4 300	3 600	3 600
Hydro	112 200	153 400	144 800	150 600	152 200	146 200	154 700	151 800	163 300	167 000	170 000
Biomass	0	490	600	660	540	450	210	320	360	310	630
Other Renewables ⁸	0	170	190	170	170	190	420	420	620	560	1 320
Other ⁹	0	0	0	0	0	0	0	0	0	230	310
Overall Total	118 100	159 600	151 100	156 500	159 000	153 800	161 000	159 000	173 700	172 300	176 700
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	12	2	2	2	10	9	3	4	12	2	2
CH ₄ intensity (g CH ₄ / kWh)	0.0003	0.0001	0.0001	0.0001	0.0002	0.0002	0.0004	0.0008	0.003	0.0003	0.0003
N ₂ O intensity (g N ₂ O/ kWh)	0.0003	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0003	0.0001	0.0001
Generation Intensity (g CO₂ eq / kWh)	12	2	3	2	10	9	3	4	12	2	2
Transmission & Distribution Losses (%) ¹⁰	6.27	8.70	6.79	5.86	4.97	5.74	6.05	6.13	5.59	5.98	6.93
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	34	33	44	23	36	37	28	26	36	37	32
Consumption Intensity (g CO₂ eq / kWh)¹²	13	3	3	2	11	9	4	5	13	2	3

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13–7 Electricity Generation and GHG Emission Details for Ontario¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	24 400	41 400	39 400	39 400	39 900	30 400	33 400	28 000	31 300	26 900	15 000
Electricity Generation⁶											
	<i>GWh</i>										
Coal	26 100	38 800	34 000	32 200	30 600	22 800	27 300	26 100	28 600	24 500	10 900
Refined Petroleum Products ⁷	1 320	500	850	730	1 640	950	60	40	310	80	80
Natural Gas	0	12 700	14 000	15 900	15 200	13 400	14 800	9 400	10 800	8 800	9 700
Nuclear	59 400	59 800	63 100	63 000	62 400	76 100	78 000	83 500	79 800	85 800	81 400
Hydro	38 700	36 600	35 800	37 100	34 700	38 100	34 600	35 000	33 400	38 700	38 700
Biomass	0	380	610	760	670	690	660	470	530	540	350
Other Renewables ⁸	0	0	0	0	0	25	26	144	490	960	2 100
Other ⁹	0	0	0	0	0	0	0	0	0	1 340	1 180
Overall Total	125 500	148 700	148 500	149 700	145 200	152 000	155 300	154 700	153 800	160 700	144 400
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	190	280	260	260	270	200	210	180	200	170	100
CH ₄ intensity (g CH ₄ / kWh)	0.002	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
N ₂ O intensity (g N ₂ O/ kWh)	0.003	0.004	0.004	0.004	0.005	0.003	0.004	0.003	0.004	0.003	0.002
Generation Intensity (g CO₂ eq / kWh)	190	280	270	260	280	200	210	180	200	170	100
Transmission & Distribution Losses (%) ¹⁰	7.72	8.3	8.9	8.5	8.7	7.9	8.8	10.4	10.9	1.06	3.73
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	80	78	102	53	83	88	53	73	109	65	63
Consumption Intensity (g CO₂ eq / kWh)¹²	210	300	290	290	300	220	230	200	230	170	110

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13-8 Electricity Generation and GHG Emission Details for Manitoba¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	470	1,030	500	490	800	400	530	390	470	440	160
Electricity Generation⁶											
	<i>GWh</i>										
Coal	300	870	450	380	570	270	420	340	400	240	180
Refined Petroleum Products ⁷	40	10	20	20	20	10	10	10	30	70	0
Natural Gas	0	0	0	120	220	80	10	40	50	120	20
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	19 800	31 500	32 900	28 800	20 200	27 200	36 400	33 700	33 500	34 600	33 500
Biomass	0	0	0	0	0	0	0	0	0	0	0
Other Renewables ⁸	0	0	0	0	0	0	0	330	330	410	360
Other ⁹	0	0	0	0	0	0	0	0	0	0	0
Overall Total	20 200	32 400	33 400	29 300	21 100	27 600	36 900	34 400	34 300	35 400	34 100
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	23	31	15	17	38	14	14	11	14	12	5
CH ₄ intensity (g CH ₄ / kWh)	0.0004	0.0004	0.0002	0.0009	0.002	0.0007	0.0002	0.0003	0.0004	0.0003	0.0001
N ₂ O intensity (g N ₂ O/ kWh)	0.001	0.001	0.0003	0.0004	0.001	0.0003	0.0003	0.0002	0.0003	0.0003	0.0001
Generation Intensity (g CO₂ eq / kWh)	23	32	15	17	38	14	14	11	14	12	5
Transmission & Distribution Losses (%) ¹⁰	13.6	18.5	17.5	19.5	5.4	7.2	8.6	11.2	10.5	19.0	19.1
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	4.5	4.4	5.8	3.0	4.7	2.7	4.2	6.2	4.2	3.4	3.1
Consumption Intensity (g CO₂ eq / kWh)¹²	27	38	18	20	40	16	16	13	15	15	6

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13–9 Electricity Generation and GHG Emission Details for Saskatchewan¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	10 600	14 100	14 600	14 700	15 700	16 200	15 000	14 300	15 200	14 800	14 800
Electricity Generation⁶											
	<i>GWh</i>										
Coal	8 700	11 600	11 500	11 700	11 600	12 100	11 400	11 500	11 800	12 400	12 900
Refined Petroleum Products ⁷	10	20	20	20	30	20	40	40	50	10	10
Natural Gas	240	2 440	2 670	2 720	4 120	3 870	3 320	3 180	3 490	4 460	4 130
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	4 200	3 000	2 400	2 800	3 400	2 700	4 600	4 000	4 400	4 000	3 000
Biomass	0	0	0	0	0	0	0	0	0	0	0
Other Renewables ⁸	0	0	0	40	60	70	90	570	580	570	580
Other ⁹	0	0	0	0	0	0	0	0	0	0	0
Overall Total	13 100	17 100	16 600	17 300	19 200	18 800	19 500	19 400	20 300	21 500	20 600
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	800	820	870	840	810	850	760	730	740	680	710
CH ₄ intensity (g CH ₄ / kWh)	0.02	0.03	0.04	0.03	0.04	0.04	0.04	0.03	0.04	0.03	0.03
N ₂ O intensity (g N ₂ O/ kWh)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Generation Intensity (g CO₂ eq / kWh)	810	820	880	850	820	860	770	740	750	690	720
Transmission & Distribution Losses (%) ¹⁰	9.90	10.4	9.5	9.9	8.5	9.0	7.5	5.7	9.6	15.3	13.6
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	1.8	1.8	2.4	1.2	1.9	1.8	1.3	2.6	3.2	0.8	0.6
Consumption Intensity (g CO₂ eq / kWh)¹²	890	910	960	930	890	940	830	780	820	800	820

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13-10 Electricity Generation and GHG Emission Details for Alberta¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	39 000	48 600	49 600	49 400	51 100	51 800	51 500	52 500	53 300	53 200	47 800
Electricity Generation⁶											
	<i>GWh</i>										
Coal	35 300	41 600	44 600	46 000	42 400	45 500	46 700	46 000	47 900	40 500	40 000
Refined Petroleum Products ⁷	10	30	30	30	30	50	40	40	20	20	10
Natural Gas	2 320	9 350	9 090	7 620	6 770	6 910	7 020	7 690	7 950	11 710	10 320
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	2 060	1 760	1 430	1 720	1 740	1 880	2 240	1 870	2 130	2 010	1 660
Biomass	0	290	410	490	460	300	330	450	390	340	510
Other Renewables ⁸	0	90	130	160	420	620	840	840	820	1 000	1 390
Other ⁹	0	90	300	310	1 980	1 180	130	80	130	120	120
Overall Total	39 600	53 200	56 000	56 300	53 800	56 400	57 300	57 000	59 300	55 700	54 000
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	980	910	880	870	940	910	890	920	890	950	880
CH ₄ intensity (g CH ₄ / kWh)	0.02	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.03
N ₂ O intensity (g N ₂ O/ kWh)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Generation Intensity (g CO₂ eq / kWh)	980	910	890	880	950	920	900	920	900	960	880
Transmission & Distribution Losses (%) ¹⁰	10.59	7.7	8.1	17.7	10.6	8.7	8.7	10.8	10.5	14.6	8.50
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	1.7	1.7	2.2	1.2	1.8	1.3	0.5	0.9	0.7	2.6	2.2
Consumption Intensity (g CO₂ eq / kWh)¹²	1 090	990	960	1 030	1 050	1 000	980	1 020	990	1 100	960

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13–11 Electricity Generation and GHG Emission Details for British Columbia¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	800	1 810	2 360	710	730	1 120	1 090	990	1 060	1 400	1 220
Electricity Generation⁶											
	<i>GWh</i>										
Coal	0	0	0	0	0	0	0	0	0	0	0
Refined Petroleum Products ⁷	100	40	50	50	50	40	30	30	60	0	0
Natural Gas	1 260	3 350	4 800	1 660	1 800	2 230	2 370	2 070	2 990	3 230	2 770
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	46 400	50 800	41 500	49 600	47 000	45 000	50 300	44 500	54 700	48 600	46 200
Biomass	0	550	590	560	600	720	650	620	850	520	380
Other Renewables ⁸	0	0	0	0	0	0	0	0	0	0	0
Other ⁹	0	0	0	0	0	0	0	0	0	410	520
Overall Total	47 800	54 700	47 000	51 900	49 500	48 000	53 400	47 200	58 600	52 800	49 900
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	17	33	50	13	14	23	20	21	18	26	24
CH ₄ intensity (g CH ₄ / kWh)	0.004	0.008	0.01	0.003	0.004	0.006	0.005	0.005	0.004	0.007	0.006
N ₂ O intensity (g N ₂ O/ kWh)	0.001	0.001	0.001	0.0004	0.0004	0.0006	0.0005	0.0006	0.0005	0.0007	0.0006
Generation Intensity (g CO₂ eq / kWh)	17	33	50	14	15	23	20	21	18	27	25
Transmission & Distribution Losses (%) ¹⁰	7.8	4.9	6.2	5.9	2.0	0.9	4.5	6.2	0.0	24	23
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	60	59	77	40	63	54	50	51	49	66	61
Consumption Intensity (g CO₂ eq / kWh)¹²	19	36	55	15	16	25	22	23	19	35	32

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Table A13-12 Electricity Generation and GHG Emission Details for Yukon, the Northwest Territories and Nunavut¹

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²
Greenhouse Gas Emissions³											
	<i>kt CO₂ eq</i>										
Overall Total^{4,5}	260	110	130	80	80	90	70	70	60	60	40
Electricity Generation⁶											
	<i>GWh</i>										
Coal	0	0	0	0	0	0	0	0	0	0	0
Refined Petroleum Products ⁷	290	230	260	240	280	270	240	240	260	210	150
Natural Gas	0	0	0	0	0	0	0	0	0	0	0
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	650	510	510	510	500	560	580	590	580	590	630
Biomass	0	0	0	0	0	0	0	0	0	0	0
Other Renewables ⁸	0	0.4	1.1	1.0	0.9	0.5	0.9	0.6	0.4	0.4	0.2
Other ⁹	0	0	0	0	0	0	0	0	0	0	0
Overall Total	940	740	770	750	780	830	820	830	840	800	780
Greenhouse Gas Intensity											
CO ₂ intensity (g CO ₂ / kWh)	260	140	160	100	100	110	80	76	63	70	44
CH ₄ intensity (g CH ₄ / kWh)	0.01	0.01	0.01	0.01	0.01	0.01	0.004	0.004	0.003	0.003	0.002
N ₂ O intensity (g N ₂ O/ kWh)	0.04	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Generation Intensity (g CO₂ eq / kWh)	270	150	160	110	110	110	80	80	70	70	50
Transmission & Distribution Losses (%) ¹⁰	14.45	5.2	10.6	12.6	15.6	16.4	22.5	20.8	14.0	14.0	12.8
SF ₆ Transmission Emissions (kt CO ₂ eq) ¹¹	0	0	0	0	0	0	0	0	0	0	0
Consumption Intensity (g CO₂ eq / kWh)¹²	310	160	180	120	120	130	103	96	75	84	52

Notes:

1. Data presented include emissions, generation and intensity for public utilities.
2. Data for 2009 are preliminary.
3. Data taken from the *Report on Energy Supply and Demand in Canada*, Catalogue No. 57-003-XIB, Statistics Canada.
4. Emissions from the flooding of land for hydro dams are not included.
5. Emissions related to the use of biomass for electric power generation are not included.
6. Data taken from *Electric Power Generation, Transmission and Distribution* (EPGTD), Catalogue No. 57-202-XIB, Statistics Canada with the exception of data for 2007–2009, which are from CANSIM Table 127-0007.
7. Includes electricity generated by combustion of light fuel oil, heavy fuel oil and diesel fuel oil.
8. Other Renewables - includes electricity generation by wind and tidal power.
9. Other - includes electricity generation by fuels not easily categorized.
10. Electrical losses calculated based on "unallocated energy" from Statistics Canada CANSIM Table 127-0008 and Cat. No. 57-202-XIB.
11. Emissions from electrical equipment from CRF Category 2.F.viii (Production and Consumption of Halocarbons and SF₆).
12. Overall intensity values are rounded and include transmission losses and associated emissions.

Annex 14

Provincial/Territorial Analysis

The following shows long-term (1990–2009) and short-term (2005–2009) changes in greenhouse gas (GHG) emissions for each of the provinces and territories in Canada. Owing to data limitations there are a number of caveats associated with the data. While the national inventory of GHG emissions is developed utilizing national, provincial, and territorial information and data, the information used to develop it relies on survey and sampling data¹ that, while statistically valid and nationally representative, may not represent every discrete and small source within a province or territory. Therefore the following provincial data may differ slightly from a more bottom-up, precise regional inventory. Note also that the sum of emissions from all provinces do not add up to the national total because the emissions from some sources are estimated at the national level only. Nevertheless, the trends in emissions from each region are considered representative of the actual emission trends in each region.

Economic and emission data are presented for each province and territory with emphasis on population, GDP, energy supply/demand, and general economic structure, all of which affect the trends in GHG emissions. Categorizations utilized in Annex 14 are not the same as those used in the rest of this document, in that activities are not organized strictly by the standard six United Nations Framework Convention on Climate Change (UNFCCC) Sectors (Energy; Industrial Processes; Solvents and Other Product Use; Agriculture; Land Use, Land-use Change and Forestry; and Waste). Rather, the data presented utilize economic-oriented sectors for industrial categories. Long-term and recent changes in GHG emissions are identified on the basis of the 12 sectors shown in Table A14–1. Sectors 1 to 6

include only Energy activities (and emissions), sectors 7 to 10 include activities (and emissions) related to both Energy and Industrial Processes, and sectors 11 and 12 include Agriculture and Waste activities, respectively. As Land Use, Land-use Change and Forestry emissions and removals are not inventoried at the provincial level (nor, for that matter, are they included in national totals) these activities are not presented in this Annex. The table also identifies how the more discrete subsectors from the Energy, Industrial Processes, Waste and Agriculture Sectors are combined to arrive at the 12 sectors.

All emission references are from the 1990–2009 national GHG inventory and are given in units of CO₂ equivalent unless otherwise stated. GDP and energy data are provided by Statistics Canada (Statistics Canada, Cat. No. 11-010-XWE and Cat. No. 57-003-XIB). Total heating degree-day (HDD) values² as compiled by Environment Canada are an indication of space heating requirements. Figure A14–1 and Figure A14–2 present provincial and territorial contributions to total Canadian GHG emissions in 1990 and 2009, respectively. All emission values provided within these graphs are presented in kilotonnes CO₂ equivalent (kt CO₂ eq). On a per capita basis, the average GHG emissions for Canada decreased by 4.0% from 21.3 tonnes (t)/person in 1990 to 20.5 t/person in 2009.

Provincial and territorial long-term (1990 to 2009) and short-term (2005 to 2009) trends are presented in Figure A14–3 through Figure A14–26.

1 Another potential source of discrepancy is the application at the provincial level of parameter values, which, while again representative as a whole of national circumstances, do not always accurately reflect regional conditions.

2 The meteorological data required to develop the HDD indicators are provided by the Meteorological Service of Canada, a branch of Environment Canada, to the Pollutant Inventories and Reporting Division of the Department for compilation. Annual HDDs are common indicators used to determine the necessity for space heating in a region. They are the annual sum of the days when the average daily temperature is below 18°C multiplied by the number of degrees that the temperature is below 18°C on each of those days. Refer to Chapter 2 for national trends in HDDs and relation to residential emissions.

Table A14-1 Subsector Groupings for Long-Term and Short-Term Trends

1. Electricity and Heat Generation	7. Mineral Products
2. Mining and Fossil Fuel Industries	IP - Cement Production
Fossil Fuel Industries	IP - Lime Production
Mining & Oil and Gas Extraction	ENERGY - Stationary Combustion - Cement
Fugitive Sources	8. Chemical Industry
Coal Mining	IP - Nitric Acid Production
Oil and Natural Gas	IP - Adipic Acid Production
Other Transportation - Pipelines	ENERGY - Stationary Combustion - Chemical
3. Residential/Commercial/Institutional	9. Metal Production
Residential	IP - Iron and Steel Production
Commercial & Institutional	IP - Aluminium Production
4. Other Manufacturing, Construction, Agriculture & Forestry (energy only)	IP - SF ₆ Used in Mg Smelters and Casters
Other Manufacturing	ENERGY - Stationary Combustion - Iron and Steel
Pulp and Paper	ENERGY - Stationary Combustion - Non-ferrous Metals
Construction	10. Other & Undifferentiated Production
Agriculture and Forestry	IP - Consumption of Halocarbons and SF ₆
5. Road Transportation	IP - Other & Undifferentiated Production
Light-duty Gasoline Vehicles	IP - Solvent & Other Product Use
Light-duty Gasoline Trucks	11. Agriculture (non-energy)
Heavy-duty Gasoline Vehicles	Enteric Fermentation
Motorcycles	Manure Management
Light-duty Diesel Vehicles	Agriculture Soils
Light-duty Diesel Trucks	Direct Sources
Heavy-duty Diesel Vehicles	Pasture, Range and Paddock Manure
Propane & Natural Gas Vehicles	Indirect Sources
6. Other Transportation	12. Waste
Civil Aviation (Domestic Aviation)	Solid Waste Disposal on Land
Railways	Wastewater Handling
Navigation (Domestic Marine)	Waste Incineration
Other Transportation	
Off-road Gasoline	
Off-road Diesel	

Note: IP = Industrial Processes

Figure A14-1 Provincial GHG Contributions to Total – 1990 (590 Mt)

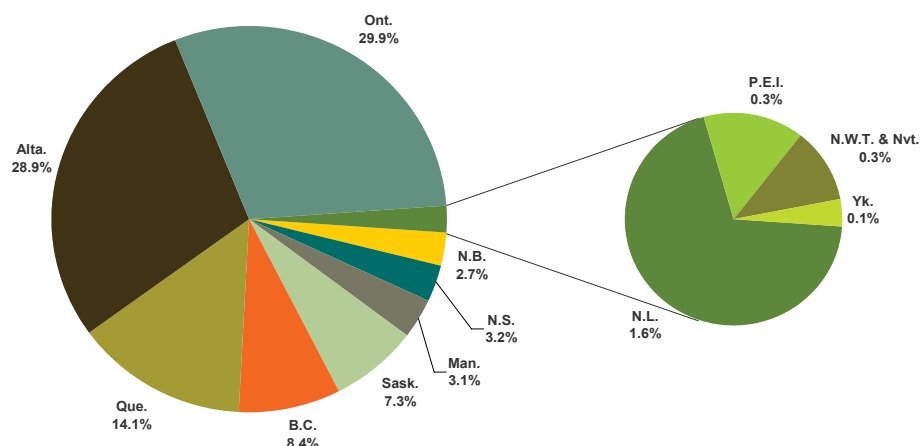
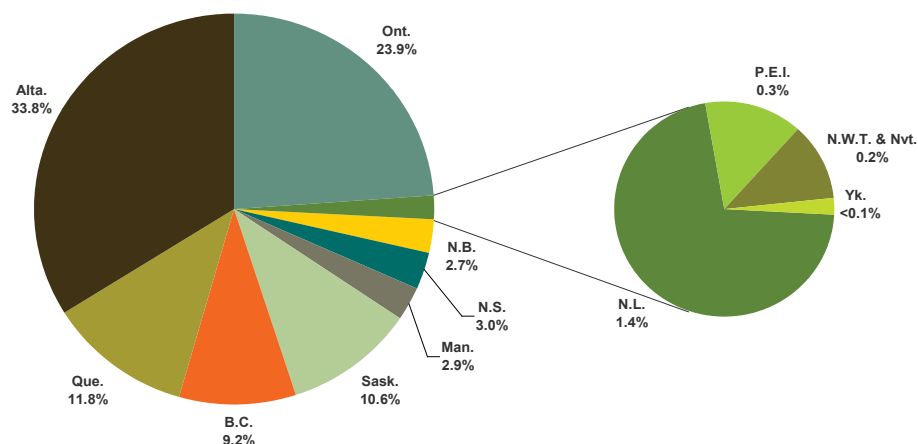


Figure A14–2 Provincial GHG Contributions to Total – 2009 (690 Mt)



A14.1. Newfoundland and Labrador

Table A14–2 Emissions, Economy, Energy and Climate, Newfoundland and Labrador

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	9.210	9.940	9.360	10.500	9.850	9.460
Change Since 1990	NA	7.9%	1.6%	13.6%	6.9%	2.7%
Annual Change	NA	-0.7%	-5.8%	11.8%	-6.0%	-4.0%
GDP (millions)	11 662	17 531	18 201	19 856	19 953	18 119
Change Since 1990	NA	50.3%	56.1%	70.3%	71.1%	55.4%
GHG Intensity (Mt/\$B GDP)	0.79	0.57	0.51	0.53	0.49	0.52
GHG Efficiency (\$B GDP/Mt GHG)	1.27	1.76	1.94	1.90	2.03	1.92
Population (000s)	577	514	510	506	508	508
Change Since 1990	NA	-10.9%	-11.6%	-12.3%	-12.0%	-12.0%
GHG Per Capita (tonnes/person)	16.0	19.3	18.4	20.7	19.4	18.6
Energy Production (Primary only) (TJ)	124 875	849 698	851 694	991 073	938 160	855 274
Change Since 1990	NA	580.4%	582.0%	693.7%	651.3%	584.9%
Net Supply (Primary & Secondary) (TJ)	143 873	165 852	158 373	170 754	165 878	145 394
Change Since 1990	NA	15.3%	10.1%	18.7%	15.3%	1.1%
Energy Use - Final Demand (Primary & Secondary) (TJ)	123 163	124 672	113 407	125 428	126 481	114 005
Change Since 1990	NA	1.2%	-7.9%	1.8%	2.7%	-7.4%
CLIMATE						
Heating Degree Days	5 058	4 698	4 419	5 017	4 819	4 778

Notes:
GDP: expenditure-based, chained 2002 dollars.
NA = Not applicable.

Figure A14-3 Newfoundland and Labrador Long-Term Emission Changes, 1990–2009

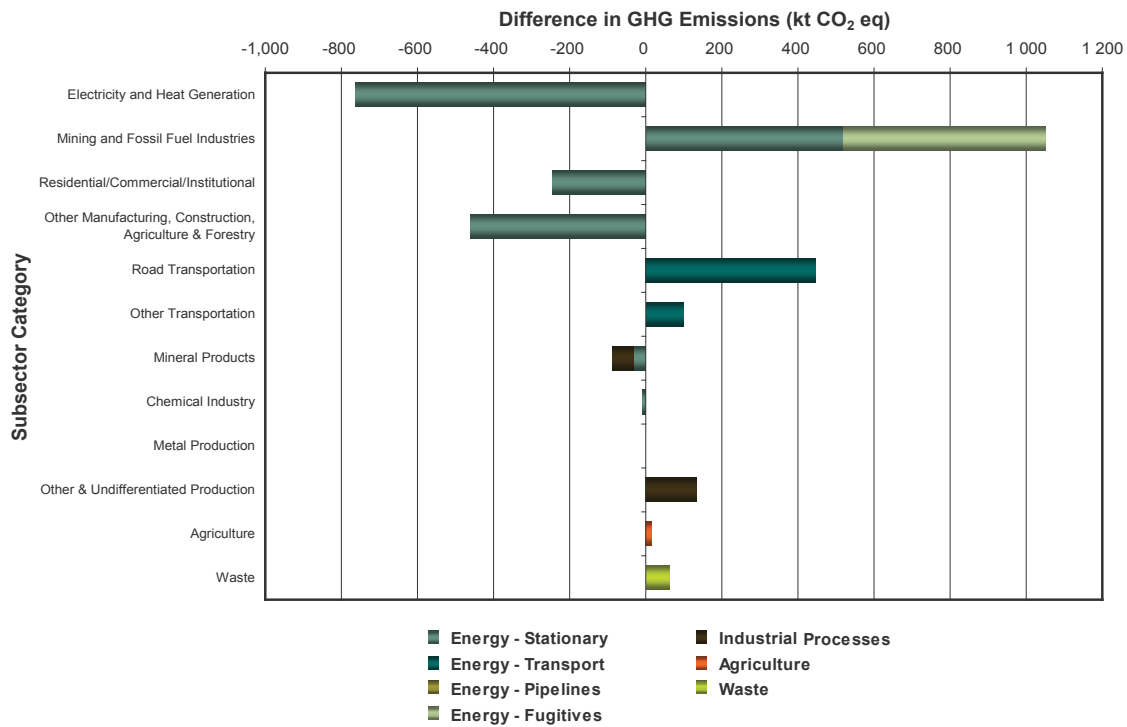
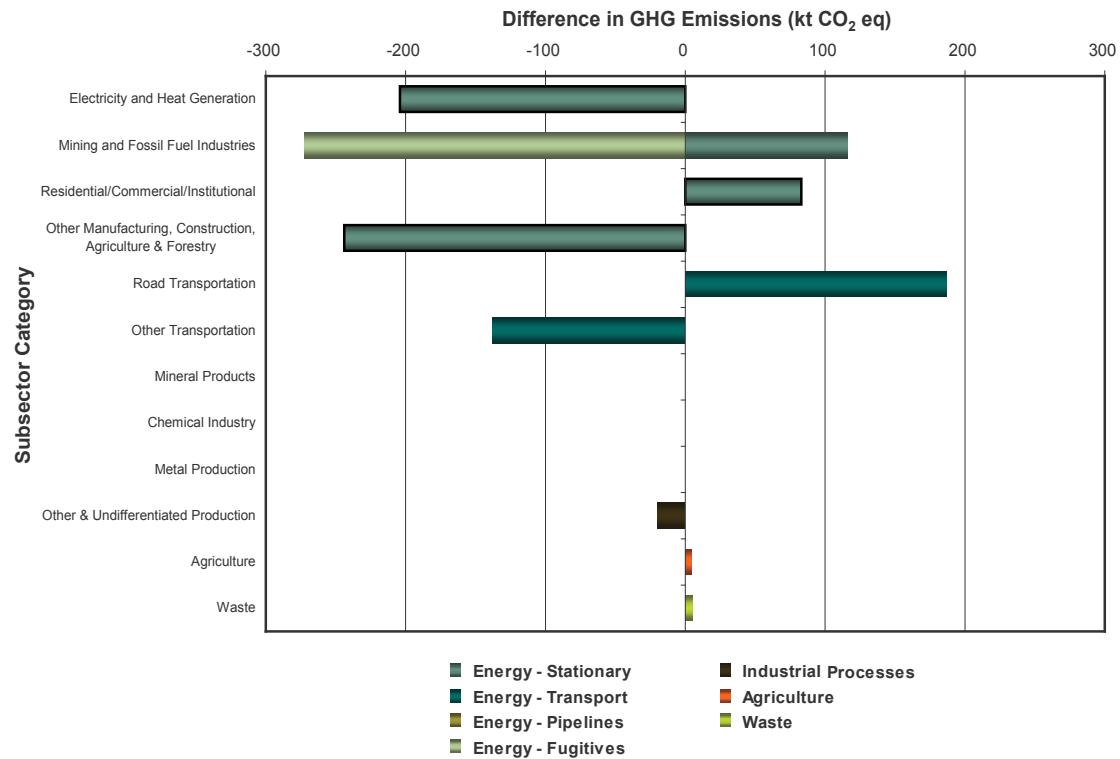


Figure A14-4 Newfoundland and Labrador Short-term Emission Changes, 2005–2009



A14.2. Prince Edward Island

Table A14–3 Emissions, Economy, Energy and Climate, Prince Edward Island

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	1.960	2.230	2.120	2.070	1.990	1.890
Change Since 1990	NA	14.3%	8.3%	5.7%	1.9%	-3.4%
Annual Change	NA	-3.1%	-5.2%	-2.4%	-3.6%	-5.2%
GDP (millions)	2 687	3 955	4 026	4 126	4 148	4 164
Change Since 1990	NA	47.2%	49.8%	53.6%	54.4%	55.0%
GHG Intensity (Mt/\$B GDP)	0.73	0.57	0.53	0.50	0.48	0.45
GHG Efficiency (\$B GDP/Mt GHG)	1.37	1.77	1.90	2.00	2.08	2.20
Population (000s)	130	138	138	138	140	141
Change Since 1990	NA	5.9%	5.8%	5.9%	7.2%	8.2%
GHG Per Capita (tonnes/person)	15.0	16.2	15.4	15.0	14.3	13.4
Energy Production (Primary only) (TJ)	0	144	130	143	510	513
Change Since 1990	NA	NA	NA	NA	NA	NA
Net Supply (Primary & Secondary) (TJ)	21 541	26 137	25 342	25 278	23 796	24 067
Change Since 1990	NA	21.3%	17.6%	17.3%	10.5%	11.7%
Energy Use - Final Demand (Primary & Secondary) (TJ)	20 598	25 060	24 492	24 652	23 283	23 539
Change Since 1990	NA	21.7%	18.9%	19.7%	13.0%	14.3%
CLIMATE						
Heating Degree Days	4 583	4 407	3 949	4 647	4 427	4 521

Notes:
GDP: expenditure-based, chained 2002 dollars.
NA = Not applicable.

Figure A14–5 Prince Edward Island Long-Term Emission Changes, 1990–2009

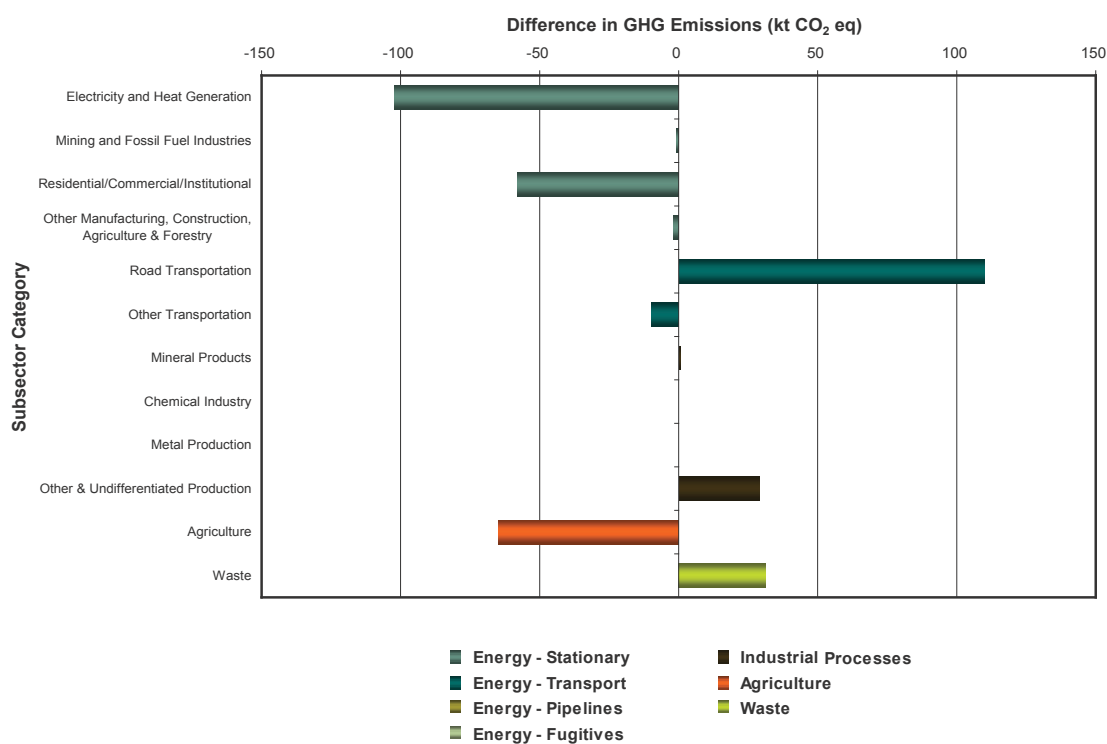
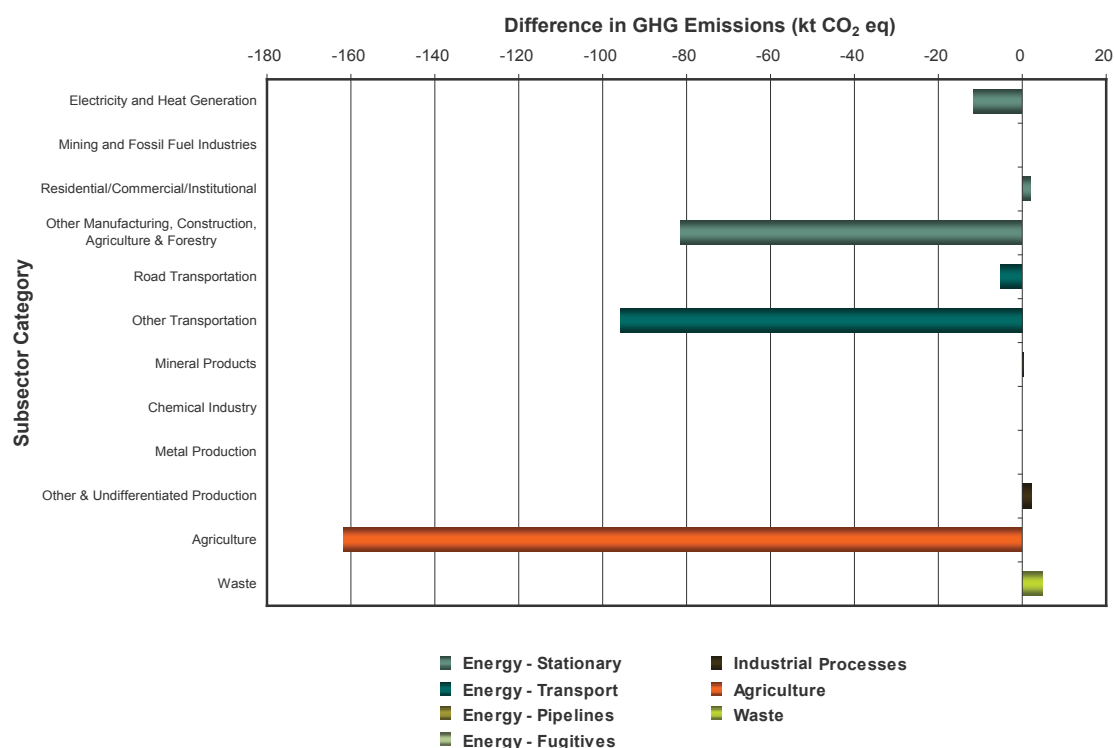


Figure A14–6 Prince Edward Island Short-Term Emission Changes, 2005–2009



A14.3. Nova Scotia

Table A14–4 Emissions, Economy, Energy and Climate, Nova Scotia

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	19.000	22.300	20.700	21.400	21.700	21.000
Change Since 1990	NA	17.4%	9.1%	12.7%	14.4%	10.5%
Annual Change	NA	-4.5%	-7.1%	3.3%	1.5%	-3.4%
GDP (millions)	20 576	28 069	28 254	28 598	29 215	28 931
Change Since 1990	NA	36.4%	37.3%	39.0%	42.0%	40.6%
GHG Intensity (Mt/\$B GDP)	0.92	0.79	0.73	0.75	0.74	0.72
GHG Efficiency (\$B GDP/Mt GHG)	1.08	1.26	1.36	1.34	1.35	1.38
Population (000s)	910	938	938	936	938	939
Change Since 1990	NA	3.0%	3.0%	2.8%	3.1%	3.1%
GHG Per Capita (tonnes/person)	20.9	23.8	22.1	22.9	23.1	22.3
Energy Production (Primary only) (TJ)	124 032	200 962	180 378	200 603	213 475	163 860
Change Since 1990	NA	62.0%	45.4%	61.7%	72.1%	32.1%
Net Supply (Primary & Secondary) (TJ)	189 393	212 898	196 696	201 723	201 253	183 813
Change Since 1990	NA	12.4%	3.9%	6.5%	6.3%	-2.9%
Energy Use - Final Demand (Primary & Secondary) (TJ)	161 655	186 303	169 456	176 280	171 403	164 800
Change Since 1990	NA	15.2%	4.8%	9.0%	6.0%	1.9%
CLIMATE						
Heating Degree Days	4 136	4 148	3 774	4 389	4 108	4 270

Notes:

GDP: expenditure-based, chained 2002 dollars.

NA = Not applicable.

Figure A14–7 Nova Scotia Long-Term Emission Changes, 1990–2009

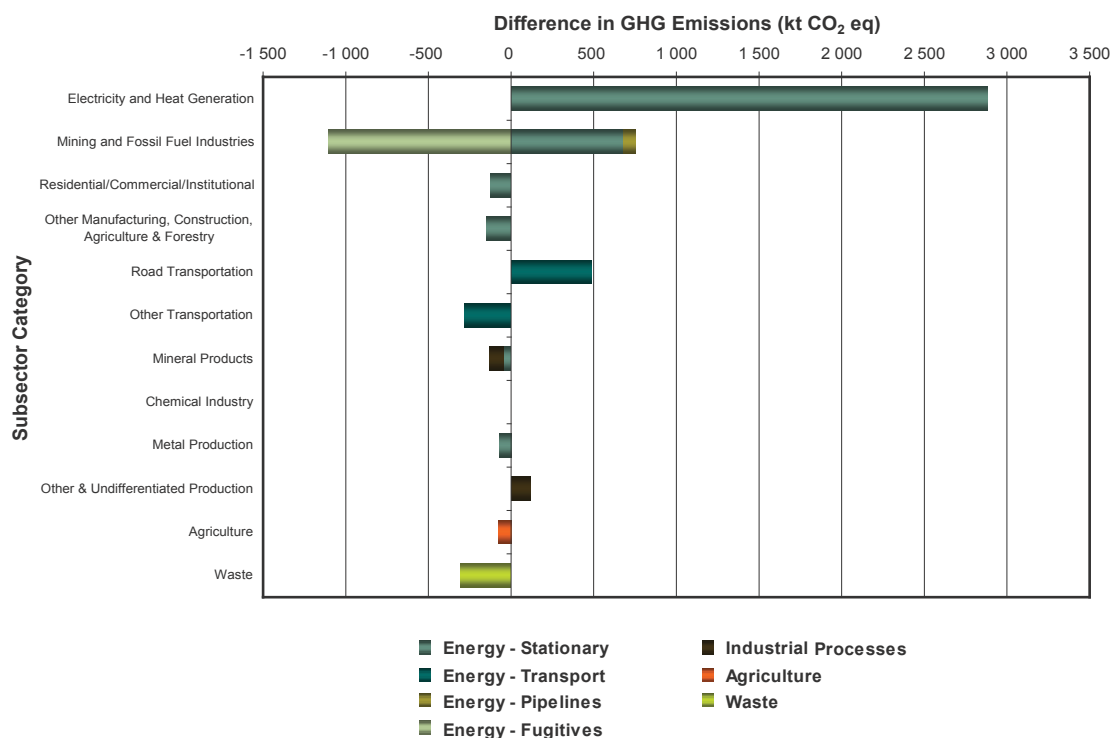
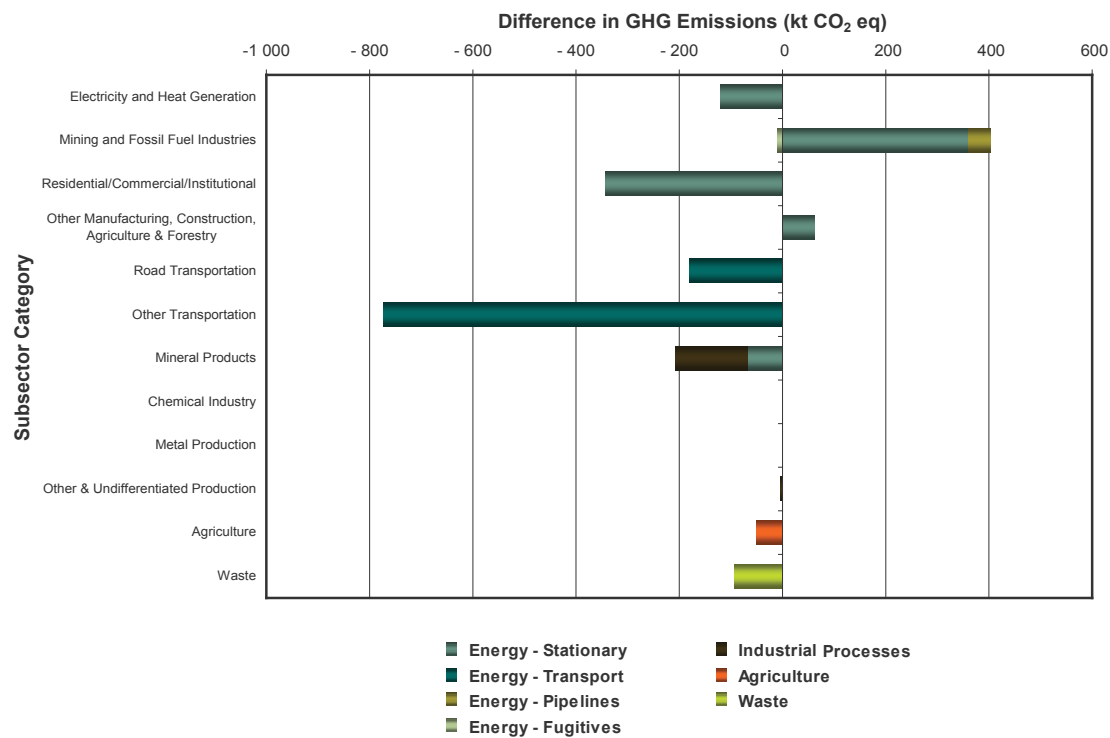


Figure A14–8 Nova Scotia Short-Term Emission Changes, 2005–2009



A14.4. New Brunswick

Table A14-5 Emissions, Economy, Energy and Climate, New Brunswick

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Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	16.000	21.800	19.300	19.800	19.200	18.400
Change Since 1990	NA	36.7%	20.7%	23.9%	20.2%	15.4%
Annual Change	NA	0.2%	-11.7%	2.7%	-3.0%	-4.0%
GDP (millions)	15 772	22 727	23 254	23 356	23 351	23 314
Change Since 1990	NA	44.1%	47.4%	48.1%	48.1%	47.8%
GHG Intensity (Mt/\$B GDP)	1.01	0.96	0.83	0.85	0.82	0.79
GHG Efficiency (\$B GDP/Mt GHG)	0.99	1.04	1.21	1.18	1.22	1.26
Population (000s)	740	748	746	745	747	749
Change Since 1990	NA	1.1%	0.7%	0.7%	1.0%	1.2%
GHG Per Capita (tonnes/person)	21.6	29.2	25.9	26.6	25.7	24.6
Energy Production (Primary only) (TJ)	46 720	34 573	32 031	34 240	28 347	24 858
Change Since 1990	NA	-26.0%	-31.4%	-26.7%	-39.3%	-46.8%
Net Supply (Primary & Secondary) (TJ)	183 713	235 581	222 289	229 283	219 215	190 568
Change Since 1990	NA	28.2%	21.0%	24.8%	19.3%	3.7%
Energy Use - Final Demand (Primary & Secondary) (TJ)	149 043	177 118	166 197	174 719	163 580	163 677
Change Since 1990	NA	18.8%	11.5%	17.2%	9.8%	9.8%
CLIMATE						
Heating Degree Days	4 673	4 609	4 219	4 860	4 722	4 811

Notes:

GDP: expenditure-based, chained 2002 dollars.

NA = Not applicable.

Figure A14-9 New Brunswick Long-Term Emission Changes, 1990-2009

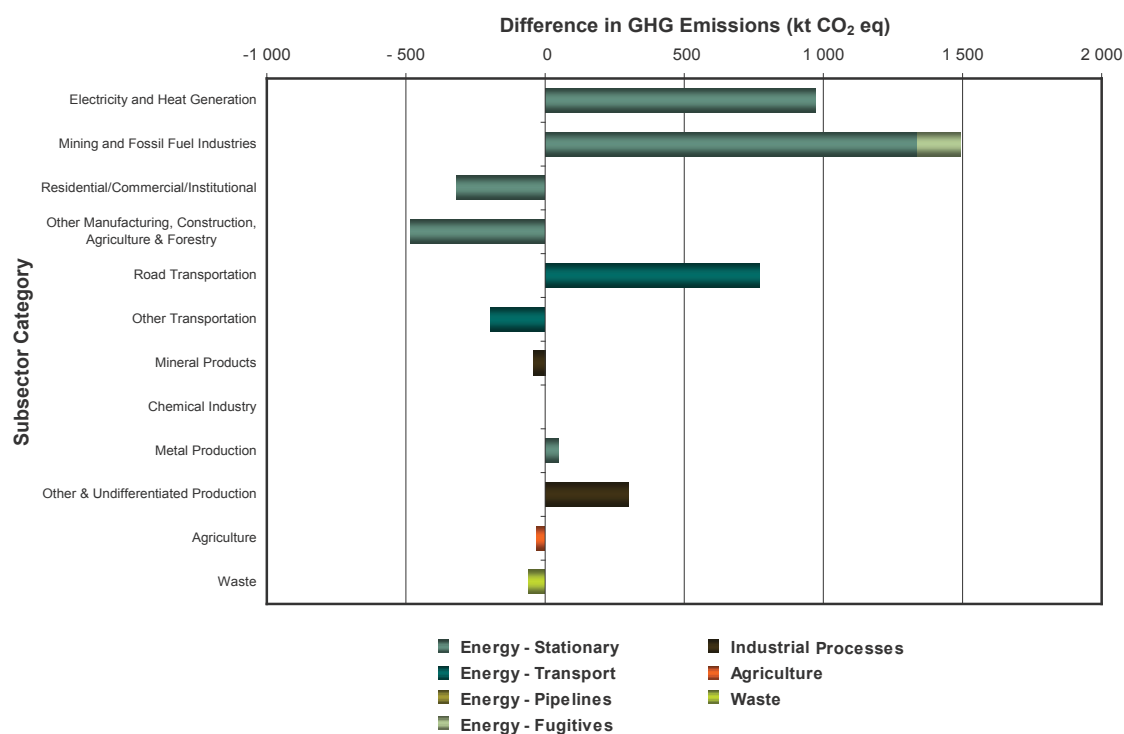
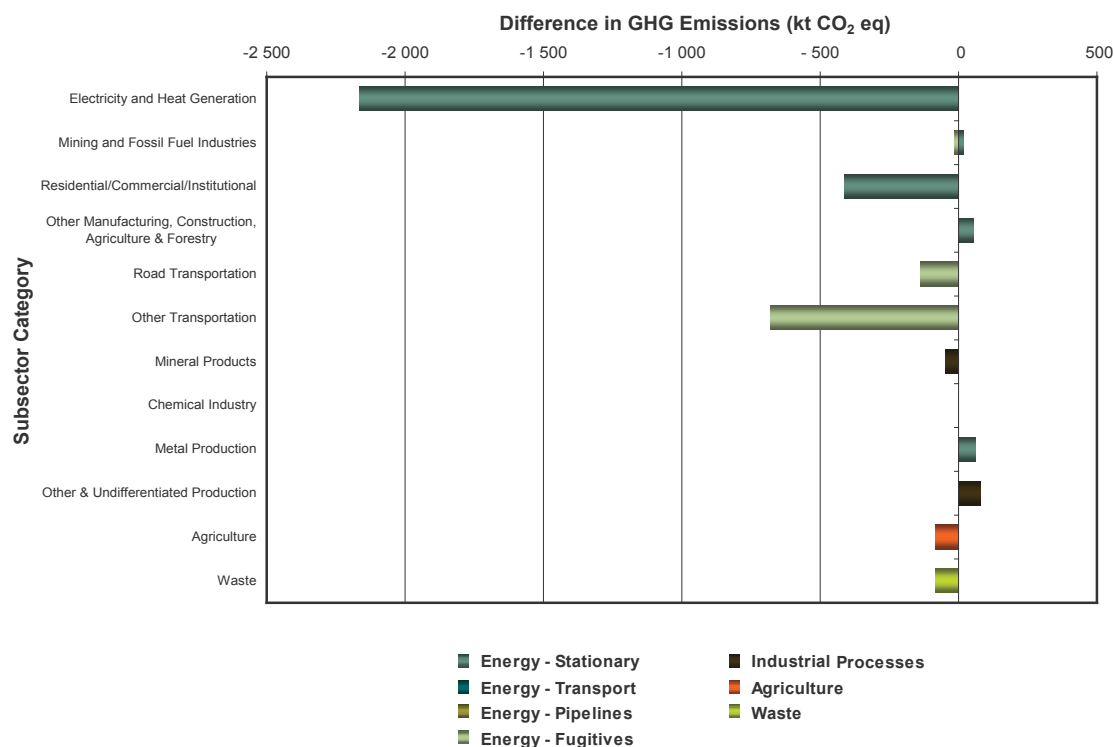


Figure A14–10 New Brunswick Short-Term Emission Changes, 2005–2009



A14.5. Quebec

Table A14–6 Emissions, Economy, Energy and Climate, Quebec

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	83.200	85.900	84.300	87.100	82.400	81.700
Change Since 1990	NA	3.2%	1.3%	4.6%	-1.0%	-1.9%
Annual Change	NA	-3.9%	-1.8%	3.3%	-5.4%	-0.9%
GDP (millions)	184 297	254 708	259 853	267 033	269 665	267 477
Change Since 1990	NA	38.2%	41.0%	44.9%	46.3%	45.1%
GHG Intensity (Mt/\$B GDP)	0.45	0.34	0.32	0.33	0.31	0.31
GHG Efficiency (\$B GDP/Mt GHG)	2.21	2.97	3.08	3.07	3.27	3.28
Population (000s)	6 997	7 582	7 632	7 686	7 751	7 828
Change Since 1990	NA	8.4%	9.1%	9.8%	10.8%	11.9%
GHG Per Capita (tonnes/person)	11.9	11.3	11.0	11.3	10.6	10.4
Energy Production (Primary only) (TJ)	482 431	641 720	639 378	669 739	691 265	699 629
Change Since 1990	NA	33.0%	32.5%	38.8%	43.3%	45.0%
Net Supply (Primary & Secondary) (TJ)	1 538 111	1 828 977	1 813 992	1 849 026	1 744 920	1 664 208
Change Since 1990	NA	18.9%	17.9%	20.2%	13.4%	8.2%
Energy Use - Final Demand (Primary & Secondary) (TJ)	1 355 855	1 592 302	1 562 649	1 595 378	1 524 222	1 522 245
Change Since 1990	NA	17.4%	15.3%	17.7%	12.4%	12.3%
CLIMATE						
Heating Degree Days	4 658	4 623	4 207	4 736	4 669	4 728

Notes:
 GDP: expenditure-based, chained 2002 dollars.
 NA = Not applicable.

Figure A14-11 Quebec Long-term Emission Changes, 1990-2009

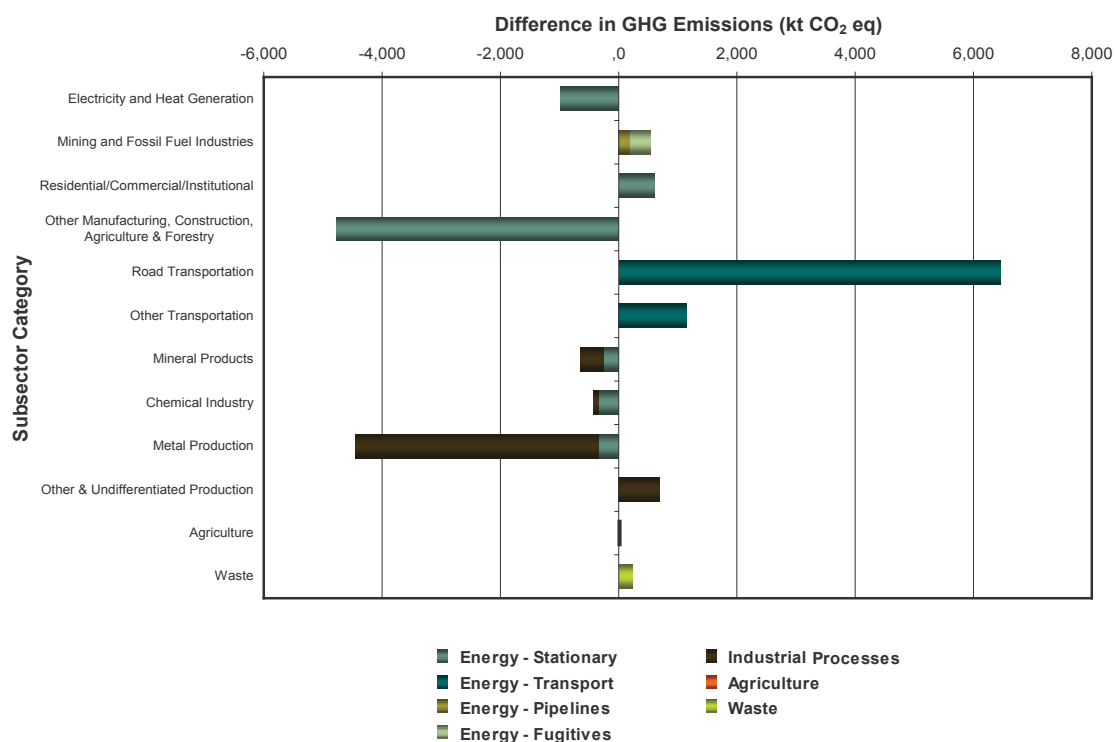
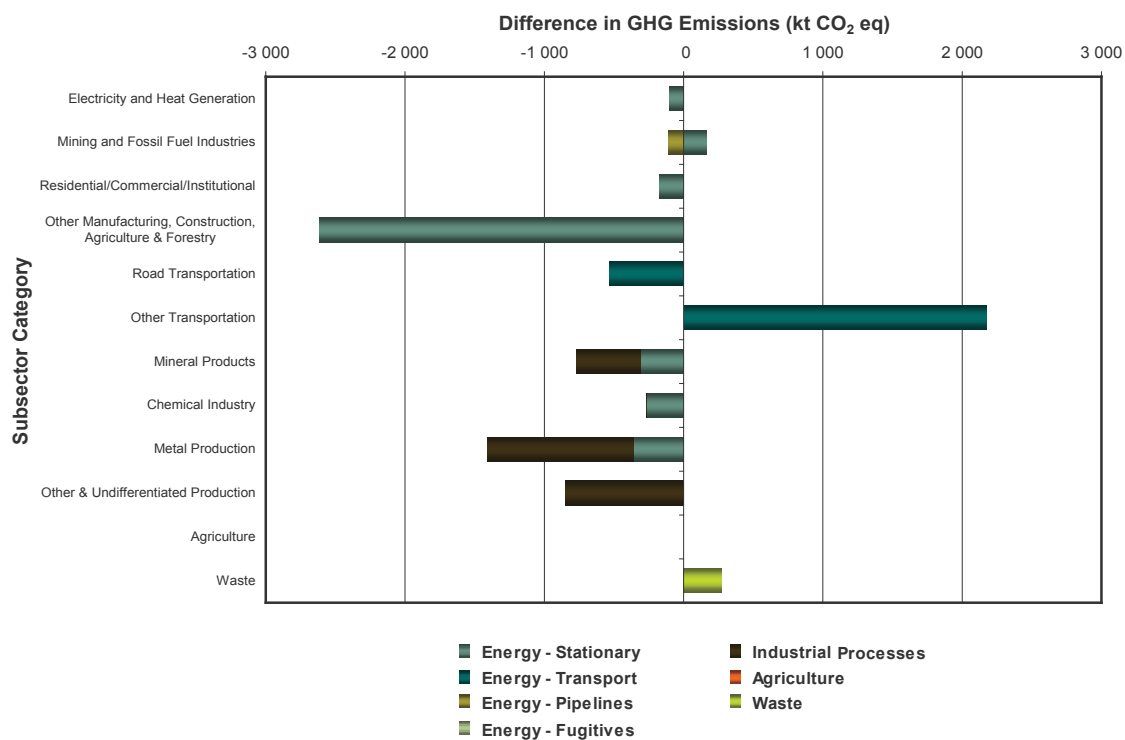


Figure A14-12 Quebec Short-term Emission Changes, 2005-2009



A14.6. Ontario

Table A14-7 Emissions, Economy, Energy and Climate, Ontario

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	177.000	202.000	194.000	200.000	190.000	165.000
Change Since 1990	NA	14.5%	9.7%	13.1%	7.4%	-6.5%
Annual Change	NA	0.6%	-4.2%	3.1%	-5.0%	-12.9%
GDP (millions)	336 227	510 626	522 845	534 880	532 209	509 421
Change Since 1990	NA	51.9%	55.5%	59.1%	58.3%	51.5%
GHG Intensity (Mt/\$B GDP)	0.53	0.40	0.37	0.37	0.36	0.32
GHG Efficiency (\$B GDP/Mt GHG)	1.90	2.53	2.70	2.68	2.81	3.09
Population (000s)	10 296	12 528	12 665	12 794	12 929	13 065
Change Since 1990	NA	21.7%	23.0%	24.3%	25.6%	26.9%
GHG Per Capita (tonnes/person)	17.1	16.1	15.3	15.6	14.7	12.6
Energy Production (Primary only) (TJ)	385 391	423 611	445 377	424 760	464 656	454 730
Change Since 1990	NA	9.9%	15.6%	10.2%	20.6%	18.0%
Net Supply (Primary & Secondary) (TJ)	2 603 620	3 052 972	3 025 362	3 153 667	3 034 658	2 515 734
Change Since 1990	NA	17.3%	16.2%	21.1%	16.6%	-3.4%
Energy Use - Final Demand (Primary & Secondary) (TJ)	2 238 689	2 656 480	2 575 752	2 644 025	2 588 367	2 369 380
Change Since 1990	NA	18.7%	15.1%	18.1%	15.6%	5.8%
CLIMATE						
Heating Degree Days	3 776	4 034	3 627	3 972	4 085	4 106

Notes:

GDP: expenditure-based, chained 2002 dollars.

NA = Not applicable.

Figure A14-13 Ontario Long-term Emission Changes, 1990–2009

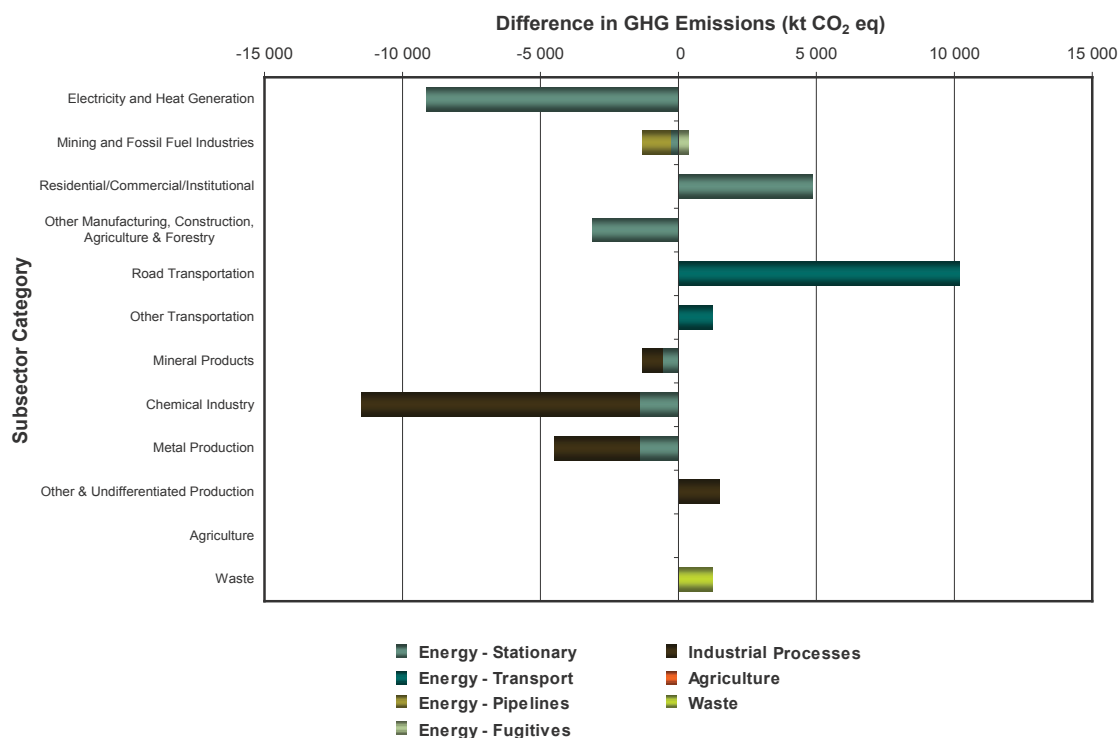
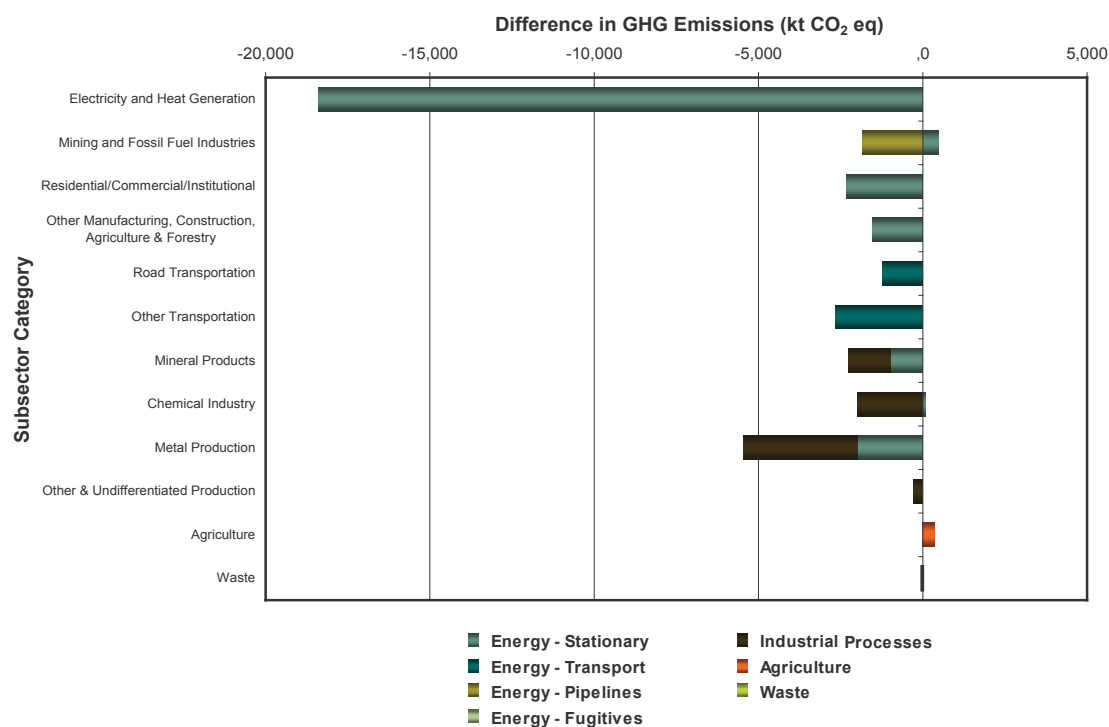


Figure A14-14 Ontario Short-term Emission Changes, 2005–2009



A14.7. Manitoba

Table A14-8 Emissions, Economy, Energy and Climate, Manitoba

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	18.500	20.900	21.000	21.500	21.600	20.300
Change Since 1990	NA	12.8%	13.5%	16.5%	17.1%	9.6%
Annual Change	NA	-1.6%	0.6%	2.6%	0.5%	-6.3%
GDP (millions)	29 629	38 783	40 158	41 593	42 407	42 077
Change Since 1990	NA	30.9%	35.5%	40.4%	43.1%	42.0%
GHG Intensity (Mt/\$B GDP)	0.62	0.54	0.52	0.52	0.51	0.48
GHG Efficiency (\$B GDP/Mt GHG)	1.60	1.86	1.91	1.93	1.96	2.08
Population (000s)	1 105	1 178	1 184	1 194	1 208	1 220
Change Since 1990	NA	6.6%	7.1%	8.0%	9.3%	10.3%
GHG Per Capita (tonnes/person)	16.7	17.7	17.7	18.0	17.9	16.6
Energy Production (Primary only) (TJ)	97 184	162 650	169 852	171 216	178 308	158 286
Change Since 1990	NA	67.4%	74.8%	76.2%	83.5%	62.9%
Net Supply (Primary & Secondary) (TJ)	257 404	280 361	271 853	287 756	294 630	280 495
Change Since 1990	NA	8.9%	5.6%	11.8%	14.5%	9.0%
Energy Use - Final Demand (Primary & Secondary) (TJ)	239 964	259 988	249 912	264 834	267 655	257 822
Change Since 1990	NA	8.3%	4.1%	10.4%	11.5%	7.4%
CLIMATE						
Heating Degree Days	5 706	5 293	4 938	5 465	5 889	5 670

Notes:
 GDP, expenditure-based, chained 2002 dollars.
 NA = Not applicable.

Figure A14–15 Manitoba Long-term Emission Changes, 1990–2009

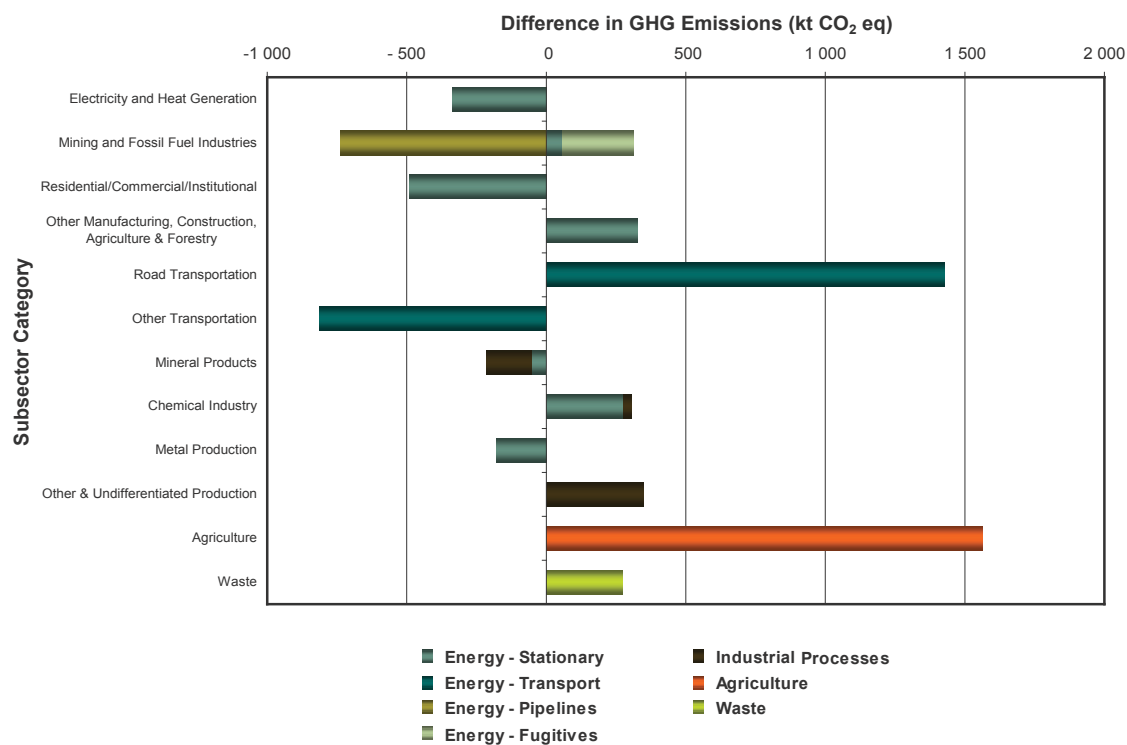
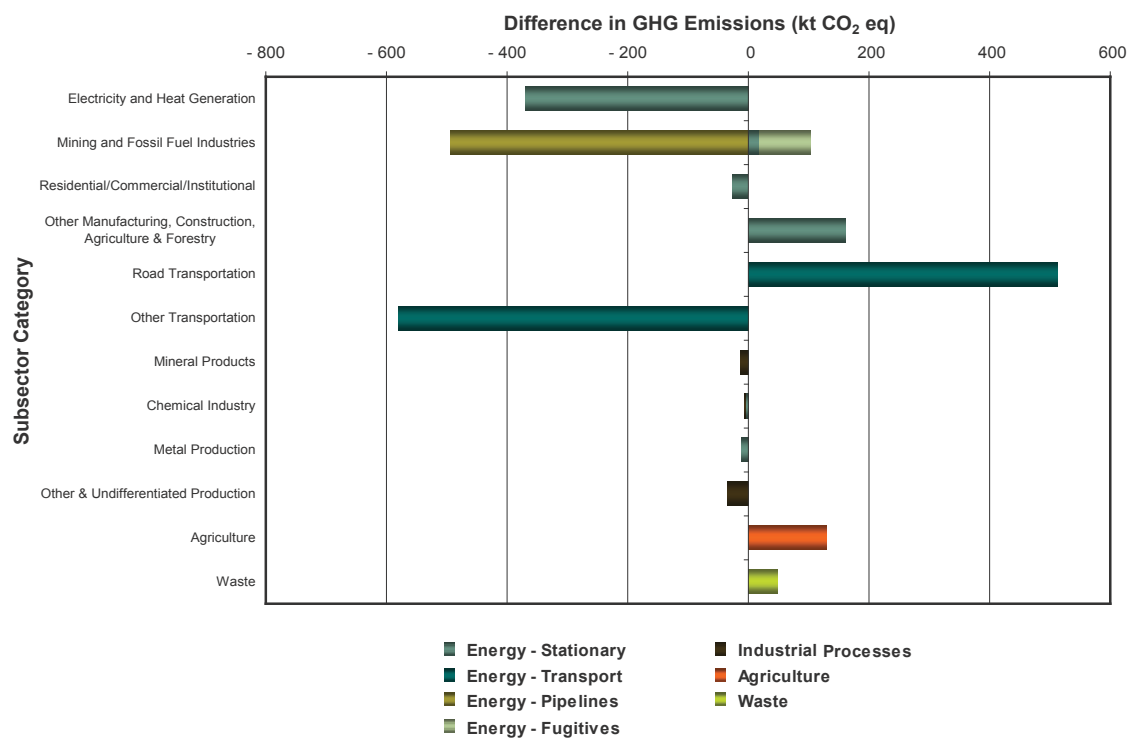


Figure A14–16 Manitoba Short-term Emission Changes, 2005–2009



A14.8. Saskatchewan

Table A14-9 Emissions, Economy, Energy and Climate, Saskatchewan

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	43.300	71.300	70.400	72.700	73.600	73.100
Change Since 1990	NA	64.8%	62.8%	68.1%	70.2%	69.0%
Annual Change	NA	0.9%	-1.3%	3.3%	1.2%	-0.7%
GDP (millions)	27 793	38 970	38 520	39 896	41 583	39 810
Change Since 1990	NA	40.2%	38.6%	43.5%	49.6%	43.2%
GHG Intensity (Mt/\$B GDP)	1.56	1.83	1.83	1.82	1.77	1.84
GHG Efficiency (\$B GDP/Mt GHG)	0.64	0.55	0.55	0.55	0.56	0.54
Population (000s)	1 008	994	992	1 000	1 016	1 029
Change Since 1990	NA	-1.4%	-1.5%	-0.8%	0.8%	2.1%
GHG Per Capita (tonnes/person)	42.9	71.8	71.0	72.7	72.5	71.0
Energy Production (Primary only) (TJ)	941 825	1 481 666	1 490 997	1 449 827	1 460 045	1 083 831
Change Since 1990	NA	57.3%	58.3%	53.9%	55.0%	15.1%
Net Supply (Primary & Secondary) (TJ)	381 411	530 003	532 617	570 137	590 854	584 736
Change Since 1990	NA	39.0%	39.6%	49.5%	54.9%	53.3%
Energy Use - Final Demand (Primary & Secondary) (TJ)	289 911	375 457	379 785	420 075	429 742	451 556
Change Since 1990	NA	29.5%	31.0%	44.9%	48.2%	55.8%
CLIMATE						
Heating Degree Days	5 750	5 548	5 334	5 700	5 981	6 227

Notes:
GDP, expenditure-based, chained 2002 dollars.
NA = Not applicable.

Figure A14-17 Saskatchewan Long-term Emission Changes, 1990-2009

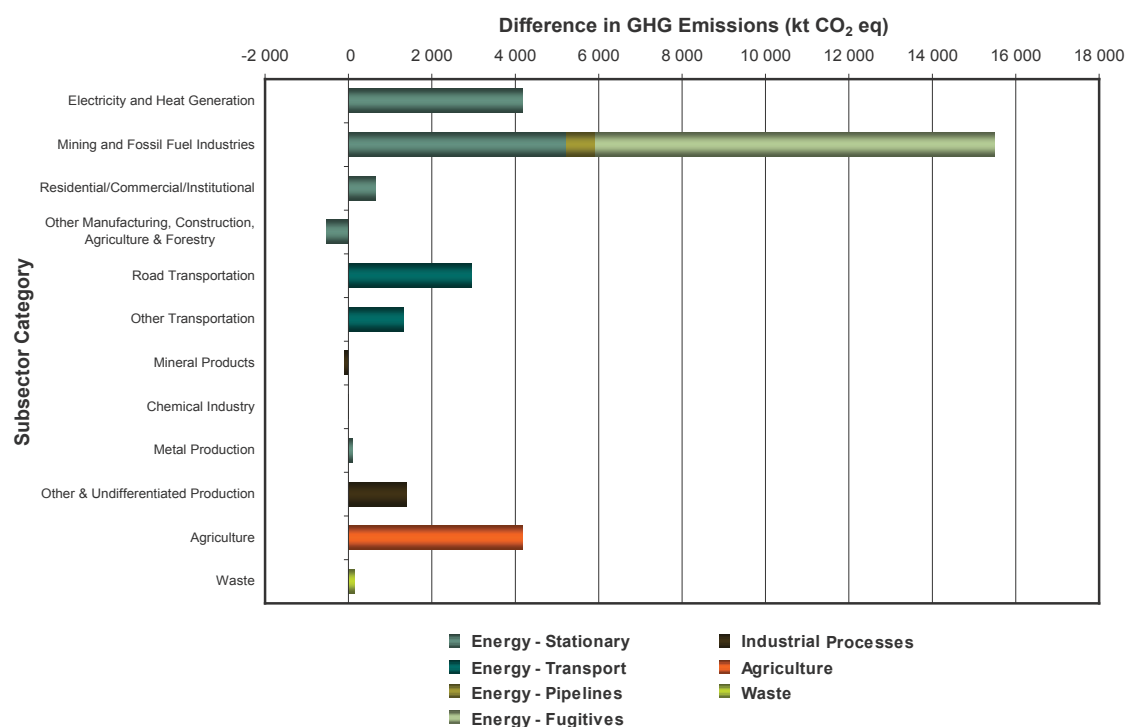
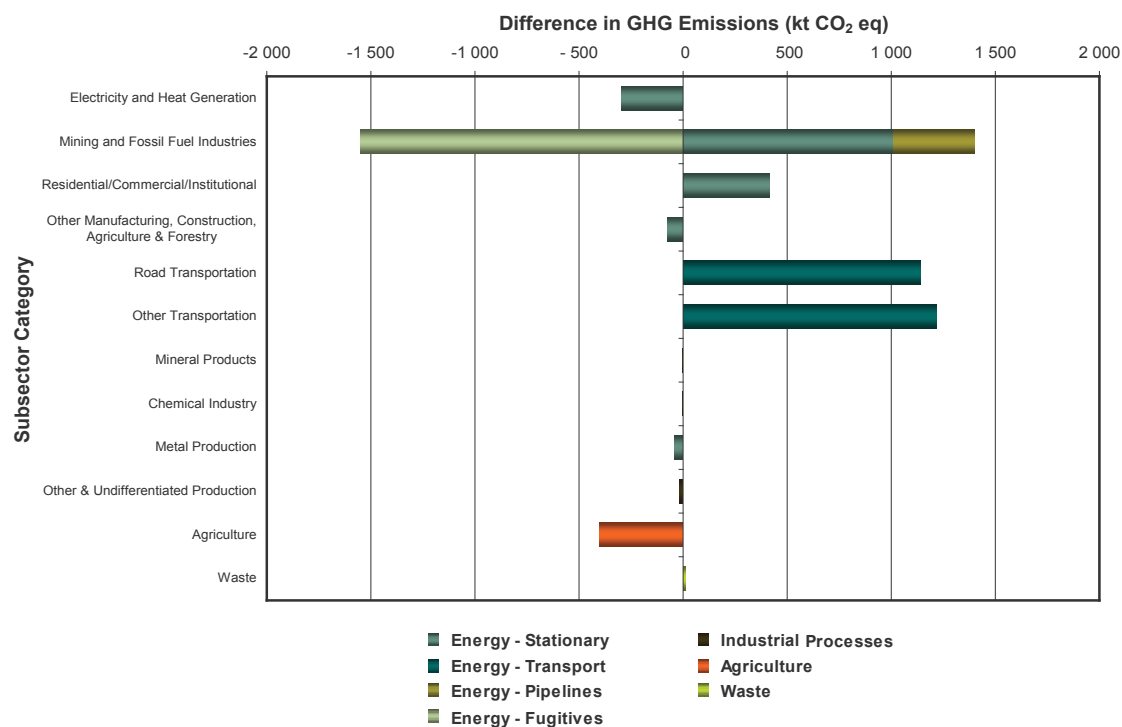


Figure A14–18 Saskatchewan Short-term Emission Changes, 2005–2009



A14.9. Alberta

Table A14–10 Emissions, Economy, Energy and Climate, Alberta

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	171.000	231.000	235.000	247.000	244.000	234.000
Change Since 1990	NA	35.2%	37.7%	44.3%	42.8%	36.7%
Annual Change	NA	-2.3%	1.8%	4.8%	-1.0%	-4.3%
GDP (millions)	98 683	171 416	181 418	185 870	185 780	178 225
Change Since 1990	NA	73.7%	83.8%	88.4%	88.3%	80.6%
GHG Intensity (Mt/\$B GDP)	1.73	1.35	1.30	1.33	1.31	1.31
GHG Efficiency (\$B GDP/Mt GHG)	0.58	0.74	0.77	0.75	0.76	0.76
Population (000s)	2 548	3 322	3 421	3 511	3 585	3 671
Change Since 1990	NA	30.4%	34.3%	37.8%	40.7%	44.1%
GHG Per Capita (tonnes/person)	67.1	69.5	68.8	70.2	68.1	63.6
Energy Production (Primary only) (TJ)	7 705 473	10 458 400	10 860 150	10 900 457	10 427 439	9 768 988
Change Since 1990	NA	35.7%	40.9%	41.5%	35.3%	26.8%
Net Supply (Primary & Secondary) (TJ)	1 774 961	2 540 678	2 598 795	2 835 049	2 771 312	2 478 258
Change Since 1990	NA	43.1%	46.4%	59.7%	56.1%	39.6%
Energy Use - Final Demand (Primary & Secondary) (TJ)	954 942	1 362 239	1 397 472	1 570 205	1 544 792	1 641 180
Change Since 1990	NA	42.7%	46.3%	64.4%	61.8%	71.9%
CLIMATE						
Heating Degree Days	5 486	5 125	5 057	5 342	5 447	5 738

Notes:
GDP, expenditure-based, chained 2002 dollars.
NA = Not applicable.

Figure A14-19 Alberta Long-term Emission Changes, 1990–2009

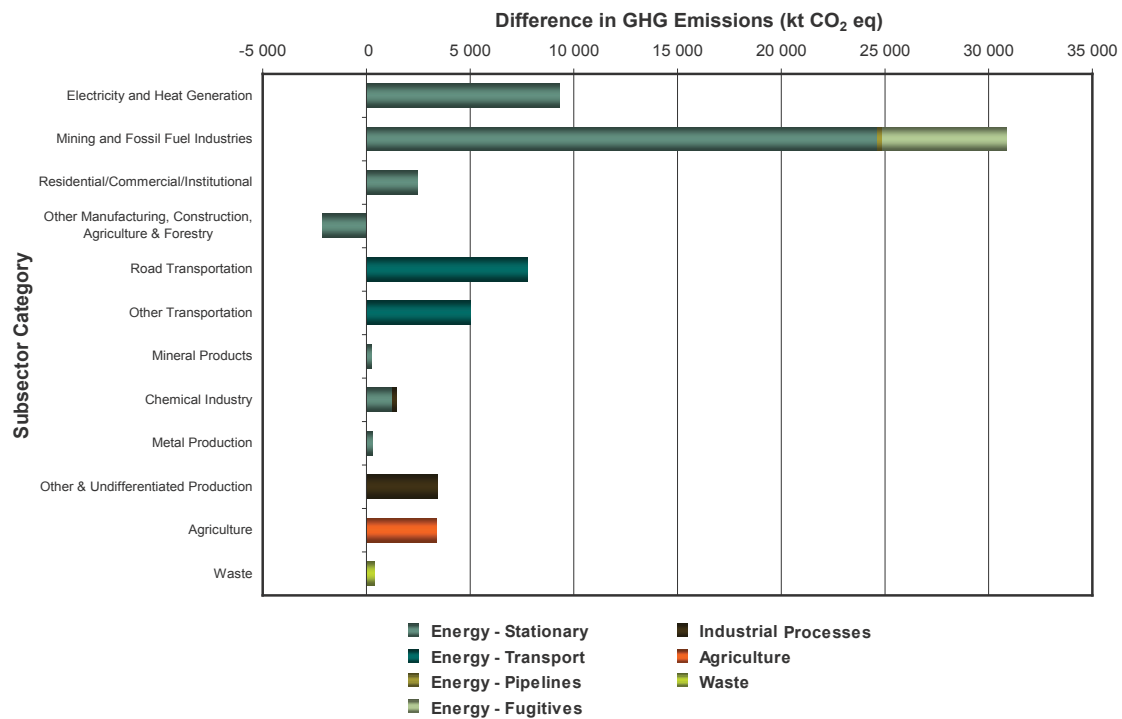
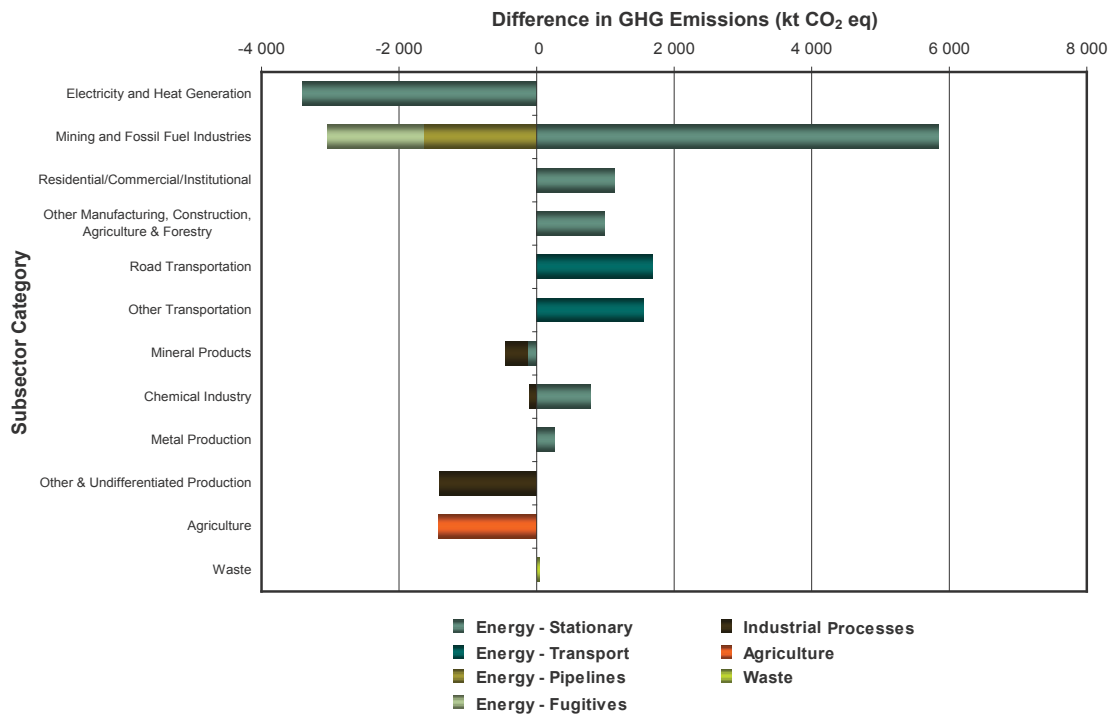


Figure A14-20 Alberta Short-term Emission Changes, 2005–2009



A14.10. British Columbia

Table A14–11 Emissions, Economy, Energy and Climate, British Columbia

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	49.800	62.700	61.600	65.200	65.900	63.800
Change Since 1990	NA	26.0%	23.7%	30.9%	32.5%	28.1%
Annual Change	NA	-4.1%	-1.9%	5.9%	1.2%	-3.3%
GDP (millions)	101 408	152 998	159 916	164 519	164 520	161 851
Change Since 1990	NA	50.9%	57.7%	62.2%	62.2%	59.6%
GHG Intensity (Mt/\$B GDP)	0.49	0.41	0.38	0.40	0.40	0.39
GHG Efficiency (\$B GDP/Mt GHG)	2.04	2.44	2.60	2.52	2.50	2.54
Population (000s)	3 292	4 197	4 244	4 310	4 382	4 460
Change Since 1990	NA	27.5%	28.9%	30.9%	33.1%	35.5%
GHG Per Capita (tonnes/person)	15.1	14.9	14.5	15.1	15.0	14.3
Energy Production (Primary only) (TJ)	1 486 548	2 165 265	2 083 427	2 125 388	2 110 192	1 997 168
Change Since 1990	NA	45.7%	40.2%	43.0%	42.0%	34.3%
Net Supply (Primary & Secondary) (TJ)	867 436	1 079 791	1 040 227	1 459 491	1 084 672	1 046 920
Change Since 1990	NA	24.5%	19.9%	68.3%	25.0%	20.7%
Energy Use - Final Demand (Primary & Secondary) (TJ)	740 893	904 141	889 849	946 647	928 808	908 791
Change Since 1990	NA	22.0%	20.1%	27.8%	25.4%	22.7%
CLIMATE						
Heating Degree Days	3 461	2 935	2 965	3 130	3 304	3 243

Notes:
GDP, expenditure-based, chained 2002 dollars.
NA = Not applicable.

Figure A14–21 British Columbia Long-term Emission Changes, 1990–2009

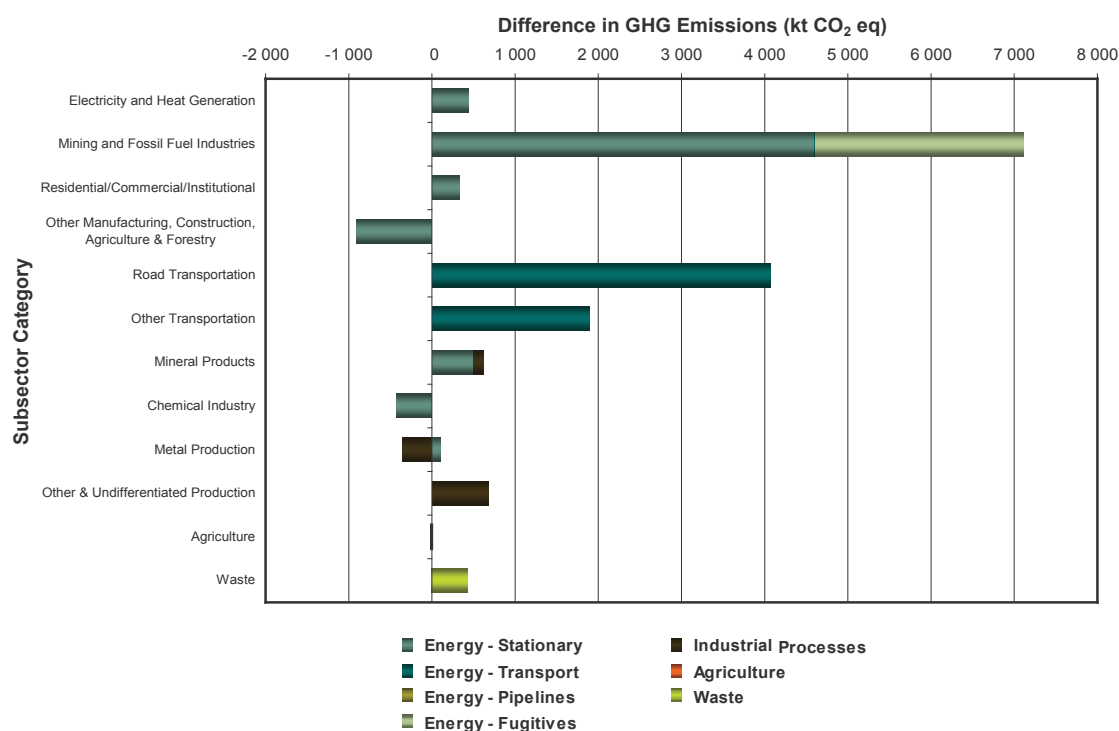
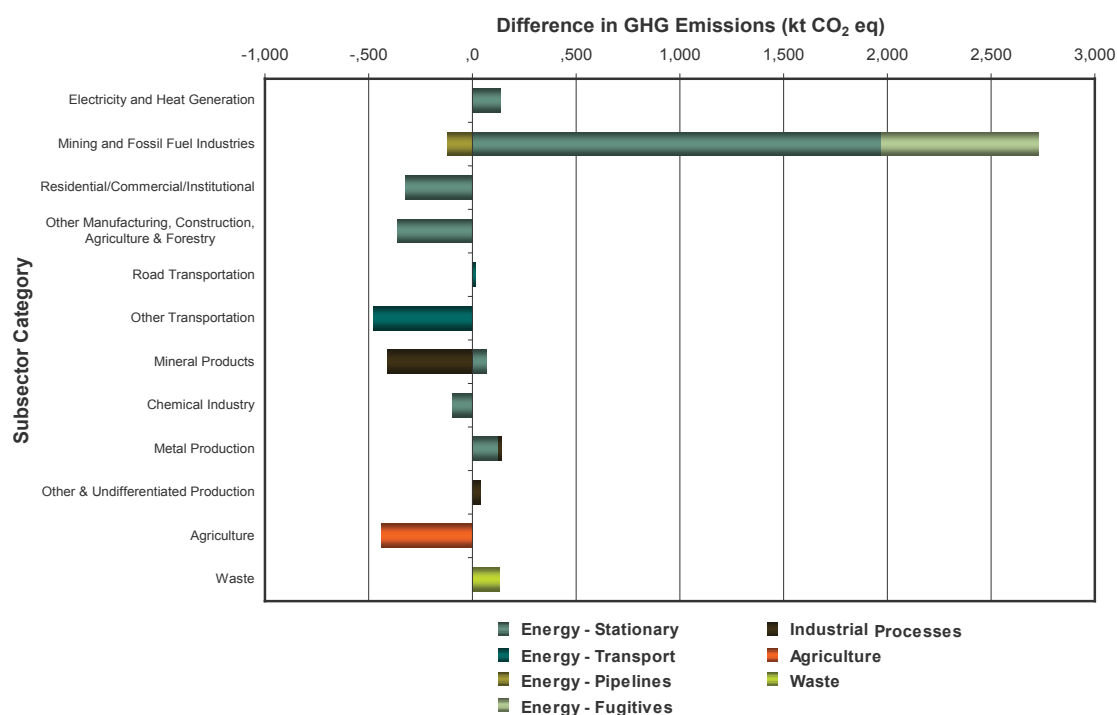


Figure A14-22 British Columbia Short-term Emission Changes, 2005–2009



A14.11. Yukon, Northwest Territories and Nunavut

Table A14-12 Emissions, Economy, Energy and Climate, Total Territories

Emissions, Economy and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	2.070	2.226	2.245	2.402	2.209	1.824
Change Since 1990	NA	7.5%	8.1%	16.0%	6.4%	-12.0%
Annual Change	NA	8.5%	0.5%	7.3%	-8.3%	-17.3%
GDP (millions)	3 578	5 842	5 970	6 465	6 322	5 852
Change Since 1990	NA	63.3%	66.9%	80.7%	76.7%	63.6%
GHG Intensity (Mt/\$B GDP)	0.58	0.38	0.38	0.37	0.35	0.31
GHG Efficiency (\$B GDP/Mt GHG)	1.73	2.62	2.66	2.69	2.87	3.21
Population (000s)	87	106	106	107	108	110
Change Since 1990	NA	21.1%	21.8%	23.1%	23.6%	25.5%
GHG Per Capita (tonnes/person)	23.8	21.1	21.1	22.4	20.4	16.7
Energy Production (Primary only) (TJ)	84 873	71 201	62 033	57 572	51 779	36 783
Change Since 1990	NA	-16.1%	-26.9%	-32.2%	-39.0%	-56.7%
Net Supply (Primary & Secondary) (TJ)	26 985	26 756	24 690	30 764	28 477	24 974
Change Since 1990	NA	-0.8%	-8.5%	14.0%	5.5%	-7.5%
Energy Use - Final Demand (Primary & Secondary) (TJ)	24 688	24 740	23 458	29 623	28 512	22 713
Change Since 1990	NA	0.2%	-5.0%	20.0%	15.5%	-8.0%
CLIMATE						
Heating Degree Days	9 171	8 012	8 127	8 434	8 584	8 258

Notes:
GDP, expenditure-based, chained 2002 dollars.
NA = Not applicable.

Table A14–13 GHG Emissions, Yukon

Emissions, Economy, and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	0.540	0.409	0.418	0.415	0.362	0.317
Change Since 1990 (%)	NA	-24.2%	-22.5%	-23.2%	-33.0%	-41.3%
Annual Change (%)	NA	-4.1%	2.3%	-0.9%	-12.7%	-12.5%

Note:
NA = Not applicable.

Table A14–14 GHG Emissions, Northwest Territories and Nunavut

Emissions, Economy, and Energy	1990	2005	2006	2007	2008	2009
Total GHG (Mt)	1.530	1.796	1.888	2.175	2.019	1.559
Change Since 1990 (%)	NA	17.3%	22.8%	42.1%	31.5%	1.7%
Annual Change (%)	NA	-4.4%	4.7%	15.7%	-7.4%	-22.6%

Note:
NA = Not applicable.

Figure A14–23 Yukon Long-term Emission Changes, 1990–2009

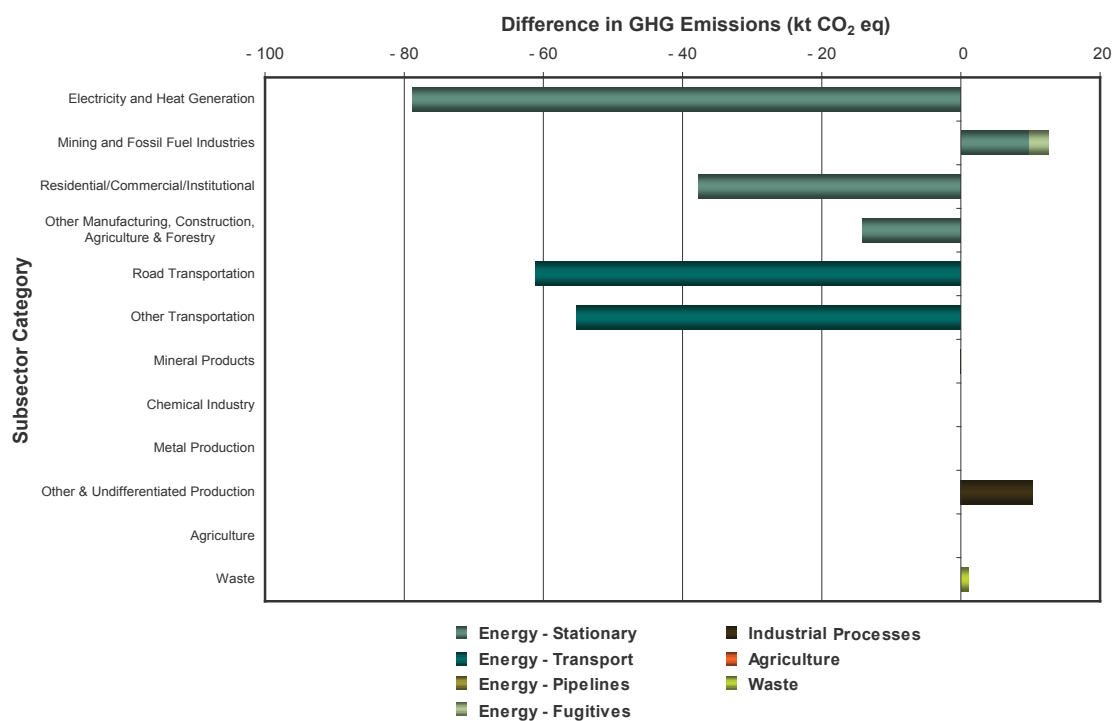


Figure A14-24 Northwest Territories and Nunavut Long-term Emission Changes, 1990–2009

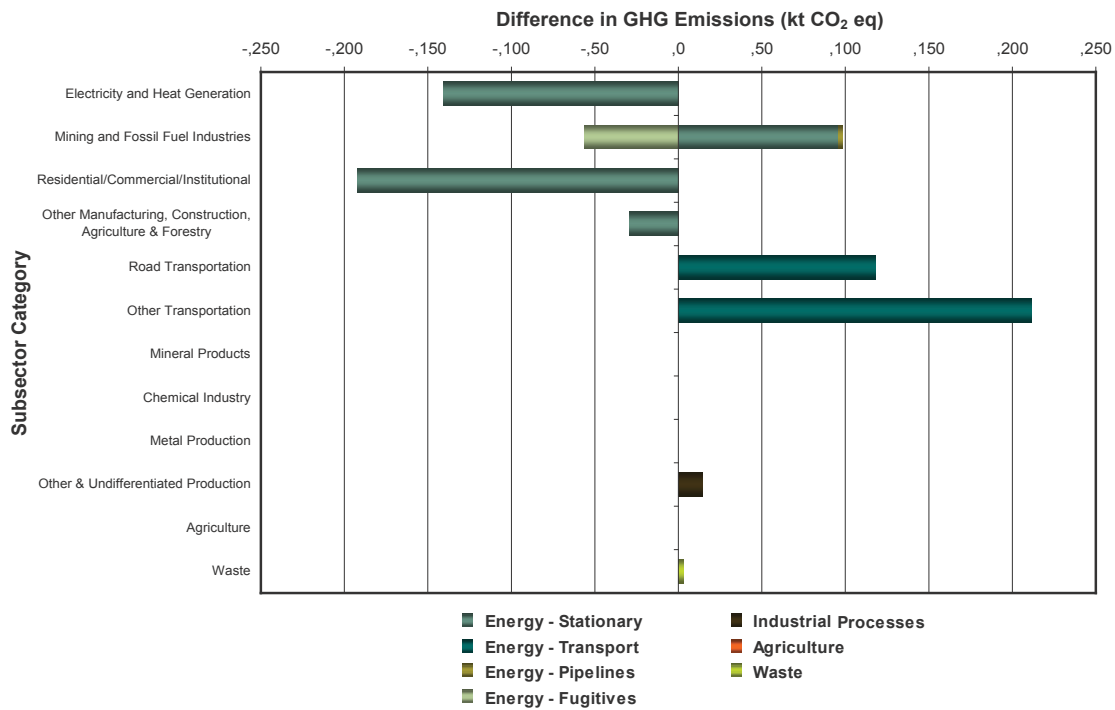


Figure A14-25 Yukon Short-term Emission Changes, 2005–2009

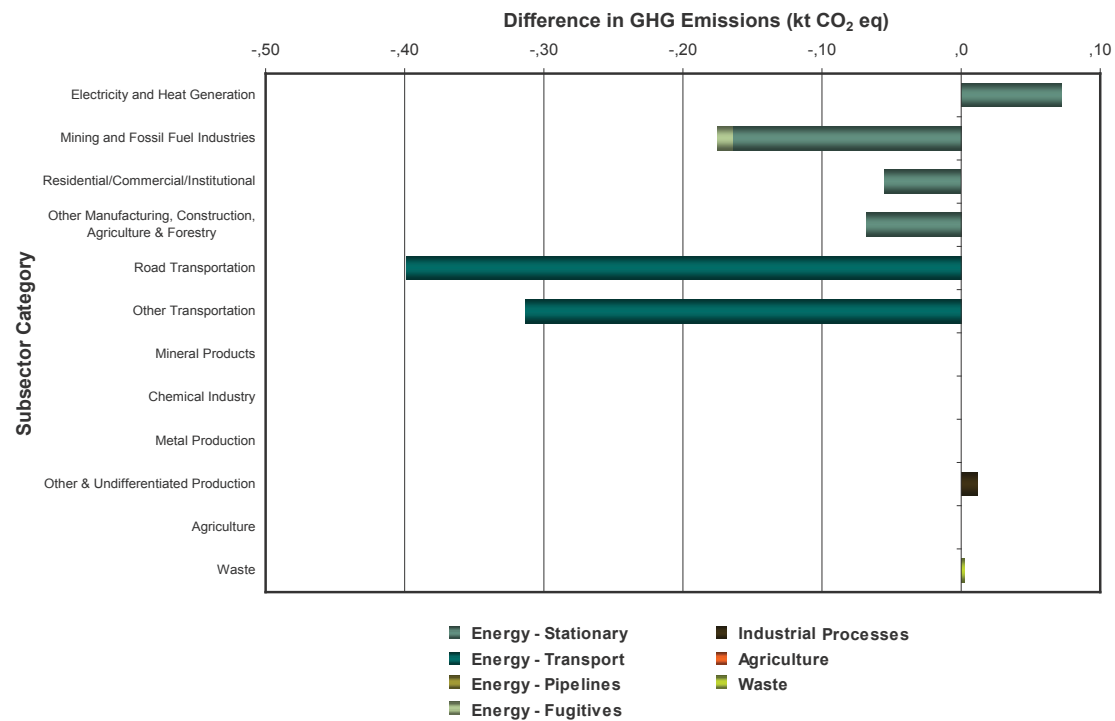
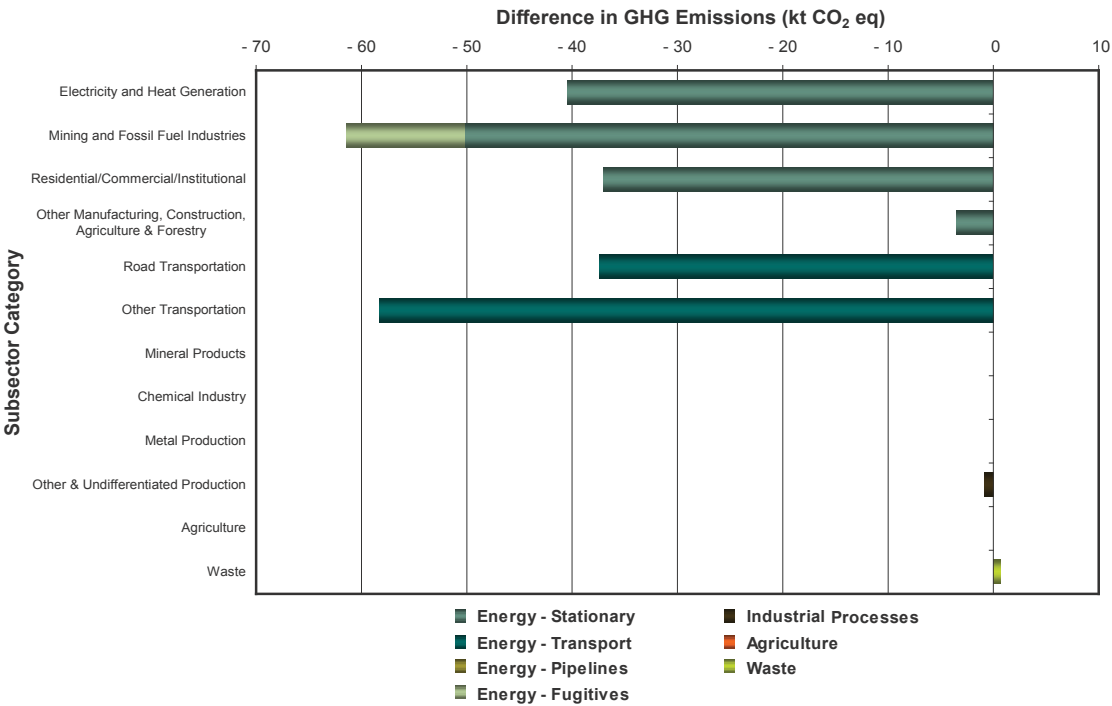


Figure A14–26 Northwest Territories and Nunavut Short-Term Emission Changes, 2005–2009



Annex 15

Provincial/Territorial Greenhouse Gas Emission Tables, 1990–2009

Summary tables illustrating GHG emissions (for GHG categories, see Table A15–1) by province/territory, sector, and year are included in this annex (Table A15–12 to Table A15–28). To account for the creation of Nunavut in 1999, a time series from 1999–2009 is provided for both Nunavut and the Northwest Territories (Table A15–24 and Table A15–26) and the years 1990–1998 are presented as a combined region in Table A15–28.

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 SF₆ (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 A15–1 GHG Category Description

GHG Source/Sink Categories		
ENERGY		
a. Stationary Combustion Sources		
Electricity and Heat Generation Electricity Generation Heat Generation	Emissions from fuel consumed by: Utility electricity generation Steam generation (for sale)	
Fossil Fuel Production and Refining Petroleum Refining and Upgrading Fossil Fuel Production	Emissions from fuel consumed by: Petroleum refining and oil sands upgrading industries Natural gas production and some conventional and unconventional oil production industries (some refining is included)	
Mining & Oil and Gas Extraction	Emissions from commercial fuel sold to: Metal and non metal mines, stone quarries, and gravel pits Oil and gas extraction industries Mineral exploration and contract drilling operations	
Manufacturing Industries	Emissions from fuel consumed by the following industries: Iron and Steel (steel foundries, casting and rolling mills) Non-ferrous metals (aluminium, magnesium, and other production) Chemical (fertilizer manufacturing, organic and inorganic chemical manufacturing) Pulp and Paper (primarily pulp, paper, and paper product manufacturers) Cement production Other manufacturing industries not listed (such as automobile manufacturing, textiles, food and beverage industries)	
Construction	Emissions from fuels consumed by the construction industry - buildings, highways etc.	
Commercial & Institutional	Emissions from fuel consumed by: Service industries related to mining, communication, wholesale and retail trade, finance and insurance, real estate, education, etc.) Federal, provincial, and municipal establishment National Defence and Canadian Coast Guard Train stations, airports, and warehouses	
Residential	Emissions from fuel consumed for personal residences (homes, apartment hotels, condominiums, and farm house)	
Agriculture & Forestry	Emissions from fuel consumed by: Forestry and logging service industry Agricultural, hunting, and trapping industry (excluding food processing, farm machinery manufacturing, and repair)	
b. Transportation	Emissions resulting from the:	
Domestic Aviation	-consumption of fossil fuels by Canadian registered airlines flying domestically	
Road Transportation	-consumption of fossil fuels (including non-CO ₂ emissions from ethanol) by vehicles licensed to operate on roads	
Railways	-consumption of fossil fuels by Canadian railways	
Domestic Marine	-consumption of fossil fuels by Canadian registered marine vessels fuelled domestically	
Others - Off Road	-consumption of fossil fuels (including non-CO ₂ emissions from ethanol) by combustion devices not licensed to operate on roads	
Others - Pipelines	-transportation and distribution of crude oil, natural gas, and other products	
c. Fugitive Sources	Intentional and unintentional releases of greenhouse gases from the following activities:	
Coal Mining	Underground and surface mining	
Oil and Natural Gas	Conventional and unconventional oil and gas exploration, production, transportation, and distribution	
INDUSTRIAL PROCESSES		
a. Mineral Products	Emissions resulting from the following process activities: 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, and SF ₆ used in magnesium smelters and casters	
d. Production and Consumption of Halocarbons and SF₆	Production of HCFC-22; use of HFCs and/or PFCs in AC units, refrigeration units, fire extinguishers, aerosol cans, solvents, foam blowing, semiconductor manufacturing and electronics industry; use of SF ₆ in electrical equipment and semiconductors	
e. Other & Undifferentiated Production	Non-energy use of fossil fuels mostly in chemical / petrochemical activities	
SOLVENT & OTHER PRODUCT USE		
	Emissions resulting from the use of N ₂ O as anaesthetic and propellant	
AGRICULTURE		
a. Enteric Fermentation	Emissions resulting from:	
b. Manure Management	Emissions resulting from the eructation of CH ₄ during the digestion of plant material by (mainly) ruminants	
c. Agricultural Soils	Emissions resulting from the release of CH ₄ and N ₂ O due to microbial activity during the storage of feces, urine and bedding materials from the cleaning of barns and pens	
Direct sources	Direct N ₂ O emissions from synthetic fertilizer, manure on cropland, crop residue, tillage, summerfallow, irrigation, and cultivation of organic soils	
Manure on Pasture, Range, and Paddock	Direct N ₂ O emissions from manure deposited on pasture, range, and paddock	
Indirect Sources	Indirect N ₂ O emissions from volatilization and leaching of animal manure nitrogen, synthetic fertilizer nitrogen, and crop residue nitrogen	
d. Field Burning of Agricultural Residues	CH ₄ and N ₂ O emissions from crop residue burning	
WASTE		
a. Solid Waste Disposal on Land	Emissions resulting from:	
b. Wastewater Handling	Municipal solid waste management sites (landfills) and dedicated wood waste landfills	
c. Waste Incineration	Domestic and industrial wastewater treatment Municipal solid waste and sewage sludge incineration	

Table A15-2 1990-2009 GHG Emission Summary for Newfoundland and Labrador

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	9 210	8 610	10 000	9 940	9 360	10 500	9 850	9 460
ENERGY	8 510	7 860	9 220	9 070	8 540	9 650	9 040	8 600
a. Stationary Combustion Sources	5 380	4 200	4 920	4 640	3 960	4 840	4 540	4 390
Electricity and Heat Generation	1 630	808	1 290	1 070	629	1 070	871	865
Fossil Fuel Production and Refining	1 000	1 200	1 500	1 500	1 400	1 700	1 600	1 800
Mining & Oil and Gas Extraction	1 060	1 010	863	976	967	936	1 040	781
Manufacturing Industries	501	248	308	277	205	196	145	41.4
Construction	32.7	10.1	24.3	17.1	16.3	15.7	20.3	7.54
Commercial & Institutional	317	320	469	439	353	433	410	531
Residential	800	520	450	340	340	440	470	340
Agriculture & Forestry	24.3	46.0	8.53	6.64	5.35	7.97	9.06	8.36
b. Transport¹	3 090	3 360	3 470	3 590	3 390	3 850	3 750	3 640
Civil Aviation (Domestic Aviation)	190	180	200	210	200	210	210	200
Road Transportation	1 640	1 760	1 820	1 900	1 910	2 040	2 130	2 090
Light-Duty Gasoline Vehicles	753	631	592	594	588	638	662	680
Light-Duty Gasoline Trucks	429	646	708	750	742	806	838	802
Heavy-Duty Gasoline Vehicles	107	45.6	53.2	53.6	53.6	58.8	62.0	63.1
Motorcycles	5.12	3.63	4.03	4.06	4.07	4.47	4.70	4.65
Light-Duty Diesel Vehicles	2.29	1.31	1.53	1.55	1.53	1.72	1.85	1.90
Light-Duty Diesel Trucks	5.54	14.1	17.0	19.1	18.8	20.2	20.9	19.2
Heavy-Duty Diesel Vehicles	335	418	442	476	498	509	536	515
Propane & Natural Gas Vehicles	1.4	1.1	0.32	0.31	0.46	0.61	0.61	0.46
Railways	-	-	-	-	-	-	30	30
Navigation (Domestic Marine)	700	680	640	590	560	740	480	500
Other Transportation	560	730	810	890	720	850	890	820
Off-Road Gasoline	140	100	32	58	31	150	210	130
Off-Road Diesel	420	630	770	840	690	700	680	690
Pipelines	-	-	-	-	-	-	-	-
c. Fugitive Sources²	40.6	303	837	846	1 200	972	750	573
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	40.6	303	837	846	1 200	972	750	573
INDUSTRIAL PROCESSES³	76.5	64.1	103	175	121	114	104	154
a. Mineral Products	57	0.12	0.10	0.09	0.13	0.13	0.14	0.12
Cement Production	57	-	-	-	-	-	-	-
Lime Production	-	-	-	-	-	-	-	-
Mineral Products Use	0.18	0.12	0.10	0.09	0.13	0.13	0.14	0.12
b. Chemical Industry	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	0.99	41	79	81	75	80	78	87
e. Other & Undifferentiated Production⁵	19	23	23	94	46	34	26	67
SOLVENT & OTHER PRODUCT USE	3.7	4.3	3.5	2.9	5.2	5.0	5.2	3.9
AGRICULTURE	49	49	57	60	63	64	65	65
a. Enteric Fermentation	18	19	23	25	26	27	27	27
b. Manure Management	13	13	14	15	15	15	15	15
c. Agriculture Soils	17	17	20	20	22	21	22	23
Direct Sources	8.3	8.1	9.5	9.6	11	10	11	11
Pasture, Range and Paddock Manure	1.6	1.7	1.9	2.0	2.1	2.2	2.2	2.1
Indirect Sources	7	7	8	8	9	9	9	9
d. Field Burning of Agricultural Residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WASTE	570	630	630	630	630	630	630	640
a. Solid Waste Disposal on Land	560	620	620	620	620	620	620	620
b. Wastewater Handling	11	11	11	11	11	11	10	10
c. Waste Incineration	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–3 2009 GHG Emission Summary for Newfoundland and Labrador

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		8 260	40	840	0.89	280	86	-	0.66	9 460
ENERGY		8 190	8.6	180	0.7	200	-	-	-	8 600
a.	Stationary Combustion Sources	4 220	6	100	0.1	40	-	-	-	4 390
	Electricity and Heat Generation	859	0.01	0.20	0.02	5	-	-	-	865
	Fossil Fuel Production and Refining	1 750	3	60	0.04	10	-	-	-	1 800
	Mining & Oil and Gas Extraction	777	0.02	0.4	0.01	4	-	-	-	781
Manufacturing Industries		38.9	0.01	0.2	0.01	2	-	-	-	41.4
Construction		7.51	0.00	0.00	0.00	0.03	-	-	-	7.54
Commercial & Institutional		527	0.01	0.1	0.01	3	-	-	-	531
Residential		256	3	70	0.04	10	-	-	-	340
Agriculture & Forestry		8.33	0.00	0.00	0.00	0.03	-	-	-	8.36
b.	Transport ¹	3 440	0.4	8	0.6	200	-	-	-	3 640
	Civil Aviation (Domestic Aviation)	196	0.01	0.2	0.01	2	-	-	-	200
	Road Transportation	2 020	0.17	3.5	0.19	58	-	-	-	2 090
	Light-Duty Gasoline Vehicles	657	0.06	1.3	0.07	21	-	-	-	680
Light-Duty Gasoline Trucks		773	0.08	1.6	0.09	27	-	-	-	802
Heavy-Duty Gasoline Vehicles		61.6	0.00	0.06	0.00	1.5	-	-	-	63.1
Motorcycles		4.59	0.00	0.03	0.00	0.03	-	-	-	4.65
Light-Duty Diesel Vehicles		1.86	0.00	0.00	0.00	0.05	-	-	-	1.90
Light-Duty Diesel Trucks		18.7	0.00	0.01	0.00	0.5	-	-	-	19.2
Heavy-Duty Diesel Vehicles		507	0.02	0.5	0.03	8	-	-	-	515
Propane & Natural Gas Vehicles		0.45	0.00	0.00	0.00	0.00	-	-	-	0.46
Railways		30.9	0.00	0.04	0.01	4	-	-	-	30
Navigation (Domestic Marine)		448	0.03	0.6	0.2	50	-	-	-	500
Other Transportation		740	0.2	4	0.3	80	-	-	-	820
Off-Road Gasoline		130	0.1	3	0.00	0.9	-	-	-	130
Off-Road Diesel		610	0.03	0.7	0.3	80	-	-	-	690
Pipelines		-	-	-	-	-	-	-	-	0
c.	Fugitive Sources ²	530	2.0	43	0.00	1	-	-	-	573
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	529	2.05	43.0	0.00	1	-	-	-	573
INDUSTRIAL PROCESSES ³		67	-	-	-	-	86	-	0.66	154
a.	Mineral Products	0.12	-	-	-	-	-	-	-	0.12
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	-	-	-	-	-	-	-	-	0
Mineral Product Use		0.12	-	-	-	-	-	-	-	0.12
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
Petrochemical Production ⁴		-	-	-	-	-	-	-	-	0
c.	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
SF ₆ Used in Magnesium Smelters and Casters		-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	86	-	0.66	87
e	Other & Undifferentiated Production ⁵	67	-	-	-	-	-	-	-	67
SOLVENT & OTHER PRODUCT USE		-	-	-	0.01	3.9	-	-	-	3.9
AGRICULTURE		-	1.6	34	0.10	31	-	-	-	65
a.	Enteric Fermentation	-	1.3	27	-	-	-	-	-	27
b.	Manure Management	-	0.33	7.0	0.03	8.2	-	-	-	15
c.	Agriculture Soils	-	-	-	0.07	23	-	-	-	23
	Direct Sources	-	-	-	0.04	11	-	-	-	11
	Pasture, Range and Paddock Manure	-	-	-	0.01	2.1	-	-	-	2.1
Indirect Sources		-	-	-	0.03	9	-	-	-	9
d.	Field Burning of Agricultural Residues	-	-	-	-	-	-	-	-	0
WASTE		-	30	620	0.03	10	-	-	-	640
a.	Solid Waste Disposal on Land	-	30	620	-	-	-	-	-	620
b.	Wastewater Handling	-	0.02	0.34	0.03	10	-	-	-	10
c.	Waste Incineration	-	-	-	-	-	-	-	-	0

Notes:

- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 - Fugitive emissions from refineries are only reported at the national level.
 - Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 - The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 - Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15-4 1990-2009 GHG Emission Summary for Prince Edward Island

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	1 960	2 200	2 310	2 230	2 120	2 070	1 990	1 890
ENERGY	1 430	1 590	1 610	1 560	1 480	1 500	1 430	1 360
a. Stationary Combustion Sources	733	744	718	660	605	611	570	569
Electricity and Heat Generation	103	56.6	18.0	11.9	7.82	-	0.56	0.28
Fossil Fuel Production and Refining	0.08	2.2	0.02	-	-	-	-	-
Mining & Oil and Gas Extraction	0.77	4.97	0.10	-	-	-	-	-
Manufacturing Industries	54.7	134	139	137	137	90.8	80.4	61.7
Construction	11.0	6.60	6.18	7.54	6.17	5.62	5.20	6.84
Commercial & Institutional	158	191	236	211	187	164	168	191
Residential	390	320	300	270	250	340	300	300
Agriculture & Forestry	18.4	31.0	20.1	18.6	16.0	13.2	13.7	13.5
b. Transport¹	694	848	890	895	879	891	856	794
Civil Aviation (Domestic Aviation)	16	10	13	14	15	16	17	18
Road Transportation	507	582	625	622	621	623	623	617
Light-Duty Gasoline Vehicles	243	229	223	219	217	217	218	215
Light-Duty Gasoline Trucks	113	195	228	237	236	237	238	217
Heavy-Duty Gasoline Vehicles	51.1	17.6	24.4	24.0	24.0	24.5	25.0	23.2
Motorcycles	1.03	1.41	2.59	2.74	2.76	2.79	2.84	2.42
Light-Duty Diesel Vehicles	2.34	1.83	2.07	2.04	2.02	2.04	2.10	2.05
Light-Duty Diesel Trucks	3.16	7.22	8.54	9.18	9.17	9.09	9.15	8.19
Heavy-Duty Diesel Vehicles	92.8	129	136	129	129	131	128	149
Propane & Natural Gas Vehicles	1.1	0.70	0.04	-	-	-	-	-
Railways	-	-	-	-	-	-	5	5
Navigation (Domestic Marine)	89	84	100	99	97	97	80	80
Other Transportation	83	170	150	160	150	150	130	73
Off-Road Gasoline	44	77	84	84	79	88	87	55
Off-Road Diesel	39	95	67	76	67	66	42	19
Pipelines	-	-	-	-	-	-	-	-
c. Fugitive Sources²	-	-	-	-	-	-	-	-
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	-	-	-	-	-	-	-	-
INDUSTRIAL PROCESSES³	3.34	16.8	30.1	30.7	29.1	30.2	29.4	32.9
a. Mineral Products	-	0.83	0.52	0.46	0.69	0.65	0.72	0.68
Cement Production	-	-	-	-	-	-	-	-
Lime Production	-	-	-	-	-	-	-	-
Mineral Products Use	-	0.83	0.52	0.46	0.69	0.65	0.72	0.68
b. Chemical Industry	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	0.02	13	27	28	27	28	27	30
e. Other & Undifferentiated Production⁵	3.3	2.8	2.5	1.8	1.8	1.8	1.6	1.8
SOLVENT & OTHER PRODUCT USE	0.84	1.1	0.93	0.78	1.4	1.4	1.4	1.1
AGRICULTURE	440	490	560	530	490	420	420	370
a. Enteric Fermentation	120	110	110	110	110	110	100	92
b. Manure Management	45	46	46	45	45	44	36	32
c. Agriculture Soils	270	330	400	380	330	270	280	250
Direct Sources	150	190	230	220	190	150	160	140
Pasture, Range and Paddock Manure	16	16	15	15	15	15	14	13
Indirect Sources	100	100	200	100	100	100	100	90
d. Field Burning of Agricultural Residues	0.11	0.20	0.18	0.22	0.18	0.16	0.16	0.12
WASTE	87	110	110	110	110	120	120	120
a. Solid Waste Disposal on Land	75	94	99	100	100	100	100	100
b. Wastewater Handling	2.7	4.1	4.2	4.1	4.2	4.1	4.3	4.1
c. Waste Incineration	9.1	9.4	9.4	9.5	9.5	9.5	9.7	9.9

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–5 2009 GHG Emission Summary for Prince Edward Island

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential <i>Unit</i>		CO ₂	CH ₄	CH ₄ 21 kt CO ₂ equivalent	N ₂ O	N ₂ O 310 kt CO ₂ equivalent	HFCs kt CO ₂ equivalent	PFCs kt CO ₂ equivalent	SF ₆ kt CO ₂ equivalent	TOTAL kt CO ₂ equivalent
TOTAL		1 280	12	260	1.0	310	30	-	-	1 890
ENERGY		1 270	2.4	50	0.1	40	-	-	-	1 360
a.	Stationary Combustion Sources	513	2	50	0.03	10	-	-	-	569
	Electricity and Heat Generation	0.27	0.00	0.00	0.00	0.01	-	-	-	0.28
	Fossil Fuel Production and Refining	-	-	-	-	-	-	-	-	0
	Mining & Oil and Gas Extraction	-	-	-	-	-	-	-	-	0
Manufacturing Industries		61.3	0.00	0.05	0.00	0.4	-	-	-	61.7
Construction		6.81	0.00	0.00	0.00	0.02	-	-	-	6.84
Commercial & Institutional		190	0.00	0.04	0.00	0.9	-	-	-	191
Residential		241	2	50	0.03	8	-	-	-	300
Agriculture & Forestry		13.4	0.00	0.00	0.00	0.06	-	-	-	13.5
b.	Transport ¹	761	0.1	3	0.1	30	-	-	-	794
	Civil Aviation (Domestic Aviation)	17.9	0.00	0.01	0.00	0.2	-	-	-	18
	Road Transportation	597	0.05	1.1	0.06	19	-	-	-	617
	Light-Duty Gasoline Vehicles	207	0.02	0.45	0.03	7.8	-	-	-	215
Light-Duty Gasoline Trucks		208	0.02	0.48	0.03	8.3	-	-	-	217
Heavy-Duty Gasoline Vehicles		22.7	0.00	0.03	0.00	0.48	-	-	-	23.2
Motorcycles		2.39	0.00	0.02	0.00	0.01	-	-	-	2.42
Light-Duty Diesel Vehicles		2.00	0.00	0.00	0.00	0.05	-	-	-	2.05
Light-Duty Diesel Trucks		7.98	0.00	0.00	0.00	0.2	-	-	-	8.19
Heavy-Duty Diesel Vehicles		147	0.01	0.1	0.01	2	-	-	-	149
Propane & Natural Gas Vehicles		-	-	-	-	-	-	-	-	0
Railways		4.79	0.00	0.01	0.00	0.6	-	-	-	5
Navigation (Domestic Marine)		71.4	0.00	0.08	0.03	9	-	-	-	80
Other Transportation		70	0.06	1	0.01	3	-	-	-	73
Off-Road Gasoline		53	0.06	1	0.00	0.4	-	-	-	55
Off-Road Diesel		17	0.00	0.02	0.01	2	-	-	-	19
Pipelines		-	-	-	-	-	-	-	-	0
c.	Fugitive Sources ²	-	-	-	-	-	-	-	-	0
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	-	-	-	-	-	-	-	-	0
INDUSTRIAL PROCESSES ³		2.5	-	-	-	-	30	-	-	32.9
a.	Mineral Products	0.68	-	-	-	-	-	-	-	0.68
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	-	-	-	-	-	-	-	-	0
	Mineral Product Use	0.68	-	-	-	-	-	-	-	0.68
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
	Petrochemical Production ⁴	-	-	-	-	-	-	-	-	0
c.	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	30	-	-	30
e	Other & Undifferentiated Production ⁵	1.8	-	-	-	-	-	-	-	1.8
SOLVENT & OTHER PRODUCT USE		-	-	-	0.00	1.1	-	-	-	1.1
AGRICULTURE		-	5.0	100	0.86	270	-	-	-	370
a.	Enteric Fermentation	-	4.4	92	-	-	-	-	-	92
b.	Manure Management	-	0.60	13	0.06	20	-	-	-	32
c.	Agriculture Soils	-	-	-	0.80	250	-	-	-	250
	Direct Sources	-	-	-	0.45	140	-	-	-	140
	Pasture, Range and Paddock Manure	-	-	-	0.04	13	-	-	-	13
	Indirect Sources	-	-	-	0.3	90	-	-	-	90
d.	Field Burning of Agricultural Residues	-	0.00	0.08	0.00	0.03	-	-	-	0.12
WASTE		8.3	5.0	110	0.01	4	-	-	-	120
a.	Solid Waste Disposal on Land	-	5.0	100	-	-	-	-	-	100
b.	Wastewater Handling	-	0.06	1.3	0.01	3	-	-	-	4.1
c.	Waste Incineration	8.3	-	-	0.01	2	-	-	-	9.9

Notes:

- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 - Fugitive emissions from refineries are only reported at the national level.
 - Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 - The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 - Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15-6 1990-2009 GHG Emission Summary for Nova Scotia

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	19 000	21 700	23 300	22 300	20 700	21 400	21 700	21 000
ENERGY	17 500	20 100	21 800	20 900	19 400	20 100	20 400	19 800
a. Stationary Combustion Sources	11 400	14 200	15 600	14 700	13 600	14 400	14 900	14 500
Electricity and Heat Generation	6 870	9 450	10 500	9 870	9 230	9 750	10 000	9 750
Fossil Fuel Production and Refining	640	990	1 100	970	950	930	1 200	1 300
Mining & Oil and Gas Extraction	35.2	53.9	28.2	27.6	27.5	29.5	29.4	28.7
Manufacturing Industries	757	719	635	525	507	504	568	548
Construction	49.2	27.2	54.1	38.1	31.3	28.9	29.1	22.3
Commercial & Institutional	790	903	1 950	1 990	1 760	1 870	1 820	1 670
Residential	2 100	1 800	1 300	1 200	1 100	1 200	1 200	1 100
Agriculture & Forestry	103	230	75.1	78.5	58.2	82.6	73.4	66.4
b. Transport¹	4 870	5 590	6 060	6 070	5 620	5 570	5 340	5 150
Civil Aviation (Domestic Aviation)	280	300	280	270	260	250	250	250
Road Transportation	3 090	3 480	3 760	3 760	3 840	3 730	3 780	3 580
Light-Duty Gasoline Vehicles	1 560	1 290	1 310	1 270	1 280	1 240	1 270	1 230
Light-Duty Gasoline Trucks	672	1 170	1 270	1 300	1 310	1 270	1 300	1 190
Heavy-Duty Gasoline Vehicles	164	89.8	113	110	112	110	114	108
Motorcycles	9.85	7.51	9.40	9.21	9.38	9.19	9.54	8.79
Light-Duty Diesel Vehicles	23.1	19.3	24.2	23.9	24.2	24.1	25.9	24.6
Light-Duty Diesel Trucks	23.3	47.1	50.3	52.4	52.5	50.4	51.7	46.4
Heavy-Duty Diesel Vehicles	635	851	975	985	1 040	1 020	1 000	974
Propane & Natural Gas Vehicles	7.5	4.2	4.2	4.9	5.1	5.1	5.5	5.4
Railways	70	70	100	100	100	200	100	100
Navigation (Domestic Marine)	610	670	770	860	590	650	480	420
Other Transportation	820	1 100	1 100	1 100	820	780	690	770
Off-Road Gasoline	330	410	320	270	280	200	260	130
Off-Road Diesel	490	650	780	760	500	520	380	560
Pipelines	-	-	30.0	34.3	46.9	61.7	58.4	77.1
c. Fugitive Sources²	1 220	378	133	132	127	131	135	122
Coal Mining	1 000	300	0.09	0.01	0.00	-	-	-
Oil and Natural Gas	50.0	128	133	132	127	131	135	122
INDUSTRIAL PROCESSES³	306	391	497	484	426	460	445	335
a. Mineral Products	180	220	230	230	200	210	210	94
Cement Production	170	220	230	230	200	210	210	92
Lime Production	-	-	-	-	-	-	-	-
Mineral Products Use	10	2.9	2.5	2.3	3.9	1.9	1.8	1.5
b. Chemical Industry	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	1.28	-	-	-	-	-	-
Iron and Steel Production	-	1.28	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	24	100	200	190	170	190	180	180
e. Other & Undifferentiated Production⁵	100	69	66	56	51	64	56	60
SOLVENT & OTHER PRODUCT USE	5.9	7.5	6.3	5.3	9.5	9.3	9.6	7.3
AGRICULTURE	450	440	430	420	410	390	380	370
a. Enteric Fermentation	190	180	170	170	160	160	160	150
b. Manure Management	91	89	84	84	82	80	75	71
c. Agriculture Soils	170	170	180	170	160	150	150	150
Direct Sources	82	81	90	83	80	74	74	74
Pasture, Range and Paddock Manure	18	18	17	17	17	16	16	15
Indirect Sources	70	70	70	70	60	60	60	60
d. Field Burning of Agricultural Residues	0.23	0.30	0.44	0.34	0.45	0.15	0.07	0.04
WASTE	740	690	600	530	490	460	470	440
a. Solid Waste Disposal on Land	700	660	570	500	460	430	440	410
b. Wastewater Handling	18	20	20	20	20	20	20	20
c. Waste Incineration	21	12	10	11	11	11	11	11

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–7 2009 GHG Emission Summary for Nova Scotia

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential Unit		CO ₂	CH ₄	CH ₄ 21 kt CO ₂ equivalent	N ₂ O	N ₂ O 310 kt CO ₂ equivalent	HFCs kt CO ₂ equivalent	PFCs kt CO ₂ equivalent	SF ₆ kt CO ₂ equivalent	TOTAL kt CO ₂ equivalent
TOTAL		19 400	43	900	1.7	510	160	-	18	21 000
ENERGY		19 200	14	300	1	300	-	-	-	19 800
a.	Stationary Combustion Sources	14 200	10	200	0.3	100	-	-	-	14 500
	Electricity and Heat Generation	9 700	0.34	7.2	0.1	40	-	-	-	9 750
	Fossil Fuel Production and Refining	1 280	2	40	0.02	5	-	-	-	1 300
	Mining & Oil and Gas Extraction	28.5	0.00	0.02	0.00	0.2	-	-	-	28.7
	Manufacturing Industries	529	0.08	2	0.06	20	-	-	-	548
	Construction	22.2	0.00	0.01	0.00	0.1	-	-	-	22.3
	Commercial & Institutional	1 660	0.02	0.4	0.03	10	-	-	-	1 670
	Residential	926	8	200	0.1	30	-	-	-	1 100
	Agriculture & Forestry	66.0	0.00	0.02	0.00	0.4	-	-	-	66.4
	b.	Transport ¹	4 930	0.6	10	0.7	200	-	-	-
	Civil Aviation (Domestic Aviation)	244	0.01	0.2	0.01	2	-	-	-	250
	Road Transportation	3 480	0.28	5.8	0.32	98	-	-	-	3 580
	Light-Duty Gasoline Vehicles	1 190	0.11	2.4	0.12	39	-	-	-	1 230
	Light-Duty Gasoline Trucks	1 140	0.11	2.4	0.13	39	-	-	-	1 190
	Heavy-Duty Gasoline Vehicles	105	0.00	0.09	0.01	2.6	-	-	-	108
	Motorcycles	8.68	0.00	0.06	0.00	0.05	-	-	-	8.79
	Light-Duty Diesel Vehicles	24.0	0.00	0.01	0.00	0.6	-	-	-	24.6
	Light-Duty Diesel Trucks	45.3	0.00	0.02	0.00	1	-	-	-	46.4
	Heavy-Duty Diesel Vehicles	957	0.04	0.9	0.05	20	-	-	-	974
	Propane & Natural Gas Vehicles	5.29	0.00	0.05	0.00	0.03	-	-	-	5.4
	Railways	121	0.01	0.1	0.05	20	-	-	-	100
	Navigation (Domestic Marine)	398	0.03	0.6	0.08	30	-	-	-	420
	Other Transportation	700	0.2	5	0.2	70	-	-	-	770
	Off-Road Gasoline	120	0.1	3	0.00	0.8	-	-	-	130
	Off-Road Diesel	500	0.03	0.6	0.2	60	-	-	-	560
	Pipelines	74.9	0.08	1.6	0.00	0.6	-	-	-	77.1
c.	Fugitive Sources ²	54	3.2	67	0.00	1	-	-	-	122
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	54.1	3.18	66.8	0.00	1	-	-	-	122
INDUSTRIAL PROCESSES ³		150	-	-	-	-	160	-	18	335
a.	Mineral Products	94	-	-	-	-	-	-	-	94
	Cement Production	92	-	-	-	-	-	-	-	92
	Lime Production	-	-	-	-	-	-	-	-	0
	Mineral Product Use	1.5	-	-	-	-	-	-	-	1.5
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
c.	Petrochemical Production ⁴	-	-	-	-	-	-	-	-	0
	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	160	-	18	180
e	Other & Undifferentiated Production ⁵	60	-	-	-	-	-	-	-	60
SOLVENT & OTHER PRODUCT USE		-	-	-	0.02	7.3	-	-	-	7.3
AGRICULTURE		-	9.0	190	0.57	180	-	-	-	370
a.	Enteric Fermentation	-	7.1	150	-	-	-	-	-	150
b.	Manure Management	-	2.0	41	0.10	30	-	-	-	71
c.	Agriculture Soils	-	-	-	0.47	150	-	-	-	150
	Direct Sources	-	-	-	0.24	74	-	-	-	74
	Pasture, Range and Paddock Manure	-	-	-	0.05	15	-	-	-	15
	Indirect Sources	-	-	-	0.2	60	-	-	-	60
d.	Field Burning of Agricultural Residues	-	0.00	0.03	0.00	0.01	-	-	-	0.04
WASTE		8.8	19	410	0.07	20	-	-	-	440
a.	Solid Waste Disposal on Land	-	19	410	-	-	-	-	-	410
b.	Wastewater Handling	-	0.05	1.1	0.06	20	-	-	-	20
c.	Waste Incineration	8.8	-	-	0.01	2	-	-	-	11

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-8 1990-2009 GHG Emission Summary for New Brunswick

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	16 000	20 400	21 800	21 800	19 300	19 800	19 200	18 400
ENERGY	14 800	19 000	20 200	20 400	17 800	18 400	17 900	17 100
a. Stationary Combustion Sources	10 700	13 500	14 500	14 700	12 300	13 000	12 800	12 200
Electricity and Heat Generation	5 970	8 790	8 890	9 100	7 280	7 400	7 490	6 940
Fossil Fuel Production and Refining	1 100	1 500	2 400	2 400	2 500	2 900	2 800	2 500
Mining & Oil and Gas Extraction	125	134	116	120	115	106	59.3	51.6
Manufacturing Industries	1 610	1 500	1 370	1 140	930	926	786	1 260
Construction	68.0	39.8	10.6	3.86	5.00	17.9	16.7	10.3
Commercial & Institutional	574	609	964	1 080	794	818	822	727
Residential	1 200	870	750	760	680	750	760	700
Agriculture & Forestry	52.4	63.7	29.7	24.4	24.2	27.8	26.7	17.1
b. Transport¹	4 050	5 410	5 470	5 450	5 320	5 220	4 880	4 630
Civil Aviation (Domestic Aviation)	140	120	120	130	120	110	110	110
Road Transportation	2 940	3 650	3 790	3 850	3 830	3 870	3 860	3 710
Light-Duty Gasoline Vehicles	1 310	1 140	1 100	1 060	1 060	1 060	1 060	1 030
Light-Duty Gasoline Trucks	651	1 090	1 180	1 210	1 200	1 210	1 210	1 100
Heavy-Duty Gasoline Vehicles	164	89.4	116	127	127	129	131	118
Motorcycles	7.04	6.77	10.4	10.4	10.5	10.6	10.8	9.57
Light-Duty Diesel Vehicles	14.8	11.8	13.5	13.2	13.2	13.5	14.1	13.6
Light-Duty Diesel Trucks	23.1	43.3	46.8	48.6	48.3	47.9	48.1	43.6
Heavy-Duty Diesel Vehicles	768	1 260	1 320	1 380	1 370	1 400	1 400	1 400
Propane & Natural Gas Vehicles	5.1	6.8	1.3	0.61	0.77	0.77	0.77	0.77
Railways	100	200	300	300	300	300	200	200
Navigation (Domestic Marine)	270	400	430	420	390	390	340	320
Other Transportation	580	1 000	850	780	710	580	340	250
Off-Road Gasoline	180	160	190	150	130	130	180	61
Off-Road Diesel	390	860	670	630	580	440	160	180
Pipelines	-	-	-	-	-	-	-	-
c. Fugitive Sources²	60.2	142	230	235	221	240	219	217
Coal Mining	1	0.6	0.3	0.4	0.3	0.4	0.2	0.4
Oil and Natural Gas	58.7	142	230	235	221	240	219	217
INDUSTRIAL PROCESSES³	165	314	440	389	369	356	376	423
a. Mineral Products	92	120	100	96	95	85	82	49
Cement Production	-	-	-	-	-	-	-	-
Lime Production	76	100	90	86	79	76	74	42
Mineral Products Use	16	20	11	11	16	8.9	8.2	7.2
b. Chemical Industry	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	0.74	68	130	140	130	140	130	140
e. Other & Undifferentiated Production⁵	72	120	210	160	140	130	160	230
SOLVENT & OTHER PRODUCT USE	4.8	6.0	5.1	4.2	7.5	7.4	7.6	5.8
AGRICULTURE	440	470	510	490	470	430	430	410
a. Enteric Fermentation	160	150	140	150	140	140	140	140
b. Manure Management	64	70	69	67	66	65	61	60
c. Agriculture Soils	220	250	300	280	250	230	230	210
Direct Sources	120	140	170	160	140	130	130	120
Pasture, Range and Paddock Manure	18	18	17	17	17	17	16	16
Indirect Sources	80	90	100	100	90	80	80	80
d. Field Burning of Agricultural Residues	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
WASTE	580	620	600	600	600	580	540	520
a. Solid Waste Disposal on Land	560	600	590	580	580	560	520	500
b. Wastewater Handling	16	18	17	17	18	18	17	17
c. Waste Incineration	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–9 2009 GHG Emission Summary for New Brunswick

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		16 800	44	930	1.8	550	140	-	0.52	18 400
ENERGY		16 500	13	260	0.9	300	-	-	-	17 100
a.	Stationary Combustion Sources	11 900	10	200	0.3	100	-	-	-	12 200
	Electricity and Heat Generation	6 900	0.26	5.4	0.1	30	-	-	-	6 940
	Fossil Fuel Production and Refining	2 520	0.04	0.9	0.01	3	-	-	-	2 500
	Mining & Oil and Gas Extraction	51.1	0.00	0.04	0.00	0.5	-	-	-	51.6
Manufacturing Industries		1 230	0.1	3	0.1	30	-	-	-	1 260
Construction		10.2	0.00	0.00	0.00	0.05	-	-	-	10.3
Commercial & Institutional		722	0.01	0.2	0.02	5	-	-	-	727
Residential		470	9	200	0.1	30	-	-	-	700
Agriculture & Forestry		17.0	0.00	0.00	0.00	0.09	-	-	-	17.1
b.	Transport ¹	4 440	0.4	8	0.6	200	-	-	-	4 630
	Civil Aviation (Domestic Aviation)	105	0.01	0.2	0.00	1	-	-	-	110
	Road Transportation	3 610	0.28	5.9	0.31	97	-	-	-	3 710
	Light-Duty Gasoline Vehicles	994	0.10	2.1	0.11	33	-	-	-	1 030
Light-Duty Gasoline Trucks		1 060	0.11	2.4	0.12	37	-	-	-	1 100
Heavy-Duty Gasoline Vehicles		115	0.00	0.10	0.01	2.8	-	-	-	118
Motorcycles		9.45	0.00	0.07	0.00	0.05	-	-	-	9.57
Light-Duty Diesel Vehicles		13.3	0.00	0.01	0.00	0.3	-	-	-	13.6
Light-Duty Diesel Trucks		42.5	0.00	0.02	0.00	1	-	-	-	43.6
Heavy-Duty Diesel Vehicles		1 370	0.06	1	0.07	20	-	-	-	1 400
Propane & Natural Gas Vehicles		0.76	0.00	0.01	0.00	0.00	-	-	-	0.77
Railways		215	0.01	0.2	0.09	30	-	-	-	200
Navigation (Domestic Marine)		285	0.02	0.3	0.1	30	-	-	-	320
Other Transportation		220	0.08	2	0.07	20	-	-	-	250
Off-Road Gasoline		59	0.07	1	0.00	0.4	-	-	-	61
Off-Road Diesel		160	0.01	0.2	0.07	20	-	-	-	180
Pipelines		-	-	-	-	-	-	-	-	0
c.	Fugitive Sources ²	160	2.4	51	0.01	4	-	-	-	217
	Coal Mining	-	0.02	0.4	-	-	-	-	-	0.4
	Oil and Natural Gas	162	2.39	50.3	0.01	4	-	-	-	217
INDUSTRIAL PROCESSES ³		280	-	-	-	-	140	-	0.52	423
a.	Mineral Products	49	-	-	-	-	-	-	-	49
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	42	-	-	-	-	-	-	-	42
Mineral Product Use		7.2	-	-	-	-	-	-	-	7.2
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
Petrochemical Production ⁴		-	-	-	-	-	-	-	-	0
c.	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
SF ₆ Used in Magnesium Smelters and Casters		-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	140	-	0.52	140
e	Other & Undifferentiated Production ⁵	230	-	-	-	-	-	-	-	230
SOLVENT & OTHER PRODUCT USE		-	-	-	0.02	5.8	-	-	-	5.8
AGRICULTURE		-	7.8	160	0.79	250	-	-	-	410
a.	Enteric Fermentation	-	6.4	140	-	-	-	-	-	140
b.	Manure Management	-	1.4	30	0.10	30	-	-	-	60
c.	Agriculture Soils	-	-	-	0.69	210	-	-	-	210
	Direct Sources	-	-	-	0.39	120	-	-	-	120
	Pasture, Range and Paddock Manure	-	-	-	0.05	16	-	-	-	16
Indirect Sources		-	-	-	0.3	80	-	-	-	80
d.	Field Burning of Agricultural Residues	-	0.00	0.01	0.00	0.00	-	-	-	0.02
WASTE		-	24	500	0.05	10	-	-	-	520
a.	Solid Waste Disposal on Land	-	24	500	-	-	-	-	-	500
b.	Wastewater Handling	-	0.09	1.9	0.05	10	-	-	-	17
c.	Waste Incineration	-	-	-	-	-	-	-	-	0

Notes:

- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 - Fugitive emissions from refineries are only reported at the national level.
 - Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 - The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 - Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15-10 1990-2009 GHG Emission Summary for Quebec

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	83 200	83 700	89 400	85 900	84 300	87 100	82 400	81 700
ENERGY	57 600	60 700	65 200	61 800	60 200	63 500	60 000	59 700
a. Stationary Combustion Sources	29 500	28 100	30 200	27 100	25 500	27 500	23 400	23 400
Electricity and Heat Generation	1 480	435	1 550	609	747	2 140	430	502
Fossil Fuel Production and Refining	3 300	3 300	3 500	3 600	3 700	3 800	3 500	3 500
Mining & Oil and Gas Extraction	734	926	449	227	246	239	698	528
Manufacturing Industries	12 200	11 400	11 400	10 200	9 790	9 730	7 670	6 690
Construction	456	187	318	289	263	258	248	283
Commercial & Institutional	4 210	5 650	6 830	6 750	5 950	6 180	6 170	7 720
Residential	6 800	5 900	5 800	5 100	4 600	4 900	4 400	3 900
Agriculture & Forestry	288	259	312	272	256	273	264	270
b. Transport¹	27 800	32 000	34 300	34 000	33 900	35 300	35 800	35 600
Civil Aviation (Domestic Aviation)	860	740	780	770	750	820	790	750
Road Transportation	20 600	24 900	27 400	27 600	27 500	27 900	27 200	27 100
Light-Duty Gasoline Vehicles	11 800	11 200	11 000	10 700	10 600	10 800	10 500	10 800
Light-Duty Gasoline Trucks	3 720	6 500	7 450	7 730	7 690	7 830	7 650	7 340
Heavy-Duty Gasoline Vehicles	578	539	837	858	863	889	880	871
Motorcycles	31.8	46.9	77.1	80.7	81.4	83.7	82.8	75.6
Light-Duty Diesel Vehicles	184	179	221	221	223	237	246	247
Light-Duty Diesel Trucks	192	357	351	360	359	367	361	354
Heavy-Duty Diesel Vehicles	3 980	6 080	7 480	7 670	7 670	7 720	7 470	7 320
Propane & Natural Gas Vehicles	110	36	39	34	29	33	29	26
Railways	600	800	800	700	800	900	900	800
Navigation (Domestic Marine)	1 400	1 400	1 400	1 300	1 200	1 200	1 500	1 300
Other Transportation	4 300	4 200	3 900	3 600	3 700	4 400	5 400	5 700
Off-Road Gasoline	1 400	1 300	1 600	1 400	1 100	1 600	1 100	1 400
Off-Road Diesel	2 900	2 800	2 100	1 900	2 300	2 600	4 100	4 000
Pipelines	25.8	107	249	335	284	268	255	227
c. Fugitive Sources²	381	610	721	731	731	762	740	734
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	381	610	721	731	731	762	740	734
INDUSTRIAL PROCESSES³	13 000	11 000	11 600	11 500	11 500	10 600	9 550	9 120
a. Mineral Products	1 800	1 900	1 900	1 900	2 000	1 900	1 700	1 400
Cement Production	1 300	1 200	1 200	1 300	1 400	1 400	1 300	1 000
Lime Production	270	430	490	460	430	420	400	360
Mineral Products Use	200	250	180	180	190	94	89	69
b. Chemical Industry	89	9.5	2.2	1.9	2.0	2.0	0.94	-
Nitric Acid Production	79.7	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	9.7	9.5	2.2	1.9	2.0	2.0	0.94	-
c. Metal Production	10 200	7 650	6 900	7 110	6 750	6 210	6 270	6 060
Iron and Steel Production	-	16.9	11.8	-	-	-	-	-
Aluminum Production	7 800	6 400	5 900	7 000	6 700	6 200	6 300	6 100
SF ₆ Used in Magnesium Smelters and Casters	2 370	1 230	950	75.1	81.3	14.1	-	-
d. Production and Consumption of Halocarbons	34	660	1 300	1 400	1 300	1 300	1 300	1 500
e. Other & Undifferentiated Production⁵	930	820	1 500	1 200	1 400	1 100	210	170
SOLVENT & OTHER PRODUCT USE	45	59	51	43	77	76	79	60
AGRICULTURE	7 200	7 000	7 400	7 300	7 000	7 600	7 500	7 300
a. Enteric Fermentation	2 500	2 400	2 500	2 500	2 400	2 400	2 400	2 300
b. Manure Management	1 200	1 300	1 300	1 300	1 300	1 300	1 200	1 200
c. Agriculture Soils	3 500	3 300	3 500	3 500	3 300	3 900	3 900	3 700
Direct Sources	2 000	1 800	2 000	1 900	1 800	2 300	2 200	2 100
Pasture, Range and Paddock Manure	250	250	270	270	260	250	250	250
Indirect Sources	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
d. Field Burning of Agricultural Residues	0.37	0.21	0.25	0.24	0.24	0.25	0.18	0.19
WASTE	5 300	5 100	5 100	5 200	5 500	5 300	5 300	5 500
a. Solid Waste Disposal on Land	4 900	4 800	4 800	4 900	5 200	4 900	4 900	5 200
b. Wastewater Handling	200	220	230	230	230	230	230	230
c. Waste Incineration	170	84	91	92	94	96	98	100

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–11 2009 GHG Emission Summary for Quebec

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		62 900	460	9 600	20	6 200	1 400	1 500	45	81 700
ENERGY		56 700	65	1 400	5	2 000	-	-	-	59 700
a.	Stationary Combustion Sources	22 300	40	800	1	300	-	-	-	23 400
	Electricity and Heat Generation	497	0.07	1.4	0.01	4	-	-	-	502
	Fossil Fuel Production and Refining	3 490	0.06	1	0.03	9	-	-	-	3 500
	Mining & Oil and Gas Extraction	526	0.01	0.2	0.01	2	-	-	-	528
Manufacturing Industries		6 590	0.4	9	0.3	100	-	-	-	6 690
Construction		281	0.01	0.1	0.01	2	-	-	-	283
Commercial & Institutional		7 670	0.1	3	0.1	50	-	-	-	7 720
Residential		2 990	40	800	0.5	100	-	-	-	3 900
Agriculture & Forestry		266	0.00	0.09	0.01	4	-	-	-	270
b.	Transport ¹	34 100	4	90	4	1 000	-	-	-	35 600
	Civil Aviation (Domestic Aviation)	736	0.08	2	0.03	8	-	-	-	750
	Road Transportation	26 300	2.1	44	2.4	730	-	-	-	27 100
	Light-Duty Gasoline Vehicles	10 500	0.99	21	1.1	330	-	-	-	10 800
Light-Duty Gasoline Trucks		7 080	0.70	15	0.78	240	-	-	-	7 340
Heavy-Duty Gasoline Vehicles		850	0.04	0.73	0.07	21	-	-	-	871
Motorcycles		74.7	0.03	0.54	0.00	0.42	-	-	-	75.6
Light-Duty Diesel Vehicles		241	0.01	0.1	0.02	6	-	-	-	247
Light-Duty Diesel Trucks		345	0.01	0.2	0.03	9	-	-	-	354
Heavy-Duty Diesel Vehicles		7 190	0.3	6	0.4	100	-	-	-	7 320
Propane & Natural Gas Vehicles		25.7	0.02	0.4	0.00	0.2	-	-	-	26
Railways		682	0.04	0.8	0.3	90	-	-	-	800
Navigation (Domestic Marine)		1 270	0.1	2	0.2	50	-	-	-	1 300
Other Transportation		5 100	2	40	2	500	-	-	-	5 700
Off-Road Gasoline		1 400	2	30	0.03	9	-	-	-	1 400
Off-Road Diesel		3 600	0.2	4	1	500	-	-	-	4 000
Pipelines		220	0.19	4.0	0.01	3	-	-	-	227
c.	Fugitive Sources ²	260	22	470	0.02	7	-	-	-	734
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	258	22.3	469	0.02	7	-	-	-	734
INDUSTRIAL PROCESSES ³		6 100	-	-	-	-	1 400	1 500	45	9 120
a.	Mineral Products	1 400	-	-	-	-	-	-	-	1 400
	Cement Production	1 000	-	-	-	-	-	-	-	1 000
	Lime Production	360	-	-	-	-	-	-	-	360
	Mineral Product Use	69	-	-	-	-	-	-	-	69
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
Petrochemical Production ⁴		-	-	-	-	-	-	-	-	0
c.	Metal Production	4 550	-	-	-	-	-	1 500	13.7	6 060
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	4 500	-	-	-	-	-	1 500	13.7	6 100
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	1 400	-	32	1 500
e.	Other & Undifferentiated Production ⁵	170	-	-	-	-	-	-	-	170
SOLVENT & OTHER PRODUCT USE		-	-	-	0.20	60	-	-	-	60
AGRICULTURE		-	140	3 000	14	4 300	-	-	-	7 300
a.	Enteric Fermentation	-	110	2 300	-	-	-	-	-	2 300
b.	Manure Management	-	33	700	1.7	520	-	-	-	1 200
c.	Agriculture Soils	-	-	-	12	3 700	-	-	-	3 700
	Direct Sources	-	-	-	6.8	2 100	-	-	-	2 100
	Pasture, Range and Paddock Manure	-	-	-	0.82	250	-	-	-	250
	Indirect Sources	-	-	-	4	1 000	-	-	-	1 000
d.	Field Burning of Agricultural Residues	-	0.01	0.14	0.00	0.05	-	-	-	0.19
WASTE		70	250	5 200	0.6	200	-	-	-	5 500
a.	Solid Waste Disposal on Land	-	250	5 200	-	-	-	-	-	5 200
b.	Wastewater Handling	-	3.7	78	0.5	200	-	-	-	230
c.	Waste Incineration	70	0.08	2	0.09	30	-	-	-	100

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-12 1990-2009 GHG Emission Summary for Ontario

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	177 000	204 000	201 000	202 000	194 000	200 000	190 000	165 000
ENERGY	130 000	164 000	158 000	160 000	151 000	158 000	148 000	130 000
a. Stationary Combustion Sources	80 700	102 000	94 200	94 300	87 400	95 300	86 200	69 700
Electricity and Heat Generation	24 400	41 700	30 600	33 600	28 200	31 600	27 200	15 300
Fossil Fuel Production and Refining	6 100	6 100	7 100	5 300	5 400	7 000	5 800	5 700
Mining & Oil and Gas Extraction	491	467	445	582	614	651	664	645
Manufacturing Industries	22 000	20 700	21 300	19 700	21 100	21 100	17 800	15 500
Construction	569	435	543	602	544	487	524	444
Commercial & Institutional	9 090	13 100	14 000	13 900	12 500	13 400	13 300	13 000
Residential	17 000	19 000	19 000	20 000	18 000	20 000	20 000	18 000
Agriculture & Forestry	770	893	963	957	950	1 210	1 140	945
b. Transport¹	47 800	60 000	61 600	64 000	61 700	60 800	59 900	58 200
Civil Aviation (Domestic Aviation)	2 300	2 300	2 300	2 200	2 200	2 200	2 200	2 100
Road Transportation	34 900	41 900	45 600	46 400	46 200	46 000	45 500	45 200
Light-Duty Gasoline Vehicles	18 600	16 600	16 500	16 100	16 100	15 800	15 700	16 500
Light-Duty Gasoline Trucks	7 470	13 400	15 600	16 400	16 200	16 000	15 900	15 400
Heavy-Duty Gasoline Vehicles	1 610	1 080	1 330	1 320	1 320	1 330	1 340	1 340
Motorcycles	43.9	39.4	63.7	65.1	65.6	65.6	66.1	62.0
Light-Duty Diesel Vehicles	150	157	192	195	196	211	228	241
Light-Duty Diesel Trucks	142	357	394	420	413	419	418	406
Heavy-Duty Diesel Vehicles	6 390	9 800	11 200	11 600	11 600	11 700	11 400	10 800
Propane & Natural Gas Vehicles	540	380	330	350	380	420	450	410
Railways	2 000	2 000	1 000	2 000	1 000	2 000	2 000	1 000
Navigation (Domestic Marine)	940	640	640	590	500	470	460	350
Other Transportation	7 800	14 000	12 000	13 000	11 000	11 000	10 000	9 400
Off-Road Gasoline	2 300	3 700	3 700	3 600	3 100	3 000	2 800	3 300
Off-Road Diesel	3 300	6 300	5 800	6 600	5 400	5 500	5 800	4 900
Pipelines	2 260	3 610	2 080	3 040	2 720	2 240	1 680	1 220
c. Fugitive Sources²	1 210	1 540	1 690	1 620	1 620	1 640	1 640	1 600
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	1 210	1 540	1 690	1 620	1 620	1 640	1 640	1 600
INDUSTRIAL PROCESSES³	30 700	24 100	26 200	25 300	25 000	24 300	24 900	18 200
a. Mineral Products	4 000	4 700	4 500	4 500	4 500	4 400	4 100	3 200
Cement Production	2 300	3 300	3 400	3 500	3 500	3 400	3 100	2 400
Lime Production	1 100	910	820	800	790	770	750	530
Mineral Products Use	600	480	210	220	240	170	260	240
b. Chemical Industry	11 000	1 000	3 200	2 800	1 300	1 600	2 500	760
Nitric Acid Production	99.4	88.8	101	67.2	78.9	74.9	64.3	68.1
Adipic Acid Production	11 000	900	3 100	2 600	1 200	1 500	2 400	660
Petrochemical Production ⁴	55	40	45	37	40	41	38	33
c. Metal Production	10 900	12 900	11 600	11 300	12 300	11 500	11 000	7 820
Iron and Steel Production	10 200	11 400	10 400	10 100	11 000	11 000	10 600	7 650
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	720	1 520	1 210	1 180	1 270	478	424	172
d. Production and Consumption of Halocarbons	850	1 300	2 300	2 400	2 300	2 400	2 300	2 600
e. Other & Undifferentiated Production⁵	4 100	4 100	4 500	4 300	4 500	4 500	4 900	3 800
SOLVENT & OTHER PRODUCT USE	66	94	84	71	130	130	130	100
AGRICULTURE	10 000	9 500	9 900	9 600	10 000	10 000	9 600	10 000
a. Enteric Fermentation	3 400	3 200	3 300	3 200	3 100	3 000	2 900	2 800
b. Manure Management	1 600	1 600	1 700	1 700	1 600	1 600	1 500	1 400
c. Agriculture Soils	5 100	4 700	5 000	4 700	5 600	5 400	5 200	5 800
Direct Sources	2 900	2 700	2 900	2 700	3 300	3 200	3 100	3 500
Pasture, Range and Paddock Manure	290	290	300	290	280	270	270	250
Indirect Sources	2 000	2 000	2 000	2 000	2 000	2 000	2 000	2 000
d. Field Burning of Agricultural Residues	3.4	1.4	0.55	0.51	0.51	0.43	0.36	0.40
WASTE	6 000	6 600	7 100	7 300	7 500	7 400	7 300	7 300
a. Solid Waste Disposal on Land	5 500	6 100	6 600	6 800	7 000	6 900	6 800	6 700
b. Wastewater Handling	360	430	450	460	460	470	470	470
c. Waste Incineration	130	73	52	55	58	61	65	68

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–13 2009 GHG Emission Summary for Ontario

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential Unit		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		139 000	600	13 000	33	10 000	2 500	-	-	165 000
ENERGY		125 000	100	2 100	9	3 000	-	-	-	130 000
a.	Stationary Combustion Sources	68 600	30	600	2	500	-	-	-	69 700
	Electricity and Heat Generation	15 100	1.4	30	0.3	90	-	-	-	15 300
	Fossil Fuel Production and Refining	5 680	0.08	2	0.02	7	-	-	-	5 700
	Mining & Oil and Gas Extraction	637	0.01	0.2	0.03	8	-	-	-	645
	Manufacturing Industries	15 300	0.6	10	0.5	100	-	-	-	15 500
	Construction	440	0.01	0.2	0.01	4	-	-	-	444
	Commercial & Institutional	12 900	0.2	5	0.3	80	-	-	-	13 000
	Residential	17 500	30	500	0.6	200	-	-	-	18 000
	Agriculture & Forestry	936	0.02	0.4	0.03	8	-	-	-	945
	b.	Transport ¹	55 900	9	200	7	2 000	-	-	-
	Civil Aviation (Domestic Aviation)	2 060	0.07	2	0.06	20	-	-	-	2 100
	Road Transportation	43 700	3.7	77	4.5	1 400	-	-	-	45 200
	Light-Duty Gasoline Vehicles	15 900	1.4	29	1.9	590	-	-	-	16 500
	Light-Duty Gasoline Trucks	14 800	1.2	26	1.8	560	-	-	-	15 400
	Heavy-Duty Gasoline Vehicles	1 310	0.06	1.1	0.11	34	-	-	-	1 340
	Motorcycles	60.9	0.03	0.67	0.00	0.37	-	-	-	62.0
	Light-Duty Diesel Vehicles	235	0.01	0.1	0.02	6	-	-	-	241
	Light-Duty Diesel Trucks	396	0.01	0.2	0.03	10	-	-	-	406
	Heavy-Duty Diesel Vehicles	10 600	0.4	9	0.6	200	-	-	-	10 800
	Propane & Natural Gas Vehicles	397	0.5	10	0.01	3	-	-	-	410
	Railways	1 150	0.06	1	0.5	100	-	-	-	1 000
	Navigation (Domestic Marine)	329	0.02	0.5	0.06	20	-	-	-	350
	Other Transportation	8 700	5	100	2	600	-	-	-	9 400
	Off-Road Gasoline	3 200	4	80	0.07	20	-	-	-	3 300
	Off-Road Diesel	4 300	0.2	5	2	600	-	-	-	4 900
	Pipelines	1 180	1.2	25	0.03	10	-	-	-	1 220
c.	Fugitive Sources ²	250	64	1 300	0.02	6	-	-	-	1 600
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	247	64.1	1 350	0.02	6	-	-	-	1 600
INDUSTRIAL PROCESSES ³		15 000	1.3	28	2.37	735	2 500	-	230	18 200
a.	Mineral Products	3 200	-	-	-	-	-	-	-	3 200
	Cement Production	2 400	-	-	-	-	-	-	-	2 400
	Lime Production	530	-	-	-	-	-	-	-	530
	Mineral Product Use	240	-	-	-	-	-	-	-	240
b.	Chemical Industry	-	1.3	28	2.37	735	-	-	-	760
	Nitric Acid Production	-	-	-	0.22	68.1	-	-	-	68.1
	Adipic Acid Production	-	-	-	2.1	660	-	-	-	660
	Petrochemical Production ⁴	-	1.3	28	0.02	5.5	-	-	-	33
c.	Metal Production	7 650	-	-	-	-	-	-	172	7 820
	Iron and Steel Production	7 650	-	-	-	-	-	-	-	7 650
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	172	172
d.	Production and Consumption of Halocarbons	-	-	-	-	-	2 500	-	63	2 600
e	Other & Undifferentiated Production ⁵	3 800	-	-	-	-	-	-	-	3 800
SOLVENT & OTHER PRODUCT USE		-	-	-	0.33	100	-	-	-	100
AGRICULTURE		-	160	3 400	21	6 600	-	-	-	10 000
a.	Enteric Fermentation	-	130	2 800	-	-	-	-	-	2 800
b.	Manure Management	-	31	650	2.6	790	-	-	-	1 400
c.	Agriculture Soils	-	-	-	19	5 800	-	-	-	5 800
	Direct Sources	-	-	-	11	3 500	-	-	-	3 500
	Pasture, Range and Paddock Manure	-	-	-	0.82	250	-	-	-	250
	Indirect Sources	-	-	-	6	2 000	-	-	-	2 000
d.	Field Burning of Agricultural Residues	-	0.01	0.29	0.00	0.11	-	-	-	0.40
WASTE		56	330	6 900	0.9	300	-	-	-	7 300
a.	Solid Waste Disposal on Land	-	320	6 700	-	-	-	-	-	6 700
b.	Wastewater Handling	-	10	210	0.8	300	-	-	-	470
c.	Waste Incineration	56	-	-	0.04	10	-	-	-	68

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-14 1990-2009 GHG Emission Summary for Manitoba

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	18 500	21 200	21 200	20 900	21 000	21 500	21 600	20 300
ENERGY	12 300	13 100	12 600	12 700	12 300	13 000	12 900	12 000
a. Stationary Combustion Sources	4 750	5 360	4 670	4 580	4 210	4 590	4 780	4 350
Electricity and Heat Generation	497	1 030	397	529	392	474	439	159
Fossil Fuel Production and Refining	1.1	0.56	0.63	0.46	2.5	0.46	0.46	0.31
Mining & Oil and Gas Extraction	73.5	29.2	105	114	112	135	152	132
Manufacturing Industries	1 050	1 140	1 210	1 250	1 330	1 340	1 400	1 400
Construction	63.1	61.7	82.1	84.9	90.9	102	98.4	75.1
Commercial & Institutional	1 400	1 670	1 580	1 450	1 290	1 410	1 500	1 440
Residential	1 600	1 400	1 200	1 100	950	1 100	1 100	1 100
Agriculture & Forestry	41.9	62.7	55.3	44.9	46.7	55.1	60.4	52.2
b. Transport¹	7 140	7 240	7 370	7 580	7 490	7 750	7 490	7 020
Civil Aviation (Domestic Aviation)	480	550	570	570	560	580	560	510
Road Transportation	3 750	4 400	4 820	4 670	4 950	5 230	5 130	5 180
Light-Duty Gasoline Vehicles	1 610	1 310	1 260	1 140	1 230	1 260	1 180	1 270
Light-Duty Gasoline Trucks	847	1 480	1 690	1 620	1 750	1 790	1 690	1 670
Heavy-Duty Gasoline Vehicles	341	211	248	228	249	258	247	264
Motorcycles	7.08	4.39	8.75	8.20	8.96	9.26	8.85	8.24
Light-Duty Diesel Vehicles	14.5	10.6	12.0	10.9	12.1	12.8	12.7	13.0
Light-Duty Diesel Trucks	40.1	90.1	101	99.7	109	112	108	102
Heavy-Duty Diesel Vehicles	828	1 260	1 480	1 550	1 570	1 770	1 860	1 830
Propane & Natural Gas Vehicles	61	36	21	14	15	18	20	17
Railways	600	300	300	300	200	200	200	200
Navigation (Domestic Marine)	0.02	-	0.11	-	-	0.32	-	-
Other Transportation	2 300	2 000	1 700	2 100	1 700	1 700	1 600	1 100
Off-Road Gasoline	460	440	400	370	330	390	340	290
Off-Road Diesel	1 000	720	890	1 100	870	900	970	710
Pipelines	841	822	429	596	535	426	244	102
c. Fugitive Sources²	386	512	537	557	610	626	623	642
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	386	512	537	557	610	626	623	642
INDUSTRIAL PROCESSES³	518	683	714	786	758	774	673	733
a. Mineral Products	210	76	66	62	57	55	54	48
Cement Production	140	-	-	-	-	-	-	-
Lime Production	58	69	62	59	54	53	51	46
Mineral Products Use	9.1	6.7	3.5	3.0	3.3	2.6	3.5	2.7
b. Chemical Industry	20	44	50	54	50	47	-	52
Nitric Acid Production	20.1	44.2	50.4	53.7	50.2	47.5	-	51.9
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	4.5	130	230	240	220	230	220	240
e. Other & Undifferentiated Production⁵	280	440	370	430	430	440	400	390
SOLVENT & OTHER PRODUCT USE	7.1	9.2	7.9	6.7	12	12	12	9.4
AGRICULTURE	5 100	6 700	7 100	6 500	7 100	6 900	7 200	6 700
a. Enteric Fermentation	1 300	1 800	2 200	2 200	2 200	2 000	2 000	1 900
b. Manure Management	370	560	670	690	700	650	620	600
c. Agriculture Soils	3 300	4 200	4 200	3 600	4 100	4 200	4 500	4 100
Direct Sources	1 800	2 200	2 100	1 700	2 000	2 100	2 300	2 100
Pasture, Range and Paddock Manure	310	460	540	550	550	510	510	470
Indirect Sources	1 000	2 000	2 000	1 000	2 000	2 000	2 000	2 000
d. Field Burning of Agricultural Residues	130	75	17	12	19	16	21	19
WASTE	600	760	810	820	840	850	860	870
a. Solid Waste Disposal on Land	570	730	780	800	810	820	830	840
b. Wastewater Handling	22	25	26	26	26	27	26	27
c. Waste Incineration	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–15 2009 GHG Emission Summary for Manitoba

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	kt CO ₂ equivalent	kt	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		11 500	180	3 800	15	4 800	240	-	3.1	20 300
ENERGY		11 100	31	660	0.9	300	-	-	-	12 000
a.	Stationary Combustion Sources	4 250	3	60	0.1	40	-	-	-	4 350
	Electricity and Heat Generation	158	0.00	0.09	0.00	0.9	-	-	-	159
	Fossil Fuel Production and Refining	0.30	0.00	0.00	0.00	0.01	-	-	-	0.31
	Mining & Oil and Gas Extraction	130	0.00	0.04	0.01	3	-	-	-	133
	Manufacturing Industries	1 380	0.05	1	0.04	10	-	-	-	1 400
	Construction	74.6	0.00	0.03	0.00	0.5	-	-	-	75.1
	Commercial & Institutional	1 430	0.03	0.6	0.03	10	-	-	-	1 440
	Residential	1 020	3	60	0.05	20	-	-	-	1 100
	Agriculture & Forestry	51.1	0.00	0.02	0.00	1	-	-	-	52.2
	Transport ¹	6 750	0.9	20	0.8	200	-	-	-	7 020
Civil Aviation (Domestic Aviation)		505	0.03	0.5	0.02	5	-	-	-	510
Road Transportation		5 040	0.41	8.7	0.43	130	-	-	-	5 180
Light-Duty Gasoline Vehicles		1 230	0.13	2.7	0.13	40	-	-	-	1 270
Light-Duty Gasoline Trucks		1 610	0.17	3.6	0.18	55	-	-	-	1 670
Heavy-Duty Gasoline Vehicles		258	0.01	0.27	0.02	5.8	-	-	-	264
Motorcycles		8.14	0.00	0.06	0.00	0.05	-	-	-	8.24
Light-Duty Diesel Vehicles		12.7	0.00	0.01	0.00	0.3	-	-	-	13.0
Light-Duty Diesel Trucks		99.6	0.00	0.05	0.01	3	-	-	-	102
Heavy-Duty Diesel Vehicles		1 800	0.08	2	0.1	30	-	-	-	1 830
Propane & Natural Gas Vehicles		16.8	0.02	0.3	0.00	0.1	-	-	-	17
Railways		203	0.01	0.2	0.08	30	-	-	-	200
Navigation (Domestic Marine)		-	-	-	-	-	-	-	-	0
Other Transportation		1 000	0.5	10	0.3	80	-	-	-	1 100
Off-Road Gasoline		280	0.3	7	0.01	2	-	-	-	290
Off-Road Diesel		630	0.03	0.7	0.3	80	-	-	-	710
Pipelines		98.7	0.10	2.1	0.00	0.8	-	-	-	102
c.	Fugitive Sources ²	60	28	580	-	-	-	-	-	642
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	59.6	27.7	582	-	-	-	-	-	642
INDUSTRIAL PROCESSES ³		440	-	-	0.17	51.9	240	-	3.1	733
a.	Mineral Products	48	-	-	-	-	-	-	-	48
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	46	-	-	-	-	-	-	-	46
	Mineral Product Use	2.7	-	-	-	-	-	-	-	2.7
b.	Chemical Industry	-	-	-	0.17	51.9	-	-	-	52
	Nitric Acid Production	-	-	-	0.17	51.9	-	-	-	51.9
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
c.	Petrochemical Production ⁴	-	-	-	-	-	-	-	-	0
	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
d.	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
	Production and Consumption of Halocarbons	-	-	-	-	-	240	-	3.1	240
e	Other & Undifferentiated Production ⁵	390	-	-	-	-	-	-	-	390
SOLVENT & OTHER PRODUCT USE		-	-	-	0.03	9.4	-	-	-	9.4
AGRICULTURE		-	110	2 200	14	4 400	-	-	-	6 700
a.	Enteric Fermentation	-	91	1 900	-	-	-	-	-	1 900
b.	Manure Management	-	16	330	0.87	270	-	-	-	600
c.	Agriculture Soils	-	-	-	13	4 100	-	-	-	4 100
	Direct Sources	-	-	-	6.8	2 100	-	-	-	2 100
	Pasture, Range and Paddock Manure	-	-	-	1.5	470	-	-	-	470
	Indirect Sources	-	-	-	5	2 000	-	-	-	2 000
d.	Field Burning of Agricultural Residues	-	0.67	14	0.02	5.4	-	-	-	19
WASTE		-	40	850	0.08	20	-	-	-	870
a.	Solid Waste Disposal on Land	-	40	840	-	-	-	-	-	840
b.	Wastewater Handling	-	0.12	2.5	0.08	20	-	-	-	27
c.	Waste Incineration	-	-	-	-	-	-	-	-	0

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-16 1990-2009 GHG Emission Summary for Saskatchewan

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	43 300	65 700	70 700	71 300	70 400	72 700	73 600	73 100
ENERGY	34 500	52 700	56 400	56 500	56 300	58 600	58 500	58 700
a. Stationary Combustion Sources	19 700	26 300	29 100	28 300	27 500	28 100	28 400	29 300
Electricity and Heat Generation	10 600	14 100	16 200	15 100	14 400	15 300	14 900	14 800
Fossil Fuel Production and Refining	3 800	5 300	6 300	6 600	6 300	6 200	6 400	6 400
Mining & Oil and Gas Extraction	971	2 060	2 050	2 350	2 380	2 500	2 500	3 560
Manufacturing Industries	906	942	680	635	584	562	589	531
Construction	70.0	48.7	41.2	40.7	43.3	63.9	72.3	48.8
Commercial & Institutional	980	1 660	1 760	1 700	1 730	1 580	1 900	1 930
Residential	2 100	1 900	1 700	1 600	1 700	1 600	1 700	1 800
Agriculture & Forestry	294	271	270	254	245	232	227	234
b. Transport¹	9 250	11 000	10 300	11 500	11 800	13 800	13 900	14 200
Civil Aviation (Domestic Aviation)	260	210	180	190	190	200	210	200
Road Transportation	4 060	5 550	5 890	5 870	6 190	6 480	6 840	7 010
Light-Duty Gasoline Vehicles	1 220	1 280	1 180	1 090	1 160	1 210	1 280	1 400
Light-Duty Gasoline Trucks	893	1 720	1 870	1 820	1 950	2 030	2 140	2 170
Heavy-Duty Gasoline Vehicles	589	358	390	361	390	410	436	471
Motorcycles	2.25	5.89	7.24	7.35	7.94	8.34	8.87	8.77
Light-Duty Diesel Vehicles	10.0	10.2	11.9	11.3	12.2	13.6	14.7	15.5
Light-Duty Diesel Trucks	57.9	201	229	235	253	278	291	287
Heavy-Duty Diesel Vehicles	1 220	1 940	2 190	2 330	2 410	2 510	2 660	2 650
Propane & Natural Gas Vehicles	65	27	17	11	10	10	11	12
Railways	600	400	200	400	400	200	500	500
Navigation (Domestic Marine)	0.10	0.02	0.01	-	-	-	-	-
Other Transportation	4 300	4 800	4 100	5 000	5 000	6 900	6 400	6 500
Off-Road Gasoline	1 200	660	750	920	1 000	1 000	1 200	1 400
Off-Road Diesel	1 600	1 800	1 900	2 200	2 400	3 100	2 700	2 900
Pipelines	1 580	2 320	1 390	1 880	1 580	2 800	2 480	2 270
c. Fugitive Sources²	5 600	15 400	17 000	16 700	17 100	16 600	16 200	15 200
Coal Mining	10	10	10	10	10	10	10	10
Oil and Natural Gas	5 590	15 300	17 000	16 700	17 000	16 600	16 200	15 200
INDUSTRIAL PROCESSES³	299	1 400	1 670	1 640	1 710	1 640	1 680	1 610
a. Mineral Products	95	13	6.9	6.4	8.4	4.8	6.0	4.7
Cement Production	83	-	-	-	-	-	-	-
Lime Production	-	-	-	-	-	-	-	-
Mineral Products Use	12	13	6.9	6.4	8.4	4.8	6.0	4.7
b. Chemical Industry	-	-	28	13	14	13	15	10
Nitric Acid Production	-	-	27.7	12.7	13.6	13.0	15.2	10.2
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	1.8	110	220	220	210	230	220	240
e. Other & Undifferentiated Production⁵	200	1 300	1 400	1 400	1 500	1 400	1 400	1 400
SOLVENT & OTHER PRODUCT USE	6.5	8.1	6.7	5.6	10	9.9	10	7.9
AGRICULTURE	7 900	11 000	12 000	12 000	12 000	12 000	13 000	12 000
a. Enteric Fermentation	2 200	3 100	3 900	4 100	4 000	3 900	3 900	3 700
b. Manure Management	620	890	1 100	1 100	1 100	1 100	1 100	1 000
c. Agriculture Soils	5 000	6 900	6 900	7 200	6 500	6 700	7 800	7 400
Direct Sources	2 900	3 800	3 600	3 800	3 300	3 500	4 100	3 900
Pasture, Range and Paddock Manure	390	590	720	760	750	730	720	690
Indirect Sources	2 000	2 000	3 000	3 000	2 000	3 000	3 000	3 000
d. Field Burning of Agricultural Residues	64	41	13	27	23	18	23	24
WASTE	550	660	690	700	710	710	710	710
a. Solid Waste Disposal on Land	530	640	670	680	690	690	690	690
b. Wastewater Handling	20	22	22	21	21	22	22	22
c. Waste Incineration	0.52	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–17 2009 GHG Emission Summary for Saskatchewan

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential <i>Unit</i>		CO ₂	CH ₄	CH ₄ 21 kt CO ₂ equivalent	N ₂ O	N ₂ O 310 kt CO ₂ equivalent	HFCs kt CO ₂ equivalent	PFCs kt CO ₂ equivalent	SF ₆ kt CO ₂ equivalent	TOTAL kt CO ₂ equivalent
		kt	kt		kt					
TOTAL		45 000	900	19 000	29	9 000	240	-	0.61	73 100
ENERGY		43 700	680	14 000	3	800	-	-	-	58 700
a.	Stationary Combustion Sources	28 700	20	300	0.7	200	-	-	-	29 300
	Electricity and Heat Generation	14 700	0.71	15	0.3	100	-	-	-	14 800
	Fossil Fuel Production and Refining	6 070	10	300	0.1	40	-	-	-	6 400
	Mining & Oil and Gas Extraction	3 530	0.07	1	0.08	30	-	-	-	3 560
	Manufacturing Industries	528	0.01	0.3	0.01	3	-	-	-	531
	Construction	48.5	0.00	0.02	0.00	0.3	-	-	-	48.8
	Commercial & Institutional	1 920	0.04	0.8	0.04	10	-	-	-	1 930
	Residential	1 730	2	40	0.05	20	-	-	-	1 800
	Agriculture & Forestry	232	0.01	0.1	0.01	1	-	-	-	234
	b.	Transport ¹	13 500	5	100	2	600	-	-	-
	Civil Aviation (Domestic Aviation)	196	0.02	0.3	0.01	2	-	-	-	200
	Road Transportation	6 820	0.59	12	0.58	180	-	-	-	7 010
	Light-Duty Gasoline Vehicles	1 350	0.17	3.5	0.15	46	-	-	-	1 400
	Light-Duty Gasoline Trucks	2 090	0.26	5.5	0.24	74	-	-	-	2 170
	Heavy-Duty Gasoline Vehicles	461	0.03	0.62	0.03	9.9	-	-	-	471
	Motorcycles	8.65	0.00	0.07	0.00	0.05	-	-	-	8.77
	Light-Duty Diesel Vehicles	15.1	0.00	0.01	0.00	0.4	-	-	-	15.5
	Light-Duty Diesel Trucks	279	0.01	0.1	0.02	7	-	-	-	287
	Heavy-Duty Diesel Vehicles	2 600	0.1	2	0.1	40	-	-	-	2 650
	Propane & Natural Gas Vehicles	11.9	0.01	0.3	0.00	0.08	-	-	-	12
	Railways	424	0.02	0.5	0.2	50	-	-	-	500
	Navigation (Domestic Marine)	-	-	-	-	-	-	-	-	0
	Other Transportation	6 100	4	90	1	400	-	-	-	6 500
	Off-Road Gasoline	1 300	2	30	0.03	9	-	-	-	1 400
	Off-Road Diesel	2 600	0.1	3	1	300	-	-	-	2 900
	Pipelines	2 210	2.3	48	0.06	20	-	-	-	2 270
c.	Fugitive Sources ²	1 400	660	14 000	0.02	6	-	-	-	15 200
	Coal Mining	-	0.6	10	-	-	-	-	-	10
	Oil and Natural Gas	1 410	655	13 800	0.02	6	-	-	-	15 200
INDUSTRIAL PROCESSES ³		1 400	-	-	0.03	10.2	240	-	0.61	1 610
a.	Mineral Products	4.7	-	-	-	-	-	-	-	4.7
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	-	-	-	-	-	-	-	-	0
	Mineral Product Use	4.7	-	-	-	-	-	-	-	4.7
b.	Chemical Industry	-	-	-	0.03	10.2	-	-	-	10
	Nitric Acid Production	-	-	-	0.03	10.2	-	-	-	10.2
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
	Petrochemical Production ⁴	-	-	-	-	-	-	-	-	0
c.	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	240	-	0.61	240
e	Other & Undifferentiated Production ⁵	1 400	-	-	-	-	-	-	-	1 400
SOLVENT & OTHER PRODUCT USE		-	-	-	0.03	7.9	-	-	-	7.9
AGRICULTURE		-	190	3 900	26	8 100	-	-	-	12 000
a.	Enteric Fermentation	-	180	3 700	-	-	-	-	-	3 700
b.	Manure Management	-	11	240	2.5	760	-	-	-	1 000
c.	Agriculture Soils	-	-	-	24	7 400	-	-	-	7 400
	Direct Sources	-	-	-	13	3 900	-	-	-	3 900
	Pasture, Range and Paddock Manure	-	-	-	2.2	690	-	-	-	690
	Indirect Sources	-	-	-	9	3 000	-	-	-	3 000
d.	Field Burning of Agricultural Residues	-	0.84	18	0.02	6.8	-	-	-	24
WASTE		-	33	690	0.07	20	-	-	-	710
a.	Solid Waste Disposal on Land	-	33	690	-	-	-	-	-	690
b.	Wastewater Handling	-	0.06	1.3	0.07	20	-	-	-	22
c.	Waste Incineration	-	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-18 1990-2009 GHG Emission Summary for Alberta

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	171 000	224 000	237 000	231 000	235 000	247 000	244 000	234 000
ENERGY	148 000	194 000	203 000	198 000	203 000	213 000	211 000	203 000
a. Stationary Combustion Sources	96 300	125 000	133 000	127 000	129 000	140 000	138 000	132 000
Electricity and Heat Generation	39 000	48 700	52 100	51 700	52 800	53 600	53 400	48 300
Fossil Fuel Production and Refining	32 000	44 000	45 000	40 000	40 000	42 000	42 000	36 000
Mining & Oil and Gas Extraction	2 710	6 680	12 500	13 200	14 200	20 400	20 300	23 400
Manufacturing Industries	10 400	11 500	9 030	8 480	8 330	8 850	7 970	10 300
Construction	237	174	159	167	188	191	145	120
Commercial & Institutional	5 020	5 360	6 180	5 540	5 330	5 490	5 570	5 620
Residential	6 700	8 400	8 200	7 500	7 600	9 000	8 800	8 600
Agriculture & Forestry	475	365	269	238	237	273	381	404
b. Transport¹	22 100	29 500	32 500	33 500	36 300	37 400	37 100	35 200
Civil Aviation (Domestic Aviation)	1 100	1 300	1 300	1 400	1 400	1 500	1 500	1 400
Road Transportation	13 500	16 600	18 900	19 500	20 600	21 300	21 200	21 200
Light-Duty Gasoline Vehicles	4 500	3 750	3 610	3 550	3 670	3 770	3 750	3 920
Light-Duty Gasoline Trucks	3 300	5 540	6 390	6 630	6 840	7 020	6 980	6 700
Heavy-Duty Gasoline Vehicles	1 600	1 200	1 650	1 660	1 740	1 800	1 820	1 830
Motorcycles	24.3	27.1	35.9	36.8	38.4	39.9	40.2	38.6
Light-Duty Diesel Vehicles	32.1	23.4	30.5	30.6	31.8	33.6	35.0	35.2
Light-Duty Diesel Trucks	174	463	571	619	635	648	646	603
Heavy-Duty Diesel Vehicles	3 190	5 310	6 410	6 890	7 470	7 860	7 850	7 990
Propane & Natural Gas Vehicles	630	270	190	120	150	120	110	110
Railways	2 000	2 000	2 000	2 000	3 000	3 000	3 000	3 000
Navigation (Domestic Marine)	0.32	0.00	0.01	-	-	-	-	-
Other Transportation	5 700	9 900	9 800	10 000	12 000	11 000	11 000	9 300
Off-Road Gasoline	1 500	1 400	1 100	1 000	1 000	1 100	930	620
Off-Road Diesel	2 900	5 700	5 600	6 000	6 800	8 100	8 600	7 200
Pipelines	1 290	2 700	3 160	3 190	3 680	2 210	1 850	1 550
c. Fugitive Sources²	29 600	39 000	37 700	37 100	37 400	36 300	35 800	35 700
Coal Mining	200	200	100	200	200	200	200	200
Oil and Natural Gas	29 400	38 800	37 600	36 900	37 200	36 000	35 500	35 400
INDUSTRIAL PROCESSES³	8 390	11 100	14 000	13 800	13 800	14 200	13 500	12 000
a. Mineral Products	1 000	1 300	1 300	1 300	1 200	1 300	1 200	940
Cement Production	740	960	1 000	1 000	1 000	1 100	1 000	760
Lime Production	100	150	130	120	110	110	100	94
Mineral Products Use	150	170	130	130	100	81	83	88
b. Chemical Industry	860	1 100	1 100	1 200	1 100	1 000	1 200	1 000
Nitric Acid Production	813	1 100	1 050	1 120	1 090	996	1 150	1 020
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	42	47	50	40	39	38	35	30
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	1.7	380	760	810	780	830	830	920
e. Other & Undifferentiated Production⁵	6 500	8 300	11 000	11 000	11 000	11 000	10 000	9 100
SOLVENT & OTHER PRODUCT USE	16	24	22	19	35	35	37	28
AGRICULTURE	13 000	18 000	17 000	18 000	17 000	18 000	18 000	17 000
a. Enteric Fermentation	5 400	7 700	7 900	8 200	7 900	7 900	7 600	7 200
b. Manure Management	1 400	1 900	1 900	2 000	2 000	1 900	1 900	1 800
c. Agriculture Soils	6 400	7 900	7 700	7 700	7 400	7 700	8 300	7 500
Direct Sources	3 500	3 900	3 800	3 800	3 600	3 800	4 200	3 700
Pasture, Range and Paddock Manure	740	1 200	1 200	1 300	1 200	1 200	1 200	1 100
Indirect Sources	2 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000
d. Field Burning of Agricultural Residues	3.9	0.22	0.35	0.66	0.50	0.19	0.40	0.34
WASTE	1 300	1 400	1 600	1 700	1 600	1 600	1 700	1 700
a. Solid Waste Disposal on Land	1 200	1 400	1 500	1 600	1 500	1 600	1 600	1 600
b. Wastewater Handling	58	75	81	83	85	88	88	90
c. Waste Incineration	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–19 2009 GHG Emission Summary for Alberta

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		184 000	1 700	36 000	40	12 000	920	-	2.2	234 000
ENERGY		174 000	1 200	26 000	8	3 000	-	-	-	203 000
a.	Stationary Combustion Sources	130 000	60	1 000	3	800	-	-	-	132 000
	Electricity and Heat Generation	48 000	1.8	37	0.9	300	-	-	-	48 300
	Fossil Fuel Production and Refining	34 300	60	1 000	0.6	200	-	-	-	36 000
	Mining & Oil and Gas Extraction	23 300	0.4	9	0.5	100	-	-	-	23 400
	Manufacturing Industries	10 200	0.4	8	0.3	100	-	-	-	10 300
	Construction	118	0.00	0.04	0.01	2	-	-	-	120
	Commercial & Institutional	5 580	0.1	2	0.1	40	-	-	-	5 620
	Residential	8 510	1	30	0.2	50	-	-	-	8 600
	Agriculture & Forestry	402	0.01	0.2	0.01	2	-	-	-	404
	b.	Transport ¹	33 300	4	90	6	2 000	-	-	-
	Civil Aviation (Domestic Aviation)	1 390	0.07	1	0.04	10	-	-	-	1 400
	Road Transportation	20 700	1.6	33	1.7	520	-	-	-	21 200
	Light-Duty Gasoline Vehicles	3 800	0.40	8.4	0.39	120	-	-	-	3 920
	Light-Duty Gasoline Trucks	6 490	0.66	14	0.65	200	-	-	-	6 700
	Heavy-Duty Gasoline Vehicles	1 780	0.07	1.5	0.14	44	-	-	-	1 830
	Motorcycles	38.1	0.01	0.27	0.00	0.21	-	-	-	38.6
	Light-Duty Diesel Vehicles	34.3	0.00	0.01	0.00	0.9	-	-	-	35.2
	Light-Duty Diesel Trucks	588	0.02	0.3	0.05	10	-	-	-	603
	Heavy-Duty Diesel Vehicles	7 860	0.3	7	0.4	100	-	-	-	7 990
	Propane & Natural Gas Vehicles	107	0.06	1	0.00	0.6	-	-	-	110
	Railways	2 810	0.2	3	1	400	-	-	-	3 000
	Navigation (Domestic Marine)	-	-	-	-	-	-	-	-	0
	Other Transportation	8 500	3	50	3	800	-	-	-	9 300
	Off-Road Gasoline	600	0.7	10	0.01	4	-	-	-	620
	Off-Road Diesel	6 400	0.4	7	3	800	-	-	-	7 200
	Pipelines	1 510	1.5	31	0.04	10	-	-	-	1 550
c.	Fugitive Sources ²	11 000	1 200	25 000	0.06	20	-	-	-	35 700
	Coal Mining	-	10	200	-	-	-	-	-	200
	Oil and Natural Gas	10 700	1 170	24 600	0.06	20	-	-	-	35 400
INDUSTRIAL PROCESSES ³		10 000	1.3	28	3.29	1 020	920	-	2.2	12 000
a.	Mineral Products	940	-	-	-	-	-	-	-	940
	Cement Production	760	-	-	-	-	-	-	-	760
	Lime Production	94	-	-	-	-	-	-	-	94
	Mineral Product Use	88	-	-	-	-	-	-	-	88
b.	Chemical Industry	-	1.3	28	3.29	1 020	-	-	-	1 000
	Nitric Acid Production	-	-	-	3.29	1 020	-	-	-	1 020
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
	Petrochemical Production ⁴	-	1.3	28	0.01	1.9	-	-	-	30
c.	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	920	-	2.2	920
e	Other & Undifferentiated Production ⁵	9 100	-	-	-	-	-	-	-	9 100
SOLVENT & OTHER PRODUCT USE		-	-	-	0.09	28	-	-	-	28
AGRICULTURE		-	370	7 800	28	8 800	-	-	-	17 000
a.	Enteric Fermentation	-	340	7 200	-	-	-	-	-	7 200
b.	Manure Management	-	24	510	4.1	1 300	-	-	-	1 800
c.	Agriculture Soils	-	-	-	24	7 500	-	-	-	7 500
	Direct Sources	-	-	-	12	3 700	-	-	-	3 700
	Pasture, Range and Paddock Manure	-	-	-	3.6	1 100	-	-	-	1 100
	Indirect Sources	-	-	-	9	3 000	-	-	-	3 000
d.	Field Burning of Agricultural Residues	-	0.01	0.25	0.00	0.09	-	-	-	0.34
WASTE		-	78	1 600	0.2	70	-	-	-	1 700
a.	Solid Waste Disposal on Land	-	77	1 600	-	-	-	-	-	1 600
b.	Wastewater Handling	-	0.79	17	0.2	70	-	-	-	90
c.	Waste Incineration	-	-	-	-	-	-	-	-	0

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-20 1990-2009 GHG Emission Summary for British Columbia

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	49 800	62 300	65 400	62 700	61 600	65 200	65 900	63 800
ENERGY	41 000	51 600	55 000	52 400	51 800	55 300	56 000	54 100
a. Stationary Combustion Sources	18 900	22 500	23 700	22 000	22 000	24 700	24 200	23 500
Electricity and Heat Generation	803	1 810	1 420	1 100	997	1 070	1 410	1 240
Fossil Fuel Production and Refining	3 500	3 800	6 500	5 800	5 800	6 200	6 200	6 700
Mining & Oil and Gas Extraction	328	730	981	742	1 550	1 840	1 850	1 810
Manufacturing Industries	6 460	7 700	6 990	6 440	5 630	7 550	6 740	6 240
Construction	306	75.9	101	107	111	117	100	59.4
Commercial & Institutional	2 840	3 420	3 520	3 400	3 360	3 330	3 370	3 040
Residential	4 300	4 700	4 100	4 400	4 500	4 500	4 500	4 500
Agriculture & Forestry	321	316	67.9	66.5	66.2	64.1	56.4	43.5
b. Transport¹	18 600	23 900	26 200	25 200	24 400	25 100	25 600	24 600
Civil Aviation (Domestic Aviation)	1 300	1 500	1 500	1 500	1 500	1 500	1 400	1 300
Road Transportation	11 400	14 800	15 700	15 500	15 400	15 600	15 400	15 500
Light-Duty Gasoline Vehicles	3 740	4 400	4 370	4 190	4 100	4 110	4 030	4 190
Light-Duty Gasoline Trucks	2 130	4 470	4 900	4 760	4 670	4 700	4 610	4 670
Heavy-Duty Gasoline Vehicles	2 220	1 820	1 840	1 790	1 770	1 800	1 780	1 890
Motorcycles	19.1	17.6	27.4	28.9	28.6	29.0	28.8	25.9
Light-Duty Diesel Vehicles	34.4	51.1	59.4	63.4	62.6	66.4	70.7	68.7
Light-Duty Diesel Trucks	40.1	72.4	59.3	58.5	58.3	59.5	59.8	63.1
Heavy-Duty Diesel Vehicles	2 440	3 600	4 160	4 380	4 480	4 640	4 580	4 370
Propane & Natural Gas Vehicles	780	330	260	190	190	230	250	200
Railways	1 000	1 000	400	400	400	400	600	500
Navigation (Domestic Marine)	1 000	1 200	2 700	2 500	2 500	2 600	2 500	2 100
Other Transportation	3 500	5 200	5 900	5 200	4 800	5 000	5 600	5 200
Off-Road Gasoline	350	520	730	450	440	450	350	260
Off-Road Diesel	2 200	3 000	4 100	3 800	3 500	3 600	4 400	4 000
Pipelines	856	1 650	1 130	989	774	933	895	868
c. Fugitive Sources²	3 470	5 150	5 080	5 210	5 310	5 560	6 230	5 970
Coal Mining	500	500	500	500	500	500	500	500
Oil and Natural Gas	2 980	4 680	4 580	4 670	4 840	5 040	5 730	5 510
INDUSTRIAL PROCESSES³	3 220	4 420	4 080	4 020	3 640	3 710	3 830	3 660
a. Mineral Products	870	1 300	1 400	1 400	1 400	1 400	1 300	1 000
Cement Production	610	1 100	1 200	1 200	1 200	1 200	1 100	830
Lime Production	160	220	190	180	170	160	160	140
Mineral Products Use	96	75	41	43	61	43	39	31
b. Chemical Industry	0.45	0.29	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	0.45	0.29	-	-	-	-	-	-
c. Metal Production	1 510	1 820	1 360	1 130	1 020	1 100	1 150	1 150
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	1 500	1 800	1 400	1 100	1 000	1 100	1 200	1 100
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	60	470	880	920	890	920	940	1 000
e. Other & Undifferentiated Production⁵	780	790	430	560	360	300	470	480
SOLVENT & OTHER PRODUCT USE	21	33	28	24	43	43	45	34
AGRICULTURE	2 100	2 400	2 600	2 500	2 300	2 300	2 200	2 100
a. Enteric Fermentation	990	1 200	1 300	1 300	1 200	1 100	1 100	1 000
b. Manure Management	310	370	400	390	370	360	350	340
c. Agriculture Soils	820	820	880	880	770	840	820	760
Direct Sources	370	310	330	340	280	330	330	310
Pasture, Range and Paddock Manure	170	230	250	240	220	210	200	180
Indirect Sources	300	300	300	300	300	300	300	300
d. Field Burning of Agricultural Residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WASTE	3 400	3 900	3 800	3 700	3 800	3 800	3 800	3 900
a. Solid Waste Disposal on Land	3 300	3 700	3 600	3 500	3 600	3 600	3 600	3 700
b. Wastewater Handling	79	100	110	110	110	110	110	110
c. Waste Incineration	66	70	69	69	68	68	68	68

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–21 2009 GHG Emission Summary for British Columbia

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		51 300	390	8 300	8.2	2 500	970	670	61	63 800
ENERGY		49 200	160	3 400	5	1 000	-	-	-	54 100
a.	Stationary Combustion Sources	22 600	30	600	1	300	-	-	-	23 500
	Electricity and Heat Generation	1 220	0.31	6.5	0.03	10	-	-	-	1 240
	Fossil Fuel Production and Refining	6 250	20	400	0.2	50	-	-	-	6 700
	Mining & Oil and Gas Extraction	1 800	0.03	0.6	0.03	9	-	-	-	1 810
	Manufacturing Industries	6 060	0.7	10	0.5	200	-	-	-	6 240
	Construction	59.0	0.00	0.02	0.00	0.4	-	-	-	59.4
	Commercial & Institutional	3 020	0.06	1	0.06	20	-	-	-	3 040
	Residential	4 150	10	200	0.2	60	-	-	-	4 500
	Agriculture & Forestry	43.1	0.00	0.02	0.00	0.4	-	-	-	43.5
	b.	Transport ¹	23 400	3	60	4	1 000	-	-	-
	Civil Aviation (Domestic Aviation)	1 330	0.05	1	0.04	10	-	-	-	1 300
	Road Transportation	14 900	1.2	25	1.6	510	-	-	-	15 500
	Light-Duty Gasoline Vehicles	4 010	0.38	7.9	0.57	180	-	-	-	4 190
	Light-Duty Gasoline Trucks	4 450	0.40	8.4	0.68	210	-	-	-	4 670
	Heavy-Duty Gasoline Vehicles	1 840	0.08	1.7	0.14	44	-	-	-	1 890
	Motorcycles	25.5	0.01	0.27	0.00	0.15	-	-	-	25.9
	Light-Duty Diesel Vehicles	67.0	0.00	0.03	0.01	2	-	-	-	68.7
	Light-Duty Diesel Trucks	61.5	0.00	0.03	0.01	2	-	-	-	63.1
	Heavy-Duty Diesel Vehicles	4 300	0.2	4	0.2	70	-	-	-	4 370
	Propane & Natural Gas Vehicles	197	0.1	2	0.00	1	-	-	-	200
	Railways	478	0.03	0.6	0.2	60	-	-	-	500
	Navigation (Domestic Marine)	1 970	0.2	3	0.3	100	-	-	-	2 100
	Other Transportation	4 700	1	30	2	500	-	-	-	5 200
	Off-Road Gasoline	250	0.3	6	0.01	2	-	-	-	260
	Off-Road Diesel	3 600	0.2	4	1	500	-	-	-	4 000
	Pipelines	844	0.83	17	0.02	7	-	-	-	868
c.	Fugitive Sources ²	3 300	130	2 700	0.00	1	-	-	-	5 970
	Coal Mining	-	20	500	-	-	-	-	-	500
	Oil and Natural Gas	3 270	107	2 240	0.00	1	-	-	-	5 510
INDUSTRIAL PROCESSES ³		2 000	-	-	-	-	970	670	61	3 660
a.	Mineral Products	1 000	-	-	-	-	-	-	-	1 000
	Cement Production	830	-	-	-	-	-	-	-	830
	Lime Production	140	-	-	-	-	-	-	-	140
	Mineral Product Use	31	-	-	-	-	-	-	-	31
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
	Petrochemical Production ⁴	-	-	-	-	-	-	-	-	0
c.	Metal Production	477	-	-	-	-	-	670	-	1 150
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	480	-	-	-	-	-	670	-	1 100
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	970	-	61	1 000
e	Other & Undifferentiated Production ⁵	480	-	-	-	-	-	-	-	480
SOLVENT & OTHER PRODUCT USE		-	-	-	0.11	34	-	-	-	34
AGRICULTURE		-	56	1 200	3.0	940	-	-	-	2 100
a.	Enteric Fermentation	-	48	1 000	-	-	-	-	-	1 000
b.	Manure Management	-	7.8	160	0.57	180	-	-	-	340
c.	Agriculture Soils	-	-	-	2.5	760	-	-	-	760
	Direct Sources	-	-	-	1.0	310	-	-	-	310
	Pasture, Range and Paddock Manure	-	-	-	0.59	180	-	-	-	180
	Indirect Sources	-	-	-	0.9	300	-	-	-	300
d.	Field Burning of Agricultural Residues	-	-	-	-	-	-	-	-	0
WASTE		57	180	3 700	0.3	100	-	-	-	3 900
a.	Solid Waste Disposal on Land	-	170	3 700	-	-	-	-	-	3 700
b.	Wastewater Handling	-	1.2	24	0.3	90	-	-	-	110
c.	Waste Incineration	57	-	-	0.04	10	-	-	-	68

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-22 1990-2009 GHG Emission Summary for Yukon

A15

Greenhouse Gas Categories								
	1990	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	540	450	426	409	418	415	362	317
ENERGY	537	442	414	396	406	401	348	302
a. Stationary Combustion Sources	224	191	130	125	140	131	129	103
Electricity and Heat Generation	93.6	17.0	7.99	7.53	7.81	10.9	11.7	14.8
Fossil Fuel Production and Refining	0.63	83	9.8	28	36	27	17	14
Mining & Oil and Gas Extraction	4.12	1.54	1.73	3.08	3.26	3.93	5.08	0.25
Manufacturing Industries	8.01	-	-	-	-	-	-	-
Construction	5.46	2.40	1.95	1.07	1.70	2.09	1.67	0.51
Commercial & Institutional	81.9	52.9	40.0	39.8	42.5	47.6	49.7	52.4
Residential	29	33	55	39	43	39	44	21
Agriculture & Forestry	1.24	0.95	13.2	6.27	6.02	-	-	-
b. Transport¹	313	247	281	267	263	267	216	196
Civil Aviation (Domestic Aviation)	34	32	36	34	34	39	36	37
Road Transportation	179	161	163	158	145	134	128	118
Light-Duty Gasoline Vehicles	79.4	48.5	40.0	34.8	29.9	24.3	19.5	20.7
Light-Duty Gasoline Trucks	30.4	38.3	40.4	37.6	32.2	26.3	21.1	20.4
Heavy-Duty Gasoline Vehicles	10.0	6.49	6.62	5.98	5.12	4.18	3.39	3.52
Motorcycles	0.50	0.33	0.37	0.33	0.28	0.23	0.19	0.19
Light-Duty Diesel Vehicles	0.77	0.47	0.43	0.38	0.33	0.27	0.22	0.23
Light-Duty Diesel Trucks	0.62	2.46	2.40	2.45	2.11	1.72	1.39	1.27
Heavy-Duty Diesel Vehicles	55.7	63.3	70.4	75.1	73.5	75.2	80.1	70.5
Propane & Natural Gas Vehicles	1.5	0.68	2.1	1.1	1.5	1.8	1.8	0.92
Railways	-	-	-	-	-	-	-	-
Navigation (Domestic Marine)	-	-	-	-	-	-	-	-
Other Transportation	100	55	82	75	83	94	52	42
Off-Road Gasoline	10	14	2.7	2.9	2.5	1.9	1.5	1.8
Off-Road Diesel	89	41	79	73	81	92	51	40
Pipelines	-	-	-	-	-	-	-	-
c. Fugitive Sources²	-	4.02	3.68	3.88	3.32	3.02	3.10	2.77
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	-	4.02	3.68	3.88	3.32	3.02	3.10	2.77
INDUSTRIAL PROCESSES³	1.43	5.56	9.97	10.5	9.95	10.3	10.5	11.6
a. Mineral Products	0.06	-	-	-	-	-	-	-
Cement Production	-	-	-	-	-	-	-	-
Lime Production	-	-	-	-	-	-	-	-
Mineral Products Use	0.06	-	-	-	-	-	-	-
b. Chemical Industry	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	-	4.9	9.5	9.9	9.4	9.6	9.8	11
e. Other & Undifferentiated Production⁵	1.4	0.71	0.48	0.56	0.56	0.71	0.71	0.71
SOLVENT & OTHER PRODUCT USE	0.18	0.24	0.21	0.18	0.33	0.32	0.34	0.26
AGRICULTURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
a. Enteric Fermentation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b. Manure Management	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Agriculture Soils	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Direct Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pasture, Range and Paddock Manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indirect Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d. Field Burning of Agricultural Residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WASTE	1.5	2.1	2.3	2.4	2.4	2.5	2.6	2.6
a. Solid Waste Disposal on Land	0.99	1.5	1.7	1.7	1.8	1.8	1.9	1.9
b. Wastewater Handling	0.52	0.62	0.65	0.65	0.65	0.67	0.66	0.67
c. Waste Incineration	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–23 2009 GHG Emission Summary for Yukon

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		290	0.29	6.0	0.03	9.8	11	-	-	317
ENERGY		289	0.19	4.1	0.03	9	-	-	-	302
a.	Stationary Combustion Sources	98.3	0.2	3	0.01	1	-	-	-	103
	Electricity and Heat Generation	14.1	0.00	0.02	0.00	0.7	-	-	-	14.8
	Fossil Fuel Production and Refining	13.3	0.04	0.9	0.00	0.1	-	-	-	14
	Mining & Oil and Gas Extraction	0.25	0.00	0.00	0.00	0.00	-	-	-	0.25
	Manufacturing Industries	-	-	-	-	-	-	-	-	0
	Construction	0.51	0.00	0.00	0.00	0.00	-	-	-	0.51
	Commercial & Institutional	52.2	0.00	0.01	0.00	0.2	-	-	-	52.4
	Residential	17.8	0.1	3	0.00	0.4	-	-	-	21
	Agriculture & Forestry	-	-	-	-	-	-	-	-	0
	Transport ¹	188	0.02	0.3	0.02	7	-	-	-	196
	Civil Aviation (Domestic Aviation)	36.2	0.00	0.06	0.00	0.4	-	-	-	37
	Road Transportation	115	0.01	0.17	0.01	2.5	-	-	-	118
	Light-Duty Gasoline Vehicles	20.0	0.00	0.05	0.00	0.64	-	-	-	20.7
	Light-Duty Gasoline Trucks	19.7	0.00	0.05	0.00	0.66	-	-	-	20.4
	Heavy-Duty Gasoline Vehicles	3.43	0.00	0.00	0.00	0.08	-	-	-	3.52
	Motorcycles	0.18	0.00	0.00	0.00	0.00	-	-	-	0.19
	Light-Duty Diesel Vehicles	0.22	0.00	0.00	0.00	0.01	-	-	-	0.23
	Light-Duty Diesel Trucks	1.24	0.00	0.00	0.00	0.03	-	-	-	1.27
	Heavy-Duty Diesel Vehicles	69.4	0.00	0.06	0.00	1	-	-	-	70.5
	Propane & Natural Gas Vehicles	0.91	0.00	0.01	0.00	0.01	-	-	-	0.92
	Railways	-	-	-	-	-	-	-	-	0
	Navigation (Domestic Marine)	-	-	-	-	-	-	-	-	0
	Other Transportation	37	0.00	0.08	0.01	5	-	-	-	42
	Off-Road Gasoline	1.7	0.00	0.04	0.00	0.01	-	-	-	1.8
	Off-Road Diesel	35	0.00	0.04	0.01	5	-	-	-	40
	Pipelines	-	-	-	-	-	-	-	-	0
	Fugitive Sources ²	2.5	0.01	0.30	-	-	-	-	-	2.77
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	2.47	0.01	0.30	-	-	-	-	-	2.77
	INDUSTRIAL PROCESSES ³		0.71	-	-	-	-	11	-	-
a.	Mineral Products	-	-	-	-	-	-	-	-	0
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	-	-	-	-	-	-	-	-	0
	Mineral Product Use	-	-	-	-	-	-	-	-	0
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
c.	Petrochemical Production ⁴	-	-	-	-	-	-	-	-	0
	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
	d.	Production and Consumption of Halocarbons	-	-	-	-	-	11	-	-
e	Other & Undifferentiated Production ⁵	0.71	-	-	-	-	-	-	-	0.71
SOLVENT & OTHER PRODUCT USE		-	-	-	0.00	0.26	-	-	-	0.26
AGRICULTURE		-	-	-	-	-	-	-	-	-
a.	Enteric Fermentation	-	-	-	-	-	-	-	-	-
b.	Manure Management	-	-	-	-	-	-	-	-	-
c.	Agriculture Soils	-	-	-	-	-	-	-	-	-
	Direct Sources	-	-	-	-	-	-	-	-	-
	Pasture, Range and Paddock Manure	-	-	-	-	-	-	-	-	-
	Indirect Sources	-	-	-	-	-	-	-	-	-
d.	Field Burning of Agricultural Residues	-	-	-	-	-	-	-	-	-
WASTE		-	0.09	1.9	0.00	0.7	-	-	-	2.6
a.	Solid Waste Disposal on Land	-	0.09	1.9	-	-	-	-	-	1.9
b.	Wastewater Handling	-	0.00	0.00	0.00	0.7	-	-	-	0.67
c.	Waste Incineration	-	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-24 1999-2009 GHG Emission Summary for Northwest Territories

A15

Greenhouse Gas Categories								
	1999	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	1 200	1 410	1 350	1 540	1 550	1 710	1 570	1 230
ENERGY	1 190	1 400	1 330	1 520	1 530	1 700	1 550	1 210
a. Stationary Combustion Sources	576	791	739	687	662	692	647	582
Electricity and Heat Generation	80.4	95.2	37.3	61.7	58.0	44.4	47.1	21.2
Fossil Fuel Production and Refining	0.70	170	180	120	84	91	49	13
Mining & Oil and Gas Extraction	217	250	269	270	297	306	331	336
Manufacturing Industries	0.00	0.00	0.18	0.25	0.00	0.00	0.00	-
Construction	0.77	0.41	1.71	1.68	0.92	0.42	0.19	-
Commercial & Institutional	188	164	156	147	148	162	132	136
Residential	89	110	93	84	75	88	88	77
Agriculture & Forestry	0.01	0.00	1.75	1.53	-	0.25	-	-
b. Transport¹	604	594	571	819	859	994	896	624
Civil Aviation (Domestic Aviation)	120	140	230	240	500	310	280	150
Road Transportation	222	217	206	249	209	302	242	206
Light-Duty Gasoline Vehicles	38.2	38.5	33.5	24.0	25.7	30.5	33.7	36.3
Light-Duty Gasoline Trucks	27.3	27.0	28.2	21.2	22.7	26.9	29.7	29.7
Heavy-Duty Gasoline Vehicles	3.35	3.76	3.82	2.80	3.02	3.66	4.13	4.42
Motorcycles	0.22	0.25	0.29	0.21	0.23	0.28	0.31	0.31
Light-Duty Diesel Vehicles	0.37	0.41	0.40	0.29	0.31	0.38	0.43	0.46
Light-Duty Diesel Trucks	1.41	1.63	1.77	1.47	1.58	1.87	2.09	1.93
Heavy-Duty Diesel Vehicles	150	146	137	199	154	238	170	132
Propane & Natural Gas Vehicles	0.83	0.34	1.0	0.54	0.73	0.88	0.92	0.46
Railways	3	3	3	3	3	5	5	2
Navigation (Domestic Marine)	4.6	5.8	-	-	-	1.2	-	-
Other Transportation	250	220	130	330	140	370	370	270
Off-Road Gasoline	21	26	18	15	13	14	18	24
Off-Road Diesel	230	190	110	310	130	360	350	240
Pipelines	4.72	5.66	2.88	2.51	2.23	2.23	1.39	2.51
c. Fugitive Sources²	8.59	13.1	23.4	18.7	6.35	8.79	5.89	7.39
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	8.59	13.1	23.4	18.7	6.35	8.79	5.89	7.39
INDUSTRIAL PROCESSES³	6.00	8.86	13.2	14.7	14.2	14.2	12.9	13.2
a. Mineral Products	-	-	-	-	-	-	-	-
Cement Production	-	-	-	-	-	-	-	-
Lime Production	-	-	-	-	-	-	-	-
Mineral Products Use	-	-	-	-	-	-	-	-
b. Chemical Industry	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	3.6	4.7	9.7	10	9.4	9.5	9.9	11
e. Other & Undifferentiated Production⁵	2.4	4.1	3.5	4.7	4.8	4.7	3.0	2.4
SOLVENT & OTHER PRODUCT USE	0.29	0.33	0.29	0.25	0.44	0.43	0.45	0.34
AGRICULTURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
a. Enteric Fermentation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b. Manure Management	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Agriculture Soils	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Direct Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pasture, Range and Paddock Manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indirect Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d. Field Burning of Agricultural Residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WASTE	3.5	3.5	4.0	4.0	4.1	4.2	4.3	4.4
a. Solid Waste Disposal on Land	2.6	2.7	3.1	3.1	3.2	3.3	3.4	3.5
b. Wastewater Handling	0.83	0.83	0.89	0.88	0.87	0.89	0.88	0.87
c. Waste Incineration	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–25 2009 GHG Emission Summary for Northwest Territories

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		1 160	0.80	17	0.15	46	11	-	-	1 230
ENERGY		1 160	0.63	13	0.1	40	-	-	-	1 210
a.	Stationary Combustion Sources	565	0.3	7	0.04	10	-	-	-	582
	Electricity and Heat Generation	20.2	0.00	0.02	0.00	0.9	-	-	-	21.2
	Fossil Fuel Production and Refining	11.8	0.04	0.7	0.00	0.1	-	-	-	13
	Mining & Oil and Gas Extraction	327	0.01	0.2	0.03	8	-	-	-	336
	Manufacturing Industries	-	-	-	-	-	-	-	-	0
	Construction	-	-	-	-	-	-	-	-	0
	Commercial & Institutional	135	0.00	0.04	0.00	0.6	-	-	-	136
	Residential	70.2	0.3	6	0.00	1	-	-	-	77
	Agriculture & Forestry	-	-	-	-	-	-	-	-	0
	Transport ¹	589	0.06	1	0.1	30	-	-	-	624
Civil Aviation (Domestic Aviation)		147	0.01	0.2	0.00	1	-	-	-	150
Road Transportation		201	0.01	0.29	0.01	4.3	-	-	-	206
Light-Duty Gasoline Vehicles		35.1	0.00	0.09	0.00	1.1	-	-	-	36.3
Light-Duty Gasoline Trucks		28.7	0.00	0.07	0.00	0.96	-	-	-	29.7
Heavy-Duty Gasoline Vehicles		4.33	0.00	0.01	0.00	0.09	-	-	-	4.42
Motorcycles		0.31	0.00	0.00	0.00	0.00	-	-	-	0.31
Light-Duty Diesel Vehicles		0.45	0.00	0.00	0.00	0.01	-	-	-	0.46
Light-Duty Diesel Trucks		1.88	0.00	0.00	0.00	0.05	-	-	-	1.93
Heavy-Duty Diesel Vehicles		130	0.01	0.1	0.01	2	-	-	-	132
Propane & Natural Gas Vehicles		0.45	0.00	0.00	0.00	0.00	-	-	-	0.46
Railways		1.60	0.00	0.00	0.00	0.2	-	-	-	2
Navigation (Domestic Marine)		-	-	-	-	-	-	-	-	0
Other Transportation		240	0.04	0.8	0.09	30	-	-	-	270
Off-Road Gasoline		24	0.03	0.6	0.00	0.2	-	-	-	24
Off-Road Diesel		210	0.01	0.2	0.09	30	-	-	-	240
Pipelines		2.40	0.00	0.00	0.00	0.1	-	-	-	2.51
c.	Fugitive Sources ²	2.0	0.26	5.4	-	-	-	-	-	7.39
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	2.00	0.26	5.38	-	-	-	-	-	7.39
INDUSTRIAL PROCESSES ³		2.4	-	-	-	-	11	-	-	13.2
a.	Mineral Products	-	-	-	-	-	-	-	-	0
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	-	-	-	-	-	-	-	-	0
	Mineral Product Use	-	-	-	-	-	-	-	-	0
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
Petrochemical Production ⁴		-	-	-	-	-	-	-	-	0
c.	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	11	-	-	11
e	Other & Undifferentiated Production ⁵	2.4	-	-	-	-	-	-	-	2.4
SOLVENT & OTHER PRODUCT USE		-	-	-	0.00	0.34	-	-	-	0.34
AGRICULTURE		-	-	-	-	-	-	-	-	-
a.	Enteric Fermentation	-	-	-	-	-	-	-	-	-
b.	Manure Management	-	-	-	-	-	-	-	-	-
c.	Agriculture Soils	-	-	-	-	-	-	-	-	-
	Direct Sources	-	-	-	-	-	-	-	-	-
	Pasture, Range and Paddock Manure	-	-	-	-	-	-	-	-	-
	Indirect Sources	-	-	-	-	-	-	-	-	-
d.	Field Burning of Agricultural Residues	-	-	-	-	-	-	-	-	-
WASTE		-	0.17	3.5	0.00	0.9	-	-	-	4.4
a.	Solid Waste Disposal on Land	-	0.17	3.5	-	-	-	-	-	3.5
b.	Wastewater Handling	-	0.00	0.00	0.00	0.9	-	-	-	0.87
c.	Waste Incineration	-	-	-	-	-	-	-	-	-

Notes:

- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 - Fugitive emissions from refineries are only reported at the national level.
 - Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 - The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 - Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15-26 1999-2009 GHG Emission Summary for Nunavut

A15

Greenhouse Gas Categories								
	1999	2000	2004	2005	2006	2007	2008	2009
<i>kt CO₂ equivalent</i>								
TOTAL	277	363	531	256	338	465	449	329
ENERGY	273	358	525	249	331	458	442	322
a. Stationary Combustion Sources	105	72.9	78.0	26.5	23.8	30.5	24.5	-
Electricity and Heat Generation	-	-	47.6	-	-	-	-	-
Fossil Fuel Production and Refining	0.08	0.09	0.10	0.06	0.12	0.12	0.12	-
Mining & Oil and Gas Extraction	93.4	49.3	5.00	7.47	7.74	8.86	9.97	-
Manufacturing Industries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Construction	0.05	0.11	0.12	0.12	0.14	0.16	0.19	-
Commercial & Institutional	6.40	14.3	19.5	14.3	10.9	15.6	7.80	-
Residential	4.7	9.1	5.7	4.6	5.0	5.7	6.4	-
Agriculture & Forestry	0.01	0.00	-	-	-	-	-	-
b. Transport¹	168	285	447	222	307	428	418	322
Civil Aviation (Domestic Aviation)	110	120	140	140	130	130	140	120
Road Transportation	19.3	24.9	29.0	25.3	25.1	28.7	28.4	31.3
Light-Duty Gasoline Vehicles	3.91	5.26	4.68	3.81	3.49	3.93	3.97	5.12
Heavy-Duty Gasoline Vehicles	8.48	12.5	13.5	11.4	10.5	11.9	12.0	14.3
Motorcycles	0.13	0.19	0.24	0.19	0.18	0.22	0.22	0.24
Light-Duty Diesel Vehicles	0.02	0.03	0.04	0.03	0.03	0.03	0.03	0.04
Light-Duty Diesel Trucks	0.04	0.06	0.07	0.06	0.05	0.06	0.06	0.06
Heavy-Duty Diesel Trucks	0.47	0.71	0.78	0.75	0.68	0.74	0.75	0.85
Propane & Natural Gas Vehicles	5.45	5.81	8.62	8.51	9.40	10.9	10.5	10.3
Railways	0.83	0.34	1.0	0.54	0.73	0.88	0.92	0.46
Navigation (Domestic Marine)	-	-	-	-	-	-	-	-
Other Transportation	3.6	4.6	-	-	-	0.90	-	-
Off-Road Gasoline	38	130	270	59	150	260	250	170
Off-Road Diesel	-	2.2	1.5	0.00	-	-	-	0.00
Pipelines	38	130	270	59	150	260	250	170
c. Fugitive Sources²	-	-	-	-	-	-	-	-
Coal Mining	-	-	-	-	-	-	-	-
Oil and Natural Gas	-	-	-	-	-	-	-	-
INDUSTRIAL PROCESSES³	1.57	2.02	3.45	3.72	3.41	3.36	3.58	4.13
a. Mineral Products	-	-	-	-	-	-	-	-
Cement Production	-	-	-	-	-	-	-	-
Lime Production	-	-	-	-	-	-	-	-
Mineral Products Use	-	-	-	-	-	-	-	-
b. Chemical Industry	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	1.5	1.9	3.4	3.7	3.4	3.4	3.6	4.1
e. Other & Undifferentiated Production⁵	0.08	0.08	0.02	-	-	-	-	-
SOLVENT & OTHER PRODUCT USE	0.19	0.22	0.20	0.17	0.31	0.31	0.32	0.25
AGRICULTURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
a. Enteric Fermentation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b. Manure Management	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Agriculture Soils	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Direct Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pasture, Range and Paddock Manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indirect Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d. Field Burning of Agricultural Residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WASTE	2.3	2.4	2.7	2.8	2.9	3.0	3.1	3.2
a. Solid Waste Disposal on Land	1.7	1.8	2.1	2.2	2.3	2.4	2.5	2.6
b. Wastewater Handling	0.54	0.56	0.61	0.61	0.62	0.64	0.63	0.64
c. Waste Incineration	-	-	-	-	-	-	-	-

Notes:

- Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 - Fugitive emissions from refineries are only reported at the national level.
 - Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 - The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 - Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

Table A15–27 2009 GHG Emission Summary for Nunavut

Greenhouse Gas Categories		Greenhouse Gases								
Global Warming Potential		CO ₂	CH ₄	CH ₄	N ₂ O	N ₂ O	HFCs	PFCs	SF ₆	TOTAL
Unit		kt	kt	21 kt CO ₂ equivalent	kt	310 kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent	kt CO ₂ equivalent
TOTAL		300	0.14	2.9	0.07	22	4.1	-	-	329
ENERGY		300	0.01	0.29	0.07	20	-	-	-	322
a.	Stationary Combustion Sources	-	-	-	-	-	-	-	-	0
	Electricity and Heat Generation	-	-	-	-	-	-	-	-	0
	Fossil Fuel Production and Refining	-	-	-	-	-	-	-	-	0
	Mining & Oil and Gas Extraction	-	-	-	-	-	-	-	-	0
	Manufacturing Industries	-	-	-	-	-	-	-	-	0
	Construction	-	-	-	-	-	-	-	-	0
	Commercial & Institutional	-	-	-	-	-	-	-	-	0
	Residential	-	-	-	-	-	-	-	-	0
	Agriculture & Forestry	-	-	-	-	-	-	-	-	0
	b. Transport ¹	300	0.01	0.3	0.07	20	-	-	-	322
Civil Aviation (Domestic Aviation)		123	0.00	0.06	0.00	1	-	-	-	120
Road Transportation		30.4	0.00	0.06	0.00	0.81	-	-	-	31.3
Light-Duty Gasoline Vehicles		4.95	0.00	0.01	0.00	0.16	-	-	-	5.12
Light-Duty Gasoline Trucks		13.8	0.00	0.03	0.00	0.46	-	-	-	14.3
Heavy-Duty Gasoline Vehicles		0.24	0.00	0.00	0.00	0.00	-	-	-	0.24
Motorcycles		0.04	0.00	0.00	0.00	0.00	-	-	-	0.04
Light-Duty Diesel Vehicles		0.06	0.00	0.00	0.00	0.00	-	-	-	0.06
Light-Duty Diesel Trucks		0.83	0.00	0.00	0.00	0.02	-	-	-	0.85
Heavy-Duty Diesel Vehicles		10.1	0.00	0.01	0.00	0.2	-	-	-	10.3
Propane & Natural Gas Vehicles		0.45	0.00	0.00	0.00	0.00	-	-	-	0.46
Railways		-	-	-	-	-	-	-	-	0
Navigation (Domestic Marine)		-	-	-	-	-	-	-	-	0
Other Transportation		150	0.01	0.2	0.06	20	-	-	-	170
Off-Road Gasoline		0.00	0.00	0.00	0.00	0.00	-	-	-	0.00
Off-Road Diesel		150	0.01	0.2	0.06	20	-	-	-	170
Pipelines		-	-	-	-	-	-	-	-	0
c.	Fugitive Sources ²	-	-	-	-	-	-	-	-	0
	Coal Mining	-	-	-	-	-	-	-	-	0
	Oil and Natural Gas	-	-	-	-	-	-	-	-	0
INDUSTRIAL PROCESSES ³		-	-	-	-	-	4.1	-	-	4.13
a.	Mineral Products	-	-	-	-	-	-	-	-	0
	Cement Production	-	-	-	-	-	-	-	-	0
	Lime Production	-	-	-	-	-	-	-	-	0
	Mineral Product Use	-	-	-	-	-	-	-	-	0
b.	Chemical Industry	-	-	-	-	-	-	-	-	0
	Nitric Acid Production	-	-	-	-	-	-	-	-	0
	Adipic Acid Production	-	-	-	-	-	-	-	-	0
Petrochemical Production ⁴		-	-	-	-	-	-	-	-	0
c.	Metal Production	-	-	-	-	-	-	-	-	0
	Iron and Steel Production	-	-	-	-	-	-	-	-	0
	Aluminum Production	-	-	-	-	-	-	-	-	0
	SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	0
d.	Production and Consumption of Halocarbons	-	-	-	-	-	4.1	-	-	4.1
e	Other & Undifferentiated Production ⁵	-	-	-	-	-	-	-	-	0
SOLVENT & OTHER PRODUCT USE		-	-	-	0.00	0.25	-	-	-	0.25
AGRICULTURE		-	-	-	-	-	-	-	-	-
a.	Enteric Fermentation	-	-	-	-	-	-	-	-	-
b.	Manure Management	-	-	-	-	-	-	-	-	-
c.	Agriculture Soils	-	-	-	-	-	-	-	-	-
	Direct Sources	-	-	-	-	-	-	-	-	-
	Pasture, Range and Paddock Manure	-	-	-	-	-	-	-	-	-
	Indirect Sources	-	-	-	-	-	-	-	-	-
d.	Field Burning of Agricultural Residues	-	-	-	-	-	-	-	-	-
WASTE		-	0.12	2.6	0.00	0.6	-	-	-	3.2
a.	Solid Waste Disposal on Land	-	0.12	2.6	-	-	-	-	-	2.6
b.	Wastewater Handling	-	0.00	0.00	0.00	0.6	-	-	-	0.64
c.	Waste Incineration	-	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.

2. Fugitive emissions from refineries are only reported at the national level.

3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.

5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.

- Indicates no emissions

0.0 Indicates emissions truncated due to rounding

Table A15-28 1990-1999 GHG Emission Summary for Northwest Territories (including Nunavut)

A15

Greenhouse Gas Categories									
	1990	1991	1992	1993	1994	1995	1996	1997	1998
<i>kt CO₂ equivalent</i>									
TOTAL	1 530	1 480	1 360	1 650	1 830	1 940	2 010	1 750	1 600
ENERGY	1 530	1 470	1 350	1 620	1 720	1 850	1 940	1 740	1 590
a. Stationary Combustion Sources	849	915	846	949	1 010	1 160	1 060	982	732
Electricity and Heat Generation	162	161	131	141	144	161	123	134	179
Fossil Fuel Production and Refining	140	51	24	37	33	34	19	4.1	0.29
Mining & Oil and Gas Extraction	116	122	111	137	222	327	294	283	257
Manufacturing Industries	23.6	14.2	16.3	6.58	12.7	19.8	17.6	9.17	0.00
Construction	3.76	3.28	3.49	4.22	3.15	20.4	0.67	0.69	0.57
Commercial & Institutional	242	359	350	386	398	469	406	364	201
Residential	160	190	200	230	200	130	200	190	94
Agriculture & Forestry	2.30	8.75	11.8	2.02	1.03	0.01	-	0.01	0.01
b. Transport¹	613	484	447	610	661	651	841	750	854
Civil Aviation (Domestic Aviation)	240	210	220	240	240	220	230	230	220
Road Transportation	119	104	102	114	135	147	159	155	208
Light-Duty Gasoline Vehicles	32.6	31.2	31.1	39.3	41.0	36.5	37.4	38.6	31.4
Light-Duty Gasoline Trucks	14.1	14.4	15.2	20.4	23.3	22.4	24.5	28.4	23.4
Heavy-Duty Gasoline Vehicles	4.64	3.86	3.52	4.24	3.68	3.53	3.59	3.40	2.83
Motorcycles	0.20	0.20	0.20	0.25	0.25	0.23	0.24	0.26	0.18
Light-Duty Diesel Vehicles	0.32	0.30	0.30	0.39	0.40	0.35	0.37	0.38	0.31
Light-Duty Diesel Trucks	0.23	0.25	0.29	0.40	0.50	0.50	0.89	1.59	1.35
Heavy-Duty Diesel Vehicles	65.6	52.1	48.5	47.1	60.3	79.1	89.7	80.5	147
Propane & Natural Gas Vehicles	1.5	1.5	2.9	2.3	5.9	4.0	2.2	1.9	1.8
Railways	3	2	2	2	1	2	1	3	2
Navigation (Domestic Marine)	0.15	0.23	0.59	0.51	0.11	70	89	13	31
Other Transportation	250	170	120	250	280	210	360	350	390
Off-Road Gasoline	52	41	42	61	59	45	59	59	31
Off-Road Diesel	200	130	82	190	220	160	300	290	350
Pipelines	-	-	-	-	2.28	0.14	0.09	0.04	5.11
c. Fugitive Sources²	64.0	68.0	58.2	61.9	42.5	42.4	39.2	6.20	4.92
Coal Mining	-	-	-	-	-	-	-	-	-
Oil and Natural Gas	64.0	68.0	58.2	61.9	42.5	42.4	39.2	6.20	4.92
INDUSTRIAL PROCESSES³	3.04	11.4	2.23	24.3	104	85.9	65.9	5.65	5.51
a. Mineral Products	-	-	-	-	-	-	-	-	-
Cement Production	-	-	-	-	-	-	-	-	-
Lime Production	-	-	-	-	-	-	-	-	-
Mineral Products Use	-	-	-	-	-	-	-	-	-
b. Chemical Industry	-	-	-	-	-	-	-	-	-
Nitric Acid Production	-	-	-	-	-	-	-	-	-
Adipic Acid Production	-	-	-	-	-	-	-	-	-
Petrochemical Production ⁴	-	-	-	-	-	-	-	-	-
c. Metal Production	-	-	-	-	-	-	-	-	-
Iron and Steel Production	-	-	-	-	-	-	-	-	-
Aluminum Production	-	-	-	-	-	-	-	-	-
SF ₆ Used in Magnesium Smelters and Casters	-	-	-	-	-	-	-	-	-
d. Production and Consumption of Halocarbons	-	-	-	-	-	1.4	1.3	2.7	4.2
e. Other & Undifferentiated Production⁵	3.0	11	2.2	24	100	85	65	3.0	1.4
SOLVENT & OTHER PRODUCT USE	0.38	0.37	0.31	0.35	0.39	0.48	0.49	0.52	0.47
AGRICULTURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
a. Enteric Fermentation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b. Manure Management	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Agriculture Soils	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Direct Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pasture, Range and Paddock Manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indirect Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d. Field Burning of Agricultural Residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WASTE	4.1	4.3	4.5	4.7	4.8	5.0	5.2	5.4	5.6
a. Solid Waste Disposal on Land	3.0	3.2	3.3	3.4	3.6	3.7	3.9	4.1	4.2
b. Wastewater Handling	1.1	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.4
c. Waste Incineration	-	-	-	-	-	-	-	-	-

Notes:

1. Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
 2. Fugitive emissions from refineries are only reported at the national level.
 3. Emissions associated with the consumption of PFCs and SF₆ are only reported at the national level.
 4. The category Petrochemical Production includes emissions coming from production of silicon/calcium carbides; of carbon black; of ethylene; of methanol; of ethylene dichloride; and of styrene. CO₂ emissions from this category are included in Petrochemical Production.
 5. Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
- Indicates no emissions
0.0 Indicates emissions truncated due to rounding

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