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ANNEX 1

KEY CATEGORIES

A1.1. DESCRIPTION OF METHODOLOGY USED FOR IDENTIFYING KEY CATEGORIES

Key categories according to the IPCC Good Practice Guidance (IPCC, 2000) are those found in the accumulative 95% (Tier 1) or 90% (Tier 2) of the total annual emissions in the last reported year or belonging to the total trend, when ranked from contributing the largest to smallest share in annual total and in the trend. As originally designed it applied only to source categories. In addition, *Good Practice Guidance for Land Use, Land-Use Change and Forestry* expands the original approach to enable the identification of key categories that are either sources or sinks, which provides on how to indentify key categories for the LULUCF. Therefore, the key category analysis was determined using both approaches:

- excluding LULUCF
- including LULUCF

Following the *Good Practice Guidelines*, Croatia undertook a key category analysis using Tier 1 and Tier 2 Level and Trend methods.

The IPCC and *Good Practice Guidance for Land Use, Land-Use Change and Forestry* also recommended which sources should be checked for their key category status, Table A1.1-1. Additionally, other sources of direct greenhouse gas emissions not listed in above mentioned guidance were added to the list, e.g. Solvent and Other Product Use.

Level assessment

Level assessment involves an identification of categories as a key by calculating the proportion of emissions and removals in each category to the total emissions and removals. The calculated values of proportion are added from the category that accounts for the largest proportion, until the sum reaches 95% for Tier 1, 90% for Tier 2. Tier 1 level assessment uses emissions and removals from each category directly and Tier 2 level assessment analyzes the emissions and removals of each category, multiplied by the uncertainty (which is calculated in uncertainty analysis chapter) of each category.

Trend Assessment

The purpose of the trend assessment is to identify categories that may not be large enough to be identified by the level assessment, but whose trend is significantly different from the trend of the overall inventory and should therefor recive particular attention.

The difference between the rate of change in emissions and removals in a category and the rate of change in total emissions and removals is calculated. The trend assessment is calculated by multiplying this value by the ratio of contribution of the relevant category to total emissions and removals. The calculated results, regarded as trend assessment values, are added from the category of which the proportion to the total of trend assessment values is the largest, until the total reaches 95% for Tier 1, 90% for Tier 2. At this point, these categories are defined as the key categories. Tier 2 trend assessment is calculated multiplying the Tier 1 trend assessment with uncertainty of each category (Table A5.2-1, Table A5.2-2).

Table A1.1-1: Categories Assessed in Key Category Analysis

Source Categories Assessed in Key Source Category Analysis	Direct GHG	Special Considerations
ENERGY SECTOR		
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	
Mobile Combustion: Road Vehicles	CO ₂	
Mobile Combustion: Road Vehicles	CH ₄	
Mobile Combustion: Road Vehicles	N ₂ O	
Mobile Combustion: Water-borne Navigation	CO ₂	
Mobile Combustion: Water-borne Navigation	CH ₄	
Mobile Combustion: Water-borne Navigation	N ₂ O	
Mobile Combustion: Aircraft	CO ₂	
Mobile Combustion: Aircraft	CH ₄	
Mobile Combustion: Aircraft	N ₂ O	
Mobile Combustion: Railways	CO ₂	
Mobile Combustion: Railways	CH ₄	
Mobile Combustion: Railways	N ₂ O	
Combustion: Agriculture/Forestry/Fishing	CO ₂	
Combustion: Agriculture/Forestry/Fishing	CH ₄	
Combustion: Agriculture/Forestry/Fishing	N ₂ O	
Fugitive Emissions from Coal Mining and Handling	CH ₄	
Fugitive Emissions from Oil and Gas Operations	CO ₂	
Fugitive Emissions from Oil and Gas Operations	CH ₄	
Fugitive Emissions from Oil and Gas Operations	N ₂ O	
INDUSTRIAL SECTOR		
CO ₂ Emissions from Cement Production	CO ₂	
CO ₂ Emissions from Lime Production	CO ₂	
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	
CO ₂ Emissions from Ammonia Production	CO ₂	
CO ₂ Emissions from Iron and Steel Production	CO ₂	
CO ₂ Emissions from Ferroalloys Production	CO ₂	
CO ₂ Emissions from Aluminium production	CO ₂	
CH ₄ Emissions from Production of Other Chemicals	CH ₄	
N ₂ O Emissions from Nitric Acid Production	N ₂ O	
N ₂ O Emissions from Adipic Acid Production	N ₂ O	NO
PFC Emissions from Aluminium production	PFC	
Sulphur hexafluoride (SF ₆) from Magnesium Production	SF ₆	NO
SF ₆ Emissions from Electrical Equipment	SF ₆	
SF ₆ Emissions from Other Sources of SF ₆	SF ₆	NO

Source Categories Assessed in Key Source Category Analysis	Direct GHG	Special Considerations
SF ₆ Emissions from Production of SF ₆	SF ₆	NO
PFC, HFC, SF ₆ Emissions from Semiconductor Manufacturing	HFC/PFC/SF ₆	NO
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	
HFC and PFC Emissions from Other Consumption	HFC/PFC	
HFC-23 Emissions from HCFC-22 Manufacture	HFC	NO
SOLVENT AND OTHER PRODUCT USE		
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	
AGRICULTURE SECTOR		
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	
CH ₄ Emissions from Manure Management	CH ₄	
N ₂ O Emissions from Manure Management	N ₂ O	
CH ₄ Emissions from Savanna Burning	CH ₄	NO
N ₂ O Emissions from Savanna Burning	N ₂ O	NO
CH ₄ Emissions from Agricultural Residue Burning	CH ₄	NO
N ₂ O Emissions from Agricultural Residue Burning	N ₂ O	NO
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	
CH ₄ Emissions from Rice Production	CH ₄	NO
LULUCF		
Forestland remaining Forestland	CO ₂	
Forestland remaining Forestland	CH ₄	
Forestland remaining Forestland	N ₂ O	
Land converted to Forestland	CO ₂	
Land converted to Forestland	CH ₄	
Land converted to Forestland	N ₂ O	
Cropland remaining Cropland	CO ₂	
Land converted to Cropland	CO ₂	
Grassland converted to Cropland: mineral soils	N ₂ O	
Grassland remaining Grassland	CO ₂	
Grassland remaining Grassland	CH ₄	
Grassland remaining Grassland	N ₂ O	
Land Converted to Grassland	CO ₂	
Land converted to Wetlands	CO ₂	
Land converted to Settlements	CO ₂	
WASTE SECTOR		
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	
CH ₄ Emissions from Wastewater Handling	CH ₄	
N ₂ O Emissions from Wastewater Handling	N ₂ O	
CO ₂ Emissions from Waste Incineration	CO ₂	
N ₂ O Emissions from Waste Incineration	N ₂ O	

NO - source categories not occur in Croatia.

The reference to the summary overview for Key Categories 2012 in CRF tables is the Excel file HRV-2014-2012-v1.2, Table 7.

The level of disaggregation is in accordance with the suggested source categories split of the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* and additionally, with the LULUCF category following the *Good Practice Guidance for Land Use, Land-Use Change and Forestry*.

Approach 2 has been done in defining and calculating key categories.

Comments relating to the Approach 2:

Using the aggregate emission factors for each sector, the differences between various types of coal and especially liquid fuel are not included, nor are the differences in the technology and the contribution of equipment for emission reduction. Therefore, the uncertainties associated with emission estimates of these gases are greater than estimates of CO₂ emissions from the fossil fuel combustion.

Uncertainty of N₂O emission is estimated to factor 2 (the emission could be twice larger or smaller than the estimated one).

Because of the high uncertainties (200%) for categories Fuel Combustion - Stationary Sources (N₂O) and Mobile Combustion - Road Vehicles (N₂O), they were calculated as key categories.

(Table A1.2-7: Level Assessment - Tier 2 (Excluding LULUCF)-1990) ,(Table A1.2-9: Key categories analysis – Trend Assessment - Tier 2 (Excluding LULUCF)-2012), (Table A1.2-11: Key categories analysis – Level Assessment - Tier 2 (Excluding LULUCF)-2012), (Table A1.2-8: Key categories analysis – Level Assessment - Tier 2 (Including LULUCF)-1990) and (Table A1.2-12: Key categories analysis – Trend Assessment - Tier 2 (Including LULUCF)-2012).

A1.2. TABLES 7.A1-7.A3 OF THE IPCC GOOD PRACTICE GUIDANCE

Table A1.2-1: Key categories analysis – Level Assessment - Tier 1 (Excluding LULUCF) - 1990

Tier 1 Analysis - Level Assessment - Excluding LULUCF				
IPCC Source Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Level Assessment	Cumulative Total (%)
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	0.268	27%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	0.141	41%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	0.113	52%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	0.088	61%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	0.042	65%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	0.039	69%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	0.038	73%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	0.034	76%
PFC Emissions from Aluminium production	PFC	936.564	0.030	79%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	0.029	82%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	0.026	85%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	0.025	87%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	0.020	89%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	0.015	91%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	0.012	92%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	0.009	93%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	0.008	94%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	0.008	95%
CH ₄ Emissions from Manure Management	CH ₄	228.623	0.007	95%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	0.005	96%
Mobile Combustion: Aircraft	CO ₂	154.724	0.005	96%
CO ₂ Emissions from Lime Production	CO ₂	153.440	0.005	97%
Mobile Combustion: Railways	CO ₂	138.142	0.004	97%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	0.004	98%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.004	98%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.004	98%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	0.003	99%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	0.003	99%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	0.002	99%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	0.002	99%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.002	99%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	0.001	100%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	0.001	100%
Mobile Combustion: Road Vehicles	CH ₄	34.113	0.001	100%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.001	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	0.000	100%
CH ₄ Emissions from Production of Other Chemicals	CH ₄	14.273	0.000	100%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N ₂ O	2.038	0.000	100%
Mobile Combustion: Aircraft	N ₂ O	1.355	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH ₄	1.299	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N ₂ O	0.668	0.000	100%
Mobile Combustion: Railways	N ₂ O	0.392	0.000	100%
Mobile Combustion: Water-borne Navigation	N ₂ O	0.337	0.000	100%

Mobile Combustion: Railways	CH4	0.214	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	100%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	0.000	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	0.000	100%
TOTAL		31,679.780		

Table A1.2-2: Key categories analysis – Level Assessment - Tier 1 (Including LULUCF) – 1990

Tier 1 Analysis - Level Assessment - Including LULUCF				
IPCC Source/Sink Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Level Assessment	Cumulative Total (%)
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	0.214	21%
Forestland remaining Forestland	CO ₂	6,874.531	0.173	39%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	0.112	50%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	0.091	59%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	0.070	66%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	0.034	69%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	0.031	73%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	0.030	76%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	0.027	78%
PFC Emissions from Aluminium production	PFC	936.564	0.024	81%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	0.024	83%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	0.021	85%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	0.020	87%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	0.016	89%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	0.012	90%
Land converted to Settlements	CO ₂	440.409	0.011	91%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	0.010	92%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	0.007	93%
Land converted to Forestland	CO ₂	272.239	0.007	93%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	0.007	94%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	0.006	95%
CH ₄ Emissions from Manure Management	CH ₄	228.623	0.006	95%
Cropland remaining Cropland	CO ₂	180.176	0.005	96%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	0.004	96%
Mobile Combustion: Aircraft	CO ₂	154.724	0.004	97%
CO ₂ Emissions from Lime Production	CO ₂	153.440	0.004	97%
Mobile Combustion: Railways	CO ₂	138.142	0.003	97%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	0.003	98%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.003	98%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.003	98%
Land converted to Grassland	CO ₂	84.615	0.002	98%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	0.002	99%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	0.002	99%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	0.002	99%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	0.001	99%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.001	99%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	0.001	99%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	0.001	99%
Mobile Combustion: Road Vehicles	CH ₄	34.113	0.001	100%
Land converted to Wetlands	CO ₂	29.997	0.001	100%
Grassland remaining Grassland	CO ₂	25.864	0.001	100%
Land converted to Cropland	CO ₂	23.477	0.001	100%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.001	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	0.000	100%
CH ₄ Emissions from Production of Other Chemicals	CH ₄	14.273	0.000	100%
Forestland remaining Forestland	CH ₄	12.150	0.000	100%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	0.000	100%

Grassland converted to Cropland: mineral soils	N2O	4.855	0.000	100%
Forestland remaining Forestland	N2O	2.779	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	0.000	100%
Grassland remaining Grassland	CH4	0.731	0.000	100%
Grassland remaining Grassland	N2O	0.675	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.000	100%
Land converted to Forestland	CH4	0.012	0.000	100%
Land converted to Forestland	N2O	0.011	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	100%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	0.000	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	0.000	100%
TOTAL		39,632.301		

Table A1.2-3: Key categories analysis – Level Assessment - Tier 1 (Excluding LULUCF) - 2012

Tier 1 Analysis - Level Assessment - Excluding LULUCF					
IPCC Source Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Level Assessment	Cumulative Total (%)
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	5,364.703	0.203	20%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	4,639.537	0.176	38%
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	3,521.277	0.133	51%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	2,474.475	0.094	61%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	1,232.428	0.047	65%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	1,108.931	0.042	70%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	998.871	0.038	73%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	816.262	0.031	76%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	0.030	79%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.030	82%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	678.637	0.026	85%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.025	87%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.019	89%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.019	91%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	0.018	93%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.009	94%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.009	95%
CH ₄ Emissions from Manure Management	CH ₄	228.623	194.729	0.007	96%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.007	96%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.005	97%
CO ₂ Emissions from Lime Production	CO ₂	153.440	114.155	0.004	97%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	110.762	0.004	98%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.004	98%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.004	98%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.004	99%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.003	99%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.002	99%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	48.531	0.002	99%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.002	100%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	37.817	0.001	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	21.813	0.001	100%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.000	100%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	9.600	0.000	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N ₂ O	2.038	1.618	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH ₄	1.299	1.005	0.000	100%
Mobile Combustion: Aircraft	N ₂ O	1.355	0.829	0.000	100%
CH ₄ Emissions from Production of Other Chemicals	CH ₄	14.273	0.440	0.000	100%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.319	0.000	100%
Mobile Combustion: Water-borne Navigation	N ₂ O	0.337	0.280	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N ₂ O	0.668	0.230	0.000	100%
Mobile Combustion: Railways	N ₂ O	0.392	0.197	0.000	100%
Mobile Combustion: Water-borne Navigation	CH ₄	0.190	0.158	0.000	100%
Mobile Combustion: Railways	CH ₄	0.214	0.111	0.000	100%

CO2 Emissions from Waste Incineration	CO2	0.043	0.078	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	100%
CO2 Emissions from Ferroalloys Production	CO2	118.836	0.000	0.000	100%
CO2 Emissions from Aluminium production	CO2	111.372	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	100%
Fugitive Emissions from Coal Mining and Handling	CH4	48.757	0.000	0.000	100%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.000	100%
TOTAL		31,679.780	26,385.288		

Table A1.2-4: Key categories analysis – Level Assessment - Tier 1 (Including LULUCF) – 2012

Tier 1 Analysis - Level Assessment - Including LULUCF					
IPCC Source/Sink Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Level Assessment	Cumulative Total (%)
Forestland remaining Forestland	CO ₂	6,874.531	6,518.512	0.190	19%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	5,364.703	0.157	35%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	4,639.537	0.136	48%
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	3,521.277	0.103	59%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	2,474.475	0.072	66%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	1,232.428	0.036	69%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	1,108.931	0.032	73%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	998.871	0.029	76%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	816.262	0.024	78%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	0.023	80%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.023	83%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	678.637	0.020	85%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.019	86%
Land converted to Settlements	CO ₂	440.409	596.161	0.017	88%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.015	90%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.015	91%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	0.014	93%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.007	93%
Cropland remaining Cropland	CO ₂	180.176	234.727	0.007	94%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.007	95%
CH ₄ Emissions from Manure Management	CH ₄	228.623	194.729	0.006	95%
Land converted to Forestland	CO ₂	272.239	189.376	0.006	96%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.005	96%
Land converted to Grassland	CO ₂	84.615	157.389	0.005	97%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.004	97%
CO ₂ Emissions from Lime Production	CO ₂	153.440	114.155	0.003	97%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	110.762	0.003	98%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.003	98%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.003	98%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.003	99%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.002	99%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.001	99%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	48.531	0.001	99%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.001	99%
Land converted to Cropland	CO ₂	23.477	47.551	0.001	99%
Grassland remaining Grassland	CO ₂	25.864	42.071	0.001	100%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	37.817	0.001	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	21.813	0.001	100%
Forestland remaining Forestland	CH ₄	12.150	21.173	0.001	100%
Land converted to Wetlands	CO ₂	29.997	15.726	0.000	100%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.000	100%
Grassland converted to Cropland: mineral soils	N ₂ O	4.855	9.784	0.000	100%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	9.600	0.000	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.000	100%

Forestland remaining Forestland	N2O	2.779	4.842	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	0.000	100%
Grassland remaining Grassland	CH4	0.731	1.229	0.000	100%
Grassland remaining Grassland	N2O	0.675	1.134	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.829	0.000	100%
CH4 Emissions from Production of Other Chemicals	CH4	14.273	0.440	0.000	100%
CO2 Emissions from Iron and Steel Production	CO2	21.447	0.319	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.197	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.111	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	0.000	100%
Land converted to Forestland	CH4	0.012	0.021	0.000	100%
Land converted to Forestland	N2O	0.011	0.019	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	100%
CO2 Emissions from Ferroalloys Production	CO2	118.836	0.000	0.000	100%
CO2 Emissions from Aluminium production	CO2	111.372	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	100%
Fugitive Emissions from Coal Mining and Handling	CH4	48.757	0.000	0.000	100%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.000	100%
TOTAL		39,632.301	34,225.004		

Table A1.2-5: Key categories analysis – Trend Assessment - Tier 1 (Excluding LULUCF) – 2012

Tier 1 Analysis - Trend Assessment - Excluding LULUCF						
IPCC Source Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Trend Assessment	% Contribution to trend	Cumulative Total (%)
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8497.044	3521.277	0.162	0.347	35%
Mobile Combustion: Road Vehicles	CO ₂	3593.319	5364.703	0.108	0.231	58%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4458.539	4639.537	0.042	0.090	67%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.035	0.076	74%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	0.027	0.058	80%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	0.022	0.047	85%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1202.278	1232.428	0.011	0.023	87%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1241.920	816.262	0.010	0.021	89%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2780.447	2474.475	0.007	0.015	91%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.005	0.011	92%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.000	0.005	0.010	93%
CO ₂ Emissions from Cement Production	CO ₂	1085.790	998.871	0.004	0.009	94%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.000	0.004	0.009	95%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.003	0.007	95%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.000	0.002	0.004	96%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.002	0.004	96%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.002	0.003	97%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.002	0.003	97%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.002	0.003	97%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.002	0.003	98%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.001	0.003	98%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.001	0.003	98%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	678.637	0.001	0.002	98%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.001	0.002	99%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.319	0.001	0.002	99%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.001	0.002	99%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.001	0.001	99%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.001	0.001	99%
CO ₂ Emissions from Lime Production	CO ₂	153.440	114.155	0.001	0.001	99%
CH ₄ Emissions from Production of Other Chemicals	CH ₄	14.273	0.440	0.001	0.001	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	21.813	0.000	0.001	100%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.000	0.001	100%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.000	0.001	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.000	0.001	100%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1337.857	1108.931	0.000	0.001	100%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	37.817	0.000	0.001	100%
CH ₄ Emissions from Manure Management	CH ₄	228.623	194.729	0.000	0.000	100%

Non-CO2 Emissions from Stationary Combustion	N2O	62.365	48.531	0.000	0.000	100%
SF6 Emissions from Electrical Equipment	SF6	10.954	9.600	0.000	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	0.000	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.829	0.000	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.197	0.000	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	0.000	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	0.000	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.111	0.000	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	CO2	132.980	110.762	0.000	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	0.000	100%
TOTAL		31,679.780	26,385.288			

Table A1.2-6: Key categories analysis – Trend Assessment - Tier 1 (Including LULUCF) – 2012

Tier 1 Analysis - Trend Assessment - Including LULUCF						
IPCC Source/Sink Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Trend Assessment	% Contribution to trend	Cumulative Total (%)
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	3,521.277	0.129	0.336	34%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	5,364.703	0.077	0.199	53%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.027	0.071	61%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	4,639.537	0.027	0.069	67%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	0.020	0.051	73%
Forestland remaining Forestland	CO ₂	6,874.531	6,518.512	0.020	0.051	78%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	0.016	0.042	82%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	816.262	0.009	0.023	84%
Land converted to Settlements	CO ₂	440.409	596.161	0.007	0.019	86%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	1,232.428	0.007	0.017	88%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.000	0.003	0.009	89%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.003	0.009	90%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.000	0.003	0.008	90%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.003	0.008	91%
Land converted to Grassland	CO ₂	84.615	157.389	0.003	0.007	92%
Cropland remaining Cropland	CO ₂	180.176	234.727	0.003	0.007	93%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	2,474.475	0.002	0.006	93%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	998.871	0.002	0.005	94%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.002	0.005	94%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.002	0.004	95%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	1,108.931	0.002	0.004	95%
Land converted to Forestland	CO ₂	272.239	189.376	0.002	0.004	96%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.000	0.001	0.004	96%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.001	0.004	96%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.001	0.004	97%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.001	0.003	97%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.001	0.003	97%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.001	0.003	98%
Land converted to Cropland	CO ₂	23.477	47.551	0.001	0.002	98%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.001	0.002	98%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.001	0.002	98%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.001	0.002	98%
Grassland remaining Grassland	CO ₂	25.864	42.071	0.001	0.002	99%
CO ₂ Emissions from Lime Production	CO ₂	153.440	114.155	0.001	0.002	99%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.319	0.001	0.002	99%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.001	0.002	99%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.001	0.001	99%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.000	0.001	99%
CH ₄ Emissions from Production of Other	CH ₄	14.273	0.440	0.000	0.001	99%

Chemicals						
Forestland remaining Forestland	CH4	12.150	21.173	0.000	0.001	99%
Land converted to Wetlands	CO2	29.997	15.726	0.000	0.001	100%
CO2 Emissions from Soda Ash Production and Use	CO2	14.466	21.813	0.000	0.001	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.000	0.001	100%
CO2 Emissions from Limestone and Dolomite Use	CO2	51.706	37.817	0.000	0.001	100%
Grassland converted to Cropland: mineral soils	N2O	4.855	9.784	0.000	0.000	100%
Non-CO2 Emissions from Stationary Combustion	N2O	62.365	48.531	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	CO2	132.980	110.762	0.000	0.000	100%
CH4 Emissions from Manure Management	CH4	228.623	194.729	0.000	0.000	100%
Forestland remaining Forestland	N2O	2.779	4.842	0.000	0.000	100%
N2O Emissions from Nitric Acid Production	N2O	784.638	678.637	0.000	0.000	100%
Grassland remaining Grassland	CH4	0.731	1.229	0.000	0.000	100%
Grassland remaining Grassland	N2O	0.675	1.134	0.000	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	0.000	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.829	0.000	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	0.000	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.197	0.000	0.000	100%
SF6 Emissions from Electrical Equipment	SF6	10.954	9.600	0.000	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	0.000	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.111	0.000	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	0.000	0.000	100%
Land converted to Forestland	CH4	0.012	0.021	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	0.000	0.000	100%
Land converted to Forestland	N2O	0.011	0.019	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	0.000	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	0.000	100%
TOTAL		39,632.301	34,225.004			

Table A1.2-7: Key categories analysis – Level Assessment - Tier 2 (Excluding LULUCF) – 1990

Tier 2 Analysis - Level Assessment - Excluding LULUCF				
IPCC Source Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Level Assessment Tier 2	Cumulative Total (%)
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	0.428	43%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	0.164	59%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	0.083	67%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	0.030	70%
PFC Emissions from Aluminium production	PFC	936.564	0.030	73%
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	0.029	76%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	0.028	79%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	0.022	81%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	0.016	83%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	0.015	84%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	0.015	86%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	0.015	87%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.014	89%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	0.013	90%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	0.012	91%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	0.010	93%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	0.010	94%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	0.010	94%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	0.008	95%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	0.005	96%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	0.005	96%
CH ₄ Emissions from Manure Management	CH ₄	228.623	0.005	97%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.004	97%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.004	98%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	0.003	98%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	0.003	98%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	0.003	99%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	0.003	99%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	0.002	99%
Mobile Combustion: Road Vehicles	CH ₄	34.113	0.002	99%
Mobile Combustion: Railways	CO ₂	138.142	0.001	99%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	0.001	99%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	0.001	100%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.001	100%
Mobile Combustion: Aircraft	CO ₂	154.724	0.001	100%
CO ₂ Emissions from Lime Production	CO ₂	153.440	0.001	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	0.001	100%
Combustion: Agriculture/Forestry/Fishing	N ₂ O	2.038	0.000	100%
Mobile Combustion: Aircraft	N ₂ O	1.355	0.000	100%
CH ₄ Emissions from Production of Other Chemicals	CH ₄	14.273	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N ₂ O	0.668	0.000	100%
Mobile Combustion: Railways	N ₂ O	0.392	0.000	100%
Mobile Combustion: Water-borne Navigation	N ₂ O	0.337	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH ₄	1.299	0.000	100%
Mobile Combustion: Railways	CH ₄	0.214	0.000	100%
Mobile Combustion: Water-borne Navigation	CH ₄	0.190	0.000	100%
CO ₂ Emissions from Waste Incineration	CO ₂	0.043	0.000	100%

Mobile Combustion: Aircraft	CH4	0.023	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	100%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	0.000	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	0.000	100%
TOTAL		31,679.780		

Table A1.2-8: Key categories analysis – Level Assessment - Tier 2 (Including LULUCF) – 1990

Tier 2 Analysis - Level Assessment - Including LULUCF				
IPCC Source/Sink Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Level Assessment Tier 2	Cumulative Total (%)
Forestland remaining Forestland	CO ₂	6,874.531	0.358	36%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	0.208	57%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	0.079	65%
Cropland remaining Cropland	CO ₂	180.176	0.058	70%
Land converted to Settlements	CO ₂	440.409	0.040	74%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	0.040	78%
Land converted to Forestland	CO ₂	272.239	0.022	81%
Land converted to Grassland	CO ₂	84.615	0.018	82%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	0.015	84%
PFC Emissions from Aluminium production	PFC	936.564	0.014	85%
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	0.014	87%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	0.014	88%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	0.011	89%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	0.008	90%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	0.007	91%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	0.007	91%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	0.007	92%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.007	93%
Land converted to Wetlands	CO ₂	29.997	0.007	93%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	0.006	94%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	0.006	95%
Land converted to Cropland	CO ₂	23.477	0.006	95%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	0.005	96%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	0.005	96%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	0.005	97%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	0.004	97%
Grassland remaining Grassland	CO ₂	25.864	0.003	97%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	0.003	98%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	0.003	98%
CH ₄ Emissions from Manure Management	CH ₄	228.623	0.002	98%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.002	98%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.002	99%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	0.002	99%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	0.002	99%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	0.002	99%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	0.001	99%
Forestland remaining Forestland	CH ₄	12.150	0.001	99%
Grassland converted to Cropland: mineral soils	N ₂ O	4.855	0.001	99%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	0.001	100%
Mobile Combustion: Road Vehicles	CH ₄	34.113	0.001	100%
Mobile Combustion: Railways	CO ₂	138.142	0.001	100%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	0.001	100%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	0.000	100%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.000	100%
Mobile Combustion: Aircraft	CO ₂	154.724	0.000	100%
CO ₂ Emissions from Lime Production	CO ₂	153.440	0.000	100%
Forestland remaining Forestland	N ₂ O	2.779	0.000	100%

CO2 Emissions from Soda Ash Production and Use	CO2	14.466	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.000	100%
CH4 Emissions from Production of Other Chemicals	CH4	14.273	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.000	100%
Grassland remaining Grassland	CH4	0.731	0.000	100%
Grassland remaining Grassland	N2O	0.675	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.000	100%
Land converted to Forestland	CH4	0.012	0.000	100%
Land converted to Forestland	N2O	0.011	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	100%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	0.000	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	0.000	100%
TOTAL		39,632.301		

Table A1.2-9: Key categories analysis – Level Assessment - Tier 2 (Excluding LULUCF) – 2012

Tier 2 Analysis - Level Assessment - Excluding LULUCF					
IPCC Source Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Level Assessment Tier 2	Cumulative Total (%)
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	1,232.428	0.462	46%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.154	62%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	1,108.931	0.072	69%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	0.057	75%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	0.042	79%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	678.637	0.026	81%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.019	83%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	5,364.703	0.018	85%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	4,639.537	0.017	87%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	816.262	0.015	88%
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	3,521.277	0.013	90%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	48.531	0.012	91%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.012	92%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.012	93%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.008	94%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.008	95%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.007	95%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	2,474.475	0.007	96%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.007	97%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	998.871	0.005	97%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.005	98%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.004	98%
CH ₄ Emissions from Manure Management	CH ₄	228.623	194.729	0.004	99%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.004	99%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.003	99%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	37.817	0.001	99%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	110.762	0.001	99%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	9.600	0.001	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	21.813	0.001	100%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.001	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.001	100%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.001	100%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.000	100%
CO ₂ Emissions from Lime Production	CO ₂	153.440	114.155	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N ₂ O	2.038	1.618	0.000	100%
Mobile Combustion: Aircraft	N ₂ O	1.355	0.829	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N ₂ O	0.668	0.230	0.000	100%
Mobile Combustion: Water-borne Navigation	N ₂ O	0.337	0.280	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH ₄	1.299	1.005	0.000	100%
Mobile Combustion: Railways	N ₂ O	0.392	0.197	0.000	100%
CH ₄ Emissions from Production of Other Chemicals	CH ₄	14.273	0.440	0.000	100%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.319	0.000	100%
Mobile Combustion: Water-borne Navigation	CH ₄	0.190	0.158	0.000	100%
CO ₂ Emissions from Waste Incineration	CO ₂	0.043	0.078	0.000	100%

Mobile Combustion: Railways	CH4	0.214	0.111	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	100%
CO2 Emissions from Ferroalloys Production	CO2	118.836	0.000	0.000	100%
CO2 Emissions from Aluminium production	CO2	111.372	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	100%
Fugitive Emissions from Coal Mining and Handling	CH4	48.757	0.000	0.000	100%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.000	100%
TOTAL		31,679.780	26,385.288		

Table A1.2-10: Key categories analysis – Level Assessment - Tier 2 (Including LULUCF) – 2012

Tier 2 Analysis - Level Assessment - Including LULUCF					
IPCC Source/Sink Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Level Assessment Tier 2	Cumulative Total (%)
Forestland remaining Forestland	CO ₂	6,874.531	6,518.512	0.339	34%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	1,232.428	0.212	55%
Cropland remaining Cropland	CO ₂	180.176	234.727	0.076	63%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.070	70%
Land converted to Settlements	CO ₂	440.409	596.161	0.054	75%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	1,108.931	0.033	78%
Land converted to Grassland	CO ₂	84.615	157.389	0.032	82%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	0.026	84%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	0.019	86%
Land converted to Forestland	CO ₂	272.239	189.376	0.016	88%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	678.637	0.012	89%
Land converted to Cropland	CO ₂	23.477	47.551	0.012	90%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.009	91%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	5,364.703	0.008	92%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	4,639.537	0.008	93%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	816.262	0.007	93%
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	3,521.277	0.006	94%
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	62.365	48.531	0.006	94%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.006	95%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.005	96%
Grassland remaining Grassland	CO ₂	25.864	42.071	0.005	96%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.004	96%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.004	97%
Land converted to Wetlands	CO ₂	29.997	15.726	0.004	97%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.003	97%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	2,474.475	0.003	98%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.003	98%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	998.871	0.002	98%
Grassland converted to Cropland: mineral soils	N ₂ O	4.855	9.784	0.002	98%
Forestland remaining Forestland	CH ₄	12.150	21.173	0.002	99%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.002	99%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.002	99%
CH ₄ Emissions from Manure Management	CH ₄	228.623	194.729	0.002	99%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.002	99%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.001	100%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	37.817	0.001	100%
Forestland remaining Forestland	N ₂ O	2.779	4.842	0.000	100%
Mobile Combustion: Water-borne Navigation	CO ₂	132.980	110.762	0.000	100%
SF ₆ Emissions from Electrical Equipment	SF ₆	10.954	9.600	0.000	100%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	21.813	0.000	100%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.000	100%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.000	100%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.000	100%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.000	100%

CO2 Emissions from Lime Production	CO2	153.440	114.155	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	0.000	100%
Grassland remaining Grassland	CH4	0.731	1.229	0.000	100%
Grassland remaining Grassland	N2O	0.675	1.134	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.829	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.197	0.000	100%
CH4 Emissions from Production of Other Chemicals	CH4	14.273	0.440	0.000	100%
CO2 Emissions from Iron and Steel Production	CO2	21.447	0.319	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.111	0.000	100%
Land converted to Forestland	CH4	0.012	0.021	0.000	100%
Land converted to Forestland	N2O	0.011	0.019	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	100%
CO2 Emissions from Ferroalloys Production	CO2	118.836	0.000	0.000	100%
CO2 Emissions from Aluminium production	CO2	111.372	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	100%
Fugitive Emissions from Coal Mining and Handling	CH4	48.757	0.000	0.000	100%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.000	100%
TOTAL		39,632.301	34,225.004		

Table A1.2-11: Key categories analysis – Trend Assessment - Tier 2 (Excluding LULUCF) – 2012

Tier 2 Analysis - Trend Assessment - Excluding LULUCF						
IPCC Source Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Trend Assessment Tier 2	% Contribution to Trend	Cumulative Total (%)
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	3,521.277	0.490	0.049	5%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	5,364.703	0.289	0.029	8%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	4,639.537	0.126	0.013	9%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.964	0.097	19%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	1.540	0.155	34%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	1.541	0.155	50%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	1,232.428	3.155	0.318	82%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	816.262	0.141	0.014	83%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	2,474.475	0.016	0.002	83%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.031	0.003	84%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.000	0.132	0.013	85%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	998.871	0.018	0.002	85%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.000	0.127	0.013	86%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.138	0.014	88%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.000	0.462	0.047	92%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.012	0.001	93%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.089	0.009	93%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.007	0.001	93%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.048	0.005	94%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.055	0.006	95%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.005	0.000	95%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.014	0.001	95%
N ₂ O Emissions from Nitric Acid Production	N ₂ O	784.638	678.637	0.034	0.003	95%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.072	0.007	96%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.319	0.025	0.002	96%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.031	0.003	96%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.035	0.003	97%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.135	0.014	98%
CO ₂ Emissions from Lime Production	CO ₂	153.440	114.155	0.002	0.000	98%
CH ₄ Emissions from Production of Other Chemicals	CH ₄	14.273	0.440	0.016	0.002	98%
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	14.466	21.813	0.014	0.001	98%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.023	0.002	99%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.049	0.005	99%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.022	0.002	99%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	1,108.931	0.013	0.001	99%
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	51.706	37.817	0.007	0.001	100%
CH ₄ Emissions from Manure Management	CH ₄	228.623	194.729	0.003	0.000	100%

Non-CO2 Emissions from Stationary Combustion	N2O	62.365	48.531	0.031	0.003	100%
SF6 Emissions from Electrical Equipment	SF6	10.954	9.600	0.002	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	0.004	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.829	0.003	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.197	0.001	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	0.001	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	0.000	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.111	0.000	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	CO2	132.980	110.762	0.000	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	0.000	100%
TOTAL		31,679.780	26,385.288			

Table A1.2-12: Key categories analysis – Trend Assessment - Tier 2 (Including LULUCF) – 2012

Tier 2 Analysis - Trend Assessment - Including LULUCF						
IPCC Source/Sink Categories	Direct GHG	Base Year (1990) Estimate (Gg eq-CO ₂)	Last Year (2012) Estimate (Gg eq-CO ₂)	Trend Assessment Tier 2	% Contribution to Trend	Cumulative Total (%)
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	8,497.044	3,521.277	0.391	0.028	3%
Mobile Combustion: Road Vehicles	CO ₂	3,593.319	5,364.703	0.205	0.015	4%
PFC Emissions from Aluminium production	PFC	936.564	0.000	0.743	0.054	10%
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	4,458.539	4,639.537	0.080	0.006	10%
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	242.623	793.024	1.131	0.082	19%
Forestland remaining Forestland	CO ₂	6,874.531	6,518.512	1.785	0.130	32%
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.000	478.771	1.145	0.083	40%
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	1,241.920	816.262	0.123	0.009	41%
Land converted to Settlements	CO ₂	440.409	596.161	1.164	0.085	49%
Fugitive Emissions from Oil and Gas Operations	CH ₄	1,202.278	1,232.428	1.971	0.143	64%
CO ₂ Emissions from Ferroalloys Production	CO ₂	118.836	0.000	0.102	0.007	64%
CO ₂ Emissions from Ammonia Production	CO ₂	466.009	503.317	0.020	0.001	64%
CO ₂ Emissions from Aluminium production	CO ₂	111.372	0.000	0.098	0.007	65%
N ₂ O Emissions from Manure Management	N ₂ O	381.844	241.462	0.118	0.009	66%
Land converted to Grassland	CO ₂	84.615	157.389	1.027	0.075	73%
Cropland remaining Cropland	CO ₂	180.176	234.727	1.505	0.109	84%
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	2,780.447	2,474.475	0.005	0.000	84%
CO ₂ Emissions from Cement Production	CO ₂	1,085.790	998.871	0.008	0.001	85%
Combustion: Agriculture/Forestry/Fishing	CO ₂	839.186	666.227	0.006	0.000	85%
Fugitive Emissions from Oil and Gas Operations	CO ₂	639.818	503.354	0.017	0.001	85%
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	1,337.857	1,108.931	0.082	0.006	85%
Land converted to Forestland	CO ₂	272.239	189.376	0.221	0.016	87%
Fugitive Emissions from Coal Mining and Handling	CH ₄	48.757	0.000	0.356	0.026	90%
Mobile Combustion: Railways	CO ₂	138.142	77.667	0.010	0.001	90%
N ₂ O Emissions from Pasture, Range and Paddock Manure	N ₂ O	261.130	184.055	0.051	0.004	90%
Mobile Combustion: Aircraft	CO ₂	154.724	94.609	0.006	0.000	90%
CO ₂ Emissions from Solvent and Other Product Use	CO ₂	82.256	104.259	0.061	0.004	90%
N ₂ O Emissions from Wastewater Handling	N ₂ O	84.567	104.012	0.033	0.002	91%
Land converted to Cropland	CO ₂	23.477	47.551	0.393	0.029	94%
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	934.066	784.860	0.115	0.008	94%
N ₂ O Emissions from Solvent and Other Product Use	N ₂ O	34.720	51.308	0.051	0.004	95%
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	168.641	125.329	0.035	0.003	95%
Grassland remaining Grassland	CO ₂	25.864	42.071	0.129	0.009	96%
CO ₂ Emissions from Lime Production	CO ₂	153.440	114.155	0.002	0.000	96%
CO ₂ Emissions from Iron and Steel Production	CO ₂	21.447	0.319	0.019	0.001	96%
Mobile Combustion: Road Vehicles	CH ₄	34.113	11.537	0.024	0.002	96%
CH ₄ Emissions from Wastewater Handling	CH ₄	283.524	228.494	0.037	0.003	97%
Mobile Combustion: Road Vehicles	N ₂ O	40.243	48.321	0.092	0.007	97%
CH ₄ Emissions from Production of Other	CH ₄	14.273	0.440	0.012	0.001	97%

Chemicals						
Forestland remaining Forestland	CH4	12.150	21.173	0.064	0.005	98%
Land converted to Wetlands	CO2	29.997	15.726	0.137	0.010	99%
CO2 Emissions from Soda Ash Production and Use	CO2	14.466	21.813	0.010	0.001	99%
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.000	6.873	0.016	0.001	99%
CO2 Emissions from Limestone and Dolomite Use	CO2	51.706	37.817	0.007	0.001	99%
Grassland converted to Cropland: mineral soils	N2O	4.855	9.784	0.075	0.005	100%
Non-CO2 Emissions from Stationary Combustion	N2O	62.365	48.531	0.036	0.003	100%
Mobile Combustion: Water-borne Navigation	CO2	132.980	110.762	0.001	0.000	100%
CH4 Emissions from Manure Management	CH4	228.623	194.729	0.001	0.000	100%
Forestland remaining Forestland	N2O	2.779	4.842	0.015	0.001	100%
N2O Emissions from Nitric Acid Production	N2O	784.638	678.637	0.001	0.000	100%
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	0.004	0.000	100%
Mobile Combustion: Aircraft	N2O	1.355	0.829	0.002	0.000	100%
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	0.001	0.000	100%
Mobile Combustion: Railways	N2O	0.392	0.197	0.001	0.000	100%
SF6 Emissions from Electrical Equipment	SF6	10.954	9.600	0.000	0.000	100%
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	0.000	0.000	100%
Mobile Combustion: Railways	CH4	0.214	0.111	0.000	0.000	100%
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	0.000	0.000	100%
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	0.000	0.000	100%
Mobile Combustion: Aircraft	CH4	0.023	0.014	0.000	0.000	100%
Other non-specified NEU	CO2	0.000	0.000	0.000	0.000	100%
TOTAL		39,630.871	34,222.600			

Table A1.2-13: Key categories for Croatia – summary (Excluding LULUCF) - 1990

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)

IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
ENERGY			
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	Yes	L1
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	Yes	L1, L2
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	Yes	L1, L2
Mobile Combustion: Road Vehicles	CO ₂	Yes	L1, L2
Mobile Combustion: Water-borne Navigation	CO ₂	No	
Mobile Combustion: Aircraft	CO ₂	No	
Mobile Combustion: Railways	CO ₂	No	
Combustion: Agriculture/Forestry/Fishing	CO ₂	Yes	L1
Fugitive Emissions from Oil and Gas Operations	CO ₂	Yes	L1
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	No	
Mobile Combustion: Road Vehicles	CH ₄	No	
Mobile Combustion: Water-borne Navigation	CH ₄	No	
Mobile Combustion: Aircraft	CH ₄	No	
Mobile Combustion: Railways	CH ₄	No	
Combustion: Agriculture/Forestry/Fishing	CH ₄	No	
Fugitive Emissions from Coal Mining and Handling	CH ₄	Yes	L2
Fugitive Emissions from Oil and Gas Operations	CH ₄	Yes	L1, L2
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	Yes	L2
Mobile Combustion: Road Vehicles	N ₂ O	No	
Mobile Combustion: Water-borne Navigation	N ₂ O	No	
Mobile Combustion: Aircraft	N ₂ O	No	
Mobile Combustion: Railways	N ₂ O	No	
Combustion: Agriculture/Forestry/Fishing	N ₂ O	No	
Fugitive Emissions from Oil and Gas Operations	N ₂ O	No	
INDUSTRIAL PROCESSES			
CO ₂ Emissions from Cement Production	CO ₂	Yes	L1
CO ₂ Emissions from Lime Production	CO ₂	No	
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	No	
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	No	
CO ₂ Emissions from Ammonia Production	CO ₂	Yes	L1
CO ₂ Emissions from Iron and Steel Production	CO ₂	No	
CO ₂ Emissions from Ferroalloys Production	CO ₂	No	
CO ₂ Emissions from Aluminium Production	CO ₂	No	
Other non-specified NEU	CO ₂	No	
CH ₄ Emissions from Production of Other Chemicals	CH ₄	No	
N ₂ O Emissions from Nitric Acid Production	N ₂ O	Yes	L1, L2
PFC Emissions from Aluminium production	PFC	Yes	L1, L2
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	No	
HFC and PFC Emissions from Other Consumption	HFC/PFC	No	
SF ₆ Emissions from Electrical Equipment	SF ₆	No	
SOLVENT AND OTHER PRODUCT USE			
CO ₂ Emissions from Solvent and Other product use	CO ₂	No	
N ₂ O Emissions from Solvent and Other product use	N ₂ O	No	
AGRICULTURE			
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	Yes	L1, L2
CH ₄ Emissions from Manure Management	CH ₄	Yes	L1
CH ₄ Emissions from Agricultural Residue Burning	CH ₄	No	
N ₂ O Emissions from Manure Management	N ₂ O	Yes	L1, L2

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)			
IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	Yes	L1, L2
N ₂ O Emissions from Pasture Range and Paddock Manure	N ₂ O	Yes	L1
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	Yes	L1, L2
N ₂ O Emissions from Agricultural Residue Burning	N ₂ O	No	
WASTE			
CO ₂ Emissions from Waste Incineration	CO ₂	No	
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	Yes	L1, L2
CH ₄ Emissions from Wastewater Handling	CH ₄	Yes	L1, L2
N ₂ O Emissions from Wastewater Handling	N ₂ O	No	
N ₂ O Emissions from Waste Incineration	N ₂ O	No	

L1 - Level excluding LULUCF Tier1

L2 - Level excluding LULUCF Tier2

Table A1.2-14: Key categories for Croatia – summary (Excluding LULUCF) – 2012

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)

IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
ENERGY			
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	Yes	L1, T1, T2
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	Yes	L1, L2, T1, T2
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	Yes	L1, L2, T1, T2
Mobile Combustion: Road Vehicles	CO ₂	Yes	L1, L2, T1, T2
Mobile Combustion: Water-borne Navigation	CO ₂	No	
Mobile Combustion: Aircraft	CO ₂	No	
Mobile Combustion: Railways	CO ₂	No	
Combustion: Agriculture/Forestry/Fishing	CO ₂	Yes	L1
Fugitive Emissions from Oil and Gas Operations	CO ₂	Yes	L1
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	No	
Mobile Combustion: Road Vehicles	CH ₄	No	
Mobile Combustion: Water-borne Navigation	CH ₄	No	
Mobile Combustion: Aircraft	CH ₄	No	
Mobile Combustion: Railways	CH ₄	No	
Combustion: Agriculture/Forestry/Fishing	CH ₄	No	
Fugitive Emissions from Coal Mining and Handling	CH ₄	Yes	T2
Fugitive Emissions from Oil and Gas Operations	CH ₄	Yes	L1, L2, T1, T2
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	No	
Mobile Combustion: Road Vehicles	N ₂ O	No	
Mobile Combustion: Water-borne Navigation	N ₂ O	No	
Mobile Combustion: Aircraft	N ₂ O	No	
Mobile Combustion: Railways	N ₂ O	No	
Combustion: Agriculture/Forestry/Fishing	N ₂ O	No	
Fugitive Emissions from Oil and Gas Operations	N ₂ O	No	
INDUSTRIAL PROCESSES			
CO ₂ Emissions from Cement Production	CO ₂	Yes	L1, T1, T2
CO ₂ Emissions from Lime Production	CO ₂	No	
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	No	
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	No	
CO ₂ Emissions from Ammonia Production	CO ₂	Yes	L1, T1, T2
CO ₂ Emissions from Iron and Steel Production	CO ₂	No	
CO ₂ Emissions from Ferroalloys Production	CO ₂	Yes	T1, T2
CO ₂ Emissions from Aluminium Production	CO ₂	Yes	T1, T2
Other non-specified NEU	CO ₂	No	
CH ₄ Emissions from Production of Other Chemicals	CH ₄	No	
N ₂ O Emissions from Nitric Acid Production	N ₂ O	Yes	L1, L2
PFC Emissions from Aluminium production	PFC	Yes	T1, T2
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	Yes	L1, L2, T1, T2
HFC and PFC Emissions from Other Consumption	HFC/PFC	No	
SF ₆ Emissions from Electrical Equipment	SF ₆	No	
SOLVENT AND OTHER PRODUCT USE			
CO ₂ Emissions from Solvent and Other product use	CO ₂	No	
N ₂ O Emissions from Solvent and Other product use	N ₂ O	No	
AGRICULTURE			
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	Yes	L1, L2, T1, T2
CH ₄ Emissions from Manure Management	CH ₄	No	
CH ₄ Emissions from Agricultural Residue Burning	CH ₄	No	
N ₂ O Emissions from Manure Management	N ₂ O	Yes	L1, T1, T2

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)			
IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	Yes	L1, L2
N ₂ O Emissions from Pasture Range and Paddock Manure	N ₂ O	No	
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	Yes	L1, L2
N ₂ O Emissions from Agricultural Residue Burning	N ₂ O	No	
WASTE			
CO ₂ Emissions from Waste Incineration	CO ₂	No	
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	Yes	L1, L2, T1, T2
CH ₄ Emissions from Wastewater Handling	CH ₄	Yes	L1, L2
N ₂ O Emissions from Wastewater Handling	N ₂ O	No	
N ₂ O Emissions from Waste Incineration	N ₂ O	No	

L1 - Level excluding LULUCF Tier1

L2 - Level excluding LULUCF Tier2

T1 - Trend excluding LULUCF Tier1

T2 - Trend excluding LULUCF Tier2

Table A1.2-15: Key categories for Croatia – summary (Including LULUCF) - 1990

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)

IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
ENERGY			
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	Yes	L1
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	Yes	L1, L2
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	Yes	L1, L2
Mobile Combustion: Road Vehicles	CO ₂	Yes	L1
Mobile Combustion: Water-borne Navigation	CO ₂	No	
Mobile Combustion: Aircraft	CO ₂	No	
Mobile Combustion: Railways	CO ₂	No	
Combustion: Agriculture/Forestry/Fishing	CO ₂	Yes	L1
Fugitive Emissions from Oil and Gas Operations	CO ₂	Yes	L1
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	No	
Mobile Combustion: Road Vehicles	CH ₄	No	
Mobile Combustion: Water-borne Navigation	CH ₄	No	
Mobile Combustion: Aircraft	CH ₄	No	
Mobile Combustion: Railways	CH ₄	No	
Combustion: Agriculture/Forestry/Fishing	CH ₄	No	
Fugitive Emissions from Coal Mining and Handling	CH ₄	No	
Fugitive Emissions from Oil and Gas Operations	CH ₄	Yes	L1, L2
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	No	
Mobile Combustion: Road Vehicles	N ₂ O	No	
Mobile Combustion: Water-borne Navigation	N ₂ O	No	
Mobile Combustion: Aircraft	N ₂ O	No	
Mobile Combustion: Railways	N ₂ O	No	
Combustion: Agriculture/Forestry/Fishing	N ₂ O	No	
Fugitive Emissions from Oil and Gas Operations	N ₂ O	No	
INDUSTRIAL PROCESSES			
CO ₂ Emissions from Cement Production	CO ₂	Yes	L1
CO ₂ Emissions from Lime Production	CO ₂	No	
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	No	
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	No	
CO ₂ Emissions from Ammonia Production	CO ₂	Yes	L1
CO ₂ Emissions from Iron and Steel Production	CO ₂	No	
CO ₂ Emissions from Ferroalloys Production	CO ₂	No	
CO ₂ Emissions from Aluminium Production	CO ₂	No	
Other non-specified NEU	CO ₂	No	
CH ₄ Emissions from Production of Other Chemicals	CH ₄	No	
N ₂ O Emissions from Nitric Acid Production	N ₂ O	Yes	L1, L2
PFC Emissions from Aluminium production	PFC	Yes	L1, L2
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	No	
HFC and PFC Emissions from Other Consumption	HFC/PFC	No	
SF ₆ Emissions from Electrical Equipment	SF ₆	No	
SOLVENT AND OTHER PRODUCT USE			
CO ₂ Emissions from Solvent and Other product use	CO ₂	No	
N ₂ O Emissions from Solvent and Other product use	N ₂ O	No	
AGRICULTURE			
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	Yes	L1, L2
CH ₄ Emissions from Manure Management	CH ₄	Yes	L1
CH ₄ Emissions from Agricultural Residue Burning	CH ₄	No	
N ₂ O Emissions from Manure Management	N ₂ O	Yes	L1

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)			
IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	Yes	L1, L2
N ₂ O Emissions from Pasture Range and Paddock Manure	N ₂ O	Yes	L1
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	Yes	L1, L2
N ₂ O Emissions from Agricultural Residue Burning	N ₂ O	No	
LULUCF			
Forestland remaining Forestland	CO ₂	Yes	L1, L2
Land converted to Forestland	CO ₂	Yes	L1, L2
Cropland remaining Cropland	CO ₂	Yes	L2
Land converted to Cropland	CO ₂	No	
Grassland remaining Grassland	CO ₂	No	
Land Converted to Grassland	CO ₂	Yes	L2
Land converted to Wetlands	CO ₂	No	
Land converted to Settlements	CO ₂	Yes	L1, L2
Forestland remaining Forestland	CH ₄	No	
Land converted to Forestland	CH ₄	No	
Grassland remaining Grassland	CH ₄	No	
Forestland remaining Forestland	N ₂ O	No	
Land converted to Forestland	N ₂ O	No	
Grassland converted to Cropland: mineral soils	N ₂ O	No	
Grassland remaining Grassland	N ₂ O	No	
WASTE			
CO ₂ Emissions from Waste Incineration	CO ₂	No	
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	Yes	L1
CH ₄ Emissions from Wastewater Handling	CH ₄	Yes	L1, L2
N ₂ O Emissions from Wastewater Handling	N ₂ O	No	
N ₂ O Emissions from Waste Incineration	N ₂ O	No	

L1 - Level including LULUCF Tier1

L2 - Level including LULUCF Tier2

Table A1.2-16: Key categories for Croatia – summary (Including LULUCF) - 2012

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)			
IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
ENERGY			
CO ₂ Emissions from Stationary Combustion: Coal	CO ₂	Yes	L1, T1, T2
CO ₂ Emissions from Stationary Combustion: Oil	CO ₂	Yes	L1, T1, T2
CO ₂ Emissions from Stationary Combustion: Gas	CO ₂	Yes	L1, T1, T2
Mobile Combustion: Road Vehicles	CO ₂	Yes	L1, T1, T2
Mobile Combustion: Water-borne Navigation	CO ₂	No	
Mobile Combustion: Aircraft	CO ₂	Yes	T2
Mobile Combustion: Railways	CO ₂	Yes	T2
Combustion: Agriculture/Forestry/Fishing	CO ₂	Yes	L1, T1, T2
Fugitive Emissions from Oil and Gas Operations	CO ₂	Yes	L1, T1, T2
Non-CO ₂ Emissions from Stationary Combustion	CH ₄	No	
Mobile Combustion: Road Vehicles	CH ₄	No	
Mobile Combustion: Water-borne Navigation	CH ₄	No	
Mobile Combustion: Aircraft	CH ₄	No	
Mobile Combustion: Railways	CH ₄	No	
Combustion: Agriculture/Forestry/Fishing	CH ₄	No	
Fugitive Emissions from Coal Mining and Handling	CH ₄	Yes	T2
Fugitive Emissions from Oil and Gas Operations	CH ₄	Yes	L1, L2, T1, T2
Non-CO ₂ Emissions from Stationary Combustion	N ₂ O	No	
Mobile Combustion: Road Vehicles	N ₂ O	No	
Mobile Combustion: Water-borne Navigation	N ₂ O	No	
Mobile Combustion: Aircraft	N ₂ O	No	
Mobile Combustion: Railways	N ₂ O	No	
Combustion: Agriculture/Forestry/Fishing	N ₂ O	No	
Fugitive Emissions from Oil and Gas Operations	N ₂ O	No	
INDUSTRIAL PROCESSES			
CO ₂ Emissions from Cement Production	CO ₂	Yes	L1, T1, T2
CO ₂ Emissions from Lime Production	CO ₂	No	
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	No	
CO ₂ Emissions from Soda Ash Production and Use	CO ₂	No	
CO ₂ Emissions from Ammonia Production	CO ₂	Yes	L1, T1, T2
CO ₂ Emissions from Iron and Steel Production	CO ₂	No	
CO ₂ Emissions from Ferroalloys Production	CO ₂	Yes	T1, T2
CO ₂ Emissions from Aluminium Production	CO ₂	Yes	T1, T2
Other non-specified NEU	CO ₂	No	
CH ₄ Emissions from Production of Other Chemicals	CH ₄	No	
N ₂ O Emissions from Nitric Acid Production	N ₂ O	Yes	L1, L2
PFC Emissions from Aluminium production	PFC	Yes	T1, T2
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	Yes	L1, L2, T1, T2
HFC and PFC Emissions from Other Consumption	HFC/PFC	No	
SF ₆ Emissions from Electrical Equipment	SF ₆	No	
SOLVENT AND OTHER PRODUCT USE			
CO ₂ Emissions from Solvent and Other product use	CO ₂	Yes	T2
N ₂ O Emissions from Solvent and Other product use	N ₂ O	No	
AGRICULTURE			
CH ₄ Emissions from Enteric Fermentation in Domestic Livestock	CH ₄	Yes	L1, T1, T2
CH ₄ Emissions from Manure Management	CH ₄	Yes	L1
CH ₄ Emissions from Agricultural Residue Burning	CH ₄	No	
N ₂ O Emissions from Manure Management	N ₂ O	Yes	L1, T1, T2

Tier 1 and Tier 2 Analysis – Source Analysis Summary (Croatian Inventory)			
IPCC Source Categories	Direct GHG	Key Source Category Flag	Criteria for Identification
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	Yes	L1, L2, T1, T2
N ₂ O Emissions from Pasture Range and Paddock Manure	N ₂ O	Yes	T2
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	Yes	L1, L2
N ₂ O Emissions from Agricultural Residue Burning	N ₂ O	No	
LULUCF			
Forestland remaining Forestland	CO ₂	Yes	L1, L2, T1, T2
Land converted to Forestland	CO ₂	Yes	L2, T2
Cropland remaining Cropland	CO ₂	Yes	L1, L2, T1, T2
Land converted to Cropland	CO ₂	Yes	L2
Grassland remaining Grassland	CO ₂	No	
Land Converted to Grassland	CO ₂	Yes	L2, T1, T2
Land converted to Wetlands	CO ₂	No	
Land converted to Settlements	CO ₂	Yes	L1, L2, T1, T2
Forestland remaining Forestland	CH ₄	No	
Land converted to Forestland	CH ₄	No	
Grassland remaining Grassland	CH ₄	No	
Forestland remaining Forestland	N ₂ O	No	
Land converted to Forestland	N ₂ O	No	
Grassland converted to Cropland: mineral soils	N ₂ O	No	
Grassland remaining Grassland	N ₂ O	No	
WASTE			
CO ₂ Emissions from Waste Incineration	CO ₂	No	
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	Yes	L1, L2, T1, T2
CH ₄ Emissions from Wastewater Handling	CH ₄	Yes	L1,
N ₂ O Emissions from Wastewater Handling	N ₂ O	No	
N ₂ O Emissions from Waste Incineration	N ₂ O	No	

L1 - Level including LULUCF Tier1
L2 - Level including LULUCF Tier2

T1 - Trend including LULUCF Tier1
T2 - Trend including LULUCF Tier2

Table A1.2-17: Table 7.A3 for 1990

Table 7.A3					
Tier 1 and Tier 2 Analysis - Source Analysis Summary (Croatian Inventory, 1990)					
A	B	C	D		E
IPCC Source Categories	GHG	Key	If Column C is Yes, Criteria for Identification		Com.
ENERGY					
CO2 Emissions from Stationary Combustion: Coal	CO2	Yes	L1e	L1i	
CO2 Emissions from Stationary Combustion: Oil	CO2	Yes	L1e, L2e	L1i, L2i	
CO2 Emissions from Stationary Combustion: Gas	CO2	Yes	L1e, L2e	L1i, L2i	
Mobile Combustion: Road Vehicles	CO2	Yes	L1e, L2e	L1i	
Mobile Combustion: Water-borne Navigation	CO2	No			
Mobile Combustion: Aircraft	CO2	No			
Mobile Combustion: Railways	CO2	No			
Combustion: Agriculture/Forestry/Fishing	CO2	Yes	L1e	L1i	
Fugitive Emissions from Oil and Gas Operations	CO2	Yes	L1e	L1i	
Non-CO2 Emissions from Stationary Combustion	CH4	No			
Mobile Combustion: Road Vehicles	CH4	No			
Mobile Combustion: Water-borne Navigation	CH4	No			
Mobile Combustion: Aircraft	CH4	No			
Mobile Combustion: Railways	CH4	No			
Combustion: Agriculture/Forestry/Fishing	CH4	No			
Fugitive Emissions from Coal Mining and Handling	CH4	Yes	L2e		
Fugitive Emissions from Oil and Gas Operations	CH4	Yes	L1e, L2e	L1i, L2i	
Non-CO2 Emissions from Stationary Combustion	N2O	Yes	L2e		
Mobile Combustion: Road Vehicles	N2O	No			
Mobile Combustion: Water-borne Navigation	N2O	No			
Mobile Combustion: Aircraft	N2O	No			
Mobile Combustion: Railways	N2O	No			
Combustion: Agriculture/Forestry/Fishing	N2O	No			
Fugitive Emissions from Oil and Gas Operations	N2O	No			
INDUSTRIAL PROCESSES					
CO2 Emissions from Cement Production	CO2	Yes	L1e	L1i	
CO2 Emissions from Lime Production	CO2	No			
CO2 Emissions from Limestone and Dolomite Use	CO2	No			
CO2 Emissions from Soda Ash Production and Use	CO2	No			
CO2 Emissions from Ammonia Production	CO2	Yes	L1e	L1i	
CO2 Emissions from Iron and Steel Production	CO2	No			
CO2 Emissions from Ferroalloys Production	CO2	No			
CO2 Emissions from Aluminium Production	CO2	No			
Other non-specified NEU	CO2	No			
CH4 Emissions from Production of Other Chemicals	CH4	No			
N2O Emissions from Nitric Acid Production	N2O	Yes	L1e, L2e	L1i, L2i	
PFC Emissions from Aluminium production	PFC	Yes	L1e, L2e	L1i, L2i	
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	No			
HFC and PFC Emissions from Other Consumption	HFC/PFC	No			
SF6 Emissions from Electrical Equipment	SF6	No			
SOLVENT AND OTHER PRODUCT USE					
CO2 Emissions from Solvent and Other Product Use	CO2	No			
N2O Emissions from Solvent and Other Product Use	N2O	No			
AGRICULTURE					
CH4 Emissions from Enteric Fermentation in Domestic Livestock	CH4	Yes	L1e, L2e	L1i, L2i	

Table 7.A3					
Tier 1 and Tier 2 Analysis - Source Analysis Summary (Croatian Inventory, 1990)					
A	B	C	D		E
IPCC Source Categories	GHG	Key	If Column C is Yes, Criteria for Identification		Com.
CH ₄ Emissions from Manure Management	CH ₄	Yes	L1e	L1i	
CH ₄ Emissions from Agricultural Residue Burning	CH ₄	No			
N ₂ O Emissions from Manure Management	N ₂ O	Yes	L1e, L2e	L1i	
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	Yes	L1e, L2e	L1i, L2i	
N ₂ O Emissions from Pasture Range and Paddock Manure	N ₂ O	Yes	L1e	L1i	
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	Yes	L1e, L2e	L1i, L2i	
N ₂ O Emissions from Agricultural Residue Burning	N ₂ O	No			
LULUCF					
Forestland remaining Forestland	CO ₂	Yes		L1i, L2i	
Land converted to Forestland	CO ₂	Yes		L1i, L2i	
Cropland remaining Cropland	CO ₂	Yes		L2i	
Land converted to Cropland	CO ₂	No			
Grassland remaining Grassland	CO ₂	No			
Land Converted to Grassland	CO ₂	Yes		L2i	
Land converted to Wetlands	CO ₂	No			
Land converted to Settlements	CO ₂	Yes		L1i, L2i	
Forestland remaining Forestland	CH ₄	No			
Land converted to Forestland	CH ₄	No			
Grassland remaining Grassland	CH ₄	No			
Forestland remaining Forestland	N ₂ O	No			
Land converted to Forestland	N ₂ O	No			
Grassland converted to Cropland: mineral soils	N ₂ O	No			
Grassland remaining Grassland	N ₂ O	No			
WASTE					
CO ₂ Emissions from Waste Incineration	CO ₂	No			
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	Yes	L1e, L2e	L1i	
CH ₄ Emissions from Wastewater Handling	CH ₄	Yes	L1e, L2e	L1i, L2i	
N ₂ O Emissions from Wastewater Handling	N ₂ O	No			
N ₂ O Emissions from Waste Incineration	N ₂ O	No			

L1e - Level excluding LULUCF Tier1

L1i - Level including LULUCF Tier1

L2e - Level excluding LULUCF Tier2

L2i - Level including LULUCF Tier2

Table A1.2-18: Table 7.A3 for 2012

Table 7.A3							
Tier 1 and Tier 2 Analysis - Source Analysis Summary (Croatian Inventory, 2012)							
A	B	C	D				E
IPCC Source Categories	GHG	Key	If Column C is Yes, Criteria for Identification				Com.
ENERGY							
CO2 Emissions from Stationary Combustion: Coal	CO2	Yes	L1e	T1e, T2e	L1i	T1i, T2i	
CO2 Emissions from Stationary Combustion: Oil	CO2	Yes	L1e, L2e	T1e, T2e	L1i	T1i, T2i	
CO2 Emissions from Stationary Combustion: Gas	CO2	Yes	L1e, L2e	T1e, T2e	L1i	T1i, T2i	
Mobile Combustion: Road Vehicles	CO2	Yes	L1e, L2e	T1e, T2e	L1i	T1i, T2i	
Mobile Combustion: Water-borne Navigation	CO2	No					
Mobile Combustion: Aircraft	CO2	Yes				T2i	
Mobile Combustion: Railways	CO2	Yes				T2i	
Combustion: Agriculture/Forestry/Fishing	CO2	Yes	L1e		L1i	T1i, T2i	
Fugitive Emissions from Oil and Gas Operations	CO2	Yes	L1e		L1i	T1i, T2i	
Non-CO2 Emissions from Stationary Combustion	CH4	No					
Mobile Combustion: Road Vehicles	CH4	No					
Mobile Combustion: Water-borne Navigation	CH4	No					
Mobile Combustion: Aircraft	CH4	No					
Mobile Combustion: Railways	CH4	No					
Combustion: Agriculture/Forestry/Fishing	CH4	No					
Fugitive Emissions from Coal Mining and Handling	CH4	Yes		T2e		T2i	
Fugitive Emissions from Oil and Gas Operations	CH4	Yes	L1e, L2e	T1e, T2e	L1i, L2i	T1i, T2i	
Non-CO2 Emissions from Stationary Combustion	N2O	No					
Mobile Combustion: Road Vehicles	N2O	No					
Mobile Combustion: Water-borne Navigation	N2O	No					
Mobile Combustion: Aircraft	N2O	No					
Mobile Combustion: Railways	N2O	No					
Combustion: Agriculture/Forestry/Fishing	N2O	No					
Fugitive Emissions from Oil and Gas Operations	N2O	No					
INDUSTRIAL PROCESSES							
CO2 Emissions from Cement Production	CO2	Yes	L1e	T1e, T2e	L1i	T1i, T2i	
CO2 Emissions from Lime Production	CO2	No					
CO2 Emissions from Limestone and Dolomite Use	CO2	No					
CO2 Emissions from Soda Ash Production and Use	CO2	No					
CO2 Emissions from Ammonia Production	CO2	Yes	L1e	T1e, T2e	L1i	T1i, T2i	
CO2 Emissions from Iron and Steel Production	CO2	No					
CO2 Emissions from Ferroalloys Production	CO2	Yes		T1e, T2e		T1i, T2i	
CO2 Emissions from Aluminium Production	CO2	Yes		T1e, T2e		T1i, T2i	
Other non-specified NEU	CO2	No					
CH4 Emissions from Production of Other Chemicals	CH4	No					
N2O Emissions from Nitric Acid Production	N2O	Yes	L1e, L2e		L1i, L2i		
PFC Emissions from Aluminium production	PFC	Yes		T1e, T2e		T1i, T2i	
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	Yes	L1e, L2e	T1e, T2e	L1i, L2i	T1i, T2i	
HFC and PFC Emissions from Other Consumption	HFC/PFC	No					
SF6 Emissions from Electrical Equipment	SF6	No					
SOLVENT AND OTHER PRODUCT USE							
CO2 Emissions from Solvent and Other Product Use	CO2	Yes				T2i	
N2O Emissions from Solvent and Other Product Use	N2O	No					
AGRICULTURE							
CH4 Emissions from Enteric Fermentation in Domestic	CH4	Yes	L1e, L2e	T1e, T2e	L1i	T1i, T2i	

Table 7.A3

Tier 1 and Tier 2 Analysis - Source Analysis Summary (Croatian Inventory, 2012)

A	B	C	D				E
IPCC Source Categories	GHG	Key	If Column C is Yes, Criteria for Identification				Com.
Livestock							
CH ₄ Emissions from Manure Management	CH ₄	Yes			L1i		
CH ₄ Emissions from Agricultural Residue Burning	CH ₄	No					
N ₂ O Emissions from Manure Management	N ₂ O	Yes	L1e	T1e, T2e	L1i	T1i, T2i	
Direct N ₂ O Emissions from Agricultural Soils	N ₂ O	Yes	L1e, L2e		L1i, L2i	T1i, T2i	
N ₂ O Emissions from Pasture Range and Paddock Manure	N ₂ O	Yes				T2i	
Indirect N ₂ O Emissions from Nitrogen Used in Agriculture	N ₂ O	Yes	L1e, L2e		L1i, L2i		
N ₂ O Emissions from Agricultural Residue Burning	N ₂ O	No					
LULUCF							
Forestland remaining Forestland	CO ₂	Yes			L1i, L2i	T1i, T2i	
Land converted to Forestland	CO ₂	Yes			L2i	T2i	
Cropland remaining Cropland	CO ₂	Yes			L1i, L2i	T1i, T2i	
Land converted to Cropland	CO ₂	Yes			L2i		
Grassland remaining Grassland	CO ₂	No					
Land Converted to Grassland	CO ₂	Yes			L2i	T1i, T2i	
Land converted to Wetlands	CO ₂	No					
Land converted to Settlements	CO ₂	Yes			L1i, L2i	T1i, T2i	
Forestland remaining Forestland	CH ₄	No					
Land converted to Forestland	CH ₄	No					
Grassland remaining Grassland	CH ₄	No					
Forestland remaining Forestland	N ₂ O	No					
Land converted to Forestland	N ₂ O	No					
Grassland converted to Cropland: mineral soils	N ₂ O	No					
Grassland remaining Grassland	N ₂ O	No					
WASTE							
CO ₂ Emissions from Waste Incineration	CO ₂	No					
CH ₄ Emissions from Solid Waste Disposal Sites	CH ₄	Yes	L1e, L2e	T1e, T2e	L1i, L2i	T1i, T2i	
CH ₄ Emissions from Wastewater Handling	CH ₄	Yes	L1e, L2e		L1i		
N ₂ O Emissions from Wastewater Handling	N ₂ O	No					
N ₂ O Emissions from Waste Incineration	N ₂ O	No					

L1e - Level excluding LULUCF Tier1

L2e - Level excluding LULUCF Tier2

L1i - Level including LULUCF Tier1

L2i - Level including LULUCF Tier2

T1e - Trend excluding LULUCF Tier1

T2e - Trend excluding LULUCF Tier2

T1i - Trend including LULUCF Tier1

T2i - Trend including LULUCF Tier2

ANNEX 2

DETAILED DISCUSSION OF ACTIVITY DATA AND EMISSION FACTORS FOR ESTIMATING CO₂ EMISSIONS FROM FOSSIL FUEL COMBUSTION

Table A2-1: The GHG emissions from Thermal Power Plants

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Hard coal (1000 t)	253.7	569.9	915.0	925.0	640.3	897.5	957.1	855.5
NCV for hard coal (MJ/kg)	25.1	26.2	24.2	24.5	24.4	24.4	25.4	24.8
Fuel oil (1000 t)	570.4	283.4	284.0	331.6	304.8	15.2	59.5	60.1
NCV for fuel oil (MJ/kg)	40.4	40.5	40.3	40.2	40.2	40.2	40.3	40.3
Extra light oil (1000 t)	0.7	7.5	3.0	1.2	1.6	1.0	1.1	1.2
NCV for extra light oil (MJ/kg)	42.3	42.0	42.3	42.3	42.1	42.8	42.7	42.6
Natural gas (1000000 m ³)	194.6	155.7	48.2	166.4	157.9	24.2	45.6	27.8
NCV for natural gas (MJ/m ³)	33.4	33.4	33.4	33.3	33.3	33.3	34.2	34.3
Gas coke (1000000 m ³)	24.5							
NCV for gas coke (MJ/m ³)	17.6							
Total fuel consumption (TJ)	36347	31930	35336	41585	33216	23317	28267	24677
Emissions								
EF CO ₂ – hard coal (t/TJ)	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
EF CO ₂ – fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ – extra light oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ – natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
EF CO ₂ – coke gas (t/TJ)	47.4							
CO ₂ emission (Gg)	2739	2577	3030	3435	2686	2121	2524	2213
EF CH ₄ – hard coal (kg/TJ)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
EF CH ₄ – fuel oil (kg/TJ)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
EF CH ₄ – extra light oil (kg/TJ)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
EF CH ₄ – natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF CH ₄ – coke gas (kg/TJ)	1.0							
CH ₄ emission (Mg)	37.4	22.9	26.1	31.4	28.4	20.7	22.6	18.4
EF N ₂ O – hard coal (kg/TJ)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
EF N ₂ O – fuel oil (kg/TJ)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
EF N ₂ O – extra light oil (kg/TJ)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
EF N ₂ O – natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O – coke gas (kg/TJ)	0.1							
N ₂ O emission (Mg)	17.8	28.0	39.1	40.8	29.2	35.2	39.7	34.8

Table A2-2: The GHG emissions from Public Cogeneration Plants

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Fuel oil (1000 t)	117.7	108.6	162.0	124.9	173.5	108.3	91.1	49.7
NCV for fuel oil (MJ/kg)	40.5	40.7	40.7	40.2	40.2	40.3	40.4	40.7
Extra light oil (1000 t)	0.0	0.9	0.0	0.2	0.1	0.1	0.0	0.6
NCV for extra light oil (MJ/kg)	0.0	21.4	21.4	21.4	21.4	42.8	43.0	43.3
Natural gas (1000000 m ³)	312.7	357.7	479.0	541.9	446.0	649.5	652.1	673.6
NCV for natural gas (MJ/m ³)	33.3	33.4	33.4	33.3	33.3	33.3	34.2	34.4
Total fuel consumption (TJ)	15196	16399	22567	23091	21854	26019	25898	25132
Emissions								
EF CO ₂ – fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ – extra light oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ – natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
CO ₂ emission (Gg)	2739	1005	1397	1393	1365	1543	1522	1446
EF CH ₄ – fuel oil (kg/TJ)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
EF CH ₄ – extra light oil (kg/TJ)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
EF CH ₄ – natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
CH ₄ emission (Mg)	11.6	34.4	88.6	90.3	85.2	119.8	118.4	118.2
EF N ₂ O – fuel oil (kg/TJ)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
EF N ₂ O – extra light oil (kg/TJ)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
EF N ₂ O – natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N ₂ O emission (Mg)	17.8	2.5	3.6	3.3	3.6	3.5	3.3	2.9

Table A2-3: The GHG emissions from Public Heating Plants

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Fuel oil (1000 t)	0.0	37.0	39.0	20.8	21.6	23.1	10.3	13.6
NCV for fuel oil (MJ/kg)	40.2	40.2	40.2	40.2	40.2	40.2	40.2	41.2
Light heating oil (1000 t)	0.0	4.4	8.2	5.5	4.2	4.8	5.1	3.2
NCV for light heating oil (MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	43.7
Natural gas (1000000 m ³)	0.0	58.8	59.4	58.8	86.2	86.6	57.4	63.1
NCV for natural gas (MJ/m ³)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
LPG (1000 t)								
NCV for LPG (MJ/kg)								
Gas works gas (1000000 m ³)	0.0	0.0	1.5					
NCV for gas work gas (MJ/m ³)			21.5					0.0
Landfill Gas (1000000 m ³)				2.2	3.3	8.8	9.2	9.2
NCV for landfill gas (MJ/m ³)				17.0	17.0	17.0	17.0	19.0
Total fuel consumption (TJ)	0.0	3359.8	3969.7	3109.7	4034.9	4228.7	2753.4	3019.8
Emissions								
EF CO ₂ - fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ - light heating oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ - natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
EF CO ₂ - LPG (t/TJ)	62.4	62.4	62.4	64.4	64.4	64.4	64.4	64.4
EF CO ₂ - gas work gas (t/TJ)	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
EF CO ₂ - landfill gas (t/TJ)				54.6	54.6	54.6	54.6	54.6
CO ₂ Emission (Gg)	0.0	216.2	260.0	195.0	246.4	258.7	166.0	182.4
EF CH ₄ - fuel oil (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ - light heating oil (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ - natural gas (kg/TJ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
EF CH ₄ - LPG (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - gas work gas (t/TJ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
EF CH ₄ - landfill gas (t/TJ)				1.0	1.0	1.0	1.0	1.0
CH ₄ Emission (Mg)	0.0	6.1	7.8	5.3	6.1	6.5	4.0	4.4
EF N ₂ O - fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - light heating oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - LPG (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - gas work gas (t/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - landfill gas (t/TJ)				0.1	0.1	0.1	0.1	0.1
N ₂ O Emission (Mg)	0.0	1.0	1.4	0.8	0.9	1.0	0.6	0.7

The GHG emissions from thermal power plants and public cogeneration plants, for the whole period (from 1990 to 2012), were calculated using more detailed Tier 2 approach. Tier 2 approach is based on bottom-up fuel consumption data from every boiler or gas turbine in plant. There were available data about monthly fuel

consumption and detailed fuel characteristics data (net calorific value, sulphur and ash content...). Every plant also has the equipment for continual measurements of SO₂, NO_x, CO and particulates emission.

For estimation of CO₂ emissions, default IPCC emission factors were used, while emission factors for CH₄ and N₂O are based on technology type and configuration (Tier 2). The results of GHG emission calculation, using more detailed approach are presented in tables A2-2 and A2-3 for the 1990, 2000, 2005 and for period 2008-2012, on aggregated level. The GHG emissions on plant level, for the year 2012, are given in the Table A2-4.

Table A2-4: The GHG emissions from TPPs and PCPs (Tier 2), year 2011

	TE Plomin	TE Rijeka	TE Sisak	TE-TO Zagreb	EL-TO Zagreb	TE-TO Osijek	KTE Jertovec
Fuel consumption							
Hard coal (1000 t)	855.468						
NCV for hard coal (MJ/kg)	24.842						
Fuel oil (1000 t)		40.680	19.429	35.561	11.557	2.546	
NCV for fuel oil (MJ/kg)		40.300	40.371	41.303	40.371	40.517	
Extra light oil (1000 t)	1.081	0.095		0.551			0.018
NCV for extra light oil (MJ/kg)	43.000	42.100		43.333			42.710
Natural gas (1000000 m ³)			22.139	459.649	155.096	58.812	5.689
NCV for natural gas (MJ/m ³)			34.075	34.157	34.345	34.737	34.528
Total fuel consumption (TJ)	21297.7	1643.4	1538.8	17192.9	5793.3	2146.1	197.2
Emissions							
EF CO ₂ – hard coal (t/TJ)	92.7						
EF CO ₂ – fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ – extra light oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ – natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8
CO ₂ emission (Gg)	1973.6	125.9	102.2	990.6	333.1	121.9	11.0
EF CH ₄ – hard coal (kg/TJ)	0.7	0.7	0.7	0.7	0.7	0.7	0.7
EF CH ₄ – fuel oil (kg/TJ)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
EF CH ₄ – extra light oil (kg/TJ)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
EF CH ₄ – natural gas (kg/TJ)	0.1	0.1	0.1	5.7	4.5	1.3	6.0
CH ₄ emission (Mg)	14.9	1.5	0.8	91.3	24.2	2.7	1.2
EF N ₂ O – hard coal (kg/TJ)	1.6	1.6	1.6	1.6	1.6	1.6	1.6
EF N ₂ O – fuel oil (kg/TJ)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
EF N ₂ O – extra light oil (kg/TJ)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
EF N ₂ O – natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N ₂ O emission (Mg)	34.0	0.5	0.3	2.0	0.7	0.2	0.0

Table A2-5: The GHG emissions from Petroleum Refining

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Fuel oil (1000 t)	227.2	193.4	254.0	194.2	252.7	244.3	196.3	153.30
NCV for fuel oil (MJ/kg)	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.19
LPG (1000 t)	0.0	0.0	9.5	0.0	0.0	0.0	0.0	2.70
NCV for LPG (MJ/kg)	46.9	46.9	46.9	46.9	46.9	46.9	46.8	46.89
Petroleum coke (1000 t)	0.0	0.0	70.7	57.9	71.9	55.9	43.9	54.50
NCV for petrol.coke (MJ/kg)	33.6	31.0	31.0	31.0	31.0	31.0	31.0	31.00
Refinery gas (1000 t)	58.4	40.7	241.1	154.5	200.2	161.5	267.1	293.80
NCV for refinery gas (MJ/kg)	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.57
Natural gas (1000000 m ³)	7.3	0.2	1.2	86.7	30.4	16.6	82.4	4.90
NCV for natural gas (MJ/m ³)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.00
Total fuel consumption (TJ)	12216	9756	24596	20052	23142	19960	25025	22414
Emissions								
EF CO ₂ – fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ – LPG (t/TJ)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
EF CO ₂ – petroleum coke (t/TJ)	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8
EF CO ₂ – refinery gas (t/TJ)	66.1	66.1	66.1	66.1	66.1	66.1	66.1	66.1
EF CO ₂ – natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
CO ₂ emission (Gg)	900.6	726.3	1804.4	1437.3	1700.5	1474.7	1753.6	1600.5
EF CH ₄ – fuel oil (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ – LPG (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ – petroleum coke (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ – refinery gas (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ – natural gas (kg/TJ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CH ₄ emission (Mg)	36.2	29.3	73.7	54.3	67.4	58.8	69.5	66.9
EF N ₂ O – fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – LPG (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – petroleum coke (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – refinery gas (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N ₂ O emission (Mg)	7.2	5.9	14.7	10.6	13.4	11.7	13.6	13.4

Table A2-6: The GHG emissions from Manufacturing of Solid Fuels and Other Energy Industries

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
LPG (1000 t)	11.9	1.0						
NCV for LPG (MJ/kg)	46.9	46.9						
Coke gas (1000000 m ³)	107.4							
NCV for coke gas (MJ/m ³)	17.9							
Extra light oil (1000 t)	1.4	7.5	5.5					
NCV for extra light oil (MJ/kg)	42.7	42.7	42.7					
Natural gas (1000000 m ³)	392.0	140.5	175.5	129.3	199.3	238.90	156.3	144.4
NCV for natural gas (MJ/m ³)	34.0	34.0	34.0	34.0	34.0	34.00	34.0	34.0
Total fuel consumption (TJ)	15869.3	5144.2	6201.9	4396.2	6776.2	8122.6	5314.2	3889.6
Emissions								
EF CO ₂ – LPG (t/TJ)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
EF CO ₂ – coke gas (t/TJ)	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
EF CO ₂ – extra light oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ – natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
CO ₂ emission (Gg)	874.4	293.1	350.3	245.4	378.2	453.4	296.6	217.1
EF CH ₄ – LPG (kg/TJ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
EF CH ₄ – coke gas (kg/TJ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
EF CH ₄ – extra light oil (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ – natural gas (kg/TJ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CH ₄ emission (Mg)	16.0	5.8	6.7	4.4	6.8	8.1	5.3	3.9
EF N ₂ O – LPG (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O – coke gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O – extra light oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N ₂ O emission (Mg)	2.3	0.7	0.7	0.4	0.7	0.8	0.5	0.4

Table A2-7: The GHG emissions from Manufacturing Industries and Construction – liquid fuels

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Gasoline (1000 t)	0.2	7.6	6.9	7.9	7.0	5.1	4.7	4.2
NCV for gasoline (MJ/kg)	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6
Petroleum (1000 t)	0.1							
NCV for petroleum (MJ/kg)	44.0							
Gas/diesel oil (1000 t)	246.5	130.8	161.6	194.3	145.4	130.2	125.3	108.4
NCV for gas/diesel o.(MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Fuel oil (1000 t)	419.2	302.2	198.6	124.3	90.7	56.3	51.2	32.1
NCV for fuel oil (MJ/kg)	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2
LPG (1000 t)	17.5	21.0	22.8	30.4	20.1	16.2	16.1	16.0
NCV for LPG (MJ/kg)	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
Lubricants (1000 t)	8.6							
NCV for lubricants (MJ/kg)	33.6							
Petroleum coke (1000 t)	0.0		172.3	191.6	140.4	116.0	93.3	93.9
NCV for petroleum coke (MJ/kg)	29.3		31.0	31.0	31.0	31.0	31.0	31.0
Total fuel consumption (TJ)	28498	19056	21602	21012	15462	12407	11266	9768
Emissions								
EF CO ₂ – gasoline (t/TJ)	68.6	68.6	68.6	68.6	68.6	68.6	68.6	68.6
EF CO ₂ – petroleum (t/TJ)	71.1	71.1	71.1	71.1	71.1	71.1	71.1	71.1
EF CO ₂ – gas/diesel oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ – fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ – LPG (t/TJ)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
EF CO ₂ – lubricants (t/TJ)	72.6	72.6	72.6	72.6	72.6	72.6	72.6	72.6
EF CO ₂ – petroleum coke (t/TJ)	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8
CO ₂ emission (Gg)	2135.5	1424.6	1738.5	1697.2	1249.3	1003.1	900.3	788.6
EF CH ₄ – gasoline (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EF CH ₄ – petroleum (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EF CH ₄ – gas/diesel oil (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EF CH ₄ – fuel oil (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EF CH ₄ – LPG (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EF CH ₄ – lubricants (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EF CH ₄ – petroleum coke (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CH ₄ emission (Mg)	0.057	0.038	0.043	0.042	0.031	0.025	0.023	0.020
EF N ₂ O – gasoline (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – petroleum (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – gas/diesel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – LPG (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – lubricants (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O – petroleum coke (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
N ₂ O emission (Mg)	0.017	0.011	0.013	0.013	0.009	0.007	0.007	0.006

Table A2-8: The GHG emissions from Manufacturing Industries and Construction – solid fuels

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Anthracite (1000 t)	107.2		0.3	0.0	0.3	1.3	2.1	0.0
NCV for anthracite (MJ/kg)	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
Hard coal (1000 t)	42.0	53.2	169.3	195.7	158.1	194.6	162.0	146.2
NCV for hard coal (MJ/kg)	25.1	26.2	25.1	24.9	24.6	24.8	24.4	24.4
Brown Coal (1000 t)	261.2	28.2	56.9	47.1	36.9	41.0	20.2	36.7
NCV for brown coal (MJ/kg)	16.7	17.8	18.5	18.0	18.0	17.6	17.1	17.1
Lignite (1000 t)	73.2	14.4	0.2					
NCV for lignite (MJ/kg)	10.9	12.0	12.1					
Briquettes (1000 t)	3.3							
NCV for briquettes (MJ/kg)	16.7							
Coke oven coke (1000 t)	251.2	37.7	22.6	24.9	25.4	27.6	27.2	28.1
NCV for coke oven coke (MJ/kg)	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
Total fuel consumption (TJ)	16784	3171	5976	6451	5307	6390	5157	5024
Emissions								
EF CO ₂ – anthracite (t/TJ)	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3
EF CO ₂ – hard coal (t/TJ)	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7
EF CO ₂ – brown coal (t/TJ)	94.1	94.1	94.1	94.1	94.1	94.1	94.1	94.1
EF CO ₂ – lignite (t/TJ)	99.2	99.2	99.2	99.2	99.2	99.2	99.2	99.2
EF CO ₂ – briquettes (t/TJ)	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
EF CO ₂ – coke oven coke (t/TJ)	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0
CO ₂ emission (Gg)	1676.8	310.5	564.4	608.9	502.9	604.3	489.4	477.7
EF CH ₄ – anthracite (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ – hard coal (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ – brown coal (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ – lignite (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ – briquettes (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ – coke oven coke (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
CH ₄ emission (Mg)	0.168	0.032	0.060	0.065	0.053	0.064	0.052	0.050
EF N ₂ O – anthracite (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O – hard coal (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O – brown coal (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O – lignite (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O – briquettes (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O – coke oven coke (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
N ₂ O emission (Mg)	0.003	0.002	0.008	0.009	0.007	0.009	0.007	0.007

Table A2-9: The GHG emissions from Manufacturing Industries and Construction –gaseous fuels

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Natural gas (1000000 m3)	1056.9	984.3	931.4	990.7	852.4	685.6	647.7	517.6
NCV for natural gas (MJ/m3)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Gas Works Gas (1000 t)	6.1	7.9	3.6	1.5	0.3			
NCV for gas work gas (MJ/kg)	15.8	15.8	21.5	19.6	19.6			
Coke Oven Gas (1000 t)	29.9							
NCV for COG (MJ/kg)	17.9							
Blast Furnace Gas (1000 t)	418.1							
NCV for blast fur. gas (MJ/kg)	3.6							
Total fuel consumption (TJ)	38072	33590	31744	33714	28988	23310	22022	17598
Emissions								
EF CO ₂ - natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
EF CO ₂ - gas work gas (t/TJ)	46.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7
EF CO ₂ - coke oven gas (t/TJ)	46.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7
EF CO ₂ - blast furnace gas (t/TJ)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO ₂ Emission (Gg)	2030.6	1881.6	1778.2	1891.5	1626.4	1301.2	1229.2	982.3
EF CH ₄ - natural gas (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - gas work gas (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - coke oven gas (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - blast furnace gas (kg/TJ)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CH ₄ Emission (Mg)	0.183	0.168	0.159	0.169	0.145	0.117	0.110	0.088
EF N ₂ O - natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - gas work gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - coke oven gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - blast furnace gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N ₂ O Emission (Mg)	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.002

Table A2-10: The number of road motor vehicles ('000) for year 1990, 2000, 2005 and for period 2008 – 2012 in Croatia

	1990	2000	2005	2008	2009	2010	2011	2012
Passenger Cars, ('000)	1120	817	1145	1395	1533	1516	1492	1480
LD Vehicles, ('000)	54	61	96	130	141	136	130	126
HD Vehicles and Buses, ('000)	33	31	36	41	43	41	38	37
Motorcycles and Mopeds, ('000)	30	37	73	133	190	192	184	177
Total, ('000)	1237	947	1350	1698	1907	1885	1844	1819

Table A2-11: Quantities of consumed fuels, NCV and GHG emissions from Road Transportation (1.A.3.b.)

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Gasoline (10 ³ t)	759.5	557.9	764.2	693.5	678.4	675.7	636.6	622.0
NCV for gasoline (MJ/kg)	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6
Diesel oil (10 ³ t)	366.0	410.0	557.8	955.6	1,107.1	1,111.8	1,100.0	1,086.7
NCV for diesel oil (MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
LPG (10 ³ t)	0.0	9.8	22.1	68.7	69.5	58.7	43.1	54.8
NCV for LPG (MJ/kg)	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
CNG (10 ⁶ m ³)	-	-	-	-	1.0	1.8	0.6	0.7
NCV for CNG (MJ/m ³)	-	-	-	-	34.0	34.0	34.0	34.0
Biodiesel (10 ³ t)	-	-	-	1.4	9.0	3.1	4.2	41.8
NCV for biodiesel (MJ/kg)	-	-	-	37.0	32.8	36.9	32.9	36.2
Emissions								
CO ₂ (Gg)	3,592.7	3,122.1	4,237.6	5,291.6	5,861.6	5,890.0	5,684.0	5,546.6
CH ₄ (Gg)	1.6	1.2	1.4	1.0	0.8	0.8	0.7	0.6
N ₂ O (Gg)	0.13	0.11	0.33	0.35	0.21	0.21	0.19	0.16

Table A2-12: Fossil fuel consumption, their net calorific values, appropriate GHG emission factors and GHG emissions for sub-sector Civil aviation for years 1990, 2000, 2005 and for period 2008 – 2012

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Gasoline (1000 t)		0.1	1.1	1.0	1.0	0.6	0.6	0.5
NCV for gasoline (MJ/kg)		44.6	44.6	44.6	44.6	44.6	44.6	44.6
Jet kerosene (1000 t)	49.7	17.6	20.3	27.4	23.9	25.5	28.3	29.9
NCV for jet kerosene (MJ/kg)	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0
Total fuel consumption (TJ)	2186	776	943	1248	1095	1147	1271	1337
Emissions								
EF CO ₂ – gasoline (t/TJ)	68.6	68.6	68.6	68.6	68.6	68.6	68.6	68.6
EF CO ₂ – jet kerosene (t/TJ)	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8
CO ₂ emission (Gg)	154.7	55.0	66.6	88.2	77.4	81.1	89.9	94.6
EF CH ₄ – gasoline (kg/TJ)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
EF CH ₄ – jet kerosene (kg/TJ)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CH ₄ emission (Mg)	1.1	0.4	0.5	0.6	0.5	0.6	0.6	0.7
EF N ₂ O – gasoline (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EF N ₂ O – jet kerosene (kg/TJ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
N ₂ O emission (Mg)	4.4	1.6	1.9	2.5	2.2	2.3	2.5	2.7

Table A2-13: Quantities of fossil fuel consumed, their net calorific values and appropriate GHG emission factors and GHG emissions in the sub-sector Navigation for the years 1990, 2000, 2005 and for period 2008 – 2012

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Gasoline (1000 t)	0.1	0.3						
NCV for gasoline (MJ/kg)	44.6	44.6						
Diesel (1000 t)	38.7	25.7	31.8	40.3	46.0	34.8	35.4	33.5
NCV for diesel (MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Fuel oil (1000 t)	2.1	1.4	NO	1.5	0.4	2.0	1.8	1.9
NCV for fuel oil (MJ/kg)	40.2	40.2	-	40.2	40.2	40.2	40.2	40.2
Light heating oil (1000 t)	1.6							
NCV for light heating oil (MJ/kg)	42.7							
Total fuel consumption (TJ)	1810	1167	1358	17812	1981	1567	1584	1507
Emissions								
EF CO ₂ - gasoline (t/TJ)	68.6	68.6	68.6	68.6	68.6	68.6	68.6	68.6
EF CO ₂ - diesel (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ - fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ - light heating oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
CO ₂ Emission (Gg)	133.0	85.7	99.6	130.8	145.3	115.1	116.4	110.8
EF CH ₄ - gasoline (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - diesel (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - fuel oil (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - light heating oil (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CH ₄ Emission (Mg)	9.1	5.8	6.8	8.9	9.9	7.8	7.9	7.5
EF N ₂ O - gasoline (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - diesel (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - light heating oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
N ₂ O Emission (Mg)	1.0	0.7	0.8	1.1	1.2	0.9	1.0	0.9

Table A2-14: Quantities of fossil fuel consumed their net calorific values and appropriate GHG emission factors and GHG emissions in the sub-sector Railways for the years 1990, 2000, 2005 and for period 2008 – 2012

	1990	2000	2005	2008	2009	2010	2011	
Fuel consumption								
Gasoline (1000 t)	0.1	0.1						
NCV for gasoline (MJ/kg)	44.6	44.6						
Diesel (1000 t)	36.1	27.2	30.5	32.3	28.5	28.5	26.4	24.8
NCV for diesel (MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Fuel oil (1000 t)	0.2							
NCV for fuel oil (MJ/kg)	40.2							
Light heating oil (1000 t)	1.1							
NCV for light heating oil (MJ/kg)	42.7							
Brown coal (1000 t)	10.0							
NCV for brown coal (MJ/kg)	16.7							
Lignite (1000 t)	4.3							
NCV for lignite (MJ/kg)	10.9							
Jet Kerosene (1000 t)	0.1							
NCV for jet kerosene (MJ/m3)	43.9							
Total fuel consumption (TJ)	1820	1166	1303	1380	1217	1217	1128	1059
Emissions								
EF CO ₂ - gasoline (t/TJ)	68.6	68.6	68.6	68.6	68.6	68.6	68.6	68.6
EF CO ₂ - diesel (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ - fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ - light heating oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ - brown coal (t/TJ)	94.1	94.1	94.1	94.1	94.1	94.1	94.1	94.1
EF CO ₂ - lignite (t/TJ)	99.2	99.2	99.2	99.2	99.2	99.2	99.2	99.2
EF CO ₂ - jet kerosene (t/TJ)	70.8	70.8	70.8	70.8	70.8	70.8	70.8	70.8
CO ₂ Emission (Gg)	138.1	85.5	95.5	101.2	89.3	89.3	82.7	77.7
EF CH ₄ - gasoline (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - diesel (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - fuel oil (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - light heating oil (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - brown coal (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - lignite (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - jet kerosene (t/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CH ₄ Emission (Mg)	10.2	5.8	6.5	6.9	6.1	6.1	5.6	5.3
EF N ₂ O - gasoline (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - diesel (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - light heating oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - brown coal (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - lignite (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - jet kerosene (t/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
N ₂ O Emission (Mg)	1.3	0.7	0.8	0.8	0.7	0.7	0.7	0.6

Table A2-15: The GHG emissions from Commercial/Institutional

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Petroleum (1000 t)	3.8							
NCV for petroleum (MJ/kg)	43.9							
Light heating oil (1000 t)	92.0	120.5	131.6	87.2	78.3	73.8	64.8	50.0
NCV for light heating oil (MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Fuel oil (1000 t)	67.6	3.9	6.6	3.2	8.4	8.0	9.7	9.5
NCV for fuel oil (MJ/kg)	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2
LPG (1000 t)	4.3	13.9	20.1	10.4	11.9	12.9	13.7	12.1
NCV for LPG (MJ/kg)	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
Brown coal (1000 t)	24.5	9.5	0.2	1.7	3.8	2.2	5.2	4.9
NCV for brown coal (MJ/kg)	16.74	17.80	18.50	18.0	18.0	17.6	17.1	17.1
Lignite (1000 t)	40.0	1.2	0.6	0.1	0.4	0.3	0.1	0.0
NCV for lignite (MJ/kg)	10.9	12.0	12.1	11.8	11.7	11.6	11.6	11.6
Briquettes (1000 t)	2.9							
NCV for briquettes (MJ/kg)	16.7							
Gas work gas (1000000 m3)	4.9	1.5	3.4	2.4	3.1	2.8	2.5	1.9
NCV for gas work gas (MJ/m3)	15.8	19.5	21.5	19.6	18.7	18.7	17.2	17.2
Natural gas (1000000 m3)	82.0	98.2	151.2	160.4	162.5	192.7	173.5	162.0
NCV for natural gas (MJ/m3)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Petroleum coke (1000 t)	1.5							
NCV for petroleum coke (MJ/kg)	29.31							
Solid Biomass-Wood (TJ)				80.3	125.60	112.1	139.6	146.4
Bio gas (TJ)				170.9	116.7	102.3	110.6	86.1
Total fuel consumption (TJ)	10819	9507	12054	10125	10139	10940	10082	8945
Emissions								
EF CO ₂ - petroleum (t/TJ)	73.3	73.3	73.3	74.3	74.3	74.3	73.3	73.3
EF CO ₂ - light heating oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ - fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ - LPG (t/TJ)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
EF CO ₂ - brown coal (t/TJ)	94.1	94.1	94.1	94.1	94.1	94.1	94.1	94.1
EF CO ₂ - lignite (t/TJ)	99.2	99.2	99.2	99.2	99.2	99.2	99.2	99.2
EF CO ₂ - briquettes (t/TJ)	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
EF CO ₂ - gas work gas (t/TJ)	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
EF CO ₂ - natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
EF CO ₂ - petroleum coke (t/TJ)	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8
EF CO ₂ - solid biom. wood (t/TJ)	107.4	107.4	107.4	107.4	107.4	107.4	107.4	107.4
EF CO ₂ - landfill gas (t/TJ)	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6
CO ₂ Emission (Gg)	771.2	635.2	782.8	641.0	643.9	683.4	633.7	558.9

Table A2-15: The GHG emissions from Commercial/Institutional (cont.)

	1990	2000	2005	2008	2009	2010	2011	2012
EF CH ₄ - petroleum (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - light heating oil (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - fuel oil (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - LPG (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - brown coal (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - lignite (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - briquettes (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - gas work gas (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - natural gas (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - petroleum coke (kg/TJ)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
EF CH ₄ - solid biom. wood (kg/TJ)	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
EF CH ₄ - landfill gas (t/TJ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CH ₄ Emission (Mg)	93.6	78.2	94.5	95.5	108.8	108.0	110.6	103.4
EF N ₂ O - petroleum (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - light heating oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - LPG (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - brown coal (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - lignite (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - briquettes (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - gas work gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - petroleum coke (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - solid biom. wood (kg/TJ)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
EF N ₂ O - landfill gas (t/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N ₂ O Emission (Mg)	5.8	4.2	4.6	3.5	3.7	3.6	3.6	3.1

Table A2-16: The GHG emissions from Residential sector

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Petroleum (1000 t)		1.6	1	1.1	0.9	0.9	1.0	0.9
NCV for petroleum (MJ/kg)		44.0	44.0	44.0	44.0	44.0	44.0	44.0
Light heating oil (1000 t)	215.9	231.5	252.8	151.0	147.3	138.8	122.0	94.5
NCV for light heat. oil (MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Fuel oil (1000 t)	48.7	8.1	15.4	4.5	10.8	10.4	11.9	12.3
NCV for fuel oil (MJ/kg)	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2
LPG (1000 t)	97.9	51.9	60.9	74.0	77.8	72.2	74.4	56.9
NCV for LPG (MJ/kg)	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
Brown coal (1000 t)	123.1	12.0	14	3.8	2.2	6.1	2.3	4.1
NCV for brown coal (MJ/kg)	16.7	17.8	18.5	18.0	18.0	17.6	17.1	17.8
Lignite (1000 t)	207.3	15.0	11.7	8.1	5.7	9.4	9.0	4.8
NCV for lignite (MJ/kg)	10.9	12.0	12.1	11.8	11.7	11.6	11.6	10.7
Brown coal (1000 t)								0.2
NCV for brown coal (MJ/kg)								24.6
Briquettes (1000 t)	6.1							
NCV for briquettes (MJ/kg)	16.7							
Gas work gas (1000000 m ³)	24.4	9.9	10.24	6.4	6.8	7.2	5.0	
NCV for gas work gas (MJ/m ³)	15.8	19.5	21.5	19.6	18.7	17.2	17.2	
Natural gas (1000000 m ³)	230.0	496.6	687.8	682.7	699.5	732.9	670.2	
NCV for natural gas (MJ/m ³)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
Biomass (TJ)	19080	13410	12510	11055	11720	13462	16222	
Total fuel consumption (TJ)	47477	43598	50831	44705	46149	48492	48460	45990
Emissions								
EF CO ₂ - petroleum (t/TJ)	71.1	71.1	71.1	71.1	71.1	71.1	71.1	71.1
EF CO ₂ - light heating oil (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
EF CO ₂ - fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ - LPG (t/TJ)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
EF CO ₂ - brown coal (t/TJ)	94.1	94.1	94.1	94.1	94.1	94.1	94.1	94.1
EF CO ₂ - lignite (t/TJ)	99.2	99.2	99.2	99.2	99.2	99.2	99.2	99.2
EF CO ₂ - briquettes (t/TJ)	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
EF CO ₂ - gas work gas (t/TJ)	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
EF CO ₂ - natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
EF CO ₂ - biomass (t/TJ)	107.4	107.4	107.4	107.4	107.4	107.4	107.4	107.4
CO ₂ Emission (Gg)	4045.3	3337.3	3718.8	3212.2	3328.3	3545.0	3672.6	3559.3
EF CH ₄ - petroleum (k/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - light heat. oil (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - fuel oil (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - LPG (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - brown coal (kg/TJ)	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
EF CH ₄ - lignite (kg/TJ)	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
EF CH ₄ - briquettes (kg/TJ)	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0

Table A2-16: The GHG emissions from Residential sector (cont.)

	1990	2000	2005	2008	2009	2010	2011	2012
EF CH ₄ - gas work gas (kg/TJ)	1.0	1.0	1.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - natural gas (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - biomass (kg/TJ)	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
CH ₄ Emission (Mg)	7249.4	4353.6	4134.4	3584.0	3771.6	4326.6	5116.3	5377.1
EF N ₂ O - petroleum (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - light heat. oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - LPG (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - brown coal (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - lignite (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - briquettes (kg/TJ)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
EF N ₂ O - gas work gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - biomass (kg/TJ)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
N ₂ O Emission (Mg)	92.8	63.5	61.6	52.9	55.7	62.5	72.9	75.5

Table A2-17: The GHG emissions from Agriculture/Forestry/Fishing

	1990	2000	2005	2008	2009	2010	2011	2012
Fuel consumption								
Gasoline (1000 t)	4.0	12.1	8.1	8.9	8.5	8.2	8.2	7.7
NCV for gasoline (MJ/kg)	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6
Other kerosene (1000 t)	0.1							
NCV for other kerosene (MJ/kg)	44.4							
Extra light oil (1000 t)	232.6	237.6	197.4	216.7	207.3	200.1	200.2	186.3
NCV for extra light oil (MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Fuel consumption - mobile (TJ)	10117	10687	8792	9869	9233	8912	8916	8300.2
Fuel oil (1000 t)	12.3	13.4	4.7	4.6	4.6	4.4	4.4	4.1
NCV for fuel oil (MJ/kg)	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2
LPG (1000 t)	4.4	2.6	2.7	2.8	2.8	2.7	2.7	2.5
NCV for LPG (MJ/kg)	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
Gas work gas (1000000 m3)								
NCV for gas work gas (MJ/m3)								
Natural gas (1000000 m3)	25.0	14.5	23.2	20.8	19.6	22.2	21.5	20.7
NCV for natural gas (MJ/m3)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Fuel consump. - stationary (TJ)	1551	1154	1104	1023	983	1058	1034	985.8
Total fuel consumption (TJ)	11668	11841	9896	10892	10215	9970	9951	9286
Emissions								
EF CO ₂ - gasoline (t/TJ)	68.6	68.6	68.6	68.6	68.6	68.6	68.6	68.6
EF CO ₂ - other kerosene (t/TJ)	71.1	71.1	71.1	71.1	71.1	71.1	71.1	71.1
EF CO ₂ - diesel (t/TJ)	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
CO ₂ emission (Gg) - mobile	741.0	781.1	643.0	721.8	675.2	651.7	652.1	607.0
EF CO ₂ - fuel oil (t/TJ)	76.6	76.6	76.6	76.6	76.6	76.6	76.6	76.6
EF CO ₂ - LPG (t/TJ)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
EF CO ₂ - gas work gas (t/TJ)	47.4	107.6	107.6	47.4	47.4	47.4	47.4	47.4
EF CO ₂ - natural gas (t/TJ)	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
CO ₂ emission (Gg) - stationary	98.2	76.4	66.4	61.8	59.6	63.6	62.3	59.2
Total CO ₂ emission (Gg)	839.2	857.5	709.4	783.6	734.8	715.3	714.3	666.2
EF CH ₄ - gasoline (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - other kerosene (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - diesel (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CH ₄ emission (Mg) - mobile	50.6	53.4	44.0	49.3	46.2	44.6	44.6	41.5
EF CH ₄ - fuel oil (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - LPG (kg/TJ)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
EF CH ₄ - gas work gas (kg/TJ)	1.0	1.0	1.0	5.0	5.0	5.0	5.0	5.0
EF CH ₄ - natural gas (kg/TJ)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CH ₄ emission (Mg) - stationary	11.3	9.1	7.1	6.7	6.5	6.8	6.7	6.3
Total CH ₄ emission (Mg)	61.8	62.5	51.1	56.0	52.7	51.4	51.3	47.8

Table A2-17: The GHG emissions from Agriculture/Forestry/Fishing (cont.)

	1990	2000	2005	2008	2009	2010	2011	2012
EF N ₂ O - gasoline (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - other kerosene (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - diesel (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
N ₂ O emission (Mg) - mobile	6.1	6.4	5.3	5.9	5.5	5.3	5.3	5.0
EF N ₂ O - fuel oil (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - LPG (kg/TJ)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EF N ₂ O - gas work gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EF N ₂ O - natural gas (kg/TJ)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N ₂ O emission (Mg) - stationary	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.2
Total N ₂ O emission (Mg)	6.6	6.9	5.5	6.2	5.8	5.6	5.6	5.2

Table A2-18: Methane emissions from Coal Mining and Handling from 1990 to 1999

Source and Sink Categories		Activity Data Production (PJ)	Emission Estimates CH ₄ /(Gg)	Emission Factor kgCH ₄ /t	Emission Factor m ³ CH ₄ /t
Year 1990					
1B 1a	Underground mines		2.32		
	Mining	0.174	2.04	5.86	17.50
	Post-Mining	0.174	0.29	0.82	2.45
Year 1991					
1B 1a	Underground mines		2.07		
	Mining	0.155	1.82	5.86	17.50
	Post-Mining	0.155	0.25	0.82	2.45
Year 1992					
1B 1a	Underground mines		1.61		
	Mining	0.120	1.41	5.86	17.50
	Post-Mining	0.120	0.20	0.82	2.45
Year 1993					
1B 1a	Underground mines		1.54		
	Mining	0.115	1.35	5.86	17.50
	Post-Mining	0.115	0.19	0.82	2.45
Year 1994					
1B 1a	Underground mines		1.38		
	Mining	0.103	1.21	5.86	17.50
	Post-Mining	0.103	0.17	0.82	2.45
Year 1995					
1B 1a	Underground mines		1.10		
	Mining	0.082	0.96	5.86	17.50
	Post-Mining	0.082	0.13	0.82	2.45
Year 1996					
1B 1a	Underground Mines		0.89		
	Mining	0.066	0.78	5.86	17.50
	Post-Mining	0.066	0.11	0.82	2.45
Year 1997					
1B 1a	Underground Mines		0.65		
	Mining	0.049	0.57	5.86	17.50
	Post-Mining	0.049	0.08	0.82	2.45
Year 1998					
1B 1a	Underground Mines		0.68		
	Mining	0.051	0.60	5.86	17.50
	Post-Mining	0.051	0.08	0.82	2.45
Year 1999					
1B 1a	Underground Mines		0.20		
	Mining	0.015	0.18	5.86	17.50
	Post-Mining	0.015	0.03	0.82	2.45

* - 0.67 kg/m³ – Methane density at 20°C and pressure 1 atm.

Table A2-19: Fugitive emissions from Oil and Gas Activities

OIL (1B2a)	1990	2000	2005	2008	2009	2010	2011	2012
Activity data								
Exploration (number of wells)	712	739	771	656	646	674	660	593
Production (PJ)	112.9	51.4	40.1	35.4	33.1	30.7	28.4	25.6
Transport (PJ)	174.1	165.6	169.5	147.3	172.5	150.6	121.2	99.3
Refining (PJ)	287.3	218.4	211.6	187.6	204.7	181.8	143.4	132.7
Distribution (PJ)	287.3	218.4	211.6	187.6	204.7	181.8	143.4	132.7
CO₂ emissions (Gg)								
Exploration	0.0003	0.0004	0.0403	0.0003	0.0003	0.1599	0.0003	0.0003
Production	0.8465	0.3811	0.2970	0.2623	0.2437	0.2262	0.2086	0.2262
Transport	0.0024	0.0022	0.0023	0.0020	0.0023	0.0020	0.0016	0.0020
Refining	NO	NO	NO	NO	NO	NO	NO	NO
Distribution	NO	NO	NO	NO	NO	NO	NO	NO
Total CO₂ emissions (Gg)	0.8492	0.3837	0.3395	0.2646	0.2463	0.3881	0.2105	0.2285
CH₄ emissions (Gg)								
Exploration	0.0456	0.0473	0.0512	0.0420	0.0413	0.0507	0.0422	0.0380
Production	0.2992	0.1361	0.1063	0.0939	0.0876	0.0813	0.0752	0.0679
Transport	0.1297	0.1234	0.1263	0.1097	0.1285	0.1122	0.0903	0.0740
Refining	0.0388	0.0295	0.0286	0.0253	0.0276	0.0245	0.0194	0.0179
Distribution	0.2140	0.1627	0.1577	0.1397	0.1525	0.1354	0.1068	0.0989
Total CH₄ emissions (Gg)	0.7272	0.4989	0.4701	0.4106	0.4376	0.4042	0.3339	0.2966
N₂O emissions (Gg)								
Exploration	NO	NO	4.76E-07	NO	NO	1.9E-06	NO	NO
Refining	NO	NO	NO	NO	NO	NO	NO	NO
Total N₂O emissions (Gg)	NO	NO	4.76E-07	NO	NO	1.9E-06	NO	NO

Table A2-19: Fugitive emissions from Oil and Gas Activities (cont.)

Gas (1B2b)	1990	2000	2005	2008	2009	2010	2011	2012
Activity data								
Exploration (number of wells)	105	94	113	130	123	124	128	132
Production / Processing (PJ)	67.4	59.4	79.8	94.1	93.5	93.9	85.0	69.2
Transmission and Distribution (PJ)	91.3	95.0	101.1	110.2	102.2	111.4	108.6	101.8
Other Leakage								
Non-residential gas consumed (PJ)	83.5	78.1	77.7	87.0	78.4	86.5	85.8	80.4
Residential gas -consumed (PJ)	7.8	16.9	23.4	23.2	23.8	24.9	22.8	21.4
CO₂ emissions (Gg)								
Exploration	0.0001	0.0627	0.0001	0.0115	0.0001	0.0058	0.0229	0.0229
Production / Processing	416.14	633.17	691.46	576.08	516.69	487.52	509.27	429.45
Transmission	0.0540	0.0534	0.0406	0.0518	0.0518	0.0578	0.0615	0.0615
Distribution	NO	NO	NO	NO	NO	NO	NO	NO
Other Leakage								
Non-residential gas consumed	NO	NO	NO	NO	NO	NO	NO	NO
Residential gas -consumed	NO	NO	NO	NO	NO	NO	NO	NO
Total CO₂ emissions (Gg)	416.19	633.29	691.50	576.15	516.75	487.58	509.36	429.54
CH₄ emissions (Gg)								
Exploration	0.0067	0.0090	0.0072	0.0089	0.0079	0.0082	0.0093	0.0095
Production / Processing	30.87	27.21	36.53	43.08	42.82	43.00	38.94	31.69
Transmission	IE	IE	IE	IE	IE	IE	IE	IE
Distribution	IE	IE	IE	IE	IE	IE	IE	IE
Other Leakage								
Non-residential gas consumed	23.35	21.83	21.71	24.32	21.90	24.16	23.98	22.46
Residential gas -consumed	1.09	2.34	3.26	3.24	3.32	3.48	3.18	2.99
Total CH₄ emissions (Gg)	55.31	51.40	61.51	70.64	68.05	70.64	66.11	57.15
N₂O emissions (Gg)								
Exploration	NO	7.48E-07	NO	1.36E-07	NO	6.8E-08	2.72E-07	2.72E-07
Total N₂O emissions (Gg)	NO	7.48E-07	NO	1.36E-07	NO	6.8E-08	2.72E-07	2.72E-07

Table A2-19: Fugitive emissions from Oil and Gas Activities (cont.)

Venting (1B2c)	1990	2000	2005	2008	2009	2010	2011	2012
Activity data								
Oil (1000 m3)	3135.1	1411.5	1100.0	971.4	902.6	837.7	772.6	837.7
Gas (1000000 m3)	1982.3	1658.5	2283.4	2729.4	2704.8	2727.2	2471.4	2727.2
Combined	NO	NO	NO	NO	NO	NO	NO	NO
CO₂ emissions (Gg)								
Oil	210.1	94.6	73.7	65.1	60.5	56.1	51.8	56.13
Gas	12.7	10.6	14.6	17.5	17.3	17.5	15.8	17.45
Combined	NO	NO	NO	NO	NO	NO	NO	NO
Total CO₂ emissions (Gg)	222.8	105.2	88.3	82.6	77.8	73.6	67.56	73.59
CH₄ emissions (Gg)								
Oil	NO	NO	NO	NO	NO	NO	NO	NO
Gas	1.213	1.069	1.436	1.693	1.683	1.690	1.530	1.245
Combined	NO	NO	NO	NO	NO	NO	NO	NO
Total CH₄ emissions (Gg)	1.213	1.069	1.436	1.693	1.683	1.690	1.530	1.245
N₂O emissions (Gg)								
Oil	0.0020	0.0009	0.0007	0.0006	0.0006	0.0005	0.0005	0.0005
Gas	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Total N₂O emissions (Gg)	0.0022	0.0010	0.0009	0.0008	0.0008	0.0007	0.0007	0.0007

ANNEX 3

CO₂ REFERENCE APPROACH AND COMPARISON WITH SECTORAL APPROACH, AND RELEVANT INFORMATION ON THE NATIONAL ENERGY BALANCE

Table A3-1: Fuel combustion CO₂ emissions (Reference and Sectoral Approach)

YEAR	FUEL TYPES	Reference approach		Sectoral approach		Difference	
		Energy	CO ₂	Energy	CO ₂	Energy	CO ₂
1990	Liquid Fuels	179.45	12,651.34	181.26	13,287.54	-1.00	-4.79
	Solid Fuels	34.27	3,102.87	28.67	2,800.86	19.54	10.78
	Gaseous Fuels	79.98	4,460.62	82.84	4,505.99	-3.45	-1.01
	Total	293.71	20,214.83	292.77	20,594.38	0.32	-1.84
1991	Liquid Fuels	124.89	8,939.29	129.22	9,484.01	-3.35	-5.74
	Solid Fuels	21.07	1,850.52	17.41	1,692.68	21.06	9.32
	Gaseous Fuels	68.08	3,798.20	71.54	3,927.11	-4.84	-3.28
	Total	214.04	14,588.02	218.16	15,103.80	-1.89	-3.41
1992	Liquid Fuels	118.55	8,452.70	122.57	9,032.61	-3.27	-6.42
	Solid Fuels	17.25	1,476.32	13.47	1,284.85	28.08	14.90
	Gaseous Fuels	71.52	3,989.76	73.97	4,095.82	-3.31	-2.59
	Total	207.33	13,918.78	210.01	14,413.28	-1.28	-3.43
1993	Liquid Fuels	117.00	8,471.38	127.09	9,345.57	-7.94	-9.35
	Solid Fuels	14.71	1,225.37	10.98	1,043.62	33.97	17.41
	Gaseous Fuels	80.04	4,921.38	82.60	4,591.99	-3.10	7.17
	Total	211.75	14,618.13	220.67	14,981.19	-4.04	-2.42
1994	Liquid Fuels	122.08	9,061.90	126.83	9,295.85	-3.75	-2.52
	Solid Fuels	9.20	771.63	6.83	661.23	34.57	16.70
	Gaseous Fuels	74.91	4,178.33	76.54	4,261.47	-2.13	-1.95
	Total	206.19	14,011.86	210.21	14,218.56	-1.91	-1.45
1995	Liquid Fuels	136.13	9,978.13	143.62	10,546.48	-5.21	-5.39
	Solid Fuels	7.71	735.29	7.63	728.68	1.04	0.91
	Gaseous Fuels	67.12	3,743.73	67.37	3,760.38	-0.37	-0.44
	Total	210.97	14,457.15	218.62	15,035.54	-3.50	-3.85
1996	Liquid Fuels	147.23	10,567.62	147.01	10,795.34	0.15	-2.11
	Solid Fuels	6.21	591.97	6.18	589.85	0.44	0.36
	Gaseous Fuels	74.87	4,177.31	75.01	4,189.67	-0.19	-0.30
	Total	228.31	15,336.89	228.21	15,574.86	0.05	-1.53
1997	Liquid Fuels	147.25	10,550.01	152.28	11,169.92	-3.30	-5.55
	Solid Fuels	10.17	960.12	10.20	962.55	-0.22	-0.25
	Gaseous Fuels	78.83	4,399.16	78.95	4,412.26	-0.15	-0.30
	Total	236.25	15,909.30	241.43	16,544.73	-2.14	-3.84
1998	Liquid Fuels	162.90	11,750.01	164.49	12,104.49	-0.96	-2.93
	Solid Fuels	9.87	929.44	9.87	929.24	0.02	0.02
	Gaseous Fuels	78.13	4,358.03	78.23	4,369.71	-0.12	-0.27
	Total	250.91	17,037.48	252.59	17,403.43	-0.66	-2.10
1999	Liquid Fuels	170.71	12,642.55	174.02	12,836.12	-1.90	-1.51
	Solid Fuels	8.63	810.25	8.52	800.59	1.22	1.21
	Gaseous Fuels	77.53	4,325.29	77.69	4,339.74	-0.20	-0.33
	Total	256.87	17,778.08	260.23	17,976.44	-1.29	-1.10
2000	Liquid Fuels	147.92	10,998.18	153.02	11,213.02	-3.33	-1.92
	Solid Fuels	18.65	1,747.47	18.68	1,750.05	-0.15	-0.15
	Gaseous Fuels	78.42	4,374.72	78.45	4,383.98	-0.04	-0.21
	Total	244.99	17,120.36	250.15	17,347.05	-2.06	-1.31
2001	Liquid Fuels	153.62	11,425.81	158.20	11,627.21	-2.89	-1.73
	Solid Fuels	19.83	1,849.61	19.69	1,836.22	0.73	0.73
	Gaseous Fuels	83.33	4,648.28	83.37	4,653.78	-0.05	-0.12
	Total	256.78	17,923.71	261.25	18,117.22	-1.71	-1.07

Table A3-1: Fuel combustion CO₂ emissions (Reference and Sectoral Approach) - cont.

YEAR	FUEL TYPES	Reference approach		Sectoral approach		Difference	
		Energy Consump. excluding non-energy (PJ)	CO ₂ emissions (Gg)	Energy Consump. (PJ)	CO ₂ emission (Gg)	Energy Consump. (%)	CO ₂ emission (%)
2002	Liquid Fuels	167.62	12,429.84	164.88	12,121.90	1.66	2.54
	Solid Fuels	24.43	2,277.22	23.88	2,225.62	2.30	2.32
	Gaseous Fuels	86.88	4,846.04	86.92	4,850.52	-0.05	-0.09
	Total	278.92	19,553.10	275.68	19,198.04	1.18	1.85
2003	Liquid Fuels	178.01	13,212.60	181.13	13,313.81	-1.73	-0.76
	Solid Fuels	27.20	2,532.94	27.00	2,514.72	0.73	0.72
	Gaseous Fuels	85.88	4,790.70	86.07	4,802.30	-0.21	-0.24
	Total	291.09	20,536.23	294.20	20,630.83	-1.06	-0.46
2004	Liquid Fuels	165.03	12,283.59	166.92	12,271.69	-1.13	0.10
	Solid Fuels	28.88	2,687.52	29.09	2,707.62	-0.75	-0.74
	Gaseous Fuels	89.48	4,991.45	89.45	4,996.18	0.03	-0.09
	Total	283.38	19,962.56	285.46	19,975.50	-0.73	-0.06
2005	Liquid Fuels	172.01	12,856.05	173.10	12,824.48	-0.63	0.25
	Solid Fuels	28.64	2,667.30	27.88	2,596.45	2.74	2.73
	Gaseous Fuels	86.93	4,849.13	86.99	4,859.52	-0.07	-0.21
	Total	287.58	20,372.48	287.97	20,280.45	-0.13	0.45
2006	Liquid Fuels	173.28	12,943.77	176.28	13,084.75	-1.70	-1.08
	Solid Fuels	26.56	2,472.98	26.38	2,456.68	0.67	0.66
	Gaseous Fuels	85.94	4,793.74	86.09	4,805.78	-0.18	-0.25
	Total	285.78	20,210.48	288.76	20,347.20	-1.03	-0.67
2007	Liquid Fuels	179.52	13,421.81	180.39	13,380.26	-0.48	0.31
	Solid Fuels	28.96	2,695.65	28.50	2,655.09	1.60	1.53
	Gaseous Fuels	99.23	5,536.15	99.08	5,537.49	0.16	-0.02
	Total	307.71	21,653.62	307.97	21,572.84	-0.09	0.37
2008	Liquid Fuels	169.62	12,549.53	167.21	12,386.66	1.44	1.31
	Solid Fuels	29.69	2,722.73	29.32	2,729.99	1.26	-0.27
	Gaseous Fuels	96.48	5,382.27	96.22	5,378.92	0.28	0.06
	Total	295.79	20,654.52	292.75	20,495.57	1.04	0.78
2009	Liquid Fuels	166.98	12,396.16	167.29	12,356.65	-0.19	0.32
	Solid Fuels	21.24	1,980.39	21.12	1,969.25	0.57	0.57
	Gaseous Fuels	90.28	5,035.29	90.07	5,034.38	0.23	0.02
	Total	278.49	19,411.84	278.48	19,360.28	0.01	0.27
2010	Liquid Fuels	142.94	10,624.98	143.07	10,520.17	-0.09	1.00
	Solid Fuels	29.33	2,732.05	28.94	2,696.20	1.34	1.33
	Gaseous Fuels	98.29	5,482.98	97.93	5,504.56	0.37	-0.39
	Total	270.56	18,840.00	269.94	18,720.93	0.23	0.64
2011	Liquid Fuels	140.30	10,397.37	142.63	10,423.27	-1.63	-0.25
	Solid Fuels	29.41	2,740.10	30.33	2,825.24	-3.03	-3.01
	Gaseous Fuels	93.32	5,213.40	93.51	5,260.84	-0.20	-0.90
	Total	263.04	18,350.87	266.47	18,509.35	-1.29	-0.86

Table A3-1: Fuel combustion CO₂ emissions (Reference and Sectoral Approach) - cont.

YEAR	FUEL TYPES	Reference approach		Sectoral approach		Difference	
		Energy Consump. excluding non-energy (PJ)	CO ₂ emissions (Gg)	Energy Consump. (PJ)	CO ₂ emission (Gg)	Energy Consump. (%)	CO ₂ emission (%)
2012	Liquid Fuels	134.04	9,405.89	134.09	9,794.06	-0.04	-3.96
	Solid Fuels	26.34	2,454.50	26.56	2,474.48	-0.81	-0.81
	Gaseous Fuels	83.02	4,639.12	83.22	4,680.72	-0.25	-0.89
	Total	243.40	16,499.51	243.87	16,949.26	-0.19	-2.65

Table A3-2: Net calorific values for different fossil fuels from 1990 to 2012

			Net calorific values 1990- 2012 MJ/kg(m³)
Liquid Fossil	Primary Fuel	Crude Oil	41.87-42.70
	Secondary Fuel	Motor Gasoline	44.59
		Jet Kerosene	43.96
		Gas/Diesel Oil	42.71
		Residual Fuel Oil	40.19
		LPG	46.89
		Naphtha	44.59
		Bitumen	33.50
		Lubricants	33.50
		Refinery Gas	48.57
		Petroleum Coke	29.31-31.00
		Ethane	47.31
Solid Fossil	Primary Fuel	Anthracite	29.29-29.31
		Other Bituminous Coal	24.30-26.90
		Sub Bituminous Coal	16.74-18.73
		Lignite	10.52-12.15
	Secondary Fuel	Gas Work Gas	15.82-22.63
		Coke Oven Coke	29.31
			TJ/Mm³
Natural Gas		Natural Gas	34.00
Biomass		Solid Biomass Fuel Wood	9.00

Table A3-3: National energy balance for 2012

ENERGY BALANCE 2010 natural units	Anthracite	Hard coal	Brown coal	Lignite	Crude oil	Natural gas
	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ⁶ m ³
Production					599.9	2013.1
Import	0.2	875.1	41.5	4.8	2325.0	1357.7
Export		0.5				256.8
Import-processing						
Export-processing						
Stock change		127.3	4.2		183.4	-142.3
Bunkers						
Energy supplied	0.2	1001.9	45.7	4.8	3108.3	2971.7
Production						
hydro power plants						
– small HPP						
Wind power plants						
Solar power plants						
Geothermal power plants						
thermal power plants						
public cogeneration plants						
public heating plants						
industrial cogeneration plants						
– in refineries						
– in gas production						
Industrial heating plants						
Petroleum refineries						
NGL-plant						
Coke plant						
Gas works						
Total production						
Transformation sector						
hydro power plants						
– small HPP						
Wind power plants						
Solar power plants						
Geothermal power plants						
thermal power plants		957.1				27.0
public cogeneration plants						652.1
public heating plants						76.0
industrial cogeneration plants			39.2			302.5
– in refineries						11.8
– in gas production						43.3
Industrial heating plants						67.2
Petroleum refineries					3273.2	76.0
NGL-plant					84.8	7.3
Coke plant						
Gas works						3.9
Total transformation sector		957.1	39.2		3358.0	1212.0
Energy sector own use						
Oil and gas extraction						39.4
Coal production						
Electric energy supply industry						
hydro power plants						
thermal power plants						
public cogeneration plants						
industrial cogeneration plants						
Wind power						
Petroleum refineries						4.9
NGL-plant						3.0
Gas works						
Total energy sector own use						47.3
Losses			52.9			
Final energy demand	0.2	146.4	10.0	4.8		1543.0
Energy consumption	0.2	146.4	10.0	4.8		1053.4
Industry	2.1	162.0	20.2			333.1
Iron and steel	0.2	146.2	1.0			239.5
Non-ferrous metals	0.2	0.3				14.0
Non-metallic minerals						1.1
Chemical			1.0			44.4
Construction materials						10.4
Pulp and paper		145.9				54.1
Food production						7.0
Not elsewhere specified						62.4
Transport						1.0
Rail						
Road						0.2
Air						
– international						
– domestic						
Sea and River						
Public transport						0.8
Not elsewhere specified						
Other sectors		0.2	9.0	4.8		812.9
Households		0.2	4.1	4.8		630.2
Services			4.9			162.0
Agriculture						20.7
Construction						

Table A3-3: National energy balance for 2012 (continue)

ENERGY BALANCE 2010 natural units	Hydro energy	Fuel wood	Wind energy	Solar energy	Geothermal energy	Landfill gas	Biofuels	Other biomass
	TJ	10 ³ m ³	TJ	TJ	TJ	10 ³ m ³	10 ³ t	TJ
Production	45448.2	2307.7	3111.5	320.3	291.5	26584.0	39.1	8399.1
Import		5.0					4.0	99.4
Export		391.1					0.4	4965.5
Import-processing								
Export-processing								
Stock change							-0.8	51.0
Bunkers								
Energy supplied	45448.2	1921.6	3111.5	320.3	291.5	26584.0	41.9	3584.0
Production								
hydro power plants								
– small HPP								
Wind power plants								
Solar power plants								
Geothermal power plants								
thermal power plants								
public cogeneration plants								
public heating plants								
industrial cogeneration plants								
– in refineries								
– in gas production								
Industrial heating plants								
Petroleum refineries								
NGL-plant								
Coke plant								
Gas works								
Total production								
Transformation sector								
hydro power plants	42588.3							
– small HPP	618.5							
Wind power plants			1852.9					
Solar power plants				0.9				
Geothermal power plants								
thermal power plants								
public cogeneration plants						9191.0		803.2
public heating plants								
industrial cogeneration plants						6812.0		106.3
– in refineries								
– in gas production								
Industrial heating plants								1319.7
Petroleum refineries								
NGL-plant								
Coke plant								
Gas works								
Total transformation sector	42588.3		1852.9	0.9		16003.0		2229.2
Energy sector own use								
Oil and gas extraction								
Coal production								
Electric energy supply industry								
hydro power plants								
thermal power plants								
public cogeneration plants								
industrial cogeneration plants								
Wind power								
Petroleum refineries								
NGL-plant								
Gas works								
Total energy sector own use								
Losses			875.0					
Final energy demand		1921.6		297.6	291.5		41.9	1237.9
Energy consumption		1921.6		297.6	291.5		41.9	1237.9
Industry		46.8						213.6
Iron and steel		48.6						747.5
Non-ferrous metals		0.5						
Non-metallic minerals		0.5						
Chemical								
Construction materials		0.1						
Pulp and paper		0.5						361.4
Food production								234.1
Not elsewhere specified		1.4						
Transport							41.8	
Rail								
Road							41.8	
Air								
– international								
– domestic								
Sea and River								
Public transport								
Not elsewhere specified								
Other sectors		1873.0		297.6	291.5		0.1	490.4
Households		1860.0		297.6				461.0
Services		13.0			291.5			29.4
Agriculture							0.1	
Construction								

Table A3-3: National energy balance for 2012 (continue)

ENERGY BALANCE 2010 natural units	Coke oven coke	Liquefied petroleum gases	Unleaded motor gasoline	Standard motor gasoline	Petroleum	Jet fuel	Diesel oil	Light heating oil	Low sulphur fuel oil	Standard fuel oil
	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t
Production		280.4	990.4			97.1	1132.8	153.5		562.5
Import	29.2	14.1	168.8	0.5	0.8	18.6	626.5	66.7	0.7	62.3
Export	1.0	145.7	549.1			4.0	356.4	31.7		326.3
Import-processing										
Export-processing										
Stock change	-0.1	-1.5	-20.0		0.1	1.6	-4.0	0.1		37.4
Bunkers										
Energy supplied	28.1	147.3	590.1	0.5	0.9	113.3	1398.9	188.6	0.7	335.9
Production										
hydro power plants										
– small HPP										
Wind power plants										
Solar power plants										
Geothermal power plants										
thermal power plants										
public cogeneration plants										
public heating plants										
industrial cogeneration plants										
– in refineries										
– in gas production										
Industrial heating plants										
Petroleum refineries		238.7	990.4			97.1	1132.8	153.5		562.5
NGL-plant		41.7								
Coke plant										
Gas works										
Total production		280.4	990.4			97.1	1132.8	153.5		562.5
Transformation sector										
hydro power plants										
– small HPP										
Wind power plants										
Solar power plants										
Geothermal power plants										
thermal power plants								0.9		58.5
public cogeneration plants									12.0	78.9
public heating plants								5.3		23.5
industrial cogeneration plants										160.7
– in refineries										156.7
– in gas production										
Industrial heating plants										22.3
Petroleum refineries										
NGL-plant										
Coke plant										
Gas works										
Total transformation sector								6.2	12.0	343.9
Energy sector own use										
Oil and gas extraction										
Coal production										
Electric energy supply industry										
hydro power plants										
thermal power plants										
public cogeneration plants										
industrial cogeneration plants										
Wind power										
Petroleum refineries		2.2								22.3
NGL-plant										
Gas works										
Total energy sector own use		2.2								22.3
Losses										
Final energy demand	28.1	144.6	590.1	0.5	0.9	113.3	1398.9	183.3	0.7	45.2
Energy consumption	28.1	144.6	590.1	0.5	0.9	113.3	1398.9	183.3	0.7	45.2
Industry	27.2	13.8					13.5	20.0		26.2
Iron and steel	28.1	16.0					12.0	18.0	0.7	17.4
Non-ferrous metals	1.6	2.8						0.7		0.7
Non-metallic minerals		5.1						0.8		
Chemical		0.1								1.8
Construction materials		0.1						0.6		0.1
Pulp and paper	19.5	3.1					12.0	3.1		5.5
Food production		0.1						0.1		
Not elsewhere specified	7.0	1.2						9.5		7.0
Transport		54.8	578.2	0.5		113.3	1123.9			1.9
Rail							24.8			
Road		54.8	578.2				1040.2			
Air				0.5		113.3				
– international						65.8				
– domestic				0.5		47.5				
Sea and River							33.5			1.9
Public transport							25.4			
Not elsewhere specified										
Other sectors		73.8	11.9		0.9		263.0	165.3		25.9
Households		56.9			0.9			94.5		12.3
Services		12.1						50.0		9.5
Agriculture		2.5	7.7				173.0	13.3		4.1
Construction		2.3	4.2				90.0	7.5		

Table A3-3: National energy balance for 2012 (continue)

ENERGY BALANCE 2010 natural units	Naphta	White spirit	Bitumen	Other oils	Lubricants	Petroleum coke	Etan	Other derivates	Refinery gas	Refinery semiproducts	Additives
	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t
Production	82.6		25.6	12.1		84.7		55.0	293.8		
Import		2.3	109.0	24.0	6.2	97.7				441.0	63.1
Export	60.1	0.1	5.5	6.8		28.0		44.6			
Import-processing											
Export-processing											
Stock change	0.9	0.3	-0.1	0.4		-6.0		-8.9		-2.7	0.2
Bunkers											
Energy supplied	23.4	2.5	129.0	29.7	6.2	148.4		1.5	293.8	438.3	63.3
Production											
hydro power plants											
– small HPP											
Wind power plants											
Solar power plants											
Geothermal power plants											
thermal power plants											
public cogeneration plants											
public heating plants											
industrial cogeneration plants											
– in refineries											
– in gas production											
Industrial heating plants											
Petroleum refineries	59.0		25.6	12.1		84.7		55.0	293.8		
NGL-plant	23.6										
Coke plant											
Gas works											
Total production	82.6		25.6	12.1		84.7		55.0	293.8		
Transformation sector											
hydro power plants											
– small HPP											
Wind power plants											
Solar power plants											
Geothermal power plants											
thermal power plants											
public cogeneration plants											
public heating plants											
industrial cogeneration plants						2.8			2.5		
– in refineries						2.8			2.5		
– in gas production											
Industrial heating plants											
Petroleum refineries	23.2									186.5	77.6
NGL-plant											
Coke plant											
Gas works											
Total transformation sector	23.2					2.8			2.5	186.5	77.6
Energy sector own use											
Oil and gas extraction											
Coal production											
Electric energy supply industry											
hydro power plants											
thermal power plants											
public cogeneration plants											
industrial cogeneration plants											
Wind power											
Petroleum refineries						51.2			284.6		
NGL-plant											
Gas works											
Total energy sector own use						51.2			284.6		
Losses									110.8	1886.8	1389.0
Final energy demand	0.0	2.5	129.0	29.7	6.2	93.9		1.5			
Energy consumption	0.0					93.9		0.0			
Industry						93.3					
Iron and steel						93.9					
Non-ferrous metals						0.2					
Non-metallic minerals											
Chemical											
Construction materials											
Pulp and paper						93.7					
Food production											
Not elsewhere specified											
Transport											
Rail											
Road											
Air											
– international											
– domestic											
Sea and River											
Public transport											
Not elsewhere specified											
Other sectors											
Households											
Services											
Agriculture											
Construction											

Table A3-3: National energy balance for 2012 (continue)

ENERGY BALANCE 2010 natural units	Gas works gas 10 ³ m ³	Electricity GWh	Steam and hot water TJ
Production	5733.7	10557.4	27567.9
Import		9230.8	
Export		1601.8	
Import-processing			
Export-processing			
Stock change			
Bunkers			
Energy supplied	5733.7	18186.4	27567.9
Production			
hydro power plants		4801.2	
– small HPP		87.7	
Wind power plants		328.7	
Solar power plants		2.4	
Geothermal power plants			
thermal power plants		2513.1	
public cogeneration plants		2529.2	8964.1
public heating plants			2661.4
industrial cogeneration plants		382.8	11301.6
– in refineries			4152.0
– in gas production			963.0
Industrial heating plants			2927.8
Petroleum refineries			
NGL-plant			
Coke plant			
Gas works	5733.7		
Total production	5733.7	10557.4	25854.9
Transformation sector			
hydro power plants			
– small HPP			
Wind power plants			
Solar power plants			
Geothermal power plants			
thermal power plants			
public cogeneration plants			
public heating plants			
industrial cogeneration plants			
– in refineries			
– in gas production			
Industrial heating plants			
Petroleum refineries			
NGL-plant			
Coke plant			
Gas works			
Total transformation sector			
Energy sector own use			
Oil and gas extraction		93.6	730.0
Coal production			38.1
Electric energy supply industry		31.6	
hydro power plants		249.7	
thermal power plants		231.0	
public cogeneration plants		89.0	636.0
industrial cogeneration plants			
Wind power		0.8	
Petroleum refineries		264.3	4152.0
NGL-plant		9.9	233.0
Gas works			
Total energy sector own use		969.9	5789.1
Losses		1830.7	1510.2
Final energy demand	5622.9	15329.7	20389.8
Energy consumption	5622.9	15329.7	20389.8
Industry		3265.8	11930.8
Iron and steel		2957.3	11199.0
Non-ferrous metals		234.9	64.4
Non-metallic minerals		86.1	
Chemical		119.3	112.0
Construction materials		260.4	4018.5
Pulp and paper		443.5	
Food production		216.7	1420.4
Not elsewhere specified		646.0	3699.2
Transport		288.4	
Rail		164.5	
Road			
Air		19.3	
– international			
– domestic		19.3	
Sea and River		19.5	
Public transport		65.8	
Not elsewhere specified		19.3	
Other sectors	5622.9	12084.0	9190.8
Households	3751.1	6464.4	7480.6
Services	1871.8	5369.4	1615.4
Agriculture		62.7	94.8
Construction		187.5	

Table A3-3: National energy balance for 2012 (continue)

<i>PJ</i>	Anthracite	Hard coal	Brown coal	Lignite	Crude oil	Natural gas
PRIMARNA BILANCA						
Production	-	-	-	-	25.62	69.187
Import	0.01	21.62	0.74	0.05	99.28	46.162
Export	-	0.01	-	-	-	8.731
Import-processing	-	-	-	-	-	-
Export-processing	-	-	-	-	-	-
Stock change	-	3.10	0.07	-	7.83	4.838
Bunkers	-	-	-	-	-	-
Energy supplied	0.01	24.71	0.81	0.05	132.72	101.78
Production	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-
- small HPP	-	-	-	-	-	-
Wind power plants	-	-	-	-	-	-
Solar power plants	-	-	-	-	-	-
Geothermal power plants	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-
public heating plants	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-
- in refineries	-	-	-	-	-	-
- in gas production	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-
Petroleum refineries	-	-	-	-	-	-
NGL-plant	-	-	-	-	-	-
Coke plant	-	-	-	-	-	-
Gas works	-	-	-	-	-	-
Total production	-	-	-	-	-	-
Gross production	0.01	24.71	0.81	0.05	132.72	101.78
Transformation sector	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-
- small HPP	-	-	-	-	-	-
Wind power plants	-	-	-	-	-	-
Solar power plants	-	-	-	-	-	-
Geothermal power plants	-	-	-	-	-	-
thermal power plants	-	20.83	-	-	-	0.48
public cogeneration plants	-	-	-	-	-	22.91
public heating plants	-	-	-	-	-	2.60
industrial cogeneration plants	-	-	0.64	-	-	9.96
- in refineries	-	-	-	-	-	-
- in gas production	-	-	-	-	-	2.45
Industrial heating plants	-	-	-	-	-	1.94
Petroleum refineries	-	-	-	-	130.56	7.06
NGL-plant	-	-	-	-	2.16	0.86
Coke plant	-	-	-	-	-	-
Gas works	-	-	-	-	-	0.10
Total transformation sector	-	20.83	0.64	-	132.72	45.91
Energy sector own use	-	-	-	-	-	-
Oil and gas extraction	-	-	-	-	-	1.34
Coal production	-	-	-	-	-	-
Electric energy supply industry	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-
Petroleum refineries	-	-	-	-	-	0.17
NGL-plant	-	-	-	-	-	0.10
Gas works	-	-	-	-	-	-
Total energy sector own use	-	-	-	-	-	1.61
Losses	-	-	-	-	-	1.80
Final energy demand	0.01	3.87	0.18	0.05	-	0.00
Energy consumption	0.01	3.87	0.18	0.05	-	0.00
Industry	0.01	3.87	0.02	-	-	8.14
Iron and steel	0.01	0.01	-	-	-	0.48
Non-ferrous metals	-	-	-	-	-	0.04
Non-metallic minerals	-	-	0.02	-	-	1.51
Chemical	-	-	-	-	-	0.35
Construction materials	-	3.86	-	-	-	1.84
Pulp and paper	-	-	-	-	-	0.24
Food production	-	-	-	-	-	2.12
Not elsewhere specified	-	-	-	-	-	1.57
Transport	-	-	-	-	-	0.03
Rail	-	-	-	-	-	-
Road	-	-	-	-	-	0.01
Air	-	-	-	-	-	-
- international	-	-	-	-	-	-
- domestic	-	-	-	-	-	-
Sea and River	-	-	-	-	-	-
Public transport	-	-	-	-	-	0.03
Not elsewhere specified	-	-	-	-	-	-
Other sectors	-	0.00	0.16	0.05	-	27.64
Households	-	0.00	0.07	0.05	-	21.43
Services	-	-	0.09	-	-	5.51
Agriculture	-	-	-	-	-	0.70
Construction	-	-	-	-	-	-

Table A3-3: National energy balance for 2012 (continue)

PL	Hydro energy	Fuel wood	Wind energy	Solar energy	Geothermal energy	Landfill gas	Biofuels	Other biomass
PRIMARNA BILANCA								
Production	45.45	20.769	3.111	0.320	0.291	0.4786	1.455	8.399
Import	-	0.05	-	-	-	-	0.11	0.10
Export	-	3.52	-	-	-	-	0.02	4.97
Import-processing	-	-	-	-	-	-	-	-
Export-processing	-	-	-	-	-	-	-	-
Stock change	-	-	-	-	-	-	0.03	0.05
Bunkers	-	-	-	-	-	-	-	-
Energy supplied	45.45	17.29	3.11	0.32	0.29	0.4786	1.52	3.58
Production	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-
- small HPP	-	-	-	-	-	-	-	-
Wind power plants	-	-	-	-	-	-	-	-
Solar power plants	-	-	-	-	-	-	-	-
Geothermal power plants	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-	-	-
public heating plants	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-	-	-
- in refineries	-	-	-	-	-	-	-	-
- in gas production	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	-
Petroleum refineries	-	-	-	-	-	-	-	-
NGL-plant	-	-	-	-	-	-	-	-
Coke plant	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-
Total production	-	-	-	-	-	-	-	-
Gross production	45.45	17.29	3.11	0.32	0.29	0.4786	1.52	3.58
Transformation sector	-	-	-	-	-	-	-	-
hydro power plants	45.45	-	-	-	-	-	-	-
- small HPP	0.83	-	-	-	-	-	-	-
Wind power plants	-	-	3.11	-	-	-	-	-
Solar power plants	-	-	-	0.02	-	-	-	-
Geothermal power plants	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	0.0149	-	-
public cogeneration plants	-	-	-	-	-	0.3363	-	1.00
public heating plants	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	0.1117	-	0.17
- in refineries	-	-	-	-	-	-	-	-
- in gas production	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	1.17
Petroleum refineries	-	-	-	-	-	-	-	-
NGL-plant	-	-	-	-	-	-	-	-
Coke plant	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-
Total transformation sector	45.45	-	3.11	0.02	-	0.4628	-	2.35
Energy sector own use	-	-	-	-	-	-	-	-
Oil and gas extraction	-	-	-	-	-	-	-	-
Coal production	-	-	-	-	-	-	-	-
Electric energy supply industry	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	-
Petroleum refineries	-	-	-	-	-	-	-	-
NGL-plant	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-
Total energy sector own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	0.0158	-	-
Final energy demand	-	17.29	-	0.30	0.29	0.0000	1.52	1.24
Energy consumption	-	17.29	-	0.30	0.29	0.0000	1.52	1.24
Industry	-	0.44	-	-	-	-	-	0.75
Iron and steel	-	0.00	-	-	-	-	-	-
Non-ferrous metals	-	0.00	-	-	-	-	-	-
Non-metallic minerals	-	-	-	-	-	-	-	-
Chemical	-	0.00	-	-	-	-	-	-
Construction materials	-	0.00	-	-	-	-	-	0.36
Pulp and paper	-	-	-	-	-	-	-	0.23
Food production	-	0.01	-	-	-	-	-	-
Not elsewhere specified	-	0.41	-	-	-	-	-	0.15
Transport	-	-	-	-	-	-	1.51	-
Rail	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	1.51	-
Air	-	-	-	-	-	-	-	-
- international	-	-	-	-	-	-	-	-
- domestic	-	-	-	-	-	-	-	-
Sea and River	-	-	-	-	-	-	-	-
Public transport	-	-	-	-	-	-	-	-
Not elsewhere specified	-	-	-	-	-	-	-	-
Other sectors	-	16.86	-	0.30	0.29	-	0.00	0.49
Households	-	16.74	-	0.30	-	-	-	0.46
Services	-	0.12	-	-	0.29	-	-	0.03
Agriculture	-	-	-	-	-	-	0.00	-
Construction	-	-	-	-	-	-	-	-

Table A3-3: National energy balance for 2012 (continue)

PJ	Coke oven coke	Liquefied petroleum gases	Unleaded motor gasoline	Standard motor gasoline	Petroleum	Jet fuel	Diesel oil	Light heating oil	Low sulphur fuel oil	Standard fuel oil
PRIMARNA BILANCA										
Production	-	-	-	-	-	-	-	-	-	-
Import	0.86	0.66	7.53	0.02	0.04	0.82	26.76	2.85	0.03	2.50
Export	0.03	6.83	24.48	-	-	0.18	15.22	1.35	-	13.11
Import-processing	-	-	-	-	-	-	-	-	-	-
Export-processing	-	-	-	-	-	-	-	-	-	-
Stock change	- 0.00	- 0.07	- 0.89	-	0.00	0.07	- 0.17	0.00	-	1.50
Bunkers	-	-	-	-	-	-	-	-	-	-
Energy supplied	0.82	- 6.24	- 17.85	0.02	0.04	0.71	11.37	1.50	0.03	- 9.11
Production	-	-	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-	-	-
- small HPP	-	-	-	-	-	-	-	-	-	-
Wind power plants	-	-	-	-	-	-	-	-	-	-
Solar power plants	-	-	-	-	-	-	-	-	-	-
Geothermal power plants	-	-	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-	-	-	-	-
public heating plants	-	-	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-	-	-	-	-
- in refineries	-	-	-	-	-	-	-	-	-	-
- in gas production	-	-	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	-	-	-
Petroleum refineries	-	11.19	44.16	-	-	4.27	48.38	6.56	-	22.61
NGL-plant	-	1.96	-	-	-	-	-	-	-	-
Coke plant	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-
Total production	-	13.15	44.16	-	-	4.27	48.38	6.56	-	22.61
Gross production	0.82	6.91	26.31	0.02	0.04	4.98	59.75	8.06	0.03	13.50
Transformation sector	-	-	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-	-	-
- small HPP	-	-	-	-	-	-	-	-	-	-
Wind power plants	-	-	-	-	-	-	-	-	-	-
Solar power plants	-	-	-	-	-	-	-	-	-	-
Geothermal power plants	-	-	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	0.05	-	2.42
public cogeneration plants	-	-	-	-	-	-	-	0.03	-	1.99
public heating plants	-	-	-	-	-	-	-	0.13	-	0.55
industrial cogeneration plants	-	0.02	-	-	-	-	-	-	-	5.40
- in refineries	-	0.02	-	-	-	-	-	-	-	5.26
- in gas production	-	-	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	0.02	-	0.43
Petroleum refineries	-	-	-	-	-	-	-	-	-	-
NGL-plant	-	-	-	-	-	-	-	-	-	-
Coke plant	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-
Total transformation sector	-	0.02	-	-	-	-	-	0.23	-	10.79
Energy sector own use	-	-	-	-	-	-	-	-	-	-
Oil and gas extraction	-	-	-	-	-	-	-	-	-	-
Coal production	-	-	-	-	-	-	-	-	-	-
Electric energy supply industry	-	-	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	-	-	-
Petroleum refineries	-	0.10	-	-	-	-	-	-	-	0.90
NGL-plant	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-
Total energy sector own use	-	0.10	-	-	-	-	-	-	-	0.90
Losses	-	-	-	-	-	-	-	-	-	-
Final energy demand	0.82	6.78	26.31	0.02	0.04	4.98	59.75	7.83	0.03	1.82
Energy consumption	0.82	6.78	26.31	0.02	0.04	4.98	59.75	7.83	0.03	1.82
Industry	0.82	0.75	-	-	-	-	0.51	0.77	0.03	0.70
Iron and steel	0.05	0.13	-	-	-	-	-	0.03	-	0.03
Non-ferrous metals	-	0.24	-	-	-	-	-	0.03	-	-
Non-metallic minerals	-	0.00	-	-	-	-	-	-	-	0.07
Chemical	-	0.00	-	-	-	-	-	0.03	-	0.00
Construction materials	0.57	0.15	-	-	-	-	0.51	0.13	-	0.22
Pulp and paper	-	0.00	-	-	-	-	-	0.00	-	-
Food production	0.21	0.06	-	-	-	-	-	0.41	-	0.28
Not elsewhere specified	-	0.16	-	-	-	-	-	0.14	0.03	0.09
Transport	-	2.57	25.78	0.02	-	4.98	48.00	-	-	0.08
Rail	-	-	-	-	-	-	1.06	-	-	-
Road	-	2.57	25.78	-	-	-	44.43	-	-	-
Air	-	-	-	0.02	-	4.98	-	-	-	-
- international	-	-	-	-	-	2.89	-	-	-	-
- domestic	-	-	-	0.02	-	2.09	-	-	-	-
Sea and River	-	-	-	-	-	-	1.43	-	-	0.08
Public transport	-	-	-	-	-	-	1.08	-	-	-
Not elsewhere specified	-	-	-	-	-	-	-	-	-	-
Other sectors	-	3.46	0.53	-	0.04	-	11.23	7.06	-	1.04
Households	-	2.67	-	-	0.04	-	-	4.04	-	0.49
Services	-	0.57	-	-	-	-	-	2.14	-	0.38
Agriculture	-	0.12	0.34	-	-	-	7.39	0.57	-	0.16
Construction	-	0.11	0.19	-	-	-	3.84	0.32	-	-

Table A3-3: National energy balance for 2012(continue)

PI	Naphta	White spirit	Bitumen	Other oils	Lubricants	Petroleum coke	Etan	Other derivatives	Refinery gas	Refinery semiproducts	Additives
PRIMARNA BILANCA											
Production	-	-	-	-	-	-	-	-	-	-	-
Import	-	0.08	3.65	0.80	0.21	3.03	-	-	-	18.83	2.69
Export	2.68	0.00	0.18	0.23	-	0.87	-	1.79	-	-	-
Import-processing	-	-	-	-	-	-	-	-	-	-	-
Export-processing	-	-	-	-	-	-	-	-	-	-	-
Stock change	0.04	0.01	0.00	0.01	-	0.19	-	0.36	-	0.12	0.01
Bunkers	-	-	-	-	-	-	-	-	-	-	-
Energy supplied	- 2.64	0.08	3.46	0.59	0.21	1.97	-	2.15	-	18.72	2.70
Production	-	-	-	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-	-	-	-
- small HPP	-	-	-	-	-	-	-	-	-	-	-
Wind power plants	-	-	-	-	-	-	-	-	-	-	-
Solar power plants	-	-	-	-	-	-	-	-	-	-	-
Geothermal power plants	-	-	-	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-	-	-	-	-	-
public heating plants	-	-	-	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-	-	-	-	-	-
- in refineries	-	-	-	-	-	-	-	-	-	-	-
- in gas production	-	-	-	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	-	-	-	-
Petroleum refineries	2.63	-	0.86	0.41	-	2.63	-	2.21	13.51	-	-
NGL-plant	1.05	-	-	-	-	-	-	-	-	-	-
Coke plant	-	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-	-
Total production	3.68	-	0.86	0.41	-	2.63	-	2.21	13.51	-	-
Gross production	1.04	0.08	4.32	0.99	0.21	4.60	-	0.06	13.51	18.72	2.70
Transformation sector	-	-	-	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-	-	-	-
- small HPP	-	-	-	-	-	-	-	-	-	-	-
Wind power plants	-	-	-	-	-	-	-	-	-	-	-
Solar power plants	-	-	-	-	-	-	-	-	-	-	-
Geothermal power plants	-	-	-	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-	-	-	-	-	-
public heating plants	-	-	-	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	0.10	-	-	0.42	-	-
- in refineries	-	-	-	-	-	0.10	-	-	0.42	-	-
- in gas production	-	-	-	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	-	-	-	-
Petroleum refineries	1.04	-	-	-	-	-	-	-	-	18.72	2.70
NGL-plant	-	-	-	-	-	-	-	-	-	-	-
Coke plant	-	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-	-
Total transformation sector	1.04	-	-	-	-	0.10	-	-	0.42	18.72	2.70
Energy sector own use	-	-	-	-	-	-	-	-	-	-	-
Oil and gas extraction	-	-	-	-	-	-	-	-	-	-	-
Coal production	-	-	-	-	-	-	-	-	-	-	-
Electric energy supply industry	-	-	-	-	-	-	-	-	-	-	-
hydro power plants	-	-	-	-	-	-	-	-	-	-	-
thermal power plants	-	-	-	-	-	-	-	-	-	-	-
public cogeneration plants	-	-	-	-	-	-	-	-	-	-	-
industrial cogeneration plants	-	-	-	-	-	-	-	-	-	-	-
Industrial heating plants	-	-	-	-	-	-	-	-	-	-	-
Petroleum refineries	-	-	-	-	-	1.59	-	-	13.09	-	-
NGL-plant	-	-	-	-	-	-	-	-	-	-	-
Gas works	-	-	-	-	-	-	-	-	-	-	-
Total energy sector own use	-	-	-	-	-	1.59	-	-	13.09	-	-
Losses	-	-	-	-	-	-	-	-	-	-	-
Final energy demand	-	0.08	4.32	0.99	0.21	2.91	-	0.06	0.00	- 0.00	-
Energy consumption	-	-	-	-	-	2.91	-	0.00	0.00	- 0.00	-
Industry	-	-	-	-	-	2.91	-	-	-	-	-
Iron and steel	-	-	-	-	-	0.01	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-	-	-	-
Non-metallic minerals	-	-	-	-	-	-	-	-	-	-	-
Chemical	-	-	-	-	-	-	-	-	-	-	-
Construction materials	-	-	-	-	-	2.90	-	-	-	-	-
Pulp and paper	-	-	-	-	-	-	-	-	-	-	-
Food production	-	-	-	-	-	-	-	-	-	-	-
Not elsewhere specified	-	-	-	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-	-	-	-
Rail	-	-	-	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-	-	-	-
Air	-	-	-	-	-	-	-	-	-	-	-
- international	-	-	-	-	-	-	-	-	-	-	-
- domestic	-	-	-	-	-	-	-	-	-	-	-
Sea and River	-	-	-	-	-	-	-	-	-	-	-
Public transport	-	-	-	-	-	-	-	-	-	-	-
Not elsewhere specified	-	-	-	-	-	-	-	-	-	-	-
Other sectors	-	-	-	-	-	-	-	-	-	-	-
Households	-	-	-	-	-	-	-	-	-	-	-
Services	-	-	-	-	-	-	-	-	-	-	-
Agriculture	-	-	-	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-	-	-	-

Table A3-3: National energy balance for 2012 (continue)

<i>PI</i>	Gas works gas	Electricity	Steam and hot water
PRIMARNA BILANCA			
Production	-	-	1.71
Import	-	33.23	-
Export	-	5.77	-
Import-processing	-	-	-
Export-processing	-	-	-
Stock change	-	-	-
Bunkers	-	-	-
Energy supplied	-	27.46	1.71
Production	-	-	-
hydro power plants	-	17.28	-
- small HPP	-	0.32	-
Wind power plants	-	1.18	-
Solar power plants	-	0.01	-
Geothermal power plants	-	-	-
thermal power plants	-	9.05	-
public cogeneration plants	-	9.11	8.96
public heating plants	-	-	2.66
industrial cogeneration plants	-	1.38	11.30
- in refineries	-	-	4.15
- in gas production	-	-	0.96
Industrial heating plants	-	-	2.93
Petroleum refineries	-	-	-
NGL-plant	-	-	-
Coke plant	-	-	-
Gas works	0.10	-	-
Total production	0.10	38.01	25.85
Gross production	0.10	65.47	27.57
Transformation sector	-	-	-
hydro power plants	-	-	-
- small HPP	-	-	-
Wind power plants	-	-	-
Solar power plants	-	-	-
Geothermal power plants	-	-	-
thermal power plants	-	-	-
public cogeneration plants	-	-	-
public heating plants	-	-	-
industrial cogeneration plants	-	-	-
- in refineries	-	-	-
- in gas production	-	-	-
Industrial heating plants	-	-	-
Petroleum refineries	-	-	-
NGL-plant	-	-	-
Coke plant	-	-	-
Gas works	-	-	-
Total transformation sector	-	-	-
Energy sector own use	-	-	-
Oil and gas extraction	-	0.34	0.73
Coal production	-	-	0.04
Electric energy supply industry	-	0.11	-
hydro power plants	-	0.90	-
thermal power plants	-	0.83	-
public cogeneration plants	-	0.32	0.64
industrial cogeneration plants	-	-	-
Industrial heating plants	-	0.00	-
Petroleum refineries	-	0.95	4.15
NGL-plant	-	0.04	0.23
Gas works	-	-	-
Total energy sector own use	-	3.49	5.79
Losses	0.00	6.79	1.39
Final energy demand	0.10	55.19	20.39
Energy consumption	0.10	55.19	20.39
Industry	-	10.65	11.20
Iron and steel	-	0.85	0.06
Non-ferrous metals	-	0.31	-
Non-metallic minerals	-	0.43	0.11
Chemical	-	0.94	4.02
Construction materials	-	1.60	-
Pulp and paper	-	0.78	1.42
Food production	-	2.33	3.70
Not elsewhere specified	-	3.42	1.88
Transport	-	1.04	-
Rail	-	0.59	-
Road	-	-	-
Air	-	0.07	-
- international	-	-	-
- domestic	-	0.07	-
Sea and River	-	0.07	-
Public transport	-	0.24	-
Not elsewhere specified	-	0.07	-
Other sectors	0.10	43.50	9.19
Households	0.06	23.27	7.48
Services	0.03	19.33	1.62
Agriculture	-	0.23	0.09
Construction	-	0.68	-

ANNEX 4

ASSESSMENT OF COMPLETENESS AND (POTENTIAL) SOURCES AND SINKS OF GREENHOUSE GAS EMISSIONS AND REMOVALS EXCLUDED

Table A4-1 shows source/sink categories of GHGs that are not estimated in the Croatian GHG inventory, and the explanations for those categories being omitted. This table is taken from the CRF Table9a.

Table A4-1: GHGs and source/sink categories not considered in the Croatian GHG inventory

GHG	Sector ⁽²⁾	Source/sink category ⁽²⁾	Explanation
Carbon	5 LULUCF	5.A.2.5 Other Land converted to Forest Land	Explanation provided in LULUCF Chapter 7.2.4.2
Carbon	5 LULUCF	5.D.1 5.D.1 Wetlands remaining Wetlands	No sufficient data for estimates
Carbon	5 LULUCF	5.E.1 5.E.1 Settlements remaining Settlements	No sufficient data for estimation
Carbon	5 LULUCF	5.A.2.5 Other Land converted to Forest Land	Explanation provided in LULUCF Chapter 7.2.4.2
Carbon	5 LULUCF	5.D.1 5.D.1 Wetlands remaining Wetlands	No sufficient data for estimates
Carbon	5 LULUCF	5.E.1 5.E.1 Settlements remaining Settlements	No sufficient data for estimation
Carbon	5 LULUCF	5.A.2.5 Other Land converted to Forest Land	Explanation provided in LULUCF Chapter 7.2.4.2
Carbon	5 LULUCF	5.D.1 5.D.1 Wetlands remaining Wetlands	No sufficient data for estimates
Carbon	5 LULUCF	5.E.1 5.E.1 Settlements remaining Settlements	No sufficient data for estimation
Carbon	5 LULUCF	5.D.1 5.D.1 Wetlands remaining Wetlands	No sufficient data for estimates
Carbon	5 LULUCF	5.E.1 5.E.1 Settlements remaining Settlements	No sufficient data for estimation
Carbon	5 LULUCF	5.A.2.5 Other Land converted to Forest Land	Explanation provided in LULUCF Chapter 7.2.4.2
CH ₄	2 Industrial Processes	2.A.7.1 Glass Production	The IPCC Guidelines do not provide methodology for the calculation of CH ₄ emission.
CH ₄	2 Industrial Processes	2.C.1.1 Steel	The IPCC Guidelines do not provide methodology for the calculation of CH ₄ emission.
CH ₄	2 Industrial Processes	2.B.5 Sulphuric acid production	IPCC Guidelines do not provide methodology for the calculation of CH ₄ emission.
CH ₄	5 LULUCF	5.G Harvested Wood Products	parties do not have to prepare estimation for this category
CH ₄	6 Waste	6.C.2 Incineration of hospital wastes	IPCC Guidelines do not provide default emission factor for CH ₄ emission calculation from incineration of clinical waste. There is no national information on these data. Information on type of incineration technology is lacking.
CO ₂	2 Industrial Processes	2.A.5 Asphalt Roofing	IPCC Guidelines do not provide methodology for the calculation of CO ₂ emission.
CO ₂	2 Industrial Processes	2.A.6 Road Paving with Asphalt	The IPCC Guidelines do not provide methodology for the calculation of CO ₂ emission.

GHG	Sector ⁽²⁾	Source/sink category ⁽²⁾	Explanation
CO2	2 Industrial Processes	2.D.2 Food and Drink	CO2 from Food and Drink Production (e.g. gasification of water) can be of biogenic or non-biogenic origin. Only information on CO2 emission of non-biogenic origin should be reported.
CO2	2 Industrial Processes	2.B.5 Sulphuric acid production	IPCC Guidelines do not provide methodology for the calculation of CO2 emission.
CO2	5 LULUCF	5.G Harvested Wood Products	parties do not have to prepare estimation for this category
N2O	2 Industrial Processes	2.A.7.1 Glass Production	The IPCC Guidelines do not provide methodology for the calculation of N2O emission.
N2O	2 Industrial Processes	2.B.5 Sulphuric acid production	IPCC Guidelines do not provide methodology for the calculation of N2O emission.
N2O	3 Solvent and Other Product Use	3.B Degreasing and Dry Cleaning	IPCC Guidelines do not provide methodology for the calculation of N2O emission from Degreasing and Dry Cleaning.
N2O	3 Solvent and Other Product Use	3.D.5 Other Solvent Use (SNAP 0604)	IPCC Guidelines do not provide methodology for the calculation of N2O emission.
N2O	5 LULUCF	5.G Harvested Wood Products	Parties do not have to prepare estimation for this category
N2O	6 Waste	6.C.2 Incineration of hospital wastes	IPCC Guidelines do not provide default emission factor for N2O emission calculation from incineration of clinical waste. There is no national information on these data. Information on type of incineration technology is lacking.

ANNEX 5

UNCERTAINTY ANALYSIS

A.5. METHODOLOGY FOR UNCERTAINTY ANALYSIS

Uncertainty estimates are calculated using two methods: Approach 1 (error propagation) and Approach 2 (Monte Carlo simulation). Use of the terminology Approach 1 and Approach 2 follows that defined in the IPCC's General Guidance and Reporting: 2006 IPCC Guidelines for National Greenhouse gas *Inventories* (2006 Guidelines) and 2000 IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (2000 GPG).

The Monte Carlo method was reviewed and revised in this submission, taking into account guidance from the 2006 Good Practice Guidance (IPCC, 2006). It will be discussed later in the chapter.

Uncertainty analysis using Approach 2 method was calculated for all key sources, those which represent more than 95% of the total annual emissions in the last reported year or belonging to the total trend, when ranked from contributing the largest to smallest share in annual total and in the trend.

Approach 2 method was calculated only for key sources because the analysis is very detail and because of lack of data for each source category, that are needed to determine uncertainty of input data; which implies the determination of appropriate distribution of input parameters.

Categories that were included in the model are those that were calculated for key sources using level assessment or trend assessment.

Sources that are included in the uncertainty model contribute to total emissions more than 97%.

Uncertainty estimates were calculated in Excel spreadsheet application. Data have been divided into six sectors according to modus how the inventory work is organized (Energy, Industrial Processes, Solvent and Other Product Use, Agriculture, Land Use, Land-Use Change and Forestry and Waste).

Every sector has been divided into sources. Each source was evaluated regarding uncertainties (%) on activity data (AD), emission factors (EF) or direct emissions (EM).

A.5.1. ESTIMATION OF UNCERTAINTY BY MONTE CARLO SIMULATION (APPROACH 2)

A.5.1.1. Overview of the method

The Monte Carlo analysis is suitable for detailed category-by-category assessment of uncertainty, particularly where uncertainties are large, distribution is non-normal, distribution functions are complex and/or there are correlations between some of the activity sets, emissions factors, or both.

The principle of Monte Carlo analysis is to select random values of emission factor, activity data and other estimation parameters from within their individual probability density functions, and to calculate the corresponding emission values.

This procedure is repeated many times, using a computer, and the results of each calculation run build up the overall emission probability density function.

Monte Carlo analysis can be performed at the category level, for aggregations of categories or for the inventory as a whole.

Detailed procedure:

- A probability distribution function (PDF) was allocated to each emission factor and activity data. The PDFs were mostly normal, log-normal or triangle. The parameters of the PDFs were set by analysing the available data on emission factors and activity data or by expert judgement.
If there was a lack of data for some emission source, associated uncertainties were extracted from the IPCC guidelines which imply that default uncertainty parameters were set.
- Using the software tool @RISK 5.7, each PDF was sampled 10,000 times and the emission calculations performed to produce a converged output distribution.
- The uncertainty in the trend between 1990 and the latest reported year, according to gas, was also estimated.

A.5.1.2. Uncertainty distributions

Distributions

All of the input parameters in inventory are modelled using normal (97%), triangle and log-normal distributions.

Correlations

The Monte Carlo model contains a number of correlations. Omitting these correlations would lead to the uncertainties being underestimated.

The trend uncertainty in the Monte Carlo model is particularly sensitive to some correlations.

Activity data and emission factor uncertainty

If for activity data or emission factor uncertainty default value from IPCC guidance was used, average value from range of given uncertainty was set.

For some pollutants and source categories, no information on uncertainty ranges were available in the Guideline so uncertainty estimates derive from expert judgment or were taken from other inventories (Japan).

Uncertainty in the emissions excluding LULUCF

The uncertainty of the key source emission was estimated at -15% to 16% in year 2012 and -13% to +14% in year 1990 (bottom of the Table A5.1-2).

The central estimate of CO₂-eq emissions in 2012 was estimated at 26,385.288 Gg CO₂-eq.

The central estimate of CO₂-eq emissions in 1990 was estimated at 31,679.780 Gg CO₂-eq.

All key sources (level/trend) represent 98.11% (25,885.572 Gg CO₂-eq) of the total inventory emission for the year 2012, and 97.99% (31,042.037 Gg CO₂-eq) for the year 1990.

Monte Carlo analysis shows that with a certainty of 95% we can say that the total emissions of all key categories for the year 2012 (25,885.572 Gg CO₂-eq) varies between 22,007.756 Gg CO₂-eq (2.5% percentile) and 30,052.779 Gg CO₂-eq (97.5% percentile).

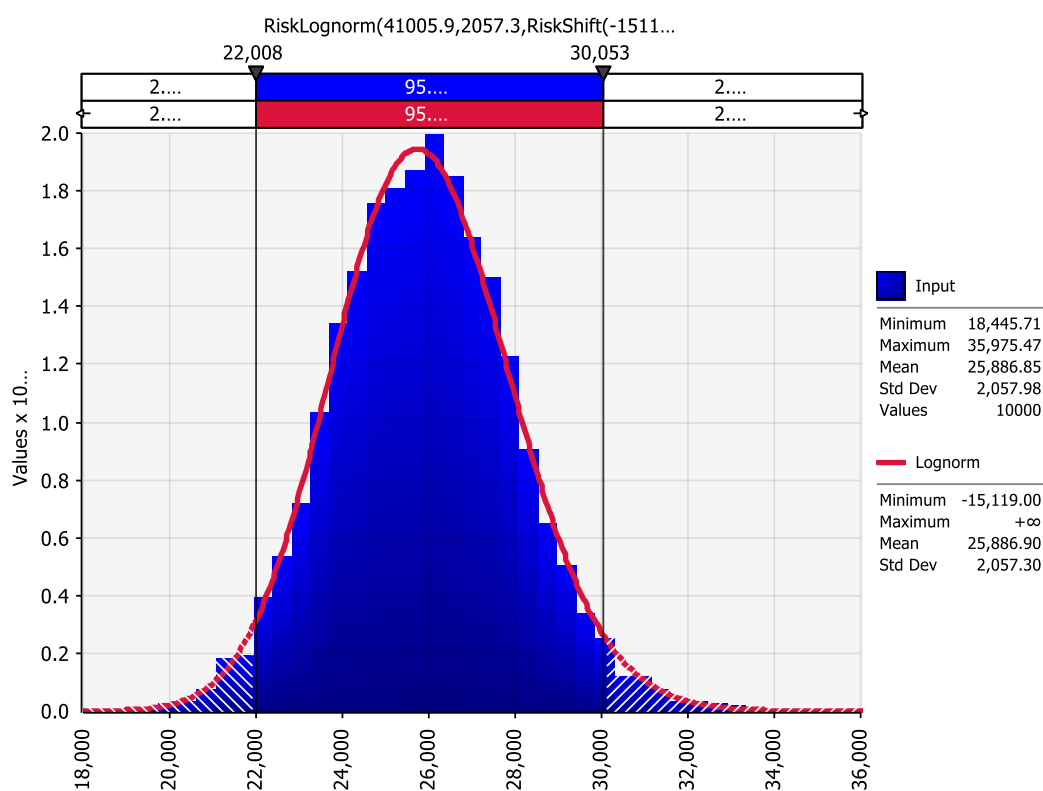


Figure A5.1-1: Distribution of total CO₂ emission for year 2012

Figure A5.1-1 shows the distribution of total CO₂ emission for year 2012 with a corresponding probability density function (red line) that best matches the simulation results.

Monte Carlo analysis shows that with a certainty of 95% we can say that the total emissions of all key categories for the year 1990 (31,042.037 Gg CO₂-eq) varies between 27,099.595 Gg CO₂-eq (2.5% percentile) and 35,389.825 Gg CO₂-eq (97.5% percentile).

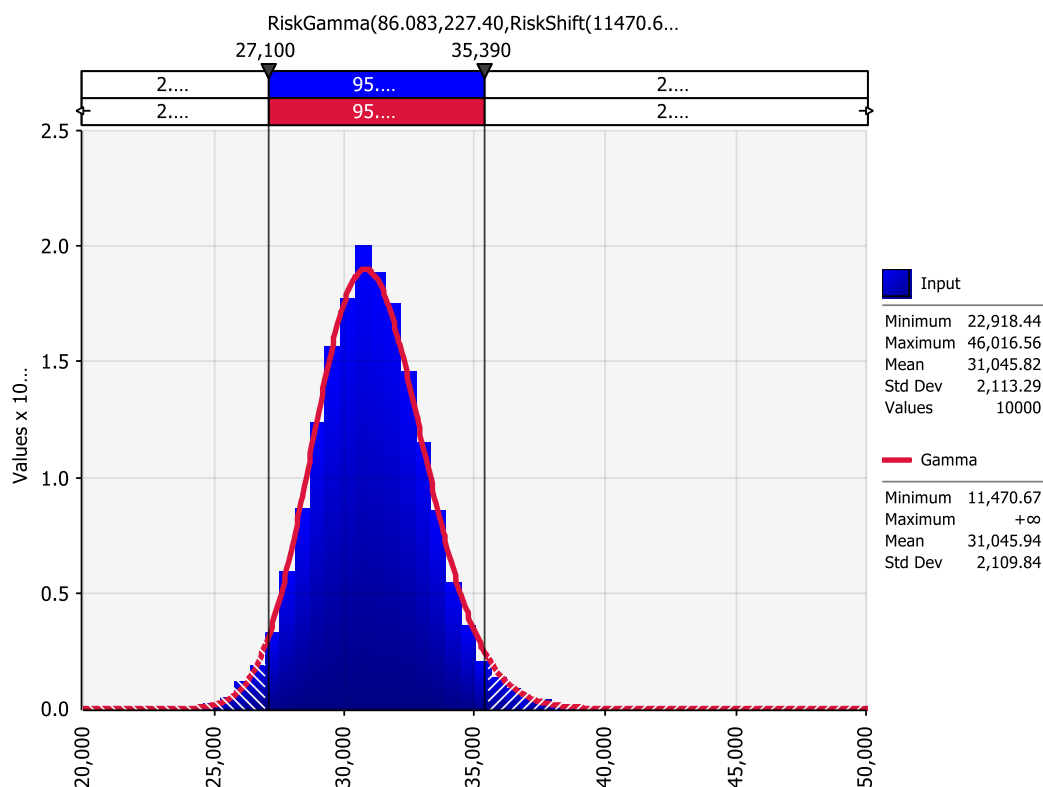


Figure A5.1-2: Distribution of total CO₂ emission for year 1990

Figure A5.1-2 shows the distribution of total CO₂ emission for year 1990 with a corresponding probability density function (red line) that best matches the simulation results.

Uncertainty in the trend excluding LULUCF

The uncertainty in the trend between 1990 and 2012 was estimated. In running this simulation it was necessary to make assumptions about the degree of correlation between sources in year 1990 and 2012.

If source emission factors are correlated this will have the effect of reducing the trend uncertainty.

The assumptions were as follows:

- Activity data are not correlated;
- Emission factors of some similar fuels are correlated;
- Emission factors for agriculture are all default and the same for 1990 and 2012 for all the activities except for: CH₄ emissions from enteric fermentation (dairy cattle). They are separately calculated which implies that they are different every year;

- Energy emission factors are not correlated;
- In Industry sector emission factors for categories Nitric Acid Production and CH₄ Production of Chemicals are correlated for both years, but for categories CO₂ Emissions from Cement Production and CO₂ Emissions from Lime Production are not correlated;
- In Solvent sector there is no correlation between years;
- In Waste sector in category Solid Waste Disposal there isn't correlation between years and in category Waste Water Handling there is correlation.

The trend in the inventory is estimated for each category and for the total summary emission (all categories included) with the following formula:

$$\text{Mean Trend (\%)} = \left(\frac{\text{Year } t \text{ emissions} - \text{Base year emissions}}{\text{Base year emissions}} \right) \cdot 100$$

For the 'total' at the foot of the Table A5.1-2, the overall uncertainty in the trend for the entire key source activities is given.

The Inventory trend is -16.31%, and the 95% probability range of the trend is -31.06% (2.5% percentile) to 0.31% (97.5% percentile), so the uncertainty in trend is from -14.45% to 16.92% with respect to the base year emissions.

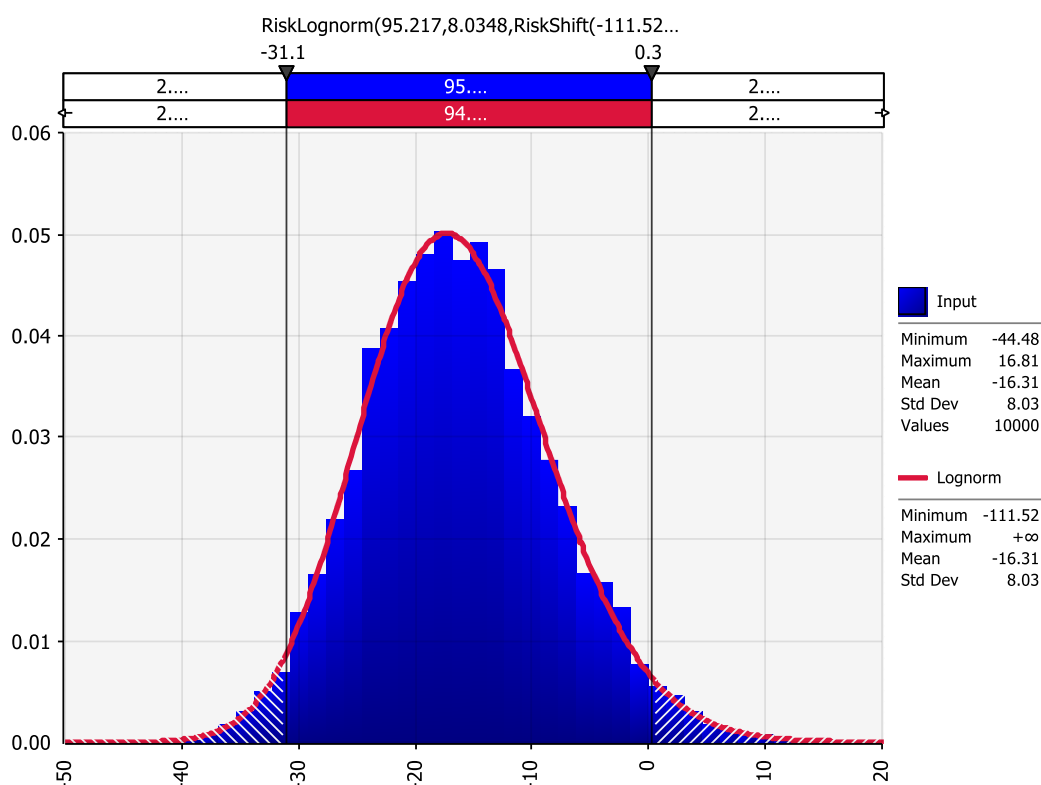


Figure A5.1-3: Distribution of trend for year 2012 respect to year 1990

Figure A5.1-3: shows the distribution of trend for year 2012 respect to year 1990 with a corresponding probability density function (red line) that best matches the simulation results.

Uncertainty in the emissions including LULUCF

The uncertainty of the key source emission was estimated at -38% to +39% in year 2012 and -25% to +27% in year 1990 (bottom of the Table A5.1-3).

The central estimate of CO₂-eq emissions in 2012 was estimated at 20,494.449 Gg CO₂-eq including LULUCF. The central estimate of CO₂-eq emissions in 1990 was estimated at 25,169.532 Gg CO₂-eq including LULUCF.

All key sources (level/trend) represent 96.50% (19,776.556 Gg CO₂-eq) of the total inventory emission for the year 2012, and 97.01% (24,417.582 Gg CO₂-eq) for the year 1990.

Monte Carlo analysis shows that with a certainty of 95% we can say that the total emissions of all key categories for the year 2012 (19,776.556 Gg CO₂-eq) varies between 12,249.754 Gg CO₂-eq (2.5% percentile) and 27,479.424 Gg CO₂-eq (97.5% percentile).

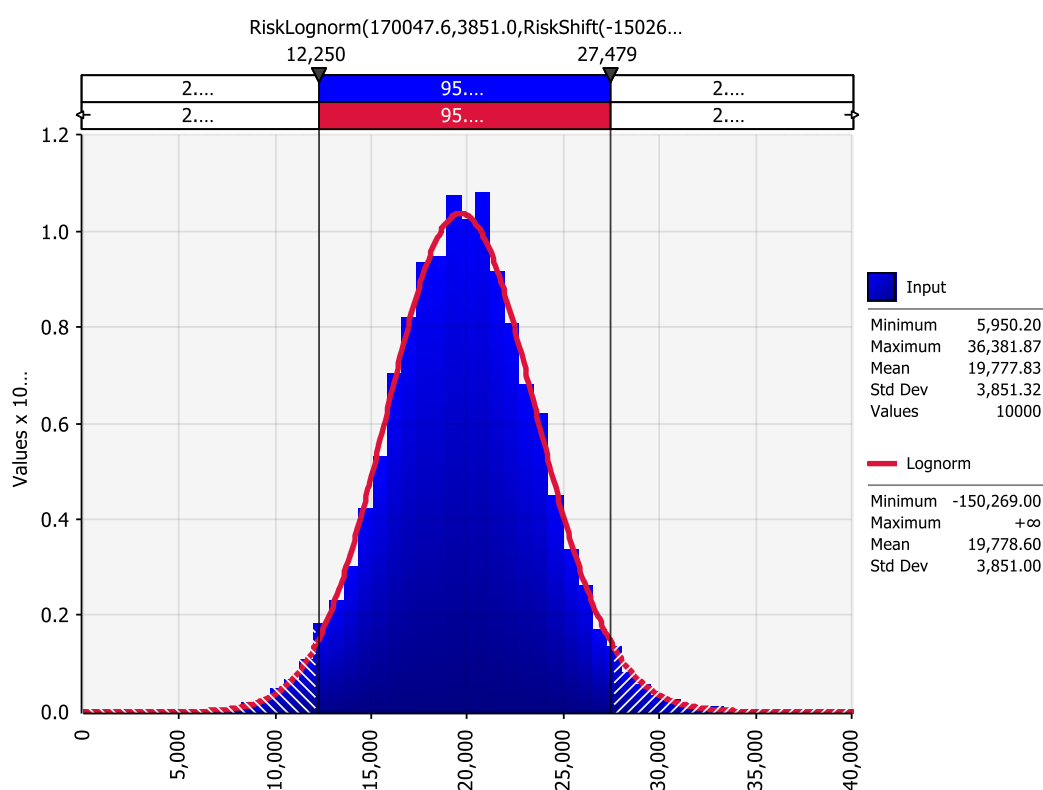


Figure A5.1-4: Distribution of total CO₂ emission for year 2012

Figure A5.1-4 shows the distribution of total CO₂ emission for year 2012 with a corresponding probability density function (red line) that best matches the simulation results.

Monte Carlo analysis shows that with a certainty of 95% we can say that the total emissions of all key categories for the year 1990 (24,417.582 Gg CO₂-eq) varies between 18,250.657 Gg CO₂-eq (2.5% percentile) and 30,953.109 Gg CO₂-eq (97.5% percentile).

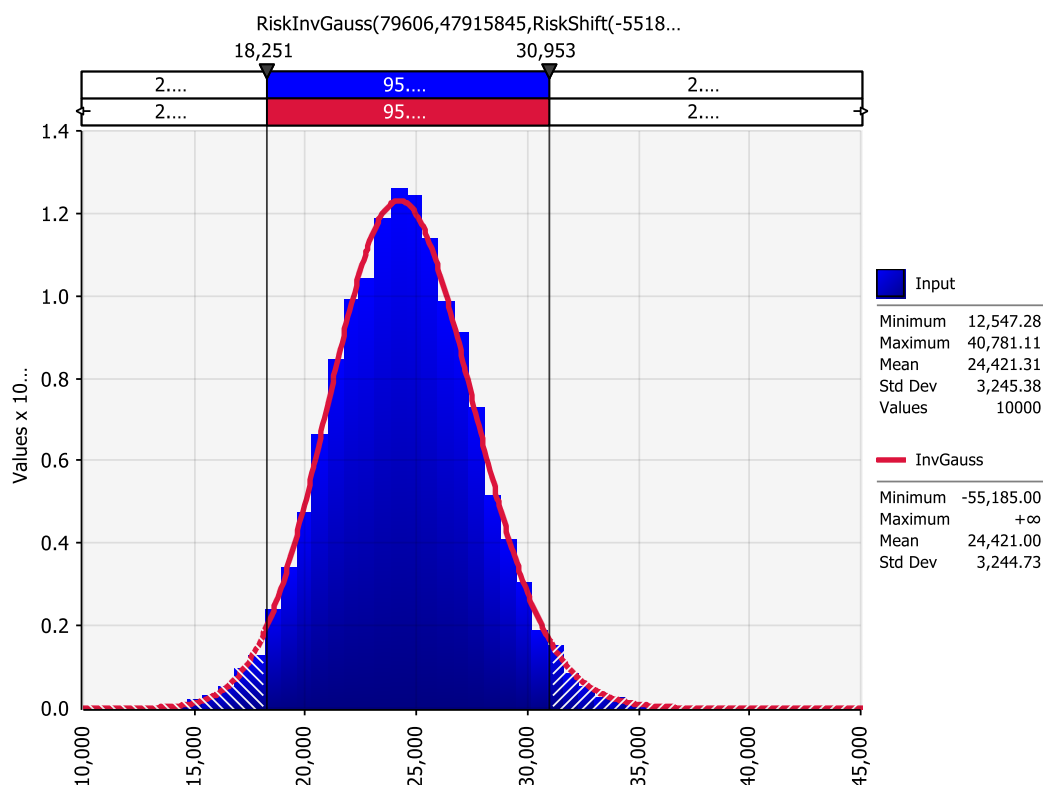


Figure A5.1-5: Distribution of total CO₂ emission for year 1990

Figure A5.1-5 shows the distribution of total CO₂ emission for year 1990 with a corresponding probability density function (red line) that best matches the simulation results.

Uncertainty in the trend including LULUCF

The Inventory trend is -14.63%, and the 95% probability range of the trend is -51.42% (2.5% percentile) to 24.10% (97.5% percentile), so the uncertainty in trend is from -32.41% to 43.11% with respect to the base year emissions.

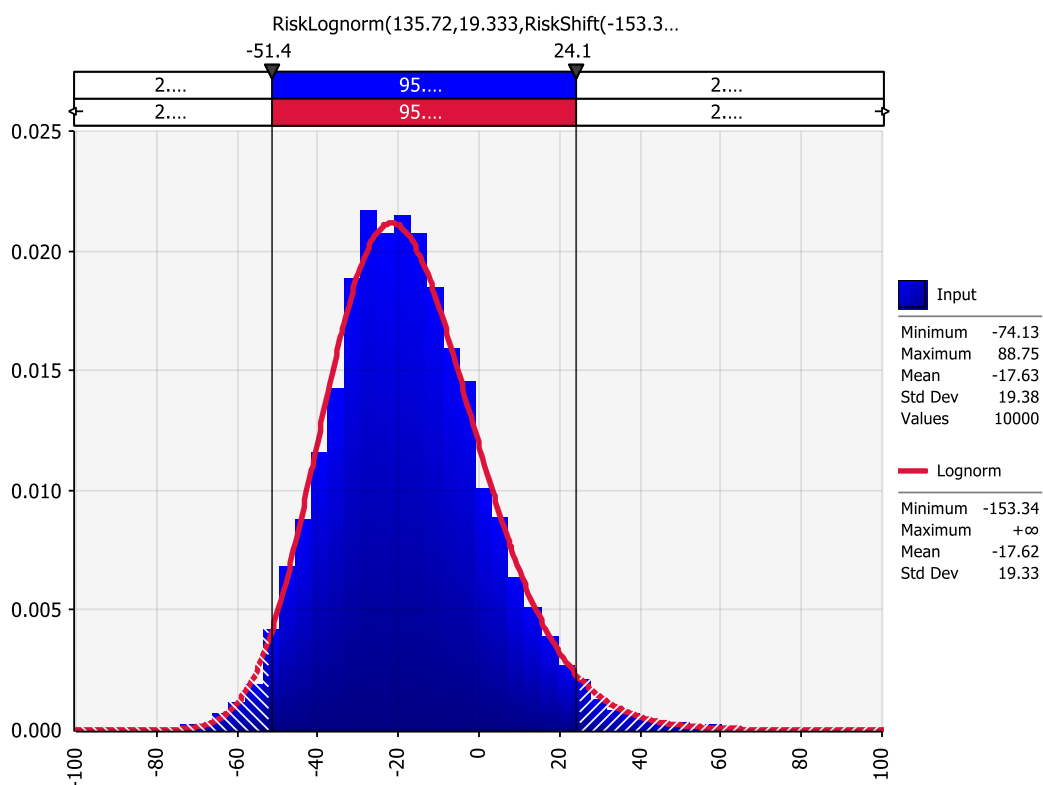


Figure A5.1-6: Distribution of trend for year 2012 respect to year 1990

Figure A5.1-6: shows the distribution of trend for year 2012 respect to year 1990 with a corresponding probability density function (red line) that best matches the simulation results.

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
1	ENERGY SECTOR													
1.1	CO2 Emissions from Stationary Combustion: Coal	CO2	2780.45	2474.48										
	1.A.1. Energy Industries	CO2												
	a. Public Electricity and Heat Production	CO2	589.30	1970.23	1.50	1.50	2.00	2.00	2.44	2.50	234.33	-23.82	26.59	
	1.A.2 Manufacturing Industries and Construction	CO2												
	a. Iron and Steel	CO2	IE,NO	6.22	2.50	2.50	5.00	5.00	5.62	5.59				5,6
	c. Chemicals	CO2	IE,NO		2.50	2.50	5.00	5.00	5.62	5.59				5,6
	e. Food Processing, Beverages and Tobacco	CO2	IE,NO	81.57	4.00	4.00	5.00	5.00	6.40	6.44				5,6
	Mineral industry	CO2	IE	395.82	2.50	2.50	5.00	5.00	5.58	5.63				5,6
	Manufacturing Industries and Construction Total (1990-2000)	CO2	1676.79	IE										1,5
	1.A.4 Other Sectors	CO2												
	a. Commercial/Institutional	CO2	86.49	8.21	4.00	4.00	5.00	5.00	6.31	6.52	-90.51	-0.81	0.88	
	b. Residential	CO2	427.86	12.42	4.00	4.00	5.00	5.00	6.24	6.54	-97.10	-0.25	0.28	
	Summary results for a given category		2780.45	2474.48					2.13	2.18	-11.00	-3.64	3.99	
1.2	CO2 Emissions from Stationary Combustion: Oil	CO2	8497.04	3521.28										
	1.A.1. Energy Industries	CO2												
	a. Public Electricity and Heat Production	CO2	2132.15	399.12	5.00	5.00	5.00	5.00	6.93	7.17	-81.28	-1.78	2.01	
	b. Petroleum Refining	CO2	2552.06	1541.33	2.50	2.50	5.00	5.00	5.63	5.58	-39.60	-4.62	4.97	
	c. Manufacture of Solid Fuels and Other Energy Industries	CO2	39.22	IE	4.00	4.00	5.00	5.00						
	1.A.2 Manufacturing Industries and Construction	CO2												
	a. Iron and Steel	CO2	IE,NO	15.01	2.50	2.50	5.00	5.00	5.73	5.59				5,6
	b. Non-Ferrous Metals	CO2	IE,NO	17.44	2.50	2.50	5.00	5.00	5.52	5.66				5,6

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
	c. Chemicals	CO ₂	IE,NO	6.17	4.0	4.0	5.0	5.0	6.2	6.6				5,6
	d. Pulp, Paper and Print	CO ₂	IE,NO	13.84	4.0	4.0	5.0	5.0	6.4	6.6				5,6
	e. Food Processing, Beverages and Tobacco	CO ₂	IE,NO	72.07	4.0	4.0	5.0	5.0	6.4	6.4				5,6
	Mineral industry	CO ₂	IE,NO	731.83	2.5	2.5	5.0	5.0	5.5	5.6				5,6
	Manufacturing Industries and Construction Total (1990-2000)	CO ₂	2135.51	IE										1,5
	1.A.4 Other Sectors													
	a. Commercial/Institutional	CO ₂	525.43	221.26	4.0	4.0	5.0	5.0	6.4	6.4	-57.89	-3.67	3.98	
	b. Residential	CO ₂	1112.67	503.21	4.0	4.0	5.0	5.0	6.4	6.4	-54.77	-3.97	4.33	
	Summary results for a given category		8497.04	3521.28					3.0	3.0	-58.56	-1.69	1.76	
1.3	CO₂ Emissions from Stationary Combustion: Gas	CO₂	4458.54	4639.54										
	1.A.1. Energy Industries	CO ₂												
	a. Public Electricity and Heat Production	CO ₂	964.76	1460.61	5.00	5.00	5.00	5.00	7.07	7.07	51.40	-14.39	-16.03	
	b. Petroleum Refining	CO ₂	13.85	9.30	2.50	2.50	5.00	5.00	5.50	5.66	-32.88	-5.06	-5.48	
	c. Manufacture of Solid Fuels and Other Energy Industries	CO ₂	835.19	217.12	4.00	4.00	5.00	5.00	6.40	6.47	-74.00	-2.25	-2.51	
	1.A.2 Manufacturing Industries and Construction	CO ₂												
	a. Iron and Steel	CO ₂	IE,NO	29.42	2.50	2.50	5.00	5.00	5.47	5.67				5,6
	b. Non-Ferrous Metals	CO ₂	IE,NO	2.09	2.50	2.50	5.00	5.00	5.57	5.55				5,6
	c. Chemicals	CO ₂	IE,NO	272.15	4.00	4.00	5.00	5.00	6.29	6.41				5,6
	d. Pulp, Paper and Print	CO ₂	IE,NO	111.59	4.00	4.00	5.00	5.00	6.31	6.51				5,6
	e. Food Processing, Beverages and Tobacco	CO ₂	IE,NO	272.53	4.00	4.00	5.00	5.00	6.31	6.38				5,6
	Mineral industry	CO ₂	IE	294.55	2.50	2.50	5.00	5.00	5.54	5.74				5,6

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
	Manufacturing Industries and Construction Total (1990-2000)	CO2	1635.00	IE										1,5
	Petrochemical Production	CO2	395.62	465.16	4.00	4.00	5.00	5.00	6.43	6.46	17.58	-10.21	11.22	
	1.A.4 Other Sectors	CO2												
	a. Commercial/Institutional	CO2	159.30	308.98	4.00	4.00	5.00	5.00	6.31	6.55	93.96	-16.87	18.45	
	b. Residential	CO2	454.82	1196.03	4.00	4.00	5.00	5.00	6.23	6.39	162.97	-22.84	24.89	
	Summary results for a given category		4458.54	4639.54					3.01	3.07	4.06	-4.26	4.53	
1.4	Mobile Combustion: Road Vehicles	CO2	3593.32	5362.81										
	Gasoline	CO2	2447.50	1863.26	3.00	3.00	3.00	5.00	4.15	4.32	-23.87	-4.38	4.68	
	Diesel	CO2	1145.82	3334.19	3.00	3.00	2.00	1.00	3.62	3.58	190.99	-14.46	15.05	
	LPG	CO2		165.35	3.00	3.00	2.00	4.00	3.55	3.58				1,5
	Summary results for a given category		3593.32	5362.81					2.73	2.68	49.24	-5.98	6.37	
1.5	Combustion: Agriculture/Forestry/Fishing	CO2	839.19	666.23										
	Gasoline	CO2	12.24	23.56	3.00	3.00	3.00	5.00	4.11	4.27	92.50	-8.04	8.27	
	Other kerosene	CO2	0.32		3.00	3.00	2.00	2.00						5
	Diesel	CO2	728.45	583.45	3.00	3.00	2.00	1.00	3.60	3.65	-19.91	-3.99	4.26	
	Fuel oil	CO2	37.86	12.62	3.00	3.00	3.00	2.00	4.20	4.34	-66.67	-1.96	2.07	
	LPG	CO2	12.88	7.32	3.00	3.00	2.00	4.00	3.58	3.65	-43.18	-2.82	2.98	
	Natural gas	CO2	47.45	39.29	3.00	3.00	3.00	4.00	4.20	4.29	-17.20	-3.42	3.53	
	Summary results for a given category		839.19	666.23					3.16	3.20	-20.61	-3.48	3.67	

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
1.6	Mobile Combustion: Aircraft	CO2	154.72	94.61										
	Jet Gasoline	CO2		1.53	3.0	3.0	4.0	4.0	5.0	4.9		-3.56	3.77	
	Jet kerosene	CO2	154.72	93.08	3.0	3.0	3.0	4.0	4.1	4.3	-39.84	-3.56	3.77	
	Summary results for a given category		154.72	94.61					4.1	4.2	-38.85	-3.58	3.81	
1.7	Fugitive Emissions from Oil and Gas Operations	CH4	1202.28	1232.43	5.0	5.0	300.0	300.0						2,4
	Summary results for a given category		1202.28	1232.43					300.3	300.0	2.51	-1419.09	1175.00	2,4
1.8	Fugitive Emissions from Oil and Gas Operations	CO2	839.19	666.23	10.0	10.0	3.0	3.0	10.3	10.3				
	Summary results for a given category		839.19	666.23					10.3	10.3	-20.61	-10.84	12.41	3,4

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2011	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
2	INDUSTRIAL PROCESSES													
2.1	2(I)A.1. CO2 Emissions from Cement Production	CO2	1085.79	998.87										
	Portland cement	CO2	1071.58	968.91	3.00	3.00	3.00	3.00	4.28	4.22	-9.58	-5.36	5.54	
	Aluminate cement	CO2	14.21	29.96	3.00	3.00	3.00	3.00	4.24	4.22	110.80	-12.36	12.91	
	Summary results for a given category		1085.79	998.87					4.16	4.10	-8.01	-5.33	5.51	
2.2	2(I)A.2. CO2 Emissions from Lime Production	CO2	153.44	114.16										
	Quicklime	CO2	146.94	62.00	3.00	3.00	3.00	3.00	4.29	4.17	-57.81	-2.44	2.59	
	Dolomitic lime	CO2	6.50	52.16	3.00	3.00	3.00	3.00	4.17	4.20	702.62	-45.68	49.11	
	Summary results for a given category		153.44	114.16					2.94	2.98	-25.60	-3.60	3.85	
2.3	2(I)B.1. CO2 Emissions from Ammonia Production	CO2	466.01	503.32										
	Natural gas consumption in process	CO2	466.01	503.32	3.00	3.00	5.00	5.00	5.77	5.94	8.01	-8.50	9.38	
	Summary results for a given category		466.01	503.32					5.77	5.94	8.01	-8.50	9.38	
2.4.	2(I)C.2. CO2 Emissions from Ferroalloys Production	CO2	118.84											
	Coke from coal	CO2	112.27		7.50	7.50	30.00	30.00						5
	Coal electrode	CO2	6.57		7.50	7.50	30.00	30.00						5
	Summary results for a given category		118.84											
2.5.	2(I)C.3. CO2 Emissions from Aluminium Production	CO2	111.37											5
	Aluminium production	CO2	111.37		3.00	3.00	30.00	30.00						5
	Summary results for a given category		111.37											5
2.6.	2(I)B.5.CH4 Emissions from Production of Other Chemicals	CH4	15.80	0.44										
	Carbon black	CH4	7.07		7.50	7.50	30.00	30.00			-100.00			
	Ethylene	CH4	1.53		7.50	7.50	30.00	30.00			-100.00			
	Dichloroethylene	CH4	0.61		7.50	7.50	30.00	30.00			-100.00			5
	Styrene	CH4	0.75		7.50	7.50	30.00	30.00			-100.00			5
	Methanol	CH4		0.0001	7.50	7.50	30.00	30.00	30.90	31.48				5
	Coke	CH4	5.84	0.44	7.50	7.50	30.00	30.00	30.61	31.30	-92.46	-0.75	0.85	5
	Summary results for a given category		15.80	0.44							-97.21	-0.70	0.71	

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
2.7.	2(DB.2. N2O Emissions from Nitric Acid Production	N2O	784.64	678.64										
	Nitric acid production	N2O	784.64	678.64	3.00	3.00	30.00	30.00	30.19	30.03	-13.31	-3.60	3.73	
	Summary results for a given category		784.64	678.64					30.19	30.03	-13.31	-3.60	3.73	
2.8.	2(II)F(a) HFC Emissions from Consumption of HFCs, PFCs, SF6	HFC,PFC, SF6	10.95	495.24										
	2(II)F(a)1. Refrigeration and air conditioning equipment													
	Domestic Refrigeration													
	HFC-134a	HFC-134a		0.36	50.00	50.00	50.00	50.00	62.61	80.95				5
	Commercial Refrigeration			104.32										5
	HFC-125	HFC-125		39.42	50.00	50.00	50.00	50.00	62.22	79.07				5
	HFC-134a	HFC-134a		1.66	50.00	50.00	50.00	50.00	61.83	82.57				5
	HFC-143a	HFC-143a		63.23	50.00	50.00	50.00	50.00	62.23	79.47				5
	Transport Refrigeration													
	HFC-134a	HFC-134a		190.55	50.00	50.00	50.00	50.00	62.45	80.42				5
	Industrial Refrigeration			23.14										5
	HFC-125	HFC-125		14.78	50.00	50.00	50.00	50.00	62.30	81.32				5
	HFC-134a	HFC-134a		4.76	50.00	50.00	50.00	50.00	62.28	81.16				5
	HFC-32	HFC-32		3.29	50.00	50.00	50.00	50.00	62.45	79.97				5
	HFC-143a	HFC-143a		0.30	50.00	50.00	50.00	50.00	93.61	-69.04				5
	Stationary Air-Conditioning													
	HFC-125	HFC-125		12.88	50.00	50.00	50.00	50.00	62.13	79.76				5
	HFC-134a	HFC-134a		4.19	50.00	50.00	50.00	50.00	62.82	81.16				5
	HFC-32	HFC-32		2.91	50.00	50.00	50.00	50.00	61.76	82.99				5
	Mobile Air-Conditioning													
	HFC-134a	HFC-134a		140.40	50.00	50.00	50.00	50.00	62.48	80.18				5
	2(II)F(a)1. Refrigeration and Air Conditioning Equipment - pot..													5
	PFC-14	PFC-14		0.02	50.00	50.00	50.00	50.00						5
	PFC-218	PFC-218			50.00	50.00	50.00	50.00	50.01	49.98				5
	HFC-23	HFC-23		2.80	50.00	50.00	50.00	50.00						5

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012(cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
	2(II)F(a)3. Fire Extinguishers													
	HFC-227ea	HFC-227ea		2.63	50.00	50.00	50.00	50.00	100.00	78.47				5
	HFC-125	HFC-125		0.17	50.00	50.00	50.00	50.00						5
	HFC-236fa	HFC-236fa			50.00	50.00	50.00	50.00						5
	2(II)F(a)4. Aerosols/Metered Dose Inhalers													
	HFC-134a	HFC-134a		4.07	50.00	50.00	50.00	50.00	50.03	49.98				
	2(II)F(a)8. Electrical Equipment													
	SF6	SF6	10.95	9.60	50.00	50.00	50.00	50.00	49.99	49.96	-12.36	-48.78	103.27	
	Summary results for a given category		10.95	495.24					32.05	37.39	4582.02	-2012.72	5379.62	
2.9	2.(I)C.3. PFC Emissions from Aluminium Production	PFC	936.56											
	Aluminium production													
	CF4	CF4	820.44	NO	3.00	3.00	30.00	30.00						5
	C2F6	C2F6	116.12	NO	3.00	3.00	30.00	30.00						5
	Summary results for a given category		936.56											5
3	3.CO2 Emissions from Solvent and Other Product use	CO2	82.26	104.26										
	3.A. Paint application	CO2	16.08	10.45	50.00	50.00	50.00	50.00	61.56	81.44	-35.04	-43.73	139.67	
	3.B.Degreasing and dry cleaning	CO2	15.40	13.75	50.00	50.00	50.00	50.00	50.01	49.96	-10.68	-49.73	109.77	
	3.C. Chemical products	CO2	8.26	4.12	50.00	50.00	50.00	50.00	62.02	81.42	-50.21	-33.55	104.68	
	3.D. Other use of solvent	CO2	42.51	75.94	50.00	50.00	50.00	50.00	63.10	81.53	78.65	-121.31	371.07	
	Summary results for a given category		82.26	104.26					47.67	60.80	26.75	-65.83	119.25	

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2011	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
4	AGRICULTURE SECTOR													
4.1	4.A.CH4 Emissions from Enteric Fermentation in Domestic Livestock	CH4	1241.92	816.26										
	Dairy Cattle	CH4	751.97	403.88	10.00	10.00	20.00	20.00	21.70	22.77	-46.29	-14.80	20.25	
	Mature non-dairy	CH4	66.13	35.51	10.00	10.00	20.00	20.00	21.68	22.84	-46.31	-14.47	20.12	
	Young	CH4	275.56	209.28	10.00	10.00	20.00	20.00	21.49	23.25	-24.05	-20.96	27.95	
	Sheep	CH4	78.86	114.12	10.00	10.00	20.00	20.00	21.91	22.75	44.73	-40.00	54.35	
	Goats	CH4	18.06	7.56	10.00	10.00	20.00	20.00	21.58	23.09	-58.15	-11.59	16.21	
	Horses	CH4	14.74	8.48	10.00	10.00	20.00	20.00	21.89	23.51	-42.50	-15.82	21.92	
	Mules & Asses	CH4	3.57	0.71	10.00	10.00	20.00	20.00	21.95	22.94	-80.22	-5.52	7.72	
	Swine	CH4	33.03	36.73	10.00	10.00	20.00	20.00	21.36	23.19	11.21	-30.43	41.44	
	Poultry	CH4												5
	Summary results for a given category		1241.92	816.26					12.56	12.98	-34.27	-11.45	14.66	
4.2.	4.B(a) CH4 Emissions from Manure Management	CH4	228.62	194.73										
	Dairy Cattle	CH4	58.01	53.08	10.00	10.00	20.00	20.00	21.88	22.90	-8.50	-25.59	34.87	
	Mature non-dairy	CH4	4.03	2.16	10.00	10.00	20.00	20.00	21.66	22.82	-46.31	-14.88	20.41	
	Young	CH4	27.05	20.54	10.00	10.00	20.00	20.00	21.85	23.15	-24.05	-20.70	28.78	
	Sheep	CH4	1.58	2.71	10.00	10.00	20.00	20.00	21.82	22.46	71.86	-47.88	64.89	
	Goats	CH4	0.40	0.18	10.00	10.00	20.00	20.00	21.70	22.82	-54.35	-12.63	17.08	
	Horses	CH4	0.90	0.66	10.00	10.00	20.00	20.00	21.76	22.76	-26.81	-20.31	27.70	
	Mules & Asses	CH4	0.21	0.05	10.00	10.00	20.00	20.00	22.01	22.65	-74.94	-6.86	9.41	
	Swine	CH4	132.13	97.96	10.00	10.00	20.00	20.00	21.80	22.83	-25.86	-20.27	28.42	
	Poultry	CH4	4.31	17.38	10.00	10.00	20.00	20.00	21.68	22.80	303.17	-111.77	153.90	
	Summary results for a given category		228.62	194.73					12.76	13.44	-14.83	-15.03	18.74	
4.3.	4.B(b) N2O Emissions from Manure Management	N2O	381.84	241.46										
	Anaerobic lagoons	N2O	0.72	0.53										
	Mature non-dairy	N2O	0.09	0.05	10.00	10.00	50.00	100.00	50.45	80.88	-46.31	-7.10	8.15	
	Young	N2O	0.63	0.48	10.00	10.00	50.00	100.00	50.37	81.31	-24.05	-10.21	11.65	

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
	Liquid systems	N2O	12.18	8.31										
	Dairy Cattle	N2O	2.83	1.58	10.00	10.00	50.00	100.00	50.24	81.05	-43.98	-7.44	8.66	
	Mature non-dairy	N2O	0.46	0.24	10.00	10.00	50.00	100.00	50.52	81.38	-46.31	-7.13	8.26	
	Young	N2O	3.06	2.32	10.00	10.00	50.00	100.00	50.56	80.86	-24.05	-10.06	11.84	
	Swine	N2O	4.44	3.29	10.00	10.00	50.00	100.00	50.41	80.89	-25.86	-9.74	11.39	
	Poultry	N2O	1.40	0.87	10.00	10.00	50.00	100.00	50.07	82.43	-37.97	-8.20	9.42	
	Solid storage & drylot	N2O	307.25	188.10										
	Dairy Cattle	N2O	213.52	119.62	10.00	10.00	50.00	100.00	50.48	81.40	-43.98	-7.44	8.46	
	Mature non-dairy	N2O	12.16	6.53	10.00	10.00	50.00	100.00	50.91	81.24	-46.31	-6.99	8.07	
	Young	N2O	81.57	61.95	10.00	10.00	50.00	100.00	50.35	80.84	-24.05	-10.00	11.50	
	Other	N2O	61.69	44.52										
	Mature non-dairy	N2O	0.06	0.03	10.00	10.00	50.00	100.00	58.18	104.48	-46.31	-7.15	8.10	
	Young	N2O	0.39	0.30	10.00	10.00	50.00	100.00	58.33	101.53	-24.05	-10.11	11.47	
	Sheep	N2O	7.90	7.15	10.00	10.00	50.00	100.00	58.24	102.84	-9.55	-12.01	13.65	
	Goats	N2O	0.84	0.35	10.00	10.00	50.00	100.00	58.29	102.08	-58.15	-5.48	6.38	
	Horses	N2O	0.19	0.11	10.00	10.00	50.00	100.00	58.21	100.99	-42.50	-7.61	8.74	
	Mules & Asses	N2O	0.08	0.02	10.00	10.00	50.00	100.00	58.26	103.44	-80.22	-2.66	3.08	
	Swine	N2O	34.48	25.56	10.00	10.00	50.00	100.00	58.18	101.11	-25.86	-9.78	11.37	
	Poultry	N2O	17.75	11.01	10.00	10.00	50.00	100.00	58.20	102.57	-37.97	-8.32	9.53	
	Summary results for a given category		381.84	241.46					31.75	45.80	-36.76	-5.94	6.37	
4.4.	4.D Agricultural Soils													
	Direct N2O Emissions from Agricultural Soils	N2O	1337.86	1108.87										
	Synthetic fertiliser (FSN)	N2O	616.15	601.14	30.00		80.00	80.00	81.77	91.90	-2.44	-41.03	104.59	
	Animal waste (FAW)	N2O	407.63	272.39	10.00	10.00	80.00	80.00	79.89	82.48	-33.18	-8.76	10.04	
	N-fixing crops (FBN)	N2O	105.36	69.57	10.00	10.00	80.00	80.00	80.16	81.11	-33.97	-8.75	10.34	
	Crop residue (FCR)	N2O	198.25	155.17	10.00	10.00	80.00	80.00	80.30	82.21	-21.73	-10.52	12.12	
	Histosols	N2O	10.47	10.47	20.00	20.00	60.00	60.00	60.96	67.11		-25.00	33.09	
	Sewage sludge (NSLUDGE)	N2O		0.14	50.00	50.00	80.00	80.00	82.35	109.31				5
	Summary results for a given category		1337.86	1108.87					50.27	56.22	-17.12	-20.09	34.21	

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
	N2O Emissions from Pasture Range and Paddock Manure	N2O	261.13	184.05										
	Dairy Cattle	N2O	40.82	22.87	10.00	10.00	63.00	63.00	63.15	65.89	-43.98	-7.40	8.26	
	Sheep	N2O	85.46	77.30	10.00	10.00	63.00	63.00	63.26	64.55	-9.55	-11.91	14.14	
	Goats	N2O	38.54	16.13	10.00	10.00	63.00	63.00	63.36	64.58	-58.15	-5.57	6.40	
	Horses	N2O	8.74	5.03	10.00	10.00	63.00	63.00	63.52	64.91	-42.50	-7.61	8.79	
	Mules & Asses	N2O	3.81	0.75	10.00	10.00	63.00	63.00	63.15	64.16	-80.22	-2.61	3.00	
	Swine	N2O	82.76	61.35	10.00	10.00	63.00	63.00	63.70	64.04	-25.86	-9.76	11.47	
	Poultry	N2O	1.00	0.62	10.00	10.00	63.00	63.00	63.69	64.47	-37.97	-8.08	9.45	
	Summary results for a given category	N2O	261.13	184.05					36.72	35.28	-29.52	-7.70	7.73	
	Indirect N2O Emissions from Nitrogen Used in Agriculture	N2O	934.07	784.86										
	Deposition	N2O	137.97	117.44					64.36	77.46	-14.88	-9.98	14.91	4,7
	Synthetic fertiliser	N2O	30.34	44.56										
	Livestock excretion	N2O	107.64	72.88										
	Leaching	N2O	796.09	667.42					89.56	292.14	-20.94	-17.35	28.33	4,7
	Synthetic fertiliser	N2O	392.44	394.11										
	Livestock excretion	N2O	403.65	273.31										
	Summary results for a given category	N2O	934.07	784.86					77.75	245.70	-23.17	-14.48	21.27	4,7

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.)

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
6	WASTE SECTOR													
6.1.	6 A.CH4 Emissions from Solid Waste Disposal Sites	CH4	242.62	793.02										
	Managed SWDS	CH4	12.01	559.16	50.00	50.00	50.00	50.00	73.76	94.23	4555.48	-3546.74	10034.57	
	Unmanaged SWDS > 5m	CH4	150.54	204.13	50.00	50.00	50.00	50.00	62.59	80.38	35.60	-91.41	275.66	
	Unmanaged SWDS < 5m	CH4	80.07	29.73	50.00	50.00	50.00	50.00	62.77	78.70	-62.87	-25.26	81.29	
	Summary results for a given category		242.62	793.02					55.60	68.07	226.86	-197.46	395.91	
6.2.	6 B.CH4 Emissions from Wastewater Handling	CH4	283.52	228.49										
	6 B 1. Industrial Wastewater	CH4	46.27	38.28	50.00	50.00	30.00	30.00						
	6 B.2 Domestic and Commercial Wastewater	CH4	237.25	190.21	50.00	50.00	30.00	30.00	53.66	63.35	-19.83	-44.34	97.47	
	Summary results for a given category		283.52	228.49					45.48	53.83	-19.41	-39.04	76.46	

Table A.5.1-1: Uncertainty estimates from the Monte Carlo simulation for year 2012 (cont.), including LULUCF

REPORTING OF APPROACH 2 UNCERTAINTY ANALYSIS USING GENERAL REPORTING TABLE FOR UNCERTAINTY														
Emissions, removals and uncertainties are from National Inventory of Croatia for year 2012														
YEAR 2012														
	A	B	C	D	E		F		G		I	J		K
	IPCC Source Category	Greenhouse Gas	Year 1990 emissions or removals	Year t emissions or removals 2012	Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Inventory trend in national emissions for year t increase with respect to year 1990 (distribution function)	Uncertainty introduced into the trend in total national emissions with respect to year 1990		Approach and Comments
			Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	(-)%	(+)%	(-)%	(+)%	(% of year 1990)	(-)%	(+)%	Approach 2
5	LULUCF													
5.A.1.	Forestland remaining Forestland	CO2	-6874.53	-6518.51					90.68	90.56	-3.76	-88.39	227.68	8
5.A.1.	Forestland remaining Forestland	CH4	12.15	21.17					177.59	177.39	74.26	-1815.06	1868.72	8
5.A.1.	Forestland remaining Forestland	N2O	2.78	4.84					177.78	177.64	74.26	-1837.09	1718.10	8
5.A.2.	Land converted to Forestland	CO2	-272.24	-189.38					172.66	172.46	-30.29	-680.05	688.86	8
5.A.2.	Land converted to Forestland	CH4	0.01	0.02					177.58	177.40	71.81	-1926.63	1840.11	8
5.A.2.	Land converted to Forestland	N2O	0.01	0.02					177.71	177.59	71.81	-1890.53	1855.70	8
5.B.1.	Cropland remaining Cropland	CO2	180.18	234.73					562.14	561.61	30.28	-1658.47	1405.88	8
5.B.2.	Land converted to Cropland	CO2	23.48	47.55					425.85	425.40	102.54	-2323.56	2116.40	8
5.B.2.2.	Grassland converted to Cropland: mineral soils	N2O	4.86	9.78					397.74	397.41	101.51	-2757.61	2200.58	8
5.C.1.	Grassland remaining Grassland	CO2	25.86	42.07					193.51	193.23	62.66	-1837.09	1686.23	8
5.C.1.	Grassland remaining Grassland	CH4	0.73	1.23					177.47	177.43	68.11	-1884.56	1723.92	8
5.C.1.	Grassland remaining Grassland	N2O	0.67	1.13					177.71	177.53	68.11	-1748.04	1802.05	8
5.C.2.	Land converted to Grassland	CO2	-84.61	-157.39					360.31	360.06	86.01	-2344.56	2107.44	8
5.D.2.	Land converted to Wetlands	CO2	30.00	15.73					398.45	398.10	-47.57	-775.73	820.73	8
5.E.2.	Land converted to Settlements	CO2	440.41	596.16					159.53	159.36	35.37	-303.24	763.10	8
	Summary results for a given category		-6635.41	-6109.02										

Approach and Comments:

1. Manufacturing Industries and Construction Total (1990-2000) is emission category which existed till 2000 year; afterwards its emission was included in other source categories.
2. Fugitive Emissions from Oil and Gas Operations: for this category wasn't enough data to calculate combine uncertainty with Monte-Carlo method, therefore combine uncertainty data from tier 1 method was implied in model.
3. CO₂ Emissions from Natural Gas Scrubbing: for this category wasn't enough data to calculate combine uncertainty with Monte-Carlo method, therefore combine uncertainty data from tier 1 method was implied in model.
4. A more complex method for estimation of uncertainties is used, and therefore activity data and emission factor uncertainties are left blank. Only combined uncertainty and trend uncertainty is shown in model.
5. Trend not calculated, when base year or year t emissions are zero or included elsewhere.
6. Emission is included in category Other Manufacturing Industries and Construction Total (1990-2000). There were no disaggregated data till 2000.
7. Because of the existence of variables in model with triangle distribution there is a slight deviation of emission in model and in CRF-REPORTER
*Left value is "real" value from crf reporter and right value is mean value of variable with its distribution
8. Combined uncertainty was used in Monte Carlo simulation for LULUCF sector

Table A5.1-2: Summary uncertainty table for year 1990 and 2012 excluding LULUCF

SUMMARY TABLE OF KEY SOURCE EMISSIONS AND THEIR UNCERTAINTIES FOR YEAR 1990 AND 2012														
IPCC Source Category	Greenhouse Gas	1990 Emissions	2012 Emissions	Uncertainty in 1990 emissions as % of emissions in category		Uncertainty introduced on national total in 1990		Uncertainty in 2012 emissions as % of emissions in category		Uncertainty introduced on national total in 2012		% change in emissions between 2012 and 1990	Range of likely % change between 2012 and 1990	
		Gg CO ₂ equivalent	Gg CO ₂ equivalent	2.5 percentile	97.5 percentile	(-)%	(+)%	2.5 percentile	97.5 percentile	(-)%	(+)%	%	2.5 percentile	97.5 percentile
		Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	%	Gg CO ₂ equivalent	Gg CO ₂ equivalent
ENERGY														
CO2 Emissions from Stationary Combustion: Coal	CO2	2780.45	2474.48	2676.74	2884.53	4%	4%	2421.80	2528.51	2%	2%	-11.00	-14.64	-7.02
CO2 Emissions from Stationary Combustion: Oil	CO2	8497.04	3521.28	8251.07	8747.81	3%	3%	3416.69	3628.17	3%	3%	-58.56	-60.25	-56.79
CO2 Emissions from Stationary Combustion: Gas	CO2	4458.54	4639.54	4327.13	4591.36	3%	3%	4499.90	4781.82	3%	3%	4.06	-0.20	8.59
Mobile Combustion: Road Vehicles	CO2	3593.32	5364.70	3481.36	3705.39	3%	3%	5216.25	5506.53	3%	3%	49.24	43.26	55.61
Mobile Combustion: Aircraft	CO2	154.72	94.61	148.23	161.42	4%	4%	90.73	98.57	4%	4%	-38.85	-42.43	-35.05
Combustion: Agriculture/Forestry/Fishing	CO2	839.19	666.23	812.98	865.95	3%	3%	645.15	687.54	3%	3%	-20.61	-24.09	-16.94
Fugitive Emissions from Oil and Gas Operations	CO2	639.82	503.35	752.70	925.60	10%	10%	597.60	734.84	10%	10%	-20.61	-31.45	-8.20
Fugitive Emissions from Oil and Gas Operations	CH4	1202.28	1232.43	-2407.42	4807.80	300%	300%	-2468.48	4929.61	300%	300%	2.51	-1416.58	1177.51
INDUSTRIAL PROCESSES														
CO2 Emissions from Cement Production	CO2	1085.79	998.87	1041.35	1132.46	4%	4%	957.33	1039.82	4%	4%	-8.01	-13.33	-2.50
CO2 Emissions from Lime Production	CO2	153.44	114.16	147.29	159.64	4%	4%	110.79	117.56	3%	3%	-25.60	-29.21	-21.75
CO2 Emissions from Ammonia Production	CO2	466.01	503.32	439.25	493.36	6%	6%	474.27	533.19	6%	6%	8.01	-0.49	17.38
CO2 Emissions from Ferroalloys Production	CO2	118.84		84.14	154.13	29%	30%							
CO2 Emissions from Aluminium production	CO2	111.37		77.71	145.11	30%	30%							
CH4 Emissions from Production of Other Chemicals	CH4	14.27	0.44	12.93	18.75	18%	19%	0.31	0.58			-97.21	-97.91	-96.50
N2O Emissions from Nitric Acid Production	N2O	784.64	678.64	548.57	1023.38	30%	30%	474.87	884.45	30%	30%	-13.31	-16.91	-9.58
HFC and PFC Emissions from Consumption in Refrigeration and	HFC/PFC		478.77	5.47	16.43	50%	50%	348.48	704.64	32%	37%	4582.02	2569.30	9961.64
HFC and PFC Emissions from Other Consumption	HFC/PFC		6.87	5.47	16.43	50%	50%	348.48	704.64	32%	37%	4582.02	2569.30	9961.64
SF6 Emissions from Electrical Equipment	SF6	10.95	9.60	5.47	16.43	50%	50%	348.48	704.64	32%	37%	4582.02	2569.30	9961.64
PFC Emissions from Aluminium production	PFC	936.56		687.46	1187.69	27%	27%							
SOLVENT AND OTHER PRODUCT USE														
CO2 Emissions from Solvent and Other Product Use	CO2	82.26	104.26	51.77	119.45	37%	45%	54.56	167.66	48%	61%	26.75	-39.08	146.00

Table A5.1-2: Summary uncertainty table for year 1990 and 2012 excluding LULUCF (cont.)

SUMMARY TABLE OF KEY SOURCE EMISSIONS AND THEIR UNCERTAINTIES FOR YEAR 1990 AND 2012														
IPCC Source Category	Greenhouse Gas	1990 Emissions	2012 Emissions	Uncertainty in 1990 emissions as % of emissions in category		Uncertainty introduced on national total in 1990		Uncertainty in 2012 emissions as % of emissions in category		Uncertainty introduced on national total in 2012		% change in emissions between 2012 and 1990	Range of likely % change between 2012 and 1990	
		Gg CO ₂ equivalent	Gg CO ₂ equivalent	2.5 percentile	97.5 percentile	(-)%	(+)%	2.5 percentile	97.5 percentile	(-)%	(+)%	%	2.5 percentile	97.5 percentile
		Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	%	Gg CO ₂ equivalent	Gg CO ₂ equivalent
AGRICULTURE														
CH4 Emissions from Enteric Fermentation in Domestic Livestock	CH4	1241.92	816.26	1062.21	1423.56	14%	15%	713.74	922.21	13%	13%	-34.27	-45.73	-19.61
CH4 Emissions from Manure Management	CH4	228.62	194.73	196.43	261.98	14%	15%	169.88	220.90	13%	13%	-14.83	-29.85	3.92
N2O Emissions from Manure Management	N2O	381.84	241.46	257.20	567.99	33%	49%	164.79	352.06	32%	46%	-36.76	-42.70	-30.40
Direct N2O Emissions from Agricultural Soils	N2O	1337.86	1108.93	694.60	2096.31	48%	57%	551.50	1732.23	50%	56%	-17.12	-37.20	17.10
N2O Emissions from Pasture, Range and Paddock Manure	N2O	261.13	184.05	175.81	344.25	33%	32%	116.47	248.99	37%	35%	-29.52	-37.21	-21.79
Indirect N2O Emissions from Nitrogen Used in Agriculture	N2O	934.07	784.86			79%	252%			78%	246%	-23.17	-37.65	-1.90
WASTE														
CH4 Emissions from Solid Waste Disposal Sites	CH4	242.62	793.02	132.66	377.03	45%	55%	352.18	1332.98	56%	68%	226.86	29.40	622.77
CH4 Emissions from Wastewater Handling	CH4	283.52	228.49	151.92	437.06	46%	54%	124.58	351.51	45%	54%	-19.41	-58.44	57.05
TOTAL		31042.04	25885.57	27099.60	35389.82	13%	14%	22007.76	30052.78	15%	16%	-16.61	-31.06	0.31

Table A5.1-3: Summary uncertainty table for year 1990 and 2012 including LULUCF

SUMMARY TABLE OF KEY SOURCE EMISSIONS AND THEIR UNCERTAINTIES FOR YEAR 1990 AND 2012														
IPCC Source Category	Greenhouse Gas	1990 Emissions	2012 Emissions	Uncertainty in 1990 emissions as % of emissions in category		Uncertainty introduced on national total in 1990		Uncertainty in 2012 emissions as % of emissions in category		Uncertainty introduced on national total in 2012		% change in emissions between 2012 and 1990	Range of likely % change between 2012 and 1990	
		Gg CO ₂ equivalent	Gg CO ₂ equivalent	2.5 percentile	97.5 percentile	(-)%	(+)%	2.5 percentile	97.5 percentile	(-)%	(+)%		2.5 percentile	97.5 percentile
		Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	%	Gg CO ₂ equivalent	Gg CO ₂ equivalent
ENERGY														
CO2 Emissions from Stationary Combustion: Coal	CO2	2780.45	2474.48	2676.74	2884.53	4%	4%	2421.80	2528.51	2%	2%	-11.00	-14.64	-7.02
CO2 Emissions from Stationary Combustion: Oil	CO2	8497.04	3521.28	8251.07	8747.81	3%	3%	3416.69	3628.17	3%	3%	-58.56	-60.25	-56.79
CO2 Emissions from Stationary Combustion: Gas	CO2	4458.54	4639.54	4327.13	4591.36	3%	3%	4499.90	4781.82	3%	3%	4.06	-0.20	8.59
Mobile Combustion: Road Vehicles	CO2	3593.32	5364.70	3481.36	3705.39	3%	3%	5216.25	5506.53	3%	3%	49.24	43.26	55.61
Mobile Combustion: Aircraft	CO2	154.72	94.61	148.23	161.42	4%	4%	90.73	98.57	4%	4%	-38.85	-42.43	-35.05
Combustion: Agriculture/Forestry/Fishing	CO2	839.19	666.23	812.98	865.95	3%	3%	645.15	687.54	3%	3%	-20.61	-24.09	-16.94
Fugitive Emissions from Oil and Gas Operations	CO2	639.82	503.35	752.70	925.60	10%	10%	597.60	734.84	10%	10%	-20.61	-31.45	-8.20
Fugitive Emissions from Oil and Gas Operations	CH4	1202.28	1232.43	-2407.42	4807.80	300%	300%	-2468.48	4929.61	300%	300%	2.51	-1416.58	1177.51
INDUSTRIAL PROCESSES														
CO2 Emissions from Cement Production	CO2	1085.79	998.87	1041.35	1132.46	4%	4%	957.33	1039.82	4%	4%	-8.01	-13.33	-2.50
CO2 Emissions from Lime Production	CO2	153.44	114.16	147.29	159.64	4%	4%	110.79	117.56	3%	3%	-25.60	-29.21	-21.75
CO2 Emissions from Ammonia Production	CO2	466.01	503.32	439.25	493.36	6%	6%	474.27	533.19	6%	6%	8.01	-0.49	17.38
CO2 Emissions from Ferroalloys Production	CO2	118.84	0.00	84.14	154.13	29%	30%	0.00	0.00	0%	0%	0.00	0.00	0.00
CO2 Emissions from Aluminium production	CO2	111.37	0.00	77.71	145.11	30%	30%	0.00	0.00	0%	0%	0.00	0.00	0.00
CH4 Emissions from Production of Other Chemicals	CH4	14.27	0.44	12.93	18.75	18%	19%	0.31	0.58	0%	0%	-97.21	-97.91	-96.50
N2O Emissions from Nitric Acid Production	N2O	784.64	678.64	548.57	1023.38	30%	30%	474.87	884.45	30%	30%	-13.31	-16.91	-9.58
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC	0.00	478.77	5.47	16.43	50%	50%	348.48	704.64	32%	37%	4582.02	2569.30	9961.64
HFC and PFC Emissions from Other Consumption	HFC/PFC	0.00	6.87	5.47	16.43	50%	50%	348.48	704.64	32%	37%	4582.02	2569.30	9961.64
SF6 Emissions from Electrical Equipment	SF6	10.95	9.60	5.47	16.43	50%	50%	348.48	704.64	32%	37%	4582.02	2569.30	9961.64
PFC Emissions from Aluminium production	PFC	936.56	0.00	687.46	1187.69	27%	27%	0.00	0.00	0%	0%	0.00	0.00	0.00
SOLVENT AND OTHER PRODUCT USE														
CO2 Emissions from Solvent and Other Product Use	CO2	82.26	104.26	51.77	119.45	37%	45%	54.56	167.66	48%	61%	26.75	-39.08	146.00

Table A5.1-3: Summary uncertainty table for year 1990 and 2012 including LULUCF (cont.)

SUMMARY TABLE OF KEY SOURCE EMISSIONS AND THEIR UNCERTAINTIES FOR YEAR 1990 AND 2012														
IPCC Source Category	Greenhouse Gas	1990 Emissions	2012 Emissions	Uncertainty in 1990 emissions as % of emissions in category		Uncertainty introduced on national total in 1990		Uncertainty in 2012 emissions as % of emissions in category		Uncertainty introduced on national total in 2012		% change in emissions between 2012 and 1990	Range of likely % change between 2012 and 1990	
				2.5 percentile	97.5 percentile	(-)%	(+)%	2.5 percentile	97.5 percentile	(-)%	(+)%		2.5 percentile	97.5 percentile
		Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	Gg CO ₂ equivalent	Gg CO ₂ equivalent	(-)%	(+)%	%	Gg CO ₂ equivalent
AGRICULTURE														
CH4 Emissions from Enteric Fermentation in Domestic Livestock	CH4	1241.92	816.26	1062.21	1423.56	14%	15%	713.74	922.21	13%	13%	-34.27	-45.73	-19.61
CH4 Emissions from Manure Management	CH4	228.62	194.73	196.43	261.98	14%	15%	169.88	220.90	13%	13%	-14.83	-29.85	3.92
N2O Emissions from Manure Management	N2O	381.84	241.46	257.20	567.99	33%	49%	164.79	352.06	32%	46%	-36.76	-42.70	-30.40
Direct N2O Emissions from Agricultural Soils	N2O	1337.86	1108.93	694.60	2096.31	48%	57%	551.50	1732.23	50%	56%	-17.12	-37.20	17.10
N2O Emissions from Pasture, Range and Paddock Manure	N2O	261.13	184.05	175.81	344.25	33%	32%	116.47	248.99	37%	35%	-29.52	-37.21	-21.79
Indirect N2O Emissions from Nitrogen Used in Agriculture	N2O	934.07	784.86	0.00	0.00	79%	252%	0.00	0.00	78%	246%	-23.17	-37.65	-1.90
LULUCF														
Forestland remaining Forestland	CO2	-6874.53	-6518.51	-11564.19	-2438.96	65%	65%	-12844.15	-635.91	91%	91%	-3.76	-92.15	223.92
Land converted to Forestland	CO2	-272.24	-189.38	-700.61	154.72	157%	157%	-518.23	137.72	173%	172%	-30.29	-710.34	658.57
Cropland remaining Cropland	CO2	180.18	234.73	-949.78	1309.32	627%	627%	-1084.76	1552.98	562%	562%	30.28	-1628.20	1436.16
Land converted to Cropland	CO2	23.48	47.55	-96.24	143.09	510%	509%	-154.94	249.83	426%	425%	102.54	-2221.01	2218.95
Grassland remaining Grassland	CO2	25.86	42.07	-23.09	74.77	189%	189%	-39.34	123.36	194%	193%	62.66	-1774.44	1748.89
Land converted to Grassland	CO2	-84.61	-157.39	-393.63	224.21	365%	365%	-724.47	409.31	360%	360%	86.01	-2258.56	2193.45
Land converted to Wetlands	CO2	30.00	15.73	-58.26	118.17	294%	294%	-46.93	78.33	398%	398%	-47.57	-823.31	773.16
Land converted to Settlements	CO2	440.41	596.16	27.29	852.82	94%	94%	-354.90	1546.20	160%	159%	35.37	-267.87	798.46
Forestland remaining Forestland	CH4	12.15	21.17	-9.17	33.45	175%	175%	-16.43	58.73	178%	177%	74.26	-1740.80	1942.98
Land converted to Forestland	CH4	0.01	0.02	-0.01	0.03	175%	175%	-0.02	0.06	178%	177%	71.81	-1854.81	1911.92
Grassland remaining Grassland	CH4	0.73	1.23	-0.55	2.01	175%	175%	-0.95	3.41	177%	177%	68.11	-1816.45	1792.02
Forestland remaining Forestland	N2O	2.78	4.84	-2.03	7.59	173%	173%	-3.77	13.44	178%	178%	74.26	-1762.83	1792.36
Land converted to Forestland	N2O	0.01	0.02	-0.01	0.03	173%	173%	-0.02	0.05	178%	178%	71.81	-1818.72	1927.51
Grassland converted to Cropland: mineral soils	N2O	4.86	9.78	-15.84	25.55	426%	426%	-29.13	48.66	398%	397%	101.51	-2656.11	2302.08
Grassland remaining Grassland	N2O	0.67	1.13	-0.49	1.84	173%	173%	-0.88	3.15	178%	178%	68.11	-1679.93	1870.15
WASTE														
CH4 Emissions from Solid Waste Disposal Sites	CH4	242.62	793.02	132.66	377.03	45%	55%	352.18	1332.98	56%	68%	226.86	29.40	622.77
CH4 Emissions from Wastewater Handling	CH4	283.52	228.49	151.92	437.06	46%	54%	124.58	351.51	45%	54%	-19.41	-58.44	57.05
TOTAL		24417.58	19776.56	18250.66	30953.11	25%	27%	12249.75	27479.42	38%	39%	-19.01	-51.42	24.10

A.5.2. ESTIMATION OF UNCERTAINTIES USING AN ERROR PROPAGATION APPROACH (APPROACH 1)

A.5.2.1. Overview of the method

In the Approach 1, an uncertainty in an emission can be propagated from uncertainties in the activity data and the emission factor through the error propagation equation (Mandel 1984, Belington and Robinson 1992).

This method is presented in the current *1996 IPCC Guidelines for National Greenhouse Gas Inventories* (officially in use), where the conditions imposed for use of the method are:

- The uncertainties are relatively small, the standard deviation divided by the mean (coefficient of variation) value being less than 0.3;
- Input parameters (emission factor, activity data) have Gaussian (normal) distributions. Uncertainty is symmetric with respect to the mean value. The length of the range from mean to upper larger value (97.5% percentile) is equal to the length of the range from mean to lower, smaller value (2.5% percentile).
- The correlation between the input data in model between years doesn't exist.

Under these conditions, the uncertainty calculated for the emission rate is appropriate.

Summary uncertainty value is calculated for all emission sources and separately for key source categories that were included in Monte-Carlo analysis (Tier 2). The results of the error propagation approach are shown in Tables A5.2-1 and A5.2-2 (gray shaded area).

The uncertainties used and calculated in the error propagation approach are not exactly the same as those used in the Monte Carlo Simulation since the error propagation source categorisation is far less detailed.

However, the values used were chosen to agree approximately with those used in the Monte Carlo Simulation.

A.5.2.2. Correlation assumptions

Calculation of trend uncertainty using tier 1 method is based on the essential assumption that the input uncertainty of emission factors and activity data for 1990 and 2011 are equal. With that assumption, we can use the default 3.2. Table from *2006 IPCC Guidelines*. Formulas in columns K and L are used as they are given. That kind of assumption is not expected in real life.

Uncertainties for 1990 and 2011 are not equal (activity data uncertainty, emission factor uncertainty).

Therefore, the formulas in columns K, L of the 3.2. Table should change the default format, according to existence of new different activity data and emission factor uncertainty into:

Column K

Under the assumption that the same emission factor is used in both years and the actual emission factors are fully correlated, the percent error introduced by it is equal in both years. Therefore the formula for the uncertainty introduced on the trend by the emission factor is:

$$K = I * F = \text{sensitivity A} * \text{uncertainty of emission factor}$$

In case no correlation between emission factors is assumed, sensitivity B should be used and the result needs to be increased by $\sqrt{\text{uncertainty}(\text{emission factor, base year})^2 + \text{uncertainty}(\text{emission factor, year t})^2}$.

$$J = \text{sensitivity B}$$

$$K = J * \sqrt{\text{uncertainty}(\text{emission factor, base year})^2 + \text{uncertainty}(\text{emission factor, year t})^2}$$

Column L

The trend is the difference between the emissions in the base year and in the year t. Therefore the uncertainty of the activity data of the base year and year t has to be taken into account.

Since activity data in both years are assumed to be independent, Column L equals:

$$L = \text{sensitivity B} \bullet \text{combined uncertainty of activity data of both years}$$

$$= J * \sqrt{\text{uncertainty}(\text{activity data, base year})^2 + \text{uncertainty}(\text{activity data, year t})^2}$$

In case correlation between activity data is assumed what is not expected in real life, sensitivity A should be used and the final formula is: $L = I * E$.

Two columns (O and P) reflecting uncertainty of emission factors and activity data for year 1990 have been added in Table A5.2-1 and Table A5.2-2.

Activity data and emission factor uncertainty in Table A5.2-1, Table A5.2-2 for the key source activities that have been checked and calculated in detail using Monte Carlo analysis have been updated.

IPCC Source category Mobile Combustion: Agriculture/Forestry/Fishing has been changed to Combustion: Agriculture/Forestry/Fishing because the emission value includes both mobile and stationary sources.

Emissions uncertainty

The error propagation analysis, excluding LULUCF emissions, shows an uncertainty of +/- 15.17% in the combined GWP total emission in 2012, the latest reported year in this inventory.

The error propagation analysis, including LULUCF emissions, shows an uncertainty of +/- 35.86% in the combined GWP total emission in 2012, the latest reported year in this inventory.

Uncertainty in the Trend

The analysis, excluding LULUCF emissions, estimates an uncertainty of +/- 16.84% in the trend between the year 1990 and 2012, the latest reported year in this inventory.

The analysis, including LULUCF emissions, estimates an uncertainty of +/- 37.73% in the trend between the year 1990 and 2012, the latest reported year in this inventory.

Table A5.2-1: Tier 1 Uncertainty Calculation and Reporting – excluding LULUCF (Table 6.1 – IPCC Good Practice Guidance)

A	B	C	D	E	F	G	H	I	J	K	L	M	O	P
IPCC Source Category	GHG	Base year emissions 1990	Year t emissions 2012	Activity data uncertainty 2012	Emission factor uncertainty 2012	Combined uncertainty 2012	Combined uncertainty as % of total emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions	Activity data uncertainty 1990	Emission factor uncertainty 1990
										I*F or Note C	J*SQRT(E+O ²) or Note D			
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%	%	%	%	%	%	%	%	%
CO2 Emissions from Stationary Combustion: Coal	CO2	2,780.447	2,474.475	1.268905099	1.786169247	2.191009066	0.205478058	0.005005461	0.078108979	0.293236954	0.170124419	0.339013612	1.77023575	3.302065792
CO2 Emissions from Stationary Combustion: Oil	CO2	8,497.044	3,521.277	1.517350855	2.58464873	2.997125735	0.399984641	-0.111938417	0.111152194	0.393511093	0.247600769	0.464927006	1.630881263	2.419349117
CO2 Emissions from Stationary Combustion: Gas	CO2	4,458.539	4,639.537	1.959772775	2.215237498	2.957699529	0.520076045	0.029193087	0.146451048	0.479126364	0.378172368	0.610390377	1.681450475	2.407480112
Mobile Combustion: Road Vehicles	CO2	3,593.319	5,364.703	2.155244813	1.63312587	2.704104345	0.549803255	0.074786854	0.169341556	0.457473884	0.532991276	0.702397362	2.293743011	2.151959059
Mobile Combustion: Water-borne Navigation	CO2	132.980	110.762	5.00	5.00	7.071067812	0.029683544	2.15085E-07	0.003496314	0.024722674	0.024722674	0.034963141	5.00	5.00
Mobile Combustion: Aircraft	CO2	154.724	94.609	2.945027723	2.953892564	4.171171247	0.014956416	-0.001081294	0.002986408	0.012576036	0.012558465	0.017772781	3.001762188	3.001300371
Mobile Combustion: Railways	CO2	138.142	77.667	5.00	5.00	7.071067812	0.020814329	-0.001180121	0.002451642	0.017335728	0.017335728	0.024516422	5.00	5.00
Combustion: Agriculture/Forestry/Fishing	CO2	839.186	666.227	2.59896043	1.755834992	3.136487181	0.079196138	-0.001032242	0.021030044	0.052150541	0.076927387	0.092938161	2.574138796	1.751144724
Fugitive Emissions from Oil and Gas Operations	CO2	639.818	503.354	10.00	3.00	10.44030651	0.199170505	-0.000932076	0.015888813	-0.002796228	0.224701752	0.22471915	10.00	3.00
CO2 Emissions from Cement Production	CO2	1,085.790	998.871	2.858899535	2.91864212	4.08555729	0.154667431	0.002983344	0.031530238	0.131293861	0.129280711	0.184259546	2.939123126	2.97000654
CO2 Emissions from Lime Production	CO2	153.440	114.155	2.153289375	2.105611619	3.011686475	0.013029977	-0.000430569	0.003603409	0.012825022	0.013013764	0.018271268	2.899375864	2.86946807
CO2 Emissions from Limestone and Dolomite Use	CO2	51.706	37.817	7.50	30.00	30.92329219	0.044321105	-0.000165646	0.001193726	0.050645492	0.012661373	0.052204179	7.50	30.00
CO2 Emissions from Soda Ash Production and Use	CO2	14.466	21.813	7.50	30.00	30.92329219	0.02556457	0.000308225	0.000688545	0.029212498	0.007303125	0.030111554	7.50	30.00
CO2 Emissions from Ammonia Production	CO2	466.009	503.317	3.00089104	5.002585258	5.833627199	0.11128025	0.003635529	0.01588763	0.112400357	0.067431795	0.131075883	3.00144918	5.00256424
CO2 Emissions from Iron and Steel Production	CO2	21.447	0.319	7.50	30.00	30.92329219	0.000374121	-0.000553766	1.00764E-05	0.000427506	0.000106876	0.000440663	7.50	30.00
CO2 Emissions from Ferroalloys Production	CO2	118.836		7.172470185	28.53439342	29.42203148		-0.003124131					7.172470185	28.53439342
CO2 Emissions from Aluminium production	CO2	111.372		3.000236828	30.02244768	30.17198677		-0.002927914					3.000236828	30.02244768
Other non-specified NEU	CO2			5.00	50.00	50.24937811							5.00	50.00
CO2 Emissions from Solvent and Other Product Use	CO2	82.256	104.259	32.49417514	43.71622445	54.46998897	0.215234072	0.001128474	0.003291042	0.193631367	0.164806613	0.254272149	38.103387	39.3770628
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	50.00	30.00	58.30951895	0.000172002	1.32046E-06	2.45682E-06	3.96139E-05	0.000173724	0.000178183	50.00	30.00
CO2 Total	CO2	23,339.564	19,233.242											

Table A5.2-1: Tier 1 Uncertainty Calculation and Reporting – excluding LULUCF (Table 6.1 – IPCC Good Practice Guidance) (cont.)

A	B	C	D	E	F	G	H	I	J	K	L	M	O	P
IPCC Source Category	GHG	Base year emissions 1990	Year t emissions 2012	Activity data uncertainty 2012	Emission factor uncertainty 2012	Combined uncertainty 2012	Combined uncertainty as % of total emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions	Activity data uncertainty 1990	Emission factor uncertainty 1990
										I*F or Note C	J*SQRT(E ² +O ²) or Note D			
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%	%	%	%	%	%	%	%	%
Non-CO2 Emissions from Stationary Combustion	CH4	168.641	125.329	5.00	50.00	50.24937811	0.238682674	-0.000477482	0.003956124	0.279740207	0.027974021	0.281135429	5.00	50.00
Mobile Combustion: Road Vehicles	CH4	34.113	11.537	2.155244813	40.00	40.05802142	0.017515822	-0.000532656	0.000364184	0.020601351	0.001982883	0.020696558	5.00	40.00
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	5.00	40.00	40.31128874	0.000241774	-1.38011E-09	4.99531E-06	0.000282577	3.53222E-05	0.000284777	5.00	40.00
Mobile Combustion: Aircraft	CH4	0.023	0.014	5.00	40.00	40.31128874	2.1452E-05	-1.60176E-07	4.43221E-07	2.50724E-05	3.13404E-06	2.52675E-05	5.00	40.00
Mobile Combustion: Railways	CH4	0.214	0.111	5.00	40.00	40.31128874	0.000169916	-2.10486E-06	3.51066E-06	0.000198593	2.48241E-05	0.000200138	5.00	40.00
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	5.00	40.00	40.31128874	0.001534887	-2.4305E-06	3.17124E-05	0.001793925	0.000224241	0.001807886	5.00	40.00
Fugitive Emissions from Coal Mining and Handling	CH4	48.757		5.00	250.00	250.049995		-0.001281822					5.00	250.00
Fugitive Emissions from Oil and Gas Operations	CH4	1,202.278	1,232.428	5.00	300.00	300.0416638	14.01461371	0.007291501	0.038902656	16.50499911	0.275083319	16.50729132	5.00	300.00
CH4 Emissions from Production of Other Chemicals	CH4	14.273	0.440	7.499530601	29.99035432	30.91382072	0.000516008	-0.000361335	1.39022E-05	0.000485932	0.000131371	0.000503377	5.749205802	17.95362768
CH4 Emissions from Enteric Fermentation in Domestic Livestock	CH4	1,241.920	816.262	5.6967549	12.88323463	14.08654503	0.435784906	-0.006881868	0.025766023	0.503192056	0.202808218	0.542525039	5.431572499	14.67703397
CH4 Emissions from Manure Management	CH4	228.623	194.729	8.205342749	14.07831666	16.29498848	0.120260744	0.000136198	0.006146806	0.1293576	0.07242991	0.148254782	8.456918221	15.64224328
CH4 Emissions from Solid Waste Disposal Sites	CH4	242.623	793.024	34.63294643	45.13526297	56.8914136	1.709902188	0.018652411	0.0250325	1.517618941	1.220601055	1.947571356	34.3243396	40.47607982
CH4 Emissions from Wastewater Handling	CH4	283.524	228.494	47.96705998	47.01801043	67.16793988	0.581667999	-0.000241335	0.007212616	-0.011347108	0.490037176	0.490168533	48.11685036	73.52868745
	CH4 Total	3,466.477	3,403.532											

Table A5.2-1: Tier 1 Uncertainty Calculation and Reporting – excluding LULUCF (Table 6.1 – IPCC Good Practice Guidance) (cont.)

A	B	C	D	E	F	G	H	I	J	K	L	M	O	P
IPCC Source Category	GHG	Base year emissions 1990	Year t emissions 2012	Activity data uncertainty 2012	Emission factor uncertainty 2012	Combined uncertainty 2012	Combined uncertainty as % of total emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions	Activity data uncertainty 1990	Emission factor uncertainty 1990
										I*F or Note C	J*SQRT(E ² +O ²) or Note D			
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%	%	%	%	%	%	%	%	%
Non-CO2 Emissions from Stationary Combustion	N2O	62.365	48.531	5.00	200.00	200.0624902	0.367976949	-0.000107694	0.001531915	0.433290956	0.010832274	0.433426338	5.00	200.00
Mobile Combustion: Road Vehicles	N2O	40.243	48.321	2.155244813	200.00	200.0116124	0.366289989	0.000467267	0.00152528	0.431414282	0.008304736	0.431494208	5.00	200.00
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	5.00	200.00	200.0624902	0.002125554	-2.44477E-09	8.84884E-06	0.002502829	6.25707E-05	0.002503611	5.00	200.00
Mobile Combustion: Aircraft	N2O	1.355	0.829	5.00	200.00	200.0624902	0.006286494	-9.458E-06	2.61711E-05	0.007402314	0.000185058	0.007404627	5.00	200.00
Mobile Combustion: Railways	N2O	0.392	0.197	5.00	200.00	200.0624902	0.001493819	-4.07787E-06	6.21888E-06	0.001758964	4.39741E-05	0.001759514	5.00	200.00
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	5.00	200.00	200.0624902	0.012269082	-2.51469E-06	5.10771E-05	0.014446781	0.00036117	0.014451294	5.00	200.00
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	5.00	300.00	300.0416638	0.00261189	-1.03143E-05	7.25025E-06	0.003076021	5.1267E-05	0.003076448	5.00	300.00
N2O Emissions from Nitric Acid Production	N2O	784.638	678.637	3.001816706	30.02489678	30.17458086	0.776098617	0.000793106	0.02142177	0.023812922	0.090947275	0.094013095	3.002302935	30.02489678
N2O Emissions from Solvent and Other Product Use	N2O	34.720	51.308	50.00	50.00	70.71067812	0.137502856	0.000706784	0.001619595	0.114522655	0.114522655	0.161959491	50.00	50.00
N2O Emissions from Manure Management	N2O	381.844	241.462	5.812732303	38.9387621	39.37023052	0.360291546	-0.002416601	0.007621945	-0.094099451	0.063959064	0.113778155	6.052135655	33.31136658
Direct N2O Emissions from Agricultural Soils	N2O	1,337.857	1,108.931	16.99403654	49.1877897	52.04071419	2.187187803	-0.000168352	0.03500439	-0.008280878	1.020122572	1.020156182	23.67487937	46.39432776
N2O Emissions from Pasture, Range and Paddock Manure	N2O	261.130	184.055	8.319365408	36.82560818	37.75363901	0.263356484	-0.001055292	0.005809849	-0.038861761	0.06950807	0.079634216	8.597759288	33.0900501
Indirect N2O Emissions from Nitrogen Used in Agriculture	N2O	934.066	784.860	35.6286899	152.8819785	156.9786702	4.669507326	0.000217737	0.024774797	0.033288128	1.300513995	1.300939949	38.55069861	143.6946974
N2O Emissions from Wastewater Handling	N2O	84.567	104.012	10.00	30.00	31.6227766	0.124658471	0.001059899	0.003283231	0.031796965	0.046431903	0.056275826	10.00	30.00
N2O Total	N2O Total	3,926.221	3,253.271											
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC		478.771	50.00	50.00	70.71067812	1.283072	0.015112827	0.015112827	1.068638247	1.068638247	1.511282702	50.00	50.00
HFC and PFC Emissions from Other Consumption	HFC/PFC		6.873	50.00	50.00	70.71067812	0.018418611	0.000216946	0.000216946	0.015340395	0.015340395	0.021694595	50.00	50.00
SF6 Emissions from Electrical Equipment	SF6	10.954	9.600	50.00	50.00	70.71067812	0.025726694	1.50334E-05	0.000303025	0.021427113	0.021427113	0.030302514	50.00	50.00
PFC Emissions from Aluminium production	PFC	936.564		3.00	27.00	27.16615541		-0.024615391					2.107883651	26.36323555
Total GHG Emissions	CO2-eq	31,679.780	26,385.288											
Total Uncertainties (Level/Trend)							15.17					16.84		

Note C $K = J \cdot \sqrt{\text{uncertainty}(\text{emission factor, base year})^2 + \text{uncertainty}(\text{emission factor, year t})^2} = \sqrt{F^2 + P^2}$

Note D $L = I \cdot E$

Table A5.2-2: Tier 1 Uncertainty Calculation and Reporting – including LULUCF (Table 6.1 – IPCC Good Practice Guidance)

A	B	C	D	E	F	G	H	I	J	K	L	M	O	P
IPCC Source Category	GHG	Base year emissions 1990	Year t emissions 2012	Activity data uncertainty 2012	Emission factor uncertainty 2012	Combined uncertainty 2012	Combined uncertainty as % of total emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions	Activity data uncertainty 1990	Emission factor uncertainty 1990
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%	%	%	%	I*F or Note C	J*SQRT(E+O ²) or Note D	%	%	%
CO2 Emissions from Stationary Combustion: Coal	CO2	2,780.447	2,474.475	1.268905099	1.786169247	2.191009066	0.264539818	0.008353215	0.098312328	0.369084422	0.214128104	0.426701482	1.77023575	3.302065792
CO2 Emissions from Stationary Combustion: Oil	CO2	8,497.044	3,521.277	1.517350855	2.58464873	2.997125735	0.514954566	-0.134530224	0.139902364	0.495295059	0.311644169	0.58518312	1.630881263	2.419349117
CO2 Emissions from Stationary Combustion: Gas	CO2	4,458.539	4,639.537	1.959772775	2.215237498	2.957699529	0.669564545	0.04002295	0.184331476	0.603055225	0.475988882	0.76827145	1.681450475	2.407480112
Mobile Combustion: Road Vehicles	CO2	3,593.319	5,364.703	2.155244813	1.63312587	2.704104345	0.707836421	0.096757608	0.213142749	0.575802203	0.670852614	0.884076584	2.293743011	2.151959059
Mobile Combustion: Water-borne Navigation	CO2	132.980	110.762	5.00	5.00	7.071067812	0.038215659	9.86338E-05	0.004400656	0.031117339	0.044006563	5.00	5.00	5.00
Mobile Combustion: Aircraft	CO2	154.724	94.609	2.945027723	2.953892564	4.171171247	0.019255426	-0.001246514	0.00375886	0.015828903	0.015806786	0.022369815	3.001762188	3.001300371
Mobile Combustion: Railways	CO2	138.142	77.667	5.00	5.00	7.071067812	0.026797113	-0.001383169	0.003085774	0.021819717	0.021819717	0.03085774	5.00	5.00
Combustion: Agriculture/Forestry/Fishing	CO2	839.186	666.227	2.59896043	1.755834992	3.136487181	0.101959947	-0.000678591	0.026469588	0.065639586	0.09682511	0.116977165	2.574138796	1.751144724
Fugitive Emissions from Oil and Gas Operations	CO2	639.818	503.354	10.00	3.00	10.44030651	0.256419248	-0.000699934	0.019998549	0.084846656	0.282822186	0.295275031	10.00	3.00
CO2 Emissions from Cement Production	CO2	1,085.790	998.871	2.858899535	2.91864212	4.08555729	0.199124396	0.004557508	0.039685721	0.165253793	0.16271993	0.231919365	2.939123126	2.970006654
CO2 Emissions from Lime Production	CO2	153.440	114.155	2.153289375	2.105611619	3.011686475	0.01677526	-0.000428435	0.004535452	0.01614229	0.01637985	0.02299724	2.899375864	2.86946807
CO2 Emissions from Limestone and Dolomite Use	CO2	51.706	37.817	7.50	30.00	30.92329219	0.05706058	-0.000170244	0.00150249	0.063745248	0.015936312	0.065707098	7.50	30.00
CO2 Emissions from Soda Ash Production and Use	CO2	14.466	21.813	7.50	30.00	30.92329219	0.032912743	0.000398649	0.000866641	0.036768483	0.009192121	0.037900085	7.50	30.00
CO2 Emissions from Ammonia Production	CO2	466.009	503.317	3.00089104	5.00258526	5.833627199	0.143266183	0.00492036	0.019997059	0.141473372	0.084873426	0.164979433	3.00144918	5.00256424
CO2 Emissions from Iron and Steel Production	CO2	21.447	0.319	7.50	30.00	30.92329219	0.000481657	-0.000681135	1.26827E-05	0.000538083	0.000134521	0.000554643	7.50	30.00
CO2 Emissions from Ferroalloys Production	CO2	118.836		7.172470185	28.53439342	29.42203148		-0.003844267					7.172470185	28.53439342
CO2 Emissions from Aluminium production	CO2	111.372		3.000236828	30.02244768	30.17198677		-0.003602822					3.000236828	30.02244768
Other non-specified NEU	CO2			5.00	50.00	50.24937811							5	50
CO2 Emissions from Solvent and Other Product Use	CO2	82.256	104.259	32.49417514	43.71622445	54.46998897	0.277100061	0.001481195	0.004142289	0.243715263	0.207434816	0.320041141	38.103387	39.3770628
Forestland remaining Forestland	CO2	-6,874.531	-6,518.512			90.63972459	-28.82908319	-0.036687393	-0.258984253			-28.91243504		
Land converted to Forestland	CO2	-272.239	-189.376			142.9916889	-1.321295705	0.001283269	-0.007524027			-1.597044125		
Cropland remaining Cropland	CO2	180.176	234.727			561.9539955	6.436166455	0.003496727	0.009325832			7.851906531		
Land converted to Cropland	CO2	23.477	47.551			425.725682	0.987754783	0.00112971	0.001889211			1.254387437		
Grassland remaining Grassland	CO2	25.864	42.071			193.3885569	0.396983677	0.000834744	0.001671487			0.452268575		
Land converted to Grassland	CO2	-84.615	-157.389			360.1003891	-2.765425076	-0.003515916	-0.006253158			-3.206214071		
Land converted to Wetlands	CO2	29.997	15.726			398.1715045	0.305534714	-0.000345599	0.000624815			0.309329243		
Land converted to Settlements	CO2	440.409	596.161			159.4395503	4.637923507	0.009436571	0.023685831			4.380602766		
CO2 Emissions from Waste Incineration	CO2	0.043	0.078	50.00	30.00	58.30951895	0.000221442	1.69398E-06	3.09229E-06	0.000131195	0.000218658	0.000254997	50.00	30.00
CO2 Total	CO2	16,808.102	13,304.199											

Table A5.2-2: Tier 1 Uncertainty Calculation and Reporting – including LULUCF (Table 6.1 – IPCC Good Practice Guidance) (cont)

A	B	C	D	E	F	G	H	I	J	K	L	M	O	P
IPCC Source Category	GHG	Base year emissions 1990	Year t emissions 2012	Activity data uncertainty 2012	Emission factor uncertainty 2012	Combined uncertainty 2012	Combined uncertainty as % of total emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions	Activity data uncertainty 1990	Emission factor uncertainty 1990
										I*F or Note C	J*SQRT(E+O ²) or Note D			
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%	%	%	%	%	%	%	%	%
Non-CO2 Emissions from Stationary Combustion	CH4	168.641	125.329	5.00	50.00	50.24937811	0.307288632	-0.000476239	0.004979399	0.352096662	0.035209666	0.353852766	5.00	50.00
Mobile Combustion: Road Vehicles	CH4	34.113	11.537	2.155244813	40.00	40.05802142	0.022550498	-0.000645194	0.000458382	0.025930013	0.002495767	0.026049845	5.00	40.00
Mobile Combustion: Water-borne Navigation	CH4	0.190	0.158	5.00	40.00	40.31128874	0.000311268	1.38853E-07	6.28738E-06	0.000355668	4.44585E-05	0.000358436	5.00	40.00
Mobile Combustion: Aircraft	CH4	0.023	0.014	5.00	40.00	40.31128874	2.7618E-05	-1.84629E-07	5.57862E-07	3.15575E-05	3.94468E-06	3.18031E-05	5.00	40.00
Mobile Combustion: Railways	CH4	0.214	0.111	5.00	40.00	40.31128874	0.000218757	-2.49129E-06	4.41871E-06	0.00024996	3.1245E-05	0.000251905	5.00	40.00
Combustion: Agriculture/Forestry/Fishing	CH4	1.299	1.005	5.00	40.00	40.31128874	0.001976069	-2.09849E-06	3.9915E-05	0.002257935	0.000282242	0.002275507	5.00	40.00
Fugitive Emissions from Coal Mining and Handling	CH4	48.757		5.00	250.00	250.049995		-0.0015773					5.00	250.00
Fugitive Emissions from Oil and Gas Operations	CH4	1,202.278	1,232.428	5.00	300.00	300.0416638	18.04291612	0.010065517	0.048965057	20.77411452	0.346235242	20.77699961	5.00	300.00
CH4 Emissions from Production of Other Chemicals	CH4	14.273	0.440	7.499530601	29.99035432	30.91382072	0.000664328	-0.000444238	1.74981E-05	-0.013322863	0.000165351	0.01332389	5.749205802	17.95362768
CH4 Emissions from Enteric Fermentation in Domestic Livestock	CH4	1,241.920	816.262	5.6967549	12.88323463	14.08654503	0.561045112	-0.007742803	0.032430556	0.63334565	0.255265761	0.682852342	5.431572499	14.67703397
CH4 Emissions from Manure Management	CH4	228.623	194.729	8.205342749	14.07831666	16.29498848	0.154827993	0.000340525	0.007736714	0.162816706	0.091164334	0.186601756	8.456918221	15.64224328
Forestland remaining Forestland	CH4	12.150	21.173			177.4426243	0.183316919	0.000448137	0.000841212			0.209815878		
Land converted to Forestland	CH4	0.012	0.021			177.4426243	0.000182556	4.4071E-07	8.37721E-07			0.000208945		
Grassland remaining Grassland	CH4	0.731	1.229			177.4426243	0.010643392	2.5184E-05	4.88409E-05			0.012181924		
CH4 Emissions from Solid Waste Disposal Sites	CH4	242.623	793.024	34.63294643	45.13526297	56.8914136	2.201389378	0.023655958	0.031507304	1.910160035	1.53631672	2.451322178	34.3243396	40.47607982
CH4 Emissions from Wastewater Handling	CH4	283.524	228.494	47.96705998	47.01801043	67.16793988	0.748860234	-9.40454E-05	0.009078202	-0.004421826	0.616788183	0.616804033	48.11685036	73.52868745
	CH4 Total	3,479.370	3,425.955											

Table A5.2-2: Tier 1 Uncertainty Calculation and Reporting – including LULUCF (Table 6.1 – IPCC Good Practice Guidance) (cont)

A	B	C	D	E	F	G	H	I	J	K	L	M	O	P
IPCC Source Category	GHG	Base year emissions 1990	Year t emissions 2012	Activity data uncertainty 2012	Emission factor uncertainty 2012	Combined uncertainty 2012	Combined uncertainty as % of total emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions	Activity data uncertainty 1990	Emission factor uncertainty 1990
										I*F or Note C	J*SQRT(E+O ²) or Note D			
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%	%	%	%	%	%	%	%	%
Non-CO2 Emissions from Stationary Combustion	N2O	62.365	48.531	5.00	200.00	200.0624902	0.473746717	-8.94174E-05	0.001928154	0.545364218	0.013634105	0.545534618	5.00	200.00
Mobile Combustion: Road Vehicles	N2O	40.243	48.321	2.155244813	200	200.0116124	0.471574864	0.000617895	0.001919802	0.543002131	0.010452805	0.54310273	5.00	200.00
Mobile Combustion: Water-borne Navigation	N2O	0.337	0.280	5.00	200.00	200.0624902	0.002736514	2.45968E-07	1.11376E-05	0.0031502	7.8755E-05	0.003151184	5.00	200.00
Mobile Combustion: Aircraft	N2O	1.355	0.829	5.00	200.00	200.0624902	0.008093457	-1.09019E-05	3.29404E-05	0.009316966	0.000232924	0.009319877	5.00	200.00
Mobile Combustion: Railways	N2O	0.392	0.197	5.00	200.00	200.0624902	0.001923196	-4.84292E-06	7.82743E-06	0.002213931	5.53483E-05	0.002214623	5.00	200.00
Combustion: Agriculture/Forestry/Fishing	N2O	2.038	1.618	5.00	200.00	200.0624902	0.015795656	-1.65724E-06	6.42885E-05	0.018183526	0.000454588	0.018189207	5.00	200.00
Fugitive Emissions from Oil and Gas Operations	N2O	0.668	0.230	5.00	300.00	300.0416638	0.003362641	-1.24879E-05	9.12557E-06	0.003871651	6.45275E-05	0.003872189	5.00	300.00
N2O Emissions from Nitric Acid Production	N2O	784.638	678.637	3.001816706	30.02489678	30.17458086	0.999177183	0.001578417	0.026962637	0.047391816	0.114471324	0.123893778	3.002302935	30.02489678
N2O Emissions from Solvent and Other Product Use	N2O	34.720	51.308	50.00	50.00	70.71067812	0.177026107	0.000915278	0.002038513	0.144144615	0.144144615	0.203851269	50.00	50.00
N2O Emissions from Manure Management	N2O	381.844	241.462	5.812732303	38.9387621	39.37023052	0.463852253	-0.002759158	0.009593406	-0.107438216	0.080502454	0.134252059	6.052135655	33.31136658
Direct N2O Emissions from Agricultural Soils	N2O	1,337.857	1,108.931	16.99403654	49.1877897	52.04071419	2.815863989	0.000777243	0.044058482	0.038230854	1.283983294	1.284552334	23.67487937	46.39432776
N2O Emissions from Pasture, Range and Paddock Manure	N2O	261.130	184.055	8.319365408	36.82560818	37.75363901	0.339054578	-0.001135077	0.007312601	-0.041799894	0.087486743	0.096959586	8.597759288	33.0900501
Indirect N2O Emissions from Nitrogen Used in Agriculture	N2O	934.066	784.860	35.6286899	152.8819785	156.9786702	6.011691135	0.000964729	0.031182944	6.542555151	1.636899614	6.744217393	38.55069861	143.6946974
Forestland remaining Forestland	N2O	2.779	4.842			177.6550534	0.041975792	0.000102492	0.00019239			0.047724162		
Land converted to Forestland	N2O	0.011	0.019			177.6550534	0.000168631	4.06608E-07	7.72898E-07			0.000191725		
Grassland converted to Cropland: mineral soils	N2O	4.855	9.784			397.6981578	0.189851788	0.000231635	0.000388707			0.226608591		
Grassland remaining Grassland	N2O	0.675	1.134			177.6550534	0.009831553	2.32353E-05	4.50615E-05			0.011177933		
N2O Emissions from Wastewater Handling	N2O	84.567	104.012	10.00	30.00	31.6227766	0.160489785	0.001396593	0.004132458	0.175325365	0.058441788	0.184809162	10.00	30.00
N2O Total	N2O Total	3,934.541	3,269.050											
HFC and PFC Emissions from Consumption in Refrigeration and Air Conditioning Equipment	HFC/PFC		478.771	50.00	50.00	70.71067812	1.651872891	0.019021849	0.019021849	1.345047835	1.345047835	1.90218489	50.00	50.00
HFC and PFC Emissions from Other Consumption			6.873	50.00	50.00	70.71067812	0.02371278	0.00027306	0.00027306	0.019308279	0.019308279	0.02730603	50.00	50.00
SF6 Emissions from Electrical Equipment		10.954	9.600	50.00	50.00	70.71067812	0.033121468	2.7025E-05	0.000381404	0.026969362	0.026969362	0.038140438	50.00	50.00
PFC Emissions from Aluminium production	PFC	936.564		3.00	27.00	27.16615541		-0.030287399					2.107883651	26.36323555
Total GHG Emissions	CO2-eq	25,169.532	20,494.449											
Total Uncertainties (Level/Trend)							35.86					37.73		

Note C $K = \sqrt{\text{uncertainty}(\text{emission factor, base year})^2 + \text{uncertainty}(\text{emission factor, year t})^2} = \sqrt{F^2 + P^2}$

Note D $L = I * E$

A.5.3 COMPARISON OF UNCERTAINTIES FROM THE ERROR PROPAGATION AND MONTE CARLO ANALYSES

Where the conditions for applicability are met (relatively low uncertainty, no correlation between sources except those dealt with explicitly by Approach 1, symmetrical distributions), Approach 1 and Approach 2 will give identical results.

Comparing the results of the error propagation approach, and the Monte Carlo estimation of uncertainty by simulation, is a useful quality control check on the behaviour of the Monte Carlo model.

The reason that the error propagation approach is used as a reference is because the mathematical approach to the error propagation approach has been defined and revised in the *2000 GPG* and the *2006 Guidelines*.

The implementation of uncertainty estimation by simulation cannot be prescriptive, and will depend on the Monte Carlo software a country chooses to use, how the country constructs its model, and the correlations included within that model. Therefore, there is a greater possibility of errors being introduced in the model used to estimate uncertainty by simulation.

If all the distributions in the Monte Carlo model were normal, and there were no correlations between sources, the estimated errors on the trend from the Monte Carlo model should be identical to those estimated by the error propagation approach.

In reality there will be correlations between sources, and some distributions are not normal and are heavily skewed. The error propagation approach does not account for the correlations, and so we might expect the trend uncertainty estimated by this method to be greater than obtained value.

The assumption of equivalence between the two methods relies on the fact that the distributions of individual uncertainties in the activity data and emissions factors in the two approaches are both normal. However, there are a number of lognormal and triangle distributions in the Monte Carlo model and the effects of these can not be fully reproduced in the error propagation model. These log-normal and triangle distributions will have the effect of increasing the uncertainty on the trend as the distributions are more skewed.

In Monte Carlo model used in this inventory, we were concentrated on uncertainties of key source categories that contribute 98.11% to total emissions. Key sources were considered because for them we had enough data to set model mathematically correct.

Model is set up so that each sector is divided in its category, and each category is divided into subcategories. Accordingly, uncertainty would not be underestimated. But, for some subcategories, uncertainty has been estimated on the basis of expert judgement or default uncertainty from the 2000 GPG has been used.

It is not expected that the central estimates from the two methods will be identical, which could be mathematically explained.

For some variables that could only assume negative values, in the Monte Carlo model for the definition of distribution of input parameters risk truncate function was used which resulted in slight change in mean value. The same slight change in mean value cause also log-normally distributed variables.

Total uncertainty for all key sources approximately amounts +/- 15-16% for error propagation approach and approach 2 (Monte Carlo) for year 2012 (excluding LULUCF).

Total uncertainty for all key sources approximately amounts +/- 36-39% for error propagation approach and approach 2 (Monte Carlo) for year 2012 (Including LULUCF).

Trend uncertainty (variability) using Monte Carlo simulation model is lower (approximately +/- 1%) than trend uncertainty using error propagation error. One of the reasons for that is because error propagation model deals with variables that have normal distributions, which implies symmetrical uncertainties for activity data and emission factor.

In Monte Carlo model some variables have log-normal or triangle distribution, which means that their value can vary plus infinite. Because of asymmetry of some input variables, it should not be expected for the final result (trend) to vary symmetrically. Also the uncertainty of input data for the year 1990 is not equal to the uncertainty for the year 2012, which also affects the changes in the variability of the trend.

Key category Indirect N₂O Emissions from Nitrogen Used in Agriculture has created problems in defining the distribution functions which resulted in lower summary emission. It was due to the large asymmetry of variability of input values that are included in the calculation of emission of this source category.

We should point out also categories CO₂ Emissions from Ferroalloys Production, CO₂ Emissions from Aluminium Production and PFC Emissions from Aluminium production and few subcategories which emission was zero in year 2012, but in year 1990 they had emission which varied in accordance with the uncertainty of input parameters.

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ANNEX 6

ARCHIVING

INVENTORY DATA RECORD SHEET, UNFCCC SEF APPLICATION,

Table A6-1: An example of Inventory Data Record Sheet for 2012 in Waste

INVENTORY DATA RECORD SHEET

Year: 2012

MODULE: WASTE	
SUBMODULE: METHANE EMISSIONS FROM SOLID WASTE DISPOSAL SITES	
WORKSHEET: 6-1	SHEET: 1 OF 1 CH₄ EMISSIONS
STEP: 1 TO 4	PAGE: 1 of 3
DIRECT DATA SOURCE: A. ACTIVITY DATA: Environmental Pollution Register database and Landfill Inventory database (Croatian Environmental Agency, CEA). Assessment of inappropriate activity data on quantities of MSW disposed to different types of SWDs - <i>Guidelines Development for starting implementation of Waste Management Plan in the Republic of Croatia</i> , EKONERG Ltd. <u>Quantities of MSW disposed to SWDSs:</u> Managed: 869.76Gg Unmanaged – deep: 396.89 Gg Unmanaged – shallow: 115.63 Gg Country-specific methane correction factor (MCF): 0.892 Country-specific fraction of degradable organic carbon (DOC): 0.16 Recovered methane: 4.80Gg B. METHODOLOGY/EMISSION FACTOR: Publications: IPCC/UNEP/OECD/IEA (1997), <i>Greenhouse Gas Inventory Workbook</i> , Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2. IPCC/UNEP/OECD/IEA (1997), <i>Greenhouse Gas Inventory Reference Manual</i> , Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3. IPCC (2000), <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> Methodology: First Order Decay method (Tier 2) Methane generation rate constant k=0.05 Fraction of DOC which really degrades: 0.55 (0.5-0.6) Fraction of carbon released as methane: 0.5	
ORIGINAL DATA SOURCE: A. ACTIVITY DATA: Environmental Pollution Register database and Landfill Inventory database (CEA)	
METHOD: bottom-up (see publications in original data source)	
ADDITIONAL INTERCALCULATION: Evaluation and compiling of data coming from original data source and adjusting to recommended Intergovernmental Panel on Climate Change (IPCC) methodology.	

MODULE: WASTE	
SUBMODULE: METHANE EMISSIONS FROM SOLID WASTE DISPOSAL SITES	
WORKSHEET: 6-1	SHEET: 1 OF 1 CH₄ EMISSIONS
STEP: 1 TO 4	PAGE: 2 of 3
DATA ARCHIVATION: Publications: Fundurulja, D., Mužinić, M. (2000) <i>Estimation of the Quantities of Municipal Solid Waste in the Republic of Croatia in the period 1990 – 1998 and 1998 – 2010.</i> Potočnik, V. (2000), Report: The basis for methane emission estimation in Croatia 1990-1998, B. Data on Municipal Solid Waste in Croatia 1990-1998 Environmental Pollution Register Database and Landfill Inventory Database, CEA	
DATA GAPS: MSW quantity estimation were in most cases gained by test weighing in order to estimate average volumes of waste delivered by vehicles and density of MSW. National classification of SWDSs is different from IPCC classification. Scarce data for DOC estimation.	
SUGGESTION FOR THE FUTURE: For the purposes of improvement activity data gathering from solid waste disposal activities it is necessary to improve quality of existing data: <ul style="list-style-type: none"> • more accurate determination on waste quantities disposed to different types of SWDSs (managed, unmanaged deep and unmanaged shallow) – based on measurement/weighing or more accurate estimation • providing methodology to determine country-specific MSW composition and periodic analysis of waste composition at major landfills. It will be solved through the project of the CEA: <i>Creating a uniform methodology for the analysis of the composition of MSW, determine the average composition of MSW in the Republic of Croatia and the projection of the amount of MSW.</i> • modification of Environmental Pollution Register and Landfill Inventory database regarding to MSW with additional information (provided on regular basis) on technical and environmental protection measures implemented at landfills, waste quantities disposed to different types of SWDS (managed, unmanaged deep and unmanaged shallow) and waste composition. • collecting the necessary data and information on organic industrial waste (including sludge from waste water treatment) disposed in SWDSs. Adjustment of country-specific to IPCC SWDS classification for entire time series, in order to accurately estimate the MCF. Due to lack of adequate information, interpolation/extrapolation method has been applied for estimation of waste and landfills characteristics over a long period of time. It is necessary to improve the quality of existing data and to reconstruct historical data. More detailed background information related to the sources of AD and EFs are necessary in order to improve transparency. Research should be conducted in order to develop country-specific parameters for the first order decay method to increase the accuracy of the emission estimates. More information for uncertainty estimation is required, regarding more accurate and transparent uncertainty analysis.	

MODULE: WASTE	
SUBMODULE: METHANE EMISSIONS FROM SOLID WASTE DISPOSAL SITES	
WORKSHEET: 6-1	SHEET: 1 OF 1 CH₄ EMISSIONS
STEP: 1 TO 4	PAGE: 3 of 3
NOTES: -	
RESPONSIBILITY: Andrea Hublin, PhD EKONERG address: Koranska 5, 10000 Zagreb tel.: +385 1 6000 134 e-mail: andrea.hublin@ekonerg.hr	

UNFCCC SEF application

Version 1.2.1

Workflow**Settings**

Party: Croatia
ISO: HR
Submission year: 2014
Reported year: 2013
Commitment period: 1

Completeness check: YES
Consistency check: YES
File locked: YES

Lock timestamp: 15.1.2014 13:05
Submission version number: 1
Submission type: Official

Functions[Export XML](#)

Party Croatia
 Submission year 2014
 Reported year 2013
 Commitment period 1

Table 1. Total quantities of Kyoto Protocol units by account type at beginning of reported year

Account type	Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Party holding accounts	1,49E+08	NO	NO	NO	NO	NO
Entity holding accounts	NO	NO	NO	NO	NO	NO
Article 3.3/3.4 net source cancellation accounts	NO	NO	NO	NO		
Non-compliance cancellation accounts	NO	NO	NO	NO		
Other cancellation accounts	NO	NO	NO	NO	NO	NO
Retirement account	NO	NO	NO	NO	NO	NO
tCER replacement account for expiry	NO	NO	NO	NO	NO	
ICER replacement account for expiry	NO	NO	NO	NO		
ICER replacement account for reversal of storage	NO	NO	NO	NO		NO
ICER replacement account for non-submission of certification report	NO	NO	NO	NO		NO
Total	1,49E+08	NO	NO	NO	NO	NO

Party Croatia
 Submission year 2014
 Reported year 2013
 Commitment period 1

Table 2 (a). Annual internal transactions

Transaction type	Additions						Subtractions					
	Unit type						Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Article 6 issuance and conversion												
Party-verified projects		NO					NO		NO			
Independently verified projects		NO					NO		NO			
Article 3.3 and 3.4 issuance or cancellation												
3.3 Afforestation and reforestation			NO				NO	NO	NO	NO		
3.3 Deforestation			NO				NO	NO	NO	NO		
3.4 Forest management			NO				NO	NO	NO	NO		
3.4 Cropland management			NO				NO	NO	NO	NO		
3.4 Grazing land management			NO				NO	NO	NO	NO		
3.4 Revegetation			NO				NO	NO	NO	NO		
Article 12 afforestation and reforestation												
Replacement of expired tCERs							NO	NO	NO	NO	NO	
Replacement of expired ICERs							NO	NO	NO	NO		
Replacement for reversal of storage							NO	NO	NO	NO		NO
Replacement for non-submission of certification report							NO	NO	NO	NO		NO
Other cancellation							NO	NO	NO	NO	NO	NO
Sub-total		NO	NO				NO	NO	NO	NO	NO	NO

Transaction type	Retirement					
	Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Retirement	NO	NO	NO	NO	NO	NO

Party Croatia
 Submission year 2014
 Reported year 2013
 Commitment period 1

Table 2 (b). Annual external transactions

	Additions						Subtractions					
	Unit type						Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Transfers and acquisitions												
Sub-total	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Additional information

Independently verified ERUs								NO				
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Table 2 (c). Total annual transactions

Total (Sum of tables 2a and 2b)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
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Party Croatia
 Submission year 2014
 Reported year 2013
 Commitment period 1

Table 3. Expiry, cancellation and replacement

Transaction or event type	Expiry, cancellation and requirement to replace		Replacement					
	Unit type		Unit type					
	tCERs	ICERs	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Temporary CERs (tCERs)								
Expired in retirement and replacement accounts	NO							
Replacement of expired tCERs			NO	NO	NO	NO	NO	
Expired in holding accounts	NO							
Cancellation of tCERs expired in holding accounts	NO							
Long-term CERs (ICERs)								
Expired in retirement and replacement accounts		NO						
Replacement of expired ICERs			NO	NO	NO	NO		
Expired in holding accounts		NO						
Cancellation of ICERs expired in holding accounts		NO						
Subject to replacement for reversal of storage		NO						
Replacement for reversal of storage			NO	NO	NO	NO		NO
Subject to replacement for non-submission of certification report		NO						
Replacement for non-submission of certification report			NO	NO	NO	NO		NO
Total			NO	NO	NO	NO	NO	NO

Party Croatia
 Submission year 2014
 Reported year 2013
 Commitment period 1

Table 4. Total quantities of Kyoto Protocol units by account type at end of reported year

Account type	Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Party holding accounts	1,49E+08	NO	NO	NO	NO	NO
Entity holding accounts	NO	NO	NO	NO	NO	NO
Article 3.3/3.4 net source cancellation accounts	NO	NO	NO	NO		
Non-compliance cancellation accounts	NO	NO	NO	NO		
Other cancellation accounts	NO	NO	NO	NO	NO	NO
Retirement account	NO	NO	NO	NO	NO	NO
tCER replacement account for expiry	NO	NO	NO	NO	NO	
ICER replacement account for expiry	NO	NO	NO	NO		
ICER replacement account for reversal of storage	NO	NO	NO	NO		NO
ICER replacement account for non-submission of certification report	NO	NO	NO	NO		NO
Total	1,49E+08	NO	NO	NO	NO	NO

Party Croatia
 Submission year 2014
 Reported year 2013
 Commitment period 1

Table 5 (a). Summary information on additions and subtractions

	Additions						Subtractions					
	Unit type						Unit type					
Starting values	AAUs	ERUs	RMUs	CERs	tCERs	ICERs	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Issuance pursuant to Article 3.7 and 3.8	1,49E+08											
Non-compliance cancellation							NO	NO	NO	NO		
Carry-over	NO	NO		NO								
Sub-total	1,49E+08	NO		NO			NO	NO	NO	NO		
Annual transactions												
Year 0 (2007)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 1 (2008)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 2 (2009)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 3 (2010)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 4 (2011)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 5 (2012)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 6 (2013)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 7 (2014)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year 8 (2015)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Sub-total	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total	1,49E+08	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Table 5 (b). Summary information on replacement

	Requirement for replacement		Replacement					
	Unit type		Unit type					
	tCERs	ICERs	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Previous CPs			NO	NO	NO	NO	NO	NO
Year 1 (2008)		NO	NO	NO	NO	NO	NO	NO
Year 2 (2009)		NO	NO	NO	NO	NO	NO	NO
Year 3 (2010)		NO	NO	NO	NO	NO	NO	NO
Year 4 (2011)		NO	NO	NO	NO	NO	NO	NO
Year 5 (2012)	NO	NO	NO	NO	NO	NO	NO	NO
Year 6 (2013)	NO	NO	NO	NO	NO	NO	NO	NO
Year 7 (2014)	NO	NO	NO	NO	NO	NO	NO	NO
Year 8 (2015)	NO	NO	NO	NO	NO	NO	NO	NO
Total	NO	NO	NO	NO	NO	NO	NO	NO

Table 5 (c). Summary information on retirement

Year	Retirement					
	Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs
Year 1 (2008)	NO	NO	NO	NO	NO	NO
Year 2 (2009)	NO	NO	NO	NO	NO	NO
Year 3 (2010)	NO	NO	NO	NO	NO	NO
Year 4 (2011)	NO	NO	NO	NO	NO	NO
Year 5 (2012)	NO	NO	NO	NO	NO	NO
Year 6 (2013)	NO	NO	NO	NO	NO	NO
Year 7 (2014)	NO	NO	NO	NO	NO	NO
Year 8 (2015)	NO	NO	NO	NO	NO	NO
Total	NO	NO	NO	NO	NO	NO

Party Croatia
 Submission year 2014
 Reported year 2013
 Commitment period 1

Table 6 (a). Memo item: Corrective transactions relating to additions and subtractions

	Additions						Subtractions					
	Unit type						Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs	AAUs	ERUs	RMUs	CERs	tCERs	ICERs

Table 6 (b). Memo item: Corrective transactions relating to replacement

	Requirement for replacement		Replacement					
	Unit type		Unit type					
	tCERs	ICERs	AAUs	ERUs	RMUs	CERs	tCERs	ICERs

Table 6 (c). Memo item: Corrective transactions relating to retirement

	Retirement					
	Unit type					
	AAUs	ERUs	RMUs	CERs	tCERs	ICERs

No problems found!

ANNEX 7

GHG EMISSION TREND

Table A7-1: GHG emission in Croatia, Base year

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Base year	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	20582.79	69.13	1451.68	0.37	114.52	NO	22148.99	70.71
A. Fuel Comb (Sectoral Appr.)	20166.84	9.61	201.74	0.55	114.52	NO	20483.11	65.40
1. Energy Industries	7126.54	0.17	3.61	0.07	13.80	NO	7143.95	22.81
2. Man. Ind. and Constr.	5447.30	0.48	10.08	0.09	17.96	NO	5475.33	17.48
3. Transport	3987.25	1.55	32.56	0.24	50.17	NO	4069.97	12.99
4. Comm./Inst, Resid., Agric.	3605.76	7.40	155.50	0.16	32.59	NO	3793.85	12.11
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	415.95	59.52	1249.94	NO	NO	NO	1665.89	5.32
1. Solid Fuels	NO	NO	48.76	NO	NO	NO	48.76	NO
2. Oil and Natural Gas	415.95	57.20	1201.18	NO	NO	NO	1617.13	5.16
2. Industrial Processes	2417.36	0.78	16.45	2.59	804.08	947.58	4185.46	13.36
A. Mineral Products	1315.38	NE,NO	NE,NO	NE,NO	NE,NO	NO	1315.38	4.20
B. Chemical Industry	870.99	16.45	16.45	2.59	804.08	NO	1691.52	5.40
C. Metal Production	230.99	NE,NO	NE,NO	NO	NO	936.56	1167.56	3.73
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	11.01	11.01	0.04
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	80.21	NO	NO	NE	NE	NO	80.21	0.26
4. Agriculture	NO	69.42	1457.81	9.26	2870.60	NO	4328.40	13.82
A. Enteric Fermentation	NO	58.54	1229.36	0.00	0.00	NO	1229.36	3.92
B. Manure Management	NO	10.88	228.44	1.22	378.74	NO	607.18	1.94
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NO	NO	8.04	2491.86	NO	2491.86	7.96
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NE,NO	NE,NO	NE,NO	NE,NO	NO	NE,NO	NE,NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-4184.93	0.00	0.01	0.00	0.00	NO	-4184.92	-13.36
A. Forest Land	-4184.93	0.00	0.01	0.00	0.00	NO	-4184.92	-13.36
B. Cropland	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NO	NE,NO	NO
C. Grassland	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NO	NE,NO	NO
D. Wetlands	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NO	NE,NO	NO
E. Settlements	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NO	NE,NO	NO
F. Other Land	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NO	NE,NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.09	23.81	499.94	0.25	78.69	NO	578.72	1.85
A. Solid Waste Disp. on Land	NE,NO	10.53	221.21	0.00	0.00	NO	221.21	0.71
B. Waste-water Handling	0.00	13.27	278.73	0.25	78.69	NO	357.42	1.14
C. Waste Incineration	0.09	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.09	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	18895.52	163.14	3425.89	12.48	3867.89	947.58	27136.87	86.64
Total Emissions without LUCF	23080.45	163.14	3425.89	12.48	3867.89	947.58	31321.79	100.0
Share of Gases in Total Em./Rem.	69.63		12.62		14.25		100.00	
Share of Gases in Total Emissions	73.69		10.94		12.35		100.00	
Memo Items:								
International Bunkers	451.83	0.01	0.20	0.01	3.28	NO	455.31	
Aviation	343.29	0.00	0.05	0.01	3.01	NO	346.35	
Marine	108.54	0.01	0.15	0.00	0.27	NO	108.96	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	2,436.76	NO	NO	NO	NO	NO	2436.76	

Table A7-1: GHG emission in Croatia, 1990

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1990	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	21234.20	69.31	1455.51	0.35	107.40	NO	22797.11	71.29
A. Fuel Comb (Sectoral Appr.)	20594.38	9.74	204.48	0.51	106.73	NO	20905.59	65.38
1. Energy Industries	7126.54	0.17	3.61	0.06	13.63	NO	7143.78	22.34
2. Man. Ind. and Constr.	5842.92	0.52	10.83	0.09	18.18	NO	5871.93	18.36
3. Transport	4019.17	1.64	34.54	0.20	42.33	NO	4096.03	12.81
4. Comm./Inst, Resid., Agric.	3605.76	7.40	155.50	0.16	32.59	NO	3793.85	11.86
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	639.82	59.57	1251.03	0.67	0.67	NO	1891.52	5.92
1. Solid Fuels	NO	NO	48.76	NO	NO	NO	48.76	NO
2. Oil and Natural Gas	639.82	57.25	1202.28	0.67	0.67	NO	1842.76	5.76
2. Industrial Processes	2023.07	0.68	14.27	2.53	784.64	947.52	3769.49	11.79
A. Mineral Products	1305.40	NE,NO	NE,NO	NE,NO	NE,NO	NO	1305.40	4.08
B. Chemical Industry	466.01	14.27	14.27	2.53	784.64	NO	1264.92	3.96
C. Metal Production	251.65	NE,NO	NE,NO	NO	NO	936.56	1188.22	3.72
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	10.95	10.95	0.03
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	82.26	NO	NO	0.11	34.72	NO	116.98	0.37
4. Agriculture	NO	80.98	1700.61	9.62	2982.09	NO	4682.71	14.64
A. Enteric Fermentation	NO	68.72	1443.12	0.00	0.00	NO	1443.12	4.51
B. Manure Management	NO	12.26	257.50	1.45	450.76	NO	708.26	2.21
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	8.17	2531.34	NO	2531.34	7.92
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NE,NO	NE,NO	NE,NO	NE,NO	NO	NE,NO	NE,NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-7187.90	0.07	1.52	0.02	5.27	NO	-7181.12	-22.46
A. Forest Land	-7572.85	0.07	1.42	0.00	0.33	NO	-7571.10	-23.68
B. Cropland	235.30	NO	NO	4.86	4.86	NO	240.15	NO
C. Grassland	-120.66	0.10	0.10	0.09	0.09	NO	-120.47	NO
D. Wetlands	30.00	NO	NO	NO	NO	NO	30.00	NO
E. Settlements	240.31	NO	NO	NO	NO	NO	240.31	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	25.05	526.15	0.27	84.57	NO	610.76	1.91
A. Solid Waste Disp. on Land	NA,NO	11.55	242.62	0.00	0.00	NO	242.62	0.76
B. Waste-water Handling	0.00	13.50	283.52	0.27	84.57	NO	368.09	1.15
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	16151.66	176.10	3698.07	12.79	3963.97	947.52	24795.93	77.54
Total Emissions without LUCF	23339.56	176.03	3698.07	12.79	3963.97	947.52	31977.05	100.0
Share of Gases in Total Em./Rem.	65.14		14.91		15.99		100.00	
Share of Gases in Total Emissions	72.99		11.56		12.40		100.00	
Memo Items:								
International Bunkers	451.83	0.01	0.20	0.01	3.28	NO	455.31	
Aviation	343.29	0.00	0.05	0.01	3.01	NO	346.35	
Marine	108.54	0.01	0.15	0.00	0.27	NO	108.96	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	2,436.76	NO	NO	NO	NO	NO	2436.76	

Table A7-1: GHG emission in Croatia, 1991

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1991	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	15722.62	62.20	1306.10	0.24	74.43	NO	17103.15	67.50
A. Fuel Comb (Sectoral Appr.)	15103.80	6.42	134.79	0.35	73.95	NO	15312.54	60.43
1. Energy Industries	4768.18	0.11	2.27	0.04	9.03	NO	4779.47	18.86
2. Man. Ind. and Constr.	4344.22	0.41	8.58	0.06	13.36	NO	4366.16	17.23
3. Transport	2955.54	1.24	26.05	0.14	29.78	NO	3011.38	11.88
4. Comm./Inst, Resid., Agric.	3035.86	4.66	97.89	0.10	21.77	NO	3155.53	12.45
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	618.81	55.78	1171.31	0.49	0.49	NO	1790.61	7.07
1. Solid Fuels	NO	NO	43.45	NO	NO	NO	43.45	NO
2. Oil and Natural Gas	618.81	53.71	1127.85	0.49	0.49	NO	1747.16	6.90
2. Industrial Processes	1553.10	0.45	9.55	2.22	689.47	653.27	2905.39	11.47
A. Mineral Products	872.59	NE,NO	NE,NO	NE,NO	NE,NO	NO	872.59	3.44
B. Chemical Industry	447.00	9.55	9.55	2.22	689.47	NO	1146.02	4.52
C. Metal Production	233.51	NE,NO	NE,NO	NO	NO	642.44	875.96	3.46
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	10.83	10.83	0.04
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	85.68	NO	NO	0.11	34.72	NO	120.40	0.48
4. Agriculture	NO	77.72	1632.08	9.56	2963.37	NO	4595.46	18.14
A. Enteric Fermentation	NO	65.58	1377.22	0.00	0.00	NO	1377.22	5.44
B. Manure Management	NO	12.14	254.87	1.43	443.46	NO	698.33	2.76
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	8.13	2519.91	NO	2519.91	9.94
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8893.94	0.19	3.97	0.02	5.70	NO	-8884.27	-35.06
A. Forest Land	-9316.25	0.18	3.81	0.00	0.87	NO	-9311.57	-36.75
B. Cropland	231.56	NO	NO	4.69	4.69	NO	236.24	NO
C. Grassland	-90.15	0.16	0.16	0.14	0.14	NO	-89.85	NO
D. Wetlands	30.17	NO	NO	NO	NO	NO	30.17	NO
E. Settlements	250.75	NO	NO	NO	NO	NO	250.75	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	25.52	535.88	0.25	78.91	NO	614.83	2.43
A. Solid Waste Disp. on Land	NA,NO	12.09	253.95	0.00	0.00	NO	253.95	1.00
B. Waste-water Handling	0.00	13.43	281.93	0.25	78.91	NO	360.84	1.42
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	8467.50	166.08	3487.58	12.30	3811.89	653.27	16454.96	64.94
Total Emissions without LUCF	17361.43	165.89	3487.58	12.30	3811.89	653.27	25339.23	100.0
Share of Gases in Total Em./Rem.	51.46		21.19		23.17		100.00	
Share of Gases in Total Emissions	68.52		13.76		15.04		100.00	
Memo Items:								
International Bunkers	139.53	0.01	0.11	0.00	0.77	NO	140.41	
Aviation	68.19	0.00	0.01	0.00	0.60	NO	68.80	
Marine	71.34	0.00	0.10	0.00	0.18	NO	71.61	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,680.37	NO	NO	NO	NO	NO	1680.37	

Table A7-1: GHG emission in Croatia, 1992

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1992	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	15038.74	60.97	1280.32	0.22	66.77	NO	16385.82	69.15
A. Fuel Comb (Sectoral Appr.)	14413.28	5.26	110.41	0.32	66.33	NO	14590.02	61.57
1. Energy Industries	5338.81	0.11	2.35	0.05	9.79	NO	5350.95	22.58
2. Man. Ind. and Constr.	3680.56	0.35	7.39	0.05	10.30	NO	3698.25	15.61
3. Transport	2844.76	1.10	23.18	0.13	27.81	NO	2895.75	12.22
4. Comm./Inst, Resid., Agric.	2549.15	3.69	77.50	0.09	18.43	NO	2645.07	11.16
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	625.45	55.71	1169.91	0.44	0.44	NO	1795.80	7.58
1. Solid Fuels	NO	NO	33.77	NO	NO	NO	33.77	NO
2. Oil and Natural Gas	625.45	54.10	1136.14	0.44	0.44	NO	1762.03	7.44
2. Industrial Processes	1609.20	0.39	8.19	2.90	900.06	10.92	2528.37	10.67
A. Mineral Products	938.99	NE,NO	NE,NO	NE,NO	NE,NO	NO	938.99	3.96
B. Chemical Industry	575.22	8.19	8.19	2.90	900.06	NO	1483.47	6.26
C. Metal Production	94.99	NE,NO	NE,NO	NO	NO	NO	94.99	0.40
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	10.92	10.92	0.05
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	66.86	NO	NO	0.11	34.72	NO	101.58	0.43
4. Agriculture	NO	65.02	1365.46	8.68	2692.24	NO	4057.69	17.12
A. Enteric Fermentation	NO	55.53	1166.17	0.00	0.00	NO	1166.17	4.92
B. Manure Management	NO	9.49	199.29	1.21	373.65	NO	572.94	2.42
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.48	2318.58	NO	2318.58	9.78
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9140.10	0.89	18.63	0.03	9.69	NO	-9111.77	-38.45
A. Forest Land	-9567.15	0.82	17.31	0.01	3.96	NO	-9545.88	-40.28
B. Cropland	221.14	NO	NO	4.52	4.52	NO	225.66	NO
C. Grassland	-77.09	1.32	1.32	1.22	1.22	NO	-74.55	NO
D. Wetlands	31.89	NO	NO	NO	NO	NO	31.89	NO
E. Settlements	251.11	NO	NO	NO	NO	NO	251.11	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	25.98	545.57	0.25	78.46	NO	624.07	2.63
A. Solid Waste Disp. on Land	NA,NO	12.63	265.23	0.00	0.00	NO	265.23	1.12
B. Waste-water Handling	0.00	13.35	280.34	0.25	78.46	NO	358.80	1.51
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	7574.73	153.25	3218.16	12.09	3747.23	10.92	14585.76	61.55
Total Emissions without LUCF	16714.83	152.36	3218.16	12.09	3747.23	10.92	23697.54	100.0
Share of Gases in Total Em./Rem.	51.93		22.06		25.69		100.00	
Share of Gases in Total Emissions	70.53		13.58		15.81		100.00	
Memo Items:								
International Bunkers	137.25	0.01	0.12	0.00	0.70	NO	138.1	
Aviation	56.62	0.00	0.01	0.00	0.50	NO	57.1	
Marine	80.62	0.01	0.11	0.00	0.20	NO	80.9	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,459.04	NO	NO	NO	NO	NO	1459.0	

Table A7-1: GHG emission in Croatia, 1993

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1993	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	15805.79	67.16	1410.41	0.24	74.79	NO	17290.99	72.65
A. Fuel Comb (Sectoral Appr.)	14981.19	4.99	104.81	0.35	74.35	NO	15160.35	63.70
1. Energy Industries	5918.93	0.14	2.93	0.05	10.07	NO	5931.93	24.92
2. Man. Ind. and Constr.	3515.57	0.34	7.04	0.05	9.82	NO	3532.42	14.84
3. Transport	3015.49	1.08	22.78	0.18	37.06	NO	3075.32	12.92
4. Comm./Inst, Resid., Agric.	2531.21	3.43	72.06	0.08	17.40	NO	2620.67	11.01
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	824.60	62.17	1305.59	0.45	0.45	NO	2130.64	8.95
1. Solid Fuels	NO	NO	32.31	NO	NO	NO	32.31	NO
2. Oil and Natural Gas	824.60	60.63	1273.29	0.45	0.45	NO	2098.33	8.82
2. Industrial Processes	1290.66	0.43	9.04	2.19	678.48	11.04	1989.22	8.36
A. Mineral Products	805.09	NE,NO	NE,NO	NE,NO	NE,NO	NO	805.09	3.38
B. Chemical Industry	446.83	9.04	9.04	2.19	678.48	NO	1134.35	4.77
C. Metal Production	38.74	NE,NO	NE,NO	NO	NO	NO	38.74	0.16
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	11.04	11.04	0.05
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	74.02	NO	NO	0.11	34.72	NO	108.74	0.46
4. Agriculture	NO	65.84	1382.67	7.73	2395.81	NO	3778.49	15.88
A. Enteric Fermentation	NO	56.05	1176.98	0.00	0.00	NO	1176.98	4.95
B. Manure Management	NO	9.79	205.69	1.21	375.17	NO	580.86	2.44
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.52	2020.65	NO	2020.65	8.49
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9254.69	2.05	43.02	0.05	15.15	NO	-9196.51	-38.64
A. Forest Land	-9638.88	1.98	41.63	0.03	9.52	NO	-9587.72	-40.28
B. Cropland	233.16	NO	NO	4.35	4.35	NO	237.51	NO
C. Grassland	-91.14	1.39	1.39	1.28	1.28	NO	-88.48	NO
D. Wetlands	33.60	NO	NO	NO	NO	NO	33.60	NO
E. Settlements	208.57	NO	NO	NO	NO	NO	208.57	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	26.47	555.90	0.25	77.64	NO	633.58	2.66
A. Solid Waste Disp. on Land	NA,NO	13.20	277.15	0.00	0.00	NO	277.15	1.16
B. Waste-water Handling	0.00	13.27	278.75	0.25	77.64	NO	356.38	1.50
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	7915.82	161.95	3401.04	10.46	3241.87	11.04	14604.49	61.36
Total Emissions without LUCF	17170.51	159.91	3401.04	10.46	3241.87	11.04	23801.01	100.0
Share of Gases in Total Em./Rem.	54.20		23.29		22.20		100.00	
Share of Gases in Total Emissions	72.14		14.29		13.62		100.00	
Memo Items:								
International Bunkers	253.72	0.01	0.18	0.00	1.50	NO	255.40	
Aviation	139.18	0.00	0.02	0.00	1.22	NO	140.42	
Marine	114.54	0.01	0.16	0.00	0.28	NO	114.98	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,388.13	NO	NO	NO	NO	NO	1388.13	

Table A7-1: GHG emission in Croatia, 1994

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1994	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	14958.48	60.80	1276.72	0.25	76.41	NO	16311.61	71.04
A. Fuel Comb (Sectoral Appr.)	14218.56	5.25	110.27	0.36	76.01	NO	14404.84	62.74
1. Energy Industries	4671.23	0.12	2.48	0.04	7.45	NO	4681.17	20.39
2. Man. Ind. and Constr.	3700.16	0.33	6.88	0.04	9.25	NO	3716.28	16.19
3. Transport	3231.38	1.18	24.80	0.19	40.73	NO	3296.90	14.36
4. Comm./Inst, Resid., Agric.	2615.80	3.62	76.11	0.09	18.58	NO	2710.49	11.80
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	739.92	55.55	1166.45	0.41	0.41	NO	1906.77	8.30
1. Solid Fuels	NO	NO	28.97	NO	NO	NO	28.97	NO
2. Oil and Natural Gas	739.92	54.17	1137.48	0.41	0.41	NO	1877.80	8.18
2. Industrial Processes	1464.00	0.41	8.69	2.37	734.70	11.16	2218.54	9.66
A. Mineral Products	976.80	NE,NO	NE,NO	NE,NO	NE,NO	NO	976.80	4.25
B. Chemical Industry	450.03	8.69	8.69	2.37	734.70	NO	1193.42	5.20
C. Metal Production	37.17	NE,NO	NE,NO	NO	NO	NO	37.17	0.16
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	11.16	11.16	0.05
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	75.80	NO	NO	0.11	34.72	NO	110.52	0.48
4. Agriculture	NO	60.55	1271.45	7.74	2399.51	NO	3670.96	15.99
A. Enteric Fermentation	NO	50.81	1067.04	0.00	0.00	NO	1067.04	4.65
B. Manure Management	NO	9.73	204.41	1.20	370.92	NO	575.32	2.51
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.54	2028.60	NO	2028.60	8.83
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9370.37	0.68	14.28	0.03	7.94	NO	-9348.15	-40.71
A. Forest Land	-9765.77	0.65	13.55	0.01	3.10	NO	-9749.11	-42.46
B. Cropland	247.47	NO	NO	4.18	4.18	NO	251.65	NO
C. Grassland	-95.90	0.72	0.72	0.67	0.67	NO	-94.51	NO
D. Wetlands	35.32	NO	NO	NO	NO	NO	35.32	NO
E. Settlements	208.50	NO	NO	NO	NO	NO	208.50	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	27.13	569.76	0.26	79.62	NO	649.43	2.83
A. Solid Waste Disp. on Land	NA,NO	13.82	290.13	0.00	0.00	NO	290.13	1.26
B. Waste-water Handling	0.00	13.32	279.63	0.26	79.62	NO	359.25	1.56
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	7127.95	149.57	3140.89	10.64	3298.19	11.16	13612.91	59.29
Total Emissions without LUCF	16498.33	148.89	3140.89	10.64	3298.19	11.16	22961.07	100.0
Share of Gases in Total Em./Rem.	52.36		23.07		24.23		100.00	
Share of Gases in Total Emissions	71.85		13.68		14.36		100.00	
Memo Items:								
International Bunkers	326.50	0.01	0.22	0.01	1.99	NO	328.71	
Aviation	188.18	0.00	0.03	0.01	1.65	NO	189.85	
Marine	138.33	0.01	0.19	0.00	0.34	NO	138.86	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,403.18	NO	NO	NO	NO	NO	1403.18	

Table A7-1: GHG emission in Croatia, 1995

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1995	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	15905.02	61.26	1286.39	0.23	72.79	NO	17264.19	73.33
A. Fuel Comb (Sectoral Appr.)	15035.54	5.41	113.56	0.34	72.40	NO	15221.50	64.65
1. Energy Industries	5262.45	0.14	2.93	0.05	9.58	NO	5274.96	22.40
2. Man. Ind. and Constr.	3540.91	0.32	6.71	0.04	9.13	NO	3556.75	15.11
3. Transport	3406.63	1.23	25.92	0.16	34.61	NO	3467.15	14.73
4. Comm./Inst, Resid., Agric.	2825.55	3.71	78.00	0.09	19.09	NO	2922.64	12.41
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	869.47	55.85	1172.83	0.39	0.39	NO	2042.70	8.68
1. Solid Fuels	NO	NO	23.07	NO	NO	NO	23.07	NO
2. Oil and Natural Gas	869.47	54.75	1149.76	0.39	0.39	NO	2019.62	8.58
2. Industrial Processes	1235.08	0.33	6.99	2.27	705.17	61.02	2008.26	8.53
A. Mineral Products	760.19	NE,NO	NE,NO	NE,NO	NE,NO	NO	760.19	3.23
B. Chemical Industry	438.77	6.99	6.99	2.27	705.17	NO	1150.93	4.89
C. Metal Production	36.12	NE,NO	NE,NO	NO	NO	NO	36.12	0.15
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	61.02	61.02	0.26
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	73.62	NO	NO	0.11	34.72	NO	108.34	0.46
4. Agriculture	NO	57.70	1211.73	7.37	2284.31	NO	3496.04	14.85
A. Enteric Fermentation	NO	48.84	1025.72	0.00	0.00	NO	1025.72	4.36
B. Manure Management	NO	8.86	186.01	1.11	344.07	NO	530.09	2.25
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.26	1940.24	NO	1940.24	8.24
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9848.79	0.45	9.37	0.02	6.47	NO	-9832.95	-41.76
A. Forest Land	10284.31	0.42	8.92	0.01	2.04	NO	10273.35	-43.63
B. Cropland	206.36	NO	NO	4.01	4.01	NO	210.37	NO
C. Grassland	-78.59	0.45	0.45	0.42	0.42	NO	-77.72	NO
D. Wetlands	37.04	NO	NO	NO	NO	NO	37.04	NO
E. Settlements	270.71	NO	NO	NO	NO	NO	270.71	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	27.70	581.72	0.28	85.67	NO	667.44	2.83
A. Solid Waste Disp. on Land	NA,NO	14.54	305.26	0.00	0.00	NO	305.26	1.30
B. Waste-water Handling	0.00	13.17	276.47	0.28	85.67	NO	362.14	1.54
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	7364.97	147.44	3096.20	10.18	3154.41	61.02	13711.33	58.24
Total Emissions without LUCF	17213.76	146.99	3096.20	10.18	3154.41	61.02	23544.28	100.0
Share of Gases in Total Em./Rem.	53.71		22.58		23.01		100.00	
Share of Gases in Total Emissions	73.11		13.15		13.40		100.00	
Memo Items:								
International Bunkers	288.76	0.01	0.17	0.01	1.89	NO	290.82	
Aviation	186.75	0.00	0.03	0.01	1.64	NO	188.42	
Marine	102.01	0.01	0.14	0.00	0.25	NO	102.40	
Multilateral Operations	C	C	C	C	C	NO	C	
CO₂ Emissions from Biomass	1,452.60	NO	NO	NO	NO	NO	1452.60	

Table A7-1: GHG emission in Croatia, 1996

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1996	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	16418.15	61.92	1300.33	0.34	104.78	NO	17823.3	73.66
A. Fuel Comb (Sectoral Appr.)	15574.86	6.32	132.74	0.50	104.39	NO	15812.0	65.35
1. Energy Industries	5110.49	0.13	2.80	0.04	8.83	NO	5122.1	21.17
2. Man. Ind. and Constr.	3507.98	0.31	6.58	0.04	9.06	NO	3523.6	14.56
3. Transport	3727.34	1.33	27.94	0.30	63.48	NO	3818.8	15.78
4. Comm./Inst, Resid., Agric.	3229.05	4.54	95.42	0.11	23.03	NO	3347.5	13.84
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	843.29	55.60	1167.59	0.38	0.38	NO	2011.3	8.31
1. Solid Fuels	NO	NO	18.61	NO	NO	NO	18.6	NO
2. Oil and Natural Gas	843.29	54.71	1148.98	0.38	0.38	NO	1992.7	8.24
2. Industrial Processes	1339.67	0.31	6.58	2.12	657.17	80.45	2083.9	8.61
A. Mineral Products	844.80	NE,NO	NE,NO	NE,NO	NE,NO	NO	844.8	3.49
B. Chemical Industry	476.59	6.58	6.58	2.12	657.17	NO	1140.4	4.71
C. Metal Production	18.28	NE,NO	NE,NO	NO	NO	NO	18.3	0.08
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	80.45	80.4	0.33
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	87.50	NO	NO	0.11	34.72	NO	122.2	0.51
4. Agriculture	NO	55.90	1173.88	7.48	2317.46	NO	3491.3	14.43
A. Enteric Fermentation	NO	47.16	990.41	0.00	0.00	NO	990.4	4.09
B. Manure Management	NO	8.74	183.46	1.08	336.34	NO	519.8	2.15
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.39	1981.13	NO	1981.1	8.19
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr.	NO	NO	NO	NO	NO	NO	NO	NO
Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9608.94	0.97	20.43	0.03	9.36	NO	-9579.2	-39.59
A. Forest Land	10019.30	0.92	19.22	0.01	4.39	NO	-9995.7	-41.31
B. Cropland	226.36	NO	NO	3.84	3.84	NO	230.2	NO
C. Grassland	-95.95	1.22	1.22	1.12	1.12	NO	-93.6	NO
D. Wetlands	38.76	NO	NO	NO	NO	NO	38.8	NO
E. Settlements	241.19	NO	NO	NO	NO	NO	241.2	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	28.27	593.70	0.26	81.19	NO	674.9	2.79
A. Solid Waste Disp. on Land	NA,NO	15.32	321.80	0.00	0.00	NO	321.8	1.33
B. Waste-water Handling	0.00	12.95	271.90	0.26	81.19	NO	353.1	1.46
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.0	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	8236.42	147.38	3094.92	10.23	3169.95	80.45	14616.5	60.41
Total Emissions without LUCF	17845.37	146.40	3094.92	10.23	3169.95	80.45	24195.6	100.0
Share of Gases in Total Em./Rem.	56.35		21.17		21.69		100.0	
Share of Gases in Total Emissions	73.75		12.79		13.10		100.0	
Memo Items:								
International Bunkers	290.93	0.01	0.19	0.01	1.83	NO	292.9	
Aviation	176.02	0.00	0.03	0.00	1.54	NO	177.6	
Marine	114.91	0.01	0.16	0.00	0.28	NO	115.4	
Multilateral Operations	C	C	C	C	C	NO	C	
CO₂ Emissions from Biomass	1,734.09	NO	NO	NO	NO	NO	1734.1	

Table A7-1: GHG emission in Croatia, 1997

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1997	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	17340.20	64.99	1364.77	0.37	115.78	NO	18820.75	73.40
A. Fuel Comb (Sectoral Appr.)	16544.73	6.38	134.07	0.55	115.40	NO	16794.19	65.50
1. Energy Industries	5593.57	0.12	2.62	0.05	10.65	NO	5606.84	21.87
2. Man. Ind. and Constr.	3594.79	0.34	7.24	0.05	9.74	NO	3611.77	14.09
3. Transport	4076.12	1.41	29.54	0.34	72.06	NO	4177.72	16.29
4. Comm./Inst, Resid., Agric.	3280.24	4.51	94.67	0.11	22.95	NO	3397.86	13.25
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	795.48	58.61	1230.71	0.39	0.39	NO	2026.57	7.90
1. Solid Fuels	NO	NO	13.61	NO	NO	NO	13.61	NO
2. Oil and Natural Gas	795.48	57.96	1217.09	0.39	0.39	NO	2012.95	7.85
2. Industrial Processes	1519.86	0.28	5.81	2.23	691.85	102.85	2320.37	9.05
A. Mineral Products	954.43	NE,NO	NE,NO	NE,NO	NE,NO	NO	954.43	3.72
B. Chemical Industry	517.83	5.81	5.81	2.23	691.85	NO	1215.48	4.74
C. Metal Production	47.61	NE,NO	NE,NO	NO	NO	NO	47.61	0.19
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	102.85	102.85	0.40
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	78.52	NO	NO	0.11	34.72	NO	113.24	0.44
4. Agriculture	NO	54.39	1142.09	8.23	2550.03	NO	3692.12	14.40
A. Enteric Fermentation	NO	45.85	962.85	0.00	0.00	NO	962.85	3.76
B. Manure Management	NO	8.53	179.23	1.05	326.55	NO	505.79	1.97
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.17	2223.48	NO	2223.48	8.67
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9020.85	1.04	21.84	0.03	9.49	NO	-8989.53	-35.06
A. Forest Land	-9443.44	0.98	20.65	0.02	4.72	NO	-9418.07	-36.73
B. Cropland	243.47	NO	NO	3.67	3.67	NO	247.14	NO
C. Grassland	-104.68	1.19	1.19	1.09	1.09	NO	-102.40	NO
D. Wetlands	40.47	NO	NO	NO	NO	NO	40.47	NO
E. Settlements	243.32	NO	NO	NO	NO	NO	243.32	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	29.20	613.11	0.26	81.56	NO	694.72	2.71
A. Solid Waste Disp. on Land	NA,NO	16.20	340.30	0.00	0.00	NO	340.30	1.33
B. Waste-water Handling	0.00	12.99	272.81	0.26	81.56	NO	354.37	1.38
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	9917.77	149.89	3147.62	11.12	3448.71	102.85	16651.67	64.94
Total Emissions without LUCF	18938.63	148.85	3147.62	11.12	3448.71	102.85	25641.20	100.0
Share of Gases in Total Em./Rem.	59.56		18.90		20.71		100.00	
Share of Gases in Total Emissions	73.86		12.28		13.45		100.00	
Memo Items:								
International Bunkers	263.80	0.01	0.13	0.01	1.85	NO	265.78	
Aviation	190.17	0.00	0.03	0.01	1.67	NO	191.87	
Marine	73.63	0.00	0.10	0.00	0.18	NO	73.92	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,793.72	NO	NO	NO	NO	NO	1793.72	

Table A7-1: GHG emission in Croatia, 1998

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1998	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	18111.55	57.29	1203.14	0.30	92.46	NO	19407.16	75.45
A. Fuel Comb (Sectoral Appr.)	17403.43	6.16	129.41	0.44	92.11	NO	17624.95	68.52
1. Energy Industries	6272.23	0.14	2.88	0.06	11.67	NO	6286.78	24.44
2. Man. Ind. and Constr.	3770.72	0.34	7.10	0.05	9.85	NO	3787.68	14.73
3. Transport	4219.28	1.45	30.39	0.23	49.13	NO	4298.80	16.71
4. Comm./Inst, Resid., Agric.	3141.20	4.24	89.03	0.10	21.45	NO	3251.69	12.64
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	708.12	51.13	1073.73	0.36	0.36	NO	1782.21	6.93
1. Solid Fuels	NO	NO	14.26	NO	NO	NO	14.26	NO
2. Oil and Natural Gas	708.12	50.45	1059.47	0.36	0.36	NO	1767.95	6.87
2. Industrial Processes	1445.57	0.28	5.83	1.68	520.84	130.76	2103.00	8.18
A. Mineral Products	1027.78	NE,NO	NE,NO	NE,NO	NE,NO	NO	1027.78	4.00
B. Chemical Industry	388.43	5.83	5.83	1.68	520.84	NO	915.10	3.56
C. Metal Production	29.36	NE,NO	NE,NO	NO	NO	NO	29.36	0.11
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	130.76	130.76	0.51
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	76.87	NO	NO	0.11	34.72	NO	111.59	0.43
4. Agriculture	NO	52.89	1110.62	7.36	2280.76	NO	3391.39	13.19
A. Enteric Fermentation	NO	44.56	935.77	0.00	0.00	NO	935.77	3.64
B. Manure Management	NO	8.33	174.85	1.02	317.07	NO	491.92	1.91
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.33	1963.70	NO	1963.70	7.63
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8687.25	2.63	55.17	0.06	19.33	NO	-8612.75	-33.49
A. Forest Land	-9136.27	2.41	50.54	0.04	11.56	NO	-9074.18	-35.28
B. Cropland	256.21	NO	NO	3.50	3.50	NO	259.71	NO
C. Grassland	-109.26	4.63	4.63	4.27	4.27	NO	-100.35	NO
D. Wetlands	42.19	NO	NO	NO	NO	NO	42.19	NO
E. Settlements	259.88	NO	NO	NO	NO	NO	259.88	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	29.90	627.99	0.26	79.52	NO	707.55	2.75
A. Solid Waste Disp. on Land	NA,NO	17.13	359.75	0.00	0.00	NO	359.75	1.40
B. Waste-water Handling	0.00	12.77	268.24	0.26	79.52	NO	347.76	1.35
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	10946.78	142.99	3002.75	9.65	2992.92	130.76	17107.93	66.51
Total Emissions without LUCF	19634.03	140.36	3002.75	9.65	2992.92	130.76	25720.68	100.0
Share of Gases in Total Em./Rem.	63.99		17.55		17.49		100.00	
Share of Gases in Total Emissions	76.34		11.67		11.64		100.00	
Memo Items:								
International Bunkers	287.83	0.01	0.14	0.01	2.01	NO	289.98	
Aviation	206.83	0.00	0.03	0.01	1.81	NO	208.67	
Marine	81.00	0.01	0.11	0.00	0.20	NO	81.31	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,678.97	NO	NO	NO	NO	NO	1678.97	

Table A7-1: GHG emission in Croatia, 1999

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 1999	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	18667.88	56.12	1178.53	0.45	138.27	NO	19984.68	74.04
A. Fuel Comb (Sectoral Appr.)	17976.44	5.92	124.39	0.66	137.93	NO	18238.77	67.58
1. Energy Industries	6467.65	0.14	2.94	0.06	11.81	NO	6482.41	24.02
2. Man. Ind. and Constr.	3506.30	0.30	6.26	0.04	8.37	NO	3520.93	13.05
3. Transport	4453.32	1.48	31.00	0.46	96.75	NO	4581.08	16.97
4. Comm./Inst, Resid., Agric.	3549.17	4.01	84.19	0.10	20.99	NO	3654.36	13.54
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	691.44	50.20	1054.14	0.34	0.34	NO	1745.91	6.47
1. Solid Fuels	NO	NO	4.29	NO	NO	NO	4.29	NO
2. Oil and Natural Gas	691.44	49.99	1049.85	0.34	0.34	NO	1741.62	6.45
2. Industrial Processes	1805.89	0.25	5.17	1.98	613.98	155.19	2580.22	9.56
A. Mineral Products	1285.30	NE,NO	NE,NO	NE,NO	NE,NO	NO	1285.30	4.76
B. Chemical Industry	492.14	5.17	5.17	1.98	613.98	NO	1111.29	4.12
C. Metal Production	28.45	NE,NO	NE,NO	NO	NO	NO	28.45	0.11
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	155.19	155.19	0.57
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	71.49	NO	NO	0.11	34.72	NO	106.21	0.39
4. Agriculture	NO	53.16	1116.45	7.95	2464.61	NO	3581.07	13.27
A. Enteric Fermentation	NO	44.07	925.39	0.00	0.00	NO	925.39	3.43
B. Manure Management	NO	9.10	191.06	1.07	333.06	NO	524.12	1.94
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.88	2131.55	NO	2131.55	7.90
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9286.15	0.33	6.85	0.02	5.91	NO	-9273.39	-34.36
A. Forest Land	-9710.06	0.26	5.40	0.00	1.24	NO	-9703.42	-35.95
B. Cropland	243.55	NO	NO	3.33	3.33	NO	246.88	NO
C. Grassland	-112.90	1.45	1.45	1.34	1.34	NO	-110.11	NO
D. Wetlands	43.91	NO	NO	NO	NO	NO	43.91	NO
E. Settlements	249.35	NO	NO	NO	NO	NO	249.35	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	31.07	652.37	0.28	85.38	NO	737.79	2.73
A. Solid Waste Disp. on Land	NA,NO	18.18	381.84	0.00	0.00	NO	381.84	1.41
B. Waste-water Handling	0.00	12.88	270.53	0.28	85.38	NO	355.91	1.32
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	11259.15	140.92	2959.37	10.67	3308.15	155.19	17716.57	65.64
Total Emissions without LUCF	20545.30	140.60	2959.37	10.67	3308.15	155.19	26989.97	100.0
Share of Gases in Total Em./Rem.	63.55		16.70		18.67		100.00	
Share of Gases in Total Emissions	76.12		10.96		12.26		100.00	
Memo Items:								
International Bunkers	263.26	0.01	0.12	0.01	1.89	NO	265.28	
Aviation	197.59	0.00	0.03	0.01	1.73	NO	199.35	
Marine	65.68	0.00	0.09	0.00	0.16	NO	65.94	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,495.79	NO	NO	NO	NO	NO	1495.79	

Table A7-1: GHG emission in Croatia, 2000

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2000	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	18085.92	59.33	1246.01	0.48	150.30	NO	19482.23	73.03
A. Fuel Comb (Sectoral Appr.)	17347.05	6.37	133.72	0.71	149.98	NO	17630.74	66.09
1. Energy Industries	5877.45	0.14	3.00	0.07	14.56	NO	5895.01	22.10
2. Man. Ind. and Constr.	3616.74	0.30	6.40	0.04	8.72	NO	3631.87	13.61
3. Transport	4463.69	1.43	29.94	0.49	103.58	NO	4597.22	17.23
4. Comm./Inst, Resid., Agric.	3389.15	4.49	94.38	0.11	23.11	NO	3506.65	13.14
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	738.88	52.97	1112.30	0.32	0.32	NO	1851.49	6.94
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	738.88	52.97	1112.30	0.32	0.32	NO	1851.49	6.94
2. Industrial Processes	1939.05	0.25	5.23	2.33	721.89	182.86	2849.02	10.68
A. Mineral Products	1423.45	NE,NO	NE,NO	NE,NO	NE,NO	NO	1423.45	5.34
B. Chemical Industry	497.96	5.23	5.23	2.33	721.89	NO	1225.07	4.59
C. Metal Production	17.64	NE,NO	NE,NO	NO	NO	NO	17.64	0.07
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	182.86	182.86	0.69
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	74.50	NO	NO	0.11	34.72	NO	109.22	0.41
4. Agriculture	NO	51.44	1080.32	7.73	2397.68	NO	3478.00	13.04
A. Enteric Fermentation	NO	42.92	901.40	0.00	0.00	NO	901.40	3.38
B. Manure Management	NO	8.52	178.92	1.01	313.22	NO	492.14	1.84
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.72	2084.46	NO	2084.46	7.81
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-7877.52	5.67	119.13	0.12	36.37	NO	-7722.03	-28.94
A. Forest Land	-8393.63	5.26	110.54	0.08	25.28	NO	-8257.82	-30.95
B. Cropland	294.42	NO	NO	3.16	3.16	NO	297.58	NO
C. Grassland	-102.22	8.59	8.59	7.93	7.93	NO	-85.71	NO
D. Wetlands	45.63	NO	NO	NO	NO	NO	45.63	NO
E. Settlements	278.29	NO	NO	NO	NO	NO	278.29	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	32.27	677.66	0.26	82.13	NO	759.83	2.85
A. Solid Waste Disp. on Land	NA,NO	19.24	404.11	0.00	0.00	NO	404.11	1.51
B. Waste-water Handling	0.00	13.03	273.55	0.26	82.13	NO	355.68	1.33
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	12221.99	148.97	3128.34	10.93	3388.37	182.86	18956.28	71.06
Total Emissions without LUCF	20099.51	143.30	3128.34	10.93	3388.37	182.86	26678.30	100.0
Share of Gases in Total Em./Rem.	64.47		16.50		17.87		100.00	
Share of Gases in Total Emissions	75.34		11.73		12.70		100.00	
Memo Items:								
International Bunkers	226.42	0.00	0.10	0.01	1.62	NO	228.15	
Aviation	169.40	0.00	0.03	0.00	1.48	NO	170.91	
Marine	57.02	0.00	0.08	0.00	0.14	NO	57.24	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,680.11	NO	NO	NO	NO	NO	1680.11	

Table A7-1: GHG emission in Croatia, 2001

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2001	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	18905.78	64.37	1351.86	0.46	141.65	NO	20399.29	73.34
A. Fuel Comb (Sectoral Appr.)	18117.22	5.19	108.98	0.67	141.35	NO	18367.55	66.04
1. Energy Industries	6376.36	0.16	3.42	0.07	15.23	NO	6395.01	22.99
2. Man. Ind. and Constr.	3613.71	0.29	6.10	0.04	8.67	NO	3628.47	13.05
3. Transport	4521.46	1.22	25.70	0.47	98.15	NO	4645.32	16.70
4. Comm./Inst, Resid., Agric.	3605.68	3.51	73.76	0.09	19.30	NO	3698.74	13.30
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	788.56	59.18	1242.88	0.31	0.31	NO	2031.74	7.31
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	788.56	59.18	1242.88	0.31	0.31	NO	2031.74	7.31
2. Industrial Processes	2057.10	0.26	5.43	1.95	605.86	205.67	2874.06	10.33
A. Mineral Products	1644.11	NE,NO	NE,NO	NE,NO	NE,NO	NO	1644.11	5.91
B. Chemical Industry	403.70	5.43	5.43	1.95	605.86	NO	1014.99	3.65
C. Metal Production	9.29	NE,NO	NE,NO	NO	NO	NO	9.29	0.03
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	205.67	205.67	0.74
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	77.84	NO	NO	0.11	34.72	NO	112.56	0.40
4. Agriculture	NO	51.69	1085.44	8.27	2562.39	NO	3647.83	13.12
A. Enteric Fermentation	NO	43.12	905.56	0.00	0.00	NO	905.56	3.26
B. Manure Management	NO	8.57	179.89	1.00	309.07	NO	488.95	1.76
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.27	2253.32	NO	2253.32	8.10
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8783.94	1.09	22.94	0.03	10.74	NO	-8750.26	-31.46
A. Forest Land	-9322.11	0.97	20.33	0.01	4.65	NO	-9297.13	-33.43
B. Cropland	322.75	NO	NO	3.69	3.69	NO	326.43	NO
C. Grassland	-140.05	2.61	2.61	2.41	2.41	NO	-135.03	NO
D. Wetlands	36.33	NO	NO	NO	NO	NO	36.33	NO
E. Settlements	319.14	NO	NO	NO	NO	NO	319.14	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	32.98	692.54	0.28	86.60	NO	779.18	2.80
A. Solid Waste Disp. on Land	NA,NO	20.47	429.83	0.00	0.00	NO	429.83	1.55
B. Waste-water Handling	0.00	12.51	262.72	0.28	86.60	NO	349.31	1.26
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	12256.82	150.39	3158.21	10.99	3407.24	205.67	19062.67	68.54
Total Emissions without LUCF	21040.76	149.30	3158.21	10.99	3407.24	205.67	27812.93	100.0
Share of Gases in Total Em./Rem.	64.30		16.57		17.87		100.00	
Share of Gases in Total Emissions	75.65		11.36		12.25		100.00	
Memo Items:								
International Bunkers	258.85	0.01	0.15	0.01	1.71	NO	260.70	
Aviation	169.48	0.00	0.03	0.00	1.48	NO	170.99	
Marine	89.37	0.01	0.13	0.00	0.22	NO	89.71	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,315.01	NO	NO	NO	NO	NO	1315.01	

Table A7-1: GHG emission in Croatia, 2002

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2002	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	20000.72	66.85	1403.86	0.33	102.86	NO	21507.43	74.43
A. Fuel Comb (Sectoral Appr.)	19198.04	5.24	110.02	0.49	102.55	NO	19410.61	67.17
1. Energy Industries	7247.35	0.19	3.94	0.08	17.84	NO	7269.12	25.15
2. Man. Ind. and Constr.	3436.58	0.28	5.86	0.04	8.51	NO	3450.96	11.94
3. Transport	4822.31	1.19	24.89	0.27	56.45	NO	4903.65	16.97
4. Comm./Inst, Resid., Agric.	3691.81	3.59	75.33	0.09	19.75	NO	3786.89	13.10
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	802.67	61.61	1293.84	0.31	0.31	NO	2096.82	7.26
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	802.67	61.61	1293.84	0.31	0.31	NO	2096.82	7.26
2. Industrial Processes	2007.45	0.21	4.49	1.90	589.53	237.70	2839.16	9.82
A. Mineral Products	1638.51	NE,NO	NE,NO	NE,NO	NE,NO	NO	1638.51	5.67
B. Chemical Industry	363.78	4.49	4.49	1.90	589.53	NO	957.79	3.31
C. Metal Production	5.16	NE,NO	NE,NO	NO	NO	NO	5.16	0.02
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	237.70	237.70	0.82
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	102.65	NO	NO	0.11	34.72	NO	137.37	0.48
4. Agriculture	NO	50.65	1063.70	8.19	2538.08	NO	3601.78	12.46
A. Enteric Fermentation	NO	42.00	882.05	0.00	0.00	NO	882.05	3.05
B. Manure Management	NO	8.65	181.65	0.99	308.32	NO	489.96	1.70
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.19	2229.76	NO	2229.76	7.72
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-9011.10	0.37	7.81	0.02	6.47	NO	-8996.82	-31.13
A. Forest Land	-9567.40	0.34	7.13	0.01	1.63	NO	-9558.65	-33.08
B. Cropland	305.38	NO	NO	4.21	4.21	NO	309.59	NO
C. Grassland	-136.51	0.68	0.68	0.63	0.63	NO	-135.19	NO
D. Wetlands	34.40	NO	NO	NO	NO	NO	34.40	NO
E. Settlements	353.04	NO	NO	NO	NO	NO	353.04	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	34.30	720.27	0.30	91.99	NO	812.30	2.81
A. Solid Waste Disp. on Land	NA,NO	21.85	458.90	0.00	0.00	NO	458.90	1.59
B. Waste-water Handling	0.00	12.45	261.38	0.30	91.99	NO	353.36	1.22
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	13099.76	152.39	3200.13	10.74	3328.92	237.70	19901.22	68.87
Total Emissions without LUCF	22110.86	152.02	3200.13	10.74	3328.92	237.70	28898.04	100.0
Share of Gases in Total Em./Rem.	65.82		16.08		16.73		100.00	
Share of Gases in Total Emissions	76.51		11.07		11.52		100.00	
Memo Items:								
International Bunkers	236.22	0.01	0.13	0.01	1.61	NO	237.96	
Aviation	162.99	0.00	0.02	0.00	1.43	NO	164.44	
Marine	73.24	0.00	0.10	0.00	0.18	NO	73.52	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,331.36	NO	NO	NO	NO	NO	1331.36	

Table A7-1: GHG emission in Croatia, 2003

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year2003	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	21384.95	68.34	1435.19	0.36	112.04	NO	22932.18	75.79
A. Fuel Comb (Sectoral Appr.)	20630.83	6.23	130.90	0.53	111.75	NO	20873.47	68.98
1. Energy Industries	7924.83	0.22	4.55	0.09	19.72	NO	7949.10	26.27
2. Man. Ind. and Constr.	3575.58	0.31	6.54	0.05	9.56	NO	3591.68	11.87
3. Transport	5210.32	1.14	23.96	0.28	58.60	NO	5292.88	17.49
4. Comm./Inst, Resid., Agric.	3920.10	4.56	95.85	0.11	23.86	NO	4039.81	13.35
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	754.13	62.11	1304.29	0.29	0.29	NO	2058.71	6.80
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	754.13	62.11	1304.29	0.29	0.29	NO	2058.71	6.80
2. Industrial Processes	2038.26	0.23	4.92	1.80	557.47	275.90	2876.55	9.51
A. Mineral Products	1620.37	NE,NO	NE,NO	NE,NO	NE,NO	NO	1620.37	5.35
B. Chemical Industry	409.38	4.92	4.92	1.80	557.47	NO	971.77	3.21
C. Metal Production	8.51	NE,NO	NE,NO	NO	NO	NO	8.51	0.03
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	275.90	275.90	0.91
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	110.89	NO	NO	0.11	34.72	NO	145.61	0.48
4. Agriculture	NO	51.19	1074.90	7.70	2387.39	NO	3462.29	11.44
A. Enteric Fermentation	NO	42.27	887.64	0.00	0.00	NO	887.64	2.93
B. Manure Management	NO	8.92	187.26	1.00	310.68	NO	497.94	1.65
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.70	2076.71	NO	2076.71	6.86
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8370.43	2.32	48.77	0.06	18.08	NO	-8303.57	-27.44
A. Forest Land	-8914.58	2.17	45.61	0.03	10.43	NO	-8858.53	-29.28
B. Cropland	293.71	NO	NO	4.73	4.73	NO	298.45	NO
C. Grassland	-134.56	3.16	3.16	2.91	2.91	NO	-128.49	NO
D. Wetlands	32.46	NO	NO	NO	NO	NO	32.46	NO
E. Settlements	352.54	NO	NO	NO	NO	NO	352.54	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	35.70	749.78	0.30	92.73	NO	842.55	2.78
A. Solid Waste Disp. on Land	NA,NO	23.39	491.15	0.00	0.00	NO	491.15	1.62
B. Waste-water Handling	0.00	12.32	258.63	0.30	92.73	NO	351.36	1.16
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	15163.71	157.79	3313.57	10.22	3167.71	275.90	21955.61	72.56
Total Emissions without LUCF	23534.14	155.47	3313.57	10.22	3167.71	275.90	30259.18	100.0
Share of Gases in Total Em./Rem.	69.07		15.09		14.43		100.00	
Share of Gases in Total Emissions	77.78		10.95		10.47		100.00	
Memo Items:								
International Bunkers	230.13	0.01	0.12	0.01	1.58	NO	231.83	
Aviation	161.46	0.00	0.02	0.00	1.41	NO	162.90	
Marine	68.67	0.00	0.10	0.00	0.17	NO	68.93	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,714.51	NO	NO	NO	NO	NO	1714.51	

Table A7-1: GHG emission in Croatia, 2004

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2004	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	20777.75	69.51	1459.71	0.52	162.39	NO	22399.84	73.62
A. Fuel Comb (Sectoral Appr.)	19975.50	6.07	127.40	0.77	162.10	NO	20265.01	66.61
1. Energy Industries	6821.48	0.21	4.40	0.08	17.79	NO	6843.66	22.49
2. Man. Ind. and Constr.	3976.89	0.36	7.55	0.05	11.36	NO	3995.80	13.13
3. Transport	5343.61	1.07	22.54	0.52	109.76	NO	5475.91	18.00
4. Comm./Inst, Resid., Agric.	3833.52	4.42	92.92	0.11	23.20	NO	3949.64	12.98
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	802.25	63.44	1332.30	0.28	0.28	NO	2134.84	7.02
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	802.25	63.44	1332.30	0.28	0.28	NO	2134.84	7.02
2. Industrial Processes	2242.00	0.22	4.68	2.19	677.70	313.28	3237.67	10.64
A. Mineral Products	1731.69	NE,NO	NE,NO	NE,NO	NE,NO	NO	1731.69	5.69
B. Chemical Industry	495.43	4.68	4.68	2.19	677.70	NO	1177.81	3.87
C. Metal Production	14.89	NE,NO	NE,NO	NO	NO	NO	14.89	0.05
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	313.28	313.28	1.03
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	139.63	NO	NO	0.11	34.72	NO	174.35	0.57
4. Agriculture	NO	55.05	1156.09	8.33	2581.58	NO	3737.67	12.28
A. Enteric Fermentation	NO	45.46	954.59	0.00	0.00	NO	954.59	3.14
B. Manure Management	NO	9.60	201.50	1.04	323.49	NO	524.99	1.73
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.28	2258.09	NO	2258.09	7.42
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8593.06	0.16	3.32	0.02	6.61	NO	-8583.12	-28.21
A. Forest Land	-9167.58	0.12	2.48	0.00	0.57	NO	-9164.54	-30.12
B. Cropland	279.83	NO	NO	5.26	5.26	NO	285.10	NO
C. Grassland	-129.23	0.85	0.85	0.78	0.78	NO	-127.60	NO
D. Wetlands	30.53	NO	NO	NO	NO	NO	30.53	NO
E. Settlements	393.40	NO	NO	NO	NO	NO	393.40	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	37.28	782.86	0.30	92.84	NO	875.74	2.88
A. Solid Waste Disp. on Land	NA,NO	24.82	521.32	0.00	0.00	NO	521.32	1.71
B. Waste-water Handling	0.00	12.45	261.54	0.30	92.84	NO	354.38	1.16
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	14566.36	162.22	3406.67	11.36	3521.12	313.28	21842.14	71.79
Total Emissions without LUCF	23159.42	162.06	3406.67	11.36	3521.12	313.28	30425.27	100.0
Share of Gases in Total Em./Rem.	66.69		15.60		16.12		100.00	
Share of Gases in Total Emissions	76.12		11.20		11.57		100.00	
Memo Items:								
International Bunkers	260.46	0.01	0.13	0.01	1.82	NO	262.41	
Aviation	187.39	0.00	0.03	0.01	1.64	NO	189.06	
Marine	73.06	0.00	0.10	0.00	0.18	NO	73.35	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,704.33	NO	NO	NO	NO	NO	1704.33	

Table A7-1: GHG emission in Croatia, 2005

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2005	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	21060.62	69.20	1453.27	0.52	161.78	NO	22675.67	73.80
A. Fuel Comb (Sectoral Appr.)	20280.45	5.79	121.53	0.77	161.51	NO	20563.49	66.93
1. Energy Industries	6779.24	0.20	4.25	0.09	18.12	NO	6801.61	22.14
2. Man. Ind. and Constr.	4081.03	0.33	6.92	0.05	10.39	NO	4098.34	13.34
3. Transport	5553.23	0.98	20.48	0.53	110.76	NO	5684.48	18.50
4. Comm./Inst, Resid., Agric.	3866.95	4.28	89.88	0.11	22.24	NO	3979.06	12.95
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	780.17	63.42	1331.74	0.27	0.27	NO	2112.18	6.87
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	780.17	63.42	1331.74	0.27	0.27	NO	2112.18	6.87
2. Industrial Processes	2281.84	0.20	4.27	2.14	662.38	347.13	3295.62	10.73
A. Mineral Products	1785.94	NE,NO	NE,NO	NE,NO	NE,NO	NO	1785.94	5.81
B. Chemical Industry	484.65	4.27	4.27	2.14	662.38	NO	1151.31	3.75
C. Metal Production	11.24	NE,NO	NE,NO	NO	NO	NO	11.24	0.04
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	347.13	347.13	1.13
G. Other	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
3. Solvent and Other Product Use	158.89	NO	NO	0.11	34.72	NO	193.61	0.63
4. Agriculture	NO	52.92	1111.39	8.35	2588.13	NO	3699.53	12.04
A. Enteric Fermentation	NO	44.57	936.03	0.00	0.00	NO	936.03	3.05
B. Manure Management	NO	8.35	175.36	0.93	288.62	NO	463.98	1.51
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.42	2299.52	NO	2299.52	7.48
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8640.19	0.15	3.25	0.02	6.88	NO	-8630.06	-28.09
A. Forest Land	-9229.99	0.13	2.75	0.00	0.63	NO	-9226.61	-30.03
B. Cropland	240.48	NO	NO	5.79	5.79	NO	246.28	NO
C. Grassland	-82.32	0.50	0.50	0.46	0.46	NO	-81.36	NO
D. Wetlands	28.59	NO	NO	NO	NO	NO	28.59	NO
E. Settlements	403.04	NO	NO	NO	NO	NO	403.04	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.03	36.39	764.20	0.31	96.92	NO	861.15	2.80
A. Solid Waste Disp. on Land	NA,NO	24.01	504.14	0.00	0.00	NO	504.14	1.64
B. Waste-water Handling	0.00	12.38	260.05	0.31	96.92	NO	356.97	1.16
C. Waste Incineration	0.03	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.03	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	14861.19	158.88	3336.38	11.34	3516.11	347.13	22095.52	71.91
Total Emissions without LUCF	23501.38	158.72	3336.38	11.34	3516.11	347.13	30725.58	100.0
Share of Gases in Total Em./Rem.	67.26		15.10		15.91		100.00	
Share of Gases in Total Emissions	76.49		10.86		11.44		100.00	
Memo Items:								
International Bunkers	305.13	0.01	0.14	0.01	2.18	NO	307.45	
Aviation	226.15	0.00	0.03	0.01	1.98	NO	228.16	
Marine	78.98	0.01	0.11	0.00	0.19	NO	79.29	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,586.57	NO	NO	NO	NO	NO	1586.57	

Table A7-1: GHG emission in Croatia, 2006

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2006	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	21137.01	75.88	1593.42	0.37	114.86	NO	22845.29	72.97
A. Fuel Comb (Sectoral Appr.)	20347.20	5.73	120.40	0.55	114.58	NO	20582.19	65.74
1. Energy Industries	6628.38	0.19	4.05	0.08	17.31	NO	6649.74	21.24
2. Man. Ind. and Constr.	4181.48	0.34	7.10	0.05	11.07	NO	4199.64	13.41
3. Transport	5907.46	0.97	20.27	0.31	64.31	NO	5992.03	19.14
4. Comm./Inst, Resid., Agric.	3629.88	4.24	88.99	0.10	21.90	NO	3740.77	11.95
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	789.81	70.14	1473.02	0.28	0.28	NO	2263.11	7.23
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	789.81	70.14	1473.02	0.28	0.28	NO	2263.11	7.23
2. Industrial Processes	2408.47	0.29	6.07	2.11	654.67	379.09	3448.29	11.01
A. Mineral Products	1917.88	NE,NO	NE,NO	NE,NO	NE,NO	NO	1917.88	6.13
B. Chemical Industry	477.34	6.07	6.07	2.11	654.67	NO	1138.08	3.64
C. Metal Production	13.25	NE,NO	NE,NO	NO	NO	NO	13.25	0.04
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	379.09	379.09	1.21
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
3. Solvent and Other Product Use	188.35	NO	NO	0.11	34.72	NO	223.07	0.71
4. Agriculture	NO	55.19	1159.03	8.70	2697.97	NO	3857.00	12.32
A. Enteric Fermentation	NO	43.79	919.51	0.00	0.00	NO	919.51	2.94
B. Manure Management	NO	11.41	239.52	1.17	363.44	NO	602.96	1.93
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.53	2334.53	NO	2334.53	7.46
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8500.92	0.35	7.45	0.03	8.39	NO	-8485.08	-27.10
A. Forest Land	-9058.37	0.33	6.93	0.01	1.59	NO	-9049.86	-28.91
B. Cropland	219.16	NO	NO	6.32	6.32	NO	225.49	NO
C. Grassland	-95.17	0.52	0.52	0.48	0.48	NO	-94.17	NO
D. Wetlands	26.66	NO	NO	NO	NO	NO	26.66	NO
E. Settlements	406.80	NO	NO	NO	NO	NO	406.80	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.04	39.62	831.94	0.32	100.63	NO	932.61	2.98
A. Solid Waste Disp. on Land	NA,NO	27.14	569.87	0.00	0.00	NO	569.87	1.82
B. Waste-water Handling	0.00	12.48	262.07	0.32	100.63	NO	362.70	1.16
C. Waste Incineration	0.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.04	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	15232.95	171.33	3597.91	11.54	3576.51	379.09	22821.19	72.90
Total Emissions without LUCF	23733.88	170.97	3597.91	11.54	3576.51	379.09	31306.27	100.0
Share of Gases in Total Em./Rem.	66.75		15.77		15.67		100.00	
Share of Gases in Total Emissions	75.81		11.49		11.42		100.00	
Memo Items:								
International Bunkers	290.81	0.01	0.12	0.01	2.16	NO	293.09	
Aviation	229.82	0.00	0.03	0.01	2.01	NO	231.87	
Marine	60.98	0.00	0.08	0.00	0.15	NO	61.22	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,641.97	NO	NO	NO	NO	NO	1641.97	

Table A7-1: GHG emission in Croatia, 2007

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2007	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	22323.79	82.19	1726.01	0.38	117.57	NO	24167.37	73.70
A. Fuel Comb (Sectoral Appr.)	21572.84	5.10	107.09	0.56	117.30	NO	21797.23	66.48
1. Energy Industries	7737.05	0.22	4.69	0.09	18.94	NO	7760.68	23.67
2. Man. Ind. and Constr.	4204.52	0.35	7.39	0.05	10.97	NO	4222.89	12.88
3. Transport	6329.85	0.93	19.59	0.33	68.58	NO	6418.02	19.57
4. Comm./Inst, Resid., Agric.	3301.42	3.59	75.41	0.09	18.81	NO	3395.64	10.36
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	750.94	77.09	1618.92	0.27	0.27	NO	2370.14	7.23
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	750.94	77.09	1618.92	0.27	0.27	NO	2370.14	7.23
2. Industrial Processes	2483.51	0.26	5.48	2.33	722.34	419.62	3630.95	11.07
A. Mineral Products	1949.58	NE,NO	NE,NO	NE,NO	NE,NO	NO	1949.58	5.95
B. Chemical Industry	521.51	5.48	5.48	2.33	722.34	NO	1249.33	3.81
C. Metal Production	12.42	NE,NO	NE,NO	NO	NO	NO	12.42	0.04
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NO	NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	419.62	419.62	1.28
G. Other	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
3. Solvent and Other Product Use	210.97	NO	NO	0.11	34.72	NO	245.69	0.75
4. Agriculture	NO	52.01	1092.21	8.58	2659.07	NO	3751.28	11.44
A. Enteric Fermentation	NO	41.39	869.20	0.00	0.00	NO	869.20	2.65
B. Manure Management	NO	10.62	223.00	1.10	339.80	NO	562.80	1.72
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.48	2319.27	NO	2319.27	7.07
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-7776.70	1.88	39.45	0.06	17.22	NO	-7720.04	-23.54
A. Forest Land	-8275.43	1.79	37.55	0.03	8.59	NO	-8229.29	-25.10
B. Cropland	130.12	NO	NO	6.87	6.87	NO	136.99	NO
C. Grassland	-80.01	1.91	1.91	1.76	1.76	NO	-76.35	NO
D. Wetlands	24.72	NO	NO	NO	NO	NO	24.72	NO
E. Settlements	423.89	NO	NO	NO	NO	NO	423.89	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.08	42.46	891.65	0.33	102.31	NO	994.04	3.03
A. Solid Waste Disp. on Land	NA,NO	29.86	627.08	0.00	0.00	NO	627.08	1.91
B. Waste-water Handling	0.00	12.60	264.56	0.33	102.31	NO	366.87	1.12
C. Waste Incineration	0.08	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.08	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	17241.64	178.80	3754.80	11.67	3618.50	419.62	25069.28	76.46
Total Emissions without LUCF	25018.34	176.92	3754.80	11.67	3618.50	419.62	32789.32	100.0
Share of Gases in Total Em./Rem.	68.78		14.98		14.43		100.00	
Share of Gases in Total Emissions	76.30		11.45		11.04		100.00	
Memo Items:								
International Bunkers	312.94	0.01	0.21	0.01	3.30	NO	316.45	
Aviation	237.29	0.01	0.11	0.01	3.12	NO	240.51	
Marine	75.65	0.00	0.10	0.00	0.19	NO	75.94	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,442.73	NO	NO	NO	NO	NO	1442.73	

Table A7-1: GHG emission in Croatia, 2008

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2008	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	21154.54	77.86	1635.09	0.36	112.48	NO	22902.11	72.86
A. Fuel Comb (Sectoral Appr.)	20495.57	5.12	107.44	0.53	112.22	NO	20715.23	65.90
1. Energy Industries	6705.03	0.19	3.90	0.08	17.36	NO	6726.30	21.40
2. Man. Ind. and Constr.	4197.67	0.33	6.95	0.05	10.07	NO	4214.68	13.41
3. Transport	6177.71	0.87	18.17	0.31	65.43	NO	6261.30	19.92
4. Comm./Inst, Resid., Agric.	3415.17	3.73	78.42	0.09	19.36	NO	3512.95	11.18
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	658.97	72.75	1527.65	0.26	0.26	NO	2186.88	6.96
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	658.97	72.75	1527.65	0.26	0.26	NO	2186.88	6.96
2. Industrial Processes	2411.69	0.19	3.90	2.38	738.37	436.97	3590.93	11.42
A. Mineral Products	1857.79	NE,NO	NE,NO	NE,NO	NE,NO	NO	1857.79	5.91
B. Chemical Industry	530.39	3.90	3.90	2.38	738.37	NO	1272.66	4.05
C. Metal Production	23.51	NE,NO	NE,NO	NO	NO	NO	23.51	0.07
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	436.97	436.97	1.39
G. Other	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
3. Solvent and Other Product Use	203.45	NO	NO	0.11	34.72	NO	238.17	0.76
4. Agriculture	NO	49.56	1040.78	8.41	2605.73	NO	3646.52	11.60
A. Enteric Fermentation	NO	40.10	842.17	0.00	0.00	NO	842.17	2.68
B. Manure Management	NO	9.46	198.62	0.98	304.38	NO	503.00	1.60
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.42	2301.35	NO	2301.35	7.32
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8103.07	0.56	11.79	0.03	10.68	NO	-8080.60	-25.71
A. Forest Land	-8589.98	0.52	10.96	0.01	2.51	NO	-8576.51	-27.29
B. Cropland	139.37	NO	NO	7.42	7.42	NO	146.79	NO
C. Grassland	-138.11	0.82	0.82	0.76	0.76	NO	-136.53	NO
D. Wetlands	22.79	NO	NO	NO	NO	NO	22.79	NO
E. Settlements	462.86	NO	NO	NO	NO	NO	462.86	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	1.01	45.30	951.39	0.33	102.13	NO	1054.53	3.35
A. Solid Waste Disp. on Land	NA,NO	32.87	690.17	0.00	0.00	NO	690.17	2.20
B. Waste-water Handling	0.00	12.44	261.22	0.33	102.13	NO	363.36	1.16
C. Waste Incineration	1.01	NE,NO	NE,NO	NE,NO	NE,NO	NO	1.01	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	15667.62	173.47	3642.96	11.51	3569.40	436.97	23351.67	74.29
Total Emissions without LUCF	23770.70	172.91	3642.96	11.51	3569.40	436.97	31432.27	100.0
Share of Gases in Total Em./Rem.	67.09		15.60		15.29		100.00	
Share of Gases in Total Emissions	75.63		11.59		11.36		100.00	
Memo Items:								
International Bunkers	332.32	0.01	0.29	0.02	4.81	NO	337.42	
Aviation	265.52	0.01	0.20	0.02	4.65	NO	270.37	
Marine	66.80	0.00	0.09	0.00	0.16	NO	67.05	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,412.76	NO	NO	NO	NO	NO	1412.76	

Table A7-1: GHG emission in Croatia, 2009

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2009	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	19955.07	75.41	1583.53	0.36	110.66	NO	21649.26	73.56
A. Fuel Comb (Sectoral Appr.)	19360.28	5.23	109.91	0.53	110.42	NO	19580.61	66.53
1. Energy Industries	6373.34	0.19	4.07	0.07	14.82	NO	6392.23	21.72
2. Man. Ind. and Constr.	3378.56	0.30	6.20	0.04	8.83	NO	3393.59	11.53
3. Transport	6180.53	0.81	17.04	0.32	66.57	NO	6264.15	21.29
4. Comm./Inst, Resid., Agric.	3427.84	3.93	82.59	0.10	20.21	NO	3530.65	12.00
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	594.79	70.17	1473.62	0.24	0.24	NO	2068.64	7.03
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	594.79	70.17	1473.62	0.24	0.24	NO	2068.64	7.03
2. Industrial Processes	1917.48	0.04	0.92	1.99	617.09	444.27	2979.76	10.13
A. Mineral Products	1460.54	NE,NO	NE,NO	NE,NO	NE,NO	NO	1460.54	4.96
B. Chemical Industry	445.63	0.92	0.92	1.99	617.09	NO	1063.64	3.61
C. Metal Production	11.30	NE,NO	NE,NO	NO	NO	NO	11.30	0.04
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	444.27	444.27	1.51
G. Other	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
3. Solvent and Other Product Use	118.17	NO	NO	0.11	33.59	NO	151.76	0.52
4. Agriculture	NO	50.33	1057.03	8.05	2495.95	NO	3552.98	12.07
A. Enteric Fermentation	NO	40.25	845.28	0.00	0.00	NO	845.28	2.87
B. Manure Management	NO	10.08	211.75	1.03	318.73	NO	530.48	1.80
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.02	2177.22	NO	2177.22	7.40
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8320.29	0.30	6.38	0.03	9.62	NO	-8304.30	-28.22
A. Forest Land	-8796.83	0.29	6.18	0.00	1.41	NO	-8789.23	-29.87
B. Cropland	73.55	NO	NO	8.02	8.02	NO	81.57	NO
C. Grassland	-89.58	0.19	0.19	0.18	0.18	NO	-89.21	NO
D. Wetlands	20.86	NO	NO	NO	NO	NO	20.86	NO
E. Settlements	471.71	NO	NO	NO	NO	NO	471.71	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.38	47.23	991.93	0.33	103.44	NO	1095.75	3.72
A. Solid Waste Disp. on Land	NA,NO	35.57	746.97	0.00	0.00	NO	746.97	2.54
B. Waste-water Handling	0.00	11.66	244.96	0.33	103.44	NO	348.40	1.18
C. Waste Incineration	0.38	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.38	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	13670.81	173.32	3639.79	10.76	3336.75	444.27	21125.21	71.78
Total Emissions without LUCF	21991.10	173.02	3639.79	10.76	3336.75	444.27	29429.51	100.0
Share of Gases in Total Em./Rem.	64.71		17.23		15.80		100.00	
Share of Gases in Total Emissions	74.72		12.37		11.34		100.00	
Memo Items:								
International Bunkers	248.79	0.01	0.20	0.01	4.03	NO	253.02	
Aviation	227.17	0.01	0.17	0.01	3.98	NO	231.31	
Marine	21.62	0.00	0.03	0.00	0.05	NO	21.71	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,541.07	NO	NO	NO	NO	NO	1541.07	

Table A7-1: GHG emission in Croatia, 2010

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2010	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	19282.49	78.49	1648.20	0.35	108.99	NO	21039.69	72.73
A. Fuel Comb (Sectoral Appr.)	18720.93	5.75	120.70	0.52	108.76	NO	18950.40	65.50
1. Energy Industries	5883.79	0.21	4.50	0.08	16.41	NO	5904.69	20.41
2. Man. Ind. and Constr.	3396.64	0.32	6.71	0.04	9.12	NO	3412.47	11.80
3. Transport	5960.80	0.73	15.29	0.29	60.99	NO	6037.08	20.87
4. Comm./Inst, Resid., Agric.	3479.71	4.49	94.20	0.11	22.24	NO	3596.16	12.43
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	561.56	72.74	1527.50	0.23	0.23	NO	2089.29	7.22
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	561.56	72.74	1527.50	0.23	0.23	NO	2089.29	7.22
2. Industrial Processes	1927.53	0.00	0.00	2.57	795.80	481.60	3204.93	11.08
A. Mineral Products	1432.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	1432.04	4.95
B. Chemical Industry	468.22	0.00	0.00	2.57	795.80	NO	1264.02	4.37
C. Metal Production	27.27	NE,NO	NE,NO	NO	NO	NO	27.27	0.09
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	481.60	481.60	1.66
G. Other	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
3. Solvent and Other Product Use	120.25	NO	NO	0.10	31.07	NO	151.32	0.52
4. Agriculture	NO	50.19	1053.95	7.72	2392.22	NO	3446.17	11.91
A. Enteric Fermentation	NO	40.39	848.16	0.00	0.00	NO	848.16	2.93
B. Manure Management	NO	9.80	205.79	0.99	307.77	NO	513.55	1.78
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.72	2084.45	NO	2084.45	7.21
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-8080.86	0.10	2.19	0.03	9.15	NO	-8069.52	-27.89
A. Forest Land	-8632.06	0.10	2.08	0.00	0.48	NO	-8629.50	-29.83
B. Cropland	146.78	NO	NO	8.58	8.58	NO	155.35	NO
C. Grassland	-105.45	0.10	0.10	0.10	0.10	NO	-105.25	NO
D. Wetlands	18.92	NO	NO	NO	NO	NO	18.92	NO
E. Settlements	490.95	NO	NO	NO	NO	NO	490.95	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.13	46.89	984.64	0.33	103.21	NO	1087.98	3.76
A. Solid Waste Disp. on Land	NA,NO	35.21	739.50	0.00	0.00	NO	739.50	2.56
B. Waste-water Handling	0.00	11.67	245.15	0.33	103.21	NO	348.35	1.20
C. Waste Incineration	0.13	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.13	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	13249.55	175.67	3688.98	11.00	3409.37	481.60	20860.57	72.11
Total Emissions without LUCF	21330.41	175.56	3688.98	11.00	3409.37	481.60	28930.09	100.0
Share of Gases in Total Em./Rem.	63.51		17.68		16.34		100.00	
Share of Gases in Total Emissions	73.73		12.75		11.78		100.00	
Memo Items:								
International Bunkers	261.64	0.01	0.21	0.01	4.29	NO	266.14	
Aviation	242.21	0.01	0.18	0.01	4.24	NO	246.63	
Marine	19.43	0.00	0.03	0.00	0.05	NO	19.50	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	1,746.18	NO	NO	NO	NO	NO	1746.18	

Table A7-1: GHG emission in Croatia, 2011

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2011	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	19086.50	74.43	1563.03	0.32	100.33	NO	20749.87	72.61
A. Fuel Comb (Sectoral Appr.)	18509.35	6.45	135.54	0.48	100.12	NO	18745.01	65.59
1. Energy Industries	6252.91	0.22	4.62	0.09	17.91	NO	6275.44	21.96
2. Man. Ind. and Constr.	3174.56	0.29	6.15	0.04	8.11	NO	3188.82	11.16
3. Transport	5825.15	0.66	13.92	0.23	48.65	NO	5887.73	20.60
4. Comm./Inst, Resid., Agric.	3256.73	5.28	110.84	0.12	25.45	NO	3393.01	11.87
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	577.16	67.98	1427.49	0.21	0.21	NO	2004.86	7.02
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	577.16	67.98	1427.49	0.21	0.21	NO	2004.86	7.02
2. Industrial Processes	1725.16	0.00	0.00	2.53	784.29	494.74	3004.19	10.51
A. Mineral Products	1220.04	NE,NO	NE,NO	NE,NO	NE,NO	NO	1220.04	4.27
B. Chemical Industry	475.94	0.00	0.00	2.53	784.29	NO	1260.23	4.41
C. Metal Production	29.18	NE,NO	NE,NO	NO	NO	NO	29.18	0.10
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	494.74	494.74	1.73
G. Other	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
3. Solvent and Other Product Use	106.29	NO	NO	0.12	36.76	NO	143.05	0.50
4. Agriculture	NO	49.92	1048.39	8.11	2514.76	NO	3563.15	12.47
A. Enteric Fermentation	NO	40.14	843.03	0.00	0.00	NO	843.03	2.95
B. Manure Management	NO	9.78	205.36	0.99	306.17	NO	511.52	1.79
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	7.12	2208.60	NO	2208.60	7.73
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-7035.12	1.06	22.29	0.05	16.48	NO	-6996.35	-24.48
A. Forest Land	-7574.45	0.92	19.28	0.01	4.41	NO	-7550.76	-26.42
B. Cropland	124.72	NO	NO	9.30	9.30	NO	134.02	NO
C. Grassland	-92.36	3.01	3.01	2.78	2.78	NO	-86.58	NO
D. Wetlands	17.32	NO	NO	NO	NO	NO	17.32	NO
E. Settlements	489.64	NO	NO	NO	NO	NO	489.64	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.05	48.32	1014.72	0.33	103.66	NO	1118.42	3.91
A. Solid Waste Disp. on Land	NA,NO	36.71	770.89	0.00	0.00	NO	770.89	2.70
B. Waste-water Handling	0.00	11.61	243.83	0.33	103.66	NO	347.48	1.22
C. Waste Incineration	0.05	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.05	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	13882.87	173.73	3648.42	11.35	3519.53	494.74	21582.32	75.52
Total Emissions without LUCF	20918.00	172.67	3648.42	11.35	3519.53	494.74	28578.67	100.0
Share of Gases in Total Em./Rem.	64.33		16.90		16.31		100.00	
Share of Gases in Total Emissions	73.19		12.77		12.32		100.00	
Memo Items:								
International Bunkers	327.56	0.01	0.29	0.01	4.60	NO	332.45	
Aviation	252.38	0.01	0.19	0.01	4.42	NO	256.98	
Marine	75.18	0.00	0.10	0.00	0.18	NO	75.47	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	2,004.45	NO	NO	NO	NO	NO	2004.45	

Table A7-1: GHG emission in Croatia, 2012

Croatia	CO ₂	CH ₄		N ₂ O		HFC,PFC,SF ₆	Total	Share
Year 2012	Gg	Gg	Gg CO ₂ eq	Gg	Gg CO ₂ eq	Gg CO ₂ eq	Gg CO ₂ eq	%
1. Energy	17452.57	65.27	1370.58	0.32	100.01	NO	18923.16	71.54
A. Fuel Comb (Sectoral Appr.)	16949.26	6.58	138.15	0.48	99.78	NO	17187.19	64.98
1. Energy Industries	5597.70	0.21	4.40	0.08	16.04	NO	5618.14	21.24
2. Man. Ind. and Constr.	2787.48	0.28	5.81	0.04	8.13	NO	2801.41	10.59
3. Transport	5647.74	0.56	11.82	0.24	49.63	NO	5709.19	21.59
4. Comm./Inst, Resid., Agric.	2916.34	5.53	116.13	0.12	25.98	NO	3058.45	11.56
5. Other	NO	NO	NO	NO	NO	NO	NO	NO
B. Fugitive Emissions from Fuels	503.31	58.69	1232.43	0.23	0.23	NO	1735.97	6.56
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	503.31	58.69	1232.43	0.23	0.23	NO	1735.97	6.56
2. Industrial Processes	1676.29	0.02	0.44	2.19	678.64	495.24	2850.61	10.78
A. Mineral Products	1172.66	NE,NO	NE,NO	NE,NO	NE,NO	NO	1172.66	4.43
B. Chemical Industry	503.32	0.44	0.44	2.19	678.64	NO	1182.39	4.47
C. Metal Production	0.32	NE,NO	NE,NO	NO	NO	NO	0.32	0.00
D. Other Production	NE	NO	NO	NO	NO	NO	NE	NE
E. Prod. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
F. Cons. of Halocarbons & SF ₆	NO	NO	NO	NO	NO	495.24	495.24	1.87
G. Other	NO	NO	NO	NO	NO	NO	NA,NO	NA,NO
3. Solvent and Other Product Use	104.26	NO	NO	0.17	51.31	NO	155.57	0.59
4. Agriculture	NO	49.05	1030.00	7.63	2364.67	NO	3394.67	12.83
A. Enteric Fermentation	NO	39.62	832.10	0.00	0.00	NO	832.10	3.15
B. Manure Management	NO	9.42	197.90	0.94	291.14	NO	489.05	1.85
C. Rice Cultivation	NO	NO	NO	0.00	0.00	NO	NO	NO
D. Agricultural Soils	NO	NA	NA	6.69	2073.52	NO	2073.52	7.84
E. Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agr. Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	-6615.42	2.30	48.24	0.07	22.74	NO	-6544.44	-24.74
A. Forest Land	-7220.01	2.18	45.80	0.03	10.47	NO	-7163.74	-27.08
B. Cropland	198.31	NO	NO	10.01	10.01	NO	208.32	NO
C. Grassland	-132.35	2.45	2.45	2.26	2.26	NO	-127.65	NO
D. Wetlands	15.73	NO	NO	NO	NO	NO	15.73	NO
E. Settlements	522.90	NO	NO	NO	NO	NO	522.90	NO
F. Other Land	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NE	NE	NE	NE	NE	NO	NE	NE
6. Waste	0.08	48.64	1021.52	0.34	104.01	NO	1125.61	4.26
A. Solid Waste Disp. on Land	NA,NO	37.76	793.02	0.00	0.00	NO	793.02	3.00
B. Waste-water Handling	0.00	10.88	228.49	0.34	104.01	NO	332.51	1.26
C. Waste Incineration	0.08	NE,NO	NE,NO	NE,NO	NE,NO	NO	0.08	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO
Total Em./Rem. with LUCF	12617.78	165.28	3470.79	10.55	3270.06	495.24	19905.18	75.26
Total Emissions without LUCF	19233.20	162.98	3470.79	10.55	3270.06	495.24	26449.62	100.0
Share of Gases in Total Em./Rem.	63.39		17.44		16.43		100.00	
Share of Gases in Total Emissions	72.72		13.12		12.36		100.00	
Memo Items:								
International Bunkers	259.48	0.01	0.19	0.01	4.55	NO	264.22	
Aviation	259.48	0.01	0.19	0.01	4.55	NO	264.22	
Marine	NO	NO	NO	NO	NO	NO	NO	
Multilateral Operations	C	C	C	C	C	NO	C	
CO ₂ Emissions from Biomass	2,270.95	NO	NO	NO	NO	NO	2270.95	

ANNEX 8

CO₂ EMISSION FACTORS, OXIDATION FACTORS AND NATIONAL NET CALORIFIC VALUES (needed for monitoring and reporting on CO₂ emission)

Table 8-1: National net calorific values, CO₂ emission factors and oxidation factors for 1990 and 2012

Fuel	Net Caloric Value			Carbon emission factor ¹ (t C/TJ)	CO ₂ emission factor (t CO ₂ /TJ) (without OF)	Oxidation factor (OF)
	Unit	1990	2012			
SOLID FUELS						
Anthracite	TJ/Gg	29.29	29.31	26.8	98.27	0.98
Other Bituminous Coal	TJ/Gg	25.14	24.35	25.8	94.60	0.98
Sub-Bituminous Coal	TJ/Gg	16.74	17.80	26.2	96.07	0.98
Lignite	TJ/Gg	10.90	10.70	27.6	101.20	0.98
Brown Coal Briquettes	TJ/Gg	16.74	-	26.6	97.53	0.98
Coke oven Coke	TJ/Gg	29.31	29.31	29.5	108.17	0.98
LIQUID FUELS						
Motor gasoline	TJ/Gg	44.60	44.59	18.9	69.30	0.99
Aviation gasoline	TJ/Gg	44.60	44.59	18.9	69.30	0.99
Jet Kerosene	TJ/Gg	44.00	43.96	19.5	71.50	0.99
Gas/Diesel oil	TJ/Gg	42.71	42.71	20.2	74.07	0.99
Residual Fuel Oil	TJ/Gg	40.19	40.19	21.1	77.37	0.99
Liquefied Petroleum Gases	TJ/Gg	46.89	46.89	17.2	63.07	0.99
Petroleum Coke	TJ/Gg	29.31	31.00	27.5	100.83	0.99
Petroleum	TJ/Gg	44.00	43.96	19.6	71.87	0.99
Lubricants	TJ/Gg	33.57	33.50	20.0	73.33	0.99
GASEOUS FUELS						
Natural Gas	TJ/10 ⁶ m ³	34.00	34.00	15.3	56.10	0.995
Gas Works Gas	TJ/10 ⁶ m ³	15.82	17.10	13.0	47.67	0.995
Coke Oven Gas	TJ/10 ⁶ m ³	17.90	-	13.0	47.67	0.995
BIOMASS FUELS						
Wood biomass	TJ/Gg	-	9.0	29.9	109.63	0.98
Industrial waste	TJ/Gg	-	-	29.9	109.63	0.98

¹ IPCC default (from "Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook")

