National Inventory Report

Iceland 2006

Submitted under the United Nations Framework
Convention on Climate Change

UST

Umhverfisstofnun

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Preface

The United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992 and entered into force in 1994. According to Articles 4 and 12 of the Convention, Parties are required to develop and to submit annually to the UNFCCC national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol.

To comply with this requirement, Iceland has prepared a National Inventory Report (NIR) for the year 2006. The NIR together with the associated Common Reporting Format tables (CRF) is Iceland's contribution to this round of reporting under the Convention, and covers emissions and removals in the period 1990 – 2004.

The Ministry for the Environment is responsible for the reporting. The Environment and Food Agency of Iceland (EFA) and the Agricultural University of Iceland (AUI) have been the principle contributors to the preparation of the report.

Ministry for the Environment, Reykjavík, December 2006

Hugi Ólafsson, director
Office of Sustainable Development and International Affairs
Ministry for the Environment

EXECUTIVE SUMMARY

Kyoto accounting:

For 2004, Iceland's total greenhouse gas emissions (without LULUCF) were estimated to be 3.707 Gg CO_2-equivalents. Iceland's total emissions in 2004 were 10,5% above 1990 levels and 3,1% above 1990 levels when carbon sequestration is taken into account. Emissions that could fall under Decision 14/CP.7 amounted to 455 Gg in 2004.

Background

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) requires that the Parties report annually on their greenhouse gas emissions by sources and removals by sinks. In response to these requirements, Iceland has prepared the present National Inventory Report (NIR).

The IPCC Good Practice Guidance, the Revised 1996 Guidelines and national estimation methods are used in producing the greenhouse gas emissions inventory. The responsibility of producing the emissions data lies with the Environment and Food Agency, which compiles and maintains the greenhouse gas inventory. Emissions and removals from the LULUCF sector are compiled by the Agricultural University of Iceland. The national inventory and reporting system is continually being developed and improved.

Iceland is a party of the UNFCCC and acceded to the Kyoto Protocol on May 23rd, 2002. Earlier that year the government adopted a climate change policy that was formulated in close cooperation between several ministries. The aim of the policy is to curb emissions of greenhouse gases so they will not exceed the limits of Iceland's obligations under the Kyoto Protocol. A second objective is to increase the level of carbon sequestration resulting from reforestation and revegetation programs.

The Kyoto Protocol commits Annex I Parties to individual, legally binding targets for their greenhouse gas emissions in the "commitment period" 2008-2012. Iceland's obligations according to the Kyoto Protocol are as follows:

- For the first commitment period, from 2008 to 2012, the greenhouse gas emissions shall not increase more than 10% from the level of emissions in 1990.
- Decision 14/CP.7 on the "Impact of single projects on emissions in the commitment period" allows Iceland to report certain industrial process' carbon dioxide emissions separately and not include them in national totals, to the extent they would cause Iceland to exceed its assigned amount. For the first commitment period, from 2008 to 2012, the mean annual carbon dioxide emissions falling under decision 14/CP.7 shall not exceed 1,600,000 tons.

Trends in emissions and removals

In 1990, the total emissions of greenhouse gases in Iceland were 3.355 Gg of CO_2-equivalents. In 2004 total emissions were 3.707 Gg CO_2-equivalents. This is an increase of 10,5% over the time period. Total emissions show a decrease between 1990 and 1994, with an exception in 1993, and an increase thereafter.

A summary of the Icelandic national emissions for 1990, 2003 and 2004 is presented in Table ES1 (without LULUCF). Empty cells indicate emissions not occurring.

Table ES1. Emissions of greenhouse gases during 1990, 2003 and 2004 in Gg CO_2-eq.

	1990	2003	2004	Changes 90-04	Changes 03-04
CO_2	2151	2764	2859	33%	3%
CH_4	413	417	416	1%	-0,2%
N_2O	366	309	330	-10%	7%
HFC 32		0,1	0,1		29%
HFC 125		26,3	22,4		-15%
HFC 134a		13,4	11,5		-14%
HFC 143a		29,4	24,3		-17%
HFC 152		0,1	0,0		-59%
CF_4	355	51	33	-91%	-35%
C_2F_6	65	9	6	-91%	-35%
SF_6	5	5	5	0%	0%
Total Emissions	**3355**	**3624**	**3707**	**10%**	**2%**
CO_2 emissions ‘fulfilling’ 14/CP.7		451	455		1%
Total emissions, excluding CO_2 emissions ‘fulfilling’ 14/CP.7[1]	**3355**	**3173**	**3252**	**-3%**	**2%**

The largest contributor of greenhouse gas emissions in Iceland is the energy sector, followed by industrial processes, then agriculture, waste and solvent and other product use. From 1990 to 2004 the contribution of the energy sector to the total emissions increased from 52% to 54%. The contribution of industrial processes decreased from 26% in 1990 to around 17 - 19% in the period 1992 to 1997. The contribution of industrial processes increased again after 1997 and was 26% in 2004.

[1] Decision 14/CP.7 allows Iceland to report certain industrial process carbon dioxide emissions separately and not include them in national totals, to the extent they would cause Iceland to exceed its assigned amount.

Table ES2. Total emissions of greenhouse gases by source 1990, 2003 and 2004, Gg CO_2-eq.

	1990	2003	2004
Energy	1704	1861	1957
Industrial Processes	867	960	949
Emissions fulfilling 14/CP.7*	-	451	455
Solvent Use	6	4	3
Agriculture	571	489	500
Waste	141	172	172
Geothermal Energy	67	138	124
Total without LULUCF	**3355**	**3624**	**3707**
LULUCF	2095	1887	1851

* Industrial process carbon dioxide emissions that could fall under Decision 14/CP.7 are included in national totals

The distribution of the total greenhouse gas emissions over the UNFCCC sectors (including geothermal energy and excluding LULUCF) in 2004 is shown in figure ES1. Emissions from the energy sector account for 53% of the national total emissions, industrial processes account for 26% and agriculture for 14%. The waste sector accounts for 4%, geothermal energy for 3% and solvent and other product use for 0,1%.

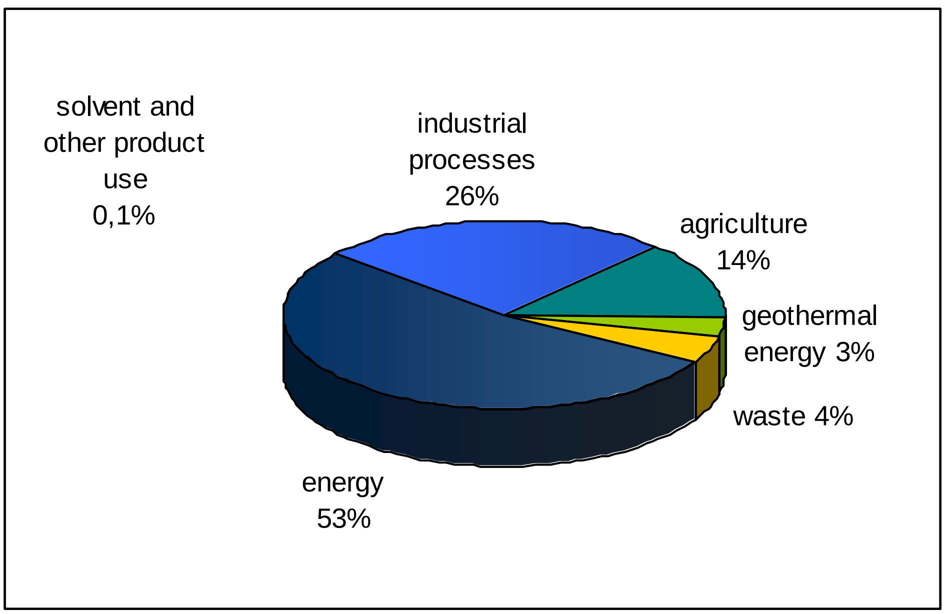

Figure ES1. Emissions of greenhouse gases by UNFCCC sector in 2004

1 INTRODUCTION

1.1 Background information

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) was ratified by Iceland in 1993 and entered into force in 1994. One of the requirements under the Convention is that Parties are to report their national anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using methodologies agreed upon by the Conference of the Parties to the Convention (COP).

In 1995 the Government of Iceland adopted an implementation strategy based on the commitments in the Framework Convention. The domestic implementation strategy was revised in 2002, based on the commitments in the Kyoto Protocol and the provisions of the Marrakech Accords. Iceland acceded to the Kyoto Protocol on May 23rd 2002. The Kyoto Protocol commits Annex I Parties to individual, legally binding targets for their greenhouse gas emissions in the "commitment period" 2008-2012. Iceland's obligations according to the Kyoto Protocol are as follows:

- For the first commitment period, from 2008 to 2012, the greenhouse gas emissions shall not increase more than 10% from the level of emissions in 1990.
- Decision 14/CP.7 on the "Impact of single project on emissions in the commitment period" allows Iceland to report certain industrial process' carbon dioxide emissions separately and not include them in national totals, to the extent they would cause Iceland to exceed its assigned amount. For the first commitment period, from 2008 to 2012, the mean annual carbon dioxide emissions falling under decision 14/CP.7 shall not exceed 1,600,000 tons.

The Ministry for the Environment formulated the climate change policy in close collaboration with the ministries of Transport and Communications, Fisheries, Finance, Agriculture, Industry and Commerce, Foreign Affairs and the Prime Minister's Office. The aim of the policy is to curb emissions of greenhouse gases so that they will not exceed the limits of Iceland's obligations under the Kyoto Protocol. A second objective is to increase the level of carbon sequestration resulting from reforestation and revegetation programs. The current climate change policy is under revision and will be finalized in the beginning of 2007.

The greenhouse gas emissions profile for Iceland is in many regards unusual. Three features stand out. Firstly, emissions from the generation of electricity and from space heating are very low since they are generated from renewable energy sources. Secondly, more than 80% of emissions from energy come from mobile sources (transport, mobile machinery and fishing vessels). The third distinctive feature is that individual sources of industrial process emissions have a significant proportional impact on emissions at the national level. Most noticeable in this regard is abrupt increases in emissions from aluminum production associated with the expanded production capacity of this industry. This last aspect of Iceland's emission profile made it difficult to set meaningful targets for Iceland during the Kyoto Protocol negotiations. This fact was acknowledged in Decision 1/CP.3 paragraph 5(d), which established a process for considering the issue and taking appropriate action. This process was completed with Decision 14/CP.7 on the Impact of single projects on emissions in the commitment period.

The problem associated with the significant proportional impact of single projects on emissions is fundamentally a problem of scale. In small economies, single projects can dominate the changes in emissions from year to year. When the impact of such projects becomes several times larger than the combined effects of available greenhouse gas abatement measures, it becomes very difficult for the party involved to adopt quantified emissions limitations. It does not take a large source to strongly influence the total emissions from Iceland. A single aluminium plant can add more than 15% to the country's total greenhouse gas emissions. A plant of the same size would have negligible effect on emissions in most industrialized countries. Decision 14/CP.7 sets a threshold for significant proportional impact of single projects at 5% of total carbon dioxide emissions of a party in 1990. Projects exceeding this threshold shall be reported separately and carbon dioxide emissions from them not included in national totals to the extent that they would cause the party to exceed its assigned amount. Iceland can therefore not transfer assigned amount units to other Parties through international emissions trading. The total amount that can be reported separately under this decision is set at 1.6 million tons of carbon dioxide. The scope of Decision 14/CP.7 is explicitly limited to small economies, defined as economies emitting less than 0.05% of total Annex I carbon dioxide emissions in 1990. In addition to the criteria above, which relate to the fundamental problem of scale, additional criteria are included that relate to the nature of the project and the emission savings resulting from it. Only projects where renewable energy is used and where this use of renewable energy results in a reduction in greenhouse gas emissions per unit of production will be eligible. The use of best environmental practice and best available technology is also required. It should be underlined that the decision only applies to carbon dioxide emissions from industrial processes. Other emissions, such as energy emissions or process emissions of other gases, such as PFCs, will not be affected.

The Government of Iceland notified the Conference of the Parties with a letter, dated October 17th 2002, of its intention to avail itself of the provisions of Decision 14/CP.7. Since Decision 14/CP.7 only applies for the first commitment period, emissions that are stated in this report as emissions that could fall under Decision 14/CP.7 are not excluded from national totals. On the other hand, they show the scope Iceland has for increased emissions.

The present report together with the associated Common Reporting Format tables (CRF) is Iceland's contribution to this round of reporting under the Convention, and covers emissions and removals in the period 1990 – 2004. The methodology used in calculating the emissions is according to the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories as set out by the IPCC Good Practice Guidance, to the extent possible.

The greenhouse gases included in the national inventory are the following: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). Emissions of the precursors NOx, NMVOC and CO as well as SO_2 are also included, in compliance with the reporting guidelines.

1.2 Institutional arrangement

The Environment and Food Agency of Iceland (EFA), an agency under the Ministry for the Environment, has overall responsibility for the national inventory. EFA compiles and maintains the greenhouse gas emission inventory, except LULUCF which is compiled by the Agricultural University of Iceland (AUI). EFA reports to the Ministry for the Environment, which reports to the Convention. Figure 1.1 illustrates the flow of information and allocation of responsibilities.

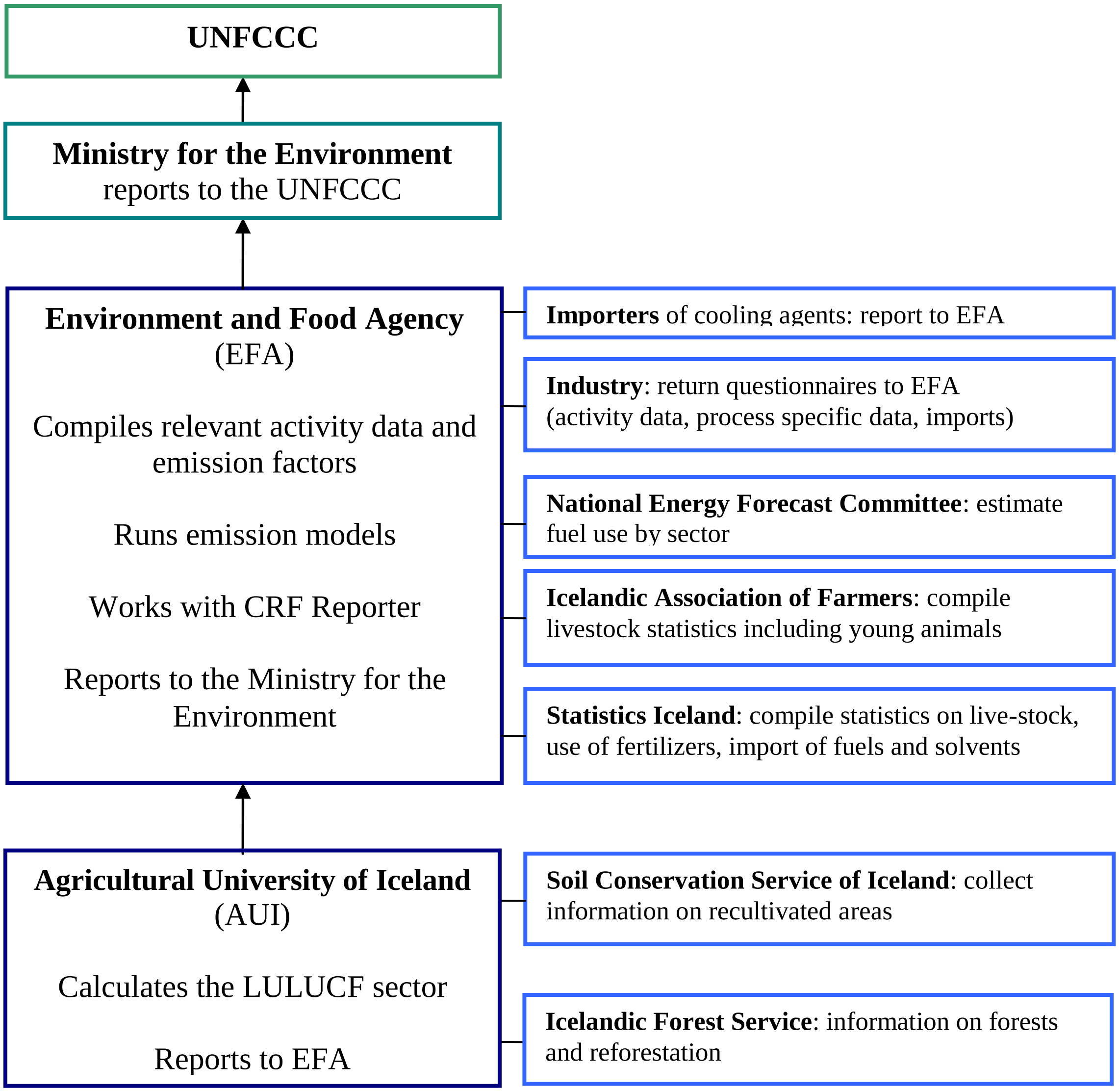

Figure 1.1 Information flow and distribution of responsibilities in the Icelandic emission inventory system for reporting to the UNFCCC

A new law on the registration of greenhouse gas emissions and removals was passed by the Icelandic legislature, Althing, in June 2006. The stated purpose of the law is to create conditions for Icelandic authorities to comply with international obligations in limiting emissions of greenhouse gases. The law covers the national system for the estimation of greenhouse gas emissions and removals by sinks, the establishment of a national registry and the duty of companies to report relevant information to the authorities.

The law specifies that the EFA is the responsible authority for the national accounting as well as the inventory of emissions and removals of greenhouse gases according to Iceland's international obligations. The EFA shall, in accordance with the legislation, produce instructions on the preparation of data and other information for the national inventory.

1.3 Process of inventory preparation

The EFA collects the bulk of data necessary to run the general emission model, i.e. activity data and emission factors. Activity data is collected from various institutions and companies, as well as by EFA directly. The National Energy Forecast Committee (NEFC) collects annual information on fuel sales from the oil companies. This information has been provided on an informal basis. Since sales statistics were not provided by all the oil companies for the years 2003 and 2004, fuel use by sector has been estimated by the NEFC. The Icelandic Association of Farmers (IAF), on the behalf of the Ministry of Agriculture, is responsible for assessing the size of the animal population each year. On request from the EFA, the IAF also accounts for young animals that are mostly excluded from national statistics on animal population. Statistics Iceland provides information on imports of solvents, the use of fertilizers in agriculture and on the import and export of fuels. The EFA collects various additional data directly. Annually a questionnaire is sent out to the industry regarding imports, use of feedstock, and production and process specific information. Importers of HFCs submit reports on their annual imports by different types of HFCs to the EFA. EFA also estimates activity data with regard to waste. Emission factors are mainly taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, since limited information is available from measurements of emissions in Iceland.

AUI receives information on recultivated areas from the Soil Conservation Service of Iceland and information on forests and reforestation from the Icelandic Forest Service. The AUI assesses other land use categories on basis of its own geographical database and available supplementary land use information. AUI then calculates the LULUCF sector, using a country-specific method and reports to the EFA.

1.4 Methodologies and data sources

The estimation methods of all greenhouse gases are harmonized with the IPCC Guidelines for National Greenhouse Gas Inventories and are, to the extent possible, in accordance with IPCC's Good Practice Guidance.

The general emission model is based on the equation:

$$\text{Emission (E)} = \text{Activity level (A)} \cdot \text{Emission Factor (EF)}$$

The model includes the greenhouse gases and in addition the precursors and indirect greenhouse gases NOx, SO_2, NMVOC and CO as well as some other pollutants (POPs).

1.5 Key source categories

According to the IPCC definition, a key source category is one that is prioritized within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both. In the Icelandic Emission Inventory key source categories are identified by means of Tier 1 method.

A key source analysis was prepared for this round of reporting. The table below lists the 16 identified key sources. Tables showing key source analysis (trend and level assessment) can be found in Annex I. The key source analysis shows similar result as last year. The main changes are due to the fact that for this round of reporting Iceland has included all emissions, unlike last year where emissions that could fall under Decision 14/CP.7 were excluded. As a result of this, CO_2 emissions from the aluminium and the ferroalloys industry constitute key sources in trend (which they were not in last year's key source analysis) as well as level. Also Iceland now includes emissions from geothermal energy which constitute a key source both in level and trend.

Table 1.1 Key sources

IPCC SOURCE CATEGORIES	Direct GHG	Key source	
		Level	Trend
ENERGY SECTOR			
Mobile combustion: fishing	CO_2	ν	ν
Mobile combustion: road vehicles	CO_2	ν	ν
Mobile combustion: road vehicles	N_2O		ν
Mobile combustion: construction	CO_2	ν	ν
CO_2 emissions from stationary combustion, oil	CO_2	ν	ν
CO_2 emissions from stationary combustion, coal	CO_2	ν	
INDUSTRIAL PROCESSES			
CO_2 emissions from Ferroalloys	CO_2	ν	ν
CO_2 emissions from cement production	CO_2	ν	
CO_2 emissions from aluminium production	CO_2	ν	ν
PFC emissions from aluminium production	PFC		ν
Emissions from substitutes for Ozone Depleting Substances	HFC	ν	ν
AGRICULTURE			
CH_4 emissions from enteric fermentation	CH_4	ν	ν
Direct N_2O emissions from agricultural soils	N_2O	ν	ν
Indirect N_2O emissions from Nitrogen used in agriculture	N_2O	ν	ν
WASTE			
CH_4 emissions from solid waste disposal sites	CH_4	ν	ν
GEOTHERMAL ENERGY			
CO_2 emissions from geothermal energy utilisation		ν	ν

1.6 Quality assurance and quality control (QA/QC)

A QA/QC plan is under preparation. Calculations and units have been checked internally within the EFA and some checks have been made regarding several key sources. Data consistency between years is also checked.

1.7 Uncertainty evaluation

For this round of reporting a preliminary estimate of the quantitative uncertainty of the Icelandic emission inventory has been prepared. The uncertainty estimate has revealed that the total uncertainty of the Icelandic inventory is 7,4%. The results of the uncertainty estimate can be found in Annex II.

1.8 General assessment of the completeness

An assessment of the completeness of the emission inventory should, according to the IPCC's Good Practice Guidance, address the issues of spatial, temporal and sectoral coverage along with all underlying source categories and activities.

In terms of spatial coverage, the emission reported under the UNFCCC covers all activities within Iceland's jurisdiction.

In the case of temporal coverage, CRF tables are reported for the whole time series from 1990 to 2004.

With regard to sectoral coverage the few sources listed in table 9 of the CRF are not estimated.

The main sources not estimated are:

- Emissions of CO_2 and CH_4 from distribution of oil products (1B2a v)
- Only the potential emissions of HFCs are estimated and SF_6 emissions are not estimated but held constant over the whole time series (2F)

The reason for not including the above activities/gases in the present submission is lack of data or methods, and/or that additional work was impossible due to time constraints in the preparation of the emission inventory.

1.9 Planned and implemented improvements

In 2004 the UNFCCC secretariat coordinated an in-country review of the 2004 greenhouse gas inventory submission of Iceland, in accordance with decision 19/CP.8 of the Conference of the Parties. The review took place from 20th to 24th of September 2004 in Iceland. The review was based on a complete set of common reporting format tables for the years 1990-2002, as well as a national inventory report from 2004. The expert review team concluded that the Icelandic emissions inventory is largely complete and largely consistent with the UNFCCC reporting guidelines. However, the expert review team noted some departures from the UNFCCC guidelines in that not all CO_2 emissions/removals from the Industrial Processes and LUCF sectors are included and the lack of data on actual emissions of HFCs and SF_6. There were other gaps in the data, for instance, with regard to emissions from wastewaster handling, N_2O and CH_4 emissions from fuel combustion of various combustion sources, CO_2 and N_2O emissions from solvent and other product use, and CO_2 emissions and removals from soils. A centralized review of the 2005 greenhouse gas inventory submissions of Iceland, took place from 10th to 15th of October 2005 in Bonn. The main findings of that review were the same as from the in-country review from the year before.

The expert review teams pointed out the following issues of high importance for improving the inventory:

- The establishment of a more robust institutional and legal framework for fulfilling the reporting requirements under the UNFCCC, for example, as a basis for the preparation of the national energy balance;
- The reporting of all LULUCF activities and industrial process emissions in accordance with the UNFCCC reporting guidelines;
- Closing other estimation and reporting gaps in the inventory (e.g. emissions from wastewater handling, and actual emissions from HFCs and SF_6);
- Improving the quality of the activity data (e.g. in the LULUCF and Waste sectors);
- Further implementation of the IPCC good practice guidance (e.g. the use of additional country-specific methodologies for key sources such as road transportation; quantitative estimation of uncertainties for total and sectoral emissions, as well as for the main key sources; and the introduction of a more advanced quality assurance/quality control system, including verification of information provided by industry, including the fishing industry);
- Improvement of the transparency of the inventory by providing more detailed information in the national inventory report (e.g. on recalculations, on the choice of methodologies, on details of country-specific methodologies and on activity data, and references to background material);
- Improvement of consistency with other national and international data sets (e.g. waste-related activity data, cement production data) and of explanation for inconsistencies, if any.

Based on the review reports, some important improvements have already been implemented, while others are to be implemented. A list of planned and implemented improvements can be seen in table 1.2.

Table 1.2 Planned and implemented improvements

Implemented improvements:

- The reporting of Industrial Processes falling under Decision 14/CP.7 are now as suggested by the ERT.
- N_2O and CH_4 emissions from fuel combustion of various combustion sources have been estimated.
- N_2O emissions from solvent and other product use have been estimated.
- The Ministry for the Environment, in close cooperation with other relevant ministries has established an institutional and legal framework to further strengthen Icelandic climate change policy.
- Preliminary estimate of the quantitative uncertainty.
- A quality assurance/quality control system is under development.
- Activity data and methodologies in the waste sector have been improved. Emissions from wastewater handling are now included and emissions from solid waste disposal sites are now estimated with the FOD method.
- Afforestation and revegetation prior to 1990 is now reported, as well as liming of agricultural land
- Cultivation of histosols in not reported separately but included in emissions from other drained organic soils.
- Prior to its 2006 submission Iceland did not submit the new CRF LULUCF tables. The LULUCF reporting is thus much more extensive than before. This includes coverage of categorized land use and land use change information on all areas of the country. In many cases, though, information on land use prior to 2004 is not available and thus reported land use for years before 2004 are the same as 2004.

Planned and ongoing improvements:

- Iceland has until now not prepared a national energy balance. Following the recommendations from the In-country review team, Iceland will now start preparing annually a national energy balance.
- Estimate actual emissions of HFCs and $SF_{6.}$
- Construction of geographically identifiable land use database covering the whole country will start in 2007, including extensive sampling on present and previous land use.
- Ongoing new forest inventory will improve both estimates of Forest land area and Carbon stock changes. Similar effort regarding Revegetation is being prepared.

Improvements under consideration:

- Improve methodologies to estimate emissions from road transportation.
- Develop country-specific emission factor for enteric fermentation
- Revise country-specific N excretion factors.
- Improvements of QA/QC for LULUCF.
- Revision of LULUCF emission/removal factors, emphasizing key sources and aiming at higher tier levels.

2 TRENDS IN GREENHOUSE GAS EMISSIONS

2.1 Emission trends for aggregated greenhouse gas emissions

The total amount of greenhouse gases emitted in Iceland during the period 1990 – 2004 is presented in the following tables, expressed in terms of contribution by gases and by sources.

Table 2.1 below presents emission figures for all direct greenhouse gases, expressed in CO_2-equivalents along with the percentage change indicated for both the time period 1990 – 2004 and 2003 – 2004.

Table 2.1. Emissions of greenhouse gases in Iceland during the period 1990 – 2004 (without LULUCF). Empty cells indicate emissions not occurring. Units: Gg CO_2-eq

	Year														
Gas	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
CO_2	2151	2072	2200	2304	2266	2299	2388	2483	2493	2696	2745	2747	2842	2764	2859
CH_4	413	411	407	408	413	407	415	421	428	429	424	428	431	417	416
N_2O	366	356	335	343	348	345	363	362	360	380	355	349	315	309	330
HFC 32									0	0	0	0	0	0	0
HFC 125						11	12	11	27	23	15	23	16	26	22
HFC 134a			1	2	3	4	6	7	8	8	6	7	4	13	12
HFC 143a						10	10	19	29	28	12	24	16	29	24
HFC 152a						0	0	0	0	0	0	0	0	0	0
CF_4	355	295	131	63	38	50	21	70	152	147	108	78	61	51	33
C_2F_6	65	54	24	12	7	9	4	13	28	27	20	14	11	9	6
SF_6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Total	**3355**	**3193**	**3102**	**3137**	**3080**	**3141**	**3225**	**3391**	**3531**	**3743**	**3689**	**3675**	**3701**	**3624**	**3707**
CO2 emissions that could fall under 14/CP.7									108	115	273	404	441	451	455
Total, without CO2 emissions that could fall under 14/CP.7									**3423**	**3628**	**3416**	**3270**	**3260**	**3173**	**3252**

Gas	1990	2003	2004	Changes 90-04	Changes 03-04
CO_2	2151	2764	2859	33%	3%
CH_4	413	417	416	1%	-0,2%
N_2O	366	309	330	-10%	7%
HFC 32		0	0		29%
HFC 125		26	22		-15%
HFC 134a		13	12		-14%
HFC 143a		29	24		-17%
HFC 152		0	0		-59%
CF_4	355	51	33	-91%	-35%
C_2F_6	65	9	6	-91%	-35%
SF_6	5	5	5	0%	0%
Total	**3355**	**3624**	**3707**	**10,5%**	**2,3%**
CO_2 emissions that could fall under 14/CP.7		451	455		0,9%
Total, without CO_2 emissions that could fall under 14/CP.7	**3355**	**3173**	**3252**	**-3,1%**	**2,5%**

As mentioned in Chapter 1.1 industrial process CO_2 emissions that fulfill Decision 14/CP.7 shall be reported separately and shall not be included in national totals, to the extent they would cause a Party to exceed its assigned amount. In this report, emissions that are stated as emissions that could fall under Decision 14/CP.7 show the scope for increased emissions. Since this decision only applies for the first commitment period, they are not excluded from national totals.

In 1990, the total emissions of greenhouse gases (excluding LULUCF) in Iceland were 3.355 Gg of CO_2- equivalents. In 2004 total emissions were 3.707 Gg CO_2-equivalents. This implies an increase of 10,5% over the time period. Total emissions show a decrease between 1990 and 1994, with an exception in 1993, and an increase thereafter. So far, 1999 has been the year with the highest emissions recorded.

Iceland has experienced economic growth since 1990, which explains the general growth in emissions. This has resulted in higher emissions from most sources, but in particular from transport and industrial processes.

Since 1990 the number of private cars has been increasing much faster than the population. Also the number of passengers using the public transport system has declined. More traffic is thus not mainly due to population growth, but much rather because a larger share of the population owns and uses private cars for their daily travel.

During the late nineties large-scale industry expanded in Iceland. The existing aluminium plant and the ferroalloys industry experienced enlargement in 1997 and 1999, and in 1998 a new aluminium plant was established.

Nitrous oxide emissions have decreased since 1990, despite the fact that nitrous oxide emissions from road transport have increased. This is due to a decrease in animal livestock and because fertilizer production in Iceland was terminated in 2001.

Before 1992 there were no imports of HFCs, but since then, imports have increased rapidly in response to the phase-out of CFCs and HCFCs. The potential emissions of HFCs have risen from 0,5 Gg CO_2-equivalent in 1992 to 58,4 Gg CO_2-equivalent in 2004.

The overall increasing trend of greenhouse gas emissions has to some extent been counteracted by decreased emissions of PFCs, caused by improved technology and process control in the aluminium industry.

2.2 Emission trends by gas

As shown in figure 2.1, the largest contributor by far to the total GHG emissions is CO_2 (77%), followed by CH_4 (11%) and N_2O (9%) and then by the fluorinated gases PFCs, HFCs and SF_6 (3%). In 1990 the share of CO_2 was lower than in 2004 or (64%), the share of CH_4 and N_2O about the same (12% and 11% respectively) but the share of fluorinated gases was higher (13%).

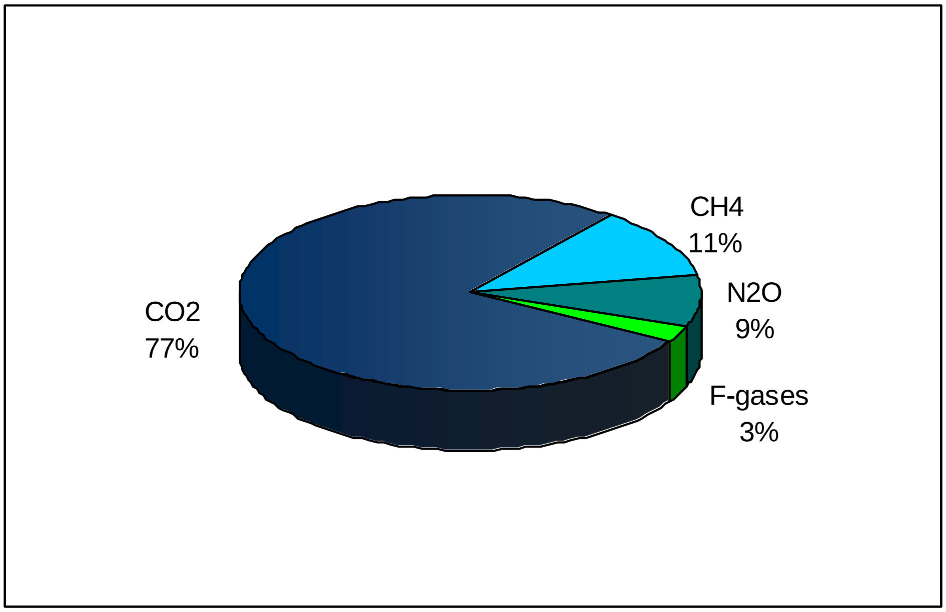

Figure 2.1 Distribution of emissions of greenhouse gases by gas in 2004

Figure 2.2 illustrates the percentage change in emissions of greenhouse gases by gas in Iceland from 1990 to 2004, compared with 1990.

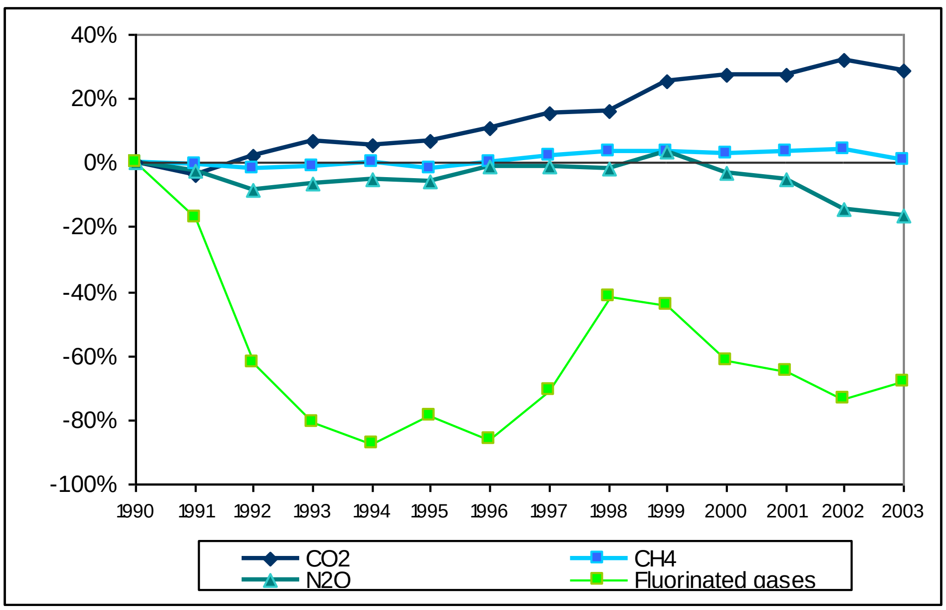

Figure 2.2 Percentage changes in emissions of greenhouse gases by gas 1990 – 2004, compared with 1990

2.2.1 Carbon dioxide (CO_2)

Fisheries, road transport and industrial processes are the three main sources of CO_2 emissions in Iceland. Since emissions from the electricity generation and space heating are very low because they are generated from renewable energy sources, emissions from stationary combustion are dominated by industrial sources. Thereof the fishmeal industry is by far the largest user of fossil fuels. Emissions from mobile sources in the construction industry are also significant. Emissions from geothermal energy exploitation are moderate. ‘Other sources’ consist mainly of emissions from coal combustion in the cement industry and other transportation than road transportation. Table 2.2 lists CO_2 emissions from each source category for the period 1990 – 2004. Figure 2.3 illustrates the distribution of CO_2 emissions by main source categories, and figure 2.4 shows the percentage change in emissions of CO_2 by source from 1990 to 2004, compared with 1990.

Table 2.2 Emissions of CO_2 by sector 1990 – 2004, Gg.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Fishing	655	676	740	770	760	772	828	810	781	765	720	640	705	662	712
Road vehicles	509	527	540	537	544	534	514	545	552	577	589	595	604	628	636
Stationary combustion, oil	237	168	241	253	229	219	270	285	261	264	203	245	275	228	191
Industrial processes	393	359	362	410	411	427	426	485	512	659	766	804	822	824	846
Construction	121	115	107	116	118	149	144	174	175	192	197	192	180	197	243
Geothermal energy	67	67	67	67	67	82	82	71	94	123	163	154	159	138	124
Other	169	160	142	152	138	117	124	114	117	115	107	116	96	86	107
Total	2151	2072	2200	2304	2266	2299	2388	2483	2493	2696	2745	2747	2842	2764	2859

In 2004 the total CO_2 emissions in Iceland were 2.859 Gg. This implies an increase of about 3% from the preceding year but an increase of about 33% from 1990. This increase in emissions, between 2003 and 2004, can be explained by increased emissions from fisheries (8%), construction (23%) as well as increased other emissions (24%). Thereof emissions from combustion of coal in the cement industry are most important. Both increased emissions from the cement industry and from the construction sector are due mainly to increased activity related to the construction of Iceland’s largest hydroplower plant. Emissions from road vehicles increased by 1% between 2003 and 2004, and emissions from industrial processes by 3%. However emissions from stationary oil combustion decreased by 16% from 2003 to 2004. This is mainly due to decreased emissions from the fish meal industry. Emissions from geothermal energy decreased by 10% in the same period.

The increase in CO_2 emissions between 1990 and 2004 can be explained by increased emissions from industrial processes (115%), road transport (25%), the construction sector (101%), geothermal energy utilization (86%) and from fishing (9%). Since 1990 and in particular after 1995 Iceland has experienced economic growth, which partly explains the general growth in emissions. During the late nineties energy intensive industry expanded. The existing aluminium plant and the ferroalloys industry experienced enlargement in 1997 and 1999, and in 1998 a new aluminium plant was built. The economic growth and the expansion of energy intensive industry has resulted in higher emissions from most sources, but in particular from the industrial processes sector as well as from the construction sector. In the 1990s the vehicle fleet in Iceland almost doubled. This has led to increased emissions from road transportation, a trend that is still ongoing.

Furthermore the latest trend has been towards larger passenger cars which consume more fuel. Since 1999 the average fuel consumption of newly registered passenger cars has increased by over 6%. Emissions from fishing rose from 1990 to 1996 because a substantial portion of the fishing fleet was operating in distant fishing grounds. From 1996 the emissions decreased again reaching 1990 levels in 2001. Emissions increased again by 10% between 2001 and 2002, but in 2003 they dropped to 1990 levels. In 2004 emissions were 9% over 1990 levels. Annual changes in emissions reflect the inherent nature of the fishing industry. Emissions from other sources decreased from 1990 to 2003, but rose again in 2004 though they were still 37% under the 1990 level. This is mainly due to changes in the cement industry where production has been slowly degrading since 1990. Due to the construction of a hydropower plant (resulting in more demand of cement) production increased again in 2004, though the major part of the cement used in this project is imported. Emissions from both domestic flight and navigation have declined significantly since 1990.

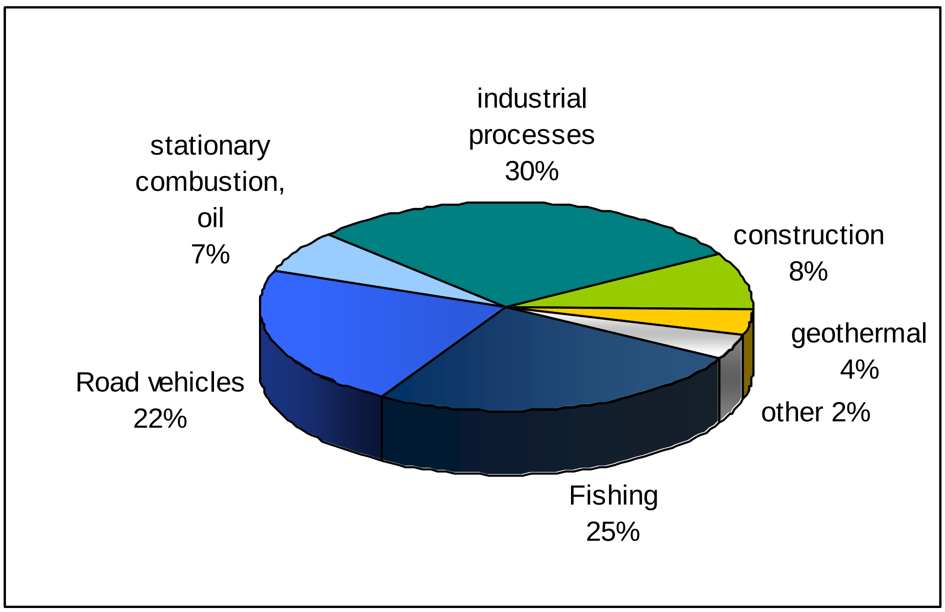

Figure 2.3 Distribution of CO_2 emissions by source in 2004

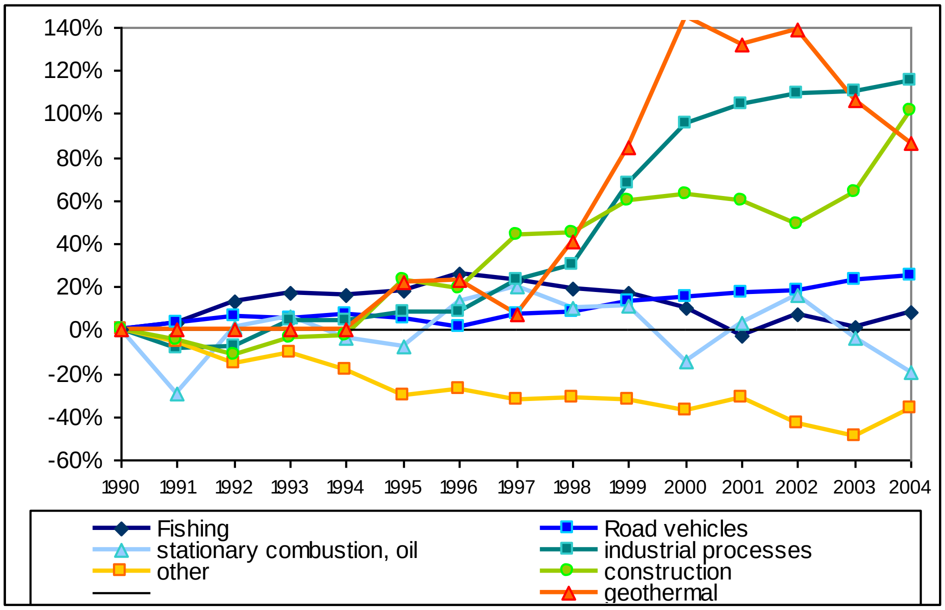

Figure 2.4 Percentage changes in emissions of CO_2 by major sources 1990 – 2004, compared with 1990

2.2.2 Methane (CH_4)

As can be seen from table 2.3 and figure 2.5, about 60% and 38% of the emissions of methane in 2004 originated from waste treatment and agriculture respectively. The emissions from agriculture have decreased by 15% since 1990, but the emissions from waste treatment increased readily from 1990 to 2002. This is due to an increased amount of waste generated and increased ratio of landfilled wastes in managed waste disposal sites. The emissions from landfills decreased slightly from 2002 to 2004, due to increased methane recovery. In 2004, emissions from landfills were 38% above the 1990 level.

In whole emissions of methane have been relatively stable over the period.

Table 2.3 Emissions of CH_4 by sector 1990 – 2004, Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Agriculture	14	14	13	13	13	13	13	13	13	13	13	13	12	12	12
Landfills	5	6	6	6	6	6	7	7	7	7	7	7	8	7	7
Other	0,3	0,3	0,3	0,3	0,3	0,2	0,3	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
Total	20	20	19	19	20	19	20	20	20	20	20	20	21	20	20

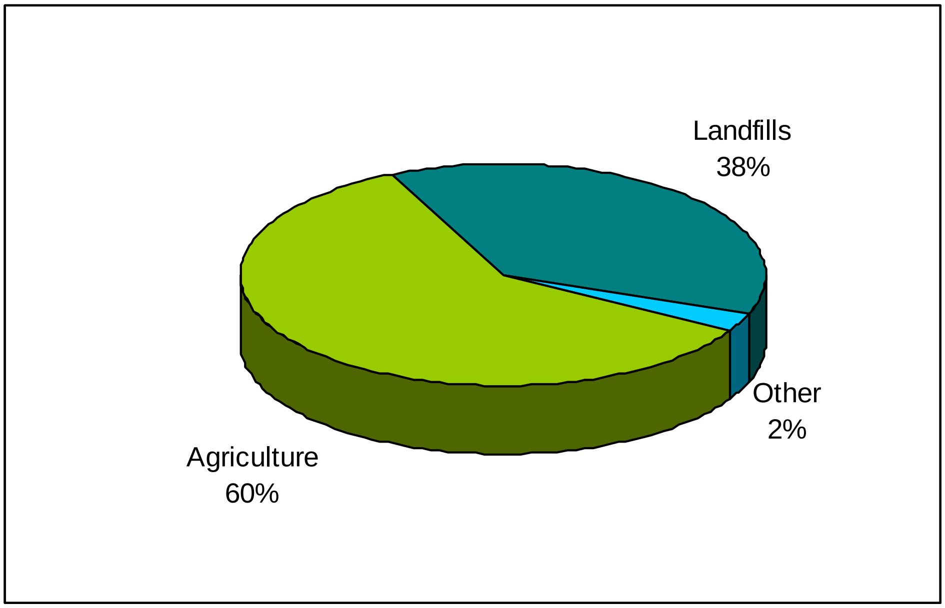

Figure 2.5 Distribution of CH_4 emissions by source in 2004

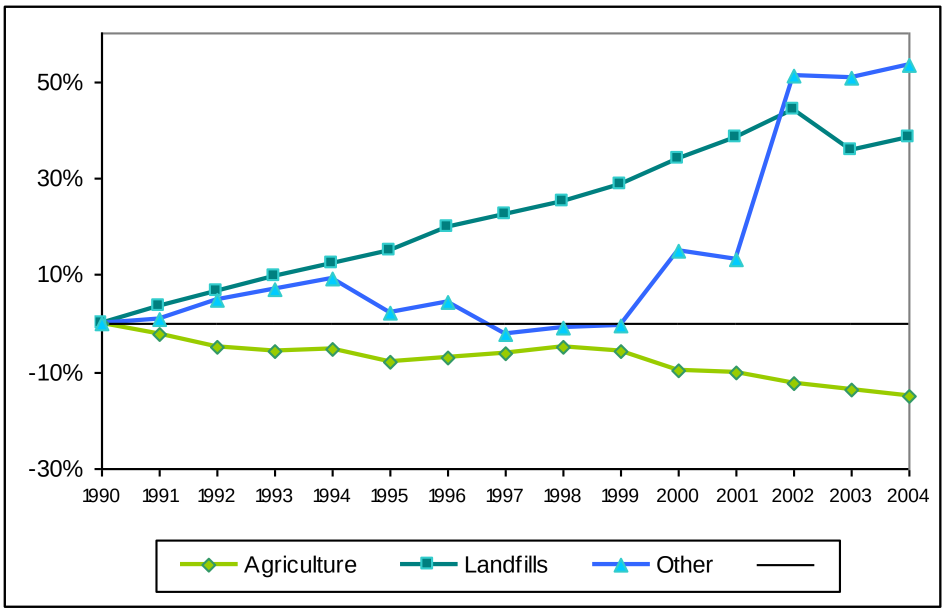

Figure 2.6 Percentage changes in emissions of CH_4 by major sources 1990 – 2004, compared to 1990

2.2.3 Nitrous oxide (N_2O)

As can be seen from table 2.4 and figure 2.7 agriculture accounts for around 76% of N_2O emissions in Iceland, with agricultural soils as the most prominent contributor. The second most important source is road transport, which has increased rapidly after the use of catalytic converters in all new vehicles became obligatory in 1995.

The overall nitrous oxide emissions decreased by 10% from 1990 to 2004, due to a decrease in the number of animal livestock and because fertilizer production in Iceland was terminated in 2001.

Table 2.4 Emissions of N_2O by sector 1990 – 2004, Gg

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Agriculture	0,9	0,9	0,8	0,8	0,9	0,8	0,9	0,8	0,8	0,9	0,9	0,8	0,8	0,8	0,8
Road traffic	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Other	0,3	0,3	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,2	0,2	0,1	0,1	0,2
Total	1,2	1,1	1,1	1,1	1,1	1,1	1,2	1,2	1,2	1,2	1,1	1,1	1,0	1,0	1,1

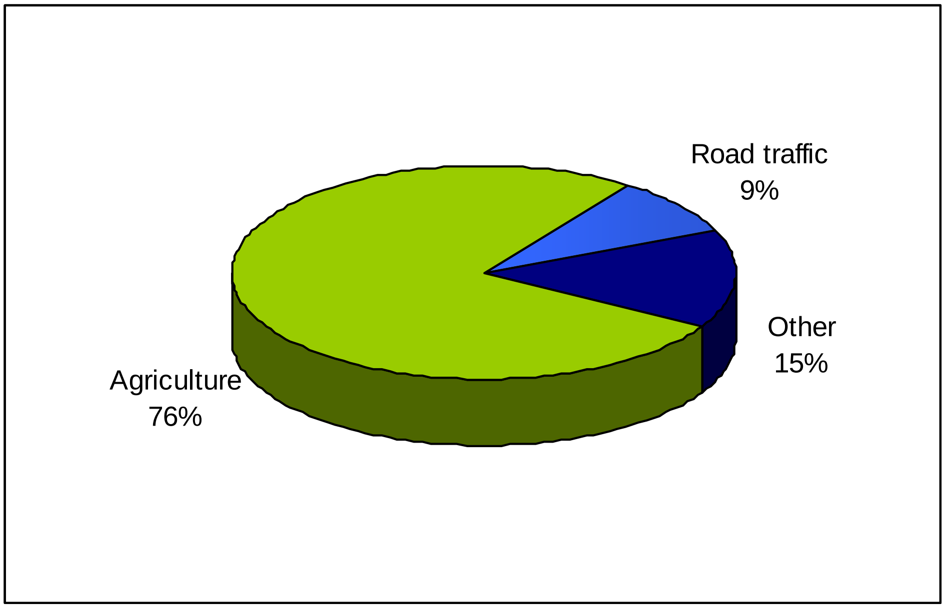

Figure 2.7 Distribution of N_2O emissions by source in 2004

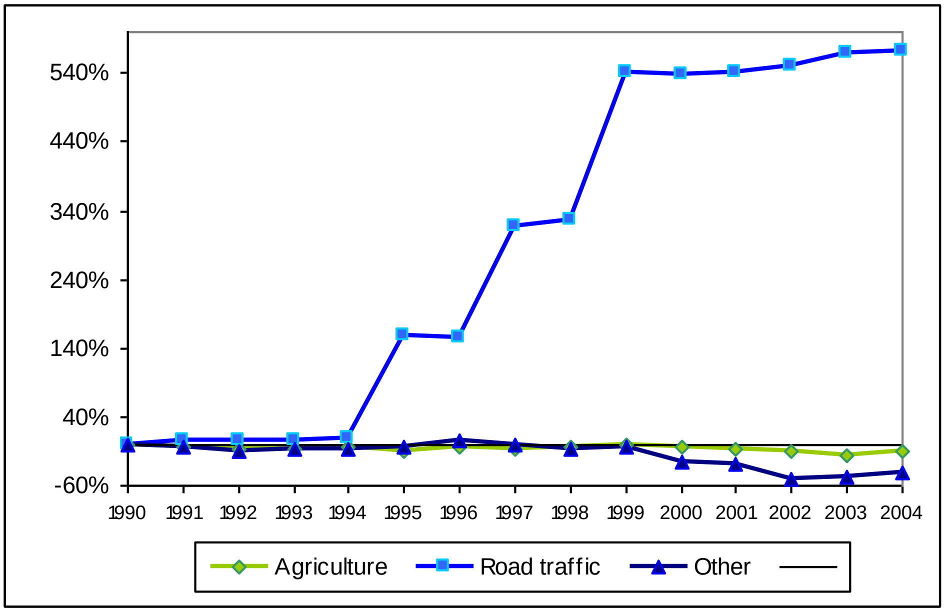

Figure 2.8 Changes in N_2O emission for major sources between 1990 and 2004

2.2.4 Perfluorcarbons

The emissions of the perfluorcarbons, tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6) from the aluminium industry were 32,6 and 5,9 Gg CO_2-equivalents respectively in 2004.

Total PFC emissions decreased by 91% in the period of 1990 – 2004. As can be seen from figure 2.9 the emissions decreased steadily from 1990 to 1996 with the exception of 1995. In 1997 and 1998 the emissions rose again due to expansion of the single existing aluminium plant in 1997 and the establishment of a new aluminium plant in 1998. Since 1998 the emissions show a steady downward trend. PFCs reduction is achieved through improved technology and process control, which has led to a 97% decrease in the amount of PFCs emitted per tonne of aluminium produced during the period of 1990 – 2004.

Table 2.5 Emissions of PFCs by species 1990 – 2004, Gg CO_2-equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
CF_4	355	295	131	63	38	50	21	70	152	147	108	78	61	51	33
C_2F_6	65	54	24	12	7	9	4	13	28	27	20	14	11	9	6
Total	423	348	155	75	45	59	25	82	180	173	127	92	73	60	39

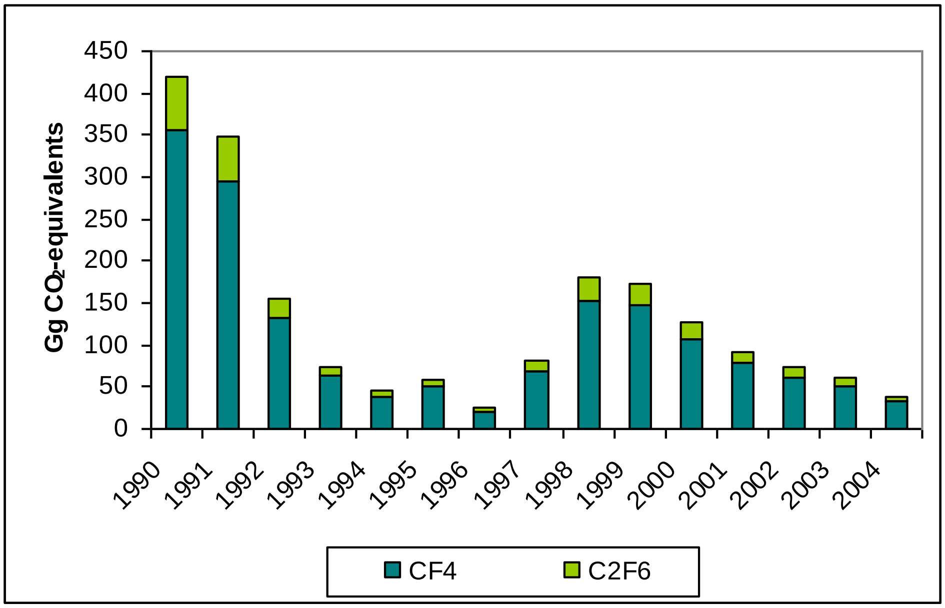

Figure 2.9 Emissions of PFCs from 1990 to 2004, Gg CO_2-equivalent

2.2.5 Hydrofluorocarbons (HFCs)

The total potential emissions of HFCs, used as substitutes for ozone depleting substances, amounted to 58,4 Gg CO_2-equivalents in 2004. The import of HFCs started in 1992 and increased until 1998. Since then annual imports have ranged between 30 and 70 Gg CO_2-equivalents. Sufficient data is not available to calculate actual emissions. This means that only potential emissions, based on imports, are estimated. The potential method is likely to overstate emissions, since chemicals used e.g. in refrigerators are emitted over a period of several years. The application category refrigeration contributes by far the largest part of HFCs emissions but foam blowing is also thought to be a minor source.

Table 2.6 Emissions of HFCs by species 1990 – 2004, Gg CO_2-equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
HFC 32	-	-	-	-	-	-	-	-	0,0	0,0	0,1	0,0	0,0	0,1	0,1
HFC 125	-	-	-	-	-	10,8	11,7	11,1	27,1	23,5	14,5	23,2	15,7	26,3	22,4
HFC 134a	-	-	0,5	1,6	3,1	4,1	6,5	7,1	8,0	8,2	6,0	6,8	3,8	13,4	11,5
HFC 143a	-	-	-	-	-	10,0	10,3	19,0	28,6	27,6	11,6	23,8	15,6	29,4	24,3
HFC 152a	-	-	-	-	-	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,0	0,1	0,0
Total	-	-	0,5	1,6	3,1	25,0	28,6	37,5	63,9	59,4	32,3	53,8	35,2	69,3	58,4

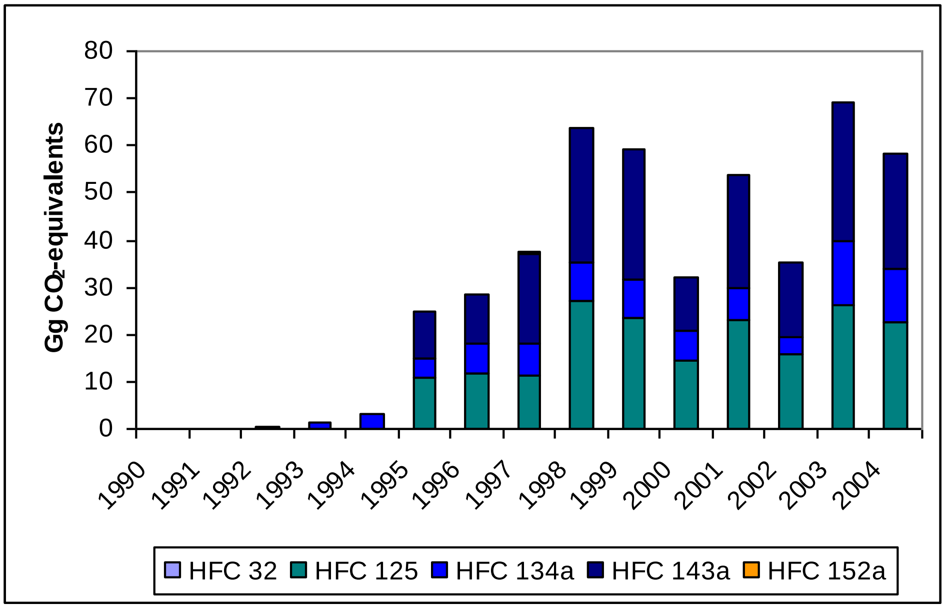

Figure 2.10 Potential emissions of HFCs by species 1990 – 2004, Gg CO_2-eq

2.2.6 Sulphur hexafluorid (SF_6)

Sulphur hexafluoride emissions are not estimated but held constant over the whole time series. The largest source of SF_6 emissions is thought to be leakages from electrical equipment.

2.3 Emission trends by source

The largest contributor of greenhouse gas emissions (without LULUCF) in Iceland is the energy sector, followed by industrial processes, agriculture, waste, geothermal energy and solvent and other product use. From 1990 to 2004 the contribution of the energy sector to the total net emissions increased from 52% to 53% respectively. The contribution of industrial processes was 26% in 1990 as well as in 2004.

Table 2.7 Total emissions of greenhouse gases by sources (without LULUCF) in Iceland 1990 – 2004, Gg CO_2-equivalents

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Energy	1704	1657	1782	1844	1808	1819	1912	1968	1931	1971	1873	1845	1916	1861	1960
Industrial Processes	867	760	566	536	509	559	535	652	798	934	950	971	936	960	949
Solvent Use	6	5	5	5	4	5	5	5	5	5	5	4	4	4	3
Agriculture	571	558	534	536	543	523	536	536	542	548	529	526	503	489	500
Waste	141	145	148	149	151	152	156	159	160	163	170	174	183	172	172
Geothermal Energy	67	67	67	67	67	82	82	71	94	123	163	154	159	138	124
Total	3355	3193	3102	3137	3080	3141	3225	3391	3531	3743	3689	3675	3701	3624	3707

The distribution of the total greenhouse gas emissions over the UNFCCC sectors (including geothermal energy and excluding LULUCF) in 2004 is shown in figure 2.11. Emissions from the energy sector account for 53% of the national total emissions, industrial processes account for 26% and agriculture for 14%. The waste sector accounts for 4%, geothermal energy for 3% and solvent and other product use for 0,1%.

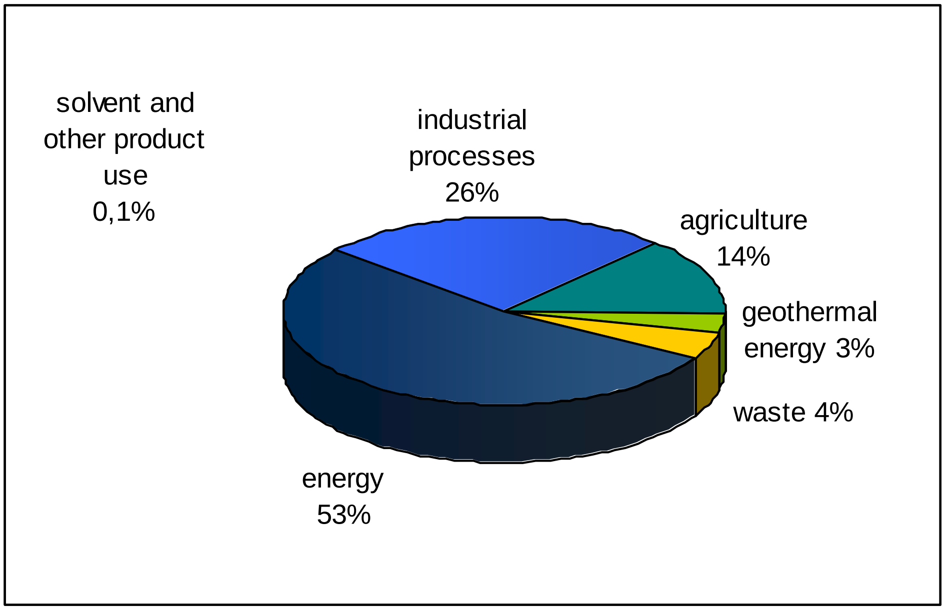

Figure 2.11 Emissions of greenhouse gases by UNFCCC sector in 2004

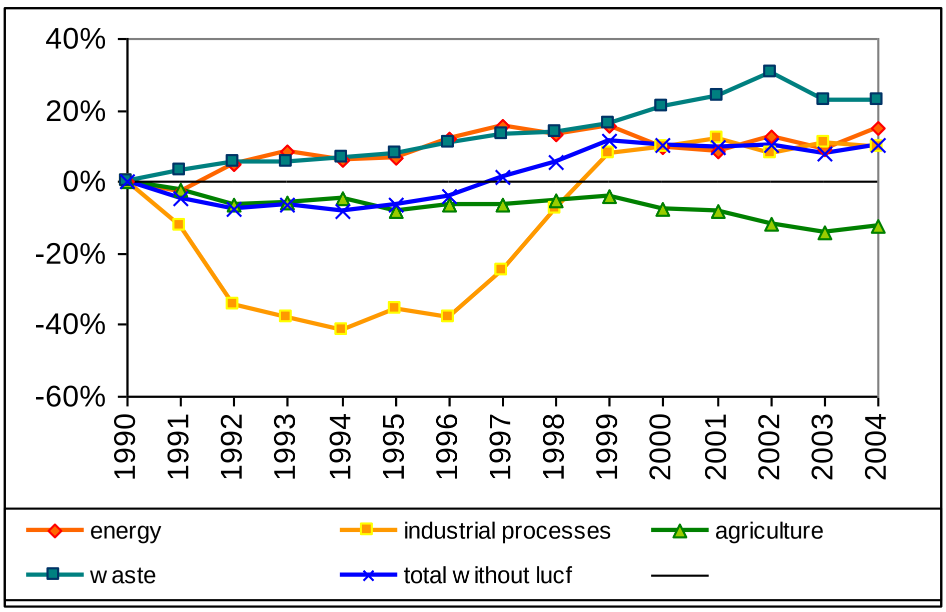

Figure 2.12 Percentage changes in emissions of total greenhouse gas emissions by UNFCCC source categories during the period 1990 – 2004, compared to 1990

2.3.1 Energy

The energy sector in Iceland is unique in many ways. In 2000 the per capita energy use was close to 500 MJ, which is high compared to other industrial countries, but the proportion of domestic renewable energy in the total energy budget is 70%, which is a much higher share than in most other countries. The cool climate and sparse population calls for high energy use for space heating and transport. Iceland relies heavily on geothermal energy for space heating and on hydropower for electricity production.

The total emissions of greenhouse gases from the energy sector over the period of 1990 – 2004 are listed in table 2.8. Figure 2.14 shows the distribution of emissions in 2004 by different source categories. The percentage change in the various source categories in the energy sector between 1990 and 2004, compared with 1990 are illustrated in figure 2.15.

Table 2.8 Total emissions of greenhouse gases from the energy sector in 1990 – 2004, Gg CO_2-eq.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Energy industries	21	22	21	23	22	25	20	16	38	21	15	15	15	14	20
Manufacturing ind. & constr.	377	300	352	380	360	376	419	491	465	492	445	477	477	451	481
Transport	608	620	630	631	634	615	605	624	627	657	660	670	674	698	710
Other sectors	698	715	779	811	792	803	867	838	801	801	753	683	750	698	749
Fugitive emissions	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total	1704	1658	1782	1844	1808	1819	1912	1968	1931	1971	1873	1845	1916	1861	1960

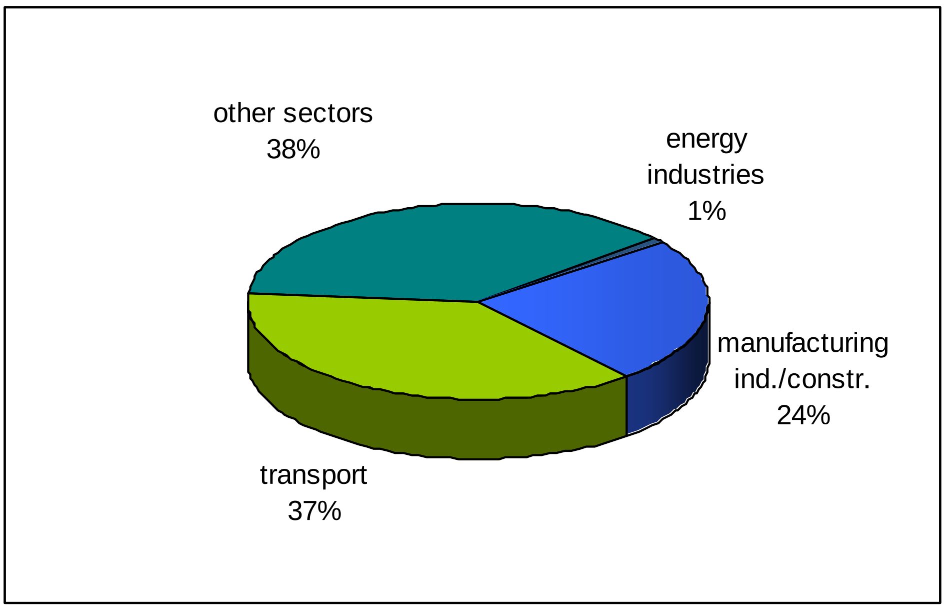

Figure 2.14 Greenhouse gas emissions in the energy sector 2004, distributed by source categories

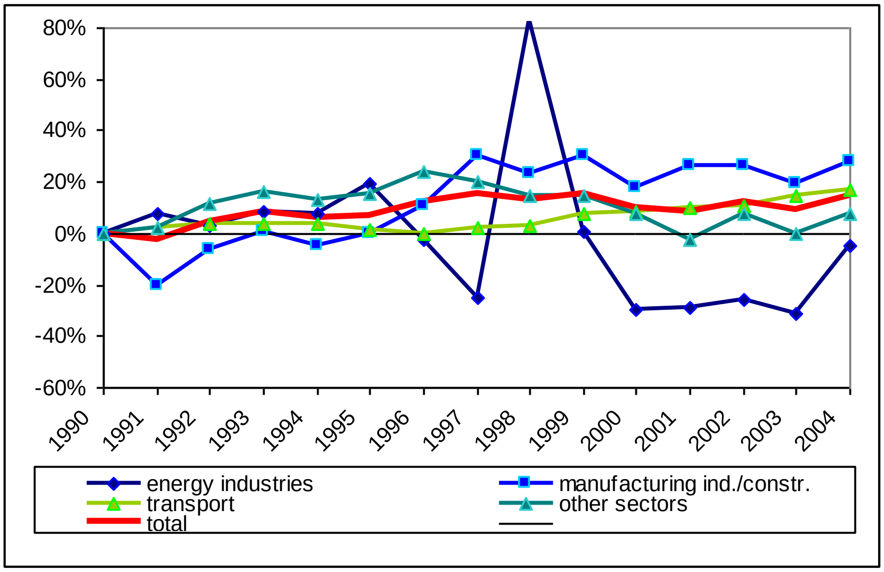

Figure 2.15 Percentage changes in emissions in various source categories in the energy sector during the period 1990 – 2004, compared to 1990

As can been seen from table 2.8 and figure 2.15 emissions from all source categories except energy industries have increased during the period. The peak in the energy industries in 1998 was due to unusual weather condition during the winter of 1997/1998, which led to unfavourable water conditions for the hydropower reservoirs. This created a shortage of electricity which was met by burning oil for electricity and heat production.

Increased emissions from the manufacturing industries and construction source category are explained by the increased activity in the construction sector during the period.

The fisheries dominate the 'other sector'. Emissions from fisheries rose from 1990 to 1996 because a substantial portion of the fishing fleet was operating in distant fishing grounds. From 1996, the emissions decreased again reaching 1990 levels in 2001. Emissions increased again by 10% between 2001 and 2002. In 2003 emissions again reached the 1990 level. In 2004 emissions were 9% over the 1990 level. Annual changes are inherent in the nature of fisheries.

In the 1990s the vehicle fleet in Iceland almost doubled. This has led to increased emissions from the transport sector, a trend that is still ongoing. The latest trend has been towards larger passenger cars, which consume more fuel. Since 1999 the average fuel consumption of newly registered passenger cars has increased by over 6%. A decrease in navigation and aviation has however compensated the effect of rising emissions in the transport sector to some extend.

2.3.2 Industrial processes

Production of raw materials is the main source of industrial process related emissions for both CO_2 and other greenhouse gases such as N_2O and PFCs. The industrial process sector accounts for about 26% of the national greenhouse gas emissions. As can be seen from figure 2.16 and table 2.9 emissions decreased from 1990 to 1996, mainly because of decrease in PFC-emissions. During the late nineties large-scale industry expanded in Iceland. The existing aluminium plant and the ferroalloys industry experienced enlargement in 1997 and 1999, and in 1998 a new aluminium plant was established. This led again to an increase in industrial process emissions.

Table 2.9 Total greenhouse gas emissions from the industry sector 1990 – 2004, Gg CO_2-eq.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Mineral Products	52	49	46	40	37	38	42	47	54	62	66	59	41	33	51
Chemical Industry	48	47	42	44	44	42	49	41	36	36	19	16	0	0	0
Metal Production	760	659	472	445	417	448	409	520	638	700	827	826	854	851	833
- Ferroalloys	*203*	*171*	*182*	*231*	*225*	*238*	*227*	*249*	*192*	*250*	*354*	*370*	*389*	*389*	*387*
- Aluminium	*556*	*488*	*289*	*214*	*193*	*210*	*182*	*271*	*446*	*520*	*473*	*466*	*465*	*461*	*446*
- Aluminium CO_2	*136*	*139*	*134*	*139*	*148*	*151*	*157*	*189*	*266*	*347*	*346*	*374*	*393*	*402*	*407*
- Aluminium PFC	*420*	*348*	*155*	*75*	*45*	*59*	*25*	*82*	*180*	*173*	*127*	*92*	*73*	*60*	*39*
Other production	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Consumption of HFCs and SF_6	5	5	6	7	8	30	34	43	69	65	38	59	41	75	64
Total	867	760	566	536	509	559	535	653	798	934	950	971	936	960	949
Emissions fulfilling 14/CP.7									108	115	273	404	441	451	455

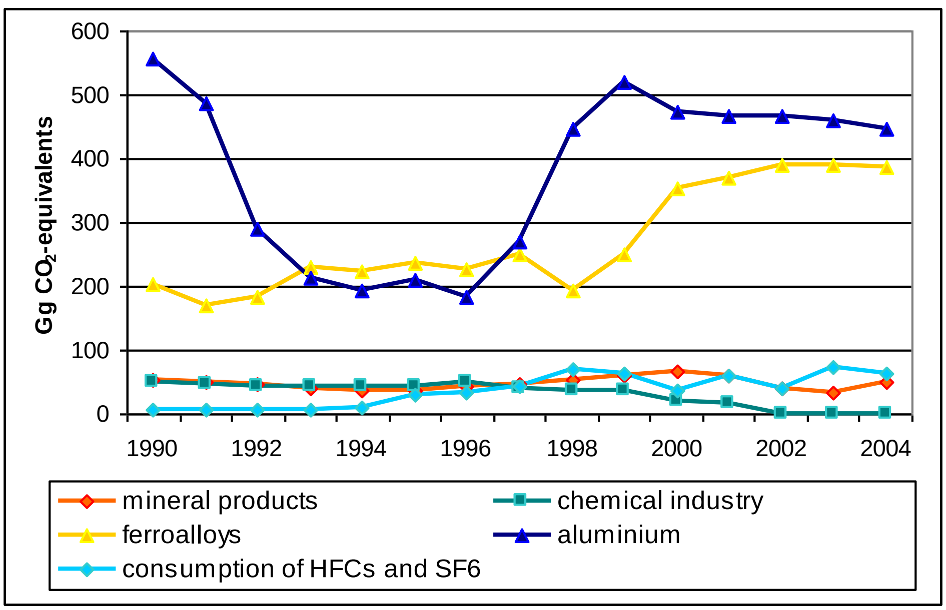

Figure 2.16 Total greenhouse gas emissions in the industrial process sector during the period from 1990 – 2004, Gg CO_2-eq.

The main category within the industrial process sector is metal production, which accounted for 88% of the sector's emissions in 1990 as well as in 2004. Aluminium production is the main source within the metal production category, accounting for 47% of the total industrial process emissions. The production technology in both existing plants is based on using prebake anode cells. The main energy source is electricity, and industrial process CO_2 is mainly due to the anodes that are consumed during the electrolysis. In addition, the production of aluminium gives rise to emissions of PFCs. From 1990 to 1996 PFC emissions were reduced by 94%. Because of the enlargement of the existing aluminium plant in 1997 and the establishment of a new aluminium plant in 1998, emissions increased again from 1997 to 1999 but have decreased since. In 2004 the emissions had decreased by 91% from the 1990 level. The reduction in PFC emissions was effectuated by improved technology and process control. PFC emissions per tonne aluminium produced went from 4,78 tonnes CO_2-equivalents in 1990, to 0,14 tonnes CO_2-equivalents in 2004.

Production of ferroalloys is another major source of emissions, accounting for 41% of the industrial processes emissions in 2004. CO_2 is emitted due to the use of coal and coke as reducing agents and from the consumption of electrodes. In 1998 a power shortage caused a temporary closure of the ferroalloy plant, resulting in exceptionally low emissions that year. In 1999, however, the existing plant was expanded and emissions have therefore increased considerably.

Production of minerals is the sector's second most important category, accounting for 5,4% of the emissions in 2004. Cement production is the dominant contributor. Cement is produced in one plant in Iceland, emitting CO_2 derived from carbon in the shell sand used as raw material in the process. Emissions from the cement industry reached a peak in 2000 but declined until 2003, partly because imports of cement. In 2004 emissions increased again. This can be explained by increased activity related to the construction of Iceland's largest hydropower plant.

Production of fertilizers used to be the main contributor to the process emissions from the chemical industry. The production was terminated in 2001.

Imports of HFCs started in 1992 and increased until 1998. Since then annual imports have been between 30 and 70 Gg CO_2-equivalents. Sufficient data is not available to calculate actual emissions. This means that only potential emissions, based on imports, are estimated. The potential method is likely to overstate emissions, since the chemicals used, e.g. in refrigerators, are emitted over a period of several years. The application category refrigeration contributes by far the largest part of HFCs emissions but foam blowing is also thought to be a source.

Sulphur hexafluoride emissions are not estimated but held constant over the whole time series. The largest source of SF_6 emissions is thought to be leakages from electrical equipment.

2.3.3 Solvent and other product use

The use of solvents and products containing solvents leads to emissions of non-methane volatile organic compounds (NMVOC), which are regarded as indirect greenhouse gases. The NMVOC emissions will over a period of time oxidize to CO_2 in the atmosphere. This conversion has not been estimated. The only emissions of direct GHG reported here are due to use of N_2O, mainly for medical purposes but also to a smaller extent for car racing. Those emissions were 3 Gg CO_2-equivalents in 2004 and have declined by 43% since 1990.

2.3.4 Agriculture

As can be seen from table 2.10 and figure 2.17 the emissions from agriculture were relatively stable between 1990 and 2004, with emission levels of around 500 Gg CO_2-equivalents per year. During that period emissions decreased by 12%, due to a decreasing number of livestock.

Table 2.10 Total greenhouse gas emissions from agriculture in 1990 – 2004, Gg CO_2-eq.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Enteric Fermentation	270	264	256	254	256	247	250	253	256	254	243	242	237	233	229
Manure Management	56	55	53	53	53	50	51	51	52	51	49	49	47	46	46
Agricultural Soils	245	240	225	229	234	225	235	232	234	242	238	235	219	211	226
Total	571	558	534	536	543	523	536	536	542	548	529	526	503	489	500

Greenhouse gas emissions from agriculture comprise emissions of methane and nitrous oxide. The greenhouse gas emissions from the agricultural sector accounted for 14% of the overall greenhouse gas emissions in 2004. The largest sources for agricultural greenhouse gas emissions are CH_4 from enteric fermentation and N_2O from agricultural soils.

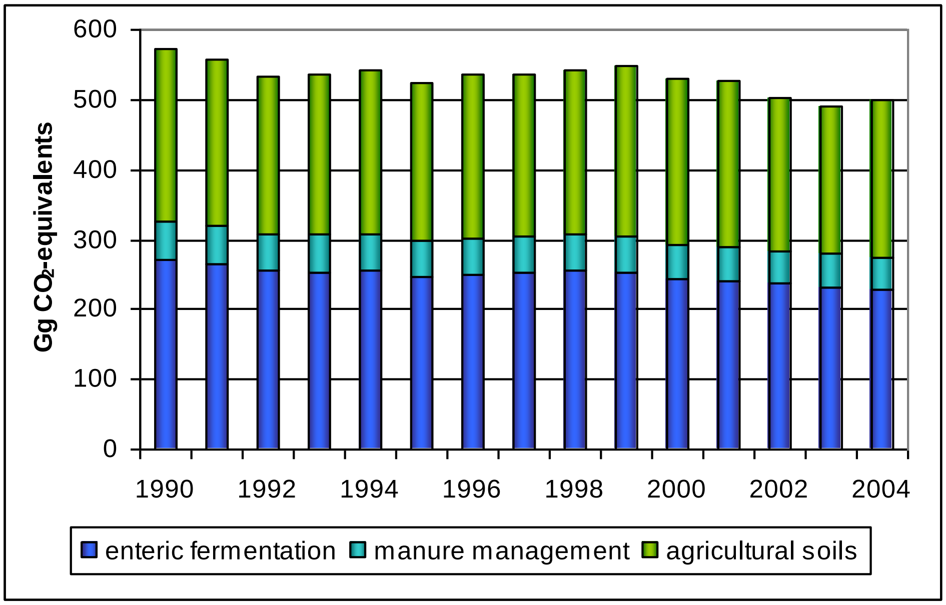

Figure 2.17 Total greenhouse gas emissions from agriculture from 1990 – 2004, Gg CO_2-eq.

2.3.5 Waste

As can be seen from table 2.11 and figure 2.18 the amount of greenhouse gases (CH_4) from landfills increased steadily from 1990 to 2002. From 2002 to 2004 a minor decrease in emissions occurred. From 1990 to 2004 the emissions rose by 38%. There are two reasons for this, increasing amounts of waste being landfilled and a larger percentage of that waste being landfilled in managed waste disposal sites. The amount of landfilled waste increased by 32% over the period. The emissions from landfills show a slight decrease from 2002 to 2003, due to increasing amount of methane recovered, and a minor increase again in 2004 due to increased amount of landfilled waste. Methane recovery started at the largest operating landfill site in 1997, and the amount recovered has increased steadily since then.

Emissions from waste incineration have decreased constantly since 1990 because total amount of waste being incinerated in Iceland has decreased. A higher percentage of the waste has concurrently been incinerated with energy recovery and is thus reported under 1A1a (public electricity and heat production).

Table 2.11 Emissions from the waste sector from 1990 – 2004, Gg CO_2-eq.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Landfills	114	118	121	124	127	131	136	139	142	146	152	157	164	154	157
Wastewater Handling	8	8	8	8	8	8	8	8	9	9	10	10	13	13	13
Waste Incineration	19	19	18	15	14	13	11	11	9	8	7	7	6	5	2
	140	144	147	148	150	151	155	158	160	163	169	174	182	172	172

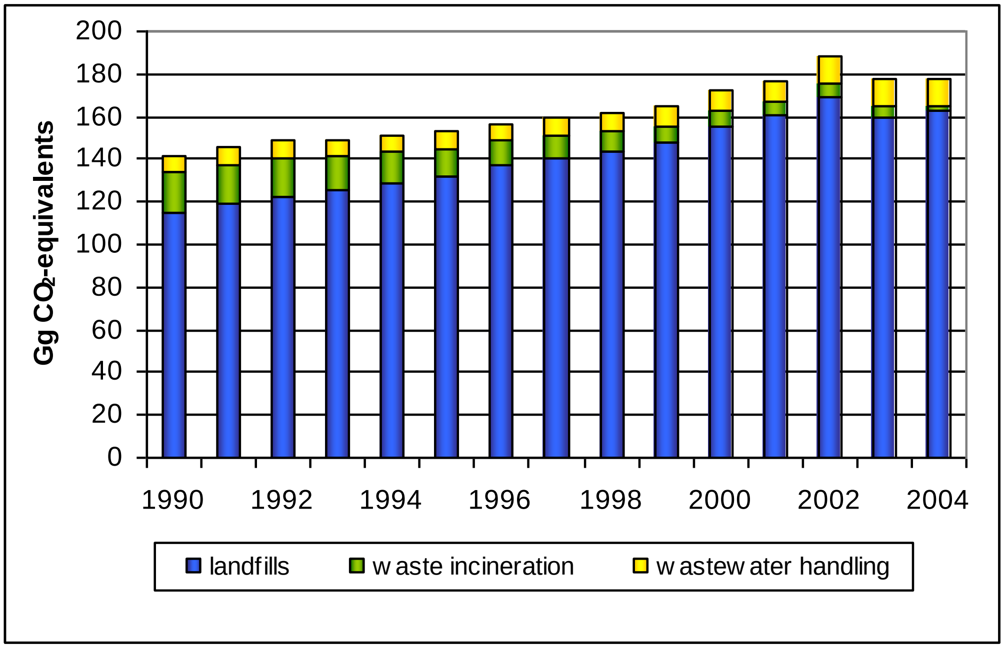

Figure 2.18 Emissions of greenhouse gases in the waste sector 1990 – 2004, Gg CO_2-eq.

2.3.6 Geothermal energy

Iceland relies heavily on geothermal energy for space heating and to some extent for electricity production. Researches indicate that CO_2 emissions associated with the utilization of geothermal energy in Iceland constitute a net increase in emissions. The emissions are though considerably less extensive than from fossil fuel power plants. Table 2.12 shows the emissions from geothermal energy from 1990 to 2004.

Table 2.12 Emissions from geothermal energy from 1990 – 2004, Gg CO_2-eq.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total	67	67	67	67	67	82	82	71	94	123	163	154	159	138	124

2.4 Emission trends for indirect greenhouse gases and SO_2

Nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOC) and carbon monoxide (CO) have an indirect effect on climate through their influence on greenhouse gases, especially ozone. Sulphur dioxide (SO_2) affects climate by increasing the level of aerosols that have in turn a cooling effect on the atmosphere.

2.4.1 Nitrogen oxides (NOx)

As can be seen in Figure 2.19, the main sources of nitrogen oxides in Iceland are fishing, transport and manufacturing industry and construction. The NOx emissions from fishing rose from 1990 to 1996 when a substantial portion of the fishing fleet was operating in distant fishing grounds. From 1996 emissions decreased, reaching the 1990 levels in 2001. In 2004 emissions were 9% over the 1990 level. Annual changes are inherent in the nature of fisheries. Emissions from transport are dominated by road transport. These emissions have decreased rapidly after the use of catalytic converters in all new vehicles became obligatory in 1995. The rise in emissions from the manufacturing industries and construction are dominated by increased activity in the construction sector during the period. Total NOx emissions show, like the emissions from fishing, an increase until 1996 and then a decrease until 2001. Emissions have been rising again since 2001. The emissions in 2004 were 4% above the 1990 level.

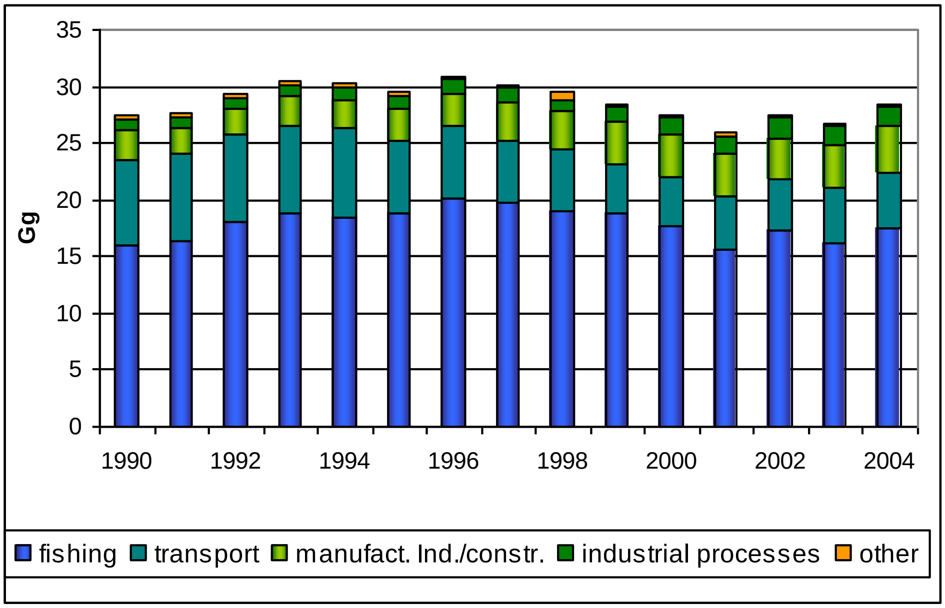

Figure 2.19 Emissions of NOx by sector 1990 – 2004, Gg

2.4.2 Non-methane volatile organic compounds (NMVOC)

As can be seen in Figure 2.20 the main sources of non-methane volatile organic compounds are transport and solvent use. Emissions from transport are dominated by road transport. These emissions have decreased rapidly after the use of catalytic converters in all new vehicles became obligatory in 1995. Emissions from solvent use vary between 2 Gg and 4 Gg during the period with no obvious trend. The total emissions show a downward trend from 1994 to 2003 with exception of 2000 and 2001. The emissions in 2004 were 41% below the 1990 level.

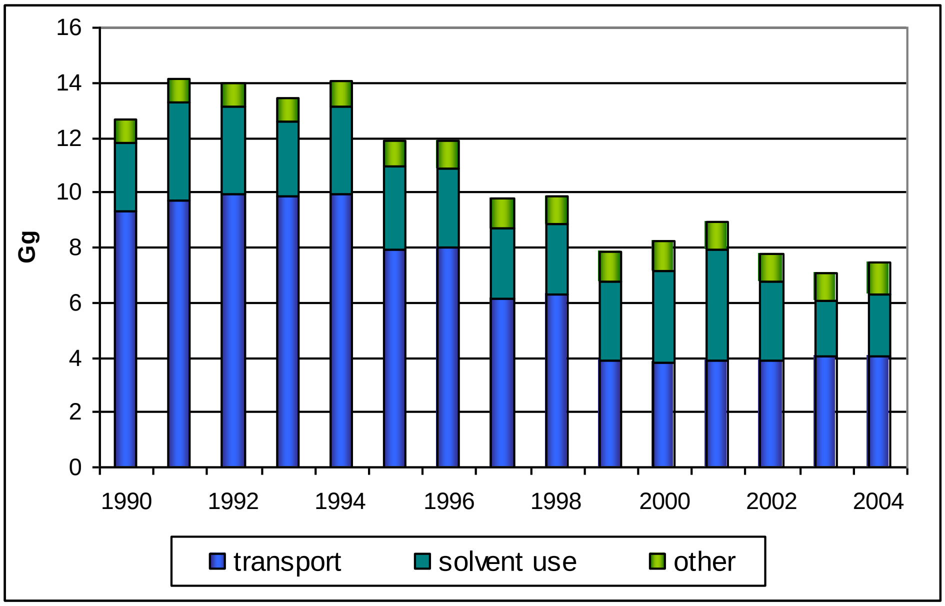

Figure 2.20 Emissions of NMVOC by sector 1990 – 2004, Gg

2.4.3 Carbon monoxide (CO)

As can be seen in Figure 2.21, transport is the prominent contributor to CO emissions in Iceland. Emissions from transport are dominated by road transport. These emissions have decreased rapidly after the use of catalytic converters in all new vehicles became obligatory in 1995. Total CO emissions show, like the emissions from transport, a rapid decrease after 1990. The emissions in 2004 were 48% below the 1990 level.

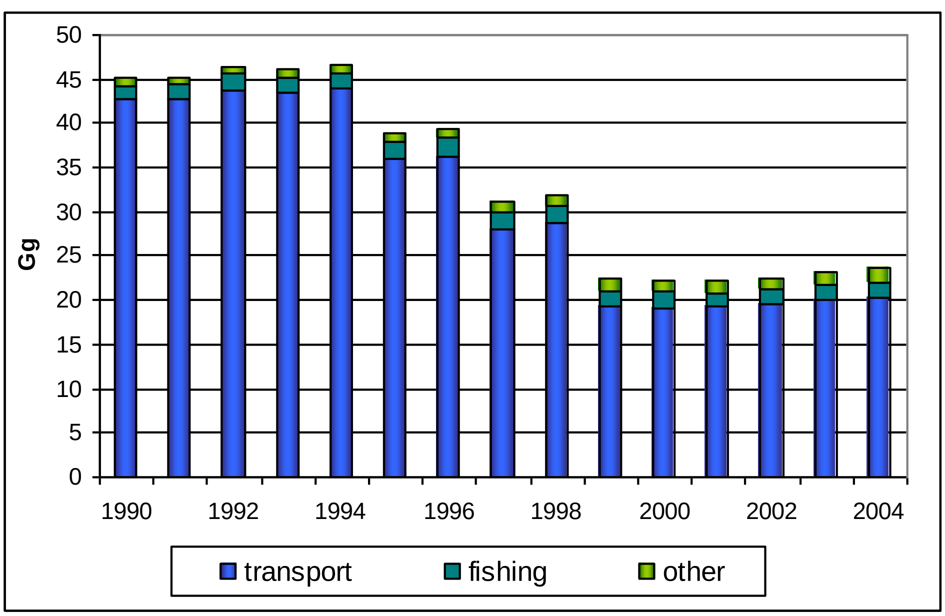

Figure 2.21 Emissions of CO by sector 1990 – 2004, Gg

2.4.4 Sulphur dioxide (SO_2)

As can be seen in Figure 2.22 the main sources of sulphur dioxide in Iceland are industrial processes and manufacturing industry and construction. Emissions from industrial processes are dominated by metal production. Until 1996 sulphur dioxide emissions were relatively stable. During the late nineties the metal industry expanded. The existing aluminium plant and the ferroalloys industry experienced enlargement in 1997 and 1999, and in 1998 a new aluminium plant was established. This led to increased emissions of sulphur dioxide. The fishmeal industry is the main contributor to sulphur dioxide emissions in the sector 'manufacturing industries and construction'. Emissions from the fishmeal industry increased generally from 1990 to 1997 but have declined since and were 8% below the 1990 level in 2004.

Total SO_2 emissions in 2004 were 4% above the 1990 level.

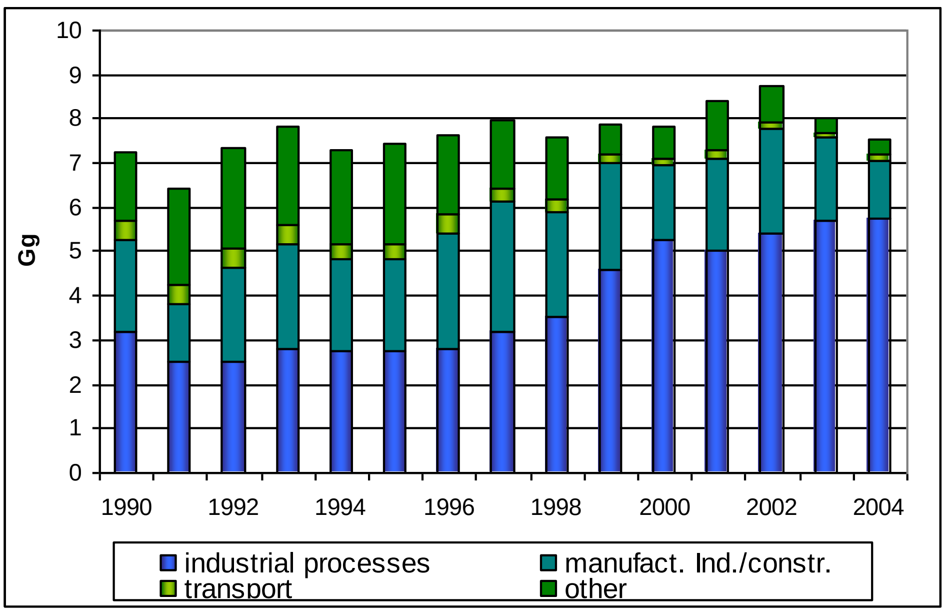

Figure 2.22 Emissions of SO_2 by sector 1990 – 2004, Gg

3 ENERGY

3.1 Overview

The energy sector in Iceland is unique in many ways. In 2000 the per capita energy use was nearly 500 MJ, which is high compared to other industrial countries. However, the proportion of domestic renewable energy in the total energy budget is 70%, which is a much higher share than in most other countries. The cool climate and sparse population calls for high energy use for space heating and transport. Iceland relies heavily on its geothermal energy sources for space heating and on hydropower for its electricity production. Emissions from hydropower reservoirs are included in the LULUCF sector. Emissions from geothermal energy are discussed in chapter 9.

The energy sector accounts for 54% of the GHG emissions in Iceland. Emissions increased by 15% from 1990 to 2004. From 2003 to 2004 the emissions increased by 5%. Fisheries and road traffic are the sector's largest single contributors. Combustion in the manufacturing industries and construction is also an important source.

3.1.1 Methodology

The calculation of greenhouse gas emissions from fuel combustion activities is based on the methodologies suggested by the IPCC Guidelines and the Good Practice Guidance. Fuel combustion activities are divided into two main categories: stationary and mobile combustion. Stationary combustion includes energy industries, manufacturing industries and the other sector (residential and commercial/institutional sector). Mobile combustion includes civil aviation, road transport, navigation, fishing, mobile combustion in construction and international bunkers. The methodology applied for each source category is described below.

The key source analysis performed for 2004 has revealed, as indicated in table 1.1, that in terms of total level and/or trend uncertainty the key sources in the Energy sector are the following:

- Stationary combustion: oil – CO_2 (1A1, 1A2, 1A4)
- Stationary combustion: coal – CO_2 (1A2f)
- Mobile combustion: construction – CO_2 (1A2f)
- Mobile combustion: road vehicles – CO_2 (1A3b)
- Mobile combustion: road vehicles – N_2O (1A3b)
- Mobile combustion: fishing – CO_2 (1A4c)

3.1.2 Completeness

Table 3.1 gives an overview of the IPCC source categories included in this chapter and presents the status of emission estimates from all sub-sources in the energy sector.

Table 3.1 Energy - completeness

Sector	Greenhouse gases						Other gases			
	CO_2	CH_4	N_2O	HFC	PFC	SF_6	Nox	CO	NMVOC	SO_2
Energy industries										
Public electricity and heat production	X	X	X	NA	NA	NA	X	X	X	X
Petroleum refining	N O T O C C U R R I N G									
Manufacture of Solid Fuels and other energy industries	N O T O C C U R R I N G									
Manufacturing Industries and Construction										
Iron and Steel	X	X	X	NA	NA	NA	X	X	X	X
Non-ferrous metals	X	X	X	NA	NA	NA	X	X	X	X
Chemicals	X	X	X	NA	NA	NA	X	X	X	X
Pulp, paper and print	N O T O C C U R R I N G									
Food Processing, Beverages and Tobacco	X	X	X	NA	NA	NA	X	X	X	X
Other	X	X	X	NA	NA	NA	X	X	X	X
Transport										
Civil Aviation	X	X	X	NA	NA	NA	X	X	X	X
Road Transportation	X	X	X	NA	NA	NA	X	X	X	X
Railways	N O T O C C U R R I N G									
Navigation	X	X	X	NA	NA	NA	X	X	X	X
Other Transportation	N O T O C C U R R I N G									
Other Sector										
Commercial/Institutional	X	X	X	NA	NA	NA	X	X	X	X
Residential	X	X	X	NA	NA	NA	X	X	X	X
Agriculture/Forestry/Fisheries	X	X	X	NA	NA	NA	X	X	X	X
Other										
Stationary	X	X	X	NA	NA	NA	X	X	X	X
Mobile	N O T O C C U R R I N G									
Fugitive Emissions from Fuels										
Solid Fuels	N O T O C C U R R I N G									
Oil and Natural Gas	NE	NE	NE	NA	NA	NA	NE	NE	NE	NE
International Transport										
Aviation	X	X	X	NA	NA	NA	X	X	X	X
Marine	X	X	X	NA	NA	NA	X	X	X	X

3.2 Stationary fuel combustion

3.2.1 Energy industries, manufacturing industries, commercial/institutional and residential fuel combustion

This source refers to emissions of GHG from combustion of fuels in the energy industries, in the manufacturing industries and construction and in the ‘other sector’ (commercial/institutional and residential fuel combustion activities). The key source analysis shows that CO_2 emissions from stationary combustion of oil constitute a key source in both level and trend and that CO_2 emissions from stationary combustion of coal constitute a key source in trend.

Emissions from fuel combustion are estimated at the sectoral level. They are calculated by multiplying energy use by source and sector with pollutant specific emission factors. Activity data is provided by the National Energy Forecast Committee (NEFC), which collects data from the oil companies on fuel sales by sector. Since not all oil companies provided sales statistics for the years 2003 and 2004, fuel use by sector has been estimated by the NEFC. Since Iceland relies heavily on geothermal energy for space heating and hydropower for electricity production, emissions from those sectors are relatively low. Emissions in this key source originate predominantly from the combustions in the manufacturing industries, and the fishmeal industry in particular. Emissions from waste incineration with energy recovery are reported under 'energy industries' and the method is described in chapter 8.

Activity data

Total use of different oil products is based on the NEFCs annual sales statistics for fossil fuels. The data is, with the exception of 2003 and 2004, considered reliable since all oil companies report their sales statistics. There is thus a given total, which usage in the different sectors must sum up to. There is not a clear distinction between the energy industries sector and residential sector in fuel sales statistics. The National Energy Authority (NEA) has on request by the Environment and Food Agency (EFA) divided the fuel consumption between the two sectors. The EFA collects consumption data from all major industry installations and the consumption in the fishmeal industry is from 1990 to 2002 estimated from production statistics, but for 2003 and 2004 they are based on data provided by the industry.

Emission factors

The CO_2 emission factors (EF) used reflect the average carbon content of fossil fuels. They are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and are presented in table 3.2. SO_2 emissions are calculated from the S-content of the fuels. Emission factors for other pollutants are taken from table 1-15 to 1-19 of the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual. Where EF were not available the default EF from tables 1-7 to 1-11 in the Reference Manual were used.

Table 3.2 Emission factors for CO_2 from stationary combustion

	NCV [TJ/kt]	Carbon EF [t C/TJ]	Fraction oxidised	CO_2 EF [t CO_2/t fuel]
Kerosene (heating)	44,75	19,60	0,99	3,18
Gas / Diesel Oil	43,33	20,20	0,99	3,18
Residual fuel oil	40,19	21,10	0,99	3,08
Coking Coal	28,05	25,80	0,98	2,60

Uncertainty

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CO_2 emissions from stationary oil combustion is 7% and for coal combustion 11%.

3.3 Mobile combustion

3.3.1 Construction sector

Emissions are calculated by multiplying energy use with a pollutant specific emission factor. Activity data is provided by the NEFC, which collects data on fuel sales by sector.

Activity data

Total use of oil products in the construction sector is based on the NEFC's annual sales statistics for fossil fuels. The data is, with the exception of 2003 and 2004, considered reliable since all the oil companies have reported their sales statistics. In some instances oil, which is reported to fall under vehicle usage, is actually used for machinery and vice versa. This is, however, very minimal and the deviation is believed to level out.

Emission factors

The CO_2 emission factors used reflect the average carbon content of fossil fuels. The emission factors for other pollutants are taken from table 1-49 in the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual. EF for CO_2 and N_2O are presented in table 3.3.

Table 3.3 Emission factors for CO_2 and N_2O from combustion in the construction sector

	NCV [TJ/kt]	Carbon EF [t C/TJ]	Fraction oxidised	CO_2 EF [t CO_2/t fuel]	N_2O EF [t N_2O/kt fuel]
Gas / Diesel Oil	43,33	20,20	0,99	3,18	1,3

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CO_2 emissions from construction is 11%.

3.3.2 Road vehicles

Emissions from road traffic are estimated by multiplying the fuel use by type of fuel and vehicle, and fuel and vehicle pollutant specific emission factors. Activity data is provided by the NEFC, which collects data on fuel sales by sector.

Activity data

Total use of diesel oil and gasoline are based on the NEFC's annual sales statistics for fossil fuels. The data is, with the exception of 2003 and 2004, considered reliable since all the oil companies have reported sales statistics. The EFA estimates how fuel sale is divided between the different types of vehicles, but the method used is considered to be inaccurate.

Emission factors

For CO_2 the standard emission factors based on carbon content of the fuels are used. Emission factors for CH_4 and N_2O depend upon vehicle type and emission control. They are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and are presented in table 3.4.

Table 3.4 Emission factors for greenhouse gases from European vehicles, g/kg fuel

	CH_4	N_2O	CO_2
Passenger car – gasoline, uncontrolled	0,8	0,06	3070
Passenger car – gasoline, non catalyst control	1,1	0,08	3070
Passenger car – gasoline, three way catalyst	0,3	0,8	3070
Light duty vehicle – gasoline	0,8	0,06	3070
Heavy duty vehicle – gasoline	0,7	0,04	3070
Passenger car – diesel	0,08	0,2	3180
Light duty vehicle – diesel	0,06	0,2	3180
Heavy duty vehicle – diesel	0,2	0,1	3180

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CO_2 emissions from road vehicles is 11%. For N_2O, both activity data and emission factors are highly uncertain. The uncertainty of N_2O emissions from road vehicles is 206%.

3.3.3 Fishing

Emissions are calculated by multiplying energy use with a pollutant specific emission factor. Activity data is provided by the NEFC, which collects data on fuel sales by sector.

Activity data

Total use of residual fuel oil and gas/diesel oil for the fishing is based on the NEFC's annual sales statistics for fossil fuels. The data is, with the exception of 2003 and 2004 considered reliable since all oil companies reported their sales statistics.

Emission factors

The emission factors are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories for ocean-going ships and are presented in table 3.5.

Table 3.5 Emission factors for CO_2, CH_4 and N_2O for ocean going ships

	NCV [TJ/kt]	Carbon EF [t C/TJ]	Fraction oxidised	EF CO_2 [t CO_2/t]	EF N_2O [kg N_2O/TJ]	N_2O EF [kg N_2O/t]	EF CH_4 [kg CH_4/TJ]	EF CH_4 [kg CH_4/t]
Gas / Diesel Oil	43,33	20,20	0,99	3,18	2	0,086	7	0,30
Residual fuel oil	40,19	22,00	0,99	3,08	2	0,084	7	0,28

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CO_2 emissions from fishing is 5%.

3.3.4 Civil aviation

Emissions are calculated by using the Tier 1 method, thus multiplying energy use with a pollutant specific emission factor. Activity data is provided by the NEFC, which collects data on fuel sales by sector.

Activity data

Total use of jet kerosene and gasoline is based on the NEFC's annual sales statistics for fossil fuels. The data is, with the exception of 2003 and 2004 considered reliable since all the oil companies reported their sales statistics.

Emission factors

The emission factors are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and are presented in table 3.6. Emissions of SO_2 are calculated from S-content in the fuels.

Table 3.6 Emission factors for CO_2 and other pollutants for aviation

	NCV [TJ/kt]	Carbon EF [t C/TJ]	Fraction oxidised	EF CO_2 [t CO_2/t]	NO_x [kg/TJ]	CH_4 [kg/TJ]	NMVOC [kg/TJ]	CO [kg/TJ]	N_2O [kg/TJ]
Jet kerosene	44,59	19,50	0,99	3,16	300	0,5	50	100	2
Gasoline	44,80	18,90	0,99	3,07	300	0,5	50	100	2

3.3.5 National navigation

Emissions are calculated by multiplying energy use with a pollutant specific emission factor. Activity data is provided by the National Energy Forecast Committee (NEFC), which collects data on fuel sales by sector.

Activity data

Total use of residual fuel oil and gas/diesel oil for national navigation is based on the NEFC's annual sales statistics for fossil fuels. The data is, with the exception of 2003 and 2004 considered reliable since all the oil companies reported their sales statistics.

Emission factors

The emission factors are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories for ocean-going ships and are presented in table 3.5.

3.4 International bunker fuels

Emissions from international aviation and marine bunker fuels are excluded from national totals as required according to the IPCC Guidelines. These emissions are presented separately for informational purposes and can be seen in table 3.6.

In 2004, greenhouse gas emissions from ships and aircraft in international traffic bunkered in Iceland amounted to a total of 603 Gg CO_2-equivalents, which corresponds to about 16% of the total Icelandic greenhouse gas emissions. Greenhouse gas emissions from marine and aviation bunkers increased by around 87% from 1990 to 2004, and between 2003 and 2004 emissions increased by 17%.

Looking at these two categories separately, it can be seen that greenhouse gas emissions from international marine bunkers increased by 129% from 1990 to 2004, while emissions from aircrafts increased by 69% during the same period. Between 2003 and 2004 emissions from marine bunkers increased by 69% while emissions from aviation bunkers increased by 12%.

Table 3.7 Greenhouse gas emissions from international aviation and marine bunkers, Gg CO_2-eq.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Marine	100	38	61	98	94	146	125	150	178	166	221	151	209	181	229
Aviation	222	224	205	197	216	238	274	295	341	367	411	352	313	333	374
Total	322	262	266	296	310	384	399	445	520	532	632	503	522	514	603

Emissions are calculated by multiplying energy use with pollutant specific emission factors. Activity data is provided by the NEFC, which collects data on fuel sales by sector. These data distinguish between national and international usage. The data is with the exception of 2003 and 2004 considered reliable since all oil companies selling oil products report those statistics. The emission factors for marine bunkers are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories for ocean-going ships and are presented in table 3.5 above. Emission factors for aviation bunkers are also taken from the IPCC Guidelines and presented in table 3.6 above.

3.5 Cross-cutting issues

3.5.1 Sectoral versus reference approach

This section will be completed for the next submission.

3.5.2 Feedstock and non-energy use of fuels

Emissions from the use of feedstocks are according to the Good Practice Guidance accounted for in the industrial processes sector in the Icelandic inventory. This includes all use of petroleum coke, other bituminous coal and coke oven coke.

Iceland uses a carbon storage factor of 1 for bitumen and 0,5 for lubricants for the non-energy use in the Reference Approach, CRF table 1(A)d.

4 INDUSTRIAL PROCESSES

4.1 Overview

Production of raw materials is the main source of industrial process related emissions for CO_2, N_2O and PFCs. Emissions also occur because of use of HFCs as substitutes for ozone depleting substances. The industrial process sector accounted for 26% of the GHG emissions in Iceland in 2004. Emissions decreased from 1990 to 1996, mainly due to reduction in PFC emissions. In 1996 emissions were 38% below the 1990 level. Due to the expansion of energy intensive industry, emissions rose rapidly from 1996 to 1999, when they were 8% above the 1990 level. In 2004 emission from the industrial processes sector were 10% above the 1990 level. The main category within the industrial process sector is metal production, which accounted for 88% of the sector's emissions in 2004.

4.1.1 Methodology

The calculation of greenhouse gas emissions from industrial processes is based on the methodologies suggested by the IPCC Guidelines and the Good Practice Guidance.

The key source analysis performed for 2004 has revealed, as indicated in table 1.1, that in terms of total level and/or trend uncertainty the key sources in the Industrial Processes Sector are the following:

- Emissions from Cement Production – CO_2 (2A1)
- Emissions from Ferroalloys – CO_2 (2C2)
- Emissions from Aluminium Production – CO_2 (2C3)
- Emissions from Aluminium Production – PFCs (2C3)
- Emissions from Substitutes for Ozone Depleting Substances – HFCs (2F)

4.1.2 Completeness

Table 4.1 gives an overview of the IPCC source categories included in this chapter and presents the status of emission estimates from all sub-sources in the industry sector.

Table 4.1 Industrial Processes - Completeness

	Greenhouse gases						Other gases			
Sector	CO_2	CH_4	N_2O	HFC	PFC	SF_6	NOx	CO	NMVOC	SO_2
Mineral Products:										
Cement Production	X	NE	NE	NA	NA	NA	NE	NE	NE	IE
Lime Production	N O T O C C U R R I N G									
Limestone and Dolomite Use	N O T O C C U R R I N G									
Soda Ash Production and Use	N O T O C C U R R I N G									
Asphalt Roofing	N O T O C C U R R I N G									
Road Paving with Asphalt	NE	NE	NE	NA	NA	NA	X	X	X	X
Other (Mineral Wool Production)	X	NE	NE	NA	NA	NA	NE	X	NE	X
Chemical Industry										
Ammonia Production	N O T O C C U R R I N G									
Nitric Acid Production	N O T O C C U R R I N G									
Adipic Acid Production	N O T O C C U R R I N G									
Carbide Production	N O T O C C U R R I N G									
Other (Silicium Production)	X	NE	NE	NA	NA	NA	X	NE	NE	NE
Other (Fertilizer Production – until 2001)*	NA	NE	X	NA	NA	NA	X	NE	NE	NE
Metal Production										
Iron and Steel Production	N O T O C C U R R I N G									
Ferroalloys Production	X	X	NA	NA	NA	NA	X	X	X	X
Aluminium Production	X	NE	NE	NA	X	NA	NE	NE	NE	X
SF_6 used in aluminium/magnesium foundries	N O T O C C U R R I N G									
Other	N O T O C C U R R I N G									
Other Production										
Pulp and Paper	N O T O C C U R R I N G									
Food and Drink	NE	NA	NA	NA	NA	NA	NA	NA	NE	NA
Production of Halocarbons and SF_6	N O T O C C U R R I N G									
Consumption of Halocarbons and SF_6	NA	NA	NA	X	NO	X	NA	NA	NA	NA
Other	N O T O C C U R R I N G									

* Fertilizer production was terminated in 2001

4.2 Mineral Products

4.2.1 Cement Production (2A1)

Emissions of CO_2 originate from the calcination of the raw material calcium carbonate, which comes from shell sand in the production process. The resulting calcium oxide is heated to form clinker and then crushed to form cement. Emissions are calculated according to the Tier 2 method based on clinker production data and data on the CaO content of the clinker. Cement Kiln Dust (CKD) is non-calcined dust produced in the kiln. CKD may be partly or completely recycled to the kiln. Any CKD that is not recycled can be considered lost to the system in terms of CO_2 emissions. Emissions are thus corrected with plant specific cement kiln dust correction factor.

Activity data

Process specific data on clinker production, CaO content of the clinker and non-recycled CKD are collected by the EFA directly from the cement production plant. The data is considered reliable. Data on clinker production is only available for the years 2003 and 2004. Historical clinker production data has been calculated as 85% of cement production.

Table 4.2 Clinker production and CO_2 emissions from cement production from 1990 – 2004.

Year	Clinker production [kt]	CO_2 emissions [kt]
1990	114,100	51,6
1991	106,174	48,0
1992	99,800	45,1
1993	86,419	39,1
1994	80,856	36,5
1995	81,514	36,8
1996	90,325	40,8
1997	100,625	45,5
1998	117,684	53,2
1999	133,647	60,4
2000	142,604	64,4
2001	127,660	57,7
2002	84,684	39,4
2003	75,314	32,1
2004	104,829	49,8

Emission factors

It has been estimated by the cement production plant that CaO content of the clinker is 63%. The corrected emission factor for CO_2 is thus 0,495. For CKD it is 7,5%.

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CO_2 emissions from cement production is 6,5%.

4.2.2 Road paving with asphalt

Asphalt road surfaces are composed of compacted aggregate and asphalt binder. Gases are emitted from the asphalt plant, the road surfacing operations and from the subsequent road surface. Information on the amount of asphalt produced come from Statistics Iceland. Emission factor for SO_2, NO_x, CO and NMVOC are taken from table 2-4, IPCC Guidelines, Reference Manual.

4.2.3 Mineral Wool Production

Emissions of CO_2 and SO_2 are calculated from the amount of shell sand and electrodes used in the production process. Emissions of CO are based on measurements that were made at the single operating plant in 2000.

4.3 Chemical industry

The only chemical industry that has existed in Iceland is the production of silicium and fertilizer. The fertilizer production plant was closed down in 2001 and the silicium production plant was closed down in 2004.

At the silicium production plant silicium containing sludge is burned to remove organic material. Emissions of CO_2 and NO_x are estimated on the basis of C-content and N-content of the sludge. Emissions also occur from the use of soda ash at the production process and those emissions are reported here.

When the fertilizer production plant was operational it reported its emissions of NO_x and N_2O to the Environment and Food Agency.

4.4 Metal Production

4.4.1 Ferroalloys

Emissions of CO_2 originate from the use of coal and coke as reducing agent, as well as from consumption of electrodes. Emissions are calculated according to the Tier 1 method based on the consumption of reducing agents and electrodes and emission factors from the IPCC Guidelines.

Activity data

The consumption of reducing agents and electrodes are collected by the EFA directly from the single operating ferroalloys production plant. The data is thus considered reliable.

Emission factors

For CO_2, the standard emission factors based on carbon content of the reducing agents and electrodes are used. They are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and are presented in table 4.3. Values for NCV are from NEA. Emission factors for CH_4, NO_x and NMVOC are taken from tables 1-7, 1-9 and 1-11 in the IPCC Guidelines, Reference Manual. Emissions of SO_2 are calculated from the sulphur content of the reducing agents and electrodes. The emission factor for CO is taken from table 2-16 in the IPCC Guidelines, Reference Manual.

Table 4.3 Emission factors for CO_2 from production of ferroalloys

	NCV [TJ/kt]	Carbon EF [t C/TJ]	Fraction oxidised	CO_2 EF [t CO_2/t input]
Other Bituminous Coal	28,00	25,80	0,98	2,60
Coke Oven Coke	28,00	29,50	0,98	2,97
Electrodes	28,00	32,14	0,98	3,23

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CO_2 emissions from ferroalloys production is 11%.

4.4.2 Aluminium Production

Primary aluminium production results in emissions of CO_2 and PFCs. CO_2 emissions originate from the consumption of electrodes. Emissions are calculated according to the Tier 1 method based on the quantity of electrodes used in the process and the emission factors from the IPCC Guidelines.

PFCs are produced during anode effects (AE) in the prebake cells, when the voltage of the cells increases from the normal 4 – 5 V to 25 – 40 V. Emissions of PFCs are dependent on the number of anode effects and their intensity and duration. Anode effect characteristics are different from plant to plant. Emission factors are calculated according to the Tier 2 Slope Method. Default coefficients are taken from the IPCC Good Practice Guidance for Centre Worked Prebaked Technology. Emission factors are calculated with the following formula:

$$\boxed{\text{EF (kg } CF_4 \text{ or } C_2F_6 \text{ per tonne of Al)} = \text{Slope} \bullet \text{AE min/cell day}}$$

Emissions are then calculated by multiplying the emission factors with the amount of aluminium produced.

Activity data

The EFA collects annual process specific data from the two operating aluminium plants. The data is considered reliable.

Emission factors

For CO_2, the standard emission factors based on carbon content of the electrodes are used. They are taken from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and are presented in table 4.2. The default coefficients for the calculation of PFC emissions are taken from the IPCC Good Practice Guidance for Centre Worked Prebaked Technology (0,14 for CF_4 and 0,018 for C_2F_6). The emissions calculated in this way seem to fit well to the measurements that have been performed at both plants. The measurements took place in 1997 at Iceland's first aluminium plant and in 2001 at the newer one.

Table 4.4 Emission factors CO_2 from aluminium production

	NCV [TJ/kt]	Carbon EF [t C/TJ]	Fraction oxidised	CO_2 EF [t CO_2/t input]
Electrodes	31,35	31,42	0,98	3,54

Table 4.5 Aluminium production, AE, CO_2 and PFC emissions from 1990 – 2004.

Year	Aluminium production [kt]	CO_2 emissions [kt]	AE Andoe Effect [min/cell day]	PFC emissions [kt CO_2-eq]	CO_2 [t/t Al]	PFC [t/t Al]
1990	87,839	136,5	4,44	419,6	1,55	4,78
1991	89,217	139,3	3,63	348,3	1,56	3,90
1992	90,045	134,2	1,60	155,3	1,49	1,72
1993	94,152	139,0	0,74	74,9	1,48	0,80
1994	98,595	148,0	0,42	44,6	1,50	0,45
1995	100,198	150,7	0,55	58,84	1,50	0,59
1996	103,362	157,0	0,23	25,2	1,52	0,24
1997	123,562	188,9	0,62	82,4	1,53	0,67
1998	173,869	265,5	10,90	180,1	1,53	1,04
1999	222,014	347,2	2,17	173,2	1,56	0,78
2000	226,362	345,5	1,13	127,2	1,53	0,56
2001	244,148	373,9	0,71	91,7	1,53	0,38
2002	264,107	392,6	0,56	72,5	1,49	0,27
2003	266,611	401,6	0,40	59,8	1,51	0,22
2004	271,384	407,3	0,25	38,6	1,50	0,14

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CO_2 emissions from aluminium production is 11%.

The emission factors for calculating PFC emissions have more uncertainty but still seem to fit well to the measurements that have been performed so far at the aluminium production plants. The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of PFC emissions from aluminium production is 9% for CF_4 and 23% for C_2F_6.

4.5 Emissions from Substitutes for Ozone Depleting Substances – HFCs (2F)

Import of HFCs started in 1992 and increased until 1998. The annual imports have since then stayed between 30 and 70 Gg CO_2-equivalents. Sufficient data is not available to calculate actual emissions. This means that only potential emissions are estimated, based on imports. Data on imports of HFCs is reported directly to EFA. The data is considered reliable. The activity data are considered reliable. Emissions are likely to be overestimated since only potential emissions are calculated.

Planned improvements

There are plans underway to estimate actual HFC emissions.

5 SOLVENT AND OTHER PRODUCT USE

The use of solvents and products containing solvents leads to emissions of non-methane volatile organic compounds (NMVOC), which are regarded as indirect greenhouse gases. Estimates of NMVOC emissions are based on data on imports of solvents combined, with expert estimates based on surveys. The NMVOC emissions will over a period of time oxidize to CO_2 in the atmosphere. This conversion has not been estimated.

The only emissions of direct GHG reported under the sector solvent and other product use are due to use of N_2O, mainly for medical purposes, and also, to a smaller extent, for car racing. Data on sold amounts are collected directly by the Environment and Food Agency.

6 AGRICULTURE

6.1 Overview

Icelanders are self-sufficient in all major livestock products such as meat, milk and eggs. Traditional livestock production is grassland-based and all the native breeds, i.e. of dairy cattle, sheep, horses and goats are of ancient Nordic origin, one of each species. These animals are generally smaller than in Europe. Beef production, however, is partly based on imported breeds. The more intensive agricultural sector, pork and poultry production, is based on imported breeds.

6.1.1 Methodology

The calculation of greenhouse gas emissions from agriculture is based on the methodologies suggested by the IPCC Guidelines and the Good Practice Guidance.

As indicated in table 1.1, the key source analysis performed for 2004 has revealed that in terms of total level and/or trend uncertainty the key sources in the agriculture sector are as follows:

- Emissions from Enteric Fermentation – CH_4 (4A)
- Direct Emissions from Agricultural Soils – N_2O (4D1)
- Indirect Emissions from Agricultural Soils – N_2O (4D2)

6.1.2 Completeness

Table 6.1 gives an overview of the IPCC source categories included in this chapter and presents the status of emission estimates from all sub-sources in the agricultural sector.

Table 6.1 Agriculture - completeness

	Greenhouse gases		
Sector	CO_2	CH_4	N_2O
Enteric Fermentation	NA	X	NA
Manure Management	NA	X	X
Rice Cultivation	Not Occurring		
Agricultural Soils			
Direct emissions	NA	NE	X
Animal Production	NA	NE	X
Indirect emissions	NA	NE	X
Prescribed burning of Savannas	Not Occurring		
Field burning of agricultural residues	Not Occurring		
Other	Not Occurring		

6.2 Enteric Fermentation

The production of CH_4 by enteric fermentation in animals varies with digestive systems and feed intake. Ruminants such as cattle and sheep produce the largest amount of methane. However, enteric fermentation in pseudo-ruminants (e.g. horses) and monogastric animals (e.g. pigs) is also of significance. The methodology for calculating methane from enteric fermentation is in accordance with the Tier 1 method. Both the population levels and emission factors by type of animal are used to calculate the emissions.

Activity data

The Icelandic Association of Farmers (IAF) is in charge of assessing the size of the animal population each year. On request from the EFA, the IAF also accounts for young animals, but those are mostly excluded from national statistics on animal population. The data is considered relatively reliable.

Emission factors

Emission factors are taken from the IPCC Guidelines. They are presented in table 6.2. The emission factors are likely to be too high, since domestic animals in Iceland are generally smaller (sheep, horses) than in other European countries.

Table 6.2 Emission factors for CH_4 from enteric fermentation

	kg CH_4 per head per year
Dairy cattle	100
Non-dairy cattle	48
Sheep	8
Goats	5
Horses	18
Swine	1,5

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CH_4 emissions from enteric fermentation is 54%.

Planned improvements

Develop country-specific emission factors from feed intake according to the Tier 2 method, in particular for the special Icelandic livestock.

6.3 Manure management

Manure management is responsible for methane and nitrous oxide emissions. Methane is produced during the anaerobic decomposition of the manure, while nitrous oxide is produced during storage and treatment of the manure before it is used as fertilizer.

CH_4 emissions from manure management were estimated according to the IPCC Tier 1 methodology. Population levels for each kind of animal as well as its specific emission factor are used to calculate the emissions. The animal population size is collected, as mentioned before, from the Icelandic Association of Farmers (IAF).

Emission factors are taken from the IPCC Guidelines. They are presented in table 6.3, but are likely to be overstated, as domestic animals in Iceland are generally smaller (sheep, horses) than in other European countries.

Table 6.3 Emission factors for CH_4 from manure management

	kg CH_4 per head per year
Dairy cattle	14
Non-dairy cattle	6
Sheep	0,19
Goats	0,12
Horses	1,4
Swine	3
Poultry	0,078

In order to calculate N_2O emissions from manure management, the default IPCC methodology was used, according to the following equation.

$$E = \sum_S \left(\sum_T (N_T \cdot Nex_T \cdot MS_{T,S}) \right) \cdot EF_S$$

where E is N_2O emissions, T is the animal species index, S is the manure management system index, N_T is the livestock population, Nex_T is the annual average N excretion per head of species, $MS_{T,S}$ is the fraction of total annual excretion for each livestock species that is managed in system S and EF_S is the N_2O emission factor for system S.

The emission factors for N excretion are country-specific nitrogen factors. They are presented in table 6.5. Emission factors for N_2O-N/N are those suggested by the IPCC Guidelines. The treatment of animal manure in different management system per animal species was estimated by the Agricultural University of Iceland. There have been some changes in the manure management practices over the time series. For example the share of liquid systems for cattle is believed to have increased from 46% in 1990 to 53% in 2004. The shares of manure management systems per animal species differ therefore for the period 1990 – 2004. The situation in 2004 is reflected in table 6.4.

Table 6.4 Manure management systems

Manure management systems	Liquid system	Solid storage and dry lot	Pasture/range/paddock
Dairy cows	53%	13%	34%
Other cattle	53%	13%	34%
Sheep	17%	41%	42%
Goats	17%	41%	42%
Horse	0%	17%	83%
Swine	100%	0%	0%
Poultry	0%	100%	0%

6.4 Emissions from Agricultural Soils – N_2O (4D)

6.4.1 Description

Three sources of N_2O from agricultural soils are distinguished in the IPCC methodology:

- Direct emissions from agricultural soils (applying for Iceland: use of synthetic fertilizers, applied animal manure, crop residue, cultivation of soils (NE)). This is a key source in both level and trend.
- Direct soil emissions from production of animals
- N_2O emissions indirectly induced by agricultural activities (N losses by volatilization, leaching and runoff). This is key source in level.

6.4.2 Methodological issues

The methodology for calculating N_2O from agricultural soil is in accordance with the Tier 1b method.

Use of synthetic fertilizer

The direct emissions of N_2O from the use of synthetic fertilizers are calculated from data on annual usage of fertilizers and their nitrogen content, multiplied by the IPCC default emission factor. The emissions are corrected for ammonia that volatilizes during application.

Manure applied to soil

It is assumed that all animal excreta that are not deposited during grazing are used as manure. The total amount of nitrogen in manure is estimated from the number of animals and the country-specific nitrogen factors for each kind of animal, presented in table 6.5. They are taken from Óskarsson, M. and Eggertsson, M. (1991).

Table 6.5 Nitrogen excretion factors

	kg N per head per year
Dairy cattle	60
Non-dairy cattle	33,6
Sheep	5,76
Goats	5,76*
Horses	28,8
Swine	13,3
Poultry	0,42

* N-excretion from goats are assumed to be the same as by sheep

Crop residue

This source is negligible.

Cultivation of organic histosols

This source is not estimated.

Direct soil emission from animal production

The fraction of the total amount of animal manure produced, which is deposited on pastures during grazing, is set to be 40 - 45% and differs between years. The Agricultural University of Iceland has estimated the proportion of excreted nitrogen from different types of livestock subject to different types of animal waste management systems. The level of animal manure deposited on pastures has been changing slightly due to changes in farming practices.

N losses by volatilization

Atmospheric deposition of nitrogen compounds fertilizes soils and surface waters, and enhances biogenic N_2O formation. Climate and the type of fertilizer influence the ammonia volatilization. The IPCC default values for volatilization are used (10% for synthetic fertilizers and 20% for animal manure).

N_2O from leaching and runoff

A considerable amount of nitrogen from fertilizers is lost from agricultural soils through leaching and runoff. Fertilizer nitrogen in ground water and surface waters enhances biogenic production of N_2O as the nitrogen undergoes nitrification and denitrification. The IPCC default value of 30% is used.

Emission factors

The IPCC default emission factor of 0,0125 kg N_2O-N/kg N has been used for all sources of direct N_2O emissions from agricultural soils, except for the emissions of N_2O from animal production which are calculated using the IPCC default factor of 0,02 kg N_2O-N/kg N.

The IPCC default emission factor of 0,025 kg N_2O-N/kg N is used for leaching and runoff.

Planned improvements

Revise country-specific N excretion factors.

7 LULUCF

7.1 Overview

This chapter provides estimates of emissions and removals from Land Use, Land-Use Change and Forestry (LULUCF) and documentation of the implementation of guidelines given in "Good Practice Guidance for Estimating and Reporting of Emissions and Removals from LULUCF" (IPCC, 2004). The LULUCF reporting is much more extensive than in previous submissions, as Iceland is for the first time reporting according to the new CRF LULUCF tabels as well as reporting sources that have not been reported before. This section was written by the Agricultural University of Iceland.

7.2 Data Sources

The changes from the former CRF for LUCF to the new CFR for LULUCF have complex implications regarding data needed to prepare the tables. The most important change is the need for country-wide land use information, not limited to the area previously reported on. No systematic sampling or recording has been carried out country-wide. Definitions of land use categories only exist for some categories and might in many cases be overlapping. There is a need to clearly define categories and there are cases of overlapping within categories. Information on land use is also in many cases inconsistent.

For several years Iceland's Agricultural Research Institute, (now merged into Iceland Agricultural University) has been compiling a geographical database on vegetation types and grazing land condition on all farmlands. The need to control grazing pressure in accordance with ground tolerance in order to prevent erosion has been the main driver for creating this database. This work has been based on existing maps of erosion and vegetation cover, remote sensing by satellite images and various other sources. Extensive ground truthing has resulted in a level of approximately 85% scoring in categorisation on less than 0.05 ha resolution.

This investment will make it feasible for Iceland to head for a database where land use categories can be identified geographically and has already made it possible to produce crude estimates of land use categories needed for CRF LULUCF. Due to the high uncertainty of information on area of land use categories and planned improvements no attempt is made in this year inventory to estimate backward the changes in each land use category.

The below description explains how information on total area of individual land use categories were obtained.

There has not been any systematic data sampling on land use in Iceland covering the whole country. Land use in many of the larger municipalities which have finished their municipal area planning is available. On the other hand the land use categories used in these municipal plans are often incongruous to the categories required for this inventory. These municipal plans are therefore not directly applicable to the inventory.

In preparing the inventory several databases and information sources were used to estimate coverage of the main land use categories. These data sources and their compilation are described below.

7.2.1 NYTJALAND- Icelandic farmland database: Geographical database on condition of farming land.

The Agricultural Research Institute in Iceland in cooperation with other institutes has for several years been working on a geographical database on condition of vegetation on all farms in Iceland. The mapping is now nearly finished and approximately 60% of the country, there of 70% of the lowlands below 400 m a.s.l., has been covered. This geographical database is based on remote sensing using both ***Landsat 7*** and ***Spot 5*** images. The categorization used divides the vegetation cover to ten classes and in addition includes lakes and glaciers as classes. The definitions of categories are not the same as required for CRF LULUCF. The classes used in NYTJALAND are listed in Table 7.1.

The pixel size in this database is 15*15 m and the reference scale is 1:30000. The data was simplified by merging areas of less than 10 pixels to nearest neighbour area, thus leaving 0.225 ha as minimum mapping unit.

NYTJALAND Class ***(Icelandic name in brackets)***	***Short description***	***Converted to CRF category***
Cultivated land (ræktað land)	All cultivated land including hayfields and cropland.	Cropland
Grassland (Graslendi)	Land with perennial grasses as dominating vegetation including drained peat-land where upland vegetation has become dominating.	Grassland
Richly vegetated heath land (Ríkt mólendi)	Heath land with rich vegetation, good grazing plants common, dwarf shrubs often dominating, and mosses common.	Grassland
Poorly vegetated heath land (Rýrt mólendi)	Heath land with lower grazing values than richly vegetated heath land often dominated by less valuable grazing plants and dwarf shrubs, mosses and lichens apparent.	Grassland
Moss land (Mosi)	Land where moss covers more than 2/3 of the total plant cover. Other vegetation includes grasses and dwarf shrubs.	Grassland
Shrubs and forest (Kjarr og skóglendi)	Land covered to more than 50% of vertical projection with trees or shrubs higher than 50 cm	Grassland
Semi-wetland- wetland upland ecotone- (Hálfdeigja)	Land where vegetation is mixture of upland and wetland species. Carex and Equisetum species common also often dwarf shrubs. Soil is generally wet but without standing water. This category includes drained land where vegetation not yet dominated by upland species.	Wetland
Wetland (votlendi)	Mires and fens. Variability of vegetation is high but mires are dominated by Carex and Equisetum species and often also shrubs.	Wetland
Partly vegetated land (hálf gróið)	Land where vegetation cover is from 20-50% generally infertile areas often on gravel soil. Both areas where the vegetation is retreating and in progress can be included in this class	Other land
Sparsely vegetated land (Lítt gróið)	Many types of surfaces are included in this class with the common criteria of less than 20 % vegetation cover in vertical projection.	Other land
Lakes and rivers	Lakes and rivers	Wetland
Glaciers	Glaciers	Other land

Table 7.1 Land cover classes of NYTJALAND database and their transformation to CRF land use classes

7.2.2 Vegetation maps

To compensate for areas not covered by NYTJALAND database simplified vegetation, maps from Iceland Museum of Natural History were used. The scale of these maps is 1:500000 and vegetation is categorised to 5 classes plus water and glaciers. These maps are of considerably less resolution and accuracy than the NYTJALAND database and their classes are listed in Table 7.2.

7.2.3 Cities, towns and villages

Data on area covered by cities, towns and villages were obtained from IS50 database of National Land Survey of Iceland available in 1:50000 scale. This area was converted to CRF_LULUCF category settlement.

Vegetation class	*Converted to CRF land use category*
Grassland -Heath land	Grassland
Wetland	Wetland
Shrubs and forests	Grassland
Moss land	Grassland
Sparsely vegetated land	Other land
Lakes and rivers	Wetland
Glaciers	Other land

Table 7.2 Categories of 1:500000 vegetation maps from Iceland Museum of Natural History and the conversion of those to CRF_LULUCF categories

7.2.4 Unified dataset

The above described geographical databases were merged to one dataset, providing a first approach to a geographically identifiable land use database covering four of the Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG - LULUCF)suggested land use categories, i.e. grassland, wetland, settlement and other land. Two subcategories, lakes and rivers and glaciers are included. A map of Iceland showing this first approach is in Figure 7.1.

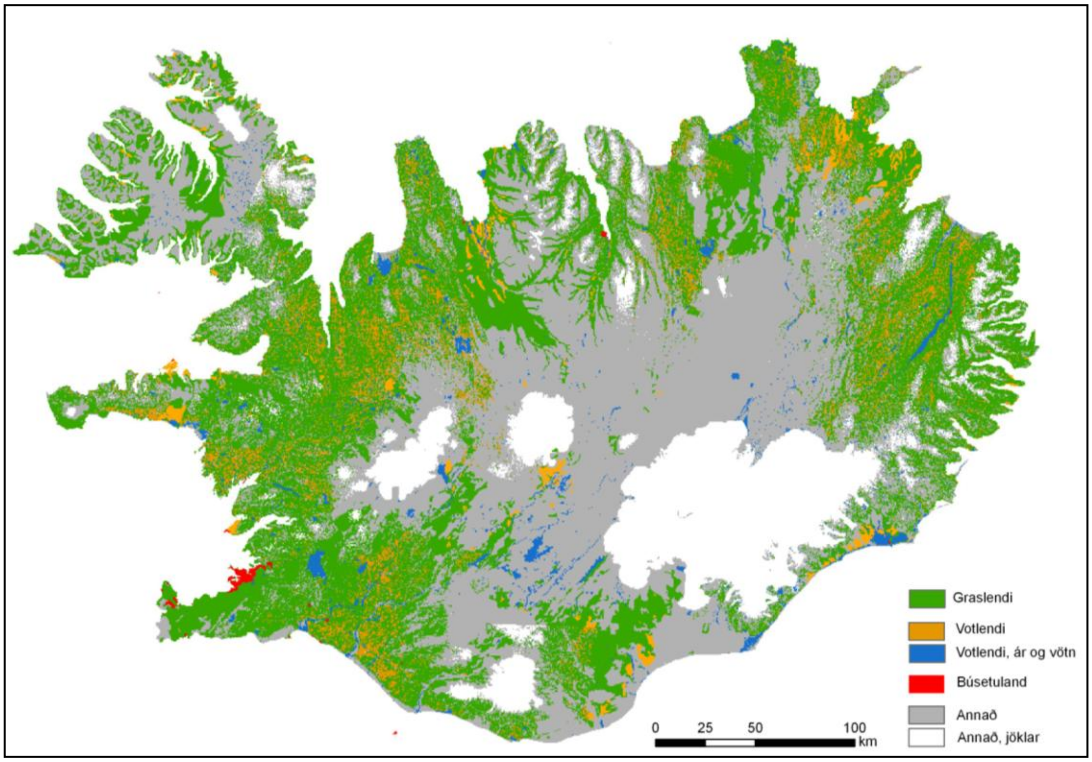

Figure 7.1 First approach to landuse map of Iceland. (Icelandic legend translation: Graslendi = Grassland, Votlendi = Wetland, Votlendi, ár og vötn = wetland subcategory, lakes and rivers, Búsetuland = Settlement, Annað = Other land, Annað, jöklar =other land subcategory, glaciers.)

Besides lacking two of the main categories suggested in the GPG-LULUCF, there are many uncertainties regarding the definition of categories. Further refinement of this database could therefore result in large areas to be transposed from one category to another. To better meet the requirements of the inventory many of the categories need to be further subdivided, most importantly to managed and unmanaged areas.

To improve the quality of the information provided several modifications of the land use categorization were made. Some of these changes are geographically identifiable but others not.

The modifications that were made are:

a) Subdivision of class "Partly vegetated land" of NYTJALAND database and reclassification of some of these subcategories. Part of this land cover class does better fit to the category 'grassland' than 'other land'. Some of the land in this category has been reclassified as such because it is eroded to certain stage. All erosion in Iceland was mapped in the years 1993-1995, in a large project which was carried out in cooperation of Iceland Agricultural Research Institute and Iceland Soil Conservation (Arnalds 2001b). By comparing the category 'partly vegetated land' and all erosion classes connected to vegetated land the areas inside this class where vegetation is retreating but still should be classified as grassland can be identified. These areas were added to the 'grassland' category and removed from the category 'other land'. In areas covered by the NYTJALAND database these transformations are geographically identifiable, in other areas not.
b) Lava fields from historic time (from year 875 AC) covered with mosses were moved from category 'grassland' to 'other land'. By comparing the geological maps from the Icelandic Museum of Natural History to land referred to as 'moss land' from both the NYTJALAND database as well as vegetation maps, these areas can be identified geographically.
c) Drained wetlands are in this inventory classified as grassland although LULUCF GPG would allow it to be also classified as cropland or managed wetland. Part of the drained wetlands is already included under the grassland category but some areas are under the categories 'semi-wetland' or 'wetland'. To correct for this, all ditches with a 100m buffer zone, from the map layer "lakes and rivers" of the National Land Survey of Iceland database were added to the 'grassland' category and subsequently removed from the 'wetland' category. As the ditches layer of National Land Survey of Iceland database is incomplete only covering 10.000 km length of ditches of where the total length is estimated 32.700 km (Óskarsson 1998) the results of the re-estimate was extrapolated to these 32.700 km of ditches, this additional area estimate was added to the Grassland category and subsequently removed from the 'wetland' category.
d) Land for roads is not included in the Settlement as it is in IS50 database of National Land Survey of Iceland used in compiling the unified dataset. To correct for that a layer of all roads with a 15 m buffer zone was added to the

unified dataset and overlaps to each category in that dataset were added to the Settlement category and subsequently removed from the relevant category.

e) The category Forest land is not in the unified dataset. Information on total area of forests both plantations and native birch shrub- and woodland are available from Icelandic Forest Research. All tree plantations fulfil the country specific definition of forest but only 37% of the native shrub- and woodland does so. Total area of defined forest was set as total area of Forest land category and subsequently removed from the grassland category. The area estimate for Forest land is explained in chapter 7.3 .
f) The Cropland category in the NYTJALAND database is incomplete and does only cover part of the country. This information has to be screen digitized to the database and that work is not finished. To compensate for this incompleteness the total area of cropland is corrected according to information from Iceland Agricultural Statistics and the difference in area removed from the Grassland category.
g) Revegetated land is not reported in this year submission as a land use category, although information on some areas is available and calculation is based on the size of land subjected to revegetation. It can be argued that revegetated land should be categorized separately in order to increase transparency and completeness of the land use recording. Thus classification of land subjected to revegetation is still to be decided.
h) The area of drained peat land has been estimated (Óskarsson 1998), and used in the grassland subcategory, ‘drained organic soil’. The areas drained are only partly geographically identifiable. The estimate based on maps from National Land Survey of Iceland is considered less accurate.
i) The area of hydro-reservoirs used for electrical power plants was obtained from the National Power Company (Landsvirkjun). This land use category is a subcategory of ‘wetland’.

Land use category *Subcategory*	*Area (kha)* *main category*	*Subcategory*	*Geographically identifiable*
Grassland	**3826,7**		Majority
Drained organic soil		*450*	Partly
Grassland on mineral soil		*3376,7*	Partly
Wetland	**877**		
Mire and fens		*668*	Partly
Reservoirs		*25*	Identifiable with little effort
Rivers and lakes		*184*	Identifiable
Settlements	**68**		Identifiable
Cropland	**129**		Partly
Forest	**71,4**		Majority
Native birch woodlands		*44*	Partly
Afforestation since 1990		*20,8*	Partly
Older afforestation		*6,6*	Partly
Other land	**5310**		
Glaciers		*1324*	Identifiable
Other(sparsely or not vegetated)		*3986*	Identifiable

Table 7.3. Land use classification used in GHG inventory submitted 2006.

The unified dataset does provide two subcategories in addition to the main categories, i.e. lakes and rivers as 'wetland' subcategories and glaciers as a subcategory of 'other land'. The resulting estimate of land use categories is listed in Table 7.3.

7.2.5 Land use definitions and the classification system and their correspondence to the LULUCF categories

Definitions of land use categories have not been elaborated. The present status of land use information in Iceland is as described above very fractional and in many ways inconsistent between data sources. The definitions on land use categories used in this inventory are those presented in Table 7.1 with the modifications described. As described in planned improvements the elaboration of definitions for land use categories is part of building the geographical land use database.

7.2.6 Uncertainties QA/QC

The NYTJALAND database, which is the main source of land use information behind the land use classification used for the inventory, has the scoring accuracy of 85% on its categorization. The modifications and additions of other data needed for the complete coverage of all land has most likely decreased that accuracy to some level. The amount of that increase in uncertainty has not been quantified.

7.2.7 Planned improvements regarding land use identification

Land use registration in Iceland is very fragmentary and not based on long term traditions as in many other European countries. Construction of geographically identifiable land use database covering the whole country will start the year 2007. The Government of Iceland has ensured financing of the project. This work is expected to gradually increase the quality of land use information as well as provide data for estimates of ongoing land use changes and to some extent past changes.

Iceland has agreed to participate in CORINE land cover mapping of Europe. The proposal is at present in the application phase. The proposal involves full participation in CLC 2006 mapping and CLC 2000/2006 changes the latter will be integrated to give CLC 2000.

The Icelandic mapping effort will be based on the NYTJALAND –database and other sources available. The planned construction of Icelandic land use database and CORINE mapping effort will be carried out in close cooperation between the relevant institutions (Icelandic Agricultural University and National Land Survey of Iceland).

These two projects are expected to improve the quality of land use information considerably and provide backward estimates of land use changes.

7.2.8 Completeness and method

Based on the above described accumulation of land use data and emission factors the emission by source and removal by sinks were calculated.

Source/sink	Area kha	Method	EF	CO_2 Gg Emission/ Removal (-)
Forest remaining forest	69,7			
- Living biomass		T2	CS	-113,08
- Dead organic matter		NE (T1)		
- Soils		NE,IE		
Land converted to forest	1,7			
- Living biomass		T2	CS	-7,48
- Dead organic matter		NE		
- Soils		NE,IE		
Cropland remaining cropland	129			
- Living biomass		NO		
- Dead organic matter		NE		
- Soils		NE		
- Lime application		T2	D,CS	2,52
Land converted to cropland	NE	NE		
Grassland remaining grassland	3826,7			
- Living biomass		NE		
- Dead organic matter		NA		
- Soils				
Mineral soil	*3376,7*	NE		
Organic soil	*450*	T1	D,CS	1815
- Lime application	NO			
Land converted to grassland	NE			
Wetlands remaining wetland				
Lakes and rivers	183,9	NE		
Peatland	667,59	NE		
Reservoirs	25			
- Living biomass				
- Dead organic matter				
- Soils (flooded)		T1	D	141,2
Land converted to wetland	NE			
Settlements remaining settlements	68,45	NE		
Land converted to settlements	NE			
Other land remaining other land	5310,06			
Land converted to other land	NE			
Biomass burning	NE			
Other				
Revegetation	NA	T2	CS	-451,68

Table 7.4 Summary of method and emission factors applied on CO_2 emission calculation.

EF = emission factor, D = default (IPCC), CS = country specific, NA = not applicable, NE= not estimated, NO = not occurring, IE=included elsewhere, T1 = Tier 1, T2 = Tier 2 and T3 = Tier 3,

			CH_4		
Source/sink	**Area kha**	**Method**	**EF**	**Gg Emission/ Removal (-)**	**CO_2 equivalent Gg**
Wetland					
reservoirs	25	T1	D	2,34	49,14
Biomass burning	NE				
			N_2O		
Direct N_2O emission from N fertilization	IE				
N_2O emission from drainage of soil					
Grassland organic soil	450	T1	D (CS)	1,27	393,7
Biomass burning	NE				
Other					
Reservoirs	25	T1	D	0,07	21,7

Table 7.5 Summary of method and emission factors applied on CH_4 and N_2O emission calculations.
EF = emission factor, D = default (IPCC), CS = country specific, NA = not applicable, NE= not estimated, NO = not occurring, IE=included elsewhere, T1 = Tier 1, T2 = Tier 2 and T3 = Tier 3,

Summary of method and emission factors used is provided in Table 7.4 and Table 7.5.

7.2.9 Key sources/sink and key areas

Of the sources/sinks calculated, four were recognized as level key source with regard to CO_2 equivalents.(Table 6) Non-estimated categories can not be excluded as a potential level key source.

Source/sink	Direct greenhouse gas Emission/ removal	CO_2 equivalents			
		Absolute value Gg	Level %	cumulative level %	Key source
Grassland organic soil	1815	1815	60,6	60,6	**x**
Revegetation	-451,68	451,68	15,1	75,7	**x**
Grassland organic soil N2O	1,27	393,7	13,1	88,8	**x**
Soils (flooded by reservoir)	141,2	141,2	4,7	93,5	**x**
Living biomass forest	-113,08	113,08	3,8	97,3	
Reservoirs CH4	2,34	49,14	1,6	98,9	
Reservoirs N2O	0,07	21,7	0,7	99,7	
Living biomass land converted to forest	-7,48	7,48	0,2	99,9	
Lime application	2,52	2,52	0,1	100	
Total		**2995,5**			

Table 7.6 Level key source assessment of land use categories, for which emissions/removals were calculated

Trend key source assessment was not done as land use change data is not available for most of the categories.

Considering the present status of land use information the key land use category were assessed. Two assessments were performed on the land use categories as reported (Table 7.7) and on applicable land use categories adding revegetation as land use category and excluding other land as by definition unmanaged and emission/removal calculation not applicable. Considering reported area four land use categories are recognized as key categories in relation to area i.e.; other land, grasslands on mineral soil, peatland and grassland on organic soil.

Land use category as reported	Area kha	Area Level %	Cumilative area level	Key land use category
Other land remaining other land	5310,06	51,6	51,6	**x**
Grassland Mineral soil	*3376,7*	32,8	84,5	**x**
Peatland	667,59	6,5	91,0	**x**
Grassland Organic soil	*450*	4,4	95,4	**x**
Lakes and rivers	183,9	1,8	97,1	
Cropland remaining cropland	129	1,3	98,4	
Forest remaining forest	69,7	0,7	99,1	
Settlements remaining settlements	68,45	0,7	99,7	
Reservoirs	25	0,2	100,0	
Land converted to forest	1,7	0,0	100,0	
Total	10282,1			

Table 7.7 Area level assessment of land use categories where area identified

Applicable land use categories	Area	Area Level %	Cumilative area level	Key land use category
Grassland Mineral soil	*3376,7*	65,7	65,7	**x**
Peatland	667,59	13,0	78,7	**x**
Grassland Organic soil	*450*	8,8	87,5	**x**
Lakes and rivers	183,9	3,6	91,1	**x**
Revegetation	164,24	3,2	94,3	**x**
Cropland remaining cropland	129	2,5	96,8	**x**
Forest remaining forest	69,7	1,4	98,1	
Settlements remaining settlements	68,45	1,3	99,5	
Reservoirs	25	0,5	100,0	
Land converted to forest	1,7	0,0	100,0	
Total	5136,28			

Table 7.8 Area level assessment of those land use categories considered relevant as potential source/ sinks and where area was identified

Considering only applicable categories (Table 7.8) two land use categorise i.e. lakes and rivers and revegetation are assessed as key areas.

7.2.10 Correlation to previous LUCF reporting.

The correlation of present submission on LULUCF to former submissions for LUCF is simple as only afforestation since 1990 and revegetation since 1990 was reported for

LUCF. All other emissions reported in the present submission are being reported for the first time.

The reported removal due to the land use category ‘forest’ now includes plantations older than from 1990 total of 6.6 kha. Also taken in account in submitted tables ISL -2006-(1990-2003) - v1.2.xls. Revegetations taken place prior to 1990 are also now reported fore the first time and are in the submitted CRF in a specific category. Removal due to revegetation in areas revegetated after 1990 in this year submission is comparable to the removal previously reported in LUCF due to revegetation.

7.3 Forest land

Current calculation of C-stock changes is simple and deficient. The whole process of forest inventories and aggregation of forestry data is under total revision as described below. Total recalculations of the forest sector are to be expected in the nearest future.

7.3.1 Carbon stock changes (5A)

7.3.1.1 Carbon stock changes in living biomass

In accordance to the GPG arising from the Kyoto Protocol a country-specific definition of forest has been adopted. The minimal crown cover of forest shall be 10%, the minimal height 2 m, minimal area 0.5 ha and minimal width 20 m. This definition will be used for the UNFCCC general C-accounting. Further description of forest definition is to be found in methodological report of carbon accounting of forests (Snorrason manuscript). All forests are defined as managed (under influence of human activities).

The total area of native woodlands in Iceland has been inventoried twice in the 20th century, in the periods 1972-1975 and 1987-1991, resulting in estimates of 125 and 118 kha respectively. Maps and data sampled in the inventories have newly been put to GIS. New SPOT images helped refine the mapping. and now the total area of the native birch woodlands is estimated to 120 kha. Only 37%, or 44 kha of this area is forest by definition.

Total woody C-stock was from these data estimated at 1300 kt C with average of 11 t C ha^{-1} in 1990. The two inventories are not comparable in methodology and can not be directly compared to show changes in area or woody stock during this period. (Sigurdsson and Snorrason 2000). The C stock of the native birch woodlands is assumed to remain constant with no changes reported.

Afforestation and reforestation started in Iceland 1899. Before 1970 planting of forest was mostly done in natural woodlands. The total area of plantations from 1970 to 1989 has been estimated to be 3 kha and of older plantations 3,6 kha. The annual changes of the woody biomass of these plantations are estimated the same as in plantations from 1990 or later.

Most afforestation areas in Iceland are relatively young and clear cutting has not started. The only exceptions of deforestation are when natural woodland and plantations have to give way for road or house building. A preliminary investigation of deforestation has shown that it is very rare and at a small scale. Neither the clear cuttings nor the thinning of managed forests is presently systematically recorded.

Current C-stock change calculation of living biomass is described in chapter 7.3.

7.3.1.2 Net carbon stock changes in dead organic matter

No attempt is made to estimate changes in dead organic matter due to lack of data. Tier 1 (GPG for LULUCF) default assumes no changes in dead wood or litter. Changes in dead organic matter are in GPG for LULUCF connected with forest management and due to the young age of most Icelandic plantations, this category is not considered important.

7.3.1.3 Net carbon stock change in soils

Net carbon stock changes in soils are not estimated for forest land. Emission from all drained organic soil is aggregated under grassland emission although some areas should be reported as forest land. Separation of drained organic soil to land use categories is not possible on basis of present land use data. The native forest and the afforested areas are mostly situated on mineral soils which can be highly variable regarding carbon content. At present the Icelandic Forest Research states that soil carbon stock in forest land is not decreasing (Snorrason 2003b).

7.3.2 Other emissions (5(I), 5 (II), 5(III))

Direct N_2O emission from use of N fertilisers is included under emission from agricultural soils. Data on use of fertilisers on forest land is not currently available.

N_2O emission from drainage of organic soils is reported as an aggregated number under emissions from grassland. Classification of drained organic soil between land use categories is not possible with the present available land use data.

Ploughing is sometimes part of the preparation of new plantations and might therefore cause N_2O emissions comparable to land conversion to cropland. Although possible, no data is available on amount of afforested land ploughed or emissions caused by such activity reported under ‘other’ in table 5(III).

7.3.3 Methodological issues

The area of new plantations is estimated from number of seedlings delivered from plant breeding stations. The estimation of afforested area is based on the following assumptions: On average planting density was 4000 seedlings ha^{-1}, 25% of afforested area is lost to various reasons (Sigurðsson and Snorrason 2000). Since 1990 the seedling density has decreased and new comparison of number of seedling and area of land did show that the number had dropped down to 2350 seedlings per ha (Snorrason 2004). First results of the ongoing new national forest inventory (Snorrason 2006 personal communication) are consistent on the total area of forests estimated.

7.3.4 Emission/removal factors

Tier 2 is used to estimate increment in carbon stock change in living biomass. The annual C removal factor used in the report (1.2 t C ha^{-1}) is a precautionary estimate of data from Icelandic Forest Research, (Snorrason 2003a) including both surface biomass and below ground biomass of coarse roots.

7.3.5 Uncertainties QA/QC

Using the average annual C removal factor overestimates the removal of C by young plantations. The C uptake factor is based on measurements where the biomass of forest plantations of known age was measured. These measurements have resulted in highly variable results ranging from 0.9-3.8 t C ha^{-1} (Jónsson 1996) (Snorrason 2003a).

How well the used factor represents the actual plantations is thus a source of error which acts both on age of plantation and spatial variability. The area estimate is based on indirect data sources calibrated to field data. (Snorrason 2004).

The new forest inventory project, established by the Icelandic Forest Research, yielded its first unpublished results which were consistent with previous estimates of total forest area. The annual removal factor is based on field measurements (Tier 2). The ongoing improvement in forest inventory will improve the control and verification options.

7.3.6 Recalculations

Native birch woodland was added to the total area of forest land , decreasingthe levels of grassland on mineral soil . As the C-stocks of these subcategories are assumed to remain unchanged, this change does not affect the calculation of emission/removal, so in fact no recalculation is carried out in this year's submission.

7.3.7 Planned improvements regarding Forest land

The methodology for the new inventory is based on systematic sampling consisting of a total amount of nearly 1.000 permanent plots. One fifth of the plots are measured each year and remeasured at 5 year intervals. The sample will be used to estimate both area classes and C-stock changes over time (Snorrason manuscript). Preparation of this work started in 2001 and the measurement on field plot started in 2005. One can therefore expect gradually improved estimates of carbon stock and carbon stock changes in both managed and unmanaged woodlands in Iceland. Improvements in forest inventories will also improve uncertainty estimates both on area and stock changes. Soil sampling is included as part of the forestry inventory program and estimates of changes in soil carbon stock is expected in future reporting.

Major recalculations of the forest sector are therefore to be expected in the nearest future.

7.4 Cropland

Cropland in Iceland consists mainly of cultivated hayfields. A small but increasing part is used for cultivation of barley. Cultivation of potatoes and vegetables also takes place. No information is available on emission/removal regarding different cultivation types and subdivision of areas is not attempted. Cropland is identified as a key area in applicable land use categories.

7.4.1 Carbon stock changes (5B)

7.4.1.1 Carbon stock changes in living biomass

as n perennial woody crops are cultivated in Iceland, no biomass changes need to be reported.

7.4.1.2 Net carbon stock changes in dead organic matter

The GPG for LULUCF does provide default parameters to estimate carbon stock changes in dead organic matter. No data is available to estimate the possible changes in dead organic matter in remaining cropland. The majority of land classified as cropland in Iceland is hayfields with perennial grasses only ploughed or harrowed at decade intervals. A turf layer is formed and depending on the soil horizon definition it can be considered as dead organic matter. This is therefore recognised as a possible sink/source although no data is available.

7.4.1.3 Net carbon stock change in soils

Net carbon stock changes in mineral cropland soil are not estimated. No data available and no default relative stock change factors recognised as applicable to perennial hayfield.

Emissions from organic cropland soils are reported as an aggregate number along with emission from drained grassland organic soils. Data for partitioning of drained organic soils between cropland and grassland is not available.

7.4.2 Other emissions (5(I), 5 (II), 5(III), 5(IV))

Direct N_2O emission from use of N fertilisers is included under emissions from agricultural soils.

N_2O emissions from drainage of organic soils are reported as an aggregated number under emissions from grassland. Separation of drained organic soil to land use categories is not possible on basis of present land use data.
As no data is available on area of land converted to cropland, its emissions are not estimated.

Carbon emissions from agricultural lime application. Information on lime application obtained from distributors. Most of the lime application is in the form of shellsand which contains 90 % $CaCO_3$. Numbers only available on national level and all of it is assumed to be applied on cropland.

7.4.3 Uncertainty QA/QC

The only reported emission/removal under ‘cropland’ is emissions due to agricultural liming. No quality control or assurance has been undertaken regarding the submitted amounts. The largest uncertainty in cropland emissions/removals is probably the area estimate. Cropland as reported by Iceland Agricultural Statistics is mostly hayfields with perennial grasses where only a small part is used for annual crops. Elaboration of definitions on cropland could shift a large section of 'cropland' to the 'grassland' category. Due to the lack of subdivision of cropland to cultivation categories and soil type, the emissions/removals of cropland are included in aggregated numbers in other categories resulting in relatively substantial uncertainty within the category. The quantity of uncertainty for cropland emissions/removals is not estimated.

7.4.4 Planned improvements regarding cropland

Mapping of cropland and subdivision with regard to soil types and cultivation will improve along with the quality of other land use information. One of the objectives by constructing the land use database is to identify relevant subcategories regarding soil types and management.

7.5 Grassland

Grassland is the second largest land use category identified by present land use mapping described above. Only the land use category "other land" which includes glaciers is estimated larger. If glaciers were excluded from 'other land' the grassland category would be the largest land use category in Iceland. The 'grassland' category is very diverse with regards to vegetation, soil type, erosion and management. Included are heathlands with dwarf shrubs, small bushes, grasses and mosses in variable combinations, fertile grasslands, all in highly variable condition regarding erosion. Also included in the category are large areas of drained peatlands. This category is likely to overlap with wetland, cropland and other land depending on definitions of each category. There are large areas suffering from severe erosion where vegetation cover is severely damaged but the Andic soil still has high amounts of carbon. Resent research results in Iceland indicate that the carbon budget of such areas might be positive, resulting in emssions to the atmosphere. The vegetation cover in many other grassland areas in Iceland is at present increasing both in vigour and continuity (e.g. Icelandic Institute of Natural History Annual Report 2005). In these areas, the annul carbon budget might be negative at present, meaning C is removed from the atmosphere. The size of these subcategories of grassland is not known at present. Whether these changes in vegetation are due to changes in climate, management or a combination of both is not clear.

Numbers are only available on the total area of drained organic soil and not for divisions between land use categories. All drained organic soil is at present assumed to be included under 'grassland' as subcategory.

Both the 'mineral' and 'organic soils' subcategories of ´grasslands' are identified as key areas considering both reported area and applicable area.

7.5.1 Carbon stock changes (5C)

7.5.1.1 Carbon stock changes in living biomass

No information is available on overall changes in living biomass although it is known that changes are occurring. Division of grassland to subcategories is not possible with the present status of geographical information. Changes in carbon stock in living biomass is therefore not estimated, as is consistent with the Tier 1 methodology for the category.

7.5.1.2 Net carbon stock changes in dead organic matter

Changes in dead organic matter are not requested by the GPG for LULUCF and no information is available for this stock.

7.5.1.3 Net carbon stock change in soils

Changes in carbon stock in mineral grassland soils are not estimated due to lack of data. Tier 1 methodology gives by default no changes if land use, management and input (F_{LU}, F_{MG}, F_I) are unchanged over a period. This subcategory is therefore not estimated. Extensive drainage of wetland has taken place in Iceland mostly in the period 1940-1985. Information on the areas drained is neither geographically identifiable nor can be subdivided to different soil types at the present time.

Although data separation is not possible at present, Iceland's drained soils include three soil types; Histosol, Histic Andosol and Gleyic Andosol. The two organic soil types are Histic Andosol and Histosol. Although Gleyic Andosol is not classified as organic, it is included here. Organic soils in Iceland generally are with relatively low C/N ratio and are therefore considered nutrient rich.

The area of grassland on organic soils is reported as an aggregate number which inculeds all drained soils. Some of it may eventually be included under cropland or even managed wetland, depending on the definitions of the land use categories still to be elaborated. Emissions from drained organic soil are calculated according to Tier 1 methodolgy and uses the emission factor from GPG table 3A.3.2 considering high N content and aggregation of areas from different categories. Resent research on upland CO_2 indicate a higher emission factor than previously thought. This factor is identified as level key source factor of LULUCF and as a key area both regarding reported area and applicable area.

7.5.2 Other emissions (5(I), 5 (II), 5(IV))

Direct N_2O emission from use of N fertilisers is included under emission from agricultural soils.

Emission of N_2O due to drainage of organic soils is reported here as aggregated number under "Other" specified as grassland on drained organic soils consistent with reporting of CO_2 emission from drained soils. Emission from drained organic soil is calculated according to Tier 1 using emission factor from GPG for LULUCF table 3A.3.4 fore nutrient rich organic soils considering high N content. This factor is identified as level key source of LULUCF.

All CO_2 emission due to liming is reported as aggregate number under land use category "cropland".

7.5.3 Uncertainty QA/QC

Uncertainty in reported emission from this category is supposed to be large. Several components contribute to this uncertainty. The CO_2emissions from mineral soils not estimated is potentially large considering the severe erosion in large areas. Counteracting these emissions might be removal in areas where vegetation is recovering from previous degradation.

Uncertainty in reported emissions from drained soil is also substantial. The total area drained is based on the estimate of drainage effectiveness and the total length of ditches (Óskarsson 1998). Both numbers have a large uncertainty range. The total amount of ditches includes only ditches dug prior to 1993 for agricultural purposes subsidized by the government. Newer ditches and ditches excavated for other purposes such as road building are not included. Effectiveness estimates range from 7.3 km/km^2 (Óskarsson 1998) to 20 km/km^2 (Geirsson 1975). Digitized mapping of ditches in Iceland has started at the Agricultural University of Iceland. Preliminary data from those maps indicate effectiveness around 8.4 km/km^2 (unpublished data from Agricultural University of Iceland), which is around 15% larger number than effectiveness used.

Emission factors for both CO_2 and N_2O are stated with large uncertainty range in GPG for LULUCF tables.

7.5.4 Planned improvements regarding grassland

Due to the potential importance of emissions, and removal in case of e.g. changed management, from/to mineral grassland soils, it is recognised as high priority issue to move up to a higher tier level regarding estimate of carbon stock changes in soil for the subcategory.

As severely degraded soils are widespread in Iceland as a result of extensive erosion over a long period of time, the changes in carbon stocks of mineral soil are a potentially large source of carbon. The importance of this source is emphasized, since mineral grassland soil in Iceland is almost always Andosol with high C content (Arnalds 2001a).

Emission from drained organic soils is identified as a key source for LULUCF and improving the resolution in recording land use, soil types and refinement of emission factors is highly important. Improvements in ascertaining the extent of drained organic soils within different land use categories will be priority of the new land use database to be established.

7.6 Wetland

7.6.1 Carbon stock changes (5D)

Wetland areas are divided to three subcategories, lakes and rivers, peatlands and reservoirs. Emissions are only estimated for reservoirs as other areas are considered unmanaged. CO_2 emission is estimated according to the Tier 1 method using eq. 3a.3.8 in GPG for LULUCF and the default emission factor from table 3A.3.5 under boreal, wet climate zone. Emissions of CO_2 from reservoirs are identified as level key source of LULUCF.

Area estimates were obtained from the National Power Company (Landsvirkjun).

As for other categories no information is available on land converted to wetlands.

The subcategories ‘lakes and rivers’ and ‘peatland’ are identified as key areas both with regards to reported and applicable land use categories.

7.6.2 Other emissions

Emissions of CH_4 and N_2O are estimated according to Tier 1 using eq. 3a.3.9 and 3a.3.10 respectively in GPG for LULUCF and the default emission factor from table 3A.3.5 under ‘boreal, wet climate zone’.

7.6.3 Uncertainty QA/QC

Main uncertainty is associated with emission factors as presented in GPG for LULUCF.

7.6.4 Planned improvements regarding Wetland

Ongoing research projects on reservoir greenhouse gas emission is expected to provide country specific emission factors enabling the movement to Tier 2 or 3 methods of estimation for all gasses.

7.7 Settlements

7.7.1 Carbon stock changes

Only carbon stock changes in living tree biomass are suggested by the GPG for LULUCF for stock changes in the land use category ‘settlement’. No data is available so the category is not reported.

7.7.2 Planned improvements regarding Settlement

There are no planned improvements regarding this land use category.

7.8 Other land

No emission/removal is reported for “other land remaining other land” in accordance with GPG for LULUCF. As with most other land use categories information on land use conversion is not available at present.

This land is identified as a key area considering reported land use categories but not as part of applicable land use categories due to its definition as unmanaged.

7.9 Other

Two emission/removal categories are reported under other in CRF- table 5. The non-CO_2 emission from reservoirs is reported here as no other obvious option in CRF tables. Tier 1 and emission factors as described above under “Wetland Other emission”.

The second category reported here is emission/removal due to revegetation accounted for in the below section.

7.10 Revegetation

Changes in carbon stock in soil and vegetation due to revegetation are reported under the category ‘other’ in the Land use Changes and Forestry section. The CRF tables do not allow for other options. Preferably, revegetation would be reported as a separate land use category addressing changes in individual pools and other emissions more directly. Due to this reporting format some information included in CRF for other land use categories does not appear. In order to increase the transparency of reporting for this category and improve consistency to other land use categories a sectoral background table for revegetation comparable to others included in CRF are included in this report (Table 7.9).

TABLE 5.G SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY Icela
Revegetated land 20
(Sheet 1 of 1) 20

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS					EMISSIONS/REMOVALS				
Land-Use Category	Sub-division[1]	Total area	Carbon stock change in living biomass per area [2,3]			Net carbon stock change in dead organic matter per area[3]	Net carbon stock change in soils per area [3]	Carbon stock change in living biomass[2,3]			Net carbon stock change in dead organic matter[3]	Net carbon stock change soils [3]
			Increase	Decrease	Net change			Increase	Decrease	Net change		
		(kha)	(Mg C/ha)					(Gg C)				
H. Total Revegetated Land		164,24	0,08	0,00	0,08	0,00	0,68	12,32	0,00	12,32	0,00	110,87
1. Revegetated Land remaining Revegetated Land		154,06	0,07	0,00	0,07	0,00	0,68	11,55	0,00	11,55	0,00	103,99
	after 1990	49,06	0,07	0,00	0,07	0,00	0,67	3,68		3,68		33,11
	before 1990	105,00	0,08	0,00	0,08	0,00	0,68	7,88		7,88		70,88
2. Land converted to Revegetaded Land[4]		10,19	0,08	0,00	0,08	0,00	0,68	0,76	0,00	0,76	0,00	6,88
2.1 Forest converted to Revegetaded Land		0,00						0,00	0,00	0,00	0,00	0,00
										0,00		
2.2 Cropland converted to Revegetaded Land		0,00						0,00	0,00	0,00	0,00	0,00
										0,00		
2.3 Grassland converted to Revegetaded Land		0,00						0,00	0,00	0,00	0,00	0,00
										0,00		
2.4 Wetlands converted to Revegetadedt Land		0,00						0,00	0,00	0,00	0,00	0,00
										0,00		
2.5 Settlements converted to Revegetaded Land		0,00						0,00	0,00	0,00	0,00	0,00
										0,00		
2.6 Other Land converted to Revegetaded Land		10,19	0,08	0,00	0,08	0,00	0,68	0,76	0,00	0,76	0,00	6,88
		10,19	0,08	0,00	0,08	0,00	0,68	0,76		0,76		6,88

(1) Land categories may be further divided according to climate zone, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

(2) CO_2 emissions and removals (carbon stock increase and decrease) should be listed separately except where, due to the methods used, it is technically impossible to separate information on increases and decreases.

(3) The signs for estimates of increases in carbon stocks are positive (+) and of decreases in carbon stocks are negative (-).

(4) A Party may report aggregate estimates for all conversions of land to forest land when data are not available to report them separately. A Party should specify in the documentation box which types of land conversion are included. Separate estimates for grassland conversion should be provided in table 5 as an information item.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

Table 7.9 Sectoral background table for revegetation not included in submitted CRF.

7.10.1 Overview

Since settlement of Iceland large areas of the former vegetated areas have been severely eroded and in large areas the entire soil mantle has been swept away. It has recently been estimated that total of 60-250 $*10^3$ kt C has been oxidized and released into the atmosphere in the past millennium (Óskarsson et al. 2004).

The current ongoing loss of SOC due to erosion was in the same study estimated 50-100 kt C yr^{-1} (Óskarsson et al. 2004). No attempt is made to include that estimate in the CRF.

The revegetation of deserted areas sequesters some of the carbon back into the soil.

The Icelandic Soil Conservation was established in 1907. Its main purpose was and still is the prevention of ongoing erosion and the revegetation of lost areas. Until 1970 recording of soil conservation and revegetation activities was very limited and consisted only of occasional maps and reports. From 1970 to 1990 most of the activities involved spreading of seeds and/or fertilizers by airplanes. These activities are to a large extent recorded. From 1990 the importance of flight has decreased as other methods have taken over and cooperation with farmers and other parties of interest has increased. At the same time, recording of activities has developed.

The area reported as revegetation after 1990 is based on activities recorded by Icelandic Soil Conservation. The area revegetated before 1990 is estimated by the Icelandic Soil Conservation.

7.10.2 Emission/removal factors

The Icelandic Soil Conservation records the revegetation efforts conducted. In 1998-2000 a special governmental effort to sequester carbon with revegetation and afforestation was carried out. Along with that effort a research effort to document carbon sequestration and estimate its rate was carried out (Arnalds et al. 2000).

No Tier 1 default emission/removal factors are available for revegetation effort. The emission factor used for calculating emission/removal due to revegetation efforts are estimated as -0,75 kt C/kha/yr based on precautious estimate of results from the research effort conducted 1998-2000. Also based on the same research effort the contribution of changes in carbon stock of living biomass and soil were estimated 10% and 90% respectively.

7.10.3 Carbon stock changes

The reported removal of CO_2 is calculated according to the estimated area revegetated and the emission/removal factor for carbon stock changes in living biomass and soil. The area reported is divided to three periods: pre-1990, 1990 - inventory year, and the area revegetated in the inventory year.
This factor is identified as a key source of LULUCF and as a key area considering only applicable land use categories.

7.10.4 Other emissions

No effort has been taken to estimate separately the emissions or removals of other GHGs. The emissions of N_2O from the use of N-fertilizers on revegetated land are included in the national inventory report under fertilizer usage.

7.10.5 Uncertainties QA/QC

Calculation of removal/emission of carbon due to revegetation depends on the size of the area and the chosen emission/removal factor. The approach is 'Tier 1 (2)' approach based on simple removal rate factor based on chronosequential accumulation estimates of carbon on revegetatied areas of a known age. Both numbers have a large uncertainty.

The areas where revegetation is carried out are very variable with regards to soil climate condition and methods used. Success of revegetation efforts is also very variable andonsequently, as is the rate of sequestration. Although some of the sources of this variability have been identified, it is far from being totally explained (Arnalds et al. 1999, Arnalds et al. 2000, Arnalds 2002).

The mapping method and registration of the revegetation on the first year of reporting (1998) was based on records of the site name and estimate of hectares within that location where the activity took place. The estimated number of hectares is partly based on amount of seeds and fertilizers used. This method may have introduced a relatively large error into the area estimates and may bring a risk of either double counting or not counting some areas. Since 1998 the reported size of area subjected to revegetation has been increasingly based on GPS recordings.

For the first time in this year submission to the UNFCCC the land revegetated prior to 1990 is reported. The size of the land subjected to revegetation prior to 1990 is much more uncertain than after that time. It is possible that today some of this land should today be identified under a different land use category.

Generally it is a necessary part of the revegetation effort to protect the area from grazing by erecting permanent fences. In some cases the whole area within such fences is reported as revegetated although only a part of it has been directly subject to the field of activities such as fertilization or seed spreading. It is important to bear in mind that the registration was designed to serve other purposes than the needs of greenhouse gas inventories.

7.10.6 Planned improvements regarding revegetation

An effort in GIS mapping of the revegetation areas and improvements of the precession of size estimate of the areas has been ongoing since 1998. Both the sequestration rate estimates and area recording aim at establishing a transparent, verifiable inventory for revegetation efforts accountable according to the Kyoto Protocol.

Two main improvements are planned and partly being carried out. First there is the improvement in recording of activities both, in location and description of activities and management. The second improvement planned is pre-activity sampling to establish a baseline for future comparisons of SOC.

The Icelandic Soil Conservation aims at using sample based approach combined with GIS mapping to identify land subjected to revegetation and to improve emission/removal factors and quality control on different activity practices. The systematic sampling approach to identify land subjected to revegetation and changes in carbon stocks will provide more accurate estimates of land use and stock changes and enable the quantification of uncertainty for these estimates.

7.10.7 Biomass burning (5V)

Accounting of biomass burning for all land use categories is addressed commonly in this section.

No emissions due to biomass burning are reported. It is considered not occurring for controlled burning of forest land, land converted to forest land, land converted to cropland, forest land converted to grassland, forest land converted to wetland and wildfires on forest land converted to: cropland, grassland or wetland. For other categories it is not estimated due to lack of information.

Burning the biomass on grazing land near the farm was for a long time common practice in sheep farming. This management regime of grasslands and wetlands is becoming less common. The recording of the activity is minimal although formal approval of local polity authority is needed for safety and birdlife protection purposes. A large wildfire broke out in the year 2006 and and research project was initiated as a result, aimed at recording the ecological effects of biomass burning. This project is expected to provide data for Tier 2 assessment of amount of biomass burned per area burned. As land use identification is expected to improve in general due to the planned increased effort on establishing a georeferenced land use database, information on area burned annually are also expected to improve.

7.11 Planned improvements of emission/removal data for LULUCF

Improvements which apply specifically to one of the land use categories or one of their pools are listed above in relevant chapter.

Simultaneously, land use information data will be collected regarding the carbon stocks of the land use category used in the classification. These efforts are aimed at gradually improving the reliability of reported emission/removal of the LULUCF sector and enable the movement from Tier1, which is presently used to calculate emission/removal in most categories, to higher tier levels.

The results of ongoing and recent research activity on emissions/removal and stocks in several ecosystems will be implemented in emissions calculations.

8 WASTE

8.1 Overview

Practices of waste disposal and wastewater treatment have undergone a radical change in Iceland since 1990. Open burning that used to be the most common means of waste disposal outside the capital area, has gradually decreased since 1990, as landfills have become the main option. Recycling of waste has also increased due to efforts made by local municipalities. A twofold increase was noted between 1994 and 2004. Municipalities have also increasingly cooperated to run waste collection schemes and operate common landfill sites. This has resulted in larger landfills and enabled closedown of a number of small sites. Currently about 70% of municipal waste is landfilled, 22% recycled or recovered, 7% incinerated with energy recovery and 1% are incinerated without energy recovery.

In 1990, 6% of the Icelandic nation was connected to wastewater treatment plants, but in 2004 the ratio was 60,7%.

8.1.1 Methodology

The calculation of greenhouse gas emissions from waste is based on the methodologies suggested by the IPCC Guidelines and the Good Practice Guidance.

As indicated in table 1.1, the key source analysis performed for 2004 has revealed that in terms of total level and/or trend uncertainty the only key source in the waste sector is the following:

- Emissions from Solid Waste Disposal Sites – CH_4 (6A)

8.1.2 Completeness

Table 8.1 gives an overview of the IPCC source categories included in this chapter and presents the status of emission estimates from all sub-sources in the industry sector.

Table 8.1 Waste - completeness

	Direct GHG			Indirect GHG			
Sector	CO_2	CH_4	N_2O	NO_x	CO	NMVOC	SO_2
Solid waste disposal on land							
Managed waste disposal on land	NE	X	NA	NA	NA	NE	NA
Unmanaged waste disposal on land	NE	X	NA	NA	NA	NE	NA
Wastewater treatment							
Industrial wastewater	NE	NE	NE	NE	NE	NE	NE
Domestic and commercial wastewater	NE	X	X	NE	NE	NE	NE
Waste incineration	X	NE	X	X	X	X	X
Other							

8.2 Solid waste disposal sites

Methane from solid waste disposal sites is emitted during the biological decomposition of waste. This transformation of organic matter takes place in several steps. During the first weeks or months, decomposition is aerobic and the main decomposition product is CO_2. When there is no oxygen left, the decomposition becomes anaerobic and methane levels starts to increase. After about one year CH_4 emissions peak and levels decrease over some decades.

In Iceland, solid waste disposal is divided between managed landfill sites and unmanaged landfill sites. Managed sites are typically deeper than 5 meters and have thorough registration on waste sorts and amounts disposed. Unmanaged landfill sites are shallow with less than 5 meters of waste. Total waste going to these landfills is disaggregated into two major waste streams, municipal solid waste (MSW) and industrial waste (IW).

The methodology for calculating methane from solid waste disposal on land is in accordance with the IPCC First Order of Decay method. The total amount of methane gas generated by the disposal of MSW and IW on landfill sites is calculated with the following equations.

$$\boxed{\mathbf{CH_4\ emissions}\ (Gg/yr) = \mathbf{[(Q_{MSW} + Q_{IW}) - R] * (1 - OX)}}$$

Q_{MSW} = Methane generated by MSW disposal (Gg/yr)
Q_{IW} = Methane generated by IW disposal (Gg/yr)
R = Methane recovery (Gg/yr)
OX = Oxidation factor

$$\boxed{\mathbf{Q_{MSW}}\ (Gg/yr) = \mathbf{\Sigma_i\ Q_i}}$$

Q_i = Methane generated by landfilled waste type i (Gg/yr)
i = type of waste (see par. 8.2.4.1)

$$\boxed{\mathbf{Q_i}\ (Gg/yr) = \mathbf{E * 16/12 * F}}$$

E = Calculates the total mass of DDOC decomposed to methane each year.
F = Is the fraction of methane in developed landfill gas

$$\boxed{\mathbf{E = C +} H_{last\ year} \mathbf{* (1 - exp1)}}$$

C = $DDOC_m$ Decomposable Degradable Organic Carbon
H = $DDOC_m$ accumulated in SWDS end of year

$$\boxed{\mathbf{H = B + (H_{last\ year} * exp1)}}$$

B = $DDOC_m$ not reacted

$$\boxed{\mathbf{C = D * (1- exp2)}}$$

D = Decomposable DOC ($DDOC_m$) deposited

$$\boxed{\mathbf{B = D * exp2}}$$

D = Decomposable DOC ($DDOC_m$) deposited

$$\boxed{\mathbf{D = W * DOC * DOC_f * MCF}}$$

W = Amount of waste landfilled
DOC = Degradable Organic Carbon
DOC_f = Fraction of DOC dissimilated
MCF = Methane Correction factor

8.2.1 Activity data

Activity data on waste in Iceland has proven to have been insufficient in the past. There is little information about actual amounts of generated waste as well as on its composition and characteristics, before 1990. Reporting of waste amounts received by managed landfill sites started after 1980 and is done by the landfill operators. Consistent and relatively reliable data-sets on total waste generation and treatment are available from 1995.

Using the calculation based on the Icelandic GDP (Gross Domestic Product) the total amount of generated waste can be extrapolated from 1994 back to 1950. This GDP based calculation uses 2004 as reference year. It calculates the amount of generated MSW per person per year and the total generated for both MSW and IW. Data quality for the reference year is ensured because of accurate waste reporting for that year.

GDP is strongly correlated with a country's waste production and is a reliable estimation method. Icelandic GDP figures date back before 1950 and are considered reliable. With regard to total waste amounts generated, it has been decided to use available reported waste figures above the on GDP-based waste figure calculations.

The activity data was mostly collated by the EFA. Secondary data sources are the municipalities and the larger waste companies in Iceland. The total amounts of MSW and IW generated and treated in Iceland between 1950 and 2004 are reported in table 8.2.

Table 8.2 Waste generation and treatment from 1950 to 2004

Year	Generated (A+B+C)*			A. Landfilled		B. Recycled		C. Incinerated	
	Total	MSW	IW	MSW	IW	MSW	IW	MSW	IW
1950	**42**	8	34	8	34	-	-	-	-
1960	**69**	16	53	16	53	-	-	-	-
1970	**112**	29	83	29	83	-	-	-	-
1980	**214**	60	154	43	151	-	-	-	-
1990	**288**	87	201	78	200	-	-	26	5
1991	**289**	88	201	79	200	-	-	26	5
1992	**282**	87	195	78	194	-	-	26	5
1993	**287**	89	198	80	197	-	-	26	5
1994	**299**	93	206	84	205	-	-	26	5
1995	**360**	114	246	110	245	-	-	24	4
1996	**370**	117	253	110	252	1	-	23	4
1997	**378**	120	258	112	257	2	-	23	4
1998	**386**	123	263	111	262	6	-	20	4
1999	**394**	126	268	109	267	11	-	18	3
2000	**403**	130	273	107	272	17	-	17	3
2001	**413**	133	280	104	269	23	10	16	3
2002	**420**	137	283	101	239	30	43	15	3
2003	**431**	140	291	102	243	32	47	14	2
2004	**443**	147	296	105	244	31	50	18	3

* Amounts is x 1.000 tons

8.2.2 Emission factors

Municipal solid waste

Municipal Solid Waste corresponds to waste from households and similar waste from the commerce and trade industry. MSW can be disaggregated into a mix of waste categories that contain significant fractions of biodegradable carbon, which are: food, garden, paper, wood, textile, nappies and sludge (from wastewater handling (Sector Waste 6B).

The composition of MSW going to landfill has been surveyed starting from 1999 and is done by SORPA, the biggest waste treatment facility in Iceland. SORPA serves the Reykjavik capital area and thus covers around 63% of the Icelandic population. The composition of MSW over the last 7 years has shown to be relatively consistent. Because very little is known about the MSW composition before 1999 the average composition from 1999 to 2004 has been used in the IPCC model for each year between 1950 and 2004.

It is understood that different MSW compositions are likely to have existed over the last 60 years. For example, the fraction of garden waste in 1950 might have been higher than in 2000. Also the fraction of plastic (packaging) waste in MSW is expected to have increased significantly since 1950.

A sensitivity analysis, however, showed very little variation in total methane emission in Sector 6A when applying different (estimated) waste compositions between 1950 and 2004. The difference calculated did not exceed 2%. Because it is impossible to estimate the exact composition of waste each year and has very little effect on the final outcome, the composition of MSW has not been further investigated. The waste composition surveys results for 1999 to 2004 and their averages are reported in table 8.3.

Table 8.3: Municipal Solid waste composition survey results 1999 – 2004

Type of waste	1999	2000	2001	2002	2003	2004	Average
Food waste	33%	28%	31%	26%	24%	26%	**28,1%**
Garden waste	4%	0%	1%	0%	2%	1%	**1,4%**
Paper and Cardboard	24%	29%	21%	22%	26%	27%	**24,8%**
Wood waste	0%	1%	1%	1%	1%	0%	**0,6%**
Textile waste	4%	4%	3%	3%	3%	4%	**3,4%**
Diapers/nappies	5%	4%	6%	7%	5%	6%	**5,6%**
Sludge	4%	4%	4%	4%	4%	4%	**3,9%**
Plastics, other inert	26%	30%	33%	37%	35%	32%	**32,2%**

The emission factors and parameters for IPCC Category 6A Municipal Solid Waste are reported in table 8.4

Table 8.4: Emission factors and parameters for Municipal Solid Waste

Parameters	Food	Garden	Paper	Wood	Textile	Nappies	Sludge
MSW composition (average 1999 -2004)	**28,1%**	**1,4%**	**24,8 %**	**0,6%**	**3,4%**	**5,6%**	**3,9%**
Methane Correction Factor (MCF)* - Unmanaged-shallow - Managed - Uncategorized				**0,4** **1,0** **0,6**			
Fraction of degradable organic carbon dissimilated (DOC_F)*				**0,5**			
Degradable organic carbon (DOC)*	**0,15**	**0,17**	**0,4**	**0,43**	**0,24**	**0,24**	**0,05**
Methane generation constant (k)*	**0,185**	**0,1**	**0,06**	**0,03**	**0,06**	**0,1**	**0,185**
Half-life time (h) (years) (h = Ln(2)/k)	**4**	**7**	**12**	**23**	**12**	**7**	**4**
Delay time (month)*				**6**			
Number of considered years				**55**			
Fraction of CH_4 in landfill gas (F) *				**0,5**			
Oxidation factor (OX) *				**0,05**			
Conversion factor (C to CH_4)				**1,33**			

* IPCC default value

Industrial waste

Industrial waste (IW) comes from agriculture, fisheries and other industrial activities. The amounts of IW used in the IPCC model are excluding separated waste fractions such as scrap metal, tyres and construction and demolition waste. It is expected that significant fractions of MSW-related waste can be found in IW and will be further explained under paragraph 8.2.3.

The emission factors and parameters for IPCC Category 6A Industrial Waste are reported in table 8.5.

Table 8.5: Emission factors and parameters for Industrial Waste

Parameters	
Methane Correction Factor (MCF)*	
- Unmanaged-shallow	**0,4**
- Managed	**1,0**
- Uncategorized	**0,6**
Fraction of degradable organic carbon dissimilated (DOC_F)*	**0,5**
Degradable organic carbon (DOC)*	**0,15**
Methane generation constant (k)*	**0,09**
Half-life time (h) (years) (h = Ln(2)/k)	**8**
Delay time (month)*	**6**
Number of considered years	**55**
Fraction of methane in landfill gas*	**0,5**
Oxidation factor (OX) *	**0,05**
Conversion factor (C to CH_4)	**1,33**

* IPCC default value

Landfill gas recovery

The recovery of landfill gas (CH_4) is done at only one landfill site (Álftanes) in Iceland, which receives the waste from the Reykjavík capital area. The recovery of CH_4 from landfill gas started in 1997 and amounts are reported in table 8.6.

Table 8.6: Landfill gas recovery in Iceland, 1997 - 2004

Gg CH_4	1997	1998	1999	2000	2001	2003	2004
Methane recovery from Solid Waste disposal sites (SWDS)	**0,105**	**0,240**	**0,349**	**0,430**	**0,407**	**1,108**	**1,143**

Uncertainties

The preliminary estimate of quantitative uncertainty has revealed that the uncertainty of CH_4 emissions from solid waste disposal sites is 52%. The quality of the activity data for Iceland may be considered sufficient, but needs further improvement to ensure its accuracy and quality. The uncertainties in the IPCC model for Sector 6A are regarding:

- **Landfilled waste between 1950 to 1980**
  The exact amounts of waste going to managed or unmanaged landfill sites between 1950 and 1980 are unknown. Therefore the Methane Correction factor (MCF) in the IPCC model has been set to uncategorised for this period (MCF = 0,6, see table 8.4 and 8.5).

- **Amount and composition of Industrial waste**
  The total amount of Industrial Waste has shown to be very significant over the last 10 years (1995-2004). Because of these large amounts of waste going to landfill, the emissions that are calculated using the IPCC model are significant as well.

  Although separated waste sorts such as scrap metal, tyres and construction and demolition waste are excluded from IW it is expected to include waste amounts that should be allocated to MSW. This is because large amounts of company related waste, thus with a similar composition as MSW, is included in mixed fraction of Industrial Waste.

  The exact composition of mixed IW and thus the fraction of biodegradable waste remain unknown. Therefore, both the total amount of mixed IW and its composition need further investigation. This has shown to be a barrier to accurate emission calculations as well as general waste statistics.

  The methane emission from landfilled IW might be overestimated. However, if a fraction from IW is allocated to MSW, it will result in an increase of methane emission from landfilled MSW. The resulting absolute difference has not been estimated.

- **MSW composition between 1950 and 1999**
  The composition of MSW for the years between 1950 and 1998 is rather difficult to estimate. The sensitivity analysis, using different estimated waste compositions showed very little change in total methane emissions. The

calculated differences in total methane emission in Sector 6A did not exceed 2%.

Recalculations

Before 2006, the methane emission from Solid Waste disposal on land in Iceland was calculated using the Tier 1 method. During the last submission in 2005, preliminary date obtained in the process of making the National Waste Management Plan (NWMP) was used. This lead to a decrease from about 266 Gg CO_2-eq in 2002 (reported in the submission from 2004) to 211 Gg in 2002 (reported in the submission from 2005).

In 2006 Iceland applied the IPCC First Order of Decay (FOD) method. Input-data was compiled from national waste statistics. Using the IPCC model resulted in a further decrease in methane emission from landfilled waste. The differences between these two methods are reported in table 8.7.

Table 8.7 Comparison between results of ´Tier 1´and ´FOD´ methods, in Gg CO_2-eq

Year	Tier 1 Method *(2005)*	FOD method *(2006)*	Difference
1990	114	114	0
1991	122	118	-4
1992	133	121	-12
1993	142	124	-18
1994	156	127	-29
1995	191	131	-60
1996	201	136	-65
1997	202	139	-63
1998	204	142	-62
1999	214	146	-68
2000	219	152	-67
2001	221	157	-64
2002	211	164	-47
2003	214	154	-60

8.3 Emission from Wastewater Handling (6B)

Very few wastewater treatment plants are operational in Iceland and most of them are located in the greater Reykjavík capital area and a few other larger municipalities. The wastewater treating systems are mostly settling tanks or septic tanks and filters (e.g. sandfilters or biological filters).

The sludge from wastewater handling is disposed on (managed and unmanaged) landfill sites. Amounts of sludge are included in total generated waste. Emissions from sludge disposal on landfills are included under Solid Waste Disposal (6A). No methane gas is recovered from wastewater handling in Iceland.

8.3.1 Methodological issues

The Icelandic methodology for calculation of methane emission from wastewater handling is consistent with the IPCC default methodology. To estimate the CH_4 emissions from domestic wastewater the *´Decision Tree for CH_4 emission'* presented in the IPCC Good Practice Guidance was used. Because very little data on wastewater treatment are available and its quality is poor, Iceland used the ´Check method´ in accordance with IPCC guidelines.

$$\boxed{\mathbf{WM = P * D * SBF * EF * FTA * 365 * 10^{-12}}}$$

WM = Annual CH_4 emission from domestic wastewater (Tg)
P = Population (person)
D = Organic load in biochemical oxygen demand per person (g BOD/person/day)
SBF = Fraction of BOD that readily settles
EF = Emission factor (g CH_4/g BOD)
FTA = Fraction of BOD in sludge that degrades anaerobically

The ´Check method´ equation can be used to roughly estimate the CH_4 emissions from domestic wastewater. The variable P (population) in this equation is country specific and only includes the population that is connected to the various wastewater treatment facilities. For the other emission factors, either IPCC default values or estimated values are used.

Nitrous oxide emissions from human sewage were calculated according to the IPCC default method, which is based on the annual per capita protein intake.

$$\boxed{\mathbf{N_2O = Protein * Frac(NPR) * populatio * EF * 44/28}}$$

Activity data

The activity data used for the ´Check method’ is represented by the population portion that is connected to wastewater handling facilities and is reported in table 8.8. The total number of population is obtained from the Statistics Iceland.

The percentage of population that is connected to wastewater handling facilities has been reported in the EFTA report to the Surveillance Authority regarding the implementation of Directive 91/271/EU on the treatment of wastewater from built-up areas.

Table 8.8: Total population and population connected to wastewater handling facilities in Iceland

	Population	Connected to wastewater facilities		
		Total	Septic tanks	Sand filters, settling tanks, etc.
1990	255.708	6,0%	0%	6,0%
1991	259.577	6,0%	0%	6,0%
1992	262.193	6,0%	0%	6,0%
1993	264.919	6,0%	0%	6,0%
1994	266.783	10,0%	4,0%	6,0%
1995	267.806	10,0%	4,0%	6,0%
1996	269.727	10,0%	4,0,%	6,0%
1997	272.069	10,0%	4,0%	6,0%
1998	275.264	14,4%	8,4%	6,0%
1999	279.049	22,4%	16,4%	6,0%
2000	282.849	39,0%	33,0%	6,0%
2001	286.250	39,0%	33,0%	6,0%
2002	288.201	60,7%	48,7%	12,0%
2003	290.490	60,7%	48,7%	12,0%
2004	293.291	60,7%	48,7%	12,0%

Emission factors

Of the total population connected to wastewater handling facilities, some are connected to handling facilities such as septic (and settling) tanks and some are connected to sand-filters. Different FTA factors apply to the two handling methods. It is expected that emissions from wastewater handling in Iceland based on the ´Check method´ are still overestimated. The annual per capita protein intake is based on Dietary Surveys of the Icelandic Nutrition Council and the Dietary Survey Unit for Nutrition Research performed in 2002 to 2003. The emission factors and parameters for IPCC Category 6B Wastewater Handing are reported in table 8.9.

Table 8.9: Emission factors and parameters for Wastewater

Parameters	
D *	**60 g/person/day**
SBF_{septic}	**0,5**
$SBF_{sand\ filter,\ etc.}$	**0,33**
EF *	**0,6 g CH_4/g BOD**
FTA_{septic}	**0,6**
$FTA_{sand\ filter,\ etc.}$	**0,2**
Protein	**31,76 kg/person/year**

* IPCC default value

Uncertainties

The uncertainties in the IPCC model for Sector 6B are regarding:

- **SBF parameter**
  Around 50% of the BOD in domestic water is associated with non-dissolved solids, much of which rapidly settles. A conventional settling tank typically removes 33% of suspended solids, whereas 50% is more appropriate to many long-term processes as lagoons or septic-tanks. Since both conventional and long term processes are used in Iceland, both SBF values are used in the Check method.

- **FTA parameter**
  For countries or areas that are extensively sewered, use only aerobic processes and whose sludge is treated by non-CH_4 producing procedures or by anaerobic digestion with combustion of CH_4, the FTA will be significantly lower or zero.

  Wastewater handling in Iceland is done using both septic-tanks and (sand) filters. In septic-tanks there is possible anaerobic digestion and therefore a higher FTA (0,6) applies than for (sand)filters (0,2). Similar to the SBF parameter, both FTA values are used in the ‘Check method’.

The calculation of emissions from wastewater handling confirms the expectation done in the NIR submission of 2005 that very little emission is generated from wastewater handling in Iceland.

Recalculations

Calculation of emissions from wastewater handling, using the IPCC guidelines, has never been used in Iceland. The emissions presented in this chapter are the first figures calculated and therefore preliminary.

8.4 Waste incineration

Emissions from waste incineration with energy recovery are reported in sector 1A1a (public electricity and heat production). Emissions from waste incineration have decreased by 87% from 1990 to 2004. This is because the total amount of waste being incinerated in Iceland has decreased while increasing levels have been incinerated with energy recovery and thus reported under 1A1a.

The methodology for calculating emissions from waste incineration is in accordance with the IPCC Guidelines. The activity data are the waste inputs into the incinerator, and the emission factor is based on the carbon content of the waste that is of fossil origin only. The burn out efficiency of the combustion is also included in the calculation. Although the most accurate way to estimate CO_2 emissions is by disaggregating the activity data into different waste types (e.g. municipal solid waste, clinical waste, hazardous waste) this could not be done for this submission. The following equation is used for calculating CO_2 emissions from waste incineration:

$$CO_2 \text{ emissions (Gg/yr)} = IMSW \bullet CCW \bullet FCF \bullet BEF \bullet 44/12$$

IMSW: Amount of incinerated waste (Gg/yr)
CCW: Fraction of carbon content in waste
FCF: Fraction of fossil carbon in waste
BEF: Burn out efficiency of incinerator
44/12: Conversion from C to CO_2

Activity data

Activity data on incinerated waste from major incineration plants have been collected by the EFA since 2000. Historic data as well as data on open pit burning not reported to EFA, was estimated with the assumptions that 500 kg of wastes have been incinerated per inhabitant in the communities where waste is known to have been incinerated (both in primitive incineration plants as well as open pit burning) in 1990, 1995 and 2000 and interpolated in the years between. These communities were mapped by EFA in the respective years. The data after the year 2000 is considered rather reliable, but pre-2000 data very unreliable.

Emission factors

Data for estimation of CO_2 from waste incineration are default values for municipal solid waste (MSW) taken from the IPCC Good Practice Guidance. They are presented in table 8.10.

Table 8.10 Parameters for waste incineration

Waste Stream	MSW
C content of waste	40%
Fossil Carbon as % of Total Carbon	40%
Efficiency of Combustion	95%

9 OTHER – GEOTHERMAL ENERGY

9.1 Overview

Iceland relies heavily on geothermal energy for space heating and to some extent for electricity production. Geothermal energy is generally considered to have relatively low environmental impact. Emissions of CO_2 are commonly considered to be among the negative environmental effects of geothermal power production, even though they have been shown to be considerably less extensive than from fossil fuel power plants.

As indicated in Table 1.1, the key source analysis performed for 2004 has revealed that geothermal energy is a key source in terms of both level and trend.

9.2 Methodology

Three major geothermal power plants in operation in Iceland are at Krafla, Svartsengi and Nesjavellir. The Svartsengi and Nesjavellir plants produce both electricity and hot water for space heating, whereas the Krafla plant generates electricity only. The total installed capacity of these three power plants is 195 MW and they produce about 17% of the total electricity used in Iceland.

Geothermal systems can be considered as geochemical reservoirs of CO_2. Degassing of mantle-derived magma is the sole source of CO_2 in these systems in Iceland. CO_2 sinks include calcite precipitation, CO_2 discharge to the atmosphere and release of CO_2 to enveloping groundwater systems. The CO_2 concentration in the geothermal steam is site and time-specific, and varies greatly between areas, wells within an area as well as the time of extraction.

Iceland reported greenhouse gas emissions from geothermal energy utilization prior to 2000 when it was decided to not include these emissions in the national emissions, as research in Iceland and some other countries indicated great uncertainty in the estimation of such emissions. At the time it was considered likely that no net emissions were taking place from geothermal power plants, only a relocation of the natural emissions within the wider geothermal area. Recent research, however, indicates that emissions associated with the utilisation of geothermal energy in Iceland do constitute a net increase in emissions.

The total emissions estimate is based on direct measurements. The enthalpy and flow of each well are measured and the CO_2 concentration of the steam fraction determined at the wellhead pressure. The steam fraction of the fluid and its CO_2 concentration at the wellhead pressure and the geothermal plant inlet pressure are calculated for each well. Information about the period each well discharged in each year is then used to calculate the annual CO_2 discharge from each well and finally the total CO_2 is found by adding up the CO_2 discharge from individual wells.

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ANNEX I: KEY SOURCES

According to the IPCC definition, key sources are those that add up to 90% of the total uncertainty in level and/or in trend. In the Icelandic Emission Inventory key source categories are identified by means of Tier 1 method.

A key source analysis was prepared for this round of reporting. Table 1.1 in Chapter 1 lists identified key sources. Table A1 shows the level assessment of the key source analysis and table A2 the trend assessment of the key source analysis.

Table A1. Key source analysis – level assessment

		1990	2004	Level assessment	Cumulative total
Mobile Combustion: Fishing	CO_2	655,5	712,1	0,20	0,20
Mobile combustion: Road vehicles	CO_2	509,0	635,7	0,17	0,37
CO_2 emissions from aluminium production	CO_2	136,5	407,3	0,11	0,48
CO_2 emissions from ferroalloys production	CO_2	203,5	387,4	0,11	0,59
Mobile combustion: Construction industry	CO_2	120,7	242,7	0,07	0,66
CH_4 emissions from enteric fermentation in domestic livestock	CH_4	269,9	229,1	0,06	0,72
CO_2 emissions from stationary combustion, oil	CO_2	237,0	190,8	0,05	0,77
CH_4 emissions from solid waste disposal sites	CH_4	113,6	157,0	0,04	0,82
Direct N_2O emissions from agricultural soils	N_2O	144,0	132,6	0,04	0,85
CO_2 emissions from geothermal energy	CO_2	66,6	124,1	0,03	0,89
Indirect N_2O emissions from Nitrogen used in agriculture	N_2O	101,2	93,1	0,03	0,91
Emissions from Substitutes for Ozone Depleting Substances	HFC		58,4	0,02	0,93
CO_2 emissions from Cement Production	CO_2	51,6	49,8	0,01	0,94
CO_2 emissions from stationary combustion, coal	CO_2	48,3	46,6	0,01	0,95

Table A1. Key source analysis – trend assessment

		1990	2004	Level assessment	Trend assessment	Contribution to trend	Cumulative total
PFC emissions from aluminium production	PFC	419,6	39,8	0,01	0,106	0,294	0,29
CO_2 emissions from aluminium production	CO_2	136,5	407,3	0,11	0,061	0,170	0,46
CO_2 emissions from ferroalloys production	CO_2	203,5	387,4	0,11	0,038	0,106	0,57
Mobile combustion: Construction industry	CO_2	120,7	242,7	0,07	0,026	0,071	0,64
CO_2 emissions from stationary combustion, oil	CO_2	237,0	190,8	0,05	0,019	0,052	0,69
CH_4 emissions from enteric fermentation in domestic livestock	CH_4	269,9	229,1	0,06	0,019	0,052	0,75
Mobile combustion: Road vehicles	CO_2	509,0	635,7	0,17	0,014	0,040	0,79
Emissions from Substitutes for Ozone Depleting Substances	HFC		58,4	0,02	0,014	0,039	0,83
CO_2 emissions from geothermal energy	CO_2	66,6	124,1	0,03	0,012	0,033	0,86
Direct N_2O emissions from agricultural soils	N_2O	144,0	132,6	0,04	0,007	0,021	0,88
Mobile Combustion: Fishing	CO_2	655,5	712,1	0,20	0,007	0,020	0,90
CH_4 emissions from solid waste disposal sites	CH_4	113,6	157,0	0,04	0,007	0,019	0,92
Mobile combustion: Road vehicles	N_2O	4,4	29,5	0,01	0,006	0,017	0,93
Indirect N_2O emissions from Nitrogen used in agriculture	N_2O	101,2	93,1	0,03	0,005	0,014	0,95

ANNEX II: QUANTITATIVE UNCERTAINTY

TIER 1 UNCERTAINTY CALCULATION AND REPORTING OF SOURCES IN ICELAND

Input Data						Uncertainty of Emissions		Uncertainty of Trend				
IPCC Source Category	Gas	Base year emissions (1990)	Year t emissions (2004)	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combine uncertainty as % of total national emissions in year 2004	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by EF unc.	Uncertainty in trend in national emissions introduced by a.d.	Uncertainty introduced into the trend in total national emissions
		Gg CO_2-equivalents		%	%	%	%	%	%	%	%	%
1.A.3.b Transport - Road Transportation	CO_2	509,02	635,67	10,0	5,0	11,18	1,92	0,022	0,189	0,11	2,68	2,68
Mobile Combustion - Construction industry	CO_2	120,67	242,68	10,0	5,0	11,18	0,73	0,033	0,072	0,16	1,02	1,04
Mobile Combustion - Fishing	CO_2	655,49	712,14	2,0	5,0	5,39	1,03	-0,004	0,212	-0,02	0,60	0,60
Stationary Combustion - Oil	CO_2	237,00	190,78	5,0	5,0	7,07	0,36	-0,021	0,057	-0,11	0,40	0,42
Stationary Combustion - Coal	CO_2	48,27	46,57	5,0	10,0	11,18	0,14	-0,002	0,014	-0,02	0,10	0,10
2.A.1 Cement Production	CO_2	51,56	49,79		6,5	6,50	0,09	-0,002	0,015	-0,01	0,00	0,01
2.C.2 Ferroalloys Production	CO_2	203,47	387,43	5,0	10,0	11,18	1,17	0,048	0,115	0,48	0,82	0,95
2.C.3 Aluminium Production	CO_2	136,49	407,26	5,0	10,0	11,18	1,23	0,076	0,121	0,76	0,86	1,15
4.A Enteric Fermentation	CH_4	269,92	229,14	20,0	50,0	53,85	3,33	-0,021	0,068	-1,03	1,93	2,19
6.A Solid Waste Disposal on Land	CH_4	113,57	157,03	15,0	50,0	52,20	2,21	0,009	0,047	0,47	0,99	1,10
1.A.3.b Transport - Road Transportation	N_2O	4,39	29,46	50,0	200,0	206,16	1,64	0,007	0,009	1,47	0,62	1,59
Direct emissions from agricultural soil	N_2O	143,98	132,64	20,0	100,0	101,98	3,65	-0,008	0,040	-0,79	1,12	1,37
Indirect emissions from Nitrogen used in agriculture	N_2O	101,17	93,13	20,0	100,0	101,98	2,56	-0,006	0,028	-0,56	0,79	0,96
2.C.3 Aluminium Production												
CF4	PFC	355,02	32,64	5,0	7,0	8,60	0,08	-0,107	0,010	-0,75	0,07	0,75
C2F6	PFC	64,61	5,94	5,0	22,0	22,56	0,04	-0,019	0,002	-0,43	0,01	0,43
Substitutes for Ozone Depleting Substances	HFC	0,00	58,40		100,0	100,00	1,58	0,017	0,017	1,74	0,00	1,74
Other non-key source emissions	All	340,79	296,10		30,0	30,00	2,40	-0,024	0,088	-0,72	0,00	0,72
Total emissions (all sources):		**3.355,44**	**3.706,78**			**Total H :**	**7,4**	**Level Uncertainty**			**Total M :**	**5,2**

Annex III: CRF tables For YEAR 2004

TABLE 1 SECTORAL REPORT FOR ENERGY
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	NO_X	CO	NMVOC	SO_2
	(Gg)						
Total Energy	1.886,18	0,17	0,22	26,83	23,30	5,12	2,19
A. Fuel Combustion Activities (Sectoral Approach)	1.886,18	0,17	0,22	26,83	23,30	5,12	2,19
1. Energy Industries	19,29	0,00	0,00	0,23	0,06	0,00	0,04
a. Public Electricity and Heat Production	19,29	0,00	0,00	0,23	0,06	0,00	0,04
b. Petroleum Refining	NO	NO	NO	NO	NO	NO	NO
c. Manufacture of Solid Fuels and Other Energy Industries	NO	NO	NO	NO	NO	NO	NO
2. Manufacturing Industries and Construction	447,19	0,01	0,10	4,12	1,27	0,55	1,74
a. Iron and Steel	1,67	0,00	0,00	0,00	0,00	0,00	0,00
b. Non-Ferrous Metals	23,68	0,00	0,00	0,06	0,00	0,00	0,23
c. Chemicals	4,93	0,00	0,00	0,03	0,01	0,00	0,06
d. Pulp, Paper and Print	NO	NO	NO	NO	NO	NO	NO
e. Food Processing, Beverages and Tobacco	121,68	NE,NO	NE,NO				1,42
f. Other *(as specified in table 1.A(a) sheet 2)*	295,22	0,01	0,10	4,02	1,26	0,55	0,03
Mineral industry	48,62	0,00	0,00	0,28	0,04	0,01	0,00
Construction	242,68	0,01	0,10	3,74	1,22	0,54	0,02
Other non-specified	3,93	0,00	0,00	0,01	0,00	0,00	0,00
3. Transport	678,56	0,09	0,10	4,96	20,22	4,06	0,11
a. Civil Aviation	24,23	0,00	0,00	0,10	0,03	0,02	0,03
b. Road Transportation	635,67	0,08	0,10	4,40	20,14	4,03	0,06
c. Railways	NA,NO	NA,NO	NA,NO	NO	NO	NO	NO
d. Navigation	18,67	0,00	0,00	0,46	0,05	0,01	0,02
e. Other Transportation *(as specified in table 1.A(a) sheet 3)*							
Other non-specified							

TABLE 1 SECTORAL REPORT FOR ENERGY
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	NO_X	CO	NMVOC	SO_2
	(Gg)						
4. Other Sectors	725,28	0,07	0,02	17,49	1,75	0,51	0,14
a. Commercial/Institutional	1,37	0,00	NA,NO	0,00	0,00		0,00
b. Residential	11,77	0,00	0,00	0,01	0,00	0,00	0,01
c. Agriculture/Forestry/Fisheries	712,14	0,07	0,02	17,48	1,75	0,50	0,13
5. Other *(as specified in table 1.A(a) sheet 4)*	15,85	0,00	0,00	0,04	0,00	0,00	0,15
a. Stationary	15,85	0,00	0,00	0,04	0,00	0,00	0,15
Other non-specified	15,85	0,00	0,00	0,04	0,00	0,00	0,15
b. Mobile	NA	NA	NA	NA	NA	NA	NA
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
a. Coal Mining and Handling	NO	NO	NO	NO	NO	NO	
b. Solid Fuel Transformation	NO	NO	NO	NO	NO	NO	NO
c. Other *(as specified in table 1.B.1)*	NA	NA	NA	NA	NA	NA	NA
2. Oil and Natural Gas	NA,NE,NO	NA,NE,NO	NA,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
a. Oil	NE,NO	NE,NO		NE	NE	NE	NE
b. Natural Gas	NO	NO				NO	NO
c. Venting and Flaring	NO	NO	NO	NO	NO	NO	NO
Venting	NO	NO				NO	NO
Flaring	NO	NO	NO	NO	NO	NO	NO
d. Other *(as specified in table 1.B.2)*	NA	NA	NA	NA	NA	NA	NA
Memo Items: [(1)]							
International Bunkers	597,30	0,02	0,02	7,14	1,08	0,42	0,81
Aviation	370,26	0,00	0,01	1,57	0,52	0,26	0,47
Marine	227,04	0,02	0,01	5,57	0,56	0,16	0,34
Multilateral Operations	NO	NO	NO	NO	NO	NO	NO
CO_2 Emissions from Biomass	NA,NO						

(1) Countries are asked to report emissions from international aviation and marine bunkers and multilateral operations, as well as CO_2 emissions from biomass, under Memo Items. These emissions should not be included in the national total emissions from the Energy sector. Amounts of biomass used as fuel are included in the national energy consumption but the corresponding CO_2 emissions are not included in the national total as it is assumed that the biomass is produced in a sustainable manner. If the biomass is harvested at an unsustainable rate, net CO_2 emissions are accounted for as a loss of biomass stocks in the Land Use, Land-Use Change and Forestry sector.

Documentation Box:
Parties should provide detailed explanations on the Energy sector in Chapter 3: Energy (CRF sector 1) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
1.AA Fuel Combustion - Sectoral Approach:1A2f Other manufacturing industries & construction includes: mineral industry, construction and other industries not included above.
1.C1 International Bunkers:Emissions are calculated on the basis of sold fuels. The oil companies report sold fuels categorized in a way that separates consumption of international bunkers from domestic consumption.

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel Combustion Activities - Sectoral Approach
(Sheet 1 of 4)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS [2]			EMISSIONS		
	Consumption		CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
	(TJ)	NCV/GCV[1]	(t/TJ)	(kg/TJ)		(Gg)		
1.A. Fuel Combustion	26.010,04	NCV				1.886,18	0,17	0,22
Liquid Fuels	25.367,60	NCV	72,23	6,69	8,50	1.832,31	0,17	0,22
Solid Fuels	502,32	NCV	92,71	1,00	1,40	46,57	0,00	0,00
Gaseous Fuels	NA,NO	NCV	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Biomass	NA,NO	NCV	NA,NO	NA,NO	NA,NO [3]		NA,NO	NA,NO
Other Fuels	140,12	NCV	52,09	NA,NE,NO	9,35	7,30	NA,NE,NO	0,00
1.A.1. Energy Industries	303,37	NCV				19,29	0,00	0,00
Liquid Fuels	163,25	NCV	73,48	3,85	0,59	12,00	0,00	0,00
Solid Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Biomass	NO	NCV	NO	NO	NO [3]	NO	NO	NO
Other Fuels	140,12	NCV	52,09	NE,NO	9,35	7,30	NE,NO	0,00
a. Public Electricity and Heat Production	303,37	NCV				19,29	0,00	0,00
Liquid Fuels	163,25	NCV	73,48	3,85	0,59	12,00	0,00	0,00
Solid Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Biomass	NO	NCV	NO	NO	NO [3]	NO	NO	NO
Other Fuels	140,12	NCV	52,09	NE	9,35	7,30	NE	0,00
b. Petroleum Refining	NO	NCV				NO	NO	NO
Liquid Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Solid Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Biomass	NO	NCV	NO	NO	NO [3]	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
c. Manufacture of Solid Fuels and Other Energy Industries	NO	NCV				NO	NO	NO
Liquid Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Solid Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO	NO	NO	NO
Biomass	NO	NCV	NO	NO	NO [3]	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO	NO	NO	NO

Note: All footnotes for this table are given at the end of the table on sheet 4.

Note: For the coverage of fuel categories, refer to the IPCC Guidelines (Volume 1. Reporting Instructions - Common Reporting Framework, section 1.2, p. 1.19). If some derived gases (e.g. gas works, gas, coke oven gas, blast furnace gas) are considered, Parties should provide information on the allocation of these derived gases under the above fuel categories (liquid, solid, gaseous, biomass and other fuels) in the NIR (see also documentation box at the end of sheet 4 of this table).

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY Inventory 2004
Fuel Combustion Activities - Sectoral Approach Submission 2006 v1.2
(Sheet 2 of 4) ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS [(2)]				EMISSIONS		
	Consumption		CO_2	CH_4	N_2O		CO_2	CH_4	N_2O
	(TJ)	NCV/GCV[(1)]	(t/TJ)	(kg/TJ)			(Gg)		
1.A.2 Manufacturing Industries and Construction	5.903,76	NCV					447,19	0,01	0,10
Liquid Fuels	5.401,44	NCV	74,17	2,56	18,43		400,62	0,01	0,10
Solid Fuels	502,32	NCV	92,71	1,00	1,40		46,57	0,00	0,00
Gaseous Fuels		NCV							
Biomass		NCV				(3)			
Other Fuels		NCV							
a. Iron and Steel	22,84	NCV					1,67	0,00	0,00
Liquid Fuels	22,84	NCV	73,33	2,00	0,60		1,67	0,00	0,00
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
b. Non-Ferrous Metals	316,44	NCV					23,68	0,00	0,00
Liquid Fuels	316,44	NCV	74,84	1,80	0,54		23,68	0,00	0,00
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
c. Chemicals	64,36	NCV					4,93	0,00	0,00
Liquid Fuels	64,36	NCV	76,59	1,00	0,60		4,93	0,00	0,00
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
d. Pulp, Paper and Print	NO	NCV					NO	NO	NO
Liquid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
e. Food Processing, Beverages and Tobacco	1.588,71	NCV					121,68	NE,NO	NE,NO
Liquid Fuels	1.588,71	NCV	76,59				121,68		
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NE	NCV	NE	NE	NE	(3)	NE	NE	NE
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
f. Other *(please specify)* [(4)]	3.911,40	NCV					295,22	0,01	0,10
Mineral industry									
Liquid Fuels	24,65	NCV	83,15	1,26	0,60		2,05	0,00	0,00
Solid Fuels	502,32	NCV	92,71	1,00	1,40		46,57	0,00	0,00
Gaseous Fuels		NCV							
Biomass		NCV				(3)			
Other Fuels		NCV							
Construction									
Liquid Fuels	3.309,55	NCV	73,33	3,92	30,00		242,68	0,01	0,10
Solid Fuels		NCV							
Gaseous Fuels		NCV							
Biomass		NCV				(3)			
Other Fuels		NCV							
Other non-specified									
Liquid Fuels	74,89	NCV	52,41	1,74	0,52		3,93	0,00	0,00
Solid Fuels		NCV							
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO

Note: All footnotes for this table are given at the end of the table on sheet 4.

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY Inventory 2004

Fuel Combustion Activities - Sectoral Approach Submission 2006 v1.2

(Sheet 3 of 4) ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS [2]				EMISSIONS		
	Consumption		CO_2	CH_4	N_2O		CO_2	CH_4	N_2O
	(TJ)	NCV/GCV[1]	(t/TJ)	(kg/TJ)			(Gg)		
1.A.3 Transport	9.696,77	NCV					678,56	0,09	0,10
Liquid Fuels	9.696,77	NCV	69,98	8,93	9,93		678,56	0,09	0,10
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass		NCV							
Other Fuels		NCV				(3)			
a. Civil Aviation	343,49	NCV					24,23	0,00	0,00
Aviation Gasoline	40,28	NCV	68,61	0,50	2,00		2,76	0,00	0,00
Jet Kerosene	303,21	NCV	70,79	0,50	2,00		21,46	0,00	0,00
b. Road Transportation	9.098,76	NCV					635,67	0,08	0,10
Gasoline	6.676,01	NCV	68,61	11,21	13,24		458,02	0,07	0,09
Diesel Oil	2.422,75	NCV	73,33	4,06	2,74		177,65	0,01	0,01
Liquefied Petroleum Gases (LPG)		NCV							
Other Liquid Fuels (please specify)	NA	NCV					NA	NA	NA
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels *(please specify)*	NA	NCV					NA	NA	NA
c. Railways	NA,NO	NCV					NA,NO	NA,NO	NA,NO
Liquid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels		NCV							
Other Fuels *(please specify)*	NA	NCV					NA	NA	NA
d. Navigation	254,52	NCV					18,67	0,00	0,00
Residual Oil (Residual Fuel Oil)	1,13	NCV	76,59	7,00	2,00		0,09	0,00	0,00
Gas/Diesel Oil	253,39	NCV	73,33	7,00	2,00		18,58	0,00	0,00
Gasoline		NCV							
Other Liquid Fuels *(please specify)*	NA	NCV					NA	NA	NA
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels		NCV							
Other Fuels *(please specify)*	NA	NCV					NA	NA	NA
e. Other Transportation *(please specify)* [5]		NCV							
Other non-specified		NCV							
Liquid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass		NCV				(3)			
Other Fuels		NCV							

Note: All footnotes for this table are given at the end of the table on sheet 4.

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel Combustion Activities - Sectoral Approach
(Sheet 4 of 4)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS [(2)]				EMISSIONS		
	Consumption		CO_2	CH_4	N_2O		CO_2	CH_4	N_2O
	(TJ)	NCV/GCV[(1)]	(t/TJ)	(kg/TJ)			(Gg)		
1.A.4 Other Sectors	9.897,43	NCV					725,28	0,07	0,02
Liquid Fuels	9.897,43	NCV	73,28	6,88	1,97		725,28	0,07	0,02
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
a. Commercial/Institutional	22,00	NCV					1,37	0,00	NA,NO
Liquid Fuels	22,00	NCV	62,44	1,10	NA		1,37	0,00	NA
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
b. Residential	166,52	NCV					11,77	0,00	0,00
Liquid Fuels	166,52	NCV	70,66	0,79	0,46		11,77	0,00	0,00
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
c. Agriculture/Forestry/Fisheries	9.708,91	NCV					712,14	0,07	0,02
Liquid Fuels	9.708,91	NCV	73,35	7,00	2,00		712,14	0,07	0,02
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
1.A.5 Other *(Not specified elsewhere)* [(6)]	208,70	NCV					15,85	0,00	0,00
a. Stationary *(please specify)* [(7)]	208,70	NCV					15,85	0,00	0,00
Other non-specified									
Liquid Fuels	208,70	NCV	75,97	2,00	0,60		15,85	0,00	0,00
Solid Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Gaseous Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
Biomass	NO	NCV	NO	NO	NO	(3)	NO	NO	NO
Other Fuels	NO	NCV	NO	NO	NO		NO	NO	NO
b. Mobile *(please specify)* [(8)]	NA	NCV					NA	NA	NA

(1) If activity data are calculated using net calorific values (NCV) as specified by the IPCC Guidelines, write NCV in this column. If gross calorific values (GCV) are used, write GCV in this column.

(2) Accurate estimation of CH_4 and N_2O emissions depends on combustion conditions, technology and emission control policy, as well as on fuel characteristics. Therefore, caution should be used when comparing the implied emission factors across countries.

(3) Although carbon dioxide emissions from biomass are reported in this table, they will not be included in the total CO_2 emissions from fuel combustion. The value for total CO_2 from biomass is recorded in Table1 sheet 2 under the Memo Items.

(4) Use the cell below to list all activities covered under "f. Other".

(5) Use the cell below to list all activities covered under "e. Other transportation".

(6) Include military fuel use under this category.

(7) Use the cell below to list all activities covered under "1.A.5.a Other - stationary".

(8) Use the cell below to list all activities covered under "1.A.5.b Other - mobile".

Documentation Box:
• Parties should provide detailed explanations on the fuel combustion sub-sector in the corresponding part of Chapter 3: Energy (CRF sub-sector 1.A) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• If estimates are based on GCV, use this documentation box to provide reference to the relevant section of the NIR where the information necessary to allow the calculation of the activity data based on NCV can be found.
• If some derived gases (e.g. gas works gas, coke oven gas, blast furnace gas) are considered, use this documentation box to provide a reference to the relevant section of the NIR containing the information on the allocation of these derived gases under the above fuel categories (liquid, soild, gaseous, biomass and other fuels).

1.AA Fuel Combustion - Sectoral Approach:1A2f Other manufacturing industries & construction includes: mineral industry, construction and other industries not included above.

TABLE 1.A(b) SECTORAL BACKGROUND DATA FOR ENERGY Inventory 2004

CO_2 from Fuel Combustion Activities - Reference Approach (IPCC Worksheet 1-1) Submission 2006 v1.2

(Sheet 1 of 1) ICELAND

FUEL TYPES			Unit	Production	Imports	Exports	International bunkers	Stock change	Apparent consumption	Conversion factor (TJ/Unit)	NCV/ GCV (1)	Apparent consumption (TJ)	Carbon emission factor (t C/TJ)	Carbon content (Gg C)	Carbon stored (Gg C)	Net carbon emissions (Gg C)	Fraction of carbon oxidized	Actual CO_2 emissions (Gg CO_2)
Liquid Fossil	Primary Fuels	Crude Oil		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Orimulsion		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Natural Gas Liquids		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
	Secondary Fuels	Gasoline	Gg		152,99	0,01	NA	3,07	149,91	44,80	NCV	6.715,76	18,90	126,93	NA	126,93	0,99	460,75
		Jet Kerosene	Gg		124,45	NA	117,31	0,35	6,80	44,59	NCV	303,21	19,50	5,91	NA	5,91	0,99	21,46
		Other Kerosene	Gg		0,01	0,00	NA	-0,15	0,16	44,75	NCV	7,16	19,60	0,14	NA	0,14	0,99	0,51
		Shale Oil			NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Gas / Diesel Oil	Gg		465,68	NA	69,79	13,52	382,37	43,33	NCV	16.568,22	20,20	334,68	NA	334,68	0,99	1.214,88
		Residual Fuel Oil	Gg		55,09	NA	1,72	12,27	41,10	40,19	NCV	1.651,85	21,10	34,85	NA	34,85	0,99	126,52
		Liquefied Petroleum Gas (LPG)	Gg		2,02	NA		-0,15	2,17	47,31	NCV	102,47	17,20	1,76	NA	1,76	0,99	6,40
		Ethane			NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Naphtha			NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Bitumen	Gg		34,29	NA		NA	34,29	40,19	NCV	1.378,19	22,00	30,32	30,32		0,99	
		Lubricants	Gg		6,45	0,01	NA	NA	6,45	40,19	NCV	259,06	20,00	5,18	2,59	2,59	0,99	9,40
		Petroleum Coke	Gg		144,47	23,74		NA	120,73	31,00	NCV	3.742,66	27,50	102,92	102,91	0,02	0,99	0,06
		Refinery Feedstocks			NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Other Oil			NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
Other Liquid Fossil												NA		NA	NA	NA		NA
Liquid Fossil Totals												30.728,59		642,70	135,82	506,88		1.839,98
Solid Fossil	Primary Fuels	Anthracite (2)		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Coking Coal	Gg	NA	18,41	NA		-0,58	18,99	28,00	NCV	531,80	25,80	13,72	NA	13,72	0,98	49,30
		Other Bituminous Coal	Gg	NA	86,14	NA	NA	-4,65	90,79	28,00	NCV	2.542,12	25,80	65,59	65,59		0,98	
		Sub-bituminous Coal		NA	NA	NA	NA	NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Lignite		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Oil Shale		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Peat		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
	Secondary Fuels	BKB(3) and Patent Fuel			NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Coke Oven/Gas Coke	Gg		52,20	NA		7,20	45,01	28,00	NCV	1.260,14	29,50	37,17	37,17	0,00	0,98	0,00
Other Solid Fossil												NA		NA	NA	NA		NA
Solid Fossil Totals												4.334,06		116,48	102,76	13,72		49,30
Gaseous Fossil		Natural Gas (Dry)		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
Other Gaseous Fossil												NA		NA	NA	NA		NA
Gaseous Fossil Totals												NA		NA	NA	NA		NA
Total												35.062,66		759,18	238,58	520,60		1.889,29
Biomass total												NA		NA	NA	NA		NA
		Solid Biomass	Gg	NA	NA	NA		NA	NA	16,72	NCV	NA	20,93	NA	NA	NA	0,98	NA
		Liquid Biomass		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA
		Gas Biomass		NA	NA	NA		NA	NA	NA	NCV	NA	NA	NA	NA	NA	NA	NA

(1) To convert quantities in previous columns to energy units, use net calorific values (NCV) and write NCV in this column. If gross calorific values (GCV) are used, write GCV in this column.

(2) If data for Anthracite are not available separately, include with Other Bituminous Coal.

(3) BKB: Brown coal/peat briquettes.

Documentation Box:

Parties should provide detailed explanations on the fuel combustion sub-sector, including information relating to CO2 from the Reference approach, in the corresponding part of Chapter 3: Energy (CRF sub-sector 1.A) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 1.A(c) COMPARISON OF CO2 EMISSIONS FROM FUEL COMBUSTION
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

FUEL TYPES	REFERENCE APPROACH			SECTORAL APPROACH (1)		DIFFERENCE (2)	
	Apparent energy consumption (3) (PJ)	Apparent energy consumption (excluding non-energy use and feedstocks) (4) (PJ)	CO_2 emissions (Gg)	Energy consumption (PJ)	CO_2 emissions (Gg)	Energy consumption (%)	CO_2 emissions (%)
Liquid Fuels (excluding international bunkers)	30,73	NA	1.839,98	25,37	1.832,31	-100,00	0,42
Solid Fuels (excluding international bunkers) (5)	4,33	NA	49,30	0,50	46,57	-100,00	5,87
Gaseous Fuels	NA	NA	NA	NA,NO	NA,NO		
Other (5)	NA	NA	NA	0,14	7,30	-100,00	-100,00
Total (5)	***35,06***	***NA***	***1.889,29***	***26,01***	***1.886,18***	***-100,00***	***0,16***

(1) "Sectoral approach" is used to indicate the approach (if different from the Reference approach) used by the Party to estimate CO_2 emissions from fuel combustion as reported in table 1.A(a), sheets 1-4.

(2) Difference in CO_2 emissions estimated by the Reference approach (RA) and the Sectoral approach (SA) (difference = 100% x ((RA-SA)/SA)). For calculating the difference in energy consumption between the two approaches, data as reported in the column "Apparent energy consumption (excluding non-energy use and feedstocks)" are used for the Reference approach.

(3) Apparent energy consumption data shown in this column are as in table 1.A(b).

(4) For the purposes of comparing apparent energy consumption from the Reference approach with energy consumption from the Sectoral approach, Parties should, in this column, subtract from the apparent energy consumption (Reference approach) the energy content corresponding to the fuel quantities used as feedstocks and/or for non-energy purposes, in accordance with the accounting of energy use in the Sectoral approach

(5) Emissions from biomass are not included.

Note: The Reporting Instructions of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories require that estimates of CO_2 emissions from fuel combustion, derived using a detailed Sectoral approach, be compared to those from the Reference approach (Worksheet 1-1 of the IPCC Guidelines, Volume 2, Workbook). This comparison is to assist in verifying the Sectoral data.

Documentation Box:

Parties should provide detailed explanations on the fuel combustion sub-sector, including information related to the comparison of CO_2 emissions calculated using the Sectoral approach with those calculated using the Reference approach, in the corresponding part of Chapter 3: Energy (CRF sub-sector 1.A) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

If the CO_2 emission estimates from the two approaches differ by more than 2 per cent, Parties should briefly explain the cause of this difference in this documentation box and provide a reference to relevant section of the NIR where this difference is explained in more detail.

1.AA Fuel Combustion - Sectoral Approach:1A2f Other manufacturing industries & construction includes: mineral industry, construction and other industries not included above.

TABLE 1.A(d) SECTORAL BACKGROUND DATA FOR ENERGY
Feedstocks and Non-Energy Use of Fuels
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

Additional information [a]

FUEL TYPE	ACTIVITY DATA AND RELATED INFORMATION		IMPLIED EMISSION FACTOR	ESTIMATE	CO2 not emitted	Subtracted from energy sector	Associated CO_2 emissions	Allocated under
	Fuel quantity (TJ)	Fraction of carbon stored	Carbon emission factor (t C/TJ)	Carbon stored in non-energy use of fuels (Gg C)	($Gg\ CO_2$)	*(specify source category)*	(Gg)	*(Specify source category, e.g. Waste Incineration)*
Naphtha [1]		0,00	NA	NA	NA			
Lubricants	259,06	0,50	20,00	2,59	9,50	NE		
Bitumen	1.378,19	1,00	22,00	30,32	111,17	NE		
Coal Oils and Tars (from Coking Coal)		0,00	NA	NA	NA			
Natural Gas[1]		0,00	NA	NA	NA			
Gas/Diesel Oil [1]		0,00	NA	NA	NA			
LPG [1]		0,00	NA	NA	NA			
Ethane [1]		0,00	NA	NA	NA			
Other *(please specify)*				205,68				
Coke oven/gas coke	1.260,14	1,00	29,50	37,17	136,31			
Other Bituminous Coal	2.542,12	1,00	25,80	65,59	240,48			
Petroleum Coke	3.742,66	1,00	27,50	102,92	377,39			

Total	238,59	874,85
Total amount of C and CO_2 from feedstocks and non-energy use of fuels that is included as emitted CO_2 in the Reference approach	2,59	9,50

[1] Enter data for those fuels that are used as feedstocks (fuel used as raw materials for manufacture of products such as plastics or fertilizers) or for other non-energy use (fuels not used as fuel or transformed into another fuel (e.g. bitumen for road construction, lubricants)).

[a] The fuel lines continue from the table to the left.

A fraction of energy carriers is stored in such products as plastics or asphalt. The non-stored fraction of the carbon in the energy carrier or product is oxidized, resulting in carbon dioxide emissions, either during use of the energy carriers in the industrial production (e.g. fertilizer production), or during use of the products (e.g. solvents, lubricants), or in both (e.g. monomers). To report associated emissions, use the above table.

Documentation box:

• Parties should provide detailed explanations on the fuel combustion sub-sector, including information related to feedstocks, in the corresponding part of Chapter 3: Energy (CRF sub-sector 1.A) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

• The above table is consistent with the IPCC Guidelines. Parties that take into account the emissions associated with the use and disposal of these feedstocks could continue to use their methodology, but should indicate this in this documentation box and provide a reference to the relevant section of the NIR where further explanation can be found.

TABLE 1.B.1 SECTORAL BACKGROUND DATA FOR ENERGY
Fugitive Emissions from Solid Fuels
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS		EMISSIONS		
				CH_4		
	Amount of fuel produced	CH_4 (1)	CO_2	Recovery/Flaring (2)	Emissions (3)	CO_2
	(Mt)	(kg/t)		(Gg)		
1. B. 1. a. Coal Mining and Handling	NO				NO	NO
i. Underground Mines(4)	NO	NO	NO		NO	NO
Mining Activities		NO	NO		NO	NO
Post-Mining Activities		NO	NO		NO	NO
ii. Surface Mines(4)	NO	NO	NO		NO	NO
Mining Activities		NO	NO		NO	NO
Post-Mining Activities		NO	NO		NO	NO
1. B. 1. b. Solid Fuel Transformation	NO	NO	NO		NO	NO
1. B. 1. c. Other *(please specify)* (5)				NA	NA	NA

(1) The IEFs for CH_4 are estimated on the basis of gross emissions as follows: (CH_4 emissions + amounts of CH_4 flared/recovered) / activity data.
(2) Amounts of CH4 drained (recovered), utilized or flared.
(3) Final CH4 emissions after subtracting the amounts of CH4 utilized or recovered.
(4) In accordance with the IPCC Guidelines, emissions from Mining Activities and Post-Mining Activities are calculated using the activity data of the amount of fuel produced for Underground Mines and Surface Mines.
(5) This category is to be used for reporting any other solid-fuel-related activities resulting in fugitive emissions, such as emissions from abandoned mines and waste piles.

Note: There are no clear references to the coverage of 1.B.1.b. and 1.B.1.c. in the IPCC Guidelines. Make sure that the emissions entered here are not reported elsewhere. If they are reported under another source category, indicate this by using notation key IE and making the necessary reference in Table 9 (completeness).

Documentation box:
- Parties should provide detailed explanations on the fugitive emissions from source category 1.B.1 Solid Fuels, in the corresponding part of Chapter 3: Energy (CRF source category 1.B.1) of the NIR. Use this documentation box to provide
- Regarding data on the amount of fuel produced entered in the above table, specify in this documentation box whether the fuel amount is based on the run-of-mine (ROM) production or on the saleable production.
- If entries are made for "Recovery/Flaring", indicate in this documentation box whether CH_4 is flared or recovered and provide a reference to the section in the NIR where further details on recovery/flaring can be found.
- If estimates are reported under 1.B.1.b. and 1.B.1.c., use this documentation box to provide information regarding activities covered under these categories and to provide a reference to the section in the NIR where the background information can be found.

TABLE 1.B.2 SECTORAL BACKGROUND DATA FOR ENERGY
Fugitive Emissions from Oil, Natural Gas and Other Sources
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA (1)			IMPLIED EMISSION FACTORS			EMISSIONS		
	Description (1)	Unit (1)	Value	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
				(kg/unit) (2)			(Gg)		
1. B. 2. a. Oil (3)							NE,NO	NE,NO	
I. Exploration	(specify)		NO	NO	NO	NO	NO	NO	
ii. Production(4)	(specify)		NO	NO	NO		NO	NO	
iii. Transport	(specify)		NO	NO	NO		NO	NO	
iv. Refining / Storage	(specify)		NO	NO	NO	NO	NO	NO	
v. Distribution of Oil Products	(specify)		NE	NE	NE		NE	NE	
vi. Other	(specify)		NO	NO	NO		NO	NO	
1. B. 2. b. Natural Gas							NO	NO	
i. Exploration	(specify)		NO	NO	NO		NO	NO	
ii. Production (4) / Processing	(specify)		NO	NO	NO		NO	NO	
iii. Transmission	(specify)		NO	NO	NO		NO	NO	
iv. Distribution	(specify)		NO	NO	NO		NO	NO	
v. Other Leakage	(specify)		NO	NO	NO		NO	NO	
at industrial plants and power stations	(specify)		NO	NO	NO		NO	NO	
in residential and commercial sectors	(specify)		NO	NO	NO		NO	NO	
1. B. 2. c. Venting (5)							NO	NO	
i. Oil	(specify)		NO	NO	NO		NO	NO	
ii. Gas	(specify)		NO	NO	NO		NO	NO	
iii. Combined	(specify)		NO	NO	NO		NO	NO	
Flaring							NO	NO	NO
i. Oil	(specify)		NO	NO	NO	NO	NO	NO	NO
ii. Gas	(specify)		NO	NO	NO	NO	NO	NO	NO
iii. Combined	(specify)		NO	NO	NO	NO	NO	NO	NO
1.B.2.d. Other *(please specify)* (6)							NA	NA	NA

(1) Specify the activity data used in the Description column (see examples). Specify the unit of the activity data in the Unit column using one of the following units: PJ, Tg, 10^6 m^3, 10^6 bbl/yr, km, number of sources (e.g. wells).
(2) The unit of the implied emission factor will depend on the unit of the activity data used, and is therefore not specified in this column.
(3) Use the category also to cover emissions from combined oil and gas production fields. Natural gas processing and distribution from these fields should be included under 1.B.2.b.ii and 1.B.2.b.iv, respectively.
(4) If using default emission factors, these categories will include emissions from production other than venting and flaring.
(5) If using default emission factors, emissions from Venting and Flaring from all oil and gas production should be accounted for under Venting.
(6) For example, fugitive CO_2 emissions from production of geothermal power could be reported here.

Documentation box:
- Parties should provide detailed explanations on the fugitive emissions from source category 1.B.2 Oil and Natural Gas, in the corresponding part of Chapter 3: Energy (CRF source category 1.B.2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
- Regarding data on the amount of fuel produced entered in this table, specify in this documentation box whether the fuel amount is based on the raw material production or on the saleable production. Note cases where more than one type of activity data is used to estimate emissions.
- Venting and Flaring: Parties using the IPCC software could report venting and flaring emissions together, indicating this in this documentation box.
- If estimates are reported under "1.B.2.d Other", use this documentation box to provide information regarding activities covered under this category and to provide a reference to the section in the NIR where background information can be found.

TABLE 1.B.2 SECTORAL BACKGROUND DATA FOR ENERGY
Fugitive Emissions from Oil, Natural Gas and Other Sources
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA (1)			IMPLIED EMISSION FACTORS			EMISSIONS		
	Description (1)	Unit (1)	Value	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
				(kg/unit) (2)			(Gg)		
1. B. 2. a. Oil (3)							NE,NO	NE,NO	
I. Exploration	(specify)		NO	NO	NO	NO	NO	NO	
ii. Production(4)	(specify)		NO	NO	NO		NO	NO	
iii. Transport	(specify)		NO	NO	NO		NO	NO	
iv. Refining / Storage	(specify)		NO	NO	NO	NO	NO	NO	
v. Distribution of Oil Products	(specify)		NE	NE	NE		NE	NE	
vi. Other	(specify)		NO	NO	NO		NO	NO	
1. B. 2. b. Natural Gas							NO	NO	
i. Exploration	(specify)		NO	NO	NO		NO	NO	
ii. Production (4) / Processing	(specify)		NO	NO	NO		NO	NO	
iii. Transmission	(specify)		NO	NO	NO		NO	NO	
iv. Distribution	(specify)		NO	NO	NO		NO	NO	
v. Other Leakage	(specify)		NO	NO	NO		NO	NO	
at industrial plants and power stations	(specify)		NO	NO	NO		NO	NO	
in residential and commercial sectors	(specify)		NO	NO	NO		NO	NO	
1. B. 2. c. Venting (5)							NO	NO	
i. Oil	(specify)		NO	NO	NO		NO	NO	
ii. Gas	(specify)		NO	NO	NO		NO	NO	
iii. Combined	(specify)		NO	NO	NO		NO	NO	
Flaring							NO	NO	NO
i. Oil	(specify)		NO	NO	NO	NO	NO	NO	NO
ii. Gas	(specify)		NO	NO	NO	NO	NO	NO	NO
iii. Combined	(specify)		NO	NO	NO	NO	NO	NO	NO
1.B.2.d. Other *(please specify)* (6)							NA	NA	NA

(1) Specify the activity data used in the Description column (see examples). Specify the unit of the activity data in the Unit column using one of the following units: PJ, Tg, 10^6 m^3, 10^6 bbl/yr, km, number of sources (e.g. wells).
(2) The unit of the implied emission factor will depend on the unit of the activity data used, and is therefore not specified in this column.
(3) Use the category also to cover emissions from combined oil and gas production fields. Natural gas processing and distribution from these fields should be included under 1.B.2.b.ii and 1.B.2.b.iv, respectively.
(4) If using default emission factors, these categories will include emissions from production other than venting and flaring.
(5) If using default emission factors, emissions from Venting and Flaring from all oil and gas production should be accounted for under Venting.
(6) For example, fugitive CO_2 emissions from production of geothermal power could be reported here.

Documentation box:
- Parties should provide detailed explanations on the fugitive emissions from source category 1.B.2 Oil and Natural Gas, in the corresponding part of Chapter 3: Energy (CRF source category 1.B.2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
- Regarding data on the amount of fuel produced entered in this table, specify in this documentation box whether the fuel amount is based on the raw material production or on the saleable production. Note cases where more than one type of activity data is used to estimate emissions.
- Venting and Flaring: Parties using the IPCC software could report venting and flaring emissions together, indicating this in this documentation box.
- If estimates are reported under "1.B.2.d Other", use this documentation box to provide information regarding activities covered under this category and to provide a reference to the section in the NIR where background information can be found.

TABLE 1.C SECTORAL BACKGROUND DATA FOR ENERGY
International Bunkers and Multilateral Operations
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS			EMISSIONS		
	Consumption	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
	(TJ)	(t/TJ)			(Gg)		
Aviation Bunkers	5.230,76				370,26	0,00	0,01
Jet Kerosene	5.230,76	70,79	0,00	0,00	370,26	0,00	0,01
Gasoline							
Marine Bunkers	3.093,24				227,04	0,02	0,01
Gasoline	NO	NO	NO	NO	NO	NO	NO
Gas/Diesel Oil	3.023,96	73,33	0,01	0,00	221,73	0,02	0,01
Residual Fuel Oil	69,29	76,59	0,01	0,00	5,31	0,00	0,00
Lubricants	NE	NE	NE	NE	NE	NE	NE
Coal	NO	NO	NO	NO	NO	NO	NO
Other *(please specify)*	NA				NA	NA	NA
Multilateral Operations [1]	NO	NO	NO	NO	NO	NO	NO

Additional information

Fuel consumption	Distribution [a] (per cent)	
	Domestic	International
Aviation	6,16	93,84
Marine	7,60	92,40

[a] For calculating the allocation of fuel consumption, the sums of fuel consumption for domestic navigation and aviation (table 1.A(a)) and for international bunkers (table 1.C) are used.

[1] Parties may choose to report or not report the activity data and implied emission factors for multilateral operations consistent with the principle of confidentiality stated in the UNFCCC r
In any case, Parties should report the emissions from multilateral operations, where available, under the Memo Items section of the Summary tables and in the Sectoral report table for energy.

Note: In accordance with the IPCC Guidelines, international aviation and

Documentation box:
• Parties should provide detailed explanations on the fuel combustion sub-sector, including international bunker fuels, in the corresponding part of Chapter 3: Energy (CRF sub-sector 1.A) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• Provide in this documentation box a brief explanation on how the consumption of international marine and aviation bunker fuels was estimated and separated from domestic consumption, and include a reference to the section of the NIR where the explanation is provided in more detail.

TABLE 2(I) SECTORAL REPORT FOR INDUSTRIAL PROCESSES
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)						(Gg)			
Total Industrial Processes	846,01	0,05	NA,NE,NO	58,40	NA,NE,NO	NA,NE,NO	38,58	0,00	NA,NE,NO	1,60	0,25	0,09	5,72
A. Mineral Products	50,93	NA,NE	NA,NE							0,02	0,05	0,01	0,03
1. Cement Production	49,79												IE
2. Lime Production	NO												
3. Limestone and Dolomite Use	NO												
4. Soda Ash Production and Use	NO												
5. Asphalt Roofing	NO										NO	NO	
6. Road Paving with Asphalt	NE									0,02	0,03	0,01	0,03
7. Other *(as specified in table 2(I).A-G)*	1,14	NA,NE	NA,NE							NA,NE	0,02	NA,NE	0,00
Glass Production	NO	NA	NA							NA	NA	NA	NA
Mineral wool production	1,14	NE	NE							NE	0,02	NE	0,00
B. Chemical Industry	0,39	NE,NO	NE,NO	NA	NA	NA	NA	NA	NA	0,37	NE,NO	NE,NO	NE,NO
1. Ammonia Production	NO	NO	NO							NO	NO	NO	NO
2. Nitric Acid Production			NO							NO			
3. Adipic Acid Production			NO							NO	NO	NO	
4. Carbide Production	NO	NO									NO	NO	NO
5. Other *(as specified in table 2(I).A-G)*	0,39	NE,NO	NE,NO	NA	NA	NA	NA	NA	NA	0,37	NE,NO	NE,NO	NE,NO
Carbon Black		NO											
Ethylene	NO	NO	NO										
Dichloroethylene		NO											
Styrene		NO											
Methanol		NO											
Fertilizer production	NO	NO	NO	NA	NA	NA	NA	NA	NA	NO	NO	NO	NO
Silicon Production	0,39	NE	NE	NA	NA	NA	NA	NA	NA	0,37	NE	NE	NE
C. Metal Production	794,69	0,05	NA	NA	NA	NA	38,58	NA	NA,NO	1,21	0,19	0,09	5,69
1. Iron and Steel Production	NA,NO	NA,NO								NO	NO	NO	NO
2. Ferroalloys Production	387,43	0,05								1,21	0,19	0,09	2,26
3. Aluminium Production	407,26	NE					38,58			NE	NE	NE	3,44
4. SF_6 Used in Aluminium and Magnesium Foundries									NO				
5. Other *(as specified in table 2(I).A-G)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: P = Potential emissions based on Tier 1 approach of the IPCC Guidelines. A = Actual emissions based on Tier 2 approach of the IPCC Guidelines. This applies only to source categories where methods exist for both tiers.

TABLE 2(I) SECTORAL REPORT FOR INDUSTRIAL PROCESSES
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs[(1)]		PFCs[(1)]		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)						(Gg)			
Total Industrial Processes	846,01	0,05	NA,NE,NO	58,40	NA,NE,NO	NA,NE,NO	38,58	0,00	NA,NE,NO	1,60	0,25	0,09	5,72
A. Mineral Products	50,93	NA,NE	NA,NE							0,02	0,05	0,01	0,03
1. Cement Production	49,79												IE
2. Lime Production	NO												
3. Limestone and Dolomite Use	NO												
4. Soda Ash Production and Use	NO												
5. Asphalt Roofing	NO										NO	NO	
6. Road Paving with Asphalt	NE									0,02	0,03	0,01	0,03
7. Other *(as specified in table 2(I).A-G)*	1,14	NA,NE	NA,NE							NA,NE	0,02	NA,NE	0,00
Glass Production	NO	NA	NA							NA	NA	NA	NA
Mineral wool production	1,14	NE	NE							NE	0,02	NE	0,00
B. Chemical Industry	0,39	NE,NO	NE,NO	NA	NA	NA	NA	NA	NA	0,37	NE,NO	NE,NO	NE,NO
1. Ammonia Production	NO	NO	NO							NO	NO	NO	NO
2. Nitric Acid Production			NO							NO			
3. Adipic Acid Production			NO							NO	NO	NO	
4. Carbide Production	NO	NO									NO	NO	NO
5. Other *(as specified in table 2(I).A-G)*	0,39	NE,NO	NE,NO	NA	NA	NA	NA	NA	NA	0,37	NE,NO	NE,NO	NE,NO
Carbon Black		NO											
Ethylene	NO	NO	NO										
Dichloroethylene		NO											
Styrene		NO											
Methanol		NO											
Fertilizer production	NO	NO	NO	NA	NA	NA	NA	NA	NA	NO	NO	NO	NO
Silicon Production	0,39	NE	NE	NA	NA	NA	NA	NA	NA	0,37	NE	NE	NE
C. Metal Production	794,69	0,05	NA	NA	NA	NA	38,58	NA	NA,NO	1,21	0,19	0,09	5,69
1. Iron and Steel Production	NA,NO	NA,NO								NO	NO	NO	NO
2. Ferroalloys Production	387,43	0,05								1,21	0,19	0,09	2,26
3. Aluminium Production	407,26	NE					38,58			NE	NE	NE	3,44
4. SF_6 Used in Aluminium and Magnesium Foundries									NO				
5. Other *(as specified in table 2(I).A-G)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: P = Potential emissions based on Tier 1 approach of the IPCC Guidelines. A = Actual emissions based on Tier 2 approach of the IPCC Guidelines. This applies only to source categories where methods exist for both tiers.

TABLE 2(I) SECTORAL REPORT FOR INDUSTRIAL PROCESSES
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)						(Gg)			
D. Other Production	NE									NO	NO	NE,NO	NO
1. Pulp and Paper										NO	NO	NO	NO
2. Food and Drink[2]	NE											NE	
E. Production of Halocarbons and SF_6					NA,NO		NA,NO		NA,NO				
1. By-product Emissions					NO		NO		NO				
Production of HCFC-22					NO								
Other					NO		NO		NO				
2. Fugitive Emissions					NO		NO		NO				
3. Other *(as specified in table 2(II))*					NA		NA		NA				
F. Consumption of Halocarbons and SF_6				58,40	NA,NE,NO	NE,NO	NA,NE,NO	0,00	NA,NE,NO				
1. Refrigeration and Air Conditioning Equipment				58,40	NE	NO	NE	NO	NE				
2. Foam Blowing				NO	NO	NO	NO	NO	NO				
3. Fire Extinguishers				NO	NO	NO	NO	NO	NO				
4. Aerosols/ Metered Dose Inhalers				NE	NE	NO	NE	NO	NE				
5. Solvents				NO	NO	NO	NO	NO	NO				
6. Other applications using ODS[3] substitutes													
7. Semiconductor Manufacture				NO	NO	NO	NO	NO	NO				
8. Electrical Equipment				NO		NO		0,00	NE				
9. Other *(as specified in table 2(II)*				NA	NA	NA	NA	NA	NA				
G. Other *(as specified in tables 2(I).A-G and 2(II))*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: P = Potential emissions based on Tier 1 approach of the IPCC Guidelines. A = Actual emissions based on Tier 2 approach of the IPCC Guidelines. This applies only to source categories where methods exist for both tiers.

(1) The emissions of HFCs and PFCs are to be expressed as CO_2 equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II).
(2) CO_2 from Food and Drink Production (e.g. gasification of water) can be of biogenic or non-biogenic origin. Only information on CO_2 emissions of non-biogenic origin should be reported.
(3) ODS: ozone-depleting substances.

Documentation box:
Parties should provide detailed explanations on the industrial processes sector in Chapter 4: Industrial processes (CRF sector 2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 2(I).A-G SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Emissions of CO_2, CH_4 and N_2O
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS [2]			EMISSIONS					
	Production/Consumption quantity		CO_2	CH_4	N_2O	CO_2		CH_4		N_2O	
						Emissions[3]	Recovery[4]	Emissions[3]	Recovery[4]	Emissions[3]	Recovery[4]
	Description [1]	(kt)	(t/t)			(Gg)					
A. Mineral Products						50,93	NA	NA,NE	NA	NA,NE	NA
1. Cement Production	clinker production	93,66	0,53			49,79					
2. Lime Production	(specify)	NO	NO			NO					
3. Limestone and Dolomite Use	(specify)	NO	NO			NO					
4. Soda Ash						NO					
Soda Ash Production	(specify)	NO	NO			NO					
Soda Ash Use	(specify)	NO	NO			NO					
5. Asphalt Roofing	(specify)	NO	NO			NO					
6. Road Paving with Asphalt	asphalt production	265,91	NE			NE					
7. Other *(please specify)*						1,14	NA	NA,NE	NA	NA,NE	NA
Glass Production	(specify)	NO	NO	NA	NA	NO	NA	NA	NA	NA	NA
Mineral wool production	mineral wool production	8,51	0,13	NE	NE	1,14	NA	NE	NA	NE	NA
B. Chemical Industry						0,39	NA	NE,NO	NA	NE,NO	NA
1. Ammonia Production[5]	(specify)	NO	NO	NO	NO	NO		NO		NO	
2. Nitric Acid Production	(specify)	NO			NO					NO	
3. Adipic Acid Production	(specify)	NO	NO		NO					NO	
4. Carbide Production	(specify)	NO	NO	NO		NO		NO			
Silicon Carbide	(specify)	NO	NO	NO		NO		NO			
Calcium Carbide	(specify)	NO	NO	NO		NO		NO			
5. Other *(please specify)*						0,39	NA	NE,NO	NA	NE,NO	NA
Carbon Black	(specify)	NO		NO				NO	NA		
Ethylene	(specify)	NO	NO	NO	NO	NO	NA	NO	NA	NO	NA
Dichloroethylene	(specify)	NO		NO				NO	NA		
Styrene	(specify)	NO		NO				NO	NA		
Methanol	(specify)	NO		NO				NO	NA		
Fertilizer production	fertilizer production	NO	NO	NO	NO	NO	NA	NO	NA	NO	NA
Silicon Production	Silicon Production	22,50	0,02	NE	NE	0,39	NA	NE	NA	NE	NA

[1] Where the IPCC Guidelines provide options for activity data, e.g. cement production or clinker production for estimating the emissions from Cement Production, specify the activity data used (as shown in the example in parentheses) in order to make the choice of emission factor more transparent and to facilitate comparisons of implied emission factors.
[2] The implied emission factors (IEF) are estimated on the basis of gross emissions as follows: IEF = (emissions plus amounts recovered, oxidized, destroyed or transformed) / activity data.
[3] Final emissions are to be reported (after subtracting the amounts of emission recovery, oxidation, destruction or transformation).
[4] Amounts of emission recovery, oxidation, destruction or transformation.
[5] To avoid double counting, make offsetting deductions for fuel consumption (e.g. natural gas) in Ammonia Production, first for feedstock use of the fuel, and then for a sequestering use of the feedstock.

TABLE 2(I).A-G SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Emissions of CO_2, CH_4 and N_2O
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS [2]			EMISSIONS					
	Production/Consumption quantity		CO_2	CH_4	N_2O	CO_2		CH_4		N_2O	
						Emissions[3]	Recovery[4]	Emissions[3]	Recovery[4]	Emissions[3]	Recovery[4]
	Description [1]	(kt)	(t/t)			(Gg)					
C. Metal Production						794,69	NA	0,05	NA	NA	NA
1. Iron and Steel Production			NA,NO	NA,NO		NA,NO	NA	NA,NO	NA		
Steel	(specify)	NO	NO	NA		NO	NA	NA	NA		
Pig Iron	(specify)	NO	NO	NO		NO	NA	NO	NA		
Sinter	(specify)	NO	NO	NO		NO	NA	NO	NA		
Coke	(specify)	NO	NO	NO		NO	NA	NO	NA		
Other *(please specify)*						NA	NA	NA	NA		
2. Ferroalloys Production	Ferrosilicon - 75% Si	118,52	3,27	0,00		387,43		0,05			
3. Aluminium Production	Aluminium production	271,38	1,50	NE		407,26		NE			
4. SF_6 Used in Aluminium and Magnesium Foundries											
5. Other *(please specify)*						NA	NA	NA	NA	NA	NA
D. Other Production						NE					
1. Pulp and Paper											
2. Food and Drink	(specify)	NE	NE			NE					
G. Other *(please specify)*						NA	NA	NA	NA	NA	NA

[1] Where the IPCC Guidelines provide options for activity data, e.g. cement production or clinker production for estimating the emissions from Cement Production, specify the activity data used (as shown in the example in parentheses) in order to make the choice of emission factor more transparent and to facilitate comparisons of implied emission factors.

[2] The implied emission factors (IEF) are estimated on the basis of gross emissions as follows: IEF = (emissions + amounts recovered, oxidized, destroyed or transformed) / activity data.

[3] Final emissions are to be reported (after subtracting the amounts of emission recovery, oxidation, destruction or transformation).

[4] Amounts of emission recovery, oxidation, destruction or transformation.

Documentation box:

• Parties should provide detailed explanations on the industrial processes sector in Chapter 4: Industrial processes (CRF sector 2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

• In relation to metal production, more specific information (e.g. data on virgin and recycled steel production) could be provided in this documentation box, or in the NIR, together with a reference to the relevant section.

• Confidentiality: Where only aggregate figures for activity data are provided, e.g. due to reasons of confidentiality, a note indicating this should be provided in this documentation box.

TABLE 2(II) SECTORAL REPORT FOR INDUSTRIAL PROCESSES - EMISSIONS OF HFCs, PFCs AND SF_6
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	HFC-23	HFC-32	HFC-41	HFC-43-10mee	HFC-125	HFC-134	HFC-134a	HFC-152a	HFC-143	HFC-143a	HFC-227ea	HFC-236fa	HFC-245ca	Unspecified mix of listed HFCs (1)	Total HFCs	CF_4	C_2F_6	C_3F_8	C_4F_{10}	$c\text{-}C_4F_8$	C_5F_{12}	C_6F_{14}	Unspecified mix of listed PFCs (1)	Total PFCs	SF_6
	(t) (2)													CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(t) (2)							CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(t) (2)
Total Actual Emissions of Halocarbons (by chemical) and SF_6	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA		5,02	0,65	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA		NA,NE,NO
C. Metal Production																**5,02**	**0,65**	NE	NE	NE	NE	NE			NA,NO
Aluminium Production																5,02	0,65	NE	NE	NE	NE	NE			
SF_6 Used in Aluminium Foundries																									NO
SF_6 Used in Magnesium Foundries																									NO
E. Production of Halocarbons and SF_6	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA		NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA		NA,NO
1. By-product Emissions	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
Production of HCFC-22	NO																								
Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
2. Fugitive Emissions	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
3. Other *(as specified in table 2(II).C,E)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA		NA
F(a). Consumption of Halocarbons and SF_6 (actual	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA		NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA		NA,NE,NO
1. Refrigeration and Air Conditioning Equipment	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE	NE	NE	NE	NE			NE
2. Foam Blowing	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
3. Fire Extinguishers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
4. Aerosols/Metered Dose Inhalers	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE	NE	NE	NE	NE			NE
5. Solvents	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
6. Other applications using ODS (3) substitutes																									
7. Semiconductor Manufacture	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
8. Electrical Equipment																									NE
9. Other *(as specified in table 2(II)F)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA		NA
G. Other *(please specify)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA		NA

Note: All footnotes for this table are given at the end of the table on sheet 2.
Note: Gases with global warming potential (GWP) values not yet agreed upon by the Conference of the Parties should be reported in table 9(b).

TABLE 2(II) SECTORAL REPORT FOR INDUSTRIAL PROCESSES - EMISSIONS OF HFCs, PFCs AND SF_6
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	HFC-23	HFC-32	HFC-41	HFC-43-10mee	HFC-125	HFC-134	HFC-134a	HFC-152a	HFC-143	HFC-143a	HFC-227ea	HFC-236fa	HFC-245ca	Unspecified mix of listed HFCs [1]	Total HFCs	CF_4	C_2F_6	C_3F_8	C_4F_{10}	$c\text{-}C_4F_8$	C_5F_{12}	C_6F_{14}	Unspecified mix of listed PFCs [1]	Total PFCs	SF_6
	(t)[2]													CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(t)[2]							CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(t)[2]
F(p). Total Potential Emissions of Halocarbons (by chemical) and SF_6 [4]	NE,NO	0,16	NE,NO	NE,NO	7,99	NE,NO	8,88	0,27	NE,NO	6,41	NE,NO	NE,NO	NE,NO			NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO			NE,NO
Production[5]	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
Import:	NE,NO	0,16	NE,NO	NE,NO	7,99	NE,NO	8,88	0,27	NE,NO	6,41	NE,NO	NE,NO	NE,NO			NE,NO	NE	NE	NE,NO	NE,NO	NE,NO	NE,NO			NE,NO
In bulk	NO	0,16	NO	NO	7,99	NO	8,88	0,27	NO	6,41	NO	NO	NO			NO	NE	NE	NO	NO	NO	NO			NO
In products [6]	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE	NE	NE	NE	NE			NE
Export:	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE	NE	NE	NE	NE			NE
In bulk	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE	NE	NE	NE	NE			NE
In products [6]	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE	NE	NE	NE	NE			NE
Destroyed amount	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			NO	NO	NO	NO	NO	NO	NO			NO
GWP values used	**11700**	**650**	**150**	**1300**	**2800**	**1000**	**1300**	**140**	**300**	**3800**	**2900**	**6300**	**560**			**6500**	**9200**	**7000**	**7000**	**8700**	**7500**	**7400**			**23900**
Total Actual Emissions [7] (CO_2 equivalent (Gg))	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	NA,NE,NO	32,64	5,94	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	38,58	NA,NE,NO
C. Metal Production																32,64	5,94	NE	NE	NE	NE	NE		38,58	NA,NO
E. Production of Halocarbons and SF_6	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA	NA,NO	NA,NO
F(a). Consumption of Halocarbons and SF_6	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	NA,NE,NO	NA,NE,NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ratio of Potential/Actual Emissions from Consumption of Halocarbons and SF_6																									
Actual emissions - F(a) (Gg CO_2 eq.)	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	NA,NE,NO	NA,NE,NO
Potential emissions - F(p) [8] (Gg CO_2 eq.)	NE,NO	0,10	NE,NO	NE,NO	22,36	NE,NO	11,55	0,04	NE,NO	24,35	NE,NO	NE,NO	NE,NO		58,40	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO		NE,NO	NE,NO
Potential/Actual emissions ratio	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA	NA,NE,NO	NA,NE,NO

(1) In accordance with the UNFCCC reporting guidelines, HFC and PFC emissions should be reported for each relevant chemical. However, if it is not possible to report values for each chemical (i.e. mixtures, confidential data, lack of disaggregation), these columns could be used for reporting aggregate figures for HFCs and PFCs, respectively. Note that the unit used for these columns is Gg of CO_2 equivalent.

(2) Note that the units used in this table differ from those used in the rest of the Sectoral report tables, i.e. *t* instead of *Gg*.

(3) ODS: ozone-depleting substances

(4) Potential emissions of each chemical of halocarbons and SF_6 estimated using Tier 1a or Tier 1b of the IPCC Guidelines (Volume 3. Reference Manual, pp. 2.47-2.50). Where potential emission estimates are available in a disaggregated manner for the source categories F.1 to F.9, these should be reported in the NIR and a reference should be provided in the documentation box. Use table Summary 3 to indicate whether Tier 1a or Tier 1b was used.

(5) Production refers to production of new chemicals. Recycled substances could be included here, but avoid double counting of emissions. An indication as to whether recycled substances are included should be provided in the documentation box to this table.

(6) Relevant only for Tier 1b.

(7) Total actual emissions equal the sum of the actual emissions of each halocarbon and SF_6 from the source categories 2.C, 2.E, 2.F and 2.G as reported in sheet 1 of this table multiplied by the corresponding GWP values.

(8) Potential emissions of each halocarbon and SF_6 taken from row F(p) multiplied by the corresponding GWP values.

Note: As stated in the UNFCCC reporting guidelines, Parties should report actual emissions of HFCs, PFCs and SF_6, where data are available, providing disaggregated data by chemical and source category in units of mass and in CO_2 equivalent. Parties reporting actual emissions should also report potential emissions for the sources where the concept of potential emissions applies, for reasons of transparency and comparability. Gases with GWP values not yet agreed upon by the COP should be reported in Table 9 (b).

Documentation box:
- Parties should provide detailed explanations on the industrial processes sector in Chapter 4: Industrial processes (CRF sector 2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
- If estimates are reported under "2.G Other", use this documentation box to provide information regarding activities covered under this category and to provide reference to the section in the NIR where background information can be found.

TABLE 2(II).C SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Metal Production
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS[2]			EMISSIONS					
			CF_4	C_2F_6	SF_6	CF_4		C_2F_6		SF_6	
						Emissions[3]	Recovery[4]	Emissions[3]	Recovery[4]	Emissions[3]	Recovery[4]
	Description [1]	(t)	(kg/t)			(t)					
C. PFCs and SF_6 from Metal Production						5,02		0,65		NA,NO	
PFCs from Aluminium Production	Aluminium production	271.384,00	0,02	0,00		5,02		0,65			
SF_6 used in Aluminium and Magnesium Foundries										NO	
Aluminium Foundries	(specify)				NO					NO	
Magnesium Foundries	(specify)				NO					NO	

(1) Specify the activity data used as shown in the examples in parentheses.

(2) The implied emission factors (IEFs) are estimated on the basis of gross emissions as follows: IEF = (emissions + amounts recovered, oxidized, destroyed or transformed) / activity data.

(3) Final emissions (after subtracting the amounts of emission recovery, oxidation, destruction or transformation).

(4) Amounts of emission recovery, oxidation, destruction or transformation.

Documentation box:
- Parties should provide detailed explanations on the industrial processes sector in Chapter 4: Industrial processes (CRF sector 2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
- Where only aggregate figures for activity data are provided, e.g. due to reasons of confidentiality (see footnote 1 to table 2(II)), a note indicating this should be provided in this documentation box.
- Where applying Tier 1b and country-specific methods, specify any other relevant activity data used in this documentation box, including a reference to the section of the NIR where more detailed information can be found.
- Use this documentation box for providing clarification on emission recovery, oxidation, destruction and/or transformation, and provide a reference to the section of the NIR where more detailed information can be found.

TABLE 2(II).E SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Production of Halocarbons and SF_6
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS[2]	EMISSIONS	
				Emissions[3]	Recovery[4]
	Description [1]	(t)	(kg/t)	(t)	
E. Production of Halocarbons and SF_6					
1. By-product Emissions					
Production of HCFC-22					
HFC-23	Production of HCFC-22		NO	NO	
Other *(specify activity and chemical)*					
Other non-specified					
2. Fugitive Emissions *(specify activity and chemical)*					
HFCs				NO	
HFC-23				NO	
HFC-32				NO	
HFC-41				NO	
HFC-43-10-mee				NO	
HFC-125				NO	
HFC-134				NO	
HFC-134a				NO	
HFC-152a				NO	
HFC-143				NO	
HFC-143a				NO	
HFC-227ea				NO	
HFC-236fa				NO	
HFC-245ca				NO	
Unspecified mix of HFCs					
PFCs				NO	
CF4				NO	
C2F6				NO	
C3F8				NO	
C4F10				NO	
c-C4F8				NO	
C5F12				NO	
C6F14				NO	
Unspecified mix of PFCs					
SF6				NO	
Other non-specified					
HFCs				NO	
HFC-23				NO	
HFC-32				NO	
HFC-41				NO	
HFC-43-10-mee				NO	
HFC-125				NO	
HFC-134				NO	
HFC-134a				NO	
HFC-152a				NO	
HFC-143				NO	
HFC-143a				NO	
HFC-227ea				NO	
HFC-236fa				NO	
HFC-245ca				NO	
Unspecified mix of HFCs					
PFCs				NO	
CF4				NO	
C2F6				NO	
C3F8				NO	
C4F10				NO	
c-C4F8				NO	
C5F12				NO	
C6F14				NO	
Unspecified mix of PFCs					
SF6				NO	
3. Other *(specify activity and chemical)*					
HFCs				NA	
HFC-23				NA	
HFC-32				NA	
HFC-41				NA	
HFC-43-10-mee				NA	
HFC-125				NA	
HFC-134				NA	
HFC-134a				NA	
HFC-152a				NA	
HFC-143				NA	
HFC-143a				NA	
HFC-227ea				NA	
HFC-236fa				NA	
HFC-245ca				NA	
Unspecified mix of HFCs				NA	
PFCs				NA	
CF4				NA	
C2F6				NA	
C3F8				NA	
C4F10				NA	
c-C4F8				NA	
C5F12				NA	
C6F14				NA	
Unspecified mix of PFCs				NA	
SF6				NA	

(1) Specify the activity data used as shown in the examples within parentheses.
(2) The implied emission factors (IEFs) are estimated on the basis of gross emissions as follows: IEF = (emissions + amounts recovered, oxidized, destroyed or transformed) / activity data.
(3) Final emissions are to be reported (after subtracting the amounts of emission recovery, oxidation, destruction or transformation).
(4) Amounts of emission recovery, oxidation, destruction or transformation.

Documentation box:
• Parties should provide detailed explanations on the industrial processes sector in Chapter 4: Industrial processes (CRF sector 2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further
• Where only aggregate figures for activity data are provided, e.g. due to reasons of confidentiality (see footnote 1 to table 2(II)), a note indicating this should be provided in this documentation box.
• Where applying Tier 2 and country-specific methods, specify any other relevant activity data used in this documentation box, including a reference to the section of the NIR where more detailed information can be found.
• Use this documentation box for providing clarification on emission recovery, oxidation, destruction and/or transformation, and provide a reference to the section of the NIR where more detailed information can be found.

TABLE 2(II).F SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Consumption of Halocarbons and SF_6
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA *Amount of fluid*			IMPLIED EMISSION FACTORS			EMISSIONS		
	Filled into new manufactured products	In operating systems (average annual stocks)	Remaining in products at decommissioning	Product manufacturing factor	Product life factor	Disposal loss factor	From manufacturing	From stocks	From disposal
	(t)			(% per annum)			(t)		
1. Refrigeration[(1)]									
Air Conditioning Equipment									
Domestic Refrigeration *(please specify chemical)* [(1)]									
Commercial Refrigeration									
Transport Refrigeration									
Industrial Refrigeration									
Stationary Air-Conditioning									
Mobile Air-Conditioning									
2. Foam Blowing[(1)]									
Hard Foam									
Soft Foam									

[(1)] Under each of the listed source categories, specify the chemical consumed (*e.g. HFC-32*) as indicated under category Domestic Refrigeration; use one row per chemical.

Note: This table provides for reporting of the activity data and emission factors used to calculate actual emissions from consumption of halocarbons and SF_6 using the "bottom-up approach" (based on the total stock of equipment and estimated emission rates from this equipment). Some Parties may prefer to estimate actual emissions following the alternative "top-down approach" (based on annual sales of equipment and/or gas). Those Parties should indicate the activity data used and provide any other information needed to understand the content of the table in the documentation box at the end of sheet 2 to this table, including a reference to the section of the NIR where further details can be found. Those Parties should provide the following data in the NIR:

1. the amount of fluid used to fill new products,
2. the amount of fluid used to service existing products,
3. the amount of fluid originally used to fill retiring products (the total nameplate capacity of retiring products),
4. the product lifetime, and
5. the growth rate of product sales, if this has been used to calculate the amount of fluid originally used to fill retiring products.

In the NIR, Parties may provide alternative formats for reporting equivalent information with a similar level of detail.

TABLE 2(II).F SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Consumption of Halocarbons and SF_6
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA *Amount of fluid*			IMPLIED EMISSION FACTORS			EMISSIONS		
	Filled into new manufactured products	In operating systems (average annual stocks)	Remaining in products at decommissioning	Product manufacturing factor	Product life factor	Disposal loss factor	From manufacturing	From stocks	From disposal
	(t)			(% per annum)			(t)		
3. Fire Extinguishers *(please specify chemical)* (1)									
4. Aerosols (1)									
Metered Dose Inhalers									
Other									
5. Solvents (1)									
6. Other applications using ODS(2) substitutes (1)									
7. Semiconductor Manufacture (1)									
8. Electrical Equipment(1)									
9. Other ***(please specify)*** (1)									

(1) Under each of the listed source categories, specify the chemical consumed (e.g. HFC-32) as indicated under category Fire Extinguishers; use one row per chemical.
(2) ODS: ozone-depleting substances.

Documentation box:
• Parties should provide detailed explanations on the industrial processes sector in Chapter 4: Industrial processes (CRF sector 2) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• Where only aggregate figures for activity data are provided, e.g. due to reasons of confidentiality (see footnote 1 to table 2(II)), a note indicating this should be provided in this documentation box.
• With regard to data on the amounts of fluid that remained in retired products at decommissioning, use this documentation box to provide a reference to the section of the NIR where information on the amount of the chemical recovered (recovery efficiency) and other relevant information used in the emission estimation can be found.
• Parties that estimate their actual emissions following the alternative top-down approach might not be able to report emissions using this table. As indicated in the note to sheet 1 of this table, Parties should in these cases provide, in the NIR, alternative formats for reporting equivalent

TABLE 3 SECTORAL REPORT FOR SOLVENT AND OTHER PRODUCT USE
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	N_2O	NMVOC
	(Gg)		
Total Solvent and Other Product Use	NE	0,01	2,22
A. Paint Application	NE		1,16
B. Degreasing and Dry Cleaning	NE	NA	0,19
C. Chemical Products, Manufacture and Processing			IE
D. Other	NE	0,01	0,87
1. Use of N_2O for Anaesthesia		0,01	
2. N_2O from Fire Extinguishers		NE	
3. N_2O from Aerosol Cans		NE	
4. Other Use of N_2O		0,00	
5. Other *(as specified in table 3.A-D)*	NE	NA	0,87
Other non-specified	NE	NA	0,87

Note: The quantity of carbon released in the form of NMVOCs should be accounted for in both the NMVOC and the CO_2 columns. The quantites of NMVOCs should be converted into CO_2 equivalent emissions before being added to the CO_2 amounts in the CO_2 column.

Documentation box:
• Parties should provide detailed explanations about the Solvent and Other Product Use sector in Chapter 5: Solvent and Other Product Use (CRF sector 3) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• The IPCC Guidelines do not provide methodologies for the calculation of emissions of N_2O from Solvent and Other Product Use. If reporting such data, Parties should provide in the NIR additional information (activity data and emission factors) used to derive these estimates, and provide in this documentation box a reference to the section of the NIR where this information can be found.

TABLE 3.A-D SECTORAL BACKGROUND DATA FOR SOLVENT AND OTHER PRODUCT USE
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS [1]	
	Description	(kt)	CO_2 (t/t)	N_2O (t/t)
A. Paint Application	(specify)	2,32	NE	
B. Degreasing and Dry Cleaning	(specify)	0,19	NE	NA
C. Chemical Products, Manufacture and Processing	(specify)			
D. Other				
1. Use of N_2O for Anaesthesia	Use of N2O	0,01		1,00
2. N_2O from Fire Extinguishers	(specify)	NE		NE
3. N_2O from Aerosol Cans	(specify)	NE		NE
4. Other Use of N_2O	Use of N2O	0,00		1,00
5. Other *(please specify)* [2]				
Other non-specified	(specify)	NA	NE	NA

[1] The implied emission factors will not be calculated until the corresponding emission estimates are entered directly into table 3.

[2] Some probable sources to be reported under 3.D Other are listed in this table. Complement the list with other relevant sources, as appropriate.

Documentation box:
Parties should provide detailed explanations on the Solvent and Other Product Use sector in Chapter 5: Solvent and Other Product Use (CRF sector 3) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 4 SECTORAL REPORT FOR AGRICULTURE
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CH_4	N_2O	NO_x	CO	NMVOC
	(Gg)				
Total Agriculture	**11,86**	0,81	NA,NO	NA,NO	NA,NE,NO
A. Enteric Fermentation	10,91				
1. Cattle (1)	4,42				
Option A:					
Dairy Cattle	2,44				
Non-Dairy Cattle	1,98				
Option B:					
Mature Dairy Cattle					
Mature Non-Dairy Cattle					
Young Cattle					
2. Buffalo	NO				
3. Sheep	5,09				
4. Goats	0,00				
5. Camels and Llamas	NO				
6. Horses	1,35				
7. Mules and Asses	NO				
8. Swine	0,04				
9. Poultry	NE				
10. Other *(as specified in table 4.A)*					
Goats					
Horses					
B. Manure Management	0,95	0,08			NE,NO
1. Cattle (1)	0,59				
Option A:					
Dairy Cattle	0,34				
Non-Dairy Cattle	0,25				
Option B:					
Mature Dairy Cattle					
Mature Non-Dairy Cattle					
Young Cattle					
2. Buffalo	NO				
3. Sheep	0,12				
4. Goats	0,00				
5. Camels and Llamas	NO				
6. Horses	0,11				
7. Mules and Asses	NO				
8. Swine	0,09				
9. Poultry	0,05				
10. Other livestock *(as specified in table 4.B(a))*					
Goats					
Horses					

Note: All footnotes for this table are given at the end of the table on sheet 2.

TABLE 4 SECTORAL REPORT FOR AGRICULTURE
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CH_4	N_2O	NO_x	CO	NMVOC
	(Gg)				
B. Manure Management (continued)					
11. Anaerobic Lagoons		NO			NO
12. Liquid Systems		0,00			NE
13. Solid Storage and Dry Lot		0,08			NE
14. Other AWMS					
C. Rice Cultivation	NA,NO				**NA,NO**
1. Irrigated	NO				NO
2. Rainfed	NO				NO
3. Deep Water	NO				NO
4. Other *(as specified in table 4.C)*	NA				NA
D. Agricultural Soils [(2)]	NA,NE	0,73			NA,NE
1. Direct Soil Emissions	NE	0,29			NE
2. Pasture, Range and Paddock Manure [(3)]		0,14			NE
3. Indirect Emissions	NE	0,30			NE
4. Other *(as specified in table 4.D)*	NA	NA			NA
E. Prescribed Burning of Savannas	NA	NA	NO	NO	NO
F. Field Burning of Agricultural Residues	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
1 . Cereals	NA,NO	NA,NO	NO	NO	NO
2. Pulses	NA,NO	NA,NO	NO	NO	NO
3 . Tubers and Roots	NA,NO	NA,NO	NO	NO	NO
4 . Sugar Cane	NO	NO	NO	NO	NO
5 . Other *(as specified in table 4.F)*	NA	NA	NA	NA	NA
G. Other *(please specify)*	**NA**	**NA**	**NA**	**NA**	**NA**

(1) The sum for cattle would be calculated on the basis of entries made under either option A (dairy and non-dairy cattle) or option B (mature dairy cattle, mature non-dairy cattle and young cattle).

(2) See footnote 4 to Summary 1.A of this common reporting format. Parties which choose to report CO_2 emissions and removals from agricultural soils under 4.D Agricultural Soils of the sector Agriculture should report the amount (in Gg) of these emissions or removals in table Summary 1.A of the CRF. References to additional information (activity data, emissions factors) reported in the NIR should be provided in the documentation box to table 4.D. In line with the corresponding table in the IPCC Guidelines (i.e. IPCC Sectoral Report for Agriculture), this table does not include provisions for reporting CO_2 estimates.

(3) Direct N_2O emissions from pasture, range and paddock manure are to be reported in the "4.D Agricultural Soils" category. All other N_2O emissions from animal manure are to be reported in the "4.B Manure Management" category. See also chapter 4.4 of the IPCC good practice guidance report.

Note: The IPCC Guidelines do not provide methodologies for the calculation of CH_4 emissions and CH_4 and N_2O removals from agricultural soils, or CO_2 emissions from prescribed burning of savannas and field burning of agricultural residues. Parties that have estimated such emissions should provide, in the NIR, additional information (activity data and emission factors) used to derive these estimates and include a reference to the section of the NIR in the documentation box of the corresponding Sectoral background data tables.

Documentation box:
• Parties should provide detailed explanations on the agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• If estimates are reported under "4.G Other", use this documentation box to provide information regarding activities covered under this category and to provide reference to the section in the NIR where background information can be found.

TABLE 4.A SECTORAL BACKGROUND DATA FOR AGRICULTURE
Enteric Fermentation
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION			IMPLIED EMISSION FACTORS [3]
	Population size [1] (1000s)	Average gross energy intake (GE) (MJ/head/day)	Average CH_4 conversion rate (Y_m) [2] (%)	CH_4 (kg CH_4/head/yr)
1. Cattle	65,59			67,34
Option A:				
Dairy Cattle [4]	24,40			100,00
Non-Dairy Cattle	41,20			48,00
Option B:				
Mature Dairy Cattle				
Mature Non-Dairy Cattle				
Young Cattle				
2. Buffalo	NO			NO
3. Sheep	636,72			8,00
4. Goats	0,62			5,00
5. Camels and Llamas	NO			NO
6. Horses	75,16			18,00
7. Mules and Asses	NO			NO
8. Swine	29,68			1,50
9. Poultry	597,48			NE
10. Other *(please specify)*				
Goats	0,62			
Horses	75,16			

[1] Parties are encouraged to provide detailed livestock population data by animal type and region, if available, in the NIR, and provide in the documentation box below a reference to the relevant section. Parties should use the same animal population statistics to estimate CH4 emissions from enteric fermentation, CH4 and N2O from manure management, N2O direct emissions from soil and N2O emissions associated with manure production, as well as emissions from the use of manure as fuel, and sewage-related emissions reported in the Waste sector.

[2] Y_m refers to the fraction of gross energy in feed converted to methane and should be given in per cent in this table.

[3] The implied emission factors will not be calculated until the corresponding emission estimates are entered directly into Table 4.

[4] Including data on dairy heifers, if available.

Documentation box:
• Parties should provide detailed explanations on the Agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• Indicate in this documentation box whether the activity data used are one-year estimates or a three-year averages.
• Provide a reference to the relevant section in the NIR, in particular with regard to:
(a) disaggregation of livestock population (e.g. according to the classification recommended in the IPCC good practice guidance), including information on whether these data are one-year estimates or
(b) parameters relevant to the application of IPCC good practice guidance.

Additional information (only for those livestock types for which Tier 2 was used) [a]

Disaggregated list of animals [b]		Dairy Cattle	Non-Dairy Cattle	Mature Dairy Cattle	Mature Non-Dairy Cattle	Young Cattle	Buffalo	Sheep	Goats	Camels and Llamas	Horses	Mules and Asses	Swine	Poultry	Other *(specify)*	Goats	Horses
Indicators:																	
Weight	(kg)																
Feeding situation [c]																	
Milk yield	(kg/day)																
Work	(h/day)																
Pregnant	(%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00
Digestibility of feed	(%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00

[a] See also Tables A-1 and A-2 of the IPCC Guidelines (Volume 3. Reference Manual, pp. 4.31-4.34). These data are relevant if Parties do not have data on average feed intake.
[b] Disaggregate to the split actually used. Add columns to the table if necessary.
[c] Specify feeding situation as pasture, stall fed, confined, open range, etc.

TABLE 4.B(a) SECTORAL BACKGROUND DATA FOR AGRICULTURE
CH_4 Emissions from Manure Management
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION							IMPLIED EMISSION FACTORS [(4)]
	Population size	Allocation by climate region [(1)]			Typical animal mass (average)	VS[(2)] daily excretion (average)	CH_4 producing potential (Bo)[(2)] (average)	CH_4
		Cool	Temperate	Warm				
	(1000s)	(%)			(kg)	(kg dm/head/day)	(m^3 CH_4/kg VS)	(kg CH_4/head/yr)
1. Cattle	65,59							8,98
Option A:								
Dairy Cattle [(3)]	24,40	1,00	0,00	0,00				14,00
Non-Dairy Cattle	41,20	1,00	0,00	0,00				6,00
Option B:								
Mature Dairy Cattle		0,00	0,00	0,00				
Mature Non-Dairy Cattle		0,00	0,00	0,00				
Young Cattle		0,00	0,00	0,00				
2. Buffalo	NO	0,00	0,00	0,00				NO
3. Sheep	636,72	1,00	0,00	0,00				0,19
4. Goats	0,62	0,00	0,00	0,00				0,12
5. Camels and Llamas	NO	0,00	0,00	0,00				NO
6. Horses	75,16	1,00	0,00	0,00				1,40
7. Mules and Asses	NO	0,00	0,00	0,00				NO
8. Swine	29,68	1,00	0,00	0,00				3,00
9. Poultry	597,48	1,00	0,00	0,00				0,08
10. Other livestock *(please specify)*								
Goats	0,62	0,00	0,00	0,00				
Horses	75,16	0,00	0,00	0,00				

(1) Climate regions are defined in terms of annual average temperature as follows: Cool = less than 15°C; Temperate = 15 - 25°C inclusive; and Warm = greater than 25°C (see table 4.2 of the IPCC Guidelines (Volume 3, Reference Manual, p. 4.8)).

(2) VS = Volatile Solids; Bo = maximum methane producing capacity for manure IPCC Guidelines (Volume 3, Reference Manual, p.4.23 and p.4.15); dm = dry matter. Provide average values for VS and Bo where original calculations were made at a more disaggregated level of these livestock categories.

(3) Including data on dairy heifers, if available.

(4) The implied emission factors will not be calculated until the corresponding emission estimates are entered directly into table 4.

Documentation box:
- Parties should provide detailed explanations on the Agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and further details are needed to understand the content of this table.
- Indicate in this documentation box whether the activity data used are one-year estimates or three-year averages.
- Provide a reference to the relevant section in the NIR, in particular with regard to:
  (a) disaggregation of livestock population (e.g. according to the classification recommended in the IPCC good practice guidance), including information on whether these data are one-year estimates or three-year averages.
  (b) parameters relevant to the application of IPCC good practice guidance;
  (c) information on how the MCFs are derived, if relevant data could not be provided in the additional information box.

TABLE 4.B(a) SECTORAL BACKGROUND DATA FOR AGRICULTURE
CH_4 Emissions from Manure Management
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

Additional information (for Tier 2) [a]

Animal category	Indicator	Climate region	Animal waste management system						
			Anaerobic lagoon	Liquid system	Daily spread	Solid storage	Dry lot	Pasture range paddock	Other
Dairy Cattle	Allocation (%)	Cool		0,53	NO	0,13		0,34	NO
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Non-Dairy Cattle	Allocation (%)	Cool		0,53	NO	0,13		0,34	NO
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Mature Dairy Cattle	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Mature Non-Dairy Cattle	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Young Cattle	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Buffalo	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Sheep	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Goats	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Camels and Llamas	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Horses	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Mules and Asses	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Swine	Allocation (%)	Cool		1,00	NO	0,00		0,00	NO
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Poultry	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							
Other livestock *(please specify)*	Allocation (%)	Cool							
		Temperate							
		Warm							
	MCF[b]	Cool							
		Temperate							
		Warm							

[a] The information required in this table may not be directly applicable to country-specific methods developed for MCF calculations. In such cases, information on MCF derivation should be described in the NIR and references to the relevant sections of the NIR should be provided in the documentation box.

[b] MCF = Methane Conversion Factor (IPCC Guidelines, (Volume 3. Reference Manual, p. 4.9)). If another climate region categorization is used, replace the entries in the cells with the climate regions for which the MCFs are specified.

TABLE 4.B(b) SECTORAL BACKGROUND DATA FOR AGRICULTURE
N_2O Emissions from Manure Management
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION							
	Population size	Nitrogen excretion	Nitrogen excretion per animal waste management system (AWMS) (kg N/yr)					
	(1000s)	(kg N/head/yr)	Anaerobic lagoon	Liquid system	Daily spread	Solid storage and dry lot	Pasture range and paddock	Other
Cattle	65,59		NO	1.509.401,90	NO	370.230,65	968.295,56	NO
Option A:								
Dairy Cattle	24,40	60,00	NO	775.761,00	NO	190.281,00	497.658,00	NO
Non-Dairy Cattle	41,20	33,60	NO	733.640,90	NO	179.949,65	470.637,56	NO
Option B:								
Mature Dairy Cattle								
Mature Non-Dairy Cattle								
Young Cattle								
Sheep	636,72	5,76	NO	623.476,81	NO	1.503.679,36	1.540.354,46	NO
Swine	29,68	13,30	NO	394.810,14	NO			NO
Poultry	597,48	0,42	NO		NO	250.940,46		NO
Buffalo	NO							
Goats	0,62							
Camels and Liamas	NO							
Horses	75,16							
Mules and Asses	NO							
Other livestock *(please specify)*								
Goats	0,62	5,76	NO	603,68	NO	1.455,93	1.491,44	NO
Horses	75,16	28,80	NO		NO	367.987,57	1.796.645,22	NO
Total per AWMS			NO	2.528.292,53	NO	2.494.293,97	4.306.786,68	NO

IMPLIED EMISSION FACTORS (1)	
Emission factor per animal waste management system	
(kg N_2O-N/kg N)	
Anaerobic lagoon	NO
Liquid system	0,00
Solid storage and dry lot	0,02
Other AWMS	NO

(1) The implied emission factor will not be calculated until the emissions are entered directly into table 4.

Documentation box:

• Parties should provide detailed explanations on the Agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

• Indicate in this documentation box whether the activity data used are one-year estimates or three-year averages.

• Provide a reference to the relevant section in the NIR, in particular with regard to:

(a) disaggregation of livestock population (e.g. according to the classification recommended in the IPCC good practice guidance), including information on whether these data are one-year estimates or three-year averages.

(b) information on other AWMS, if reported.

TABLE 4.C SECTORAL BACKGROUND DATA FOR AGRICULTURE
Rice Cultivation
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA AND OTHER RELATED INFORMATION			IMPLIED EMISSION FACTOR (1)	EMISSIONS
		Harvested area (2)	Organic amendments added(3)		CH_4	CH_4
		(10^9 m^2/yr)	type	(t/ha)	(g/m^2)	(Gg)
1. Irrigated						NO
Continuously Flooded		NO	(specify type)		NO	NO
Intermittently Flooded	Single Aeration	NO	(specify type)		NO	NO
	Multiple Aeration	NO	(specify type)		NO	NO
2. Rainfed						NO
Flood Prone		NO	(specify type)		NO	NO
Drought Prone		NO	(specify type)		NO	NO
3. Deep Water						NO
Water Depth 50-100 cm		NO	(specify type)		NO	NO
Water Depth > 100 cm		NO	(specify type)		NO	NO
4. Other *(please specify)*		NA				NA
Upland Rice(4)						
Total (4)		NA,NO				

(1) The implied emission factor implicitly takes account of all relevant corrections for continuously flooded fields without organic amendment, the correction for the organic amendments and the effect of different soil characteristics, if considered in the calculation of methane emissions.

(2) Harvested area is the cultivated area multiplied by the number of cropping seasons per year.

(3) Specify dry weight or wet weight for organic amendments in the documentation box.

(4) These rows are included to allow comparison with international statistics. Methane emissions from upland rice are assumed to be zero.

Documentation box:
- Parties should provide detailed explanations on the Agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
- When disaggregating by more than one region within a country, and/or by growing season, provide additional information on disaggregation and related data in the NIR and provide a reference to the relevant section in the NIR.
- Where available, provide activity data and scaling factors by soil type and rice cultivar in the NIR.

TABLE 4.D SECTORAL BACKGROUND DATA FOR AGRICULTURE
Agricultural Soils
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION		IMPLIED EMISSION FACTORS	EMISSIONS
	Description	Value		N_2O
		kg N/yr	kg N_2O-N/kg N [2]	(Gg)
1. Direct Soil Emissions	**N input to soils**			0,29
1. Synthetic Fertilizers	Nitrogen input from application of synthetic fertilizers	10.857.600,00	0,01	0,21
2. Animal Manure Applied to Soils	Nitrogen input from manure applied to soils	4.018.069,20	0,01	0,08
3. N-fixing Crops	Nitrogen fixed by N-fixing crops	NO	NO	NO
4. Crop Residue	Nitrogen in crop residues returned to soils			0,00
5. Cultivation of Histosols [2]	Area of cultivated organic soils (ha/yr)	NE	NE	NE
6. Other direct emissions *(please specify)*				NA
2. Pasture, Range and Paddock Manure	**N excretion on pasture range and paddock**	4.306.786,68	0,02	0,14
3. Indirect Emissions				0,30
1. Atmospheric Deposition	Volatized N from fertilizers, animal manures and other	3.072.274,63	0,01	0,05
2. Nitrogen Leaching and Run-off	N from fertilizers, animal manures and other that is lost through leaching and run-off	6.418.011,95	0,02	0,25
4. Other *(please specify)*				NA

[1] To convert from N_2O-N to N_2O emissions, multiply by 44/28. Note that for cultivation of Histosols the unit of the IEF is kg N_2O-N/ha.

Documentation box:

• Parties should provide detailed explanations on the Agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

• Provide a reference to the relevant section in the NIR, in particular with regard to:

(a) Background information on CH_4 emissions from agricultural soils, if accounted for under the Agriculture sector;

(b) Disaggregated values for $Frac_{GRAZ}$ according to animal type, and for $Frac_{BURN}$ according to crop types;

(c) Full list of assumptions and fractions used.

TABLE 4.D SECTORAL BACKGROUND DATA FOR AGRICULTURE

Inventory 2004

Agricultural Soils[(1)]

Submission 2006 v1.2

(Sheet 2 of 2)

ICELAND

Additional information

Fraction [(a)]	Description	Value
$Frac_{BURN}$	Fraction of crop residue burned	NO
$Frac_{FUEL}$	Fraction of livestock N excretion in excrements burned for fuel	NO
$Frac_{GASF}$	Fraction of synthetic fertilizer N applied to soils that volatilizes as NH_3 and NOx	0,10
$Frac_{GASM}$	Fraction of livestock N excretion that volatilizes as NH_3 and NOx	0,20
$Frac_{GRAZ}$	Fraction of livestock N excreted and deposited onto soil during grazing	0,46
$Frac_{LEACH}$	Fraction of N input to soils that is lost through leaching and run-off	0,30
$Frac_{NCRBF}$	Fraction of total above-ground biomass of N-fixing crop that is N	0,01
$Frac_{NCRO}$	Fraction of residue dry biomass that is N	NO
$Frac_{R}$	Fraction of total above-ground crop biomass that is removed from the field as a crop product	0,47
Other fractions *(please specify)*		0,00

[(a)] Use the definitions for fractions as specified in the IPCC Guidelines (Volume 3. Reference Manual, pp. 4.92-4.113) as elaborated by the IPCC good practice guidance (pp. 4.54-4.74).

TABLE 4.E SECTORAL BACKGROUND DATA FOR AGRICULTURE
Prescribed Burning of Savannas
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION					IMPLIED EMISSION FACTORS		EMISSIONS	
	Area of savanna burned (k ha/yr)	Average above-ground biomass density (t dm/ha)	Fraction of savanna burned	Biomass burned (Gg dm)	Nitrogen fraction in biomass	CH_4	N_2O	CH_4	N_2O
						(kg/t dm)		(Gg)	
(specify ecological zone)								NA	NA

Additional information

	Living Biomass	Dead Biomass
Fraction of above-ground biomass	0,00	0,00
Fraction oxidized	0,00	0,00
Carbon fraction	0,00	0,00

Documentation box:
Parties should provide detailed explanations on the Agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 4.F SECTORAL BACKGROUND DATA FOR AGRICULTURE
Field Burning of Agricultural Residues
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION								IMPLIED EMISSION FACTORS		EMISSIONS	
	Crop production	Residue/ Crop ratio	Dry matter (dm) fraction of residue	Fraction burned in fields	Fraction oxidized	Total biomass burned	C fraction of residue	N-C ratio in biomass residues	CH_4	N_2O	CH_4	N_2O
	(t)					(Gg dm)			(kg/t dm)		(Gg)	
1. Cereals											NA,NO	NA,NO
Wheat		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Barley		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Maize		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Oats		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Rye		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Rice		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Other *(please specify)*											NA	NA
2. Pulses											NA,NO	NA,NO
Dry bean		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Peas		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Soybeans		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Other *(please specify)*											NA	NA
3 Tubers and Roots											NA,NO	NA,NO
Potatoes		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
Other *(please specify)*											NA	NA
4 Sugar Cane		0,00	0,00	0,00	0,00		0,00		NO	NO	NO	NO
5 Other *(please specify)*											NA	NA

Documentation box:
Parties should provide detailed explanations on the Agriculture sector in Chapter 6: Agriculture (CRF sector 4) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5 SECTORAL REPORT FOR LAND USE, LAND-USE CHANGE AND FORESTRY
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions/removals[(1), (2)]	CH_4	N_2O	NO_x	CO
	(Gg)				
Total Land-Use Categories	**1.386,70**	**2,34**	**1,34**	**NA**	**NA**
A. Forest Land	**-120,56**		**IE**		
1. Forest Land remaining Forest Land	-113,08		IE		
2. Land converted to Forest Land	-7,48		IE		
B. Cropland	**2,52**				
1. Cropland remaining Cropland					
2. Land converted to Cropland					
C. Grassland	**1.815,00**				
1. Grassland remaining Grassland	1.815,00				
2. Land converted to Grassland					
D. Wetlands	**141,42**	**2,34**	**0,07**		
1. Wetlands remaining Wetlands [(3)]	141,42	NA	NA		
2. Land converted to Wetlands	NA	NA	NA		
E. Settlements					
1. Settlements remaining Settlements [(3)]					
2. Land converted to Settlements					
F. Other Land					
1. Other Land remaining Other Land [(4)]					
2. Land converted to Other Land					
G. Other *(please specify)* [(5)]	**-451,68**		**1,27**	**NA**	**NA**
Harvested Wood Products [(6)]	NA				
Revegetation	-451,68		IE	NA	NA
Grassland organic soil			1,27		
Information items[(7)]					
Forest Land converted to other Land-Use Categories	NE				
Grassland converted to other Land-Use Categories	NE				

[(1)] According to the Revised 1996 IPCC Guidelines, for the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+). Net changes in carbon stocks are converted to CO_2 by multiplying C by 44/12 and by changing the sign for net CO_2

[(2)] CO_2 emissions from liming and biomass burning are included in this column.

[(3)] Parties do not have to prepare estimates for categories contained in appendices 3a.2, 3a.3 and 3a.4 of the IPCC good practice guidance for LULUCF, although they may do so if they wish and report in this row.

[(4)] Parties do not have to prepare estimates for this category contained in Chapter 3.7.1 of the IPCC good practice guidance for LULUCF, although they may do so if they wish and report in this row. This land-use category is to allow the total of identified land area to match the national area.

[(5)] May include other non-specified sources and sinks.

[(6)] Parties do not have to prepare estimates for this category contained in appendix 3a.1 of the IPCC good practice guidance for LULUCF, although they may do so if they wish and report in this row.

[(7)] These items are listed for information only and will not be added to the totals, because they are already included in subcategories 5.A.2 to 5.F.2.

Note: The totals for some land-use categories for N2O (5.A and 5.D), CO2 (5.B and 5.C) and CO2, CH4, N2O (5.E and 5.F) may not equal the summation of the subcategories included in this table, because these totals include data from tables 5(II), 5(IV) and 5(V), where the subcategories are not available. Emissions of CO2, CH4, N2O from 5.G Other are estimated based on the information provided in the background data tables.

Documentation box:

• Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

• If estimates are reported under 5.G Other, use this documentation box to provide information regarding activities covered under this category and to provide reference to the section in the NIR where background information can be found.

5.A Forest Land:Land convertion due to afforestation only reported as aggregated estimate. All afforestation assumed on grassland.

5.C.1 Grassland remaining Grassland:Extensive drainage of wetland has taken place in Iceland mostly in the period from 1940- 85. Information on this drainage is not geographically identifiable. All this drainage is therefore classified as grassland although some of it should be classified to landuse the category Cropland.

5.D Wetlands:CH4 and N2O emissions from reservoirs

5.G Revegetation:The CO2 sink of revegetation is reported here. Background information on revegetation are provided in NIR (Ch7).

5.G N2O emissions from drainage of soils:Extensive drainage of wetland has taken place in Iceland mostly in the period from 1940- 85. Information on this drainage is not geographically identifiable. All this drainage is therefore classified as grassland although some of it should be classified to the landuse category Cropland. Accordingly N2O emission from drained cultivated organic soils (Histosols, Andic Histosol and Gleyic Andosol) is included here.

TABLE 5.A SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
Forest Land
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS					EMISSIONS/REMOVALS				
Land-Use Category	Sub-division[1]	Total area (kha)	Carbon stock change in living biomass per area [2,3]			Net carbon stock change in dead organic matter per area[3]	Net carbon stock change in soils per area [3]	Carbon stock change in living biomass[2,3]			Net carbon stock change in dead organic matter[3]	Net carbon stock change in soils [3]
			Increase	Decrease	Net change			Increase	Decrease	Net change		
			(Mg C/ha)					(Gg C)				
A. Total Forest Land		52,40	0,63	IE	0,63			32,88	IE	32,88		
1. Forest Land remaining Forest Land		50,70	0,61	IE	0,61	NA,NE	NA,NE	30,84	IE	30,84	NA,NE	NA,NE
	Native Birch	25,00				NA	NA				NA	NA
	Plantations	25,70	1,20	IE	1,20	NE	NE	30,84	IE	30,84	NE	NE
2. Land converted to Forest Land[4]		1,70	1,20		1,20			2,04		2,04		
2.1 Cropland converted to Forest Land												
2.2 Grassland converted to Forest Land		1,70	1,20		1,20	NA	NA	2,04		2,04	NA	NA
	New Plantations (ID=	1,70	1,20		1,20	NA	NA	2,04		2,04	NA	NA
2.3 Wetlands converted to Forest Land												
2.4 Settlements converted to Forest Land												
2.5 Other Land converted to Forest Land												

(1) Land categories may be further divided according to climate zone, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

(2) CO_2 emissions and removals (carbon stock increase and decrease) should be listed separately except where, due to the methods used, it is technically impossible to separate information on increases and decreases.

(3) The signs for estimates of increases in carbon stocks are positive (+) and of decreases in carbon stocks are negative (-).

(4) A Party may report aggregate estimates for all conversions of land to forest land when data are not available to report them separately. A Party should specify in the documentation box which types of land conversion are included. Separate estimates for grassland conversion should be provided in table 5 as an information item.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5.B SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
Cropland
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS					EMISSIONS/REMOVALS				
Land-Use Category	Sub-division [1]	Total area (kha)	Carbon stock change in living biomass per area [2], [3]			Net carbon stock change in dead organic matter per area[3]	Net carbon stock change in soils per area [3]	Carbon stock change in living biomass[2], [3], [4]			Net carbon stock change in dead organic matter[3,5]	Net carbon stock change in soils [3]
			Increase	Decrease	Net change			Increase	Decrease	Net change		
			(Mg C/ha)					(Gg C)				
B. Total Cropland		129,00										
1. Cropland remaining Cropland		129,00										
2. Land converted to Cropland[6]												
2.1 Forest Land converted to Cropland												
2.2 Grassland converted to Cropland												
2.3 Wetlands converted to Cropland												
2.4 Settlements converted to Cropland												
2.5 Other Land converted to Cropland												

(1) Land categories may be further divided according to climate zone, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

(2) CO_2 emissions and removals (carbon stock increase and decrease) should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on increases and decreases.

(3) The signs for estimates of increases in carbon stocks are positive (+) and of decreases in carbon stocks are negative (-).

(4) For category 5.B.1 Cropland remaining Cropland this column only includes changes in perennial woody biomass.

(5) No reporting on dead organic matter pools is required for category 5.B.1. Cropland remaining Cropland.

(6) A Party may report aggregate estimates for all land conversions to cropland, when data are not available to report them separately. A Party should specify in the documentation box which types of land conversion are included. Separate estimates for forest and grassland conversion should be provided in table 5 as an information item.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5.C SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY

Grassland

(Sheet 1 of 1)

Inventory 2004

Submission 2006 v1.2

ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS					EMISSIONS/REMOVALS				
Land-Use Category	Sub-division [1]	Total area (kha)	Carbon stock change in living biomass per area [2], [3]			Net carbon stock change in dead organic matter per area [2]	Net carbon stock change in soils per area [2]	Carbon stock change in living biomass [2], [3], [4]			Net carbon stock change in dead organic matter [2], [5]	Net carbon stock change in soils [2]
			Increase	Decrease	Net change			Increase	Decrease	Net change		
			(Mg C/ha)					(Gg C)				
C. Total Grassland		3.845,70	NE	NE	NE		-0,13	NE	NE	NE		-495,00
1. Grassland remaining Grassland		3.845,70	NE	NE	NE	NA	-0,13	NE	NE	NE	NA	-495,00
	Grassland on mineral soil	3.395,70	NE	NE	NE	NA	NE	NE	NE	NE	NA	NE
	Drained organic soil	450,00				NA	-1,10				NA	-495,00
2. Land converted to Grassland [6]												
2.1 Forest Land converted to Grassland												
2.2 Cropland converted to Grassland												
2.3 Wetlands converted to Grassland												
2.4 Settlements converted to Grassland												
2.5 Other Land converted to Grassland												

(1) Land categories may be further divided according to climate zone, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

(2) The signs for estimates of increases in carbon stocks are positive (+) and of decreases in carbon stocks are negative (-).

(3) CO_2 emissions and removals (carbon stock increase and decrease) should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on increases and decreases.

(4) For category 5.C.1 Grassland remaining Grassland this column only includes changes in perennial woody biomass.

(5) No reporting on dead organic matter pools is required for category 5.C.1 Grassland remaining Grassland.

(6) A Party may report aggregate estimates for all land conversions to grassland, when data are not available to report them separately. A Party should specify in the documentation box which types of land conversion are included. Separate estimates for forest conversion should be provided in table 5 as an information item.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5.D SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
Wetlands[(1)]
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS					EMISSIONS/REMOVALS				
Land-Use Category	Sub-division [(2)]	Total area (kha)	Carbon stock change in living biomass per area [(3), (4)]			Net carbon stock change in dead organic matter per area[(4)]	Net carbon stock change in soils per area [(4)]	Carbon stock change in living biomass[(3), (4)]			Net carbon stock change in dead organic matter[(4)]	Net carbon stock change in soils [(4)]
			Increase	Decrease	Net change			Increase	Decrease	Net change		
			(Mg C/ha)					(Gg C)				
D. Total Wetlands		876,49	NE	NE	NE		-0,04	NE	NE	NE		-38,57
1. Wetlands remaining Wetlands		876,49	NE	NE	NE	NA,NE	-0,04	NE	NE	NE	NA,NE	-38,57
	Lakes and rivers	183,90	NE	NE	NE	NE	NO	NE	NE	NE	NE	NO
	Peatland	667,59	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	Reservoirs	25,00				NA	-1,54				NA	-38,57
2. Land converted to Wetlands [(5)]												
2.1 Forest Land converted to Wetlands												
2.2 Cropland converted to Wetlands												
2.3 Grassland converted to Wetlands												
2.4 Settlements converted to Wetlands												
2.5 Other Land converted to Wetlands												

(1) Parties do not have to prepare estimates for categories contained in appendices 3a.2, 3a.3 and 3a.4 of the IPCC good practice guidance for LULUCF, although they may do so if they wish.

(2) Land categories may be further divided according to climate zone, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

(3) CO_2 emissions and removals (carbon stock increase and decrease) should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on increases and decreases.

(4) The signs for estimates of increases in carbon stocks are positive (+) and of decreases in carbon stocks are negative (-).

(5) A Party may report aggregate estimates for all land conversions to wetlands, when data are not available to report them separately. A Party should specify in the documentation box which types of land conversion are included. Separate estimates for forest and grassland conversion should be provided in table 5 as

Documentation box:

Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5.E SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
Settlements[(1)]
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS					EMISSIONS/REMOVALS				
Land-Use Category	Sub-division [(2)]	Total area (kha)	Carbon stock change in living biomass per area [(3), (4)]			Net carbon stock change in dead organic matter per area[(4)]	Net carbon stock change in soils per area [(4)]	Carbon stock change in living biomass[(3), (4) (5)]			Net carbon stock change in dead organic matter[(4)]	Net carbon stock change in soils [(4)]
			Increase	Decrease	Net change			Increase	Decrease	Net change		
			(Mg C/ha)					(Gg C)				
E. Total Settlements		68,45										
1. Settlements remaining Settlements		68,45										
2. Land converted to Settlements[(6)]												
2.1 Forest Land converted to Settlements												
2.2 Cropland converted to Settlements												
2.3 Grassland converted to Settlements												
2.4 Wetlands converted to Settlements												
2.5 Other Land converted to Settlements												

(1) Parties do not have to prepare estimates for categories contained in appendices 3a.2, 3a.3 and 3a.4 of the IPCC good practice guidance for LULUCF, although they may do so if they wish.

(2) Land categories may be further divided according to climate zone, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

(3) CO_2 emissions and removals (carbon stock increase and decrease) should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on increases and decreases.

(4) The signs for estimates of increases in carbon stocks are positive (+) and of decreases in carbon stocks are negative (-).

(5) For category 5.E.1 Settlements remaining Settlements this column only includes changes in perennial woody biomass.

(6) A Party may report aggregate estimates for all land conversions to settlements, when data are not available to report them separately. A Party should specify in the documentation box which types of land conversion are included. Separate estimates for forest and grassland conversion should be provided in table 5 as an information item.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5.F SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
Other land[1]
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS					EMISSIONS/REMOVALS				
Land-Use Category	Sub-division [2]	Total area (kha)	Carbon stock change in living biomass per area [3], [4]			Net carbon stock change in dead organic matter per area[4]	Net carbon stock change in soils per area [4]	Carbon stock change in living biomass[3], [4]			Net carbon stock change in dead organic matter[4]	Net carbon stock change in soils [4]
			Increase	Decrease	Net change			Increase	Decrease	Net change		
			(Mg C/ha)					(Gg C)				
F. Total Other Land		5.310,06										
1. Other Land remaining Other Land		5.310,06										
2. Land converted to Other Land[5]												
2.1 Forest Land converted to Other Land												
2.2 Cropland converted to Other Land												
2.3 Grassland converted to Other Land												
2.4 Wetlands converted to Other Land												
2.5 Settlements converted to Other Land												

(1) Parties do not have to prepare estimates for this category contained in Chapter 3.7.1 of the IPCC good practice guidance for LULUCF, although they may do so if they wish. This land-use category is to allow the total of identified land area to match the national area.

(2) Land categories may be further divided according to climate zone, management system, soil type, vegetation type, tree species, ecological zones or national land classification.

(3) CO_2 emissions and removals (carbon stock increase and decrease) should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on increases and decreases.

(4) The signs for estimates of increases in carbon stocks are positive (+) and of decreases in carbon stocks are negative (-).

(5) A Party may report aggregate estimates for all land conversions to other land, when data are not available to report them separately. A Party should specify in the documentation box which types of land conversion are included. Separate estimates for forest and grassland conversion should be provided in table 5 as an information item.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5 (I) SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY Inventory 2004

Direct N_2O emissions from N fertilization [1] Submission 2006 v1.2

(Sheet 1 of 1) ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS	EMISSIONS
Land-Use Category [2]	Total amount of fertilizer applied	N_2O-N emissions per unit of fertilizer	N_2O
	(Gg N/yr)	(kg N_2O-N/kg N)[3]	(Gg)
Total for all Land Use Categories	**IE**	**IE**	**IE**
A. Forest Land [4], [5]	**IE**	**IE**	**IE**
1. Forest Land remaining Forest Land	IE	IE	IE
2. Land converted to Forest Land	IE	IE	IE
G. Other *(please specify)*			

(1) Direct N_2O emissions from fertilization are estimated using equations 3.2.17 and 3.2.18 of the IPCC good practice guidance for LULUCF based on the amount of fertilizers applied to forest land. The indirect N_2O emissions from forest land are estimated as part of the total indirect emissions (Agriculture sector and Forest Land) in the Agriculture sector based on the total fertilizers used in the country.

(2) N_2O emissions from N fertilization of cropland and grassland are reported in the Agriculture sector; therefore only forest land is included in this table.

(3) In the calculation of the implied emission factor, N_2O emissions are converted to N_2O-N by multiplying by 28/44.

(4) If a Party is not able to separate the fertilizer applied to forest land from that applied to agriculture, it may report all N_2O emissions from fertilization in the Agriculture sector. This should be explicitly indicated in the documentation box.

(5) A Party may report aggregate estimates for all N fertilization on forest land when data are not available to report forest land remaining forest land and land conversion to forest land separately.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
5 Direct N2O emissions from N fertilization:All N-fertilizers are included in Agricultural sector. Data not available for amount of fertilisers used in forestry or revegetation.

TABLE 5 (II) SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
N_2O emissions from drainage of soils [1]
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA	IMPLIED EMISSION FACTORS	EMISSIONS
Land-Use Category [2]	Sub-division [3]	Area of drained soils	N_2O-N per area drained [4]	N_2O
		(kha)	(kg N_2O-N/ha)	(Gg)
Total all Land-Use Categories		**450,00**	**1,80**	**1,27**
A. Forest Land				
Organic Soil				
Mineral Soil				
D. Wetlands		**NA**	**NA**	**NA**
Organic Soil		NA	NA	NA
Mineral Soil		NA	NA	NA
G. Other (please specify)				
Revegetation				
Organic Soil				
Mineral Soil				
Grassland organic soil		450,00	1,80	1,27
Organic Soil				
Mineral Soil				

(1) Methodologies for estimating N_2O emissions from drainage of soils are not addressed in the Revised 1996 IPCC Guidelines, but are addressed for forest soils in Appendix 3a.2 of the IPCC good practice guidance for LULUCF (equation 3a.2.1) and for wetland soils in appendix 3a.3.

(2) N_2O emissions from drained cropland and grassland soils are covered in the Agriculture tables of the CRF under Cultivation of Histosols.

(3) A Party should report further disaggregations of drained soils corresponding to the methods used. Tier 1 disaggregates soils into "nutrient rich" and "nutrient poor" areas, whereas higher-tier methods

(4) In the calculation of the implied emission factor, N_2O emissions are converted to N_2O-N by multiplying by 28/44

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.

TABLE 5 (III) SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY

N_2O emissions from disturbance associated with land-use conversion to cropland [1]

(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS	EMISSIONS
Land-Use Category [2]	Land area converted	N_2O-N emissions per area converted[3]	N_2O
	(kha)	(kg N_2O-N/ha)	(Gg)
Total all Land-Use Categories [4]			
B. Cropland			
2. Lands converted to Cropland [5]			
Organic Soils			
Mineral Soils			
2.1 Forest Land converted to Cropland			
Organic Soils			
Mineral Soils			
2.2 Grassland converted to Cropland			
Organic Soils			
Mineral Soils			
2.3 Wetlands converted to Cropland [6]			
Organic Soils			
Mineral Soils			
2.5 Other Land converted to Cropland			
Organic Soils			
Mineral Soils			
G. Other *(please specify)*			

[1] Methodologies for N_2O emissions from disturbance associated with land-use conversion are based on equations 3.3.14 and 3.3.15 of the IPCC good practice guidance for LULUCF. N_2O emissions from fertilization in the preceding land use and new land use should not be reported.

[2] According to the IPCC good practice guidance for LULUCF N_2O emissions from disturbance of soils are only relevant for land conversions to cropland. N_2O emissions from cropland remaining cropland are included in the Agriculture sector of the good practice guidance. The good practice guidance provides methodologies only for mineral soils.

[3] In the calculation of the implied emission factor, N_2O emissions are converted to N_2O-N by multiplying by 28/44.

[4] Parties can separate between organic and mineral soils, if they have data available.

[5] If activity data cannot be disaggregated to all initial land uses, Parties may report some initial land uses aggregated under other lands converted to cropland (indicate in the documentation box what this category includes).

[6] Parties should avoid double counting with N_2O emissions from drainage and from cultivation of organic soils reported in Agriculture under Cultivation of Histosols.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF Sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
5 N2O emissions from disturbance associated with land-use conversion to cropland:Information on land converted to cropland not available although occuring. Land has been converted to cropland form grassland, other land and wetland. No estimates on area converted available.

TABLE 5 (IV) SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
Carbon emissions from agricultural lime application [1]
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS	EMISSIONS
Land-Use Category	Total amount of lime applied	Carbon emissions per unit of lime	Carbon
	(Mg/yr)	(Mg C/Mg)	(Gg)
Total all Land-Use Categories [(2), (3), (4)]	**6.456,62**	**0,11**	**0,69**
B. Cropland [(4)]	**6.456,62**	**0,11**	**0,69**
Limestone $CaCO_3$	180,00	0,12	0,02
Dolomite $CaMg(CO_3)_2$	295,00	0,07	0,02
shellsand (90% CaCO3)	5.981,62	0,11	0,65
C. Grassland [(4)]	**NO**	**NO**	
Limestone $CaCO_3$	NO	NO	
Dolomite $CaMg(CO_3)_2$	NO	NO	
G. Other *(please specify)* [(4, 5)]			
Revegetation	NA	NA	NA
Limestone CaCO3	NA	NA	NA
Dolomite CaMg(CO3)2	NA	NA	NA
Grassland organic soil			
Limestone CaCO3			
Dolomite CaMg(CO3)2			

(1) Carbon emissions from agricultural lime application are addressed in equation 3.3.6 and 3.4.11 of the IPCC good practice guidance for LULUCF.
(2) If Parties are not able to separate liming application for different land-use categories, they should include liming for all land-use categories in the total.
(3) Parties that are able to provide data for lime application to forest land should provide this information under 5.G Other and specify in the documentation box that forest land application is included in this category.
(4) A Party may report agregate estimates for total lime applications when data are not available for limestone and dolomite.
(5) If a Party has data broken down to limestone and dolomite at national level, it can report these data under 5.G Other.

Documentation box:
Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
5 Carbon emissions from agricultural lime application:Liming information only available on national level

TABLE 5 (V) SECTORAL BACKGROUND DATA FOR LAND USE, LAND-USE CHANGE AND FORESTRY
Biomass Burning [1]
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA			IMPLIED EMISSION FACTOR			EMISSIONS		
	Description[3]	Unit	Values	CO_2	CH_4	N_2O	CO_2 [4]	CH_4	N_2O
Land-Use Category[2]		(ha or kg dm)		(Mg/activity data unit)			(Gg)		
Total for Land-Use Categories			**NE,NO**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
A. Forest Land			**NE,NO**	**NE,NO**	**NE,NO**	**NE,NO**			
1. Forest land remaining Forest Land			NE,NO	NE,NO	NE,NO	NE,NO			
Controlled Burning	(specify)		NO	NO	NO	NO			
Wildfires	(specify)		NE	NE	NE	NE			
2. Land converted to Forest Land			NE,NO	NE,NO	NE,NO	NE,NO			
Controlled Burning	(specify)		NO	NO	NO	NO			
Wildfires	(specify)		NE	NE	NE	NE			
B. Cropland			**NE,NO**	**NE,NO**	**NE,NO**	**NE,NO**			
1. Cropland remaining Cropland[5]									
Controlled Burning	(specify)								
Wildfires	(specify)								
2. Land converted to Cropland			NE,NO	NE,NO	NE,NO	NE,NO			
Controlled Burning	(specify)		NO	NO	NO	NO			
Wildfires	(specify)		NE	NE	NE	NE			
2.1. Forest Land converted to Cropland			NO	NO	NO	NO			
Controlled Burning	(specify)		NO	NO	NO	NO			
Wildfires	(specify)		NO	NO	NO	NO			
C. Grassland			**NE**	**NE**	**NE**	**NE**			
1. Grassland remaining grassland [6]			NE	NE	NE	NE			
Controlled Burning	(specify)		NE	NE	NE	NE			
Wildfires	(specify)		NE	NE	NE	NE			
2. Land converted to Grassland			NE	NE	NE	NE			
Controlled Burning	(specify)		NE	NE	NE	NE			
Wildfires	(specify)		NE	NE	NE	NE			
2.1. Forest Land converted to Grassland			NO	NO	NO	NO			
Controlled Burning	(specify)		NO	NO	NO	NO			
Wildfires	(specify)		NO	NO	NO	NO			
D. Wetlands			**NE,NO**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
1. Wetlands remaining Wetlands [7]			NE	NA	NA	NA	NA	NA	NA
Controlled Burning	(specify)		NE	NA	NA	NA	NA	NA	NA
Wildfires	(specify)		NE	NA	NA	NA	NA	NA	NA
2. Land converted to Wetlands			NO	NA	NA	NA	NA	NA	NA
Controlled Burning	(specify)		NO	NA	NA	NA	NA	NA	NA
Wildfires	(specify)		NO	NA	NA	NA	NA	NA	NA
2.1. Forest Land converted to Wetlands			NO	NO	NO	NO			
Controlled Burning	(specify)		NO	NO	NO	NO			
Wildfires	(specify)		NO	NO	NO	NO			
E. Settlements [7]	(specify)		NE	**NE**	**NE**	**NE**			
F. Other Land [8]	(specify)								
G. Other (please specify)									
Revegetation									
Controlled Burning									
Controlled Burning									
Wildfires									
Wildfires									
Controlled Burning									
Wildfires									
Grassland organic soil									
Controlled Burning									
Controlled Burning									
Wildfires									
Wildfires									
Controlled Burning									
Wildfires									

(1) Methodological guidance on burning can be found in sections 3.2.1.4 and 3.4.1.3 of the IPCC good practice guidance for LULUCF.
(2) Parties should report both Controlled/Prescribed Burning and Wildfires emissions, where appropriate, in a separate manner.
(3) For each category activity data should be selected between area burned or biomass burned. Units for area will be ha and for biomass burned kg dm. The implied emission factor will refer to the selected activity data with an automatic change in the units.
(4) If CO_2 emissions from biomass burning are not already included in tables 5.A - 5.F, they should be reported here. This should be clearly documented in the documentation box and in the NIR. Double counting should be avoided. Parties that include all carbon stock changes in the carbon stock tables (5.A, 5.B, 5.C, 5.D, 5.E and 5.F), should report IE (included elsewhere) in this column.
(5) Field burning of agricultural residues is reported in the Agriculture sector.
(6) Only includes emissions from controlled biomass burning on grasslands outside the tropics (prescribed savanna burning is reported under the Agriculture sector).
(7) Parties do not have to prepare estimates for categories contained in appendices 3a.2, 3a.3 and 3a.4 of the IPCC good practice guidance for LULUCF, although they may do so if they wish.
(8) Parties do not have to prepare estimates for this category contained in Chapter 3.7.1 of the IPCC good practice guidance for LULUCF, although they may do so if they wish. This land-use category is to allow the total of identified land area to match the national area.

Documentation box: Parties should provide detailed explanations on the Land Use, Land-Use Change and Forestry sector in Chapter 7: Land Use, Land-Use Change and Forestry (CRF sector 5) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
5 Biomass Burning:Biomass burning taking place but data not available on total area or biomass burned.

TABLE 6 SECTORAL REPORT FOR WASTE
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	NO_x	CO	NMVOC	SO_2
	(Gg)						
Total Waste	**2,44**	**7,74**	**0,02**	**0,01**	**0,00**	**0,00**	**0,01**
A. Solid Waste Disposal on Land	**NE,NO**	**7,48**		**NE**	**NE**	**NE**	
1. Managed Waste Disposal on Land	NE	3,67		NE	NE	NE	
2. Unmanaged Waste Disposal Sites	NE,NO	3,36		NE	NE	NE	
3. Other *(as specified in table 6.A)*		0,45					
Uncategorized		0,45					
B. Waste Water Handling		**0,26**	**0,02**	**NA,NE**	**NA,NE**	**NA,NE**	
1. Industrial Wastewater		NE	NE	NE	NE	NE	
2. Domestic and Commercial Waste Water		0,26	0,02	NE	NE	NE	
3. Other *(as specified in table 6.B)*		NA	NA	NA	NA	NA	
C. Waste Incineration	**2,44**	**NE**	**0,00**	**0,01**	**0,00**	**0,00**	**0,01**
D. Other *(please specify)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

[(1)] CO_2 emissions from source categories Solid waste disposal on land and Waste incineration should only be included if they derive from non-biological or inorganic waste sources.

Documentation box:
• Parties should provide detailed explanations on the waste sector in Chapter 8: Waste (CRF sector 6) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• If estimates are reported under "6.D Other", use this documentation box to provide information regarding activities covered under this category and to provide reference to the section in the NIR where background information can be found.

TABLE 6.A SECTORAL BACKGROUND DATA FOR WASTE
Solid Waste Disposal
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION			IMPLIED EMISSION FACTOR		EMISSIONS		
	Annual MSW at the SWDS	MCF	DOC degraded	CH_4 [1]	CO_2	CH_4		CO_2 [4]
						Emissions [2]	Recovery [3]	
	(Gg)		%	(t /t MSW)		(Gg)		
1 Managed Waste Disposal on Land	162,20	1,00	0,00	0,03	NE	3,67	1,40	NE
2 Unmanaged Waste Disposal Sites			0,00		NE,NO	3,36	NO	NE,NO
a. Deep (>5 m)	NO	NO	NO	NO	NO	NO	NO	NO
b. Shallow (<5 m)	178,80	0,40	0,00	0,02	NE	3,36	NO	NE
3 Other *(please specify)*						0,45		
Uncategorized			0,00			0,45		

Additional information

Description	Value
Total population (1000s) [a]	**293,29**
Urban population (1000s) [a]	
Waste generation rate (kg/capita/day)	
Fraction of MSW disposed to SWDS	0,00
Fraction of DOC in MSW	0,00
CH_4 oxidation factor [b]	0,10
CH_4 fraction in landfill gas	0,50
CH_4 generation rate constant (k) [c]	
Time lag considered (yr) [c]	

Note: MSW - Municipal Solid Waste, SWDS - Solid Waste Disposal Site, MCF - Methane Correction Factor, DOC - Degradable Organic Carbon (IPCC Guidelines (Volume 3. Reference Manual, section 6.2.4)).
MSW includes household waste, yard/garden waste, commercial/market waste and organic industrial solid waste. MSW should not include inorganic industrial waste such as construction or demolition materials.

(1) The CH_4 implied emission factor (IEF) is calculated on the basis of gross CH_4 emissions, as follows: IEF = (CH_4 emissions + CH_4 recovered)/annual MSW at the SWDS.
(2) Actual emissions (after recovery).
(3) CH_4 recovered and flared or utilized.
(4) Under Solid Waste Disposal, CO_2 emissions should be reported only when the disposed waste is combusted at the disposal site as a management practice. CO_2 emissions from non-biogenic wastes are included in the total emissions, whereas the CO_2 emissions from biogenic wastes are not included in the total emissions.

(a) Specify whether total or urban population is used and the rationale for doing so.
(b) See IPCC Guidelines (Volume 3. Reference Manual, p. 6.9).
(c) Only for Parties using Tier 2 methods.

TABLE 6.C SECTORAL BACKGROUND DATA FOR WASTE
Waste Incineration
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTOR			EMISSIONS		
	Amount of incinerated wastes	CO_2	CH_4	N_2O	CO_2 [1]	CH_4	N_2O
	(Gg)	(kg/t waste)			(Gg)		
Waste Incineration	4,38				2,44	NE	0,00
a. Biogenic [1]	3,68	995,24	NE	0,10	3,67	NE	0,00
b. Other (non-biogenic - *please specify*) [1], [2]					2,44	NE	0,00
Plastics and other non-biogenic waste	0,70	3.483,33	NE	0,10	2,44	NE	0,00

(1) Under Solid Waste Disposal, CO_2 emissions should be reported only when the disposed waste is combusted at the disposal site as a management practice. CO_2 emissions from non-biogenic wastes are included in the total emissions, while the CO_2 emissions from biogenic wastes are not included in the total emissions.
(2) Enter under this source category all types of non-biogenic wastes, such as plastics.

Note: Only emissions from waste incineration without energy recovery are to be reported in the Waste sector. Emissions from incineration with energy recovery are to be reported in the Energy sector, as Other Fuels (see IPCC good practice guidance, page 5.23).

Documentation box:
• Parties should provide detailed explanations on the waste sector in Chapter 8: Waste (CRF sector 6) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further
• Parties that use country-specific models should provide a reference in the documentation box to the relevant section in the NIR where these models are described, and fill in only the relevant cells of tables 6.A and 6.C.
• Provide a reference to the relevant section in the NIR, in particular with regard to:
(a) A population size (total or urban population) used in the calculations and the rationale for doing so;
(b) The composition of landfilled waste;
(c) In relation to the amount of incinerated wastes (specify whether the reported data relate to wet or dry matter).

TABLE 6.B SECTORAL BACKGROUND DATA FOR WASTE
Waste Water Handling
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND RELATED INFORMATION[1]		IMPLIED EMISSION FACTOR		EMISSIONS		
	Total organic product		CH_4 [2]	N_2O [3]	CH_4		N_2O [3]
					Emissions [4]	Recovery [5]	
	(Gg DC[1]/yr)		(kg/kg DC)		(Gg)		
1. Industrial Waste Water					NE	NE	NE
a. Waste Water	NE		NE	NE	NE	NE	NE
b. Sludge	NE		NE	NE	NE	NE	NE
2. Domestic and Commercial Wastewater					0,26	NE,NO	0,02
a. Waste Water	NE		NE	NE	0,26	NO	NE
b. Sludge	NE		NE	NE	NE	NE	NE
3. Other *(please specify)* [6]					NA	NA	NA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION			IMPLIED EMISSION FACTOR	EMISSIONS
	Population (1000s)	Protein consumption (kg/person/yr)	N fraction (kg N/kg protein)	N_2O (kg N_2O-N/kg sewage N produced)	N_2O (Gg)
N_2O from human sewage [3]	293,29	31,76	0,16	0,01	0,02

[1] DC - degradable organic component. DC indicators are COD (Chemical Oxygen Demand) for industrial waste water and BOD (Biochemical Oxygen Demand) for Domestic/Commercial waste water/sludge (IPCC Guidelines (Volume 3. Reference Manual, pp. 6.14, 6.18)).

[2] The CH_4 implied emission factor (IEF) is calculated on the basis of gross CH_4 emissions, as follows: IEF = (CH_4 emissions + CH_4 recovered or flared) / total organic product.

[3] Parties using methods other than those from the IPCC for estimating N_2O emissions from human sewage or waste-water treatment should provide aggregate data in this table.

[4] Actual emissions (after recovery).

[5] CH_4 recovered and flared or utilized.

[6] Use the cells below to specify each activity covered under "6.B.3 Other". Note that under each reported activity, data for waste water and sludge are to be reported separately.

Documentation box:
• Parties should provide detailed explanations on the Waste sector in Chapter 8: Waste (CRF sector 6) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and/or further details are needed to understand the content of this table.
• Regarding the estimates for N_2O from human sewage, specify whether total or urban population is used in the calculations and the rationale for doing so. Provide explanation in the documentation box.
• Parties using methods other than those from the IPCC for estimating N_2O emissions from human sewage or waste-water treatment should provide, in the NIR, corresponding information on methods, activity data and emission factors used, and should provide a reference to the relevant section of the NIR in this documentation box.

TABLE 6.B SECTORAL BACKGROUND DATA FOR WASTE
Waste Water Handling
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

Additional information

	Domestic	Industrial
Total waste water (m^3):		
Treated waste water (%):	0,00	0,00

Waste-water streams:	Waste-water output (m^3)	DC (kg COD/m^3)
Industrial waste water		
Iron and steel		
Non-ferrous		
Fertilizers		
Food and beverage		
Paper and pulp		
Organic chemicals		
Other (please specify)		
Textile		
Rubber		
Poultry		
Wood and wood production		
Wool Scouring		
Other agricultural		
Chemical		
Dairy Processing		
Electricity, steam, water production		
Leather industry		
Leather and Skins		
Iron and steel		
Meat industry		
Fuels		
Machinery and equipment		
Mining and quarrying		
	DC (kg BOD/1000 person/yr)	
Domestic and Commercial		
Other (please specify)		

Handling systems:	Industrial waste water treated (%)	Industrial sludge treated (%)	Domestic waste water treated (%)	Domestic sludge treated (%)
Aerobic	0,00	0,00	0,00	0,00
Anaerobic	0,00	0,00	0,00	0,00
Other (please specify)	0,00	0,00	0,00	0,00

SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)
(Sheet 1 of 3)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions/removals	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)						(Gg)			
Total National Emissions and Removals	**4.245,42**	**22,16**	**2,40**	**58,40**	**NA,NE,NO**	**NA,NE,NO**	**38,58**	**0,00**	**NA,NE,NO**	**28,44**	**23,55**	**7,43**	**31,86**
1. Energy	**1.886,18**	**0,17**	**0,22**							**26,83**	**23,30**	**5,12**	**2,19**
A. Fuel Combustion — Reference Approach [2]	1.889,29												
Sectoral Approach [2]	1.886,18	0,17	0,22							26,83	23,30	5,12	2,19
1. Energy Industries	19,29	0,00	0,00							0,23	0,06	0,00	0,04
2. Manufacturing Industries and Construction	447,19	0,01	0,10							4,12	1,27	0,55	1,74
3. Transport	678,56	0,09	0,10							4,96	20,22	4,06	0,11
4. Other Sectors	725,28	0,07	0,02							17,49	1,75	0,51	0,14
5. Other	15,85	0,00	0,00							0,04	0,00	0,00	0,15
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NO							NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
1. Solid Fuels	NA,NO	NA,NO	NA,NO							NA,NO	NA,NO	NA,NO	NA,NO
2. Oil and Natural Gas	NA,NE,NO	NA,NE,NO	NA,NO							NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
2. Industrial Processes	**846,01**	**0,05**	**NA,NE,NO**	**58,40**	**NA,NE,NO**	**NA,NE,NO**	**38,58**	**0,00**	**NA,NE,NO**	**1,60**	**0,25**	**0,09**	**5,72**
A. Mineral Products	50,93	NA,NE	NA,NE							0,02	0,05	0,01	0,03
B. Chemical Industry	0,39	NE,NO	NE,NO	NA	NA	NA	NA	NA	NA	0,37	NE,NO	NE,NO	NE,NO
C. Metal Production	794,69	0,05	NA				38,58		NA,NO	1,21	0,19	0,09	5,69
D. Other Production [3]	NE									NO	NO	NE,NO	NO
E. Production of Halocarbons and SF_6					NA,NO		NA,NO		NA,NO				
F. Consumption of Halocarbons and SF_6				58,40	NA,NE,NO	NE,NO	NA,NE,NO	0,00	NA,NE,NO				
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)
(Sheet 2 of 3)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions/removals	CH_4	N_2O	HFCs [1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)						(Gg)			
3. Solvent and Other Product Use	**NE**		**0,01**							**NE**	**NE**	**2,22**	**NE**
4. Agriculture		**11,86**	**0,81**							**NA,NO**	**NA,NO**	**NA,NE,NO**	**NO**
A. Enteric Fermentation		10,91											
B. Manure Management		0,95	0,08									NE,NO	
C. Rice Cultivation		NA,NO										NA,NO	
D. Agricultural Soils[4]		NA,NE	0,73									NA,NE	
E. Prescribed Burning of Savannas		NA	NA							NO	NO	NO	
F. Field Burning of Agricultural Residues		NA,NO	NA,NO							NA,NO	NA,NO	NA,NO	
G. Other		NA	NA							NA	NA	NA	NO
5. Land Use, Land-Use Change and Forestry	(5) **1.386,70**	**2,34**	**1,34**							**NA**	**NA**		
A. Forest Land	(5) -120,56		IE										
B. Cropland	(5) 2,52												
C. Grassland	(5) 1.815,00												
D. Wetlands	(5) 141,42	2,34	0,07										
E. Settlements	(5)												
F. Other Land	(5)												
G. Other	(5) -451,68		1,27							NA	NA		
6. Waste	**2,44**	**7,74**	**0,02**							**0,01**	**0,00**	**0,00**	**0,01**
A. Solid Waste Disposal on Land	(6) NE,NO	7,48								NE	NE	NE	
B. Waste-water Handling		0,26	0,02							NA,NE	NA,NE	NA,NE	
C. Waste Incineration	(6) 2,44	NE	0,00							0,01	0,00	0,00	0,01
D. Other	NA	NA	NA							NA	NA	NA	NA
7. Other ***(please specify)*** [7]	**124,08**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**23,94**
Geothermal Energy	124,08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	23,94

SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)
(Sheet 3 of 3)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions/removals	CH_4	N_2O	HFCs		PFCs		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)						(Gg)			
Memo Items: [8]													
International Bunkers	**597,30**	**0,02**	**0,02**							**7,14**	**1,08**	**0,42**	**0,81**
Aviation	370,26	0,00	0,01							1,57	0,52	0,26	0,47
Marine	227,04	0,02	0,01							5,57	0,56	0,16	0,34
Multilateral Operations	**NO**	**NO**	**NO**							**NO**	**NO**	**NO**	**NO**
CO_2 Emissions from Biomass	**NA,NO**												

[1] The emissions of HFCs and PFCs are to be expressed as CO_2 equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II) of this common reporting format.

[2] For verification purposes, countries are asked to report the results of their calculations using the Reference approach and to explain any differences with the Sectoral approach in the documentation box to Table 1.A.(c). For estimating national total emissions, the results from the Sectoral approach should be used, where possible.

[3] Other Production includes Pulp and Paper and Food and Drink Production.

[4] Parties which previously reported CO_2 from soils in the Agriculture sector should note this in the NIR.

[5] For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

[6] CO_2 from source categories Solid Waste Disposal on Land and Waste Incineration should only be included if it stems from non-biogenic or inorganic waste streams. Only emissions from Waste Incineration Without Energy Recovery are to be reported in the Waste sector, whereas emissions from Incineration With Energy Recovery are to be reported in the Energy sector.

[7] If reporting any country-specific source category under sector "7. Other", detailed explanations should be provided in Chapter 9: Other (CRF sector 7) of the NIR.

[8] Countries are asked to report emissions from international aviation and marine bunkers and multilateral operations, as well as CO_2 emissions from biomass, under Memo Items. These emissions should not be included in the national total emissions from the energy sector. Amounts of biomass used as fuel are included in the national energy consumption but the corresponding CO_2 emissions are not included in the national total as it is assumed that the biomass is produced in a sustainable manner. If the biomass is harvested at an unsustainable rate, net CO_2 emissions are accounted for as a loss of biomass stocks in the Land Use, Land-use Change and Forestry sector.

SUMMARY 1.B SHORT SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7B)
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		Net CO_2 emissions/removals	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
					P	A	P	A	P	A				
		(Gg)			CO_2 equivalent (Gg)						(Gg)			
Total National Emissions and Removals		**4.245,42**	**22,16**	**2,40**	**58,40**	**NA,NE,NO**	**NA,NE,NO**	**38,58**	**0,00**	**NA,NE,NO**	**28,44**	**23,55**	**7,43**	**31,86**
1. Energy		**1.886,18**	**0,17**	**0,22**							**26,83**	**23,30**	**5,12**	**2,19**
A. Fuel Combustion	Reference Approach[2]	1.889,29												
	Sectoral Approach[2]	1.886,18	0,17	0,22							26,83	23,30	5,12	2,19
B. Fugitive Emissions from Fuels		NA,NE,NO	NA,NE,NO	NA,NO							NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
2. Industrial Processes		**846,01**	**0,05**	**NA,NE,NO**	**58,40**	**NA,NE,NO**	**NA,NE,NO**	**38,58**	**0,00**	**NA,NE,NO**	**1,60**	**0,25**	**0,09**	**5,72**
3. Solvent and Other Product Use		**NE**		**0,01**							**NE**	**NE**	**2,22**	**NE**
4. Agriculture [3]			**11,86**	**0,81**							**NA,NO**	**NA,NO**	**NA,NE,NO**	**NO**
5. Land Use, Land-Use Change and Forestry		[4] **1.386,70**	**2,34**	**1,34**							**NA**	**NA**		
6. Waste		**2,44**	**7,74**	**0,02**							**0,01**	**0,00**	**0,00**	**0,01**
7. Other		**124,08**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**23,94**
Memo Items: [5]														
International Bunkers		**597,30**	**0,02**	**0,02**							**7,14**	**1,08**	**0,42**	**0,81**
Aviation		370,26	0,00	0,01							1,57	0,52	0,26	0,47
Marine		227,04	0,02	0,01							5,57	0,56	0,16	0,34
Multilateral Operations		**NO**	**NO**	**NO**							**NO**	**NO**	**NO**	**NO**
CO_2 Emissions from Biomass		**NA,NO**												

Note: A = Actual emissions based on Tier 2 approach of the IPCC Guidelines.
P = Potential emissions based on Tier 1 approach of the IPCC Guidelines.

(1) The emissions of HFCs and PFCs are to be expressed as CO_2 equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II) of this common reporting format.

(2) For verification purposes, countries are asked to report the results of their calculations using the Reference approach and to explain any differences with the Sectoral approach in the documentation box to Table 1.A.(c).
For estimating national total emissions, the result from the Sectoral approach should be used, where possible.

(3) Parties which previously reported CO_2 from soils in the Agriculture sector should note this in the NIR.

(4) For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(5) Countries are asked to report emissions from international aviation and marine bunkers and multilateral operations, as well as CO_2 emissions from biomass, under Memo Items. These emissions should not be included in the national total emissions from the energy sector. Amounts of biomass used as fuel are included in the national energy consumption but the corresponding CO_2 emissions are not included in the national total as it is assumed that the biomass is produced in a sustainable manner. If the biomass is harvested at an unsustainable rate, net CO_2 emissions are accounted for as a loss of biomass stocks in the Land Use, Land-use Change and Forestry sector.

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs [(2)]	PFCs [(2)]	SF_6 [(2)]	Total
	CO_2 equivalent (Gg)						
Total (Net Emissions) [(1)]	**4.245,42**	**465,31**	**744,94**	**58,40**	**38,58**	**5,38**	**5.558,02**
1. Energy	**1.886,18**	**3,57**	**67,44**				**1.957,19**
A. Fuel Combustion (Sectoral Approach)	1.886,18	3,57	67,44				1.957,19
1. Energy Industries	19,29	0,01	0,44				19,74
2. Manufacturing Industries and Construction	447,19	0,30	31,08				478,58
3. Transport	678,56	1,82	29,84				710,22
4. Other Sectors	725,28	1,43	6,04				732,75
5. Other	15,85	0,01	0,04				15,90
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NO				NA,NE,NO
1. Solid Fuels	NA,NO	NA,NO	NA,NO				NA,NO
2. Oil and Natural Gas	NA,NE,NO	NA,NE,NO	NA,NO				NA,NE,NO
2. Industrial Processes	**846,01**	**0,95**	**NA,NE,NO**	**58,40**	**38,58**	**5,38**	**949,33**
A. Mineral Products	50,93	NA,NE	NA,NE				50,93
B. Chemical Industry	0,39	NE,NO	NE,NO	NA	NA	NA	0,39
C. Metal Production	794,69	0,95	NA	NA	38,58	NA,NO	834,22
D. Other Production	NE						NE
E. Production of Halocarbons and SF_6				NA,NO	NA,NO	NA,NO	NA,NO
F. Consumption of Halocarbons and SF_6 [(2)]				58,40	NA,NE,NO	5,38	63,78
G. Other	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	**NE**		**3,41**				**3,41**
4. Agriculture		**249,10**	**251,30**				**500,40**
A. Enteric Fermentation		229,14					229,14
B. Manure Management		19,96	25,53				45,50
C. Rice Cultivation		NA,NO					NA,NO
D. Agricultural Soils[(3)]		NA,NE	225,76				225,76
E. Prescribed Burning of Savannas		NA	NA				NA
F. Field Burning of Agricultural Residues		NA,NO	NA,NO				NA,NO
G. Other		NA	NA				NA
5. Land Use, Land-Use Change and Forestry[(1)]	**1.386,70**	**49,14**	**415,40**				**1.851,24**
A. Forest Land	-120,56		IE				-120,56
B. Cropland	2,52						2,52
C. Grassland	1.815,00						1.815,00
D. Wetlands	141,42	49,14	21,70				212,26
E. Settlements							
F. Other Land							
G. Other	-451,68		393,70				-57,98
6. Waste	**2,44**	**162,54**	**7,40**				**172,38**
A. Solid Waste Disposal on Land	NE,NO	157,03					157,03
B. Waste-water Handling		5,51	7,26				12,77
C. Waste Incineration	2,44	NE	0,14				2,58
D. Other	NA	NA	NA				NA
7. Other *(as specified in Summary 1.A)*	**124,08**	**NA**	**NA**	**NA**	**NA**	**NA**	**124,08**

Memo Items: [(4)]							
International Bunkers	597,30	0,51	5,16				602,97
Aviation	370,26	0,05	3,24				373,56
Marine	227,04	0,45	1,92				229,41
Multilateral Operations	**NO**	**NO**	**NO**				**NO**
CO_2 Emissions from Biomass	**NA,NO**						**NA,NO**

Total CO_2 Equivalent Emissions without Land Use, Land-Use Change and Forestry [(5)]	3.706,78
Total CO_2 Equivalent Emissions with Land Use, Land-Use Change and Forestry [(5)]	5.558,02

(1) For CO_2 from Land Use, Land-use Change and Forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(2) Actual emissions should be included in the national totals. If no actual emissions were reported, potential emissions should be included.

(3) Parties which previously reported CO_2 from soils in the Agriculture sector should note this in the NIR.

(4) See footnote 8 to table Summary 1.A.

(5) These totals will differ from the totals reported in table 10, sheet 5 if Parties report non-CO_2 emissions from LULUCF.

SUMMARY 3 SUMMARY REPORT FOR METHODS AND EMISSION FACTORS USED
(Sheet 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6	
	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor
1. Energy												
A. Fuel Combustion												
1. Energy Industries												
2. Manufacturing Industries and Construction												
3. Transport												
4. Other Sectors												
5. Other												
B. Fugitive Emissions from Fuels	NA	NA	NA	NA	NA	NA						
1. Solid Fuels	NA	NA	NA	NA	NA	NA						
2. Oil and Natural Gas	NA	NA	NA	NA	NA	NA						
2. Industrial Processes					**NA**	**NA**	**NA**	**NA**			**NA**	**NA**
A. Mineral Products			NA	NA	NA	NA						
B. Chemical Industry			NA	NA	NA	NA					NA	NA
C. Metal Production					NA	NA						
D. Other Production												
E. Production of Halocarbons and SF_6							NA	NA	NA	NA	NA	NA
F. Consumption of Halocarbons and SF_6							NA	NA	NA	NA	NA	NA
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Use the following notation keys to specify the method applied:

D (IPCC default) | **T1a, T1b, T1c** (IPCC Tier 1a, Tier 1b and Tier 1c, respectively) | **CR** (CORINAIR)
RA (Reference Approach) | **T2** (IPCC Tier 2) | **CS** (Country Specific)
T1 (IPCC Tier 1) | **T3** (IPCC Tier 3) | **OTH** (Other)

If using more than one method within one source category, list all the relevant methods. Explanations regarding country-specific methods, other methods or any modifications to the default IPCC methods, as well as information

Use the following notation keys to specify the emission factor used:

D (IPCC default) | **CS** (Country Specific) | **OTH** (Other)
CR (CORINAIR) | **PS** (Plant Specific)

Where a mix of emission factors has been used, list all the methods in the relevant cells and give further explanations in the documentation box. Also use the documentation box to explain the use of notation OTH.

SUMMARY 3 SUMMARY REPORT FOR METHODS AND EMISSION FACTORS USED
(Sheet 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6	
	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor
3. Solvent and Other Product Use	**NA**	**NA**										
4. Agriculture												
A. Enteric Fermentation												
B. Manure Management												
C. Rice Cultivation			NA	NA								
D. Agricultural Soils			NA	NA								
E. Prescribed Burning of Savannas			NA	NA	NA	NA						
F. Field Burning of Agricultural Residues			NA	NA	NA	NA						
G. Other			NA	NA	NA	NA						
5. Land Use, Land-Use Change and Forestry												
A. Forest Land					NA	NA						
B. Cropland												
C. Grassland												
D. Wetlands												
E. Settlements												
F. Other Land												
G. Other												
6. Waste												
A. Solid Waste Disposal on Land	NA	NA										
B. Waste-water Handling												
C. Waste Incineration			NA	NA								
D. Other	NA	NA	NA	NA	NA	NA						
7. Other (as specified in Summary 1.A)	**CS**		**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Use the following notation keys to specify the method applied:

D (IPCC default) **T1a, T1b, T1c** (IPCC Tier 1a, Tier 1b and Tier 1c, respectively) **CR** (CORINAIR)
RA (Reference Approach) **T2** (IPCC Tier 2) **CS** (Country Specific)
T1 (IPCC Tier 1) **T3** (IPCC Tier 3) **OTH** (Other)

If using more than one method within one source category, list all the relevant methods. Explanations regarding country-specific methods, other methods or any modifications to the default IPCC methods, as well as information regarding the use of different methods per

Use the following notation keys to specify the emission factor used:

D (IPCC default) **CS** (Country Specific) **OTH** (Other)
CR (CORINAIR) **PS** (Plant Specific)

Where a mix of emission factors has been used, list all the methods in the relevant cells and give further explanations in the documentation box. Also use the documentation box to explain the use of notation OTH.

Documentation box:

• Parties should provide the full information on methodological issues, such as methods and emission factors used, in the relevant sections of Chapters 3 to 9 (see section 2.2 of each of Chapters 3 - 9) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and further details are needed to understand the content of this table.

• Where a mix of methods/emission factors has been used within one source category, use this documentation box to specify those methods/emission factors for the various sub-sources where they have been applied.

• Where the notation OTH (Other) has been entered in this table, use this documentation box to specify those other methods/emission factors.

TABLE 7 SUMMARY OVERVIEW FOR KEY CATEGORIES
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

KEY CATEGORIES OF EMISSIONS AND REMOVALS	Gas	Criteria used for key source identification			Key category excluding LULUCF [1]	Key category including LULUCF [1]	Comments [1]
		L	T	Q			
Specify key categories according to the national level of disaggregation used:							

Note: L = Level assessment; T = Trend assessment; Q = Qualitative assessment.

[1] The term "key categories" refers to both the key source categories as addressed in the IPCC good practice guidance and the key categories as addressed in the IPCC good practice guidance for LULUCF.

[2] For estimating key categories Parties may chose the disaggregation level presented as an example in table 7.1 of the IPCC good practice guidance (page 7.6) and table 5.4.1 (page 5.31) of the IPCC good practice guidance for LULUCF, the level used in table Summary 1.A of the common reporting format or any other disaggregation level that the Party used to determine its key categories.

Documentation box:
Parties should provide the full information on methodologies used for identifying key categories and the quantitative results from the level and trend assessments (according to tables 7.1–7.3 of the IPCC good practice guidance and tables 5.4.1–5.4.3 of the IPCC good practice guidance for LULUCF) in Annex 1 to the NIR.

TABLE 8(a) RECALCULATION - RECALCULATED DATA
(Sheet 1 of 2)

Recalculated year: Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO_2					CH_4					N_2O				
		Previous submission	Latest submission	Difference	Difference(1)	Impact of recalculation on total emissions(2)	Previous submission	Latest submission	Difference	Difference(1)	Impact of recalculation on total emissions(2)	Previous submission	Latest submission	Difference	Difference(1)	Impact of recalculation on total emissions(2)
		CO_2 equivalent (Gg)			(%)	(%)	CO_2 equivalent (Gg)			(%)	(%)	CO_2 equivalent (Gg)			(%)	(%)
Total National Emissions and Removals			**4.245,42**					465,31					744,94			
1. Energy			**1.886,18**					3,57					67,44			
1.A.	Fuel Combustion Activities		1.886,18					3,57					67,44			
1.A.1.	Energy Industries		19,29					0,01					0,44			
1.A.2.	Manufacturing Industries and Construction		447,19					0,30					31,08			
1.A.3.	Transport		678,56					1,82					29,84			
1.A.4.	Other Sectors		725,28					1,43					6,04			
1.A.5.	Other		15,85					0,01					0,04			
1.B.	Fugitive Emissions from Fuels		NA,NE,NO					NA,NE,NO					NA,NO			
1.B.1.	Solid fuel		NA,NO					NA,NO					NA,NO			
1.B.2.	Oil and Natural Gas		NA,NE,NO					NA,NE,NO					NA,NO			
2. Industrial Processes			**846,01**					**0,95**					**NA,NE,NO**			
2.A.	Mineral Products		50,93					NA,NE					NA,NE			
2.B.	Chemical Industry		0,39					NE,NO					NE,NO			
2.C.	Metal Production		794,69					0,95					NA			
2.D.	Other Production		NE													
2.G.	Other		NA					NA					NA			
3. Solvent and Other Product Use			**NE**										**3,41**			
4. Agriculture								**249,10**					**251,30**			
4.A.	Enteric Fermentation							229,14								
4.B.	Manure Management							19,96					25,53			
4.C.	Rice Cultivation							NA,NO								
4.D.	Agricultural Soils (3)							NA,NE					225,76			
4.E.	Prescribed Burning of Savannas							NA					NA			
4.F.	Field Burning of Agricultural Residues							NA,NO					NA,NO			
4.G.	Other							NA					NA			
5. Land Use, Land-Use Change and Forestry (net) (4)			**1.386,70**					49,14					415,40			
5.A.	Forest Land		-120,56										IE			
5.B.	Cropland		2,52													
5.C.	Grassland		1.815,00													
5.D.	Wetlands		141,42					49,14					21,70			
5.E.	Settlements															
5.F.	Other Land															
5.G.	Other		-451,68										393,70			

Note: All footnotes for this table are given at the end of the table on sheet 2.

TABLE 8(a) RECALCULATION - RECALCULATED DATA
(Sheet 2 of 2)

Recalculated year: Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2					CH_4					N_2O				
	Previous submission	Latest submission	Difference	Difference[(1)]	Impact of recalculation on total emissions [(2)]	Previous submission	Latest submission	Difference	Difference[(1)]	Impact of recalculation on total emissions [(2)]	Previous submission	Latest submission	Difference	Difference[(1)]	Impact of recalculation on total emissions [(2)]
	CO_2 equivalent (Gg)			(%)	(%)	CO_2 equivalent (Gg)			(%)	(%)	CO_2 equivalent (Gg)			(%)	(%)
6. Waste		**2,44**					162,54					7,40			
6.A. Solid Waste Disposal on Land		NE,NO					157,03								
6.B. Waste-water Handling							5,51					7,26			
6.C. Waste Incineration		2,44					NE					0,14			
6.D. Other		NA					NA					NA			
7. Other ***(as specified in Summary 1.A)***		124,08					NA					NA			
Memo Items:															
International Bunkers		**597,30**					**0,51**					**5,16**			
Multilateral Operations		**NO**					**NO**					**NO**			
CO_2 Emissions from Biomass		**NA,NO**													

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	HFCs					PFCs					SF_6				
	Previous submission	Latest submission	Difference	Difference[(1)]	Impact of recalculation on total emissions [(2)]	Previous submission	Latest submission	Difference	Difference[(1)]	Impact of recalculation on total emissions [(2)]	Previous submission	Latest submission	Difference	Difference[(1)]	Impact of recalculation on total emissions [(2)]
	CO_2 equivalent (Gg)			(%)	(%)	CO_2 equivalent (Gg)			(%)	(%)	CO_2 equivalent (Gg)			(%)	(%)
Total Actual Emissions		**NA,NE,NO**					**38,58**					**NA,NE,NO**			
2.C.3. Aluminium Production							38,58								
2.E. Production of Halocarbons and SF_6		NA,NO					NA,NO					NA,NO			
2.F. Consumption of Halocarbons and SF_6		NA,NE,NO					NA,NE,NO					NA,NE,NO			
2.G. Other		NA					NA					NA			
Potential Emissions from Consumption of HFCs/PFCs and SF_6		**58,40**					**NE,NO**					**5,38**			

	Previous submission	Latest submission	Difference	Difference[(1)]
	CO_2 equivalent (Gg)			(%)
Total CO2 Equivalent Emissions with Land Use, Land-Use Change and Forestry [(5)]		5.558,02		
Total CO2 Equivalent Emissions without Land Use, Land-Use Change and Forestry [(5)]		3.643,00		

[(1)] Estimate the percentage change due to recalculation with respect to the previous submission (Percentage change = 100 x [(LS-PS)/PS], where LS = Latest submission and PS = Previous submission. All cases of recalculation of the estimate of the source/sink category should be addressed and explained in table 8(b).

[(2)] Total emissions refer to total aggregate GHG emissions expressed in terms of CO_2 equivalent, excluding GHGs from the LULUCF sector. The impact of the recalculation on the total emissions is calculated as follows:
impact of recalculation (%) = 100 x [(source (LS) - source (PS))/total emissions (LS)], where LS = Latest submission, PS = Previous submission.

[(3)] Parties which previously reported CO_2 from soils in the Agriculture sector should note this in the NIR.

[(4)] Net CO_2 emissions/removals to be reported.

[(5)] The information in these rows is requested to facilitate comparison of data, because Parties differ in the way they report emissions and removals from Land Use, Land-Use Change and Forestry.

Documentation box:
Parties should provide detailed information on recalculations in Chapter 10: Recalculations and Improvements, and in the relevant sections of Chapters 3 to 9 (see section 2.5 of each of Chapters 3 - 9) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and further details are needed to understand the content of this table.

TABLE 8(b) RECALCULATION - EXPLANATORY INFORMATION
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

Specify the sector and source/sink category[1] where changes in estimates have occurred:		GHG	RECALCULATION DUE TO				
			CHANGES IN:			Addition/removal/ reallocation of source/sink categories	Other changes in data (e.g. statistical or editorial changes, correction of errors)
			Methods [2]	Emission factors [2]	Activity data [2]		

[1] Enter the identification code of the source/sink category (e.g. 1.B.1) in the first column and the name of the category (e.g. Fugitive Emissions from Solid Fuels) in the second column of the table. Note that the source categories entered in this table should match those used in table 8(a).
[2] Explain changes in methods, emission factors and activity data that have resulted in recalculation of the estimate of the source/sink as indicated in table 8(a). Include changes in the assumptions and coefficients in the Methods column.

Documentation box:
Parties should provide the full information on recalculations in Chapter 10: Recalculations and Improvements, and in the relevant sections of Chapters 3 to 9 (see section 2.5 of each of chapters 3 - 9) of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and further details are needed to understand the content of this table. References should point particularly to the sections of the NIR in which justifications of the changes as to improvements in the accuracy, completeness and consistency of the inventory are reported.

TABLE 9(a) COMPLETENESS - INFORMATION ON NOTATION KEYS
(Sheet 1 of 1)

Inventory 2004
Submission 2006 v1.2
ICELAND

Sources and sinks not estimated (NE)[1]			
GHG	**Sector[2]**	**Source/sink category [2]**	**Explanation**
Carbon	5 LULUCF	Grassland on mineral soil	
Carbon	5 LULUCF	Lakes and rivers	
Carbon	5 LULUCF	Peatland	
Carbon	5 LULUCF	Grassland on mineral soil	
Carbon	5 LULUCF	Lakes and rivers	
Carbon	5 LULUCF	Peatland	
Carbon	5 LULUCF	Plantations	
Carbon	5 LULUCF	Lakes and rivers	
Carbon	5 LULUCF	Peatland	
Carbon	5 LULUCF	Plantations	
Carbon	5 LULUCF	Grassland on mineral soil	
Carbon	5 LULUCF	Peatland	
CH4	1 Energy	1.B.2.A.5 Distribution of oil products	
CH4	1 Energy	1.AA.1.A Public Electricity and Heat Production	
CH4	1 Energy	1.AA.2.E Food Processing, Beverages and Tobacco	
CH4	1 Energy	1.C1.B Marine	
CH4	2 Industrial Processes	2.C.3 Aluminium Production	
CH4	2 Industrial Processes	2.A.7.CS.3 Mineral wool production	
CH4	2 Industrial Processes	Silicon Production	
CH4	4 Agriculture	4.A Enteric Fermentation	
CH4	4 Agriculture	4.D.1 Direct Soil Emissions	
CH4	4 Agriculture	4.D.3 Indirect Emissions	
CH4	6 Waste	6.B.1 Industrial Wastewater	
CH4	6 Waste	6.B.1 Industrial Wastewater	
CH4	6 Waste	6.B.1 Industrial Wastewater	
CH4	6 Waste	6.B.1 Industrial Wastewater	
CH4	6 Waste	6.B.2.1 Domestic and Commercial (w/o human sewage)	
CH4	6 Waste	6.B.2.1 Domestic and Commercial (w/o human sewage)	
CH4	6 Waste	6.C.1 Biogenic	
CH4	6 Waste	Plastics and other non-biogenic waste	
CO2	1 Energy	1.B.2.A.5 Distribution of oil products	
CO2	1 Energy	1.AA.2.E Food Processing, Beverages and Tobacco	
CO2	1 Energy	1.C1.B Marine	
CO2	2 Industrial Processes	2.A.6 Road Paving with Asphalt	
CO2	2 Industrial Processes	2.D.2 Food and Drink	
CO2	3 Solvent and Other Product Use	3.A Paint Application	
CO2	3 Solvent and Other Product Use	3.B Degreasing and Dry Cleaning	
CO2	3 Solvent and Other Product Use	Other non-specified	
CO2	5 LULUCF	Forest Land converted to Other Land-Use Categories	
CO2	5 LULUCF	Grassland converted to Other Land-Use Categories	
CO2	6 Waste	6.A.1 Managed Waste Disposal on Land	
CO2	6 Waste	6.A.2.2 shallow (<5 m)	
HFCs	2 Industrial Processes	2.F.4 Aerosols/ Metered Dose Inhalers	
N2O	1 Energy	1.AA.2.E Food Processing, Beverages and Tobacco	
N2O	1 Energy	1.C1.B Marine	
N2O	2 Industrial Processes	2.A.7.CS.3 Mineral wool production	
N2O	2 Industrial Processes	Silicon Production	
N2O	3 Solvent and Other Product Use	3.D.2 Fire Extinguishers	
N2O	3 Solvent and Other Product Use	3.D.3 N2O from Aerosol Cans	
N2O	4 Agriculture	4.D.1.5 Cultivation of Histosols	
N2O	6 Waste	6.B.1 Industrial Wastewater	
N2O	6 Waste	6.B.1 Industrial Wastewater	
N2O	6 Waste	6.B.1 Industrial Wastewater	
N2O	6 Waste	6.B.2.1 Domestic and Commercial (w/o human sewage)	
N2O	6 Waste	6.B.2.1 Domestic and Commercial (w/o human sewage)	
N2O	6 Waste	6.B.2.1 Domestic and Commercial (w/o human sewage)	
SF6	2 Industrial Processes	2.F.1 Refrigeration and Air Conditioning Equipment	
SF6	2 Industrial Processes	2.F.4 Aerosols/ Metered Dose Inhalers	
SF6	2 Industrial Processes	2.F.8 Electrical Equipment	
SF6	2 Industrial Processes	2.F.P2.2 In products	
SF6	2 Industrial Processes	2.F.P3.1 In bulk	
SF6	2 Industrial Processes	2.F.P3.2 In products	

Sources and sinks reported elsewhere (IE)[3]				
GHG	**Source/sink category**	**Allocation as per IPCC Guidelines**	**Allocation used by the Party**	**Explanation**
Carbon	Plantations			
N2O	rest Land remaining Forest Land			
N2O	2 Land converted to Forest Land			
N2O	Revegetation			

[1] Clearly indicate sources and sinks which are considered in the IPCC Guidelines but are not considered in the submitted inventory. Explain the reason for excluding these sources and sinks, in order to avoid arbitrary interpretations. An entry should be made for each source/sink category for which the notation key NE (not estimated) is entered in the sectoral tables.

[2] Indicate omitted source/sink following the IPCC source/sink category structure (e.g. sector: Waste, source category: Waste-Water Handling).

[3] Clearly indicate sources and sinks in the submitted inventory that are allocated to a sector other than that indicated by the IPCC Guidelines. Show the sector indicated in the IPCC Guidelines and the sector to which the source or sink is allocated in the submitted inventory. Explain the reason for reporting these sources and sinks in a different sector. An entry should be made for each source/sink for which the notation key IE (included elsewhere) is used in the sectoral tables.

TABLE 9(b) COMPLETENESS - INFORMATION ON ADDITIONAL GREENHOUSE GASES (Sheet 1 of 1)

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Additional GHG emissions reported[1]						
GHG	Source category	Emissions (Gg)	Estimated GWP value (100-year horizon)	Emissions CO_2 equivalent (Gg)	Reference to the source of GWP value	Explanation

[1] Parties are encouraged to provide information on emissions of greenhouse gases whose GWP values have not yet been agreed upon by the COP. Include such gases in this table if they are considered in the submitted inventory. Provide additional information on the estimation methods used.

Documentation box:
Parties should provide detailed information regarding completeness of the inventory in the NIR (Chapter 1.8: General Assessment of the Completeness, and Annex 5). Use this documentation box to provide references to relevant sections of the NIR if any additional information and further details are needed to understand the content of this table.

TABLE 10 EMISSIONS TRENDS (CO_2)
(Sheet 1 of 5)
(Part 1 of 2)

Inventory 2004
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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	**1.672,56**	**1.627,13**	**1.752,38**	**1.812,36**	**1.774,87**	**1.777,72**	**1.868,40**	**1.915,47**	**1.877,33**	**1.906,72**
A. Fuel Combustion (Sectoral Approach)	1.672,56	1.627,13	1.752,38	1.812,36	1.774,87	1.777,72	1.868,40	1.915,47	1.877,33	1.906,72
1. Energy Industries	20,70	22,28	21,29	22,35	22,22	24,61	20,00	15,27	37,64	20,64
2. Manufacturing Industries and Construction	361,05	285,42	338,63	365,40	344,24	358,05	398,89	467,81	441,43	466,69
3. Transport	600,13	611,43	621,54	622,17	624,79	600,44	590,81	602,47	605,24	626,84
4. Other Sectors	690,56	707,87	770,13	801,03	783,53	793,00	858,33	829,89	788,06	788,18
5. Other	0,12	0,14	0,78	1,42	0,10	1,62	0,38	0,03	4,95	4,36
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
2. Oil and Natural Gas	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
2. Industrial Processes	**392,66**	**359,37**	**362,43**	**409,86**	**410,71**	**427,14**	**426,21**	**484,91**	**512,73**	**659,07**
A. Mineral Products	52,34	48,71	45,74	39,73	37,45	37,96	41,87	46,64	54,49	61,52
B. Chemical Industry	0,36	0,31	0,25	0,24	0,35	0,46	0,40	0,44	0,40	0,43
C. Metal Production	339,96	310,34	316,43	369,89	372,91	388,72	383,94	437,83	457,84	597,12
D. Other Production	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Production of Halocarbons and SF_6										
F. Consumption of Halocarbons and SF_6										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4. Agriculture										
A. Enteric Fermentation										
B. Manure Management										
C. Rice Cultivation										
D. Agricultural Soils										
E. Prescribed Burning of Savannas										
F. Field Burning of Agricultural Residues										
G. Other										
5. Land Use, Land-Use Change and Forestry[(2)]	**1.630,65**	**1.619,54**	**1.606,88**	**1.591,78**	**1.579,61**	**1.568,19**	**1.556,61**	**1.539,74**	**1.524,38**	**1.503,42**
A. Forest Land	-33,88	-40,04	-46,64	-53,24	-59,40	-65,12	-70,40	-75,24	-80,96	-87,56
B. Cropland	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Grassland	1.815,00	1.815,00	1.815,00	1.815,00	1.815,00	1.815,00	1.815,00	1.815,00	1.815,00	1.815,00
D. Wetlands	141,42	141,42	141,42	141,42	141,42	141,42	141,42	141,42	141,42	141,42
E. Settlements										
F. Other Land										
G. Other	-291,89	-296,84	-302,90	-311,40	-317,41	-323,11	-329,41	-341,45	-351,08	-365,44
6. Waste	**18,84**	**18,69**	**18,19**	**15,49**	**14,27**	**12,59**	**11,28**	**10,87**	**9,21**	**7,53**
A. Solid Waste Disposal on Land	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
B. Waste-water Handling										
C. Waste Incineration	18,84	18,69	18,19	15,49	14,27	12,59	11,28	10,87	9,21	7,53
D. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7. Other *(as specified in Summary 1.A)*	**66,63**	**66,63**	**66,63**	**66,63**	**66,63**	**81,62**	**82,12**	**71,32**	**94,08**	**122,96**
Total CO2 emissions including net CO2 from LULUCF [(3)]	**3.781,35**	**3.691,36**	**3.806,50**	**3.896,12**	**3.846,10**	**3.867,26**	**3.944,62**	**4.022,31**	**4.017,73**	**4.199,70**
Total CO2 emissions excluding net CO2 from LULUCF [(3)]	**2.150,70**	**2.071,82**	**2.199,62**	**2.304,35**	**2.266,49**	**2.299,07**	**2.388,01**	**2.482,57**	**2.493,35**	**2.696,28**
Memo Items:										
International Bunkers	**318,65**	**259,64**	**263,56**	**293,02**	**307,10**	**380,15**	**395,45**	**440,80**	**514,67**	**527,25**
Aviation	219,65	221,99	203,62	195,64	213,62	236,15	271,51	292,12	338,13	363,37
Marine	99,00	37,65	59,95	97,38	93,49	144,00	123,95	148,68	176,54	163,88
Multilateral Operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO_2 Emissions from Biomass	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO

TABLE 10 EMISSIONS TRENDS (CO_2)
(Sheet 1 of 5)
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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	Change from base to latest reported year
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
1. Energy	**1.808,95**	**1.781,97**	**1.854,15**	**1.796,72**	**1.886,18**	**12,77**
A. Fuel Combustion (Sectoral Approach)	1.808,95	1.781,97	1.854,15	1.796,72	1.886,18	12,77
1. Energy Industries	14,41	14,54	15,13	14,07	19,29	-6,79
2. Manufacturing Industries and Construction	419,46	451,59	452,83	424,87	447,19	23,86
3. Transport	629,42	640,06	643,65	666,71	678,56	13,07
4. Other Sectors	741,05	656,26	720,24	675,62	725,28	5,03
5. Other	4,61	19,53	22,30	15,45	15,85	13.106,67
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
2. Oil and Natural Gas	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
2. Industrial Processes	**765,57**	**803,55**	**822,27**	**824,33**	**846,01**	**115,46**
A. Mineral Products	65,57	58,77	40,56	33,08	50,93	-2,69
B. Chemical Industry	0,41	0,49	0,45	0,48	0,39	7,93
C. Metal Production	699,60	744,28	781,25	790,78	794,69	133,76
D. Other Production	NE	NE	NE	NE	NE	0,00
E. Production of Halocarbons and SF_6						
F. Consumption of Halocarbons and SF_6						
G. Other	NA	NA	NA	NA	NA	0,00
3. Solvent and Other Product Use	NE	NE	NE	NE	NE	0,00
4. Agriculture						
A. Enteric Fermentation						
B. Manure Management						
C. Rice Cultivation						
D. Agricultural Soils						
E. Prescribed Burning of Savannas						
F. Field Burning of Agricultural Residues						
G. Other						
5. Land Use, Land-Use Change and Forestry[(2)]	**1.482,26**	**1.465,90**	**1.445,72**	**1.422,04**	**1.386,70**	**-14,96**
A. Forest Land	-93,72	-99,44	-106,48	-113,08	-120,56	255,84
B. Cropland	NE	NE	NE	2,36	2,52	100,00
C. Grassland	1.815,00	1.815,00	1.815,00	1.815,00	1.815,00	0,00
D. Wetlands	141,42	141,42	141,42	141,42	141,42	0,00
E. Settlements						0,00
F. Other Land						0,00
G. Other	-380,44	-391,08	-404,22	-423,67	-451,68	54,74
6. Waste	**7,08**	**6,57**	**6,10**	**5,20**	**2,44**	**-87,03**
A. Solid Waste Disposal on Land	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0,00
B. Waste-water Handling						
C. Waste Incineration	7,08	6,57	6,10	5,20	2,44	-87,03
D. Other	NA	NA	NA	NA	NA	0,00
7. Other *(as specified in Summary 1.A)*	**163,48**	**154,48**	**159,20**	**137,74**	**124,08**	**86,22**
Total CO2 emissions including net CO2 from LULUCF[(3)]	**4.227,35**	**4.212,46**	**4.287,44**	**4.186,04**	**4.245,42**	**12,27**
Total CO2 emissions excluding net CO2 from LULUCF[(3)]	**2.745,09**	**2.746,56**	**2.841,71**	**2.764,00**	**2.858,72**	**32,92**
Memo Items:						
International Bunkers	**626,29**	**498,17**	**517,17**	**509,59**	**597,30**	**87,45**
Aviation	407,74	349,13	309,85	330,02	370,26	68,57
Marine	218,55	149,04	207,32	179,57	227,04	129,34
Multilateral Operations	NO	NO	NO	NO	NO	0,00
CO_2 Emissions from Biomass	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00

Note: All footnotes for this table are given at the end of the table on sheet 5.

TABLE 10 EMISSIONS TRENDS (CH_4)
(Sheet 2 of 5)
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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
Total CH_4 emissions	**22,03**	**21,93**	**21,70**	**21,78**	**22,00**	**21,73**	**22,10**	**22,40**	**22,70**	**22,76**
1. Energy	0,22	0,23	0,24	0,24	0,24	0,22	0,23	0,20	0,20	0,17
A. Fuel Combustion (Sectoral Approach)	0,22	0,23	0,24	0,24	0,24	0,22	0,23	0,20	0,20	0,17
1. Energy Industries	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2. Manufacturing Industries and Construction	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,02
3. Transport	0,15	0,15	0,16	0,16	0,16	0,13	0,13	0,11	0,11	0,08
4. Other Sectors	0,06	0,06	0,07	0,07	0,07	0,07	0,08	0,08	0,07	0,07
5. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
2. Oil and Natural Gas	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
2. Industrial Processes	**0,03**	**0,02**	**0,02**	**0,03**	**0,03**	**0,03**	**0,03**	**0,03**	**0,02**	**0,03**
A. Mineral Products	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE
B. Chemical Industry	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
C. Metal Production	0,03	0,02	0,02	0,03	0,03	0,03	0,03	0,03	0,02	0,03
D. Other Production										
E. Production of Halocarbons and SF_6										
F. Consumption of Halocarbons and SF_6										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use										
4. Agriculture	**13,97**	**13,67**	**13,26**	**13,18**	**13,25**	**12,85**	**12,96**	**13,12**	**13,28**	**13,16**
A. Enteric Fermentation	12,85	12,57	12,18	12,11	12,19	11,79	11,90	12,06	12,20	12,09
B. Manure Management	1,11	1,10	1,08	1,07	1,07	1,06	1,06	1,07	1,08	1,07
C. Rice Cultivation	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
D. Agricultural Soils	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE
E. Prescribed Burning of Savannas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F. Field Burning of Agricultural Residues	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Land Use, Land-Use Change and Forestry	**2,34**	**2,34**	**2,34**	**2,34**	**2,34**	**2,34**	**2,34**	**2,34**	**2,34**	**2,34**
A. Forest Land										
B. Cropland										
C. Grassland										
D. Wetlands	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
E. Settlements										
F. Other Land										
G. Other										
6. Waste	**5,47**	**5,66**	**5,84**	**5,99**	**6,14**	**6,29**	**6,54**	**6,70**	**6,85**	**7,06**
A. Solid Waste Disposal on Land	5,41	5,60	5,77	5,92	6,07	6,22	6,47	6,63	6,77	6,95
B. Waste-water Handling	0,06	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,09	0,11
C. Waste Incineration	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7. Other *(as specified in Summary 1.A)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Memo Items:										
International Bunkers	0,01	0,01	0,01	0,01	0,01	0,02	0,01	0,02	0,02	0,02
Aviation	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Marine	0,01	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02
Multilateral Operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO_2 Emissions from Biomass										

TABLE 10 EMISSIONS TRENDS (CH_4)
(Sheet 2 of 5)
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ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	Change from base to latest reported year
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
Total CH_4 emissions	**22,54**	**22,74**	**22,87**	**22,20**	**22,16**	**0,59**
1. Energy	0,17	0,16	0,17	0,17	0,17	-23,59
A. Fuel Combustion (Sectoral Approach)	0,17	0,16	0,17	0,17	0,17	-23,59
1. Energy Industries	0,00	0,00	0,00	0,00	0,00	-14,42
2. Manufacturing Industries and Construction	0,02	0,02	0,02	0,02	0,01	19,12
3. Transport	0,08	0,08	0,08	0,09	0,09	-40,97
4. Other Sectors	0,07	0,06	0,07	0,06	0,07	7,92
5. Other	0,00	0,00	0,00	0,00	0,00	13.215,27
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
2. Oil and Natural Gas	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
2. Industrial Processes	**0,04**	**0,04**	**0,05**	**0,04**	**0,05**	**56,47**
A. Mineral Products	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	0,00
B. Chemical Industry	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0,00
C. Metal Production	0,04	0,04	0,05	0,04	0,05	56,47
D. Other Production						
E. Production of Halocarbons and SF_6						
F. Consumption of Halocarbons and SF_6						
G. Other	NA	NA	NA	NA	NA	0,00
3. Solvent and Other Product Use						
4. Agriculture	**12,60**	**12,56**	**12,26**	**12,05**	**11,86**	**-15,07**
A. Enteric Fermentation	11,56	11,53	11,27	11,08	10,91	-15,11
B. Manure Management	1,04	1,03	0,99	0,97	0,95	-14,61
C. Rice Cultivation	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
D. Agricultural Soils	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	0,00
E. Prescribed Burning of Savannas	NA	NA	NA	NA	NA	0,00
F. Field Burning of Agricultural Residues	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
G. Other	NA	NA	NA	NA	NA	0,00
5. Land Use, Land-Use Change and Forestry	**2,34**	**2,34**	**2,34**	**2,34**	**2,34**	**0,00**
A. Forest Land						0,00
B. Cropland						0,00
C. Grassland						0,00
D. Wetlands	2,34	2,34	2,34	2,34	2,34	0,00
E. Settlements						0,00
F. Other Land						0,00
G. Other						0,00
6. Waste	**7,39**	**7,63**	**8,06**	**7,60**	**7,74**	**41,54**
A. Solid Waste Disposal on Land	7,24	7,48	7,80	7,34	7,48	38,26
B. Waste-water Handling	0,15	0,15	0,26	0,26	0,26	334,21
C. Waste Incineration	NE	NE	NE	NE	NE	0,00
D. Other	NA	NA	NA	NA	NA	0,00
7. Other *(as specified in Summary 1.A)*	**NA**	**NA**	**NA**	**NA**	**NA**	**0,00**
Memo Items:						
International Bunkers	0,02	0,02	0,02	0,02	0,02	120,64
Aviation	0,00	0,00	0,00	0,00	0,00	68,55
Marine	0,02	0,01	0,02	0,02	0,02	129,19
Multilateral Operations	NO	NO	NO	NO	NO	0,00
CO_2 Emissions from Biomass						

Note: All footnotes for this table are given at the end of the table on sheet 5.

TABLE 10 EMISSIONS TRENDS (N_2O)
(Sheet 3 of 5)
(Part 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
Total N_2O emissions	**2,52**	**2,49**	**2,42**	**2,45**	**2,46**	**2,45**	**2,51**	**2,51**	**2,50**	**2,57**
1. Energy	**0,09**	**0,08**	**0,08**	**0,09**	**0,09**	**0,12**	**0,12**	**0,16**	**0,16**	**0,19**
A. Fuel Combustion (Sectoral Approach)	0,09	0,08	0,08	0,09	0,09	0,12	0,12	0,16	0,16	0,19
1. Energy Industries	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2. Manufacturing Industries and Construction	0,05	0,05	0,05	0,05	0,05	0,06	0,06	0,07	0,07	0,08
3. Transport	0,02	0,02	0,02	0,02	0,02	0,04	0,04	0,06	0,06	0,09
4. Other Sectors	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02
5. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Fugitive Emissions from Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
2. Oil and Natural Gas	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
2. Industrial Processes	**0,16**	**0,15**	**0,14**	**0,14**	**0,14**	**0,14**	**0,16**	**0,13**	**0,12**	**0,12**
A. Mineral Products	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE
B. Chemical Industry	0,16	0,15	0,14	0,14	0,14	0,14	0,16	0,13	0,12	0,12
C. Metal Production	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
D. Other Production										
E. Production of Halocarbons and SF_6										
F. Consumption of Halocarbons and SF_6										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	0,02	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,02	0,02
4. Agriculture	**0,90**	**0,87**	**0,82**	**0,84**	**0,85**	**0,82**	**0,85**	**0,84**	**0,85**	**0,87**
A. Enteric Fermentation										
B. Manure Management	0,11	0,10	0,10	0,10	0,10	0,09	0,09	0,09	0,09	0,09
C. Rice Cultivation										
D. Agricultural Soils	0,79	0,77	0,73	0,74	0,76	0,73	0,76	0,75	0,75	0,78
E. Prescribed Burning of Savannas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F. Field Burning of Agricultural Residues	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Land Use, Land-Use Change and Forestry	**1,34**	**1,34**	**1,34**	**1,34**	**1,34**	**1,34**	**1,34**	**1,34**	**1,34**	**1,34**
A. Forest Land	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
B. Cropland										
C. Grassland										
D. Wetlands	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07
E. Settlements										
F. Other Land										
G. Other	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27	1,27
6. Waste	**0,02**	**0,02**	**0,02**	**0,02**	**0,02**	**0,02**	**0,02**	**0,02**	**0,02**	**0,02**
A. Solid Waste Disposal on Land										
B. Waste-water Handling	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02
C. Waste Incineration	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7. Other *(as specified in Summary 1.A)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Memo Items:										
International Bunkers	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**
Aviation	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Marine	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Multilateral Operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO_2 Emissions from Biomass										

Note: All footnotes for this table are given at the end of the table on sheet 5.

TABLE 10 EMISSIONS TRENDS (N_2O)
(Sheet 3 of 5)
(Part 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	Change from base to latest reported year
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
Total N_2O emissions	**2,49**	**2,47**	**2,36**	**2,34**	**2,40**	**-4,70**
1. Energy	**0,19**	**0,19**	**0,19**	**0,20**	**0,22**	**152,48**
A. Fuel Combustion (Sectoral Approach)	0,19	0,19	0,19	0,20	0,22	152,48
1. Energy Industries	0,00	0,00	0,00	0,00	0,00	979,89
2. Manufacturing Industries and Construction	0,08	0,08	0,08	0,08	0,10	95,29
3. Transport	0,09	0,09	0,09	0,10	0,10	477,94
4. Other Sectors	0,02	0,02	0,02	0,02	0,02	8,11
5. Other	0,00	0,00	0,00	0,00	0,00	13.215,27
B. Fugitive Emissions from Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
2. Oil and Natural Gas	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
2. Industrial Processes	**0,06**	**0,05**	**NA,NE,NO**	**NA,NE,NO**	**NA,NE,NO**	**-100,00**
A. Mineral Products	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	0,00
B. Chemical Industry	0,06	0,05	NE,NO	NE,NO	NE,NO	-100,00
C. Metal Production	NA	NA	NA	NA	NA	0,00
D. Other Production						
E. Production of Halocarbons and SF_6						
F. Consumption of Halocarbons and SF_6						
G. Other	NA	NA	NA	NA	NA	0,00
3. Solvent and Other Product Use	0,01	0,01	0,01	0,01	0,01	-43,15
4. Agriculture	**0,85**	**0,84**	**0,79**	**0,76**	**0,81**	**-9,56**
A. Enteric Fermentation						
B. Manure Management	0,09	0,09	0,08	0,08	0,08	-21,94
C. Rice Cultivation						
D. Agricultural Soils	0,77	0,76	0,71	0,68	0,73	-7,91
E. Prescribed Burning of Savannas	NA	NA	NA	NA	NA	0,00
F. Field Burning of Agricultural Residues	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0,00
G. Other	NA	NA	NA	NA	NA	0,00
5. Land Use, Land-Use Change and Forestry	**1,34**	**1,34**	**1,34**	**1,34**	**1,34**	**0,00**
A. Forest Land	IE	IE	IE	IE	IE	0,00
B. Cropland						0,00
C. Grassland						0,00
D. Wetlands	0,07	0,07	0,07	0,07	0,07	0,00
E. Settlements						0,00
F. Other Land						0,00
G. Other	1,27	1,27	1,27	1,27	1,27	0,00
6. Waste	**0,02**	**0,02**	**0,02**	**0,02**	**0,02**	**0,24**
A. Solid Waste Disposal on Land						
B. Waste-water Handling	0,02	0,02	0,02	0,02	0,02	14,70
C. Waste Incineration	0,00	0,00	0,00	0,00	0,00	-87,03
D. Other	NA	NA	NA	NA	NA	0,00
7. Other *(as specified in Summary 1.A)*	**NA**	**NA**	**NA**	**NA**	**NA**	**0,00**
Memo Items:						
International Bunkers	**0,02**	**0,01**	**0,01**	**0,01**	**0,02**	**86,93**
Aviation	0,01	0,01	0,01	0,01	0,01	68,55
Marine	0,01	0,00	0,01	0,00	0,01	129,19
Multilateral Operations	NO	NO	NO	NO	NO	0,00
CO_2 Emissions from Biomass						

Note: All footnotes for this table are given at the end of the table on sheet 5.

TABLE 10 EMISSION TRENDS (HFCs, PFCs and SF_6)
(Sheet 4 of 5)
(Part 1 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
Emissions of HFCs(4) - (Gg CO_2 equivalent)	**NA,NE,NO**	**NA,NE,NO**	**0,47**	**1,56**	**3,12**	**25,01**	**28,56**	**37,46**	**63,90**	**59,40**
HFC-23	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-32	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-41	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-43-10mee	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-125	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-134	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-134a	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-152a	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-143	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-143a	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-227ea	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-236fa	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
HFC-245ca	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
Unspecified mix of listed HFCs(5) - (Gg CO_2 equivalent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emissions of PFCs(4) - (Gg CO_2 equivalent)	**419,63**	**348,34**	**155,28**	**74,86**	**44,57**	**58,84**	**25,15**	**82,36**	**180,13**	**173,21**
CF_4	0,05	0,05	0,02	0,01	0,01	0,01	0,00	0,01	0,02	0,02
C_2F_6	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
C_3F_8	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
C_4F_{10}	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
c-C_4F_8	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
C_5F_{12}	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
C_6F_{14}	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
Unspecified mix of listed PFCs(5) - (Gg CO_2 equivalent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emissions of SF6(4) - (Gg CO_2 equivalent)	**5,38**	**5,38**	**5,38**	**5,38**	**5,38**	**5,38**	**5,38**	**5,38**	**5,38**	**5,38**
SF_6	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO

TABLE 10 EMISSION TRENDS (HFCs, PFCs and SF_6)
(Sheet 4 of 5)
(Part 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	Change from base to latest reported year
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
Emissions of HFCs[(4)] - (Gg CO_2 equivalent)	**32,28**	**53,78**	**35,16**	**69,35**	**58,40**	**100,00**
HFC-23	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-32	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-41	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-43-10mee	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-125	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-134	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-134a	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-152a	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-143	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-143a	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-227ea	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-236fa	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
HFC-245ca	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
Unspecified mix of listed HFCs[(5)] - (Gg CO_2 equivalent)	NA	NA	NA	NA	NA	0,00
Emissions of PFCs[(4)] - (Gg CO_2 equivalent)	**127,16**	**91,66**	**72,54**	**59,78**	**38,58**	**-90,81**
CF_4	0,02	0,01	0,01	0,01	0,01	-90,81
C_2F_6	0,00	0,00	0,00	0,00	0,00	-90,81
C_3F_8	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
C_4F_{10}	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
$c\text{-}C_4F_8$	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
C_5F_{12}	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
C_6F_{14}	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00
Unspecified mix of listed PFCs[(5)] - (Gg CO_2 equivalent)	NA	NA	NA	NA	NA	0,00
Emissions of SF6[(4)] - (Gg CO_2 equivalent)	**5,38**	**5,38**	**5,38**	**5,38**	**5,38**	**0,00**
SF_6	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0,00

Note: All footnotes for this table are given at the end of the table on sheet 5.

TABLE 10 EMISSION TRENDS (SUMMARY)
(Sheet 5 of 5)
(Part 2 of 2)

Inventory 2004
Submission 2006 v1.2
ICELAND

GREENHOUSE GAS EMISSIONS	2000	2001	2002	2003	2004	Change from base to latest reported year
	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(%)
CO2 emissions including net CO_2 from LULUCF[3]	4.227,35	4.212,46	4.287,44	4.186,04	4.245,42	12,27
CO2 emissions excluding net CO_2 from LULUCF[3]	2.745,09	2.746,56	2.841,71	2.764,00	2.858,72	32,92
CH_4	473,36	477,45	480,26	466,13	465,31	0,59
N_2O	770,52	764,22	730,81	724,20	744,94	-4,70
HFCs	32,28	53,78	35,16	69,35	58,40	100,00
PFCs	127,16	91,66	72,54	59,78	38,58	-90,81
SF_6	5,38	5,38	5,38	5,38	5,38	0,00
Total (including net CO_2 from LULUCF)[3]	**5.636,05**	**5.604,94**	**5.611,58**	**5.510,88**	**5.558,02**	**1,97**
Total (excluding net CO_2 from LULUCF)[3], [6]	**4.153,79**	**4.139,04**	**4.165,86**	**4.088,84**	**4.171,32**	**9,20**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	Change from base to latest reported year
	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	CO_2 equivalent (Gg)	(%)
1. Energy	1.872,62	1.844,66	1.916,25	1.861,43	1.957,19	14,86
2. Industrial Processes	949,96	971,41	936,31	959,77	949,33	9,54
3. Solvent and Other Product Use	4,53	4,03	4,03	3,72	3,41	-43,15
4. Agriculture	528,96	525,67	502,78	489,45	500,40	-12,39
5. Land Use, Land-Use Change and Forestry[7]	1.946,80	1.930,44	1.910,26	1.886,58	1.851,24	-11,64
6. Waste	169,71	174,25	182,75	172,18	172,38	22,20
7. Other	163,48	154,48	159,20	137,74	124,08	86,22
Total (including LULUCF)[7]	**5.636,05**	**5.604,94**	**5.611,58**	**5.510,88**	**5.558,02**	**1,97**

[1] The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the COP. For these Parties, this different base year is

[2] Fill in net emissions/removals as reported in table Summary 1.A. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

[3] The information in these rows is requested to facilitate comparison of data, because Parties differ in the way they report CO_2 emissions and removals from LULUCF.

[4] Enter actual emissions estimates. If only potential emissions estimates are available, these should be reported in this table and an indication for this be provided in the documentation box. Only in these rows are the emissions expressed as CO_2 equivalent emissions.

[5] In accordance with the UNFCCC reporting guidelines, HFC and PFC emissions should be reported for each relevant chemical. However, if it is not possible to report values for each chemical (i.e. mixtures, confidential data, lack of disaggregation), this row could be used for reporting aggregate figures for HFCs and PFCs, respectively. Note that the unit used for this row is Gg of CO_2 equivalent and that appropriate notation keys should be entered in the cells for the individual chemicals.

[6] These totals will differ from the totals reported in table Summary 2 if Parties report non-CO_2 emissions from LULUCF.

[7] Includes net CO_2, CH_4 and N_2O from LULUCF.

Documentation box:
• Parties should provide detailed explanations on emissions trends in Chapter 2: Trends in Greenhouse Gas Emissions and, as appropriate, in the corresponding Chapters 3 - 9 of the NIR. Use this documentation box to provide references to relevant sections of the NIR if any additional information and further details are needed to understand the content of
• Use the documentation box to provide explanations if potential emissions are reported.