Iceland's
Seventh National Communication and
Third Biennial Report

**Under the United Nations Framework
Convention on Climate Chance**

UMHVERFIS- OG
AUDLINDARÁDUNEYTID

*Ministry for the Environment
and Natural Resources*

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Table of content

Index of figures

Index of tables

1 Executive summary

This report covers Iceland‘s Seventh National Communication and Third Biennial Report as required under the Framework Convention on Climate Change and the Kyoto Protocol. The Third Biennial report is attached as an annex (Annex I). The report was prepared in accordance with UNFCCC guidelines.

The latest National Inventory Report (NIR) for greenhouse gases was submitted in April 2017.

Iceland has ratified the UNFCCC, the Kyoto Protocol and the Doha amendment to the Kyoto Protocol. Iceland ratified the Paris Agreement in September 2016.

National circumstances

Iceland is a parliamentary democracy. Most executive power rests with the Government, which traditionally is supported by a majority of Althingi, the Parliament. Althingi has 63 members, and parliamentary elections are held every four years. A president is elected by direct popular vote for a term of four years, with no term limit. The country is divided into 74 municipalities, and local authorities are elected every four years.

The population of Iceland was 338.349 on January 1st 2017. The growth from 1990 to 2015 was 30%. A medium estimate predicts that the population will have reached around 436.000 in 2050. Iceland is the second-largest island in Europe and the third largest in the Atlantic Ocean, with a land area of 103,000 square kilometres. Iceland is the most sparsely populated country in Europe with a population density of three inhabitants per square kilometre. Settlement in Iceland is primarily along the coast. Around 63% of the nation lives in the capital area.

Iceland is situated just south of the Arctic Circle. The mean temperature is considerably higher than might be expected at this latitude. Relatively mild winters and cool summers characterize Iceland’s oceanic climate. The average monthly temperature varies from -3 to +3 °C in January and from +8 to +15°C in July. Storms and rain are frequent, with annual precipitation ranging from 400 to 4000 mm on average annually, depending on location. The amount of daylight varies greatly between the seasons. For two to three months in the summer there is almost continuous daylight.

The Mid-Atlantic Ridge runs across Iceland from the south-west to the north-east. This area is characterized by volcanic activity, which also explains the abundance of geothermal resources. Glaciers are a distinctive feature of Iceland, covering about 10% of the total land area. Soil erosion and desertification have resulted in a disappearance of more than half of the vegetation cover since the settlement of Iceland. Remnants of the former woodlands now cover less than 2% of the total surface area.

Iceland has access to rich marine resources in the country’s 758,000-km^2 exclusive economic zone. Iceland is the 19th largest fishing nation in the world and the marine sector is one of the main economic sectors and backbone of export activities. Total allowable catches are issued with the aim of promoting conservation and efficient utilization of the marine resources. All commercially important species are regulated within the system. A comprehensive fisheries management system based on individual transferable quotas has been developed.

Iceland has extensive domestic energy sources in the form of hydro and geothermal energy. Oil has almost disappeared as a source of energy for space heating and domestic energy has replaced oil in industry and in other fields where such replacement is feasible and economically viable. Iceland ranks first among OECD countries in the per capita consumption of primary energy, which can largely be explained by power intensive industries and the high proportion of geothermal energy in the energy mix. Production of non-ferrous metals accounts for 79% of the electricity consumption in 2015.

Tourism has increased rapidly the last few years with increase every year, demonstrated by the total number of foreign visitors in 2016 was 1.8 million, a 39% increase from 2015, when foreign visitors numbered around 1.3 million. This increase is also reflected in the GDP figures as the share of the tourism industry in the total GDP was 8,4% in 2016, compared to 6,75 in 2015 and 5,6% in 2014.

In 2016 the tourism industry was the largest export industry in Iceland accounted for 39.2% and the power intensive industry came second with 22,7%.

The domestic transportation network consists of roads and air transportation. Private car ownership is widespread. Aviation plays a key role in Iceland. The country's geographical location makes undisturbed international air transportation imperative. Domestic aviation is also important because of long travel distances within the country combined with a small population.

Greenhouse gas inventory information

Iceland's total emissions of greenhouse gases, excluding LULUCF, were 4,538 kt. CO_2-equivalent in 2015.

Carbon dioxide dominated (74%), followed by CH_4 (12%), N_2O (7%) and fluorinated gases PFCs (2%), HFCs (5%), and SF_6(0,03%). In the year 2015, the changes in gas emissions compared to 1990 levels for PFCs and have decreased significantly -79% and -16% respectively. CO_2 have increased the most or by 56%

The largest source of emission comes from industrial processes, followed by the energy sector, agriculture and waste. Changes in greenhouse gas emission from 1990 to 2015, without LULUCF was 28.15% and the changes between 2014 and 2015 was 1.88%.

The emissions peaked in 2008 with a period where there was drop in the total emission (without LULUCF) but the total emission increased between 2014 and 2015. The main driver behind increased emissions was the development of primary production of non-ferrous metal. Other drivers are population increase, growth in GDP and increased tourism.

Iceland has met its obligations during the first commitment period of the Kyoto protocol, 2008–2012. Iceland's Kyoto obligation was to keep GHG emissions during the commitment period within 10% above 1990 levels. Emissions of additional CO_2 up to a 1.6 Mt per annum from new heavy industry originating after 1990 was authorized by Decision 14/CP.7, on the Impact of Single Projects, if the industry meets the prescribed conditions.

Decision 14/CP.7 on the "Impact of single project on emissions in the commitment period" allowed Iceland to report certain industrial process carbon dioxide emissions separately and not include them in national totals; to the extent they caused Iceland to exceed its assigned amount. For the first commitment period, from 2008 to 2012, the carbon dioxide emissions falling under decision 14/CP.7 were not to exceed 8,000,000 tonnes.

Policies and measures

A Climate Change Strategy was adopted by the Icelandic government in 2007. The strategy was conceived as a framework for action and government involvement in climate change issues. A long-term vision was set forth for the reduction of net emissions of greenhouse gases by 50-75% until the year 2050, using 1990 as a base year. Emphasis is placed on reducing net emissions by the most economical means possible and in a way that provides additional benefits, by actions such as including the introduction of new low- and zero-carbon technology, economic instruments, carbon sequestration in vegetation and soil, and financing climate-friendly measures in other countries.

A Climate Change Action Plan was endorsed by the government in 2010. The Action Plan is a main instrument for defining and implementing actions to reduce emissions of greenhouse gases and enhance carbon sequestration.

The EU Emissions Trading Scheme (EU-ETS) was transposed into Icelandic law in 2011. Aviation became part of the emission trading system in 2012 and primary production of non-ferrous metals in 2013. The emission trading system covers about 40% of emissions from Iceland in 2015. A carbon tax on fossil fuel use was introduced in 2010. The tax is levied on fossil fuels in liquid or gaseous form with respect to the carbon content of the fuels. With these measures more than 90% of CO_2 emissions are covered by economic instruments in Iceland.

Various changes have been made in taxes and levies with the aim of reducing emissions from transportation. The excise duty on passenger cars and the semi-annual road tax are now based on carbon dioxide emissions. The Director of Customs is authorized at clearance to waive VAT on electric or hydrogen vehicles up to a certain maximum and there are special provisions regarding the excise duty and semi-annual road tax for vehicles that drive on methane gas. A minimum of 5% renewable fuel of the total energy content of the fuel for land transportation is required as of 1 January 2015. Efforts have been made regarding official procurement of low-carbon and fue lefficient vehicles, and increased share of public transport, walking and bicycling in transport.

The policy on waste management is manifested in in national plans and in legislation.

By 2020 bio-waste going to landfills must be reduced to 35% of the total amount of bio-waste produced in 1995.

Recovery of waste has increased, and primitive waste incinerators and unmanaged landfills have been closed. Waste management in Iceland has undergone positive changes in the past but nowadays there are several indications that authorities should be alert in this policy area. With increased prosperity waste generation is on the rise and the implementation of the circular economy could be challenging. Landfill gas is collected at Iceland‘s largest landfill, and the methane is used for powering vehicles in the capital area.

Iceland selected revegetation as an activity in the land-use, land-use change and forestry sector for the first commitment period of the Kyoto protocol. Sequestration of carbon in vegetation and soil is among four main objectives stated in the action plan.

Afforestation on at least 5% of land area below 400 m above sea level should be aimed at.

Projections

According to the projection published in this report it is most likely that the total emission in Iceland will increase substantially to 2030 or up to 53% according to base case scenario and 71% in scenario 3 (mid case). The main increase will occur in the industry sector based on new power intensive industry that is in the pipelines. The power intensive industry is regulated under the ETS-system. If the emission under the ETS-system is left out there will be drop in the total emission. All implemented measures are included in the projection.

There are many mitigation options available in all sectors, but they differ in both cost and effect.

The total emissions of greenhouse gases in Iceland (excl. LULUCF) were estimated to be 3,541 kt. CO_2-eq. in 1990 and 4,536 kt. CO_2-eq. in 2015. This corresponds to an increase of around 28% over the time period.

The largest contributor of greenhouse gas emissions in Iceland in 2015 when excluding LULUCF were industrial Processes, followed by the energy sector, then agriculture and waste. From 1990 to 2015, the contribution of Industrial Processes increased from 27% to 45%, emissions from the Energy sector decreased from 50% to 37% during the same period.

Emissions from industrial processes were estimated to account for 45%, the energy sector for 37% of the national total emissions in 2015, agriculture for 13% and the waste sector was estimated to account for 5%.

The largest contributor by far to total GHG emissions in 2015 is CO_2 (74%), followed by CH_4 (12%), N_2O (7%) and fluorinated gases PFCs (2%), HFCs (5%), and SF_6(0,03%). In the year 2015, the changes in gas emissions compared to 1990 levels for PFCs and have decreased significantly -79% and -16% respectively. CO_2 have increased the most or by 56%.

Industrial processes, road transport and commercial fishing are the three main sources of CO_2 emissions in Iceland.

CO_2 emissions from road transport have increased by 59% since 1990, owing to increases in population, number of cars per capita, more mileage driven, and - until 2007 - an increase in the share of larger vehicles. Since 1990 the vehicle fleet in Iceland has increased by 78%. Emissions from both domestic flights and navigation have declined since 1990.

Hydrofluorocarbons (HFCs) are used foremost as refrigerants in Iceland and are banned for most other uses. The HFCs are substitutes for ozone depleting substances and their emissions and stock in the refrigeration systems have increased after imports started in 1993. In response to the phase-out of ODS like chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) the use of HFCs increased until 2010. Import numbers decreased strongly in 2011, causing only a slight decrease in emissions due to the time lag between refrigerant use and leakage. Refrigeration and air-conditioning were by far the largest sources of HFC emissions and the fishing industry plays an eminent role.

Since 2005 emissions from agriculture have increased by 8% due to an increase in livestock population size but still remain 5% below 1990 levels. This general trend is modified by the amount of synthetic nitrogen applied annually to agricultural soils. The largest sources of agricultural greenhouse gas emissions in 2015 were from enteric fermentation 49%, 34% from agricultural soils and manure management accounted for 17% of total agriculture emissions are methane and nitrous oxide emissions from manure management.

Dominant greenhouse gas emissions in the waste sector or 88%, are methane emissions from solid waste disposal on land. Other sources accounting for the remaining 11% of the emissions are waste water handling, incineration and biological treatment of solid waste. Key drivers for the emissions are therefore the composition and amount of landfilled waste.

Land use, land use change and forestry is a sector of major importance and has figured prominently in Iceland's climate policy from the start. Opportunities for mitigation efforts by carbon sequestration through afforestation and revegetation are abundant, and rewetting of drained wetlands provides possibilities for halting carbon dioxide emissions.

A Parliament resolution was passed in 2002 on a revegetation action plan. Sequestration of carbon in vegetation and soil was among four main objectives stated in the action plan. The action plan set the framework for revegetation activities in the period 2003 – 2014.

Impacts and adaptation measures

Since the 1980s, Iceland has experienced considerable warming, and early in the 21st century temperatures reached values comparable to those observed in the 1930s. The warmest year in the series was 2016. While there are pronounced inter-decadal temperature swings in Iceland, the long term warming rate in Iceland is similar to the global one, suggesting that the recent warming is a combination of local variability and large-scale background warming.

Recently a precipitation records for the whole of Iceland during the last decades of the 20th century has been established using high resolution atmospheric reanalysis. The results show significant decadal variations in precipitation, and a tendency for higher amounts of precipitation during warmer decades. The long-term station records indicate that precipitation tends to increase by 4% to 8% for each degree of warming. Furthermore, several new studies suggest an increase in the precipitation intensity during the recent warming episode.

Based on the results of the Climate models, the warming observed is expected to continue. The warming rates differ between emission scenarios and between models. An analysis of the CMIP5 RCP scenarios for many models showed that over the 21st century the warming rate is likely to be 2 – 4 °C on average and precipitation increase to be 2 – 3%. The uncertainty range is quite large, for temperature the span between the 5th and 95th percentile ranges was 4 – 5 °C but for precipitation 20 – 30%.

Studies on regional sea level rise reveal indicate that the sea level rise in Iceland may be quite different from the global average. The main reason for this is that the melting of the Greenland ice sheet will affect the gravitational field around Greenland in a way that, with other things being equal, would lower sea level in the vicinity of Greenland. This effect can be calculated given assumptions about glacial melt, and its "fingerprint" mapped. When other changes, such as the thermal expansion of the oceans and the residual isostatic adjustment from the last glaciation are factored in, sea level in the vicinity of Greenland does actually rise, but less than the global average.

There are long term time series from quarterly observations, since 1983, of ocean carbon dioxide at two sites near Iceland which differ significantly in oceanographic characteristics. The time series are invaluable for assessing long term trends and rates of change. They reveal rapid ocean acidification in the Iceland Sea at 68°N. The surface pH there falls 50% faster than is observed in the sub-tropical Atlantic. The rapid rate of change is because the Iceland Sea is a strong sink for carbon dioxide and the sea water is cold and relatively poorly buffered. The sea water calcium carbonate saturation state is low in these waters and it falls with the lowering pH. The calcium carbonate saturation horizon which lies at about 1700 m is shoaling which results in large areas of sea floor becoming exposed to undersaturated waters with respect to aragonite (calcium carbonate). At shallower depths the sea water saturation state is falling with unknown consequences for benthic calcifying organisms.

Glaciers are a distinctive feature of Iceland, covering about 10% of the total land area. The largest glacier is Vatnajökull in southeast Iceland with an area of 7,800 km^2. Climate changes are likely to have a substantial effect on glaciers and lead to major runoff changes in Iceland. The changes in glacier runoff are already substantial and expected to increase in the future and they are one of the most important consequences of future climate changes in Iceland. The runoff increase may, for example, have practical implications for the design and operation of hydroelectric power plants.

Rapid retreat of glaciers does not only influence glacier runoff but leads to changes in fluvial erosion from currently glaciated areas, and changes in the courses of glacier rivers, which may affect roads and other communication lines. A recent example of this is the change in drainage from Skeiðarárjökull, a south flowing outlet glacier from Vatnajökull ice cap. Due to thinning and retreat of the glacier the outlet of the river Skeiðará moved west in 2009 along the glacier and the river merged into another river, Gígjukvísl. As a consequence, little water now flows under the bridge over Skeiðará, the longest bridge in Iceland. In addition, glacier melting is of international interest due to the contribution of glaciers and small ice caps to rising sea level. Regular monitoring shows that today, all non-surging glaciers in Iceland are retreating

Climate change impacts on infra-structure sectors are the subject of ongoing studies. While the results of these studies show that significant impacts can be expected plans for adaptation to climate change are in most cases not well developed. The most notable exception is the Icelandic Power Company but the likely impacts of expected climate change are taken fully into account in their operational strategies and investment planning.

Financial assistance and transfer of technology

International development cooperation is one of the key pillars of Iceland's foreign policy, with the main goal of contributing to the fight against poverty in the world's poorest countries and guided by the Sustainable Development Goals (SDGs).

In line with best practices in development cooperation and OECD-DAC guidelines thereto, all cooperation in bilateral partner countries is based on close cooperation with local communities and their needs and is based on detailed needs assessment. The same preconditions apply to the activities of multilateral partners. However, it is worth noting that Iceland's first OECD-DAC Peer Review (2017) highlighted that Iceland could make further efforts to improve the impact of environmental mainstreaming activities across its program and steps are being taken to address this shortcoming. This includes harmonization of climate change, business and development cooperation strategies within Iceland's Ministry for Foreign Affairs in accordance with the Kyoto Protocol.

In 2016 approximately 39,4% of Iceland's relevant ODA (bilateral, core support to NGOs, scholarships, etc.), or 1302 million ISK, had mitigation or adaptation to climate change (or both) as a significant or primary objective.

Out of the 1302 million ISK allocated to climate-specific projects in 2016, 53,7% were allocated to projects with adaptation objectives only, 35,4% for mitigation objectives only and 10,9% for projects with both mitigation and adaptation to climate change as a significant or primary objective.

Iceland is committed to assist developing countries adapt to and mitigate the adverse effects of climate change and in 2016 Iceland contributed approximately 2087 million ISK in 'new and additional' support, when compared to 2012 (last year of last NC reporting period).

As of 2012 a separate budget line has been included on environmental issues and climate change in international development cooperation in the State budget. This budget item began with Iceland's Fast Start Finance commitments but has continued ever since. It shows the importance of the topic within Iceland's official development assistance. With the budget line, allocations to climate change projects now have earmarked funding, instead of being a part of the general budget line. When narrowing in on this budget line, a 32% increase in climate-related financing is noted between 2012 and 2016.

Most emphasis is put on the LDCs in Iceland's international development cooperation strategy. In terms of priority regions, high emphasis is placed on Sub-Saharan Africa, and specifically Malawi, Mozambique and Uganda where Iceland has bilateral agreements on development cooperation. Sustainable use of natural resources is a key element in Iceland's development efforts, where developing countries benefit from Icelandic expertise and experience in the fields of renewable energy and sustainable fisheries.

One of Iceland's more notable efforts within the area of gender and climate change is a project promoting gender responsive climate change mitigation and adaptation in Uganda. The project included research on gender and climate change in rural Uganda by the local Makerere University, preparations of the

Ugandan delegation for the COP meetings, conferences and the development of a short training course on how to mainstream gender into climate change actions. The training course was developed by the UNU Gender Equality and Studies Program in close collaboration with Ugandan partners, and training and capacity building was provided for a selected number of experts and policy makers at the district level.

More than half (60%) of Iceland’s development cooperation is allocated to multilateral institutions. Iceland places strong emphasis on core contributions, rather than earmarked funding, and prioritizes the work of four international organizations: The World Bank, UNICEF, UN Women and the United Nations University.

Systematic observation

The institutions most important for the observation of climate change are the Icelandic Meteorological Office (IMO) and the Marine and Freshwater Research Institute (MFRI).

The IMO is responsible for atmospheric climate monitoring and observation. The IMO monitors and archives data from close to 200 stations. These stations are either manual (synoptic, climatological and precipitation stations) or automatic. The number of synoptic stations in operation (about 40) was relatively constant from 1960 to 2000 but with increasing numbers of automatic stations the synoptic network has been scaled down to 33 stations. The observations are distributed internationally on the WMO GTS (Global Telecommunication System). The manual precipitation network has been steadily expanding and now consists of about 70 stations measuring precipitation daily in addition to the synoptic stations. The majority of the precipitation stations report daily to the IMO database. The automation of measurements started in Iceland in 1987, and the number of automatic stations has been rapidly growing since then. The IMO now operates about 70 stations and about 35 in addition to this in cooperation with the National Power Company, The Energy Authority and the Maritime Administration. A repository of data from the about 50 stations operated by the Public Roads Administration is also located at the IMO. A majority of automatic stations observe wind and temperature every 10 minutes, a few once per hour, and most transmit data to the central database every hour. Many stations also include humidity, pressure and precipitation observations, and a few observe additional parameters (shortwave radiation and ground temperatures) or observe at more than one level.

The IMO also monitors hydrological conditions in Iceland and runs a network of about 200 gauging stations in Icelandic Rivers. The network provides basic information for knowledge of the hydrology of Iceland. As the importance of monitoring and mediating information has been growing, the network has been updated and transmits data to the IMO centre at least once a day. The gauge network mainly measures water-flow, water-level and ground water, and in some cases other environmental factors.

The Marine and Freshwater Research Institute (MFRI) maintains a monitoring net of about 70 hydrobiological stations on 10 standard sections (transects) around Iceland. These stations are monitored three to four times per year for physical (temperature, salinity) observations and once to two times a year (phosphate, nitrate, silicate) for chemical observations and once a year for biological observations (phytoplankton, zooplankton). Some of these stations have been monitored regularly since around 1950. The MFRI has monitored carbonate system parameters on two-time series stations northeast and west of Iceland since 1983. A network of about 10 continuous sea surface temperature meters is maintained at coastal stations all around the country.

Research on Mitigation options and technology

The CarbFix project involves capturing otherwise emitted CO_2 from Hellisheidi geothermal power plant through a scrubbing process and inject dissolved CO_2 into nearby basalt formations. After injection, chemical reactions between the basaltic host rock and injected CO_2 lead to the formation of carbonate minerals within the subsurface. These minerals are stable over geologic timescales, resulting in permanent removal of CO_2 from the atmosphere.

The Pilot phase injections of CO_2 in CarbFix took place at Hellisheidi in SW-Iceland in 2012 and industrial scale capture and injection began in 2014. Notably, the CarbFix method is not only being used to reduce CO_2 emissions from the Hellisheidi geothermal power plant but also to simultaneously capture and inject H_2S, another environmentally important gas. Currently about 1/3rd and 2/3rd of otherwise emitted CO_2 and H_2S are being captured and injected through the CarbFix method at the power plant and in the future the company aims towards near zero emissions for the power plant. The CarbFix method significantly improves the safety and efficiency of sour gas capture and storage.

Carbon Recycling International has been developing methods to produce methanol from renewable hydrogen and carbon dioxide, which is obtained from geothermal boreholes using their own catalysis technology.

CRI's carbon capture and utilization (CCU) technology reached industrial maturity in 2012 with commissioning of the company's first commercial demonstration plant in Iceland. The plant produces renewable methanol by capturing CO_2 from the emissions of a local geothermal power plant and reacting the gas with hydrogen made by water electrolysis. Electricity for the production process comes from the Icelandic electricity mix, which is generated exclusively from hydro and geothermal sources. The output from the production plant is sold globally to, among others, oil and chemical companies, ferry operators and biodiesel manufacturers.

The main purpose of the Iceland Deep Drilling Project (IDDP) is to find out if it is economically feasible to extract energy and chemicals out of hydrothermal systems at supercritical conditions. The results could potentially have a great impact on the exploitation of geothermal energy.

Numerous research proposals from the international science community are active, ranging from petrology and petrophysics to fluid chemistry, water rock reactions, surface and borehole geophysics and reservoir modeling and engineering. The IDDP is a long-term research and development project which will take at least a decade more to conclude. In the long term, however, the potential benefits of the IDDP regarding increased use of climate-friendly geothermal energy include:

- Increased power output per well, perhaps by an order of magnitude, and production of higher-value, high-pressure, high-temperature steam,
- Development of an environmentally benign high-enthalpy energy source below currently producing geothermal fields – and thereby diminishing environmental footprints of power production,
- Extended lifetime of the exploited geothermal reservoirs and power generation facilities, and
- Re-evaluation of the geothermal resource base worldwide.

Education, training and public awareness

The educational system in Iceland is administered by the Ministry of Education, Science and Culture. The Ministry prepares educational policy, oversees its implementation, and is responsible for educational matters at all educational levels. Education has traditionally been organised within the public sector, but there are few private institutions in the school system, all of which receive public funding.

Individual local authorities have taken steps toward increased sustainability and climate change awareness. Reykjavik city has, in cooperation with Festa – the Icelandic Centre for Corporate Social Responsibility (CSR)[1], taken decisive steps towards increased climate change awareness and actions within companies in the city. The companies were asked to sign a joint declaration on actions intended to fight climate change and adapt to it. The declaration has been signed by 107 companies. Those companies who sign are invited to participate in organised training, dialogue events, conferences and workshops on climate change and CSR. Furthermore, extensive information is available on Festa's website on the progress of the companies who have signed the declaration, along with other information on climate change and corporate responsibility.

The Eco-Schools Programme[2] is an international project funded by the government and managed in Iceland by the NGO Landvernd (The Icelandic Environment Association). Eco-Schools is a programme for environmental management and certification which aims at enhancing environmental education and to strengthen environmental policy in schools. It is designed to implement sustainable development education in schools by encouraging children and students to take an active role in how their school can be run for the benefit of the environment. Schools that fulfil the necessary criteria are awarded the Green Flag for their work, which they keep for two years, before they need to renew their permission to flag the Green Flag.

In 2017, 182 schools at all school levels participated in the programme, reaching 32% of all children at the Pre-School level, 46% of all children in the Compulsory (elementary) School Level and 42% of all students at the Upper Secondary Level.

Iceland runs four training programmes as a part of the UN University, three of which offer training that benefit directly the fight against climate change The Geothermal Training Programme, The UN University Land Restoration Training Programme, The Gender Equality Studies and Training Programme and the UN University Fisheries Training Programme.

Several public campaigns conducted in Iceland by public and private parties contribute to the reduction of emissions. One of those is the annual "Bike to work" campaign[3], conducted by the National Olympic and Sports Association of Iceland with financial support from the public sector and others. The campaign – which over a period of two weeks encourages the public to leave their car at home and bike, walk or use public transport to work – has been widespread and successful, with good participation from the public. The same association conducts other campaigns aiming at encouraging people to use their own powers to transport – such as the "Lífshlaupið" campaign (where all kind of physical movement or sport count), and the "Bike to School" and "Walk to School" campaigns directed towards students.

[1] Festa – Icelandic Center for Corporate Social Responsibility
[2] Eco-schools
[3] Bike to work

2 National Circumstances

2.1 Government structure

Iceland is a constitutional republic with a multi-party parliamentary system of government. The Constitution was adopted on 17 June 1944, when the Republic was established. Legislative power is vested in Parliament (Althingi) and the president, in that bills of legislation are passed by Parliament and submitted to the president for confirmation by his or her signature. Upon such confirmation, the bill in question acquires the force of law. The Government must be supported by a majority of Parliament in order to remain in power. The 63 members of Parliament are elected from six constituencies based on proportional representation, for a term of four years. Over the past thirty years, the participation of women in politics has increased significantly and their share of seats in Parliament has increased from 15% to roughly 40%. The president is the head of state and is elected for a term of four years by a direct vote of the electorate.

General elections are generally held every four years, but the Constitution allows for early dissolution of Parliament, which triggers early elections.

The most recent election was held on 29th of October 2017. The results of the elections were as follows: The Independence Party obtained 25,2 % of votes and 16 seats, the Left Green Movement

16,9 % and 11 seats, the Social Democratic Alliance 12,1 % and 7 seats, the Progressive Party 10,7 % and 8 seats and the Pirate Party 9,2 % and 6 seats. A new party, the Centre Party (fraction from the Progressive party), obtained 10,9 % and 7 seats. Other parties did not received votes above the required minimum of 5%.

A coalition government of the Left-Green Movement, the Independence Party and the Progressive Party took office in November 2017, with the total of 35 members out of 63 in the Parliament.

The government is headed by a prime minister, and the executive branch is usually divided among 9 - 12 ministers. Judicial power lies with the Supreme Court and the district courts, and the judiciary is independent. Significant amendments were made to the Act on the Judiciary in spring 2016. Most significant is the establishment of a new Court of Appeals, which will take effect on 1 January 2018. From then on, Iceland’s court system will be divided into three levels: district courts (currently eight in number), the Court of Appeals, and the Supreme Court.

The country is divided into 74 municipalities, (see Figure 2-1) and local authorities are elected every four years. The largest municipality is the capital, Reykjavík, with 123.246 inhabitants but the greater capital area has around 220.600 inhabitants in 6 municipalities. The smallest municipality on the other hand has less than 50 inhabitants.[4]

[4] Hagstofan (Statistics Iceland).

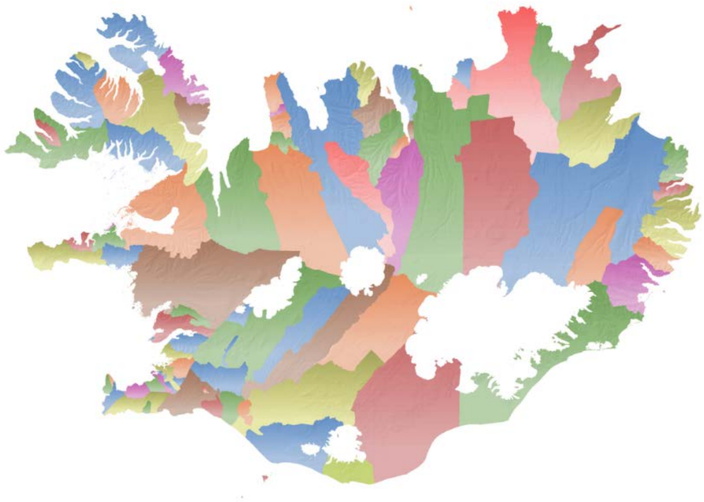

Figure 2-1 Municipalities in Iceland 2016.

In 1990 the number of municipalities was 204, but an attempt has been made to unite small municipalities, and this has resulted in fewer, but more populous, municipalities. This trend is likely to continue since the tasks of local authorities have grown increasingly complex in recent years. The local authorities have their own sources of revenue and budgets and are responsible for various areas that are important with regards to greenhouse gas emissions. This includes physical planning, waste-management, granting industry licenses and the design and operation of public transport. Municipalities also play an important role in education.

The Ministry for the Environment and Natural Resources is responsible for the implementation of the UNFCCC and coordinated national climate change policymaking in close cooperation with the Ministry of Industries and Innovation, Ministry of the Interior, Ministry of Finance, Ministry of Foreign Affairs and the Prime Minister's Office. Several public institutions and public enterprises, operating under the auspices of these ministries, also participated directly or indirectly in preparing the national implementation policy.

2.2 Population

The population of Iceland was 338.349 on 1 January 2017.See Figure 2-2. With only 3 inhabitants per square kilometre, Iceland is one of the least densely populated countries in Europe. In 2000–2015, annual average population growth was 1.1% and the natural increase (births less deaths) 0.8%. Around 63% of the population (almost 210 thousand) live in the capital city of Reykjavík and its surrounding municipalities. In 1990 this same ratio was 57%, demonstrating higher population growth in the capital area than in smaller communities and rural areas.

The largest town outside the capital area is Akureyri, located in North Iceland, with a population of just over 18 thousand. Most of the remaining inhabitants live in small towns along the coast.

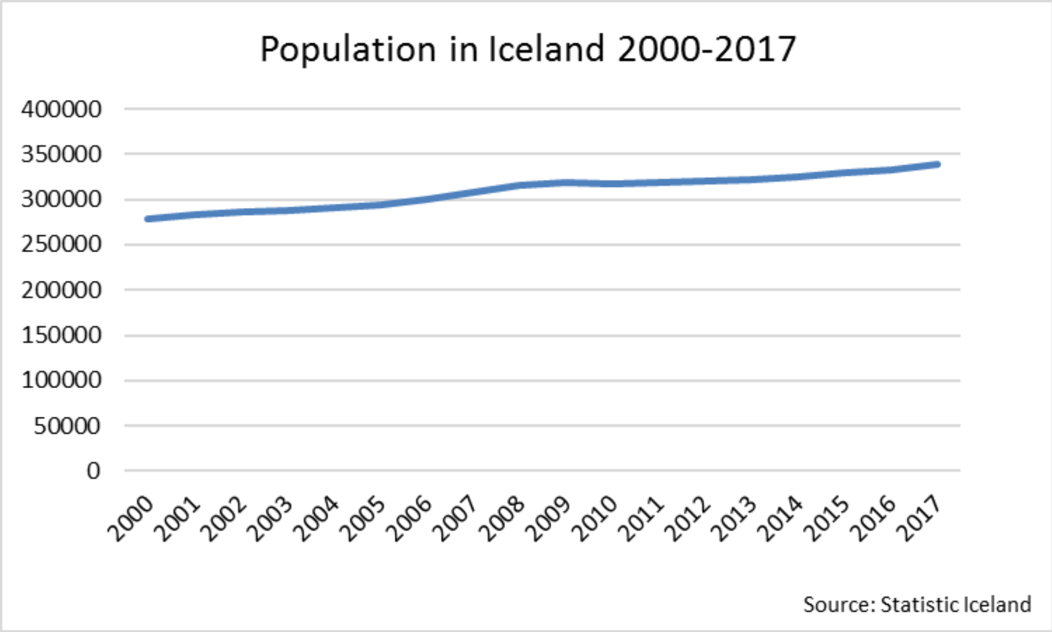

Figure 2-2 Population in Iceland 2000-2017.

As in other advanced countries, the population of Iceland is ageing, but at a relatively slower pace than in most OECD countries. In 2014, despite high life expectancy, the ratio of the total population aged over 65 to the population of working age was 22%, eighth-lowest in the OECD.5 . See Figure 2-3.

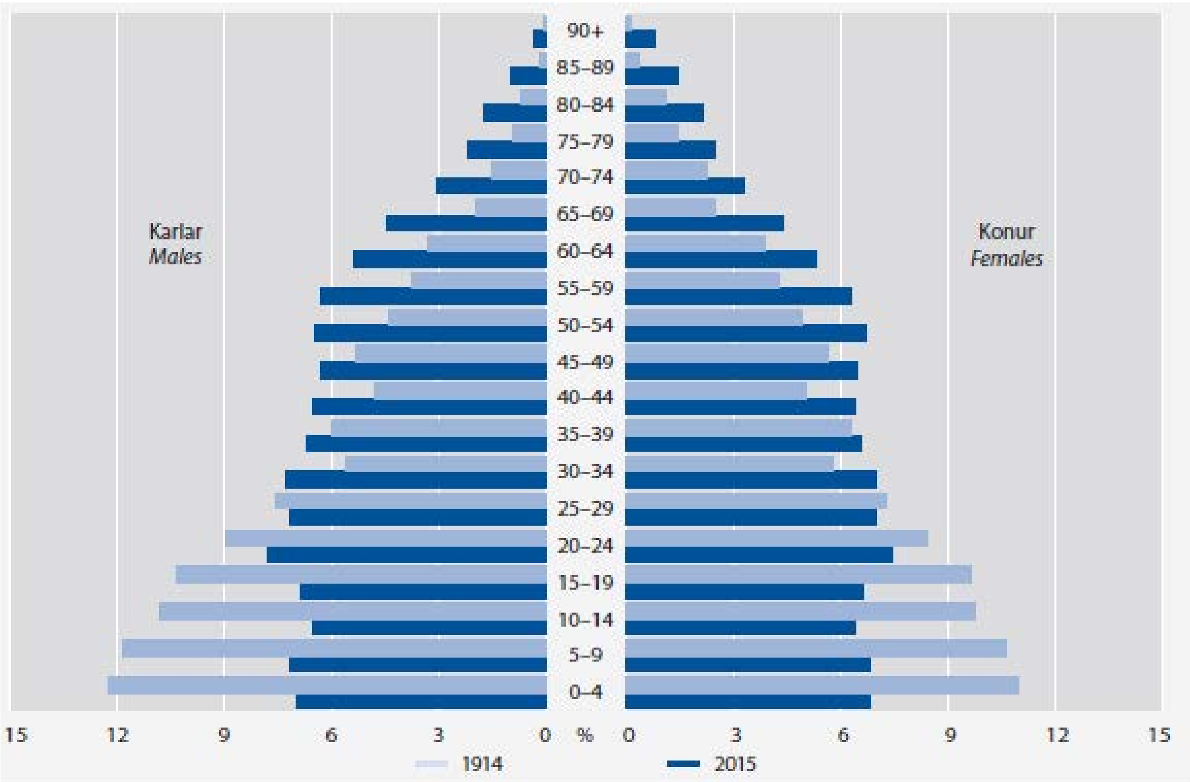

Figure 2-3 Population by age and sex 1914 and 2015[6]

[5] Economy of Iceland 2016
[6] Economy of Iceland 2016

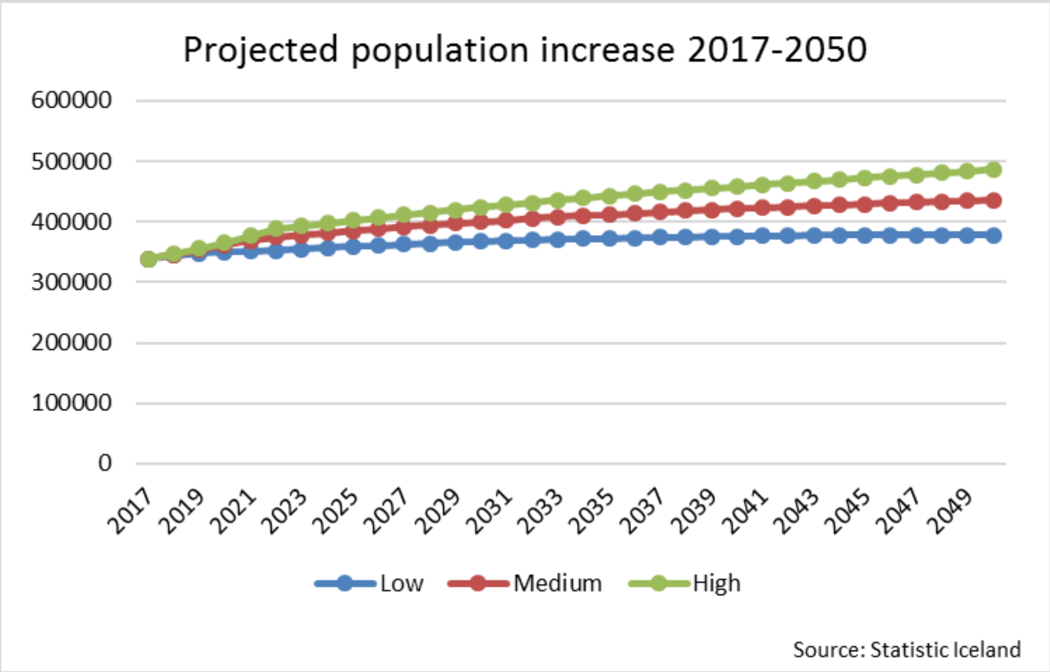

Figure 2-4 Projected population increase in Iceland 2015 – 2050

Figure 2-4 shows three scenarios for population growth until 2050. A low estimate predicts that the population will reach around 380.000 in 2050, the medium estimate predicts the population will reach around 436.000 and the high estimate predicts that the population will reach around 487.000 in 2050.

2.3 Geography

Iceland is located in the North Atlantic between Norway, Scotland and Greenland. (Figure 2-5). It is the second-largest island in Europe and the third largest in the Atlantic Ocean, with a land area of some 103 thousand square kilometres, a coastline of 4,970 kilometres and a 200-nautical-mile exclusive economic zone extending over 758 thousand square kilometres in the surrounding waters. Iceland enjoys a warmer climate than its northerly location would indicate because a part of the Gulf Stream flows around the southern and western coasts of the country. In Reykjavík the average temperature is nearly 11°C in July and just below zero in January.

Figure 2-5 Geographic location of Iceland

Geologically speaking, the country is very young and bears many signs of still being in the making. Iceland is mostly mountainous and of volcanic origin. The Mid-Atlantic Ridge runs across Iceland from the south-west to the north-east. This area is characterized by volcanic activity, which also explains the abundance of geothermal resources. Glaciers are a distinctive feature of Iceland, covering about 10% of the total land area. The largest glacier, also the largest in Europe, is Vatnajökull in Southeast Iceland with an area of 8,300 km$^{2.}$ Glacial erosion has played an important part in giving the valleys their present shape, and in some areas, the landscape possesses alpine characteristics. Regular monitoring has shown that all glaciers in Iceland are presently receding, they are smelting faster which has resulted in significant changes in the areas closest to the glaciers.

Rivers and lakes are numerous in Iceland, covering about 6% of the total land area. Freshwater supplies are abundant, but the rivers flowing from the highlands to the sea also provide major potential for hydropower development. Geothermal energy is another domestic source of energy.

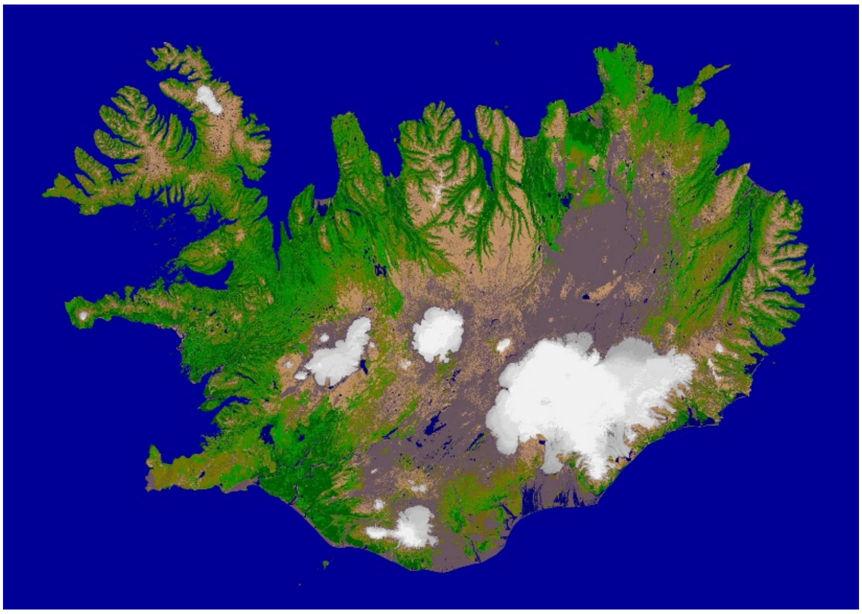

Figure 2-6 Vegetation map of Iceland

Soil erosion and desertification is a problem in Iceland. More than half of the country's vegetation cover is estimated to have disappeared because of erosion since the settlement period. This is particularly due to clearing of woodlands and overgrazing, which have accelerated erosion of the sensitive volcanic soil. Remnants of the former woodlands now cover less than 1,200 km^2, or only about 1% of the total surface area. Around 60% of the vegetation cover is dry land vegetation and wetlands. Arable and permanent cropland amounts to approximately 1,300 km^2. Systematic revegetation and land reclamation began more than a century ago with the establishment of the Soil Conservation Service of Iceland in 1907, which is a governmental agency. Reforestation projects have also been numerous in the last decades, and especially noteworthy is the active participation of the public in both soil conservation projects and reforestation projects.

Iceland has access to rich marine resources in the country's 758,000-km^2 exclusive economic zone. The abundance of marine plankton and animals results from the influence of the Gulf Stream and the mixing of the warmer waters of the Atlantic with cold Arctic waters. Approximately 270 fish species have been found within the Icelandic 200-mile exclusive economic zone; about 150 of these are known to spawn in the area.

2.4 Climate profile

Iceland is situated just south of the Arctic Circle. The mean temperature is considerably higher than might be expected at this latitude. Relatively mild winters and cool summers characterize Iceland's oceanic climate. The average monthly temperature varies from -3 to +3 °C in January and from +8 to +15°C in July. Storms and rain are frequent, with annual precipitation ranging from 400 to 4000 mm on average annually, depending on location. The mild climate stems from the Gulf Stream and attendant warm ocean currents from the Gulf of Mexico. The weather is also affected by polar currents from East Greenland that travel southeast towards the coastline of the northern and eastern part of Iceland.

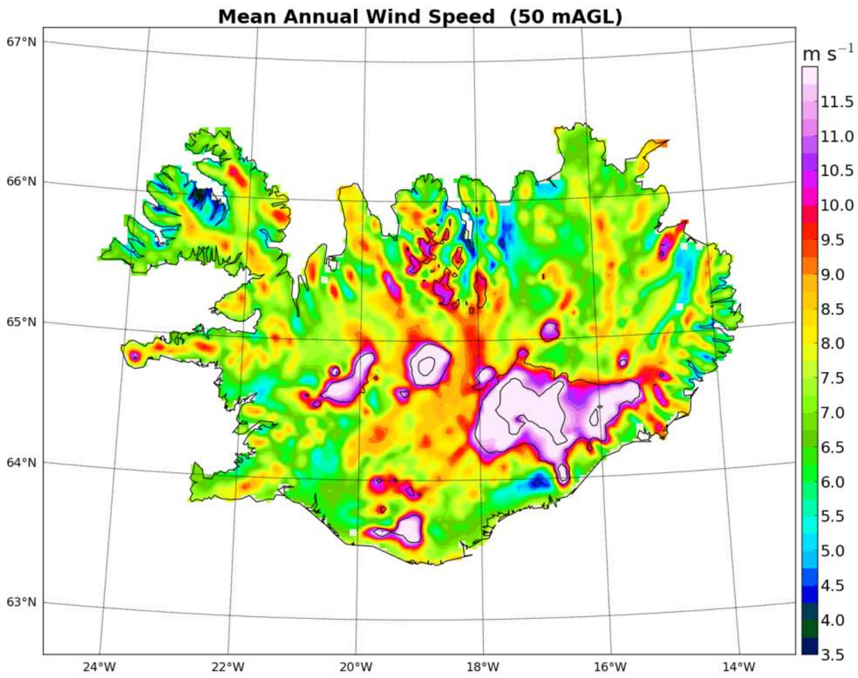

Figure 2-7 Mean annual average wind speed at 50 m above ground level

Figure 2-7 shows annual average wind speed in Iceland. The figure is from a study of the wind energy potential of Iceland made by the Icelandic Met Office. The study shows that Iceland compares with areas such as Scotland and the western coasts of Ireland and Norway, which are ranked within the highest wind power class in Europe. These areas are characterized by average winds above 6 m/s over sheltered terrain and average winds above 8.5 m/s at the coast, measured at 50 m above ground level.

The amount of daylight varies greatly between the seasons. For two to three months in the summer there is almost continuous daylight; early spring and late autumn enjoy long twilight, but from November until the end of January, the daylight is limited to only three or four hours.

2.5 The Economy

Iceland is endowed with natural resources that include the fishing grounds around the island within and outside the country's 200-mile Exclusive Economic Zone as well as hydroelectric and geothermal energy resources The Icelandic economy displays the characteristics of an advanced economy, with high income levels and a relatively large services sector. Its distinguishing features are its large marine and energy sectors based on ample resources, a growing tourism sector, and a high labour participation rate.

Policies of market liberalization, privatization and other structural changes were implemented in the late 1980s and 1990s, including membership of the European Economic Area by which Iceland was integrated into the internal market of the European Union. Economic growth started to gain momentum by the middle of the 1990s, rekindled by replenishing fish stocks and economic efficiency due to sustainable quota allocations, a global economic recovery, a rise in exports and a new wave of investment in the aluminium sector. During the second half of the 1990s, the liberalization process continued, competition increased, the Icelandic financial markets and financial institutions were restructured and expanded rapidly, and the exchange rate policy became more flexible. Iceland experienced until 2007 one of the highest growth rates of GDP among OECD countries.

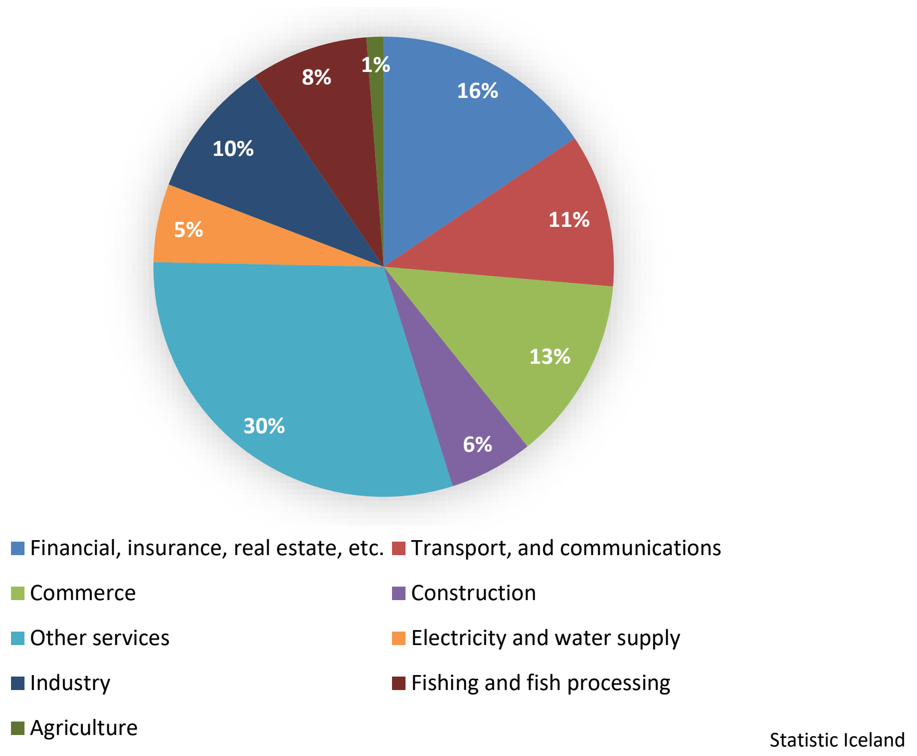

Figure 2-8 Breakdown of GDP in 2015 by sector.

Iceland was severely hit by an economic crisis when its three largest banks collapsed in the fall of 2008. The blow was particularly hard owing to the large size of the banking sector in relation to the overall economy as it had grown to be ten times the annual GDP. The crisis resulted in serious contraction of the economy followed by increase in unemployment, a depreciation of the Icelandic króna by over 40% in 2009 compared with the 1st quarter of 2008 and a drastic increase in external debt. Private consumption has contracted by a quarter since 2007. The GDP contracted by almost 11% in 2009 and 2010. Growth picked up in 2011 and growth was 3.1% in the first nine months of 2013 compared with the same period in 2012. See Figure 2-8 for breakdown of GDP in 2015.

The annual national accounts for 2016 show a 7.4% increase in Gross Domestic Product (GDP) in real terms. The economic growth in 2016 was mainly driven by an 8.9% increase in the gross domestic final expenditure.

Household final consumption increased by 7.1% and government final consumption by 1.9% while gross fixed capital formation (GFCF) increased by 22.8%, the largest increase in GFCF since 2006. A considerable increase of 26.4% was observed in the business sector GFCF, as well as in residential construction of 29.4%. The share of GFCF was 21.3% of GDP in 2016 which is close to the historical average.

At the same time, exports grew by 10.9% and imports by 14.5%. Service exports amounted to 26.8% of GDP and outweighed the exports of goods for the first time in the history of Icelandic National Accounts dating back to 1945. This resulted in a 155.4 billion ISK surplus in the balance of trade in goods and services in 2016. Despite a large foreign trade surplus, a higher growth in imports compared to that of exports contributed to a decreased growth in GDP.

Surplus in the balance of trade and in primary income from abroad, according to figures from the Central bank of Iceland, results in a large current account surplus in 2016, or 201 billion ISK or 8.2% of GDP. During 2016 the terms of trade improved by 1.4% of GDP of the previous year. This development and the positive current account balance led to 11.3% growth in GNI.7

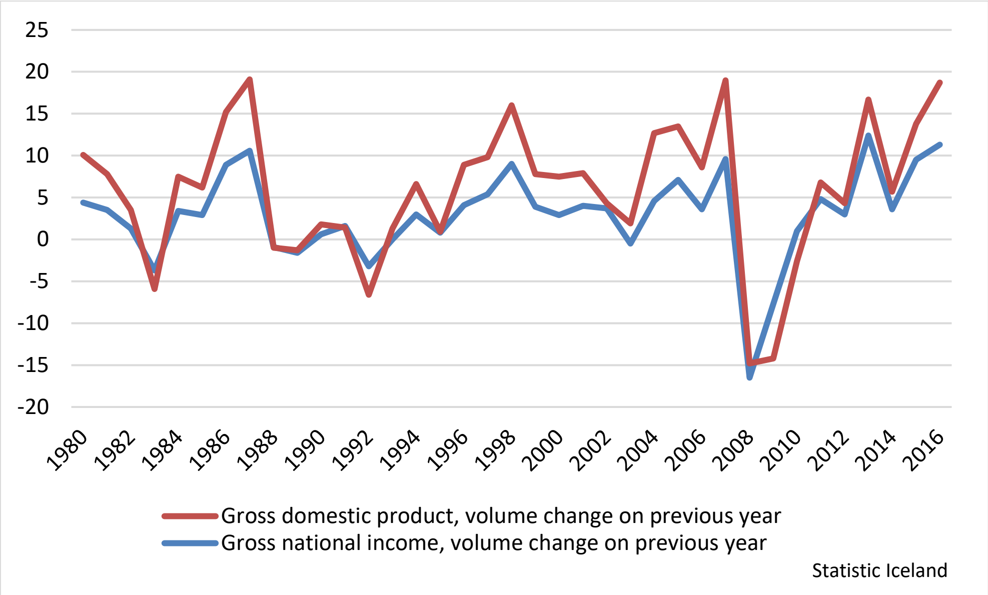

Figure 2-9 GDP and Gross national income 1998-2016

The unemployment rate has followed the recession in GDP and national income, see Figure 2-9 and Figure 2-10.

[7] Statistic Iceland

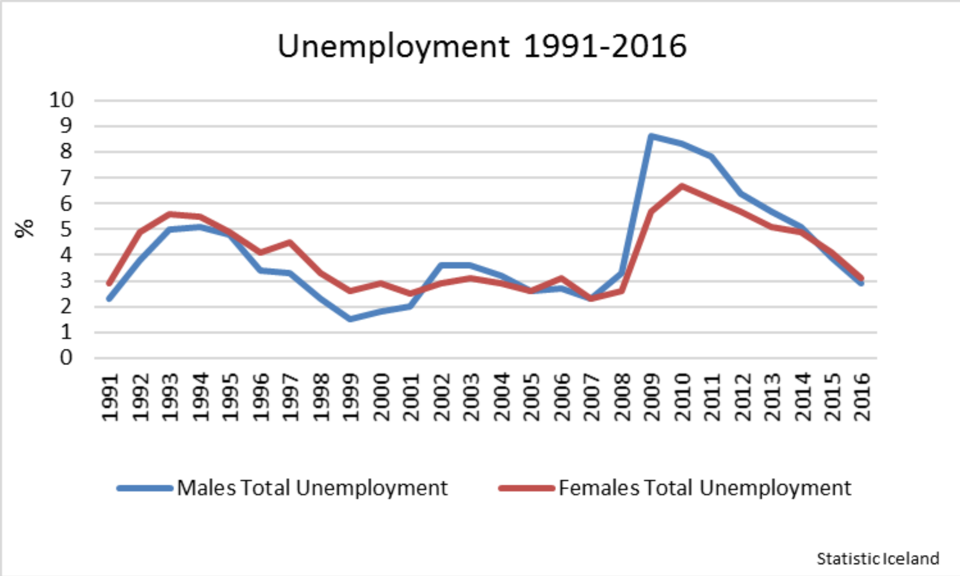

Figure 2-10 Unemployment 1991-2016.

2.6 Development of economic sectors

2.6.1 Fisheries

Iceland is the 19th largest fishing nation in the world, exporting nearly all its catch. The marine sector is still one of the main economic sectors and the backbone of export activities in Iceland although its relative importance has diminished over the past four decades. See Figure 2-11.

A comprehensive fisheries management system based on individual transferable quotas has been developed. Total allowable catches (TACs) are issued with the aim of promoting conservation and efficient utilization of the marine resources. All commercially important species are regulated within the system. In addition to the fisheries management system there are a number of other explicit and direct measures to rationalize investments in the fishing sector, to support its aims and reinforce conservation and socio-economic sustainability.

Throughout most of the 20th century, the marine sector was of key importance to the Icelandic economy. To a large extent, economic growth was generated by the marine sector. Fisheries and fish processing are still one of the main pillars of export activities in Iceland: in 2015, 42% of goods exports and roughly 22% of all export earnings from goods and services came from fisheries. However, as exports of manufactured goods have been growing rapidly, the share of the marine sector in goods exports has fallen, from around 63% in 2000 to 42% in 2015. Despite this, the sector’s contribution to GDP has remained relatively constant in the past five years at 8-10%, down from 12% in 2000.[8]

The total catch of Icelandic fishing vessels in 2015 was 1,319 thousand tonnes which is 243 thousand tonnes more than in 2014. The value of the catch amounted to 151 billion ISK and increased by 15% from previous year. The largest part of the catch was processed in the eastern part of the country, mainly pelagic fish. The highest regional share of the demersal catch, almost quarter of the quantity, was landed in Northeast Iceland. The main processing method for cod was freezing in land-based factories, and most of the capelin went to reduction. Total value of by-products amounted to 5.6 billion in 2015.

The total export in 2015 was 632 thousand tonnes compared to 654 tonnes in 2014. The export production of marine products in 2015 amounted to ISK 267 billion and has decreased in value by 6% from the previous year. Frozen products generated half of the value of exported marine products. Frozen

[8] Economy of Iceland 2016

cod was of greatest value, 35.6 billion ISK and the value of iced cod was second highest 34.4 billion ISK. Around 75% of Icelandic marine products was sold to Europe, 8.6% to Asia and 8% to North America.[9]

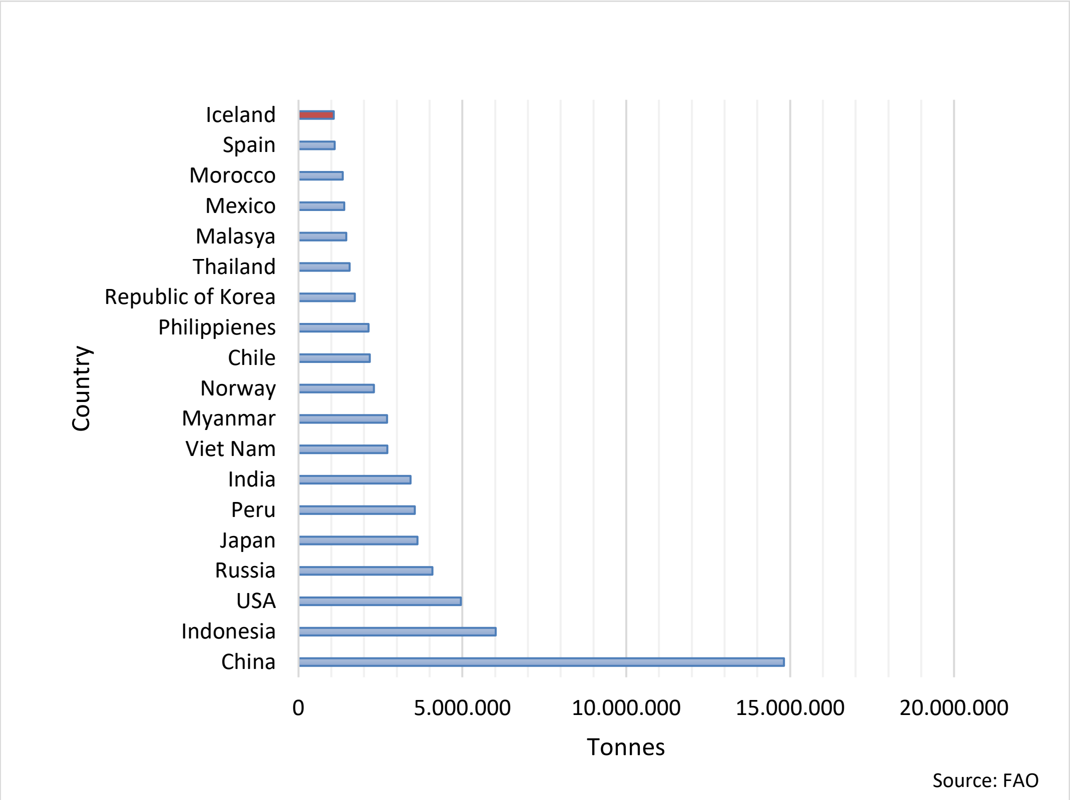

Figure 2-11 Marine Capture production – 20 largest producers 2014[10]

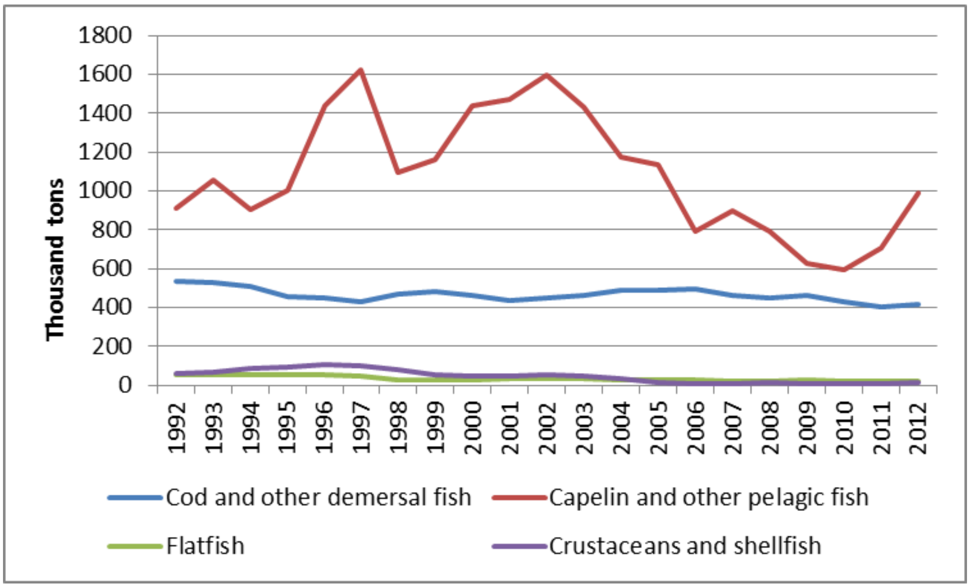

Figure 2-12 Fish catch 1992 - 2012

[9] Statistic Iceland
[10] FAO The state of world fisheries and aquaculture 2016

Figure 2-12 shows significant fluctuations in the total catch of demersal species, which are mainly cod, haddock, ocean perch (red fish) and pollock.

2.6.2 Export

Fish and other marine products have traditionally been the mainstay of goods exports, although they have been declining as a share of total exports since the early 1990s. In 2015, fish and other marine products accounted for 42% of goods exports and 22% of total exports, down from 63% and 41%, respectively, in 2000. Exports of manufactured goods have been growing rapidly in importance, led by aluminium smelting and medical and pharmaceutical products, and accounted for 53% of goods exports in 2015 (up from 31% in 2000) and 28% of total exports. Exports of services have also increased as the economy has grown and become increasingly service-oriented. Tourism has soared over the past few years and has been one of the main drivers of export growth, contributing over 50% of the growth during the post-crisis period. Services now account for 47% of total export revenues, up from 37% in 2000. Iceland imports a wide range of manufactured goods and commodities, reflecting both the small size of the economy and the limited range of natural resources. Imports of industrial supplies accounted for 28% of total goods imports and 18% of total imports in 2015. Capital goods constituted almost 21% of total goods imports and consumer goods 27% (13% and 17%, respectively, of total imports in 2015), while services contributed around 36% of total imports.[11]

2.6.3 Energy profile

The energy profile is unusual as 84% of primary energy use in 2015 came from renewable resources, hydro and geothermal**.** The remaining 16% came from imported fossil fuels, which are mainly used in transportation and the fishing industry.

Iceland has extensive domestic energy sources in the form of hydro and geothermal energy. The development of the energy sources in Iceland may be divided into three phases. The first phase covered the electrification of the country, utilization of hydropower and harnessing the most accessible geothermal fields, especially for space heating. In the second phase, steps were taken to harness the resources for power-intensive industry by building bigger hydropower plants. This began in 1966 with the signing of agreements on the building of an aluminium plant, and in 1979 a ferrosilicon plant began production. In the third phase, following the oil crisis of 1973-74, efforts were made to use domestic sources of energy to replace oil, particularly for space heating and fishmeal production in recent years. Oil has almost disappeared as a source of energy for space heating in Iceland, and domestic energy has replaced oil in industry and in other fields where such replacement is feasible and economically viable.

Electricity consumption per capita is very high in Iceland compared to other OECD-countries, with 53 MWh/capita, next comes Norway with 23 MWh/capita and Canada and Finland with 15 MWh/capita.

[11] Economy of Iceland 2016

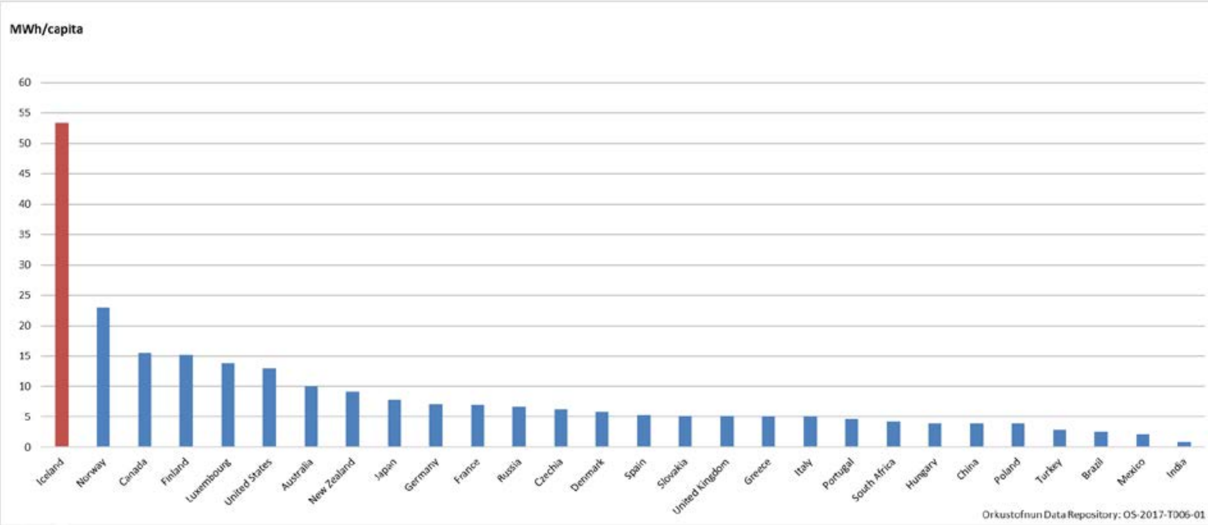

Figure 2-13 Electricity consumption per capita in selected countries 2014.

Renewable energy sources (hydropower and geothermal power) account for 99.9% of electricity production Figure 2-14, and 99% of space heating.

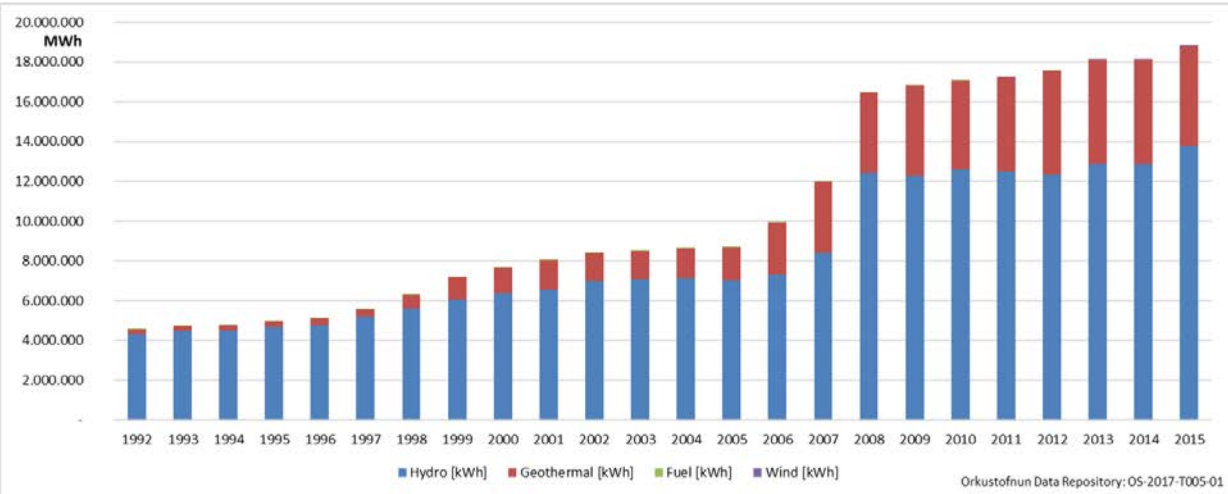

Figure 2-14 Electricity production by sources 2003-2015.

In 2015 production of non-ferrous metals accounts for 79% of the electricity consumption see Figure 2-15.

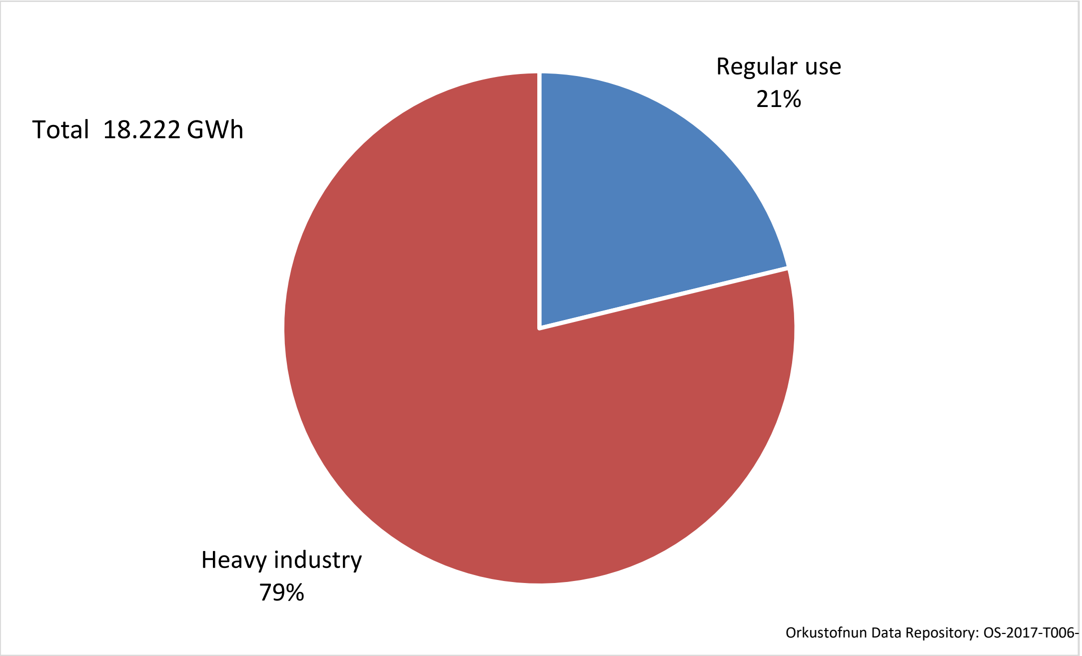

Figure 2-15 Electricity consumption 2015.

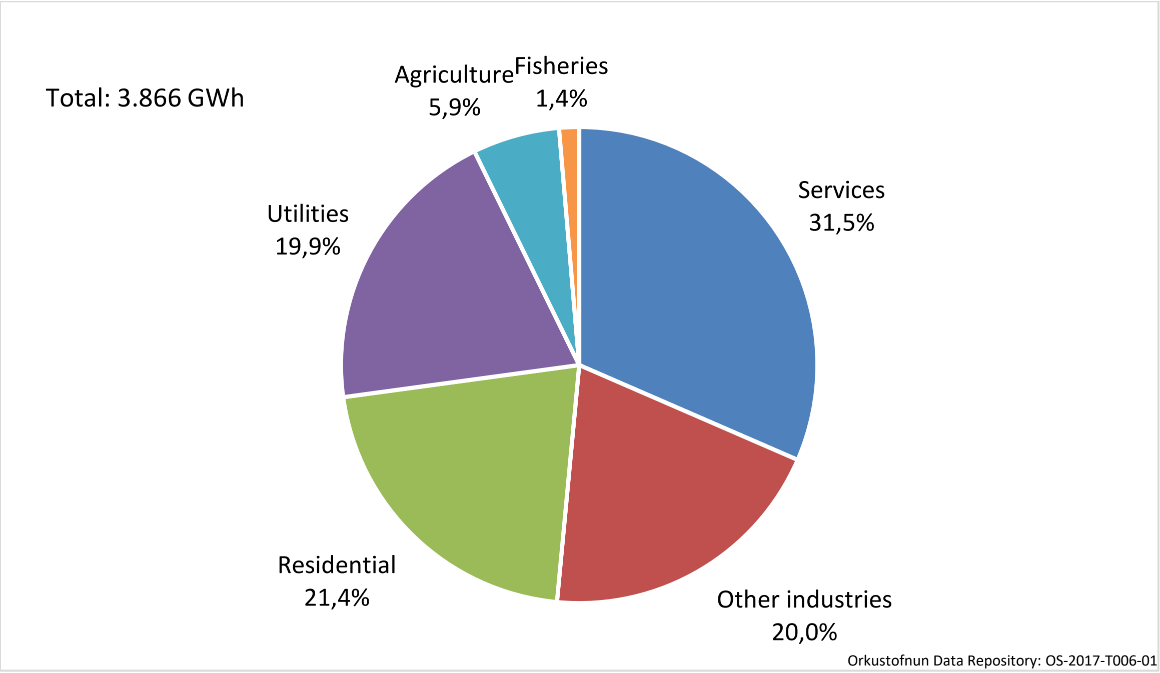

Figure 2-16 Regular electricity consumption 2015 (

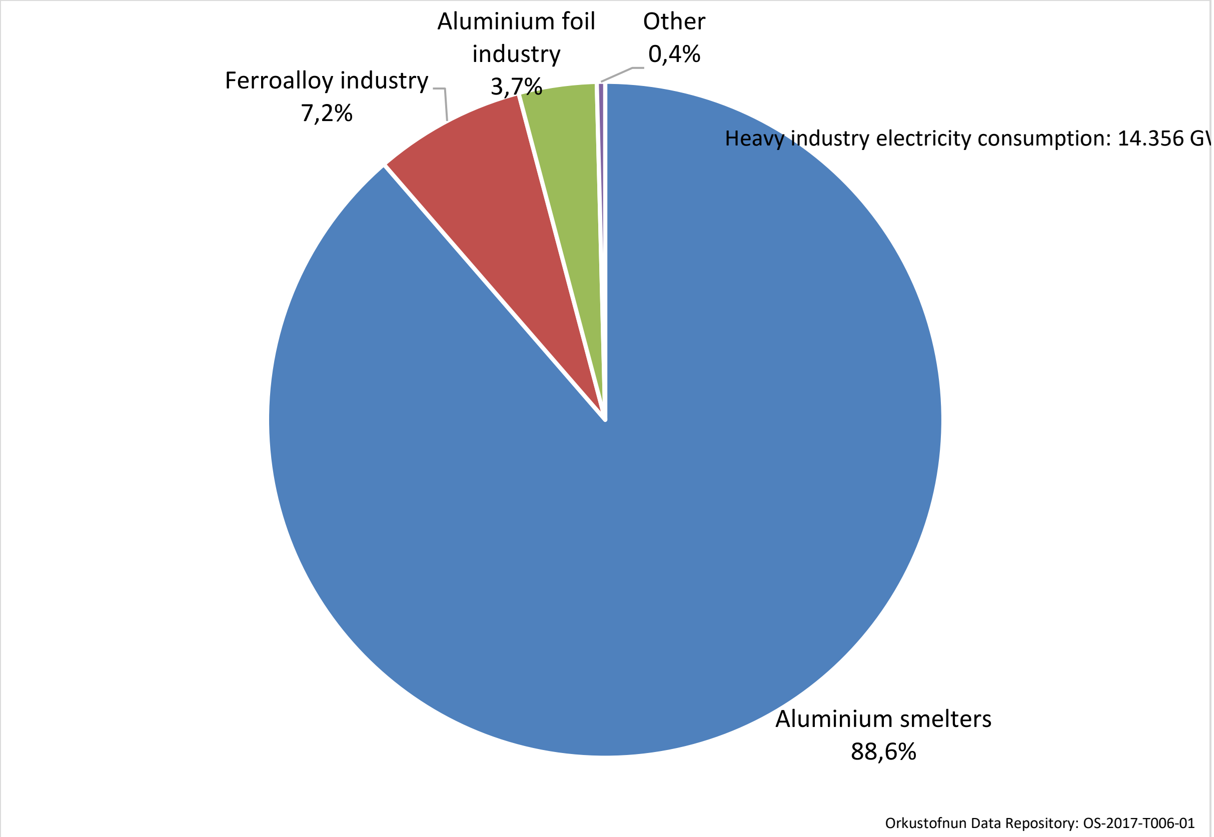

Figure 2-17 Heavy industry electricity consumption 2015.

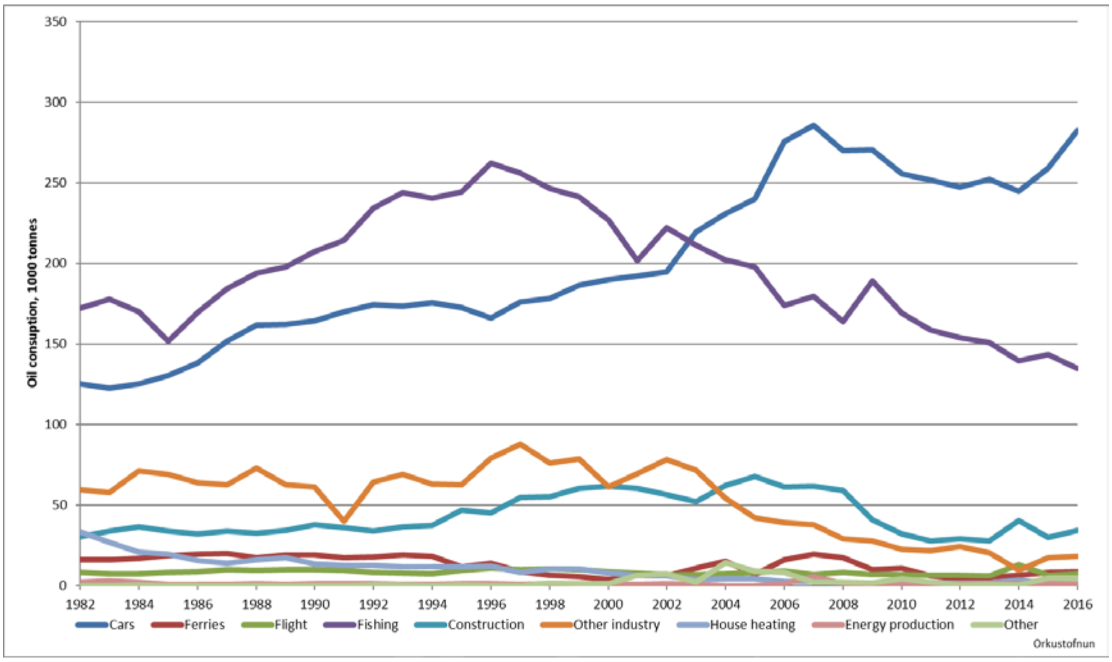

Figure 2-18 Domestic oil consumption in Iceland 1980 – 2016.

Geothermal heat and hydropower account for 86 per cent of the country's primary energy consumption. In 2012, the total installed capacity for electricity production was 2658 MW, 71% in hydropower and

25% in geothermal power plants. Some 90% of all homes in Iceland are heated with geothermal energy. In 2016 the installed capacity for electricity production was 2,773 MW, 72% in hydropower and 24 in geothermal. Total electricity production in 2016 was 18,549 GWh.

Hydro power developments can have various environmental impacts. The most noticeable is usually connected with the construction of reservoirs, which are necessary to store water for the winter season. Such reservoirs affect the visual impact of uninhabited wilderness areas in the highlands and may inundate vegetated areas. Other impacts may include disturbance of wildlife habitats, the disappearance or alteration of waterfalls, reduced sediment transportation in glacial rivers downstream from the reservoirs and changed conditions for fresh-water fishing. Geothermal developments may also have environmental impacts, among them the drying up of natural hot springs. Development of high-temperature fields causes air pollution by increasing the natural H_2S

emission from the fields. Geothermal power plants, associated steam stack exhaust and transmission pipelines for geothermal water create visual impacts in the environment. Noise is associated with boreholes, power generation and water pumps, and pumping water underground at geothermal power plants can lead to earthquakes.

2.6.4 Industry

The production structure of Iceland's manufacturing sector is unique among industrialised countries in many respects. First, the manufacturing sector is dominated by two sub-sectors, food processing and aluminium production, which together account for roughly ¾ of total manufacturing. Second, production of machinery and other investment goods is relatively limited. Food production is directed partly at the domestic market, but a larger share, or 62% (in 2015), focuses on seafood production for export. Other less important sub-sectors are machinery equipment production (12%), building materials production (3%), and pharmaceuticals/chemical products (3%).

Iceland's largest manufacturing industry by far is the energy-intensive industry (mainly aluminium), which has increased substantially over the past decade, generating 38% of goods exports in 2015, up from one-fifth in 2000. Iceland's aluminium industry is based primarily on competitive energy costs, strategic location, and a skilled labour force. Production has risen sharply since the turn of the century, from 210 thousand metric tonnes per year (mtpy) in 2000 to an

estimated 857.000 thousand mtpy in 2015. Iceland's share of world aluminium production (excluding China) increased from 1% in 2000 to 3% in 2014.

Parallel investments in increased power capacity were needed to accommodate for this almost tenfold increase in aluminium production. The size of these investments is large compared to the size of Iceland´s economy.

2.6.5 Tourism

Tourism has increased rapidly in Iceland in recent years.

The total number of foreign visitors was around 1.8 million in 2016, a 39% increase from 2015, when foreign visitors numbered around 1.3 million.

Around 1,790,000 tourists came on flights through Keflavík International Airport in 2016, or 98.7% of the total number of visitors. Around 20,000 came with the ferry Norræna through Seyðisfjörður, or around 1.1% of the total. Around 3,800 came on flights through Reykjavík Airport or Akureyri Airport, or 0.2 % of the total. It must be assumed that there are variations in counts at Keflavik International Airport, as they cover all departures, including foreign national´s resident in Iceland. See Figure 2-19.

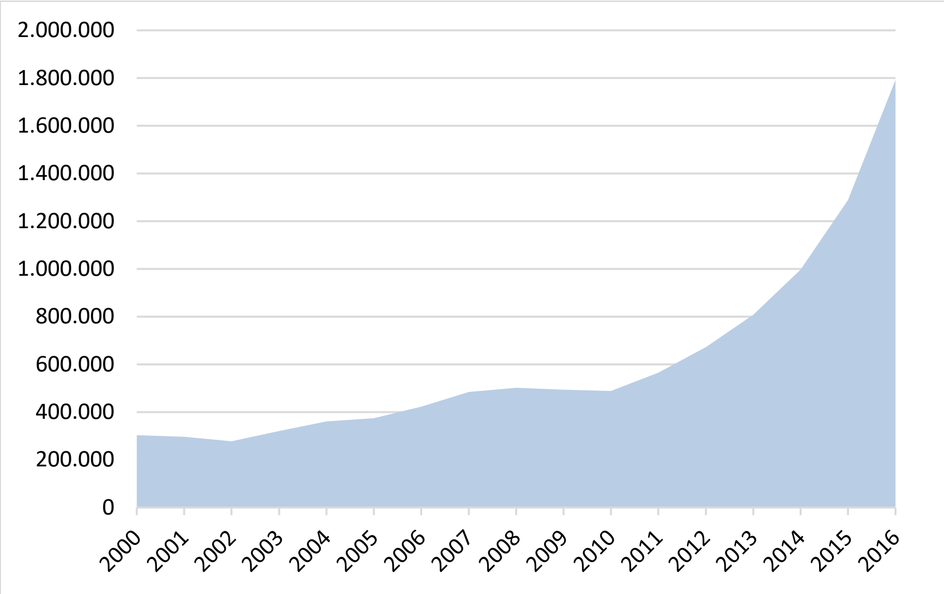

Figure 2-19 Foreign visitor's arrivals by air and sea to Iceland 2000-2016. Icelandic Tourist Board

In 2016 Travel and tourism directly supported 10,000 jobs (5.5% of total employment). This is expected to rise to 16,000 jobs (8.6% of total employment) in 2027.

The total contribution of the Tourism industry to the export of goods and services accouted for 39,2% in 2016, from 31,1 % in 2015 and 26,4% in 2013, see Figure 2-20.

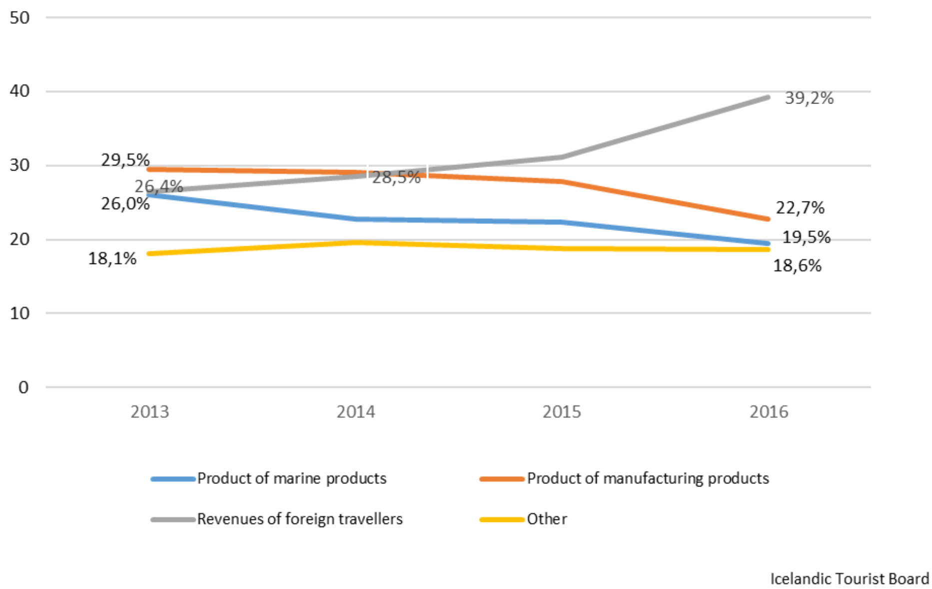

Figure 2-20 Export of goods and services 2013-2016.

2.6.6 Transport

The domestic transportation network consists of roads and air transportation. Public transportation is mainly in the capital area and few of the bigger towns. Public transportation outside the main urban areas is primitive and has been difficult to operate, due to thin population and widespread private car ownership. In 2010, Iceland had 643 registered vehicles per 1,000 inhabitants, in 2016 this number was up to 717 registered vehicles per 1,000 inhabitants, see Figure 2-21.

National roads totalled 12,900 km in 2017, of which 4,920 km are classified as major roads.

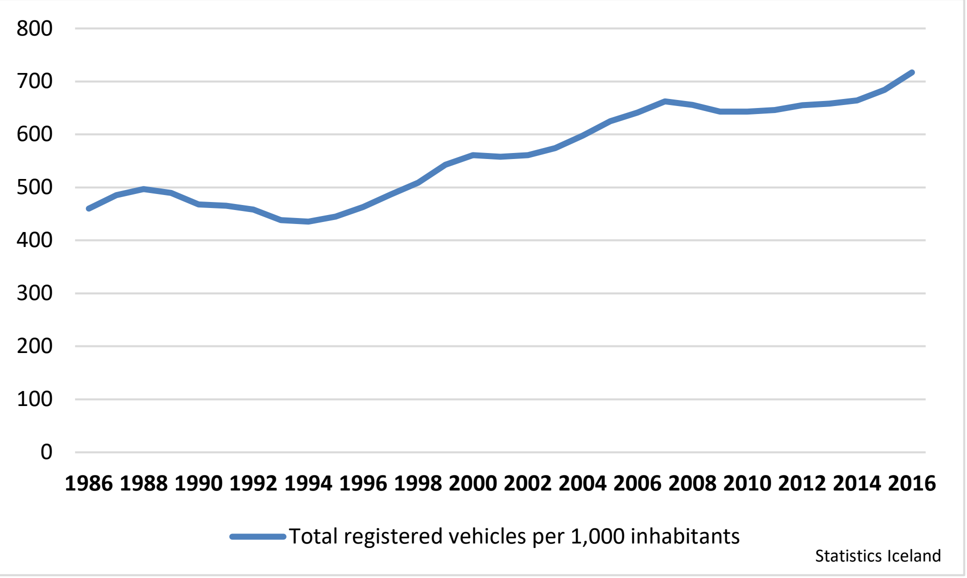

Figure 2-21 Registered vehicles per 1000 inhabitants 1986 – 2016

2.6.6.1 Aviation

Aviation plays a key role in Iceland. The country's geographical location makes undisturbed international air transportation imperative. Domestic aviation is also important because of long travel distances within the country combined with a small population. An investment in a railway system is therefore not a viable option.

Figure 2-22 International passengers in Icelandic airports with scheduled services 2016 (Isavia)

In 2007, international passengers in Icelandic airports equalled 2.5million of which 536,000 were transit passengers.

In 2016, the total number of international passengers was 6.7 million of which 2.2 million where transit passengers. 99.3% passed through Keflavik International Airport in 2016, compared to 97.5% in 2012. See Figure 2-22.

In all 165.640 aircrafts entered the Reykjavík Oceanic Control Area in 2016, compared to 107.000 in 2012 which was 13,5% increase compared to 2015.[12]

Iceland has numerous harbours large enough to handle international ship traffic, which are free of ice throughout the year. The two main shipping lines operate regular liner services to the major ports of Europe and the US.

2.6.7 Construction

In the late 1970s the number of completed residential flats and houses in Iceland lay above 2000 annually. The number decreased steadily until 2001 when construction expanded rapidly with a peak in 2007 with 3300 houses and flats completed. This expansion coincided with major building projects, the Kárahnjúkar hydropower plant and dam and the Alcoa aluminium smelter in eastern Iceland. After the economic crises the numbers of residential buildings completed each year dropped dramatically, but since 2012 things have gone up again.

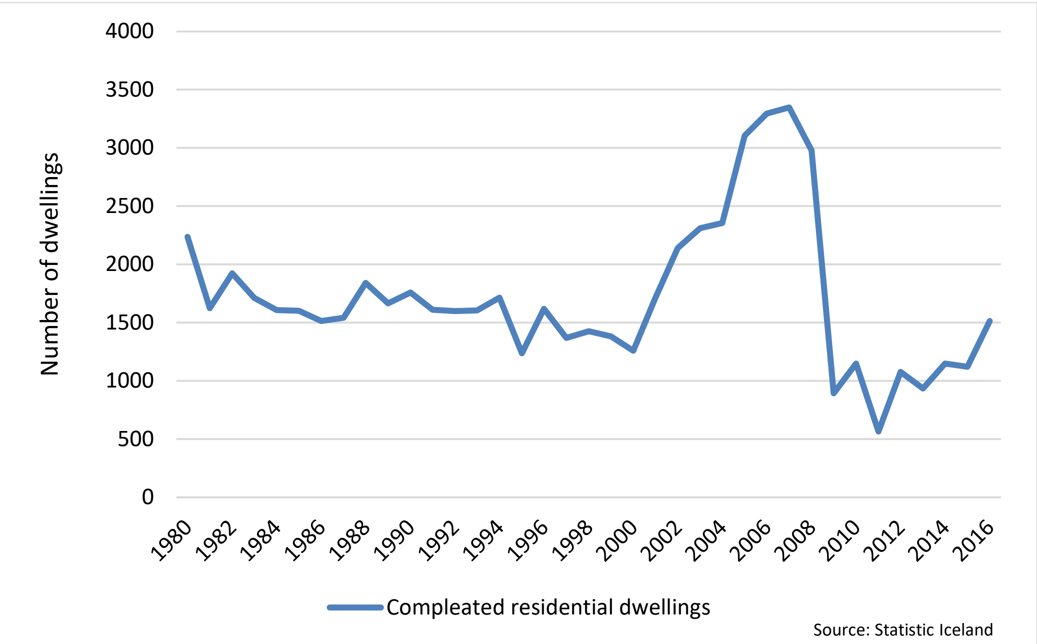

Figure 2-23 Completed Residential buildings in Iceland 1980-2016

The construction industry collapsed after 2008 with a record low number of completed residences in 2011. The recession led to the closure of Iceland's only cement factory in 2012. The economy has been recovering the last years as has the construction industry, see Figure 2-23.

[12] Isavia – Aviation Fact File 2016

2.6.8 Agriculture, land management and forestry

Approximately one fifth of the total land area of Iceland is suitable for grazing and fodder production and the raising of livestock. Around 6% of this area is cultivated, with the remainder devoted to raising livestock or left undeveloped. Production of meat and dairy products is mainly for domestic consumption. The principal crops have been hay, potatoes and other root vegetables. Cultivation of other crops, such as barley and oats, has increased rapidly in the last 10 years and they are now becoming one of the staples. Vegetables and flowers are mainly cultivated in greenhouses heated with geothermal water and lit with electricity in winter.

In Iceland the human impact on ecosystems is strong. The entire island was estimated to be about 65% covered with vegetation at the time of settlement in the year 874. Today, Iceland is only about 25% vegetated. This reduction in vegetative cover is the result of a combination of harsh climate and intensive land and resource utilization by a farming and agrarian society over 11 centuries. Estimates vary as to the percentage of the island originally covered with forest and woodlands at settlement, but a range of 25 to 30% is plausible.

Organized forestry is considered to have started in Iceland in 1899. Afforestation through planting did increase considerably during the 1990s from an average of around 1 million seedlings annually in the 1980s to 4 million in the 1990s. Planting reached a high of about 6 million seedlings per year during 2007 – 2009 but was reduced after the financial crisis to about 3.5 million seedlings in 2012. Around 1100-1900 ha was afforested annually in the period of 1990-2007. Planting of native birch has been increasing proportionate to the total afforestation, comprising 24% of seedlings planted in the period 1990-2007. From its limited beginnings in 1970, state supported afforestation on farms and privately-owned land has become the main channel for afforestation activity in Iceland, comprising about 80% of the afforestation effort today. The total area of forest and other wooded land is 1840 km^2 covering 1.8% of the surface of Iceland. Native birch forest and woodland cover 1460 km^2 and cultivated forest cover 380 km^2.

The Soil Conservation Service of Iceland, an agency under the Ministry for the Environment and Natural Resources, was founded in 1907. The main tasks of the agency are combating desertification, sand encroachment and other soil erosion, the promotion of sustainable land use and reclamation and restoration of degraded land. A pollen record from Iceland confirms the rapid decline of birch and the expansion of grasses in 870-900 AD, a trend that continued to the present. As early as around 1100 more than 90% of the original Icelandic forest was gone and by 1700 about 40% of the soils had been washed or blown away. Vast gravel-covered plains were created where once there was vegetated land. Ecosystem degradation is one of the largest environmental problems in Iceland. Vast areas have been decertified after over-exploitation and the speed of erosion is often magnified in certain areas by volcanic activity and harsh weather conditions.

Land reclamation activities focused in the beginning on areas in south and south west Iceland where problems of drifting sand were most evident in threatening farms and fishing villages. After World War II the reclamation effort was spread more widely but still with a focus on south Iceland. With increased resources after 1974 reclamation activity was extended to many inland locations that were prime sources of sand along major rivers or near outlets of rivers. With detailed information aquired from mapping of erosion severity, recent reclamation activity has become wider spread, more selective and targeted.

2.6.9 Waste

Waste management in Iceland has undergone impressive changes in the 21st century with increased separate collection of waste for recovery purposes. There was a steady increase of the total amounts of waste up to 2008 when there was a peak and then a fast decrease following the economic crisis. The total waste per capita reached 2008 levels again around 2013 and has been increasing fast ever since. From the year 1995, the amount of waste destined for landfill or other final disposal has decreased 50%

while there has been a fast increase in the amount of waste for recovery. Figure 2-24 and Figure 2-25 shows the development of the amounts of waste and the fate of the waste during this period.

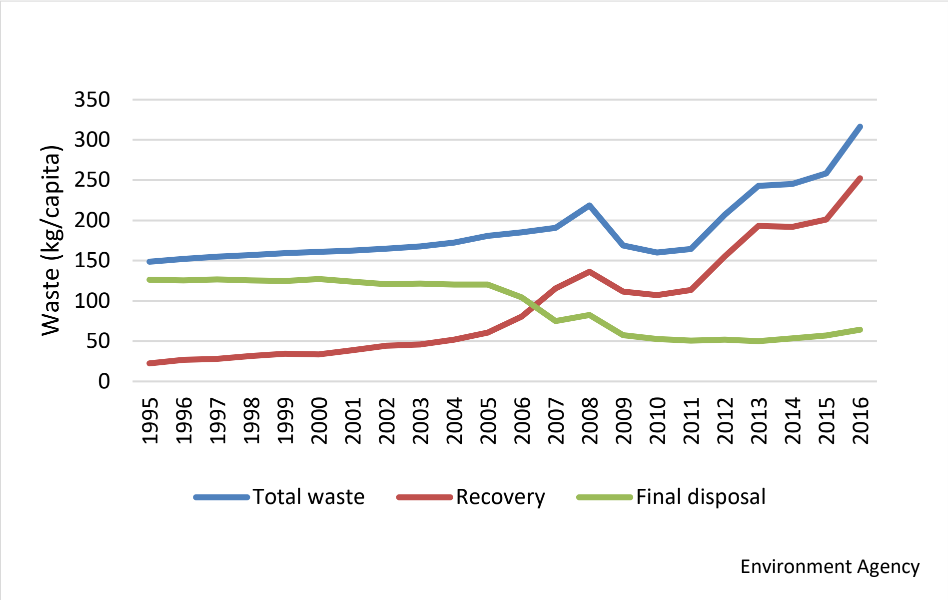

Figure 2-24 Changes in the amount of waste per capita in the years 1995 - 2016

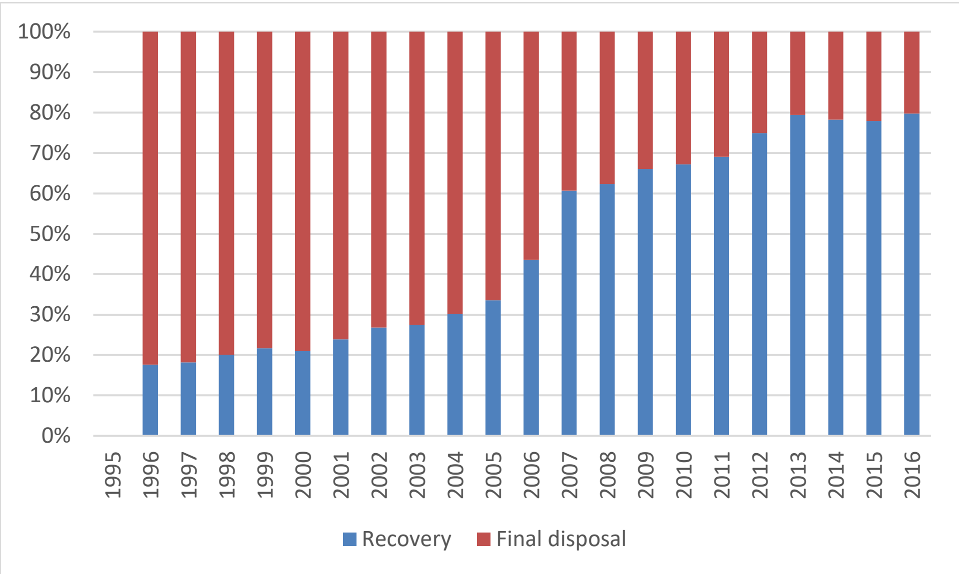

Figure 2-25 The development of the fate of waste in the years 1995 - 2016

Since 2002, there has also been great development in the composition of waste where mixed non-household waste has decreased very fast due to increased separation by the industry. More separation of waste has provided possibilities for increased waste recovery.

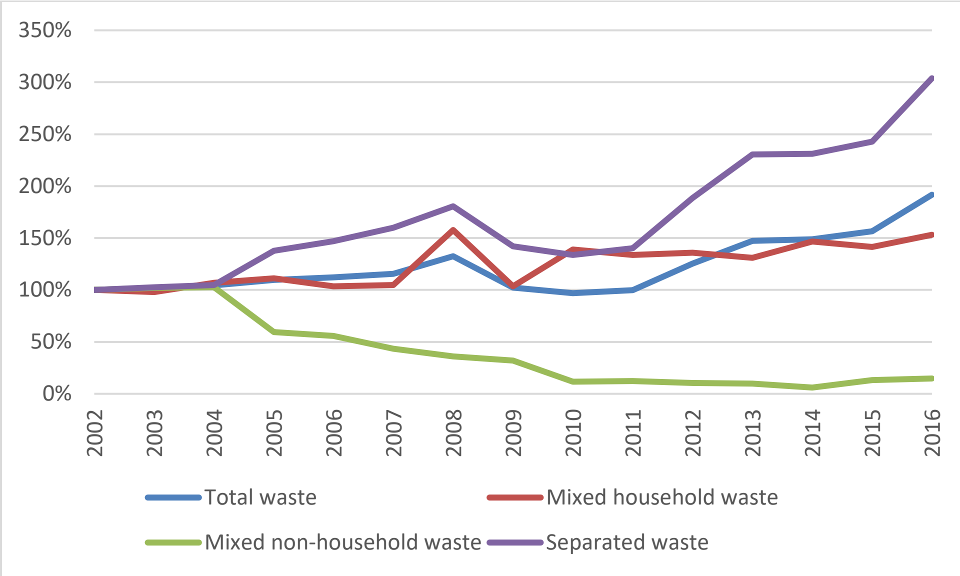

Figure 2-26 Proportional changes in the amount of waste per capita relative to 2002.

3 Greenhouse gas inventory information (including national system and national registries)

In this chapter the Iceland´s greenhouse gas (GHG) emissions and their trends for the period 1990- 2015 is presented. Information on Iceland´s national system for greenhouse gas inventory and the national registry is also presented. The informations are consistent with Iceland´s 2017 submission to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat with the latest data for the year 2015. Summary tables of GHG emissions in the common reporting format are presented in Annex III. The presented data is on direct greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N2 O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). Emissions of the precursors NO_X, NMVOC and CO as well as SO_2 are also included in the Inventory, in compliance with the reporting guidelines.

Iceland submitted to UNFCCC the 2017 annual Inventory data (CRF) on April 13th, 2017. During UNFCCC´s in-country review (28 August – 2 September 2017) the expert review team (ERT) raised some issues that were solved during the review week and lead to recalculations of Iceland´s inventory. Iceland therefore resubmitted the 2017 inventory data (CRF) to the UNFCCC on 31st of August 2017. Iceland´s 2017 National Inventory Report (NIR) was not updated in accordance to the recalculations. Iceland´s 2018 NIR will include information on the recalculations done during the UNFCCC review week, as well as information on other recalculations.

All recalculations were done for the timeseries 1990-2015 and increased Iceland´s total emissions (without LULUCF) by 0,37% in 1990 and 0,40% in 2015. Recalculations were done in all 1.A sectors and in sectors 1.B.2, 2C.2 and 3.A. No recalculations were done in the LULUCF or waste sector.

Annex V contains tables on the recalculations for each sector and subsectors.

All inventory data information published in this National Communication are based on Iceland's 2017 National Inventory Report submitted on April 13th, 2017, if not otherwise commented.

3.1 Background Information

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

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.

For the first commitment period of the Kyoto Protocol, from 2008 to 2012, the greenhouse gas emissions were not to increase by more than 10% from the level of emissions in 1990. Iceland AAUs for the first commitment period were decided in Iceland's Initial Report under the Kyoto Protocol and amounted to 18,523,847 tonnes of CO2-equivalents.

Decision 14/CP.7 on the "Impact of single project on emissions in the commitment period" allowed Iceland to report certain industrial process carbon dioxide emissions separately and not include them in national totals; to the extent they caused Iceland to exceed its assigned amount. For the first commitment period, from 2008 to 2012, the carbon dioxide emissions falling under decision 14/CP.7 were not to exceed 8,000,000 tonnes.

Iceland's initial AAUs for the first commitment period amounted to 18,523,847 tonnes of CO2-equivalents for the period or 3,704,769 tonnes per year on average. Added to that are a total of 1,541,960

RMUs from Art. 3.3 and Art. 3.4 activities and total of 33,125 AAUs, CERs and ERUs from Joint Implementation projects, resulting in an available assigned amount of 20,098,931 AAUs.

Emissions from Annex A sources during CP1 were 23,356,071 tonnes CO2-eq. This means that Annex A emissions were 3,257,140 tonnes CO2 in excess of Iceland´s available assigned amount.

Total CO2 emissions falling under Decision 14/CP.7 during CP1 were 5,912,964 tonnes CO2. Therefore, in order to comply with its goal for CP1, Iceland reported 3,257,140 tonnes of the CO2 emissions falling under decision 14/CP.7 separately and not include them in national totals.

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 (BEP) and best available technology (BAT) 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 industrial process carbon dioxide emissions falling under Decision 14/CP.7 cannot be transferred by Iceland or acquired by another Party under Articles 6 and 17 of the Kyoto Protocol. If carbon dioxide emissions are reported separately according to the Decision that will imply that Iceland cannot transfer assigned amount units to other Parties through international emissions trading.

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. Emissions that fall under Decision 14/CP.7 are not excluded from national totals in the Inventory report, as Iceland undertook the accounting with respect to the Decision at the end of the commitment period.

In 2015 an agreement was concluded between the European Union, its Member States and Iceland concerning Iceland´s participation in the joint fulfilment of commitments of the Union, the Member States and Iceland in the second commitment period of the Kyoto Protocol for the period 2013-2020. Therein the Parties agree to fulfil their quantified emission limitation and reduction commitments for the second commitment period inscribed in the third column of Annex B to the Kyoto Protocol jointly. Therefor the Icelandic National Inventory Report is submitted in accordance to article 7.1 of the European Union Monitoring Mechanism Regulation (MMR, Regulation 512/2013) and relevant articles and annexes in the implementing Regulation 749/2014. [13]

3.2 Greenhouse gas emissions and trends

The total amounts of greenhouse gases emitted in Iceland during the period 1990-2015 are presented in the following tables and figures, expressed in terms of contribution by gas and source.

Table 3-1 presents emission figures for greenhouse gases by sector in 1990, 2000, 2010, 2014 and 2015 expressed in kt. CO_2-equivalents along with percentage changes for both time periods 1990-2015 and 2014-2015. Table 3-2 presents emission figures for all greenhouse gases by gas in 1990, 2000, 2010, 2014, and 2015 expressed in kt. CO_2-equivalents along with percentage changes for both time periods 1990-2015 and 2014-2015.

[13] Regulation (EU) No 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions…

Table 3-1 **Emissions** ***of GHG by sector in Iceland during the period 1990-2015 (kt. CO_2-eq.)***

	1990	2000	2010	2014	2015	Changes ´90-´15	Changes ´14-´15
1 Energy	1,777	2,034	1,859	1,682	1,695	**-4.60%**	**0.80%**
2 Industrial Processes	954	1,004	1,947	1,939	2,021	**111.80%**	**4.23%**
3 Agriculture	647	596	594	623	616	**-4.88%**	**-1.74%**
4 Land Use, Land Use Change and Forestry	10,134	10,140	10,338	10,324	10,288	**1.52%**	**-0.35%**
5 Waste	164	229	247	208	207	**26.50%**	**-0.28%**
Total emissions without LULUCF	**3,541**	**3863**	**4,649**	**4,454**	**4,538**	**28.15%**	**1.88%**
Total emissions with LULUCF	**13,675**	**14,003**	**14,987**	**14,779**	**14,827**	**8.42%**	**0.32%**

Table 3-2 Emissions of greenhouse gases by gas in Iceland during the period 1990-2015 (without LULUCF) in kt. CO_2-eq.

	1990	2000	2010	2014	2015	1990	2000	Changes ´90-´15	Changes ´14-´15
CO_2	2,148	2,312	2,757	2,848	3,427	3,285	3,357	**56%**	**2%**
CH_4	522	540	559	563	585	549	552	**6%**	**1%**
N_2O	375	347	352	316	313	335	314	**-16%**	**-6%**
PFCs	495	69	150	31	172	99	104	**-79%**	**5%**
HFCs	0.3	10.2	43.3	69.3	145.8	181.7	207.0	-	**14%**
SF_6	1.1	1.2	1.3	2.5	4.7	2.2	1.5	**40%**	**-31%**
Total emissions	**3,541**	**3,281**	**3,863**	**3,830**	**4,647**	**4,452**	**4,536**	-	-
Total change	-	-	-	-	-	-	-	**28%**	**2%**

In 1990 total GHG emissions (excluding LULUCF) in Iceland were 3,541 kt CO_2-equivalents. In 2015 total emissions were 4,538 kt CO_2-equivalents. This is tantamount to an increase of 28% over the whole time period. Total emissions show a slight decrease between 1990 and 1994, with the exception of 1993. From 1995-1999 total emissions increased by 3 to 6% per year, then plateaued from 2000 to 2005. Between 2005 and 2008 emissions increased rapidly or by 5 to 15%% per year. Between 2008 and 2010 annual emissions decreased again by on average 4% per year. Emissions increased by 2% between 2014 and 2015.

By the middle of the 1990s economic growth started to gain momentum in Iceland. Until 2007 Iceland experienced one of the highest GDP growth rate among OECD countries. In the autumn of 2008, Iceland was hit by an economic crisis when three of the largest banks collapsed. The blow was particularly hard owing to the large size of the banking sector in relation to the overall economy as the sector´s worth was about ten times the annual GDP. The crisis resulted in a serious contraction of the economy followed by an increase in unemployment, a depreciation of the Icelandic króna (ISK), and a drastic increase in external debt. Private consumption contracted by 20% between 2007 and 2010. Emissions of greenhouse gases decreased from most sectors between 2008 and 2011.

The main driver behind increased emissions since 1990 has been the expansion of the metal production sector. In 1990, 87,839 tonnes of aluminium were produced in one aluminium plant in Iceland. A second aluminium plant was established in 1998 and a third one in 2007. In 2015, 857,319 tonnes of aluminium were produced in three aluminium plants (primary aluminium production). Parallel investments in increased power capacity were needed to accommodate for this almost tenfold increase in aluminium production. The size of these investments is large compared to the size of Iceland´s economy.

The increase in GDP since 1990 further explains the general growth in emissions as well as the fact that the Icelandic population has grown by 30% from 1990 to 2015. This has resulted in higher emissions from most sources, but in particular from transport and the construction sector. Emissions from the transport sector have risen considerably since 1990, as a larger share of the population uses private cars for their daily travel. Since 2008 fuel prices have risen significantly leading to lower emissions from the sector compared to preceding years. A knock-off effect of the increased levels of economic growth until 2007 was an increase in construction, especially residential building in the capital area. The construction of a large hydropower plant (Kárahnjúkar, building time from 2002 to 2007) led to further increase in emissions from the sector. The construction sector collapsed in late 2008. Emissions from fuel combustion in the transport and construction sector decreased in 2008 by 5% compared to 2007, in 2009 by 8% compared to 2008, in 2010 by 7% compared to 2009 and in 2011 by 5% compared to 2010, because of the economic crises. In 2015 the emissions were 5% higher than in 2011, yet still 19% below the peak in 2007. Emissions from Cement production had decreased by 69% since 2007 (process emissions and emissions from fuel consumption) also as a result of the economic crises and the collapse of the construction sector. Cement production was shut down in late 2011.

The overall increasing trend of greenhouse gas emissions until 2005 was counteracted to some extent by decreased emissions of PFCs, caused by improved technology and process control in the aluminium industry. Increased emissions due to an increase in production capacity of the aluminium industry (since 2006) led to a trend of overall increase in greenhouse gas emissions between 2006 and 2008, when emissions from the aluminium sector peaked. In 2015 total emissions from the aluminium sector were 12% lower than in 2008 due to less PFC emissions from the sector.

3.2.1 Emission Trends by Gas

All values in this chapter refer to Iceland´s total GHG emissions without LULUCF. The largest contributor by far to total GHG emissions in 2015 is CO_2 (74%), followed by CH_4 (12%), N_2O (7%) and fluorinated gases PFCs (2%), HFCs (5%), and SF_6(0,03%). In the year 2015, the changes in gas emissions compared to 1990 levels for PFCs and have decreased significantly -79% and -16% respectively. CO_2 have increased the most or by 56%. See Figure 3-2.

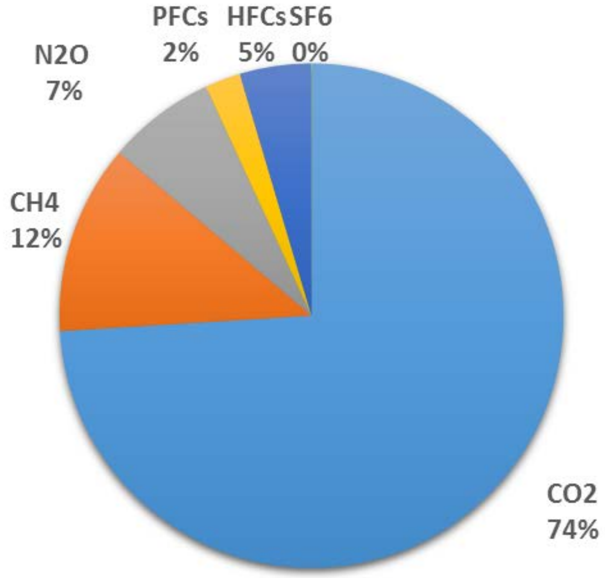

Figure 3-1 Distribution of emissions of GHG by gas in 2015.

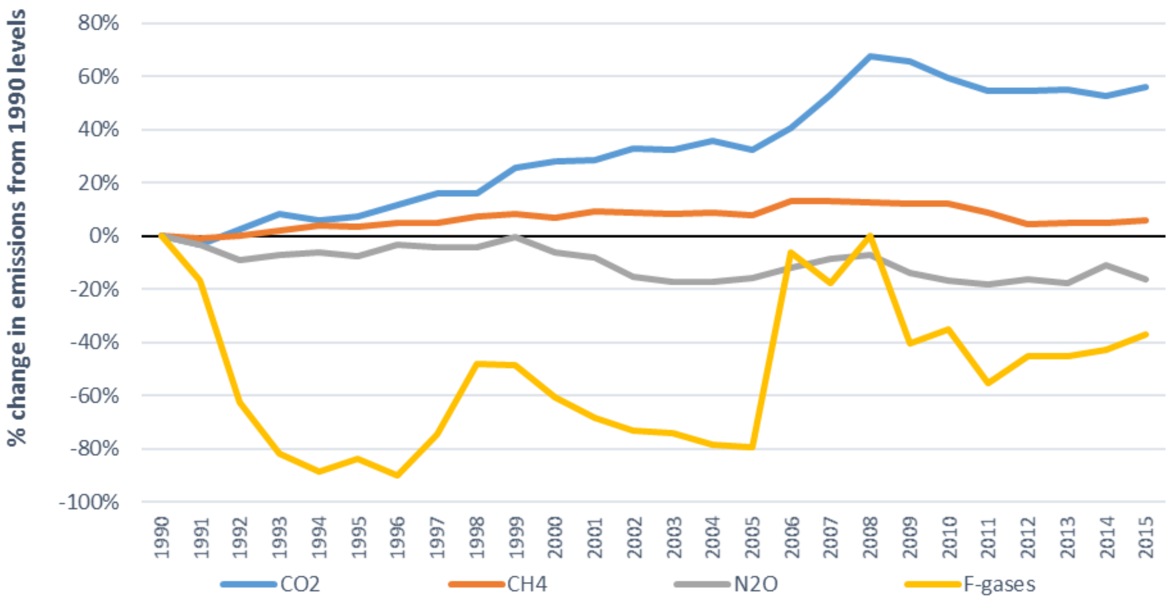

Figure 3-2 Percentage changes in emissions of GHG by gas 1990-2015, compared to 1990 levels.

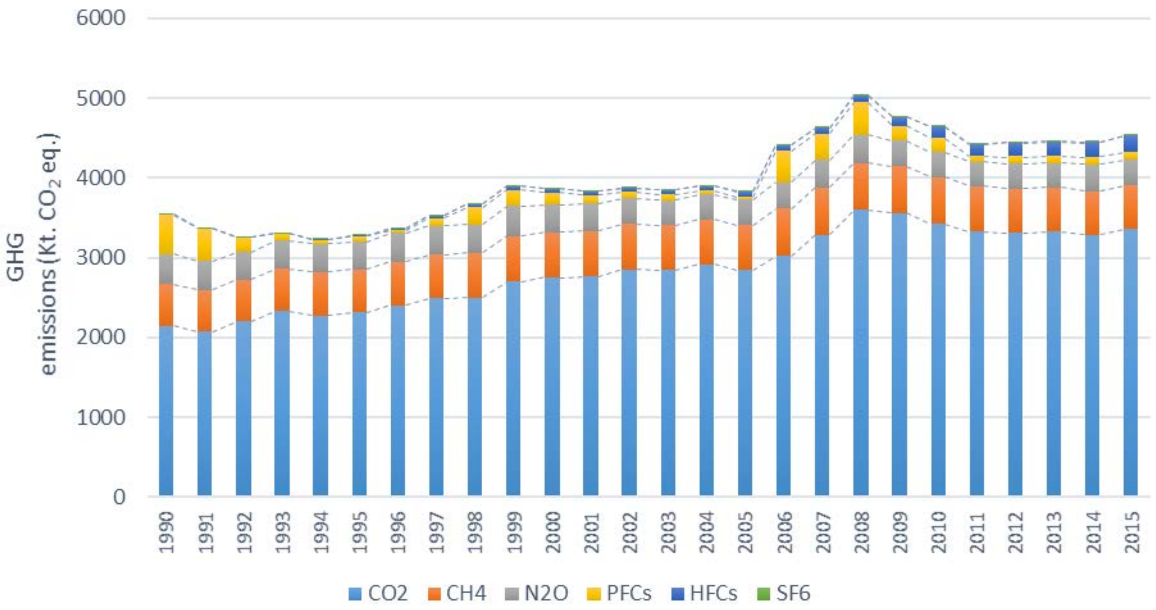

Figure 3-3 Emissions of greenhouse gases by gas, 1990-2015.

3.2.1.1 Carbon Dioxide (CO_2)

Industrial processes, road transport and commercial fishing are the three main sources of CO_2 emissions in Iceland. Since emissions from electricity generation and space heating are low, as 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 sector are also significant (though much lower since 2008 than in the years before). Emissions from geothermal energy exploitation are considerable. Other sources consist mainly of emissions from non-road transport and waste incineration. Table 3-3 lists CO_2 emissions from the main source categories for the period 1990-2015. Table 3-3 shows the percentage change in emissions of CO_2 by source from 1990 to 2015 compared with 1990 levels.

Table 3-3 Emissions f CO_2 (kt.) by sector 1990-2015.

	1990	1995	2000	2005	2010	2014	2015
1. Energy	1,736	1,866	1,969	1,991	1,801	1,626	1,643
2. Industrial processes	405	441	786	853	1,620	1,652	1,704
3. Agriculture	0	0	0	0	0	0	1
5. Waste	7	5	3	5	6	6	9
Total CO_2 emissions (kt.)	**2,148**	**2,312**	**2,757**	**2,848**	**3,427**	**3,285**	**3,357**

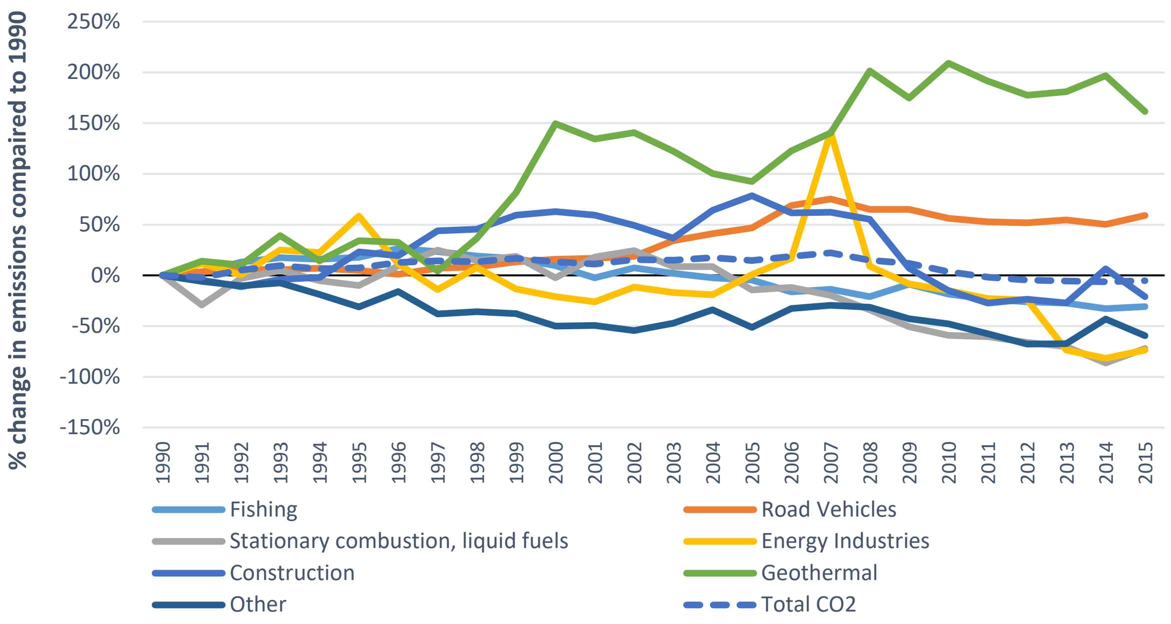

Figure 3-4 Percentage changes in CO_2 emissions by major sources 1990-2015, compared to 1990.

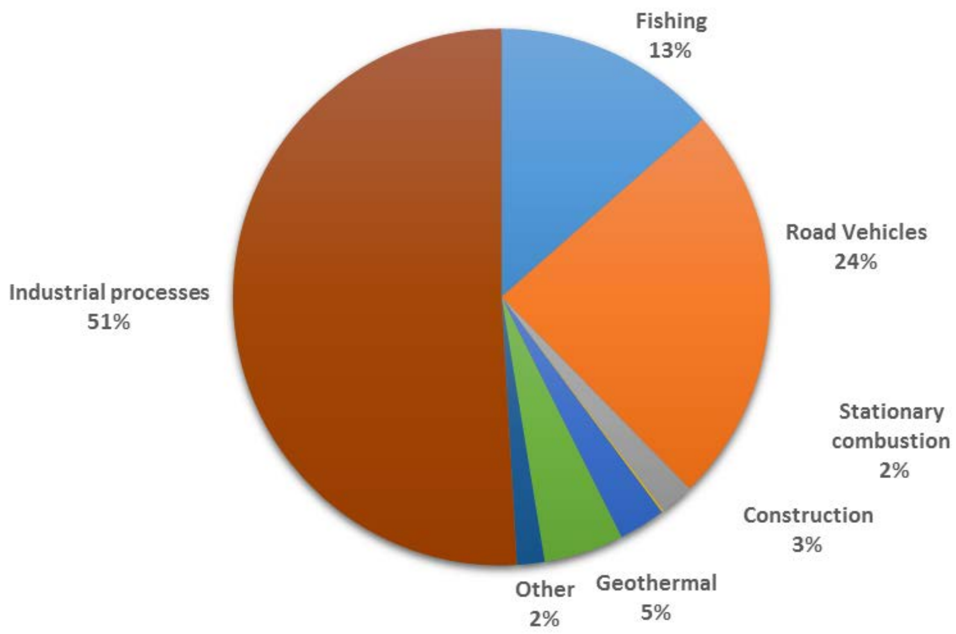

Figure 3-5 Distribution of CO_2 emissions by source in 2015.

In 2015, Iceland´s total CO2 emissions were 3,357 kt. This is tantamount to an increase of 56.7% from 1990 levels and an increase of 2.4% from the preceding year. CO2 emissions from Industrial Processes increased by 3.3% from 2014 to 2015 due to increase emissions from the mineral production, metal production, non-energy products from fuels and solvent use and fireworks. Emissions from geothermal energy exploitation decreased by 11.8% between 2014 and 2015. Emissions from road vehicles peaked in 2007 but were 9.6% lower in 2015 than in 2007. This decreasing trend is caused by significantly higher fuel prices, owing to the depreciation of the Icelandic króna since 2008, and by an increasing share of fuel efficient vehicles in the fleet. In 2009, 2010 and 2011 fuel prices continued to rise. In recent years more fuel efficient vehicles have been imported – a turn-over of the trend from the years 2002 to 2007 when larger vehicles were imported. This can be seen in less fuel consumption in 2010 than in 2009 despite the fact that driven mileage stayed almost the same. Driven mileage decreased by 5% for gasoline passenger cars and by 6% for diesel fueled cars between 2011 and 2012 but is on the rise again. Emissions from stationary combustion of liquid fuels increased by 102% from 2014 to 2015. Emissions from construction decreased by 26% and emissions from other sources decreased by 29% during the same time period.

The increase in CO_2 emissions between 1990 and 2015 can be explained by increased emissions from industrial processes (361%), road transport (59%) and geothermal energy utilisation (162%). Total CO_2 emissions from the commercial fishing on the other hand declined by 31% respectively. In 2007 residual oil use in energy industries increased significantly due to insufficient supply of electricity

The main driver behind increased emissions from industrial processes since 1990 has been the expansion of the metal production sector, in particular the aluminium sector. In 1990, 87,839 tonnes of aluminium were produced in one aluminium plant in Iceland. A second aluminium plant was established in 1998 and a third one in 2007. In 2015, a total of 857,319 tonnes of aluminium were produced in these three aluminium plants, corresponding to a 2.13% production increase since 2014.

CO_2 emissions from road transport have increased by 59% since 1990, owing to increases in population, number of cars per capita, more mileage driven, and - until 2007 - an increase in the share of larger vehicles. Since 1990 the vehicle fleet in Iceland has increased by 78%. Emissions from both domestic flights and navigation have declined since 1990.

Emissions from geothermal energy exploitation have increased 162% since 1990. Electricity production using geothermal energy has increased from 283 GWh in 1990 to 5,003 GWh in 2015, or close to 18-fold.

CO_2 emissions from commercial 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 then increased again by 10% between 2001 and 2002, but in 2003 they dropped to 1990 levels. In 2015, the emissions were 31% below the 1990 levels and 3% below the 2014 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 between 2004 and 2007 when they were 18% above the 1990 level. This is mainly due to changes in the cement industry where production had been slowly decreasing since 1990. The construction of the Kárahnjúkar hydropower plant (building time from 2002 to 2007) increased demand for cement, and the production at the cement plant increased again between 2004 and 2007, although most of the cement used in this project was imported. In 2011, emissions from cement production were 67% lower than in 2007, due to the collapse of the construction sector. The sole cement plant ceased operation in late 2011. CO_2 emissions from other sources in 2015 were 4.9% below the 1990 levels and 30% below the 2014 level.

3.2.2 Methane (CH4)

Agriculture and waste treatment have been the main sources of methane emissions since 1990. In 2015 they comprised 64% and 34% of total methane emissions, respectively. The main methane source in the agriculture sector is enteric fermentation, the main source in the waste sector is solid waste disposal on land. Together they accounted for roughly 87% of all methane emissions in 2015.

Methane emissions from agriculture decreased by 3.2% between 1990 and 2015 due to a decrease in livestock population. Emissions from waste, on the other hand, increased by 26.7% during the same period. Emissions from waste treatment increased sharply from 1990 to 2007 although the amount of waste landfilled had been oscillating between 300 and 350 kt. from 1986 to 2005. The increase was due to an increasing share of waste landfilled in well managed solid waste disposal sites which are characterised by a higher methane correction factors than unmanaged sites. The decrease in methane emissions from the waste sector since 2005 by 23% is due to a decrease in the amount of waste landfilled since 2005 (Table 3-4 and Figure 3-6).

Table 3-4 Emissions of CH_4 by sector 1990-2015 (kt. CO_2-eq.).

	1990	1995	2000	2005	2010	2014	2015
1. Energy	6.5	6.4	6.2	6.2	8.5	7.6	7.7
2. Industrial processes	0.7	0.7	1.1	1.3	1.1	1.3	1.4
3. Agriculture	364	338	332	322	342	347	353
5. Waste	150	196	220	233	233	193	190
Total CH_4 emissions	**522**	**540**	**559**	**563**	**585**	**549**	**552**

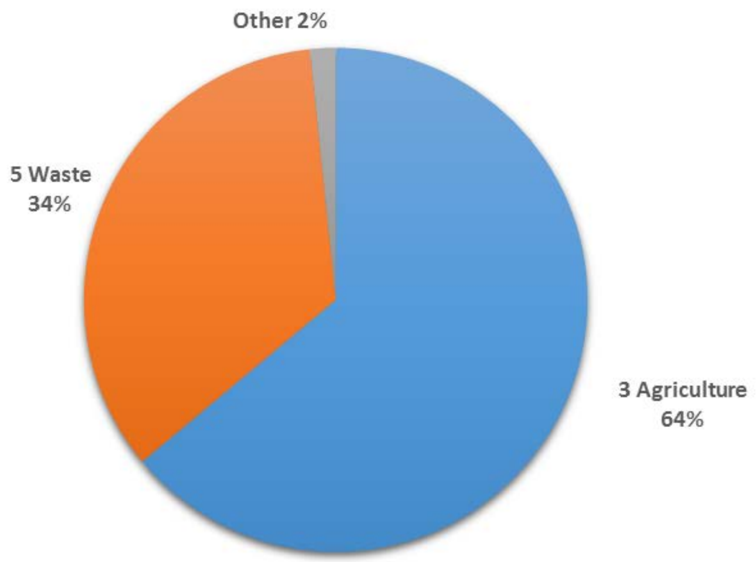

Figure 3-6 Distribution of CH_4 emissions by source in 2015.

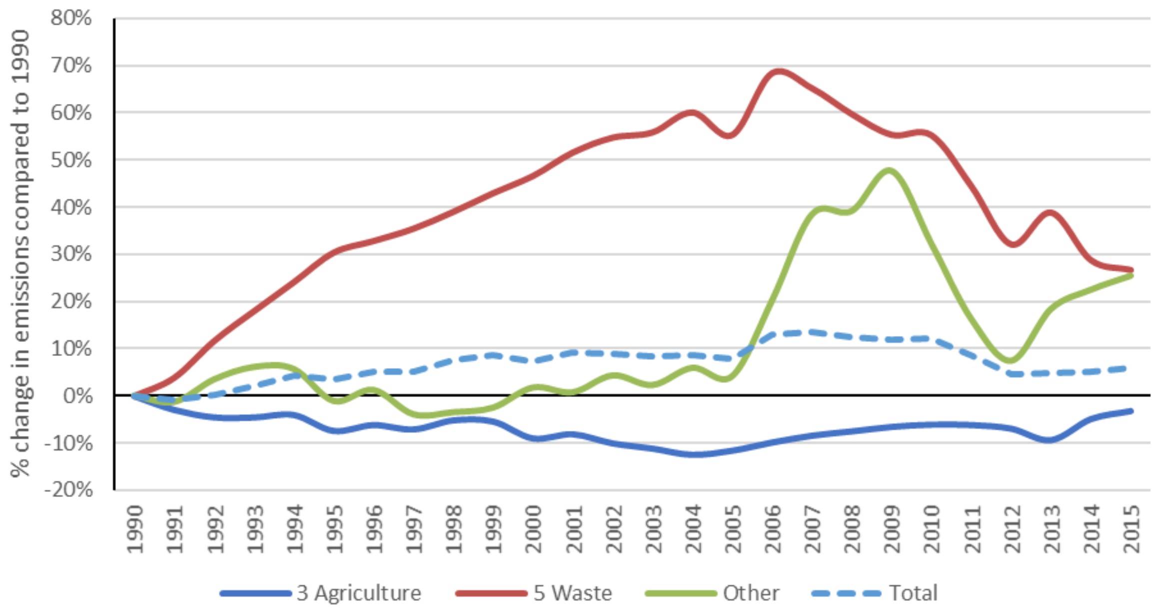

Figure 3-7 Percentage changes in CH_4 emissions by major sources 1990-2015, compared to 1990.

3.2.2.1 Nitrous Oxide (N_2O)

Agriculture has been the main source of N_2O emissions in Iceland and accounted for 82% of nitrous oxide emissions in 2015 (Table 3-5 and Figure 3-8). Direct and indirect N_2O emissions from agricultural soils were the most prominent emission contributors, followed by emissions from unmanaged manure and manure managed in solid storage. Emissions from the agriculture sector decreased by 8% since 1990. This development was mainly due to a decrease in livestock populations accompanied by a decrease in manure production. The second most important source of N_2O, since the shutdown of the fertilizer plant in 2001, is road transport. Emissions increased rapidly when catalytic converters became obligatory in all new vehicles in 1995. N_2O is a by-product of NO_x reduction in catalytic converters. Total nitrous oxide emissions have decreased by 16% since 1990.

Table 3-5 Emissions of N_2O by sector 1990-2015 (kt. CO_2-eq.).

	1990	1995	2000	2005	2010	2014	2015
1 Energy	34	43	59	66	49	48	44
2 Industrial processes	52	45	22	3.4	3.6	2.9	2.9
3 Agriculture	282	253	264	240	252	276	259
5 Waste	6.4	6.3	6.1	6.3	7.7	8.3	8.4
Total N_2O emissions	**375**	**347**	**352**	**316**	**313**	**335**	**314**

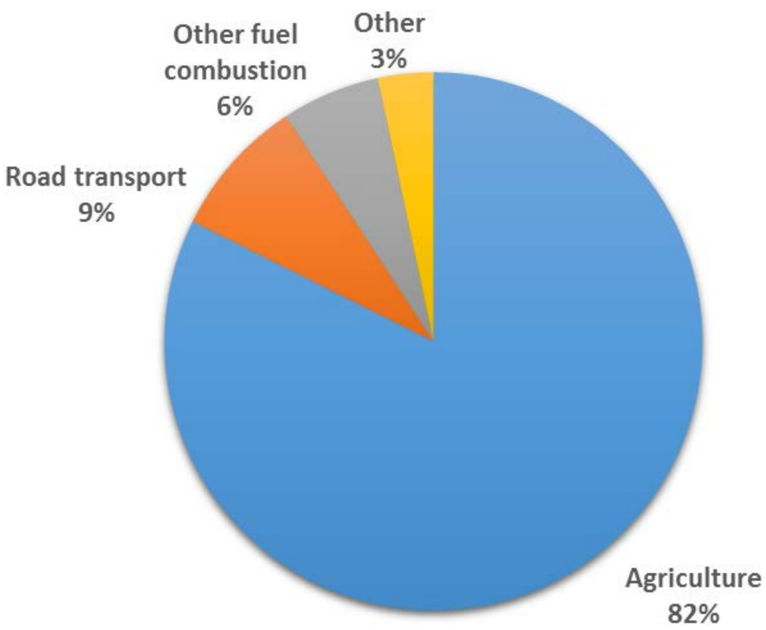

Figure 3-8 Distribution of N_2O emissions by source in 2015.

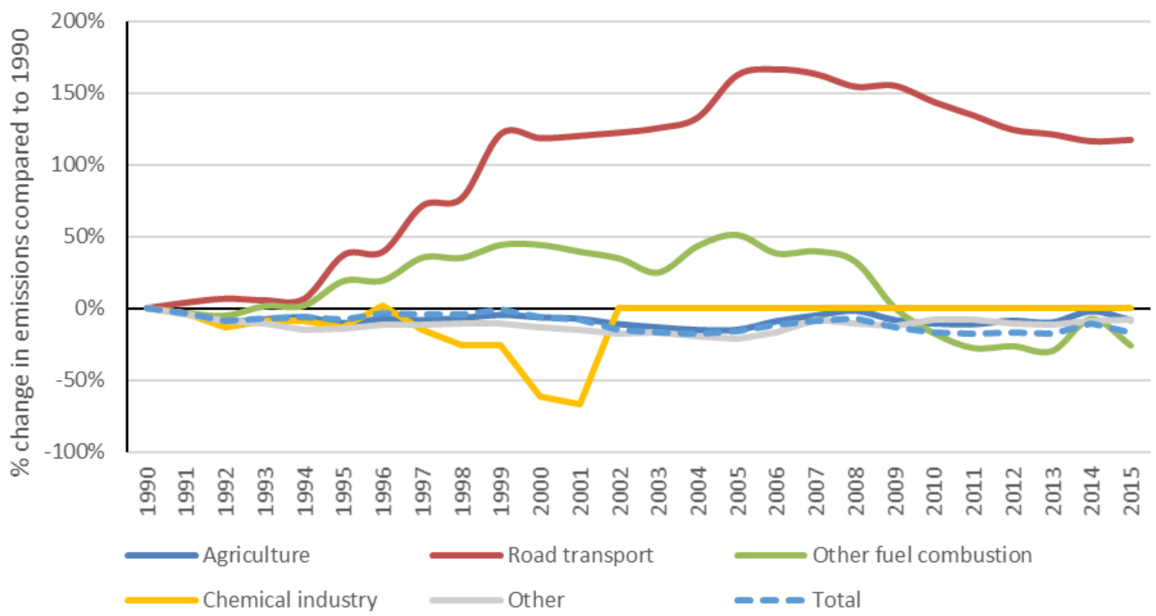

Figure 3-9 Changes in N_2O emission for major sources between 1990 and 2015.

The trend for Chemical Industry stops in 2001, where the fertilizer factory shut down, thereby ending N_2O emissions from the Chemical industry.

3.2.2.2 Perfluorocarbons (PFCs)

Perfluorocarbon emissions in Iceland come from the aluminium industry (tetrafluoromethane (CF4) and hexafluoroethane (C2F6)), and from refrigeration equipment (hexafluoroethane (C2F6) commercially known as PFC116, and octafluoropropane (C3F8), commercially known as PFC218)). The emissions of the perfluorocarbons, i.e. tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6) from the aluminium industry were 86.4 and 17.3 kt CO_2-equivalents respectively in 2015, or 103.7 kt. CO_2-equivalents in total. Emissions of PFCs (PFC 116 and PFC 218) from consumption of halocarbons in refrigeration and air conditioning equipment were 0.015 kt. CO_2-equivalents in 2015.

Total PFC emissions decreased by 79% in the period of 1990-2015. The emissions decreased steadily from 1990 to 1996 with the exception of 1995, as can be seen from Figure 3-10. At that time one aluminium plant was operating in Iceland. PFC emissions per tonne of aluminium are generally high during start up and usually rise during expansion. The emissions therefore rose again due to the expansion of the Rio Tinto Alcan aluminium plant in 1997 and the establishment of the Century Aluminium plant in 1998. The emissions showed a steady downward trend between 1998 and 2005. The PFC reduction was achieved through improved technology and process control and led to a 98% decrease in the amount of PFC emitted per tonne of aluminium produced during the period of 1990 to 2005. The PFC emissions rose significantly in 2006 due to an expansion of the Century Aluminium facility. PFC emissions per tonne of aluminium went down from 2007 to 2010 and reached 2005 levels in 2010 at the Century Aluminium plant. The Alcoa Fjarðarál aluminium plant was established in 2007 and reached full production capacity in 2008. The decline in PFC emissions in 2009, 2010 and 2011 was achieved through improved process control at both Century Aluminium plant and Alcoa Fjarðarál (except in December at Alcoa), as the processes have become more stable after a period of start-up in both plants. In December 2010, a rectifier was damaged in fire at Alcoa. This led to increased PFC emissions leading to higher emissions at the plant in 2010 than in 2009.

To a very small extent PFCs have also been used as refrigerants. C_2F_6 has been used in refrigeration and air conditioning equipment since 2002 (0.001 to 0.007 kt. CO_2-equivalents per year) and C_3F_8 was used in refrigeration and air conditioning equipment for the first time in 2009.

Table 3-6 Emissions of PFCs 1990-2015 (kt. CO_2-eq.).

	1990	1995	2000	2005	2010	2014	2015
1 Energy	NO	NO	NO	NO	NO	NO	NO
2 Industrial processes	495	69	150	31	172	99	104
3 Agriculture	NO	NO	NO	NO	NO	NO	NO
5 Waste	NO	NO	NO	NO	NO	NO	NO
Total PFCs emissions	**495**	**69**	**150**	**31**	**172**	**99**	**104**

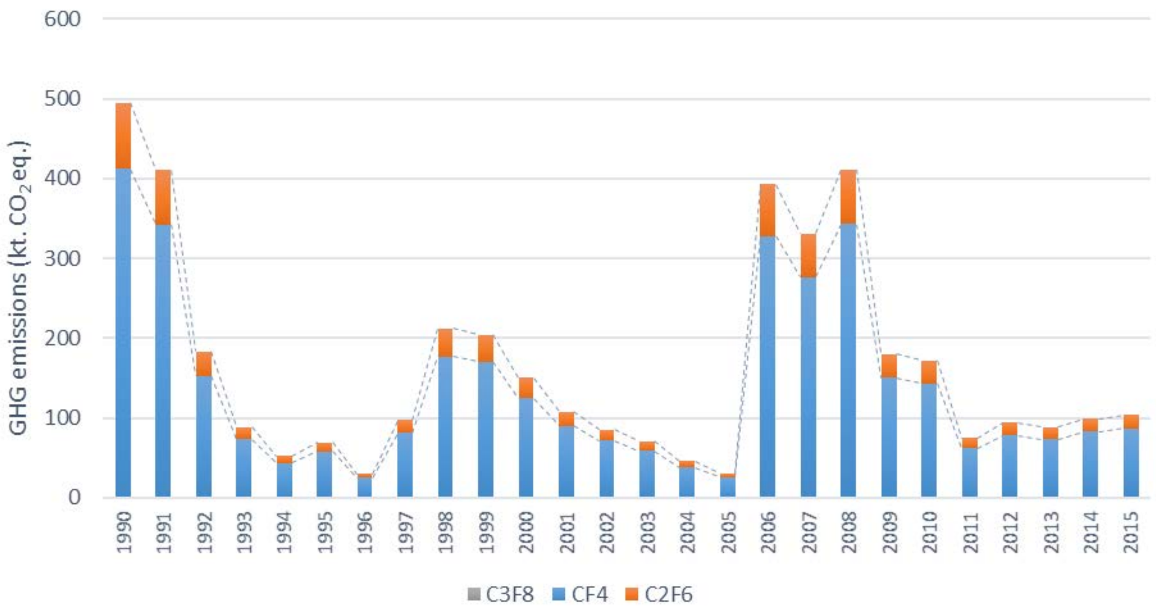

Figure 3-10 Emissions of PFCs from 1990 to 2015 (kt. CO_2-eq.).

3.2.2.3 Hydrofluorocarbons (HFCs)

Total emissions of HFCs, used as substitutes for ozone depleting substances (ODS), amounted to 207 kt. CO2-equivalents in 2015 (Table 3-7). The import of HFCs started in 1993 and has increased until 2010 in response to the phase-out of ODS like chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). Import numbers decreased strongly in 2011, causing only a slight decrease in emissions due to the time lag between refrigerant use and leakage. Refrigeration and air-conditioning were by far the largest sources of HFC emissions and the fishing industry plays an eminent role.

Table 3-7. Emissions of HFCs from 1990 to 2015 (kt. CO_2-eq.).

	1990	1995	2000	2005	2010	2014	2015
1 Energy	NO	NO	NO	NO	NO	NO	NO
2 Industrial processes	0.34	10.2	43.3	69.3	146	182	207
3 Agriculture	NO	NO	NO	NO	NO	NO	NO
5 Waste	NO	NO	NO	NO	NO	NO	NO
Total HFCs emissions	**0.34**	**10.2**	**43.3**	**69.3**	**146**	**182**	**207**

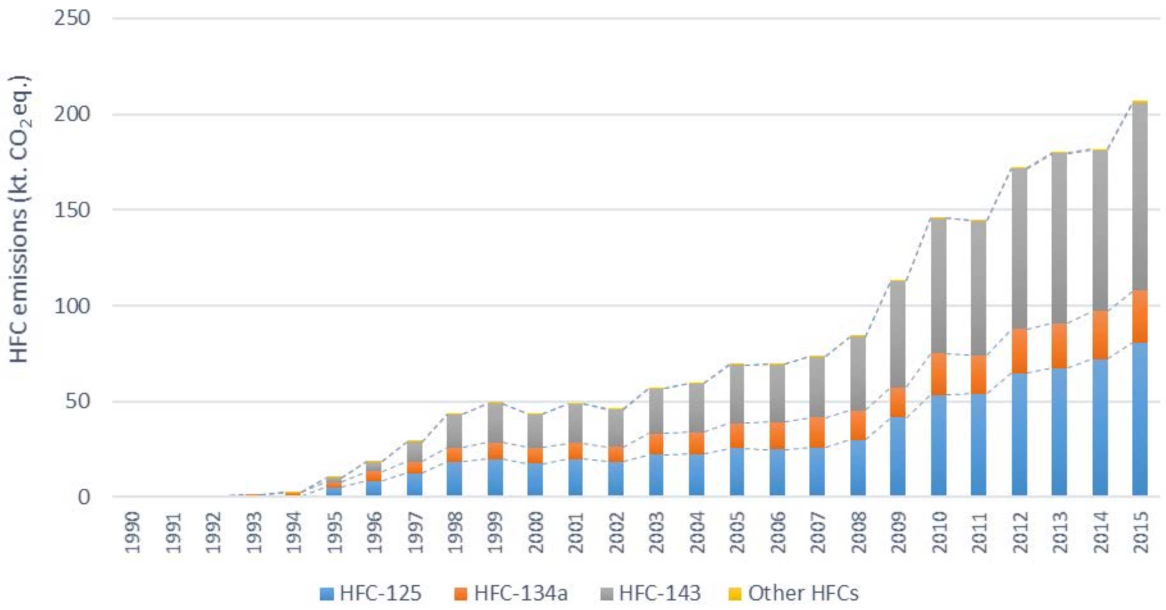

Figure 3-11 Emissions of HFCs from 1990 to 2015 (kt. CO_2-eq.).

3.2.2.4 Sulphur Hexafluoride (SF_6)

The sole source of SF_6 emissions in Iceland is leakage from electrical equipment. Total emissions in 2015 were 67.1 kg SF_6 which is tantamount to 1.53 kt. CO_2-equivalents. Emissions have increased by 39.5% since 1990. This increase reflects the expansion of the Icelandic electricity distribution system since 1990 which is accompanied by an increase in SF_6 used in high voltage gear. The emission peak in 2010 was caused by two unrelated accidents during which the SF_6 amounts contained in the gear affected by the accidents was emitted see Figure 3-11. The emission peak in 2012 was caused by increased leakage in the transmission grid of Landsnet LLC.

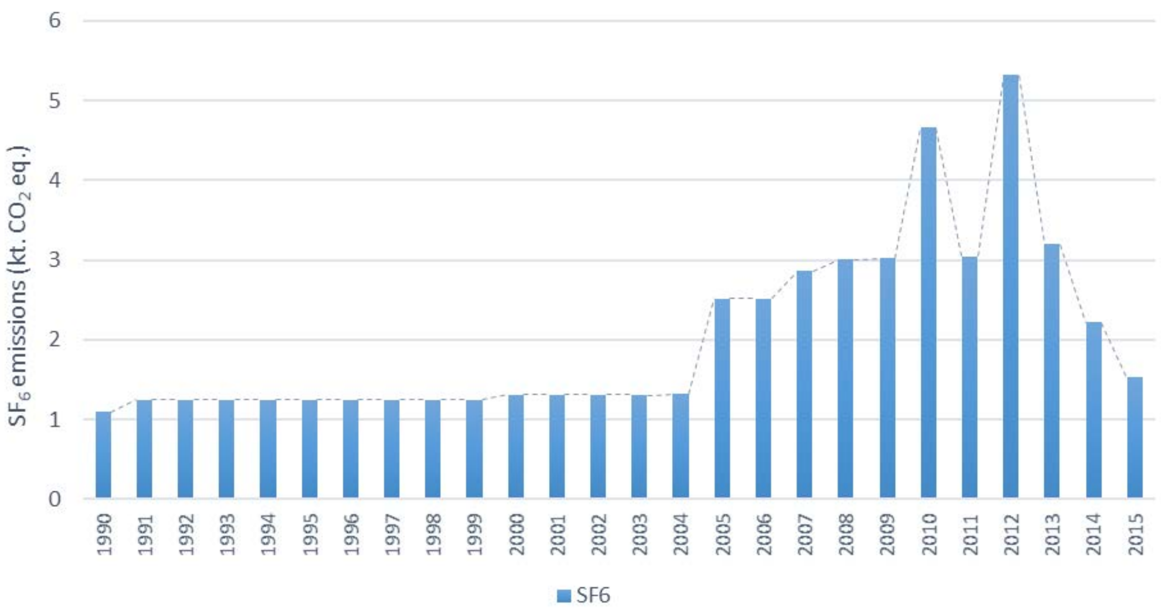

Figure 3-12 Emissions of SF_6 from 1990 to 2015 (kt. CO_2-eq.).

3.3 Emission Trends by Source

Industrial processes are the largest contributor of greenhouse gas emissions in Iceland (without LULUCF), followed by Energy, Agriculture, and Waste. The contribution of Industrial Processes to total net emissions (without LULUCF) increased from 27% in 1990 to 44% in 2015. The contribution of the Energy sector decreased from 50% in 1990 to 38% in 2015. Agriculture and the Waste sector accounted for 14% and 5% of 2015 emissions, respectively, see Figure 3-13 and Figure 3-14.

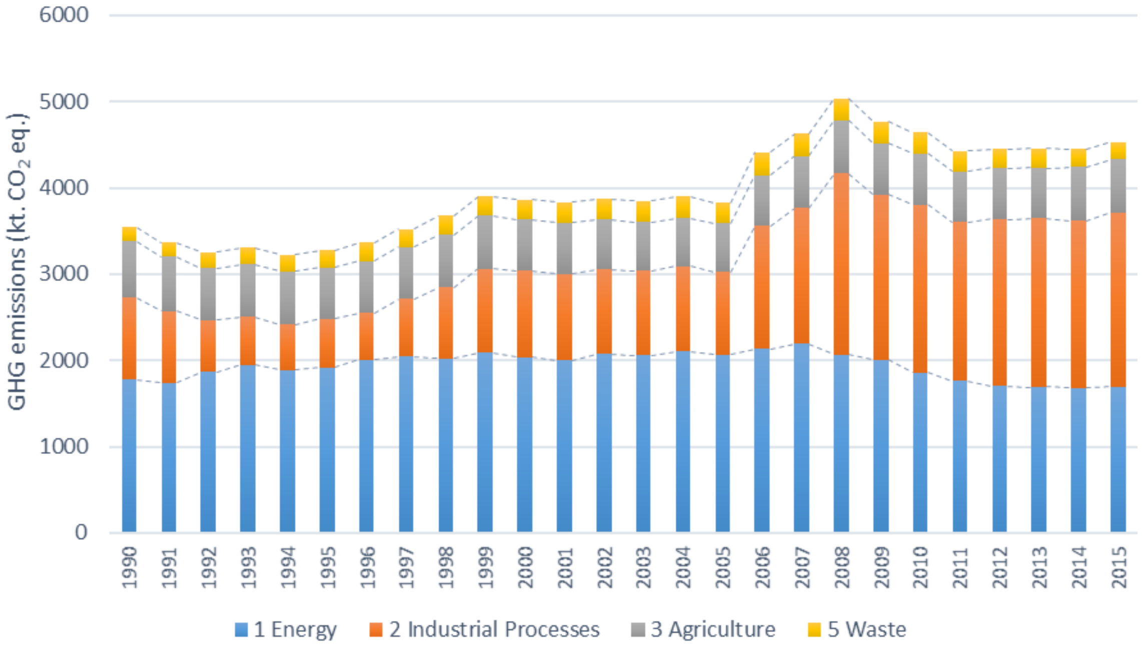

Figure 3-13 Emissions of GHG by UNFCCC sector, without LULUCF, 1990 to 2015 (kt. CO_2-eq.).

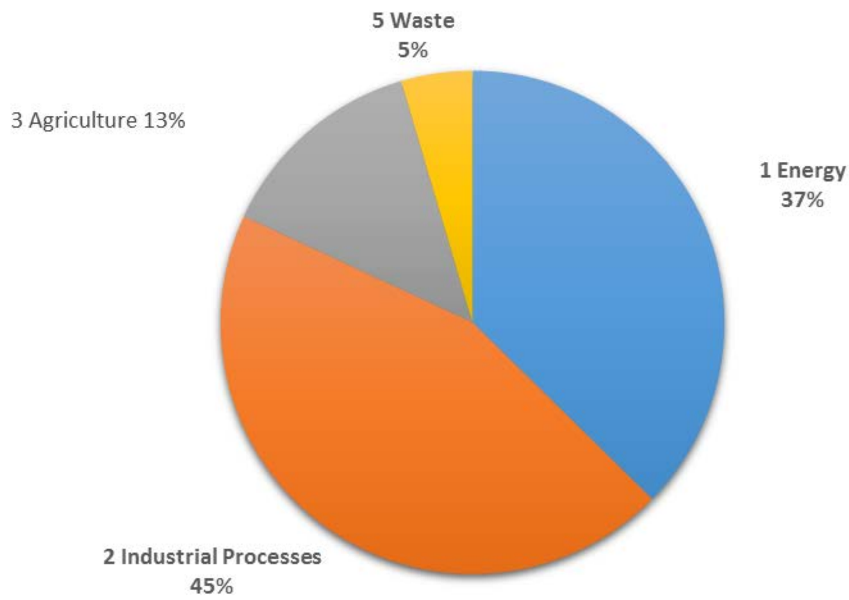

Figure 3-14 Emissions of GHG by UNFCCC sector in 2015 (CO_2-eq.).

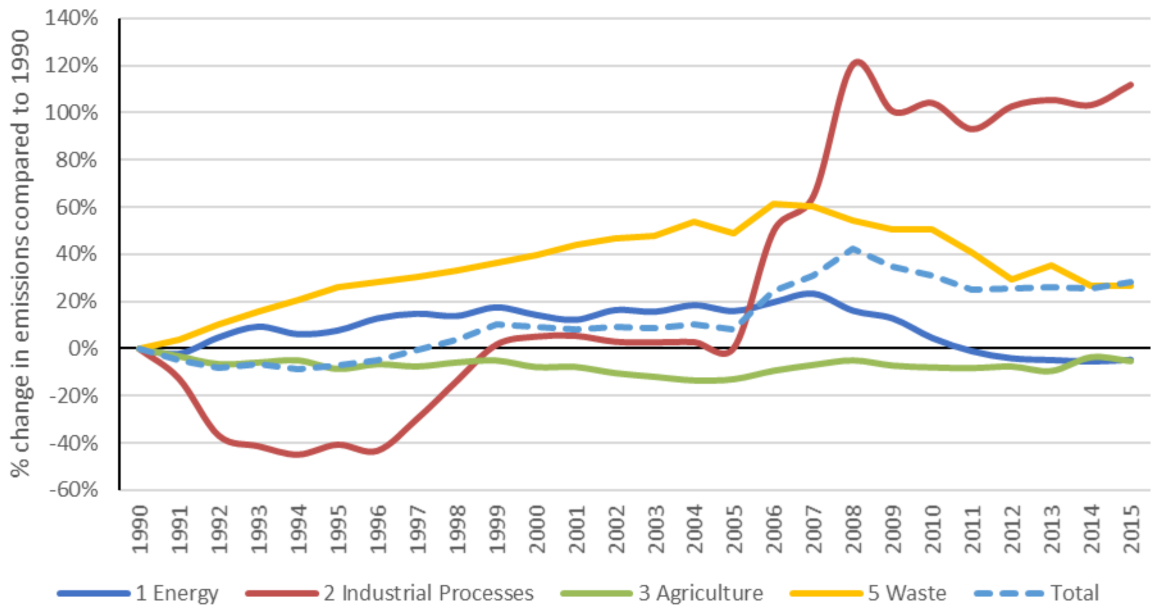

Figure 3-15 Percentage changes in total GHG emissions by sectors 1990-2015, compared to 1990.

3.3.1 Energy

The Energy sector in Iceland is unique in many ways. Iceland ranks 1st among OECD countries in the per capita consumption of primary energy and in 2015 the consumption per capita was about 785 GJ. However, the proportion of domestic renewable energy in the total energy budget is 85.3%, 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. Also, key export industries such as fisheries and metal production are energy-intensive. The metal industry used around 75% of the total electricity produced in Iceland in 2015. Iceland relies heavily on its geothermal energy sources for space heating (over 90% of all homes) and electricity production (30% of the electricity) and on hydropower for electricity production (70% of the electricity).

The development of the energy sources in Iceland can be divided into three phases. The first phase covered the electrification of the country and harnessing the most accessible geothermal fields, mainly for space heating. In the second phase, steps were taken to harness the resources for power-intensive industry. This began in 1966 with agreements on the building of an aluminium plant, and in 1979 a ferrosilicon plant began production. In the third phase, following the oil crisis of 1973-1974, efforts were made to use domestic sources of energy to replace oil, particularly for space heating and fishmeal production. Oil has almost disappeared as a source of energy for space heating in Iceland, and domestic energy has replaced oil in industry and in other fields where such replacement is feasible and economically viable.

Table 3-8 shows the distribution of emissions in 2015 by different source categories. The relative contributions of the various source categories to the total emissions of the Energy sector are shown in Figure 2.16. The percentage change in the various source categories in the Energy sector between 1990 and 2015, compared with 1990, is illustrated in Figure 3-17.

Table 3-8 Total GHG emissions from fuel combustion in the Energy sector in 1990-2015 (kt. CO_2-eq.).

	1990	1995	2000	2005	2010	2014	2015
1A1 Energy industries	14	22	11	14	12	3	4
1A2 Manufacturing industry and construction	244	219	237	209	100	33	68
1A3 Transport	617	622	660	831	884	855	886
1A4 Other Sectors	840	970	971	888	668	604	572
1B2 Fugitive Emissions from Fuels (Geothermal energy)	62	83	155	121	195	187	165
Total emissions (kt.)	**1,777**	**1,916**	**2,034**	**2,063**	**1,859**	**1,682**	**1,695**

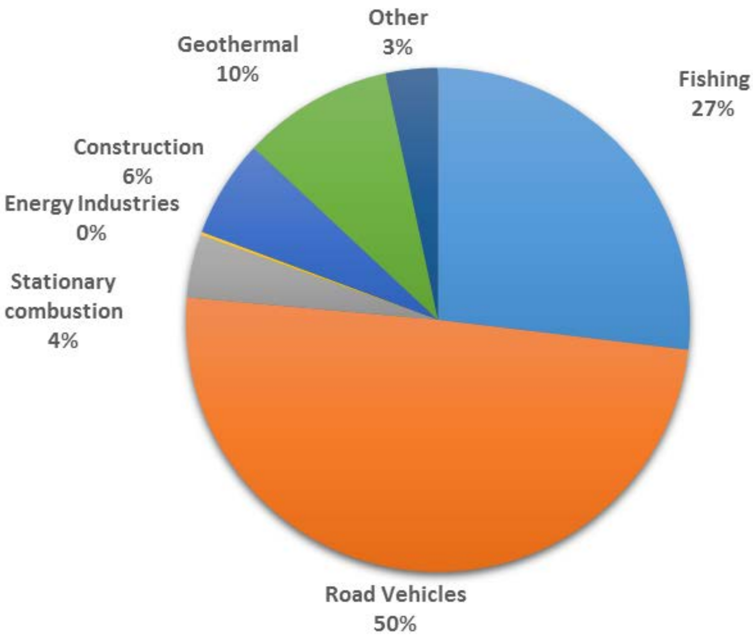

Figure 3-16 GHG emissions in the Energy sector 2015, distributed by source categories. during 1990-2015, compared to 1990.

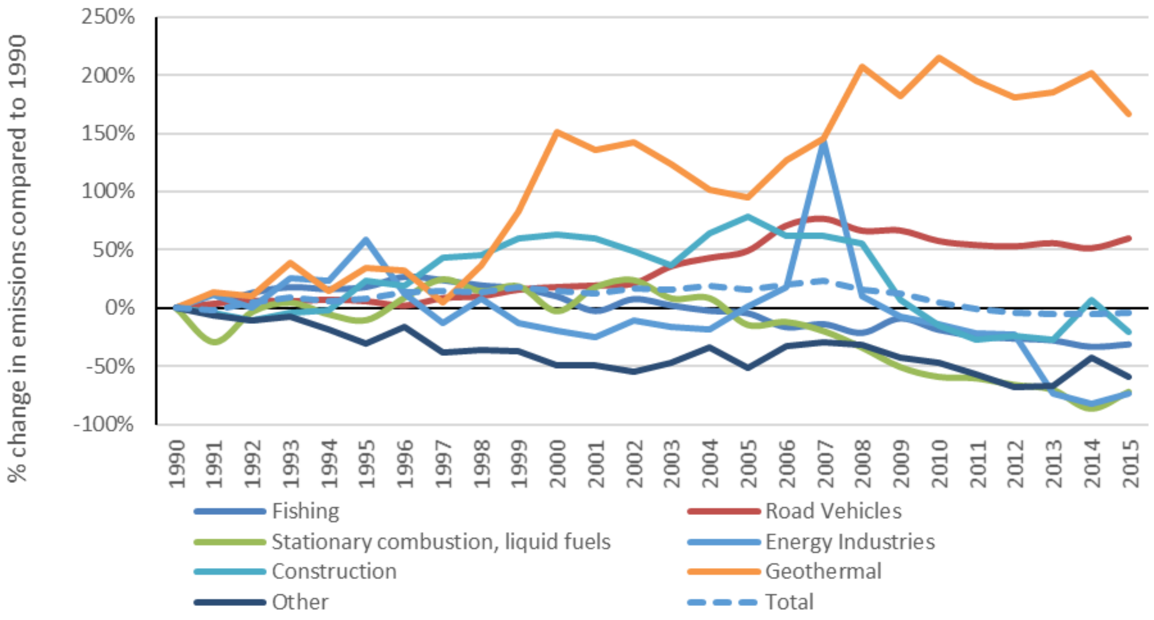

Figure 3-17 Percentage changes in GHG emissions for source categories in the Energy sector

3.3.1.1 Fuel Combustion

Emissions from fuel combustion in the Energy sector accounted for 33.9% of the total greenhouse gas emissions in Iceland in 2015. Figure 3-17 shows that emissions from road vehicles have increased by 60% since 1990 as emissions from fishing have decreased by 31%. Emissions from energy industries are 74% below 1990 levels and emissions from manufacturing industries and construction are 21% below 1990 levels.

Energy include emissions from electricity and heat production. Iceland relies heavily on renewable energy sources for electricity and heat production, thus emissions from this sector are very low. Since 1997 emissions have been around 40% lower in normal years than in 1990. Emissions from energy industries accounted for 0.21% of the sector’s total and 0.1% of the total GHG emissions in Iceland in 2013. Electricity is produced with fuel combustion at 2 locations, which are located far from the distribution system (two islands, Flatey and Grimsey). Some electricity facilities have backup systems using fuel combustion which they use if problems occur in the distribution system. Some district heating facilities that lack access to geothermal energy sources use electric boilers to produce heat from electricity. They depend on curtailable energy. These heat plants have back-up fuel combustion in case of an electricity shortage or problems in the distribution system. Emissions from the energy industries sector have generally decreased since 1990. In 1995 there were issues in the electricity distribution system (snow avalanches in the west fjords and icing in the northern part of the country) that resulted in higher emissions that year. Unusual weather conditions during the winter of 1997/1998 led to unfavourable water conditions for the hydropower plants. This created a shortage of electricity which was met by burning oil for electricity and heat production. In 2007 a new aluminium plant was established. Because the Kárahnjúkar hydropower project was delayed, the aluminium plant was supplied for a while with electricity from the distribution system. This led to electricity shortages for the district heating systems and industry depending on curtailable energy, leading to increased fuel combustion and emissions. This also effected the implied emission factor (IEF) for energy industries, as waste and residual fuel oil have different emission factors. In years where more oil is used in the sector the IEF is considerably higher than in normal years.

Increased emissions from the manufacturing industries and construction source category over the period 1990 to 2007 are explained by the increased activity in the construction sector during the period. The knock-off effect of the increased levels of economic growth was increased activity in the construction sector. Emissions rose until 2007, where the rise, particularly in the years prior to 2007, was related to the construction of Iceland's largest hydropower plant (Kárahnjúkar, building time from 2002 to 2007). The construction sector collapsed in fall 2008 due to the economic crises and the emissions from the sector decreased by 55% between 2007 and 2011. Emissions from fuel combustion at the cement plant decreased rapidly due to the collapse of the construction sector and in 2011 the plant was closed. The fishmeal industry is the second most important source within manufacturing industries and construction. Emissions from fishmeal production decreased over the period due to replacement of oil with electricity as well as a production reduction.

Emissions from the Transport sector increased by 43% from 1990 to 2015. Emissions from road transport have increased by 60% since 1990, owing to an increase in the number of cars per capita, more mileage driven and until 2007 an increase in larger vehicles. Since 1990 the vehicle fleet in Iceland has increased by 89%. Also, the Icelandic population has grown by 30% from 1990 to 2015. Emissions from road vehicles peaked in 2007 and have decreased by 9.6% since then. In recent years more fuel economic vehicles have been imported – a turn-over of the trend from the years 2002 to 2007 when larger vehicles were imported. Another factor in reducing fuel consumption is the fact that the mean mileage per vehicle has been in decline from 2010-2015. Emissions from both domestic flights and navigation have declined since 1990 and this decrease in navigation and aviation has compensated for rising emissions in the transport sector to some extent.

The fisheries dominate the Other sector as heating in Iceland relies on renewable energy sources. Emissions from fisheries rose from 1990 to 1996 because a substantial portion of the fishing fleet was operating in unusually 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 2015 emissions were 31% below the 1990 level and 3% below the 2014 level. Annual changes are inherent to the nature of fisheries.

3.3.1.2 Geothermal Energy

Emissions from geothermal energy utilization accounts for 3.6% of the total greenhouse gas emissions in Iceland in 2015. Iceland relies heavily on geothermal energy for space heating (over 90% of the homes) and electricity production (27% of the total electricity production). The emissions from geothermal power plants are considerably less, or 19 times lower, than from fossil fuel power plants. Table 3-9 shows the emissions from geothermal energy from 1990 to 2015. Electricity production using geothermal power increased almost 18-fold during this period from 283 to 5,003 GWh. Emissions during the same time increased by 167%. Emissions from geothermal utilization are site and time-specific and can vary greatly between areas and the wells within an area as well as by the time of extraction.

Table 3-9. Emissions from geothermal energy from 1990 to 2015 (kt. CO_2-eq.).

	1990	1995	2000	2005	2010	2014	2015
Geothermal energy	62	83	155	121	195	187	165

3.3.1.3 Distribution of oil products

Emissions from distribution of oil products are a minor source in Iceland. Emissions are around 0.3 to 0.5 kt. per year.

3.3.1.4 International Bunkers

Emissions from international aviation and marine bunker fuels are excluded from national totals as is outlined in the IPCC Guidelines. These emissions are presented separately for information purposes and can be seen in Table 3-10.

In 2015 greenhouse gas emissions from ships and aircrafts in international traffic bunkered in Iceland amounted to a total of 983 kt. CO_2-equivalents, which corresponds to about 22% of the total Icelandic greenhouse gas emissions. Greenhouse gas emissions from marine and aviation bunkers increased by 209% from 1990 to 2015; with an 24.5% increase between 2014 and 2015.

Looking at these two categories separately, it can be seen that greenhouse gas emissions from international marine bunkers increased by 212% from 1990 to 2015, while emissions from aircrafts increased by 207% during the same period. Between 2014 and 2015 emissions from marine bunkers increased by 34.3% while emissions from aviation bunkers increased by 20.5%. Emissions from international bunkers are rising again after decline since 2007. Foreign commercial fishing vessels dominate the fuel consumption from marine bunkers.

Table 3-10 GHG emissions from international aviation and international water-borne navigation 1990-2015 (kt. CO_2-eq.).

	1990	1995	2000	2005	2010	2014	2015
1A3ai Aviation	219	236	407	421	376	559	673
1A3di Marine	99	145	219	112	184	231	310
Total GHG emissions	**318**	**380**	**626**	**532**	**560**	**790**	**983**

3.3.2 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. Emissions also occur as a result of the consumption of HFCs as substitutes for ozone depleting substances and SF_6 from electrical equipment. The Industrial Process sector accounts for 44% of the national greenhouse gas emissions. As can be seen in Table 3-11 and Figure 3-18, emissions from industrial processes decreased from 1990 to 1996, mainly because of a decrease in PFC emissions. Increased production capacity has led to an increase in industrial process emissions since 1996, especially after 2005 as the production capacity in the aluminum industry has increased. By 2015, emissions from the industrial processes sector were 140% above the 1990 level.

Table 3-11. GHG emissions from industrial processes 1990-2015 (kt. CO_2-eq.).

2 IPPU	1990	1995	2000	2005	2010	2014	2015
2A Mineral products	52	38	65	55	10	0.6	0.7
2B Chemical industry	47	41	18	NO	NO	NO	NO
2C Metal production	843	468	866	826	1,780	1,749	1,806
2D Non-Energy Products from Fuels and Solvent Use	4.4	4.8	4.3	3.9	2.6	2.6	2.9
2F Product Uses as Substitutes for Ozone Depleting Substances	0.3	10	43	69	146	182	207
2G Other Product Manufacture and Use	7.0	5.5	5.9	6.0	8.3	5.1	4.5
Total GHG emissions	**954**	**567**	**1,004**	**960**	**1,947**	**1,939**	**2,021**

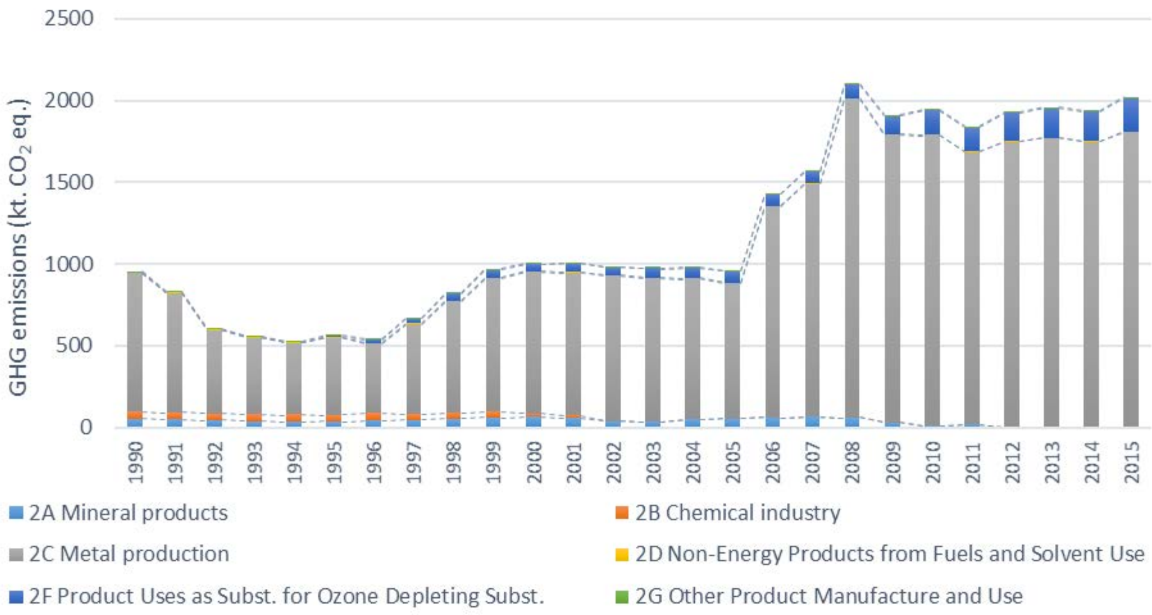

Figure 3-18 Total GHG emissions in the Industrial Process sector during 1990-2015 (kt. CO_2-eq.).

The significant category within the Industrial Processes sector is metal production, which accounted for 88% of the sector's emissions in 1990 and 91% in 2015. Aluminium production is the main source within the metal production category, accounting for 70% of the total Industrial Processes emissions in 2015. Aluminium is produced at three plants, Rio Tinto Alcan at Straumsvík, Century Aluminium at Grundartangi, and Alcoa Fjarðaál at Reyðarfjörður. The production technology in all aluminium plants is based on using prebaked anode cells. The main energy source is electricity, and industrial process CO_2 emissions are mainly due to the anodes that are consumed during 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 expansion of the existing aluminium plant in 1997 and the establishment of a second aluminium plant in 1998, emissions increased again from 1997 to 1999. From 2000, the emissions showed a steady downward trend until 2005. The PFC reduction was achieved through improved technology and process control and led to a 98% decrease in the amount of PFC emitted per tonne of aluminium produced during the period of 1990 to 2005; from 4.78 tonnes CO_2-equivalents in 1990 to 0.10 tonnes CO_2-equivalents in 2005. In 2006 the PFC emissions rose significantly due to an expansion at Century Aluminium. PFC emissions per tonne of aluminium at the Century Aluminium plant went down from 2007 to 2011 through improved process technology, reaching 0.12 tonnes CO_2-equivalents per tonne aluminium in 2011. The Alcoa Fjarðaál aluminium plant was established in 2007 and reached full production capacity in 2008. PFC emissions per tonne of aluminium are generally high during start up and usually rise during expansion. PFC emission declined in 2009 and 2010 through improved process technology until December 2010 at Alcoa Fjarðaál, when a rectifier was damaged in fire. This led to increased PFC emissions leading to higher emissions at the plant in 2010 than in 2009. In 2011 PFC emissions per tonne of aluminium at the Alcoa Fjarðaál went down to 0.07 tonnes CO_2-equivalents per tonne aluminium before increasing again to 0.2 tonnes CO_2-equivalents per tonne aluminium in 2015.

Production of ferroalloys is another major source of emissions, accounting for 20% of Industrial Processes emissions in 2015. CO_2 is emitted due to the use of coal and coke as reducing agents and from the consumption of electrodes and other carbon-containing additives (carbon blocks, electrode casings and limestone). In 1998 a power shortage caused a temporary closure of the ferrosilicon plant, resulting in exceptionally low emissions that year. In 1999, however, the plant was expanded (addition of the third furnace) and emissions have therefore increased considerably, or by 129% since 1990. Emissions in 2015 were 8.9% higher than in 2014.

Production of minerals accounted for only 0.1% of the emissions in 2011. Cement production was the dominant contributor until 2011 when the sole cement plant shut down. CO_2 derived from carbon in the shell sand used as raw material is the source of CO_2 emissions from cement production. Emissions from the cement industry reached a peak in 2000 but declined until 2003, partly because of cement imports. In 2004 to 2007 emissions increased again because of increased activity related to the construction of the Kárahnjúkar hydropower plant (built 2002 to 2007) although most of the cement used for the project was imported.

Production of fertilizers, which used to be the main contributor to the process emissions from the chemical industry was closed 2001. No chemical industry has been in operation in Iceland after the closure of a silicon production facility in 2004.

Imports of HFCs started in 1993 and have increased steadily since then. HFCs are used as substitutes for ozone depleting substances that are being phased out in accordance with the Montreal Protocol. Refrigeration and air conditioning are the main uses of HFCs in Iceland and the fishing industry plays a preeminent role. HFCs stored in refrigeration units constitute banks of refrigerants which emit HFCs during use due to leakage. The process of retrofitting older refrigeration systems and replacing ODS as refrigerants is still on-going which means that the size of the refrigerant bank is still increasing, causing an accelerated increase of emissions since 2008. The amount of HFCs emitted by mobile air conditioning units in vehicles has also been increasing steadily (Table 3-12).

The sole source of SF_6 emissions is leakage from electrical equipment. Emissions have been increasing since 1990 due to the expansion of the Icelandic electricity distribution (Table 3-12). The peak in 2010 was caused by two unrelated accidents during which the SF_6 contained in equipment leaked into the atmosphere. The peak in 2012 was caused by increased emissions from the operator of the Icelandic grid Landsnet LLC.

Table 3-12. HFC and SF_6 emissions from consumption of HFC and SF_6 (kt CO_2 -eq.).

	1990	1995	2000	2005	2010	2014	2015
HFCs	0.3	10.2	43.3	69.3	146	182	207
PFCs	1.1	1.2	1.3	2.5	4.7	2.2	1.5
SF6	495	69	150	31	172	99	104

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 as the NMVOC compounds are oxidized to CO_2 in the atmosphere over time. NMVOC emissions reported here include emissions from domestic solvent use, road paving with asphalt, coating applications, degreasing, dry-cleaning, chemical products, printing and wood preservation. Furthermore, NMVOC from food and beverage production are reported.

Also included in this sector are emissions of N_2O from medical and other uses and emissions of CO_2 from lubricants and paraffin wax use. New addition to the Icelandic inventory are CH_4 and N_2O emissions from tobacco, as well as GHG and precursor emissions from firework use.

3.3.3 Agriculture

Emissions from agriculture are closely coupled with livestock population sizes, especially cattle and sheep. Since emission factors were assumed to be stable during the last two decades (with the exception of gross energy intake of dairy cows, whose increase reflects an increase in milk production), changes in activity data translated into proportional emission changes. The only other factor that had considerable impact on emission estimates was the amount of nitrogen in fertilizer applied annually to agricultural soils. A 17% decrease in livestock population size of sheep between 1990 and 2005 – partly counteracted by increases of livestock population sizes of horses, swine, and poultry - led to emission decreases from all subcategories and resulted in a 13% decrease of total agriculture emissions during the same period (Table 3-13 and Figure 3-19).

Since 2005 emissions from agriculture have increased by 8% due to an increase in livestock population size but still remain 5% below 1990 levels. This general trend is modified by the amount of synthetic nitrogen applied annually to agricultural soils. The largest sources of agricultural greenhouse gas emissions in 2015 were from enteric fermentation 49%, 34% from agricultural soils and manure management accounted for 17% of total agriculture emissions are methane and nitrous oxide emissions from manure management (Figure 3-19.

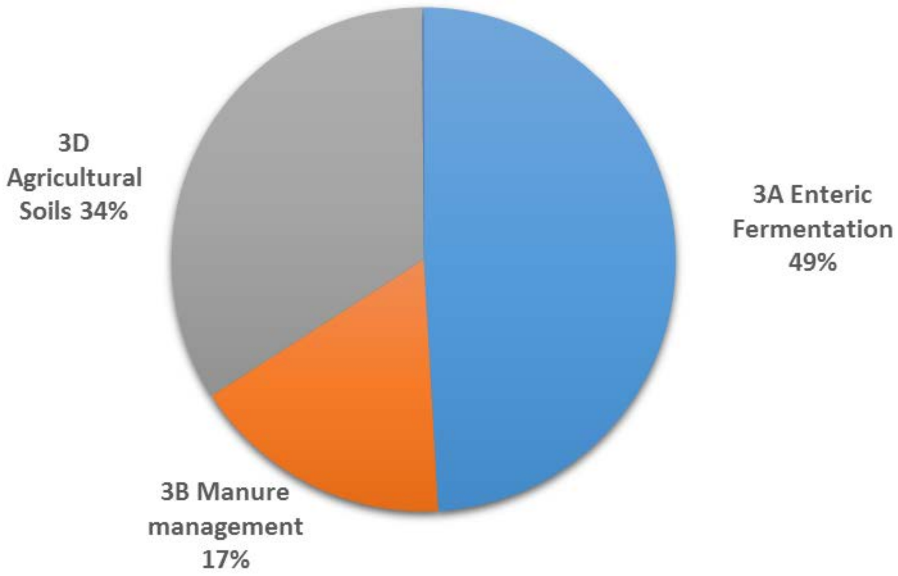

Figure 3-19 GHG emissions from the agriculture sector 2015, distributed by source categories.

Table 3-13. GHG emissions from agriculture sector from 1990 to 2015 (kt. CO_2-eq.).

3 Agriculture	**1990**	**1995**	**2000**	**2005**	**2010**	**2014**	**2015**
3A Enteric Fermentation	313.8	290.0	284.8	276.0	293.1	296.8	300.5
3B Manure management	109.4	95.3	96.8	94.3	98.9	100.8	102.9
3D Agricultural Soils	223.3	205.3	214.3	191.9	202.5	225.1	208.1
3G Liming	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3H Urea Application	0.1	0.1	0.1	0.1	0.1	0.3	0.6
Total GHG emissions	**647**	**591**	**596**	**562**	**595**	**623**	**612**

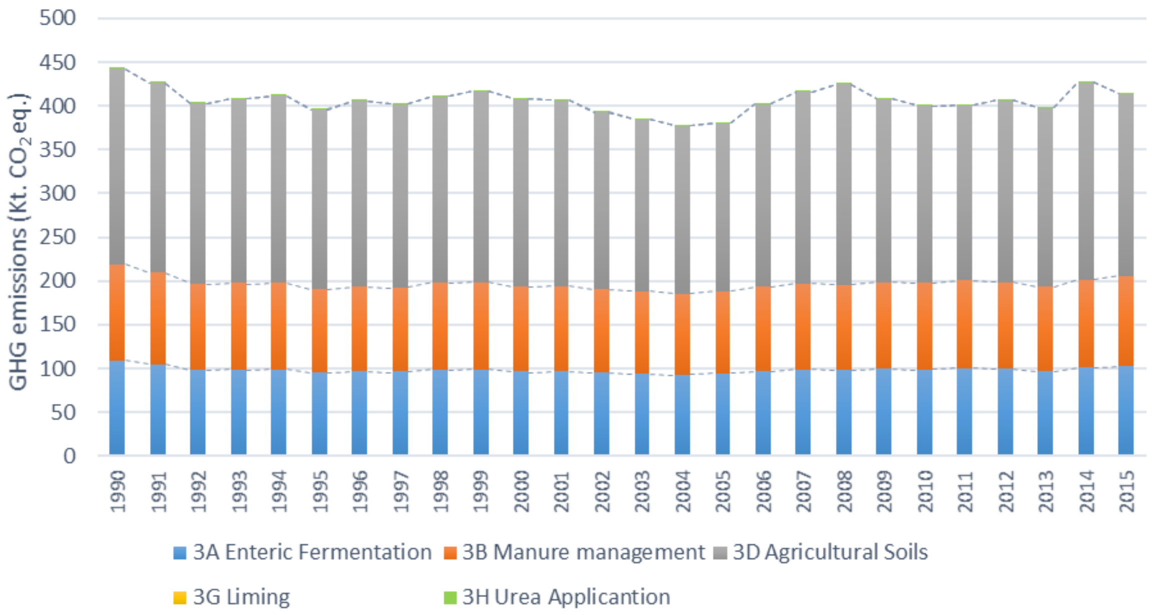

Figure 3-20 GHG emissions from agriculture 1990-2015, (kt. CO_2-eq.).

3.3.4 Land Use, Land-Use Change and Forestry (LULUCF)

Net emissions from the LULUCF sector in Iceland are high; the sector had the highest net emissions 1990-2015. A large part of the absolute value of emissions from the sector in 2015 was from cropland and grassland on drained organic soil. The emissions can be attributed to drainage of wetlands in the latter half of the 20th century, which had largely ceased by 1990. Emissions of CO_2 from drained wetlands continue for a long time after drainage.

Net emissions (emissions – removals) in the sector have decreased over the time period, as can be seen in

Table 3-14. This is explained by increased removals through afforestation and revegetation as well as a decrease in emissions from land converted to cropland. Increased removals in afforestation and revegetation are explained by the increased activity in those categories and changes in forest growth with stand age.

Table 3-14. GHG emissions from the LULUCF sector from 1990 to 2015 (kt. CO_2-eq.).

4 LULUCF	1990	1995	2000	2005	2010	2014	2015
4A Forest Land	-41	-63	-97	-148	-202	-284	-334
4B Cropland	2014	1969	1912	1859	1804	1761	1750
4C Grassland	6964	6992	7140	7322	7619	7747	7761
4D Wetlands	1116	1121	1101	1074	1035	1018	1016
4E Settlements	13	6	15	20	6	5	5
4G Harvested Wood Products	NO, NE	NO, NE	0,11	0,11	0,12	0,19	0,22
4H Other	66	67	69	71	74	75	76
Net emissions LULUCF	**10134**	**10092**	**10139**	**10198**	**10336**	**10322**	**10274**

Analyses of trends in emissions of the LULUCF sector must be interpreted with care as some potential sinks and sources are not included. Uncertainty estimates for reported emissions are considerable and observed changes in reported emissions therefore not necessarily significantly different from zero.

3.3.5 Waste

Emissions from the Waste sector accounted for 5% of total GHG emissions in 2015. About 88% of these emissions were methane emissions from solid waste disposal on land. 5.6% were CH_4 and N_2O emissions from wastewater treatment and 4.5% were CO_2, CH_4 and N_2O emissions from waste incineration. The remaining 1.9% originated from biological treatment of waste, i.e. composting. Emissions from the waste sector increased steadily from 1990 to 2007 due to an increase in emissions from solid waste disposal on land (SWD) (Table 3-15Table 3-15 and Figure 3-21). This increase was caused by the accumulation of degradable organic carbon in recently established managed, anaerobic solid waste disposal sites which are characterised by higher methane production potential than the unmanaged SWDs they succeeded. The decrease in emissions from the waste sector since 2007 is caused by a decrease in SWD emissions which is due to a rapidly decreasing share of waste landfilled since 2005 and by an increase in methane recovery at SWDs. The total increase of SWD emissions between 1990 and 2015 amounted to 28%.

Table 3-15. GHG emissions from the waste sector from 1990 to 2015 (kt. CO_2-eq.).

5 Waste	1990	1995	2000	2005	2010	2014	2015
5A Solid Waste Disposal	142	188	214	225	226	186	182
5B Biological Treatment of Solid Waste	NO	0.4	0.4	0.9	2.9	3.8	4.0
5C Incineration and Open Burning of Waste	15	10.3	6.0	5.5	6.5	6.9	9.3
5D Wastewater Treatment and Discharge	6.8	8.3	8.6	12.2	11.3	11.5	11.6
Total emissions	**164**	**207**	**229**	**244**	**247**	**208**	**207**

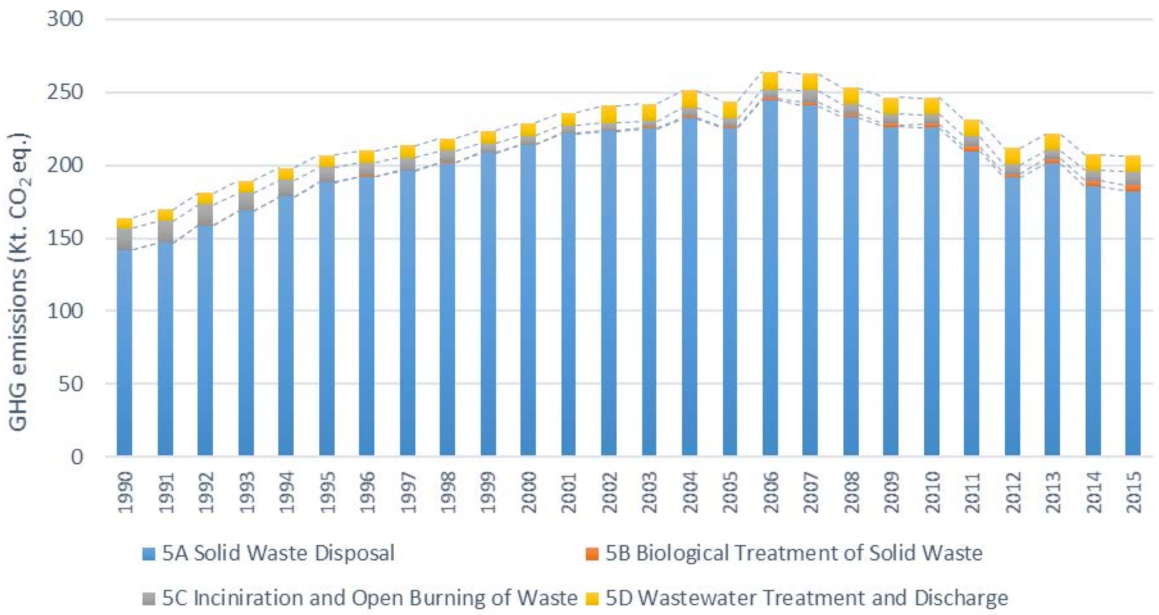

Figure 3-21 GHG emissions of the waste sector 1990-2015 (kt. CO_2-eq.).

Total wastewater handling emissions increased by 64% since 1990 due to increasing N_2O and CH_4 emissions. The increase in N_2O emission estimates is proportional to an increase in population. The increase in methane emissions is mainly due to an increase in the share of wastewater treated in septic systems. All other wastewater discharge pathways were assumed to emit no methane since the wastewater is either treated aerobically or discharged into fast running rivers or straight into the sea.

Emissions from waste incineration decreased by 39% between 1990 and 2015 due to a decrease in the amount of waste incinerated and a change in waste incineration technology. During the early 1990s waste was either burned in open pits or in waste incinerators at low or varying temperatures. Since the mid-1990s increasing amounts of waste are incinerated in proper waste incinerators that control combustion temperatures which lead to lower emissions of CO_2, CH_4 and N_2O per waste amount incinerated (Figure 3-22).

The CO_2 emission factor for waste incineration is slightly higher than for open burning of waste (oxidisation factor of 1 vs. 0.58), but the CH_4 emission factor for open burning of waste is, however, 27 times higher and the N_2O emission factor 2.5 times higher than the one for waste incineration.

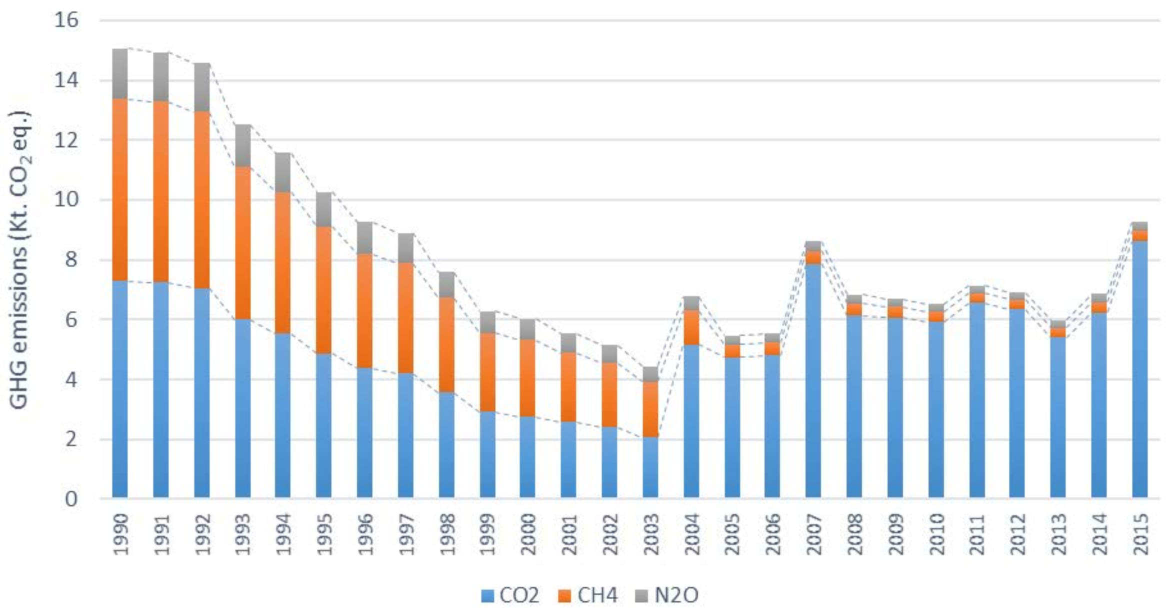

Figure 3-22 Emissions from incineration and open burning of waste 1990-2015 (kt. CO_2-eq.).

Emissions from composting have been steadily increasing from 1995 when composting started. Between 1995 and 2015 composting emissions increased tenfold due to increasing amounts of waste composted.

3.4 National System and national registry

3.4.1 Institutional Arrangement

Act No. 70/2012 establishes the national system for the estimation of greenhouse gas emissions by sources and removals by sinks, a national registry, emission permits and establishes the legal basis for installations and aviation operators participating in the EU ETS.

Iceland’s greenhouse gas inventory is addressed in Chapter III, Article 6 of Act No. 70/2012. The Envionment Agency of Iceland (EA) is designated as the responsible authority for the national accounting and the inventory of emissions and removals of greenhouse gases according to Iceland’s international obligations. The Environment Agency compiles Iceland’s greenhouse gas inventory. Main data suppliers are listed and the type of information they are responsible for collecting and reporting to the Environment Agency:

- Soil Conservation Service of Iceland (SCSI)
- Iceland Forest Service (IFS)
- National Energy Authority (NEA)
- Agricultural University of Iceland (AUI)
- Iceland Food and Veterinary Authority
- Statistics Iceland
- The Road Traffic Directorate
- The Icelandic Recycling Fund
- Directorate of Customs

In June 2017, a new regulation No 520/2017 [14] was published, in according to the Act on data collection and information from institutions related to Iceland´s inventory on GHG emissions and removal. The new regulation clarifies institutional, legal and procedural arrangements between different government agencies, and sets deadlines for delivering information. The regulation replaces the role a Coordinating Team had previously, with regards to cooperation between different entities.

The Environment Agency of Iceland (EA), an agency under the auspices of the Ministry for the Environment and Natural Resources, carries the overall responsibility for the national inventory. EA compiles and maintains the greenhouse gas emission inventory, except for LULUCF which is compiled by the Agricultural University of Iceland (AUI). EA reports to the Convention. Figure 3-23 illustrates the flow of information and allocation of responsibilities.

The contact person at the Environment Agency of Iceland is:

Vanda Hellsing
Environment Agency of Iceland
Suðurlandsbraut 24
IS-108 Reykjavík
Iceland

[14] Regulation No 520/2017 on data collection and information.

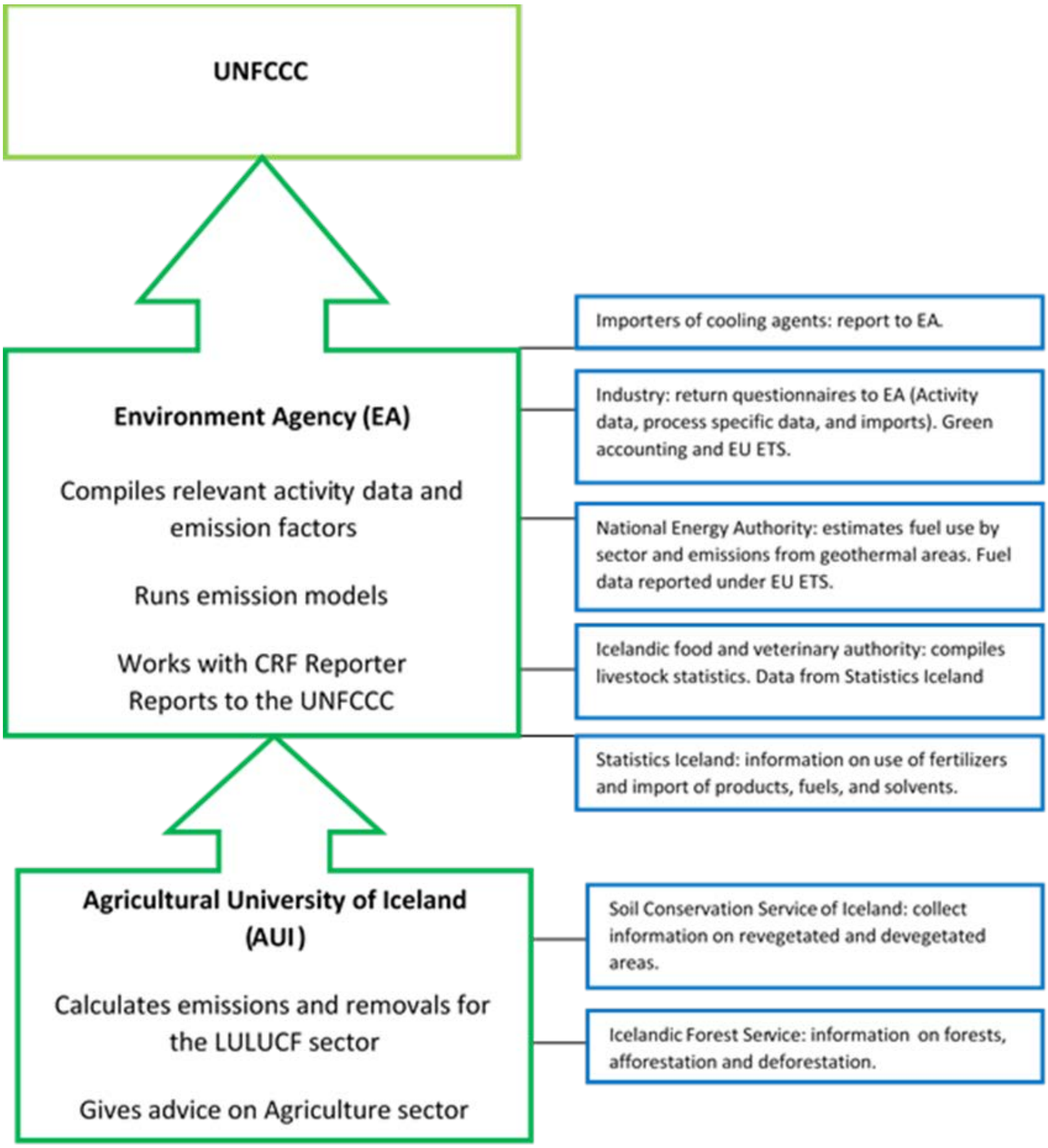

Figure 3-23 Information flow and distribution of responsibilities in the Icelandic emission inventory system for reporting to the UNFCCC.

3.5 Inventory process and Preparation

The EA 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 EA directly. The National Energy Authority (NEA) collects annual information on fuel sales from the oil companies. This information was until 2008 provided on an informal basis. From 2008 and onwards, Act No. 48/2007 enables the NEA to obtain sales statistics from the oil companies. Until 2011 the Farmers Association of Iceland (FAI), on behalf of the Ministry of Agriculture, was responsible for assessing the size of the animal population each year, when the Food and Veterinary Authority took over that responsibility. On request from the EA, the FAI assisted to come up with a method to account for young animals that are mostly excluded from national statistics on animal population. Animal statistics have been further developed to better account for replacement animals in accordance with recommendations from the ERT that came to Iceland for an in-country review in 2011. Statistics Iceland provides information on population, GDP, production of asphalt, food and beverages, imports of solvents and other products, the import of fertilizers and on the import and export of fuels. The EA collects various additional data directly. Annually an electronic questionnaire on imports, use of feedstock, and production and process specific information is sent out to industrial producers, in accordance with Regulation No 244/2009 Green Accounts submitted under Regulation No 851/2002 from the industry are also used. For this submission the data contained in applications for free allowances under the EU ETS is also used. Importers of HFCs submit reports on their annual imports by type of HFCs to the EA. The Icelandic Directorate of Customs supplies the EA with information on the identity of importers of open and closed-cell foam. The EA also estimates activity data with regards to waste. Emission factors are taken mainly from the revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, IPCC Good Practice Guidance, IPCC Good Practice Guidance for LULUCF, and the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, since limited information is available from measurements of emissions in Iceland.

The AUI receives information on revegetated areas from the Soil Conservation Service of Iceland and information on forests and afforestation from the Icelandic Forest Service. The AUI assesses other land use categories on the basis of its own geographical database and other available supplementary land use information. The AUI then calculates emissions and removals for the LULUCF sector and reports to the EA.

The annual inventory cycle (Figure 3-24) describes individual activities performed each year in preparation for next submission of the emission estimates.

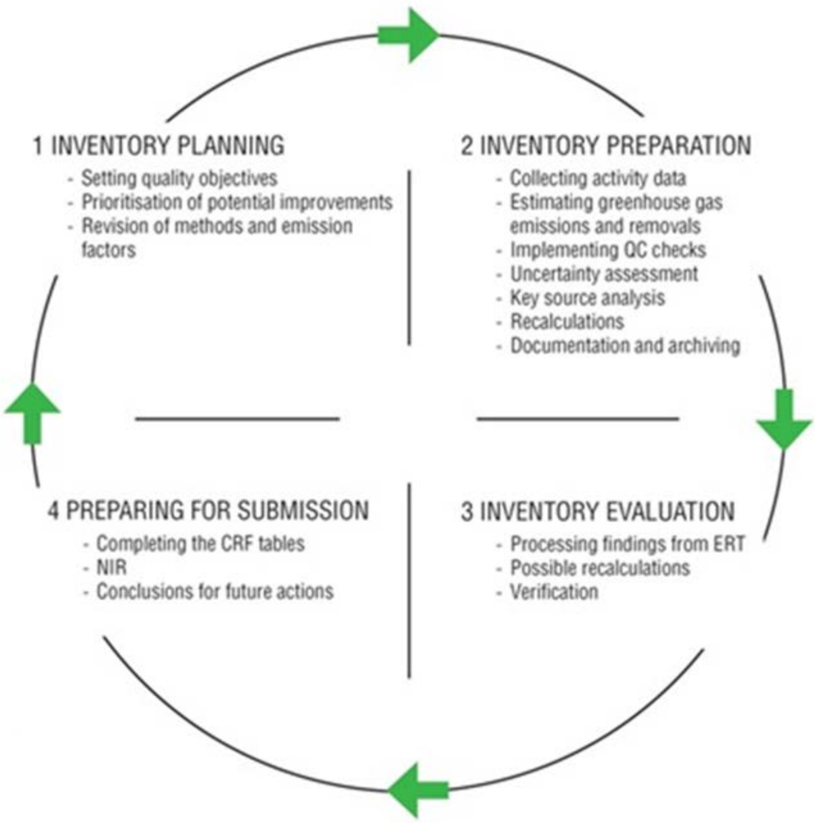

Figure 3-24 The annual inventory cycle.

A new annual cycle begins with an initial planning of activities for the inventory cycle by the inventory team and major data providers as needed (NEA, AUI, IFS and SCSI), taking into account the outcome of the internal and external review as well as the recommendations from the UNFCCC review. The initial planning is followed by a period assigned for compilation of the national inventory and improvement of the National System.

After compilation of activity data, emission estimates and uncertainties are calculated, and quality checks performed to validate results. Emission data is received from the sectoral expert for LULUCF. All emission estimates are imported into the CRF Reporter software.

A series of internal review activities are carried out annually to detect and rectify any anomalies in the estimates, e.g. time series variations, with priority given to emissions from industrial plants falling under Decision 14/CP.7, other key source categories and for those categories where data and methodological changes have recently occurred.

After an approval by the director and the inventory team at the EA, the greenhouse gas inventory is submitted to the UNFCCC by the EA.

3.6 Methodology and data storage

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

The general emission model is based on the equation:

Emission (E) = Activity level (A) · Emission Factor (EF)

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

3.7 Archiving

Gopro.net, a document management system running on .NET, is used to store email communications concerning the GHG inventory. Paper documents, e.g. written letters, are scanned and also stored in Gopro.net. The system runs on its own virtual server and uses a MS SQL server 2012 running on a separate server. Both servers are running Windows Server 2012 R2.

Each staff member at EA has online Office 365 subscription and are emails sent and received using Microsoft Office 365 servers hosted in Ireland.

Numerical data, calculations and other related documents are stored on a fileserver running Windows Server 2012 R2. EA´s virtual servers are using VMWare software running on Dell Blade Servers.

Advania, a local IT company, hosts EA´s servers. Their hosting is fully ISO-9001 and ISO-27001 certified. Their hosting rooms are in two locations in Hafnarfjordur, a town very close to Reykjavik. One room is the primary server room while the other is a secondary backup room storing off-site backups, the rooms are separated by roughly 5 km.

Backups are taken daily and stored for 30 days. Every 3 months a full backup is taken and stored for 18 months. Backups are done with solutions from Veeam Backup & Replication using reverse incremental backup.

Hard copies of all references listed in the NIR are stored in the EA. The archiving process has improved over the last years, i.e. the origin of data dating years back cannot always be found out. The land use database IGLUD is stored on a server of the Agricultural University of Iceland (AUI). All other data used in LULUCF as well as spread sheets containing calculations are stored there as well. This excludes data regarding Forestry and Revegetation which is stored on servers of the Icelandic Forest Service and Soil Conservation Service of Iceland, respectively.

According to IPCC definition, a key 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 categories are identified by means of Approach 1 method. The results of the key category analysis prepared for the 2017 submission are shown in Table 3-16. Tables showing the key category analysis (trend and level assessment) with a higher level of disaggregation can be found in Annex III. The key category analysis shown below includes LULUCF greenhouse gas sources. Key category analyses for each sector, excluding LULUCF, are presented in the respective chapters.

3.8 Key Category Analysis

Table 3-16 Key source categories of Iceland's 2017 GHG inventory (including LULUCF).
✓= Key source category.

IPCC source category			Level 1990	Level 2015	Trend
Energy (CRF sector 1)					
1A2	Fuel combustion - Manufacturing Industries and Construction	CO_2	✓		✓
1A3b	Road Transportation	CO_2	✓	✓	✓
1A4	Other Sectors - Liquid Fuels	CO_2	✓	✓	✓
1B2d	Fugitive Emissions from Fuels - Other	CO_2		✓	✓
IPPU (CRF sector 2)					
2C2	Ferroalloys Production	CO_2	✓	✓	✓
2C3	Aluminium Production	CO_2	✓	✓	✓
2C3	Aluminium Production	PFCs	✓	✓	✓
2F1	Refrigeration and Air Conditioning	Aggregate F-gases		✓	✓
Agriculture (CRF sector 3)					
3A	Enteric Fermentation	CH_4	✓	✓	
3B	Manure Management	N_2O		✓	
3D1	Direct N_2O Emissions From Managed Soils	N_2O	✓	✓	
Land use, Land use change and Forestry (CRF sector 4)					
4B1	Cropland Remaining Cropland	CO_2	✓	✓	✓
4B2	Land Converted to Cropland	CO_2	✓		✓
4C1	Grassland Remaining Grassland	CO_2	✓	✓	✓
4C2	Land Converted to Grassland	CO_2	✓	✓	✓
4(II).	Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CO_2	✓	✓	
4(II).	Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CH_4	✓	✓	✓
4H	Other: N_2O from grassland drained soils	N_2O	✓		
Waste (CRF sector 5)					
5A	Solid Waste Disposal	CH_4	✓	✓	✓

3.9 Quality Assurance & Quality Control (QA/AC)

The objective of QA/QC activities in national greenhouse gas inventories is to improve transparency, consistency, comparability, completeness, accuracy, confidence and timeliness. A QA/QC plan for the annual greenhouse gas inventory of Iceland has been prepared and can be found on the EA's website.[15] The document describes the quality assurance and quality control programme. It includes the quality objectives and an inventory quality assurance and quality control plan. It also describes the responsibilities and the time schedule for the performance of QA/QC procedures. The QC activities include general methods such as accuracy checks on data acquisition and calculations and the use of approved standardised procedures for emission calculations, measurements, estimating uncertainties, archiving information and reporting. Source category specific QC measures have been developed for several key source categories.

A quality manual for the Icelandic emission inventory has been prepared and can also be found on the EA's website.[16] To further facilitate the QA/QC procedures all calculation sheets have been revised. They include a brief description of the method used. They are also provided with colour codes for major activity data entries and emissions results to allow immediate visible recognition of outliers.

3.10 Uncertainty Analysis

Uncertainty estimates are an essential element of a complete inventory and are not used to dispute the validity of the inventory but rather help prioritise efforts to improve the accuracy of the inventory. Here, the uncertainty analysis is according to the Tier 1 method of the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories where different gases are reviewed separately as CO_2-equivalents. Total base and current years´ emissions within a greenhouse gas sector, category or subcategory are used in the calculations as well as corresponding uncertainty estimate values for activity data and emission factors used in emission calculations.

Iceland is in the process of reviewing its uncertainty analysis and In February 2017, new templates were created for uncertainty estimates based on the 2006 IPCC guidelines, provided in Table 3.2.[17]. The new templates were not used for this submission, but implementation is in progress and they will be used for the 2018 submission.

For this submission Iceland's uncertainties were estimated for all greenhouse gas source and sink categories (i.e. including LULUCF) according to the IPCC Good Practice Guidance. Estimates for activity data uncertainties are mainly based on expert judgement whereas emission factor uncertainties are mainly based on IPCC source category defaults. Errors in the determination of EF uncertainty factors for the Agriculture and Waste sectors were corrected. All source category uncertainties were first weighted with 2012 emission estimates and then summarized using error propagation. This calculation yielded an overall uncertainty of the 2012 emission estimate of 33.5%.

Uncertainty estimates introduced on the trend of greenhouse gas emission estimates by uncertainties in activity data and emission factors are combined and then summarized by error propagation to obtain the total uncertainty of the trend. This calculation yielded a total trend uncertainty of 16%. The decrease from the value of the 2015 submission (16.7%) is caused by the above-mentioned correction of errors.

There are two main challenges in calculating uncertainty estimates - estimating the uncertainty of activity data and implementing country-specific emission factors. The utilisation of the new uncertainty

[15] QA/QC plan
[16] Quality manual
[17] 2006 IPCC guidelines on Uncertainties

templates in future submissions will be accompanied by a review of uncertainties, and will therefore improve the uncertainty estimates as well as providing more transparent documentation.

3.11 General Assessment of 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 emissions 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 2015.

With regard to sectoral coverage few sources are not estimated.

The main sources not estimated are:

- Emissions of CO_2 and CH_4 from road paving with asphalt (2D3b).
- In the LULUCF sector the most important estimates remaining are the ones regarding emissions/removals of mineral soil in few categories.

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

3.12 Planned and implemented improvements

The Environment Agency of Iceland is in the process of carrying out a significant review and update of inventory methodologies (Iceland is engaging in this activity with consultants, Aether) as part of its ongoing improvements plan. For this submission, a specific review has been conducted on both the agriculture and waste sectors, with methodologies implemented in line with IPCC 2006 Guidelines.

Activity data and emission factors have been reviewed and updated where possible, although further work is planned for future submissions. Further information is provided in the agriculture and waste chapters of this report. The Agency will engage in similar reviews for the Energy, IPPU and Land Use sectors in future years.

4 Policies and Measures

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) was ratified by Iceland in 1993 and entered into force in 1994.

Iceland acceded to the Kyoto Protocol on May 23rd, 2002. Iceland's obligations according to the Kyoto Protocol have been and are as follows:

Decision 14/CP.7 on the "Impact of single project on emissions in the commitment period" allowed Iceland to report certain industrial process carbon dioxide emissions separately and not include them in national totals, (see chapter 3).

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 are eligible. The use of best environmental practice (BEP) and best available technology (BAT) 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, are not be affected.

Iceland has fulfilled its commitments under the first commitment period of the Kyoto protocol (see chapter 3).

In 2015 an agreement was concluded between the European Union, its Member States and Iceland concerning Iceland´s participation in the joint fulfilment of commitments of the Union, the Member States and Iceland in the second commitment period of the Kyoto Protocol. Therein the Parties agree to fulfil their quantified emission limitation and reduction commitments for the second commitment period inscribed in the third column of Annex B to the Kyoto Protocol jointly.

Under the Paris Agreement, Iceland aims to be part of a collective delivery by European countries to reach a target of 40% reduction of greenhouse gas emissions by 2030 compared to 1990 levels. A precise commitment for Iceland within such collective delivery has yet to be determined and is dependent on an agreement with the European Union and its Member States and possibly other countries. Under such an arrangement, Iceland will ensure fulfilment of its fair share of the collective delivery of the 40% target by: a) continuing participation in the EU Emissions Trading Scheme and b) determining a target for emissions outside the EU-ETS by the same methodology as applied to EU Member States. It is expected that a decision will be in place late 2018 or early 2019. In the event that an agreement on collective delivery is not reached, Iceland will determine a national target by other methods and communicate it to the UNFCCC.

In November 2017 a new government took office. In the governmental agreement there is a focus on climate issues where following statements are set forth.

- Iceland shall reduce greenhouse gas emission of 40% before 2030
- Iceland is to be carbon neutral no later than 2040
- New Acton plan will be published with defined and financed projects
- Climate committee will be established
- All sectors of the society are to be included in the actions to be taken
- Increased focus will be set on the effects of climate change on the oceans
- New concessionary investment agreements are to be in accordance to climate strategy
- The carbon tax will be revised

The Ministry for the Environment and Natural Resources will co-ordinate the work on the different projects that will be conducted regarding climate action plan, which will replace the action plan from 2010. The focus will be set on action and measures to able Iceland to meet the targets of 40% reduction of greenhouse gas emission in 2030 compared to 1990 and to gain carbon neutrality no later than 2040.

4.1 Roles and responsibilities

4.1.1 Climate Change Strategy 2007

The Icelandic government adopted a Climate Change Strategy in 2007. It is conceived as a framework for action and government involvement in climate change issues. The Strategy sets forth a long-term vision for the reduction of net emissions of greenhouse gases by 50-75% until the year 2050, using 1990 emissions figures as a baseline. Emphasis is placed on reducing net emissions by the most economical means possible and in a way, that provides additional benefits, by actions such as including the introduction of new low- and zero-carbon technology, economic instruments, carbon sequestration in vegetation and soil, and financing climate-friendly measures in other countries.

The Strategy sets forth the Icelandic government's five principal objectives with respect to climate change, which aim toward the realization of the above-described long-term vision:

- The Icelandic government will fulfil its international obligations according to the UN Framework Convention on Climate Change and the Kyoto Protocol.
- Greenhouse gas emissions will be reduced, with a special emphasis on reducing the use of fossil fuels in favour of renewable energy and climate-friendly fuels.
- The government will attempt to increase carbon sequestration from the atmosphere through afforestation, revegetation, wetland reclamation, and changed land use.
- The government will foster research and innovation in fields related to climate change affairs and will promote the exportation of Icelandic expertise in fields related to renewable energy and climate-friendly technology.
- The government will prepare for adaptation to climate change.

On the basis of the Strategy, two expert work groups were appointed to support the further development of climate policy. One group had the role of compiling and summarizing the best available scientific knowledge of the likely impact of climate change on Iceland and to present proposals on adaptation efforts.[18] The second work group was given the task of exploring the technical possibilities of mitigating greenhouse gas emissions in different sectors of the Icelandic economy.[19]

A Climate Change Action Plan was endorsed by the government in 2010. The Action Plan is a main instrument for defining and implementing actions to reduce emissions of greenhouse gases and enhance carbon sequestration. A committee appointed in 2011 oversees the implementation of the action plan, makes proposals for new projects, and provides information and advice. The committee is composed of representatives from the Prime Minister's Office, the Ministry of Finance and Economic Affairs, the Ministry of Industries and Innovation, the Ministry of Transport and Local Government, the Association of Local Authorities in Iceland and the Ministry for the Environment and Natural Resources who chairs the committee. The committee issues annual status reports where the Action Plan is reviewed both in terms of implementation of key actions, and actual emissions trends compared to set objectives. The committee´s third annual report was released in 2015[20].

[18] Science Report on Climate Change
[19] Report on technical possibilities of mitigation
[20] Third annual report on Climate actions

In 2015, the government launched a special climate action plan to supplement the climate action plan from 2010. The special plan was intended inter alia to strengthen mitigation actions, such as financing charging stations for electric cars, and designing road maps for reduced emissions in agriculture and fisheries. The programme also increased funds to afforestation, revegetation and wetland restoration.

4.1.2 Law and regulation

Act No. 70/2012 on Climate Change is the first comprehensive act on climate change in Iceland. The purpose of the legislation is twofold, to set a comprehensive act covering regulations set with the purpose to mitigate and adapt to climate change, and to cover the regulatory framework related to the European Union Emission Trading System, EU-ETS. The legislation replaces Act No. 65/2007 on the emissions of greenhouse gases.

The Environment Agency of Iceland (EA) is assigned with responsibility for the implementation of the provisions of the Act. The EA shall consult and cooperate with other authorities as closer specified in the Act. The Act sets the framework for a Climate Change Action Plan for reducing the net emissions of greenhouse gases and an Action Plan committee. The EA has the responsibility for the national inventory report and bodies are specified, which have a responsibility to deliver to the EA relevant information for the national inventory report. The EA has the main responsibility for the implementation of the Emission Trading System.

In June 2017, a new regulation No 520/2017 was published, in according with the Act on Climate Change, on data collection and information from institutions related to Iceland´s inventory on GHG emissions and removal. The new regulation clarifies institutional, legal and procedural arrangements between different government agencies, and sets deadlines for delivering information. The regulation replaces the role a Coordinating Team had previously, with regards to cooperation between different entities. With this regulation the Icelandic inventory system is in consistency with the EU Monitoring Mechanism Regulation 525/2013 (MMR Regulation).

The Act on Nature Conservation No 44/1999 is framework legislation and sets general criteria for nature conservation and concerns all human interference with nature. The act is also the main legal base for protection of areas, organisms, ecosystems and biodiversity. According to the Act the Minister shall call an Environmental Assembly following national elections and again two years later. The Environmental Assembly shall discuss environmental and nature protection and sustainable development. Members of parliament, representatives from government and municipal agencies, representatives from employers and NGOs shall be invited to the Assembly. Every four years the Environmental Assembly shall discuss implementation plans for sustainable development. The Environmental Assembly convened in November 2017, put focus on Climate change and climate mitigation.

4.1.3 Sustainable Development Goals

Welfare for the Future is the name given to Iceland’s national strategy for sustainable development, which was approved by the Government shortly before the World Summit on Sustainable Development held in Johannesburg in 2002. The original strategy set forth 17 objectives for environmental protection and resource utilisation, together with ancillary goals, and was intended as a framework for Iceland’s policy on sustainable development through 2020. The first version of the strategy contained a summary of short-term measures and realistic steps towards the achievement of the 17 objectives. The top-priority tasks for the achievement of the 17 objectives are reviewed every four years.

New four-year priorities were thus defined following the Environmental Assemblies of 2005 and 2009. Key priorities under the objectives of Welfare for the Future over the four-year period from 2010-2013 were endorsed by the government in 2010. The Icelandic government has adopted the UN Sustainable Development Goals (Agenda 2030). A steering committee, coordinated by the Prime Minister´s office, has been tasked with analysing Iceland’s starting position in relation to the SDGs. Results from that work are expected to become available in early 2018. The committee also liaises with various stakeholders (e.g. government institutes, academia and NGOs) to disseminate knowledge about the SDGs in Iceland.

4.2 Policies and measures

4.2.1 Introduction

No economic analysis has been made to evaluate the impact of mitigation actions on Iceland‘s emissions in a quantitative manner, compared to business-as-usual. The overall emissions figures are small, and a detailed economic analysis costly when seen in that context. Iceland can point out that it has undertaken a number of comparative actions as many neighbouring countries, including setting up a carbon tax, introducing the EU-ETS in relevant sectors, and reducing taxes and fees on low-carbon fuels and vehicles. These measures should have a positive effect on net emissions, and there are signals in some sectors that this is the case, even if the evidence is not easily quantifiable.

Regarding transport, there are signals that mitigation actions have had an impact on emissions. A significant increase has been in the sale of plug-in hybrid cars and rapid build-up of charging stations, partly driven by government support, plays a part in that trend. It is hoped that the upward trend of sales of plug-in hybrid cars will continue, and that sales in pure electric cars will also go up. There is also a clear sign of increase in bicycling and use of public transport. Again, it is difficult to say if this is primarily due to government actions or other factors, such as increased awareness of a healthy lifestyle. But there has been effort in constructing bicycle paths in the capital area in recent years, and in schemes by workplaces to support climate-friendly transport.

There has also been a marked decrease in emissions from fisheries and fish-meal production, a significant sector in Iceland. This is perhaps primarily due to actions promoted by industry, but clearly supported in some instances by government action, such as by the carbon tax and a fisheries system that encourages minimum fishing effort for maximum gain.

It should be noted that the bulk of the increase in emissions – both in recent years and in projections – is from heavy industry that is regulated within the EU-ETS and needs to buy emissions permits within that system. These emissions are thus firmly regulated and accounted for under the regional climate regulation in the European Economic Area and the joint fulfilment arrangement Iceland has with the European Union and its Member States under the Kyoto Protocol in 2013-2020.

In February 2017, the Economic Institute of the University of Iceland (HHÍ), publish a study of Iceland´s mitigation potential and options in the report *Iceland and climate issues* (Ísland og loftslagsmál).[21] The study was conducted by assignment of the Ministry for the Environment and Natural Resources

The study sees considerable mitigation potential in Iceland, most notably in the LULUCF and transport sectors. The use of afforestation, revegetation and other actions under LULUCF to meet climate obligations may, however, be limited for Iceland, under EU rules on LULUCF. Transport is also the sector seen in many neighbouring countries as being one of the most difficult to achieve mitigation. (See chapter 5).

Compared to many other developed countries, Iceland can be said to have a limited amount of low-hanging fruit when it comes to cost-efficient climate change mitigation. Energy production, the main sector targeted for mitigation action in many developed countries, is almost entirely based on renewable energy in Iceland. Industrial emissions, the biggest sector, is regulated under the EU-ETS and is believed

[21] Mitigation potentials in Iceland – Ísland og loftslagsmál

to have very limited mitigation potential. Emissions per ton of produced aluminium are probably nowhere lower in any country. Emissions from livestock, a significant source, are difficult to control.

Iceland puts an emphasis on reducing emissions from mobile sources, cars and ships, and in carbon sequestration in LULUCF. Mitigation action, however, are also undergoing in all other sectors, including industry and waste. Iceland´s unusual mitigation profile calls for different priorities than in many other developed countries.

In the short run Iceland faces a challenge regarding emissions development, in the effect of strong economic growth, mostly fuelled by a growth in tourism. This will clearly make it a big challenge for Iceland to meet targets for 2020, even if the increase in the EU-ETS sector is not counted in total emissions.

In the longer run Iceland hopes to carry out a similar energy transformation from fossil fuels to renewables regarding mobile sources as has already been carried out in stationary energy production. Iceland also plans to harness its great potential in LULUCF, and gradually reduce emissions in the agriculture, waste and industry sectors. There are clear signals that mitigation actions have had an impact, and it is hoped mitigation actions will help this development.

4.2.2 Cross cutting measures

Table 4-1 Cross cutting measures.

Name of mitigation action	Sectors affected	GHGs affected	Type of instrument	Brief description	Start year of implementation	Implementing entity or entities
Climate Change Strategy	Cross-cutting	CH4, CO2, HFCs, N2O, I	Strategy	A framework for action and government involvement in climate change issues	2007	Ministry for the Environment and Natural Resourses
Climate Changes implementation plan	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs, SF6	Strategy	A general frameworkd for policies set by authorieis in fields relation to sustainable development.	2002	Ministry for the Environment and Natural Resouces
National strategy for sustainable development	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs	Action plan	Supplementary action plan to the plan from 2010	2015	Ministry for the Environment and Natural Resouces
Special Action Plan	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs	Action plan	Supplementary action plan to the plan from 2010	2015	Ministry for the Environment and Natural Resouces

The Climate Change Action Plan, published in 2010 builds on the results of the expert group tasked with exploring technical possibilities of mitigating greenhouse gas emissions in different sectors of the Icelandic economy. The Action Plan covers economy wide measures and the responsibility for implementation and financing of mitigation actions are distributed across different ministries and agencies. Municipalities and private entities do also finance actions, which are aimed at reducing emissions.

Ten key action are specified in the Climate Change Action Plan:

1. Implementation of the EU-ETS – (Completed)
2. Tax on carbon – (Implemented – Reviewed on regular bases)
3. Change the system for taxes and levies on vehicles and fuel – (Implemented – Reviewed on regular bases)
4. Procurement of low-emission and environmentally friendly vehicles for government and local authorities uses –(Implemented)
5. Increased walking, cycling and use of public transportation – (In progress)
6. Use of biofuels for the fishing fleet – (In progress)
7. Electrification of the fishmeal industry – (Mostly completed)
8. Afforestation and revegetation – (In progress)
9. Restoration of wetlands – (In progress)
10. Enhanced research and innovation in the field of climate change – (In progress)

In 2015, the government launched Special Climate Action Plan. Specific projects complimentary to the actions identified in the Action Plan from 2010, where funded for three years, that is 2016-2018. In the Special Climate Acton Plan the focus is on the following:

- Implementing Parliamentary Resolution on energy change in transport and fishing industry.
- Funding of charging stations for electrical cars.
- Funding of a roadmaps for reducing emissions in agriculture and fisheries respectively.
- Increasing funds for afforestation, revegetation and wetland restoration.
- Funding of capacity building.

4.2.2.1 Implementation of the EU-ETS

The EU Emissions Trading Scheme (EU-ETS) was transposed into Icelandic law in 2011 (Act No. 64/2011). Iceland‘s participation in the ETS started on 1 January 2012 when aviation became part of the emission trading system. Important changes were made to the system with Directive 2009/29/EC, which enlarged the scope of the trading system with respect to activities and gases. With these changes primary production of non-ferrous metals, aluminium and ferro-silicon, which have an important role in Iceland‘s economy were included in the trading system. These changes were transposed into law by Act No. 70/2012 on Climate Change. The emission trading system covers about 40% of 2015 emissions from Iceland.

4.2.2.2 Tax on carbon

A carbon tax on fossil fuel use was introduced on 1 January 2010 by Act No. 129/2009, on environment and natural resources taxes. The tax is levied on fossil fuels in liquid or gaseous form with respect to the carbon content of the fuels. From January 1st, 2017 the tax is 6.30 IKR/litre of gas and diesel oil, 5.50 IKR/litre of gasoline, 7.75 IKR/kg of fuel oil and 6.90 IKR/kg of petroleum gas or other gaseous hydrocarbons. With VAT (24%) the carbon tax on diesel oil and gasoline amounts to 7.81 IKR/litre and 6.82 IKR/litre respectively. The carbon tax on diesel and gasoline with VAT corresponded to about € 10 per ton of emitted CO_2 at the beginning but has changed since then in accordance to the inflation index.

A Committee that is to review the tax system regarding fuel and vehicles is to deliver proposals early 2018, on further steps to encourage the use of low emitting vehicles.

The Government that took office in November 2017, has announced that the Carbon tax will be raised by 50% in 2018, with the aim of reduce the use of carbon and by that reduce CO_2 emission.

4.2.3 Energy and transport

Policies and measures in the energy and transport sector (all included "With measures)

Table 4-2 Mitigation actions in the energy sector

Name of mitigation action	Sectors affected	GHGs affected	Type of instrument	Brief description	Start year of implementation	Implementing entity or entities
Implementation Plan for clean transport	Transport, Energy	CO2	Action plan	Action plan w ith the aim to increase the use of low -emisson cars	2017	Ministry for the Industry and Innovation , Ministry for Transport
Carbon tax	Transport, Energy	CO2	Fiscal	Tax on liquid and gaseous fossil fuels	2010	Ministry of Finance and Econimic Affaris
Excise duty on vehicles based on CO2 emission	Transport, Energy	CO2	Fiscal	The excise duty varies from 0%-60% depending on CO2 emissions	2011	Ministry of Finance and Econimic Affaris
Biannual fee on vehicles	Transport, Energy	CO2	Fiscal	Basic fee w ith additional fee for higher emission levels or w eight depending on w eight class	2011	Ministry of Finance and Econimic Affaris
No WAT on zero-emission vehicles w ith a cap	Transport, Energy	CO2	Fiscal	Elecric, hydrogen and hybrid vehicles exempted from VAT up to a certain maximum limit.	2012	Ministry of Finance and Econimic Affaris
Reduced excise duty and semiannual car tax on methane vehicles	Transport, Energy	CO2	Fiscal	Methane vehicles get a discount from levied excise duty an dpay only minumum semiannual car tax.	2011	Ministry of Finance and Econimic Affaris
Parking benefits for low emission vehicles	Transport, Energy	CO2	Fiscal	Vehicles emitting less that 120 gr.	2007	Municipalities
Incresed public transportation and cycling	Transport, Energy	CO2	Fiscal	The Icelandic Transport Administration supports public transportation and construction of bike and w alking paths.	2012	Ministry of Transport, Municipalities
Implementation Plan for transport	Transport, Energy	CO2	Policy	Action plan on infrastructure for transport	2011	Minstry for Transport
Excemption from excise duty an carbon tax for CO2 neutral fuels	Transport	CO2	Fiscal	No excise duty and carbon tax on CO2 nautral fuels	2010	Ministry of Finance and Econimic Affaris
Renew ables in fuel for transport	Transport	CO2	Regulatory	Requirement of blending fossil fuels w ith renew ables	2014	Ministry for the Industry and Innovation
National Renew able Energy Action Plan	Energy	CO2	Action plan	Strategic approach and concreate measures on how Iceland w ill meet mandatory national targets for renew able energy in 2020	2015	Ministry for Industry and Innovation

The Icelandic energy sector is unique in many ways, not the least because of its isolation and the share of renewable energy in the total primary energy budget. Iceland has ample reserves of renewable energy in the form of hydro and geothermal energy, and these energy sources are mainly used for district heating and electricity production.

Electricity consumption per capita is very high in Iceland compared to other OECD-countries, with 53 MWh/capita, next comes Norway with 23 MWh/capita and Canada and Finland with 15 MWh/capita.

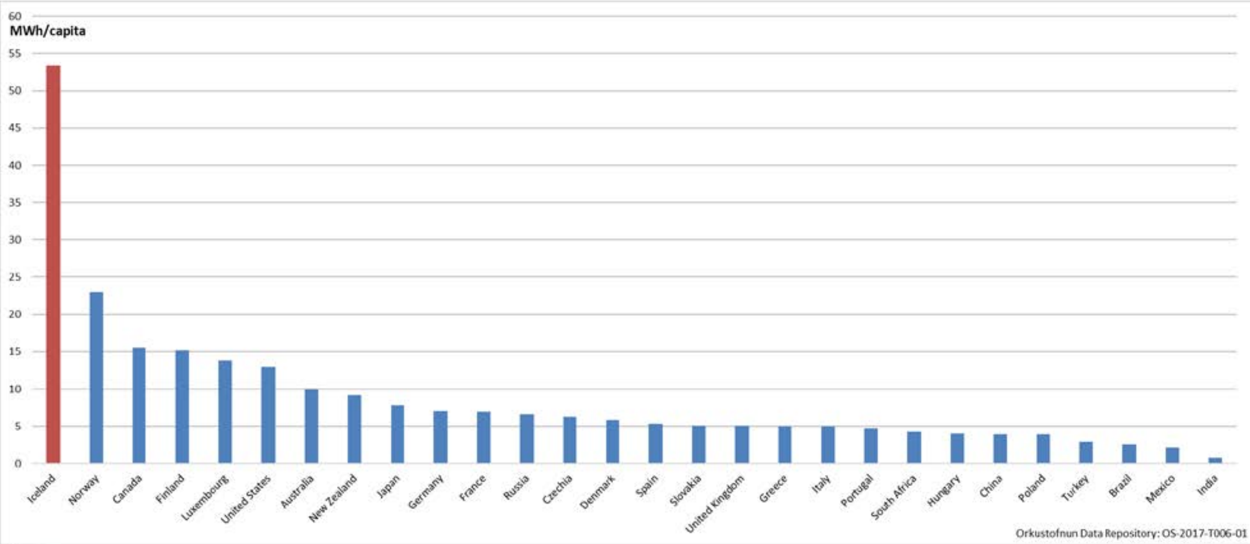

Figure 4-1 Electricity consumption per capita in selected countries 2014.

Renewable energy sources (hydropower and geothermal power) account for 99.9% of electricity production and 99% of space heating.

The energy profile is unusual as 84% of primary energy use in 2015 came from renewable resources, hydro and geothermal. The remaining 16% came from imported fossil fuels, which are mainly used in transportation and the fishing industry.

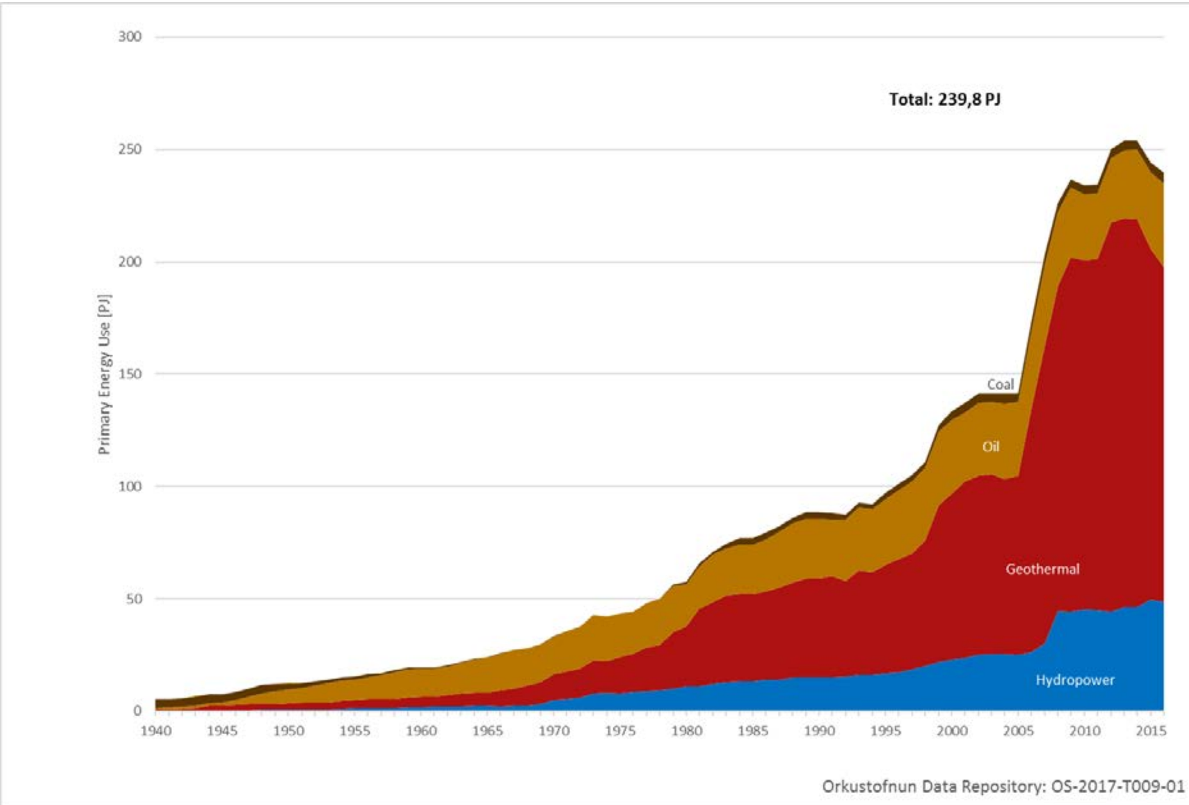

Figure 4-2 Primary energy consumption in Iceland 1940 – 2015.

Fossil fuels are imported to Iceland and consisted in 2015 mainly of oils (79%) and coal (20%), while gas import was small (0.4%). Coal was primarily used as raw material in the production of ferro-silicon and falls under industrial processes.

The main uses of oil in 2015 were for road transport (55%) and fishing (31%). Other uses were in construction (6%), manufacturing (4%), domestic aviation (1%) and national navigation (1%). Only miniscule amounts of oil are used for residential heating and electricity production in Iceland. See Figure 4-3.

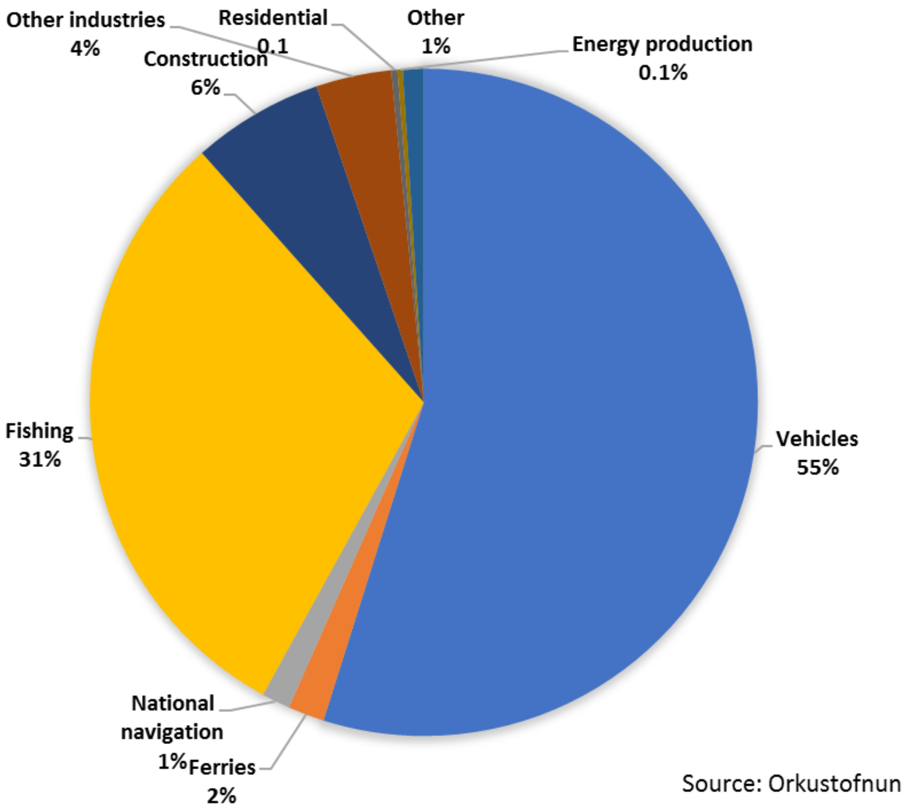

Figure 4-3 Domestic use of liquid fossil fuels (t %) in Iceland 2015

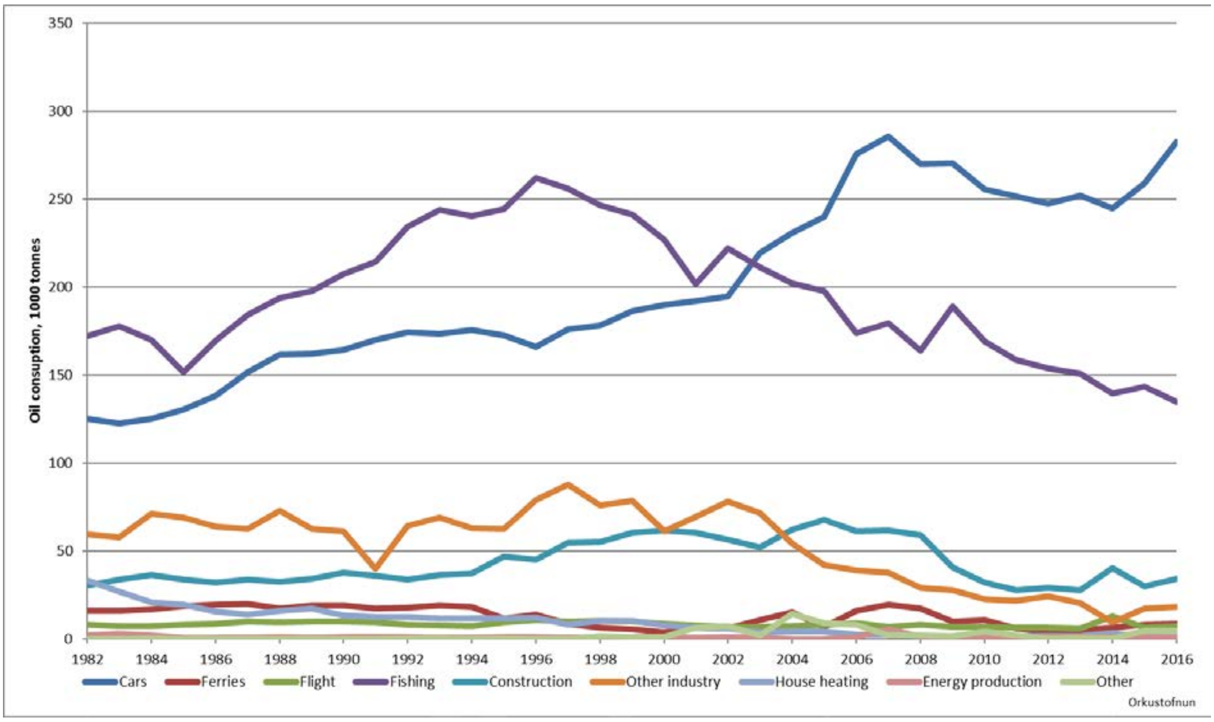

Figure 4-4 Oil consumption 1982-2015

The EU Directive on the promotion of the use of energy from renewable sources (RES) was transposed into Icelandic legislation by Act No. 40/2013, on renewable fuel in ground transportation and Act No. 30/2008, on guarantees of origin of electricity from renewable energy sources.

A strategic approach on how to meet mandatory targets regarding renewable energy sources has been set out in the National Renewable Energy Action Plan, (NREAP) first published in accordance with Article 4 of Directive 2009/28/EC.

As reported in the NREAP progress report from Iceland in 2013, the share of energy from renewable energy sources was 63.4% in 2005 (RES share) in gross final consumption of energy and the target for 2020 was set to 72% in 2020.[22]

In the 2015 progress report on the implementation of the RES directive,[23] recalculation of the target was made due to some inaccuracy in the first report, as the energy consumptions for fisheries industry had been accounted for in the transport sector. To reflect the corrections made in the calculations the overall target for RES 2020 was adjusted to 67% to reflect the correction made in the calculations.

The total share of renewable energy in gross final consumption of energy in 2015 was 70,2%.[24]

The electricity and space heating sectors in Iceland are close to full saturation of renewable energy sources and there is little room for further improvement or only minimal increases.

[22] NREAP Progress report 2013
[23] NREAP Progress report 2015
[24] Eurostat

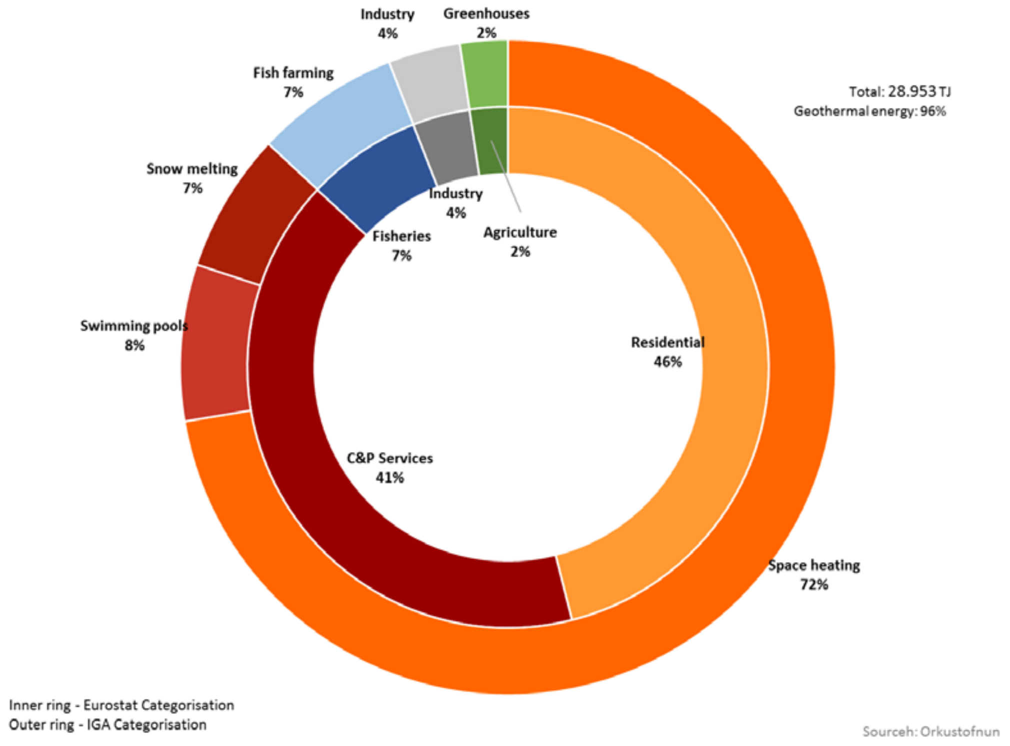

Figure 4-5 Final heat use in 2015

4.2.4 Transport sector

The main uses of liquid fossil fuels in Iceland is in transportation and fishing.

Total share of RES fuel in the transport sector was 5,75%[25] in 2015. In 2011 the share was less than 1%. Biofuel produced in Iceland has exclusively been used for the ships, but all biofuel used in land transport is imported, except methane which is extracted from landfills.

In May 2017, a Resolution No 18/156[26] on action plan on energy change was adopted by the Parliament According to the action plan, the goal is to increase the share of renewable energy in the energy budget and at the same time reduce fossil fuel.

The main goal is to increase the share of renewable energy in the transport sector from 6% in 2017 to 10 in 2020 and 40% in 2030. Regarding the fishing sector. In 2017, the share of renewable energy used by the domestic fishing fleet is less than 1% but according to the action plan, the goal is to increase the share to 10% in 2030.

Derived effect of the action plan is expected to be increased energy security and currency saving, as less fossil fuel needs to be imported.

Græna orkan (Green energy) is a cluster for collaboration and exchange of experience between the private and the public sectors, which aims at increasing the use of renewable domestic energy in transportation. The project management team of Græna orkan has members from ministries and the private sector. The mandate is based on a parliament resolution from 2011. Among the objectives of the cluster are to link actors working toward energy shift in transportation, visualize steps taken, organize

[25] Eurostat SHARES tables results 2015
[26] Parliamentary Resolution 18/146

and create consensus on key actions that need to be implemented, promote education and sharing of information and encourage research and development.

The Gæna orkan played an important role in preparing the Parliamentary Resolution on Action plan on energy transition, adopted in 2017.

4.2.4.1 Taxes and levies on vehicles

The carbon tax, introduced in 2010, covers four categories of fuels: gas diesel oil, motor gasoline, heavy fuel oil and LPG. Fuels used by the fishing fleet are fully subject to the carbon tax and VAT, and to no other forms of taxation.

The excise duty and biannual fees are based on CO_2 emissions with special provisions for methane driven vehicles. Zero-emission vehicles, powered by electricity and hydrogen enjoy exemption from VAT.

4.2.4.2 Excise duty on vehicles based on CO_2 emissions

According to Act No 29/1993, with later amendments, on excise duty on motor vehicles, fuel, etc., the excise duty on passenger cars has from 1 January 2011 been based on carbon dioxide emissions declared by the car manufacturer for combination of city and road driving. Where emissions data are not available, the tax rate is based on the weight of the vehicle. The registration tax is at minimum 10% ad valorem (max. 65 percent) of the taxable value. On passenger cars and other motor vehicles, which are not specifically mentioned in articles 4 and 5, excise duty shall be levied under the Main Category in the following table based on the vehicles registered emissions of carbon dioxide (CO_2), measured in grams per kilometre driven.

Table 4-3 Registered emissions and excise duty categories

Price Band	Registered emissions	Main Category	Exception Category
	(g CO2/km)		(Article 5)
A	0–80	0	0
B	81–100	10	0
C	101–120	15	0
D	121–140	20	0
E	141–160	25	5
F	161–180	35	10
G	181–200	45	15
H	201–225	55	20
I	226–250	60	25

Table 4-3 is based on Act Nr 29/1993 on excise duty for passenger cars and fuel.

Under the main category fall all conventional vehicles, which are not listed under the exception category. Under the exception category fall many different types of “unusual” vehicles, such as for handicapped, ambulances, vehicles used by the rescue forces, vehicles owned by foreign embassies, vehicles 40 years and older and machines used in the construction sector.[27]

4.2.4.3 Excise duty and semi-annual car tax on methane vehicles is lowered.

Some special provisions is granted for vehicles that drive on methane gas. They will get a discount of ISK 1,250,000 from the levied excise duty and pay the minimum semi-annual car tax, ISK 5,000.

4.2.4.4 Biannual fee on vehicles is based on CO_2 emissions.

According to Act No 39/1988 the semi-annual road tax shall be based on the registered emissions of carbon dioxide (CO_2) of the vehicle concerned. Recorded emission is measured in grams per kilometre driven. In 2017, semi-annual road tax on each vehicle, weighing 3,500 kg or less, shall be ISK 5,810 for emission up to 121 gram of carbon emissions registered and ISK 139 per gram of registered emissions beyond that. If the information on registered carbon dioxide emissions are not available, the vehicles emission shall be determined 0.12 grams per kilogram of the vehicle's registered own weight, plus 50 grams of carbon dioxide. Semi Annual road tax on each vehicle, weighing more than 3,500 kg, shall be ISK 54,420 plus ISK 2,32 per kilo of the vehicles weight exceeding 3,500 kg. Semi Annual road tax on vehicles weighing more than 3,500 kg shall not exceed ISK 85,660 for each payment period.

4.2.4.5 No VAT on zero-emission vehicles with a cap.

With the aim to favour zero-emission vehicles, according to Act No 50/1988 on VAT, as amended (exemptions, credits, etc.) the Director of Customs is authorized a clearance to waive VAT on low emission vehicles. The maximum exemption on electric or hydrogen vehicles was in 2017 ISK 1,440,000 and to a maximum of ISK 960,000 on a hybrid vehicle. At taxable sales, the taxable party may also be exempt from taxable turnover amounting to a maximum of ISK 6,000,000 due to electric or hydrogen cars and a maximum of ISK 4,000,000 for hybrid cars. This provision has been extended on a yearly basis up to one year at a time, but as of January 2018, the provision was extended up to three years, that is to December 31 2020.

4.2.4.6 Fuels

Oils that are not fossil fuels are exempt from a levy on fuels, according to Act No. 87/2004. The same provision applies to such oils blended with oils of fossil origin. Fuels that are not of fossil origin blended with gasoline are exempt from a levy on gasoline, according to Act No. 29/1993. The fossil fuel parts of oil and gasoline mixtures are not exempt from the levy as prescribed by Acts Nos 87/2004 and 29/1993.

4.2.4.7 Implementation of EU regulations on the performance of vehicles

The European Union has made an effort to reduce CO2 emissions from vehicles and to that end the Union has adopted various rules and regulations.

Iceland is a member to the agreement of the European Economic Area and by the agreement Iceland is obliged to incorporate the EU-regulations regarding vehicles in to Icelandic legal framework.

Included among others are regulations on vehicle type and equipment, Euro-standards, standards for heavy duty vehicles, vehicle design and equipment and labelling of tyres.

EU-regulations in this field have been implemented in Iceland through Regulation no 822/2004, on vehicle design and equipment, with later amendments and Regulation No 855/2012, on tyre labelling to promote fuel-efficient and safety of tyres, with later amendments. New EU regulation in this field is actively followed and implemented in Iceland. There is no manufacturing of cars in Iceland.

4.2.4.8 Renewable fuels and low emission vehicles

As has been Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC was transposed into

[27] Act No 29/1993 on excise duties

Icelandic legislation by Act No. 40/2013, on renewable fuel in ground transportation and Act No. 30/2008, on guarantees of origin of electricity from renewable energy sources. Iceland‘s National Renewable Energy Action Plan sets out a strategic approach and measures on how Iceland will meet the mandatory national targets for 2020 laid down in Directive 2009/28/EC, including the overall target and the 10% target on share of energy from renewable sources in transport.

Act No. 40/2013, as amended, on renewable fuel used in land transportation, stipulates the use of minimum percentage of renewable fuel in fuel used for land transportation. A minimum of 3.5%, calculated as part of the total energy content of the fuel, is required from 1 January 2014. A minimum of 5% has been required from 1 January 2015.

There are clear signs that the effects of the policies and measures taken regarding the transport sector has been positive. There is significant increase in sales of electric cars and hybrid cars which can be traced to incentives given to low emission vehicles. See Figure 4-6 and Figure 4-7.

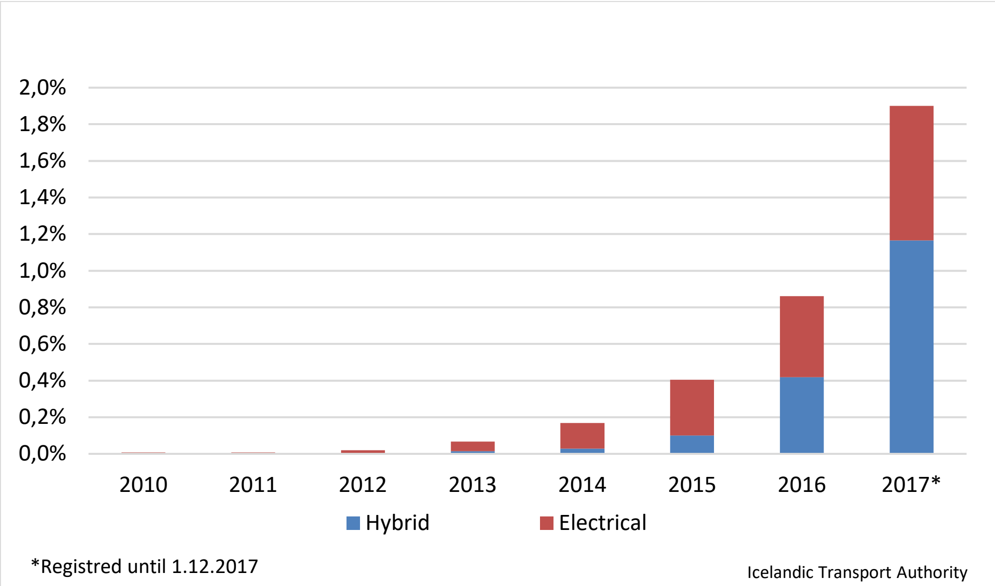

Figure 4-6 Hybrid and electrical vehicles, as percentage of all registered passenger vehicles

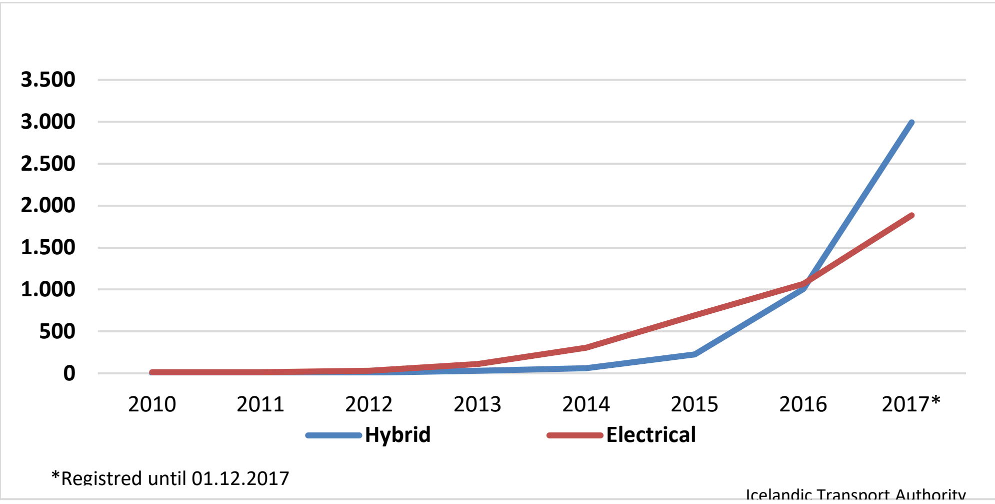

Figure 4-7 Total registered hybrid and electrical passenger vehicles

The average registered gCO2/km has also been decreasing as is illustrated in Figure 4-8.

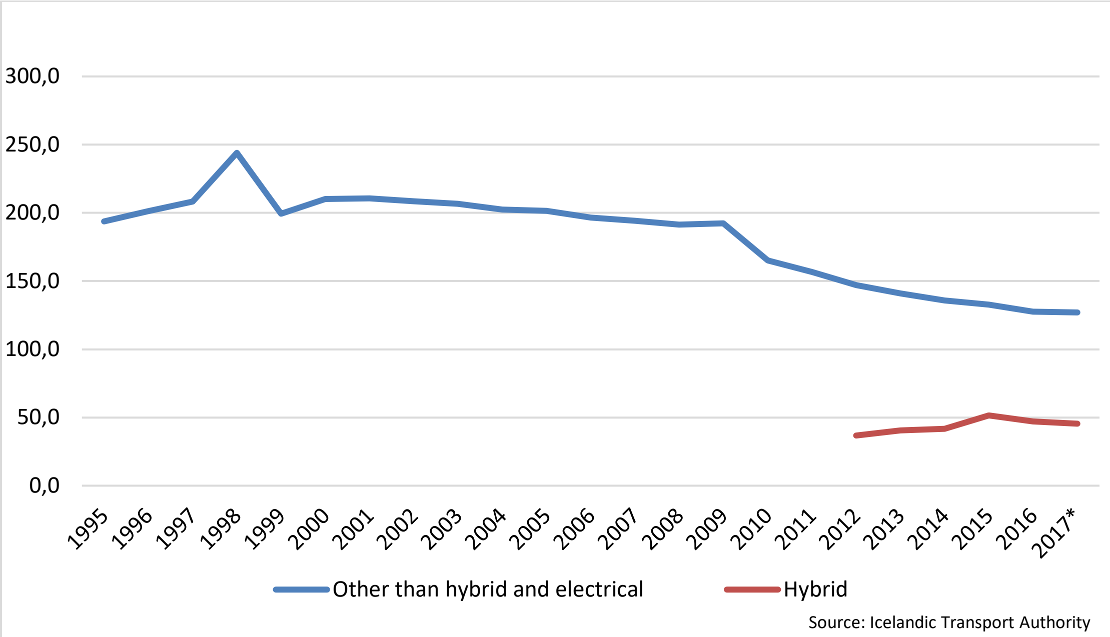

Figure 4-8 Average -gCO2/km – new registration

4.2.4.9 Official procurement of vehicles, public transportation, walking and bicycling

Official procurement of low-carbon and fuel-efficient vehicles and increased share of public transport, walking and bicycling in transport are among the 10 key measures in the 2010 Climate Mitigation Action Plan.

Since 2011, low emission vehicles have been stressed in procurement of vehicles for the Icelandic state. The city of Reykjavik adopted a policy with the aim, e.g. to reduce negative effects of vehicle traffic on the environment and enhance environmentally friendly transportation. Procurement of low emission vehicles has been emphasized as part of the policy. The proportion of electric vehicles and vehicles powered with methane from the city‘s landfill of the vehicle fleet owned by Reykjavik city was 56% in early 2013.

Increased share of public transport, walking and bicycling in transport is an important component of the Transport Policy Plan 2011-2022 and the four-year Transport Policy Plan 2015-2018 adopted as a Parliament resolution in October 2016, and the same can be said about the previous four-year Transport Policy Plan for the years 2011-2014.

Municipalities in the capital area and the government have initiated a 10-year pilot project, with the objective of doubling the share of public transportation in the greater capital region. An agreement was made between the Icelandic Transport Authority (Previously the Road and Coastal Administration) and the municipalities in the capital region in 2012.

According to the agreement, the Transport Authority supported public transportation in the capital region with 350 million IKR in 2012 and annually from 2013 the support is 900 million IKR for ten years. In 2022, additional funding of 550 million will be provided.

In the special action plan which was set forth in 2015, one of the actions identified was to support the funding of charging stations for electrical cars, with focus on areas outside the capital area. The Energy fund was assigned to manage the funding of the charging station by application process to the fund. Total grans amounted to ISK 201 million over three-year period. Grantees are energy utility companies, fuel retail companies and municipalities.

In total 42 fast-charging stations and 63 conventional charging stations will be built, in total 105 new charging stations. When the program started in 2016, there were only 13 fast charging stations in Iceland, most of them in the municipality area.

ON Power – a subsidiary of Reykjavik Energy, is one of the beneficiaries of the grants provided through the special action plan 2016-2018. ON Power has been leading in installing charging point for electric vehicles all around Iceland and its scheme of opening up Iceland’s ring-road for EVs with fast-charging points at regular intervals is in its final stages and will be completed in 2018. The charging points are already 27, and ON Power has ambitious plans for increasing their number both in Iceland’s urban and rural areas, see Figure 4-9.

In addition to the grants of the special action plan, the energy supplier Orkusalan, a subsidiary of RARIK- the Iceland State Electricity, has announced that it will donate about 80 charging stations to municipalities, with the goal of having at least one station in every municipality.

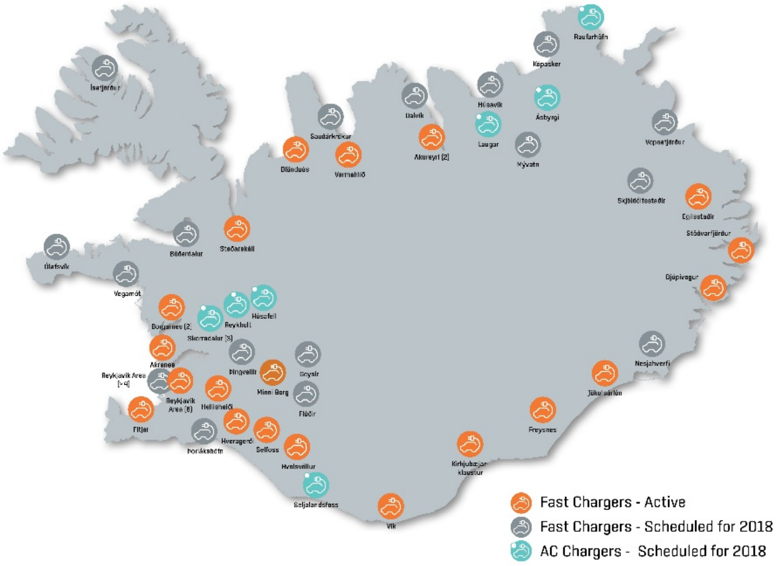

Figure 4-9 The Charging stations of ON-Power.

4.2.4.10 Transport policy in Reykjavik

The capital of Iceland, Reykjavik, is by far the largest municipality with 123.246 inhabitants and the greater capital area has around 216.600 inhabitants in 6 municipalities, which is around 60% of total population. Therefor the transport policy in the capital area is of great importance and the capital is in cooperation with the neighbouring municipalities regarding planning and transport. Sustainable urban mobility is a key factor in planning in Reykjavik. A number of key strategies addressing the issue have been adopted in the last decade and a number of measures to create a more sustainable transport system have been implemented. Population density has been growing in key locations, a network of bicycle paths has been built, public transport service has been improved and accessibility to alternative fuel has increased.

In accordance to the Municipal Plan 2010-2030, which was adopted in 2013, at least 90% of all new residential units in the planning period will rise within current urban boundaries. A denser urban area will reduce distances, cost and the environmental impact of transport. The Plan proposes radical changes in earlier policy on the development of transport systems. The objective is for the modal share of public transportation, to be tripled, from 4% to 12%. The modal share of pedestrians and cyclists should rise from 21% to over 30% in the planning period.

Smart growth is a key theme in a new regional plan for the C*apital Area to 2040***,** which was adopted in 2015, where the formation of frequent transit development corridors is the cornerstone. Growth is to be focused in urban centres and other transit-oriented areas with access to high-class public transport.

To increase the modal share of cycling, the Reykjavik Cycling strategy for the period 2015-2020, sets four measurable sub-goals and 11 measures to reach them. In 2012 the total length of designated cycle routes was 9 km. In 2016 the network was approx. 25 km and paths (excluding sidewalks) for walking and biking have a total length of approx. 400 km.

The IRCA supports, with matching municipal funds, the construction of bike and walking paths in the capital region and trunk routes for bicycles. The Transport Policy Plan 2011-2022 foresees 200 – 250 million ISK annual funds for these projects and additional 100 million ISK each year for construction of pedestrian bridges and tunnels.

Specific measures have been taken to increase the share of public transport in Reykjavik. To increase the share of public transport, the city adopted The Reykjavik Public Transport Strategy in 2015. Together the municipalities in the capital region operate a holistic bus network that consists of 27 routes. In 2012 bus service was increased by a total of 35% with increased frequency on key routes and longer operational hours. During peak hours in 2017 majority of the routes have a 15 minutes frequency and some have a 10 minutes frequency. This has been very successful. Increasing the frequency further is being considered to accommodate more growth. The minimum frequency for all routes in Reykjavik during off-peak hours is now 30 minutes instead of 60 minutes before. Buses mostly drive in general purpose lanes but priority lanes for buses, with a total length of 3,8 km, have been built at 19 critical locations in the last decade. Investment is prioritized with a cost/benefit analysis based on GPS tracking from all buses in the network that shows where buses are experiencing the most traffic delays.

The goal of the City of Reykjavik is to have a zero-emission car fleet by 2025. In 2017 82% of the city's own vehicle fleet used alternative fuel.

*The City of Reykjavik's Climate Policy was adop*ted in 2016. The goal is that by 2040 emissions from automotive traffic and public transport will be free of greenhouse gases. Energy shift in transport and an increased ratio of electricity-powered modes of transport will be supported. Important element is the infrastructure for electrical vehicles and the availability of charging stations in the city's parking garages. In October 2017 there was an ongoing procurement for 58 charging stations all over the city.

4.2.4.11 Akureyri environmental policy

The municipality of Akureyri, a city of 20.000 people, in North Iceland and by far the largest city outside the municipality area, has set forth ambitious goals on environment and climate with focus on transport and waste.

For over ten years the local bus in Akureyri has been free of charge which has led to increase in the number of passengers. The plan before 2020 is to have three buses running on bio-methane and the rest running on 100% locally produced bio-diesel, or electricity. The methane is collected from an old landfill site near the city.

There are around 14.000 cars in Akureyri and the plan is to replace around 75% of the car fleet with clean energy cars well before 2030.The plan includes local production of energy for transport. That includes electricity from hydro-power, bio-methane produced with material from farms in the area and biodiesel produced with used cooking oil from restaurants and animal fat from slaughter houses.

Some of the Climate Goals for transport that have been adopted by the Akureyri city council.

- All public transport within the city limits will be fossil free before 2020.
- Public transport will have increased priority and streets designed accordingly.
- Cars that meet the requirements for environmentally friendly energy sources and are identified as such will be given priority to the parking in the city centre.
- All new planning projects to include walking and cycling paths.
- To brand Akureyri as Bicycle Friendly Community.

4.2.4.12 Use of biofuels for the fishing fleet

Increase use of alternative fuel in the fishing fleet was one of the kay actions in the 2010 action plan. The Icelandic fishing fleet uses about 200.000 tons of oil/year. The fuel forecast prepared by the National Energy authority predicts increased use of alternative fuels such as biodiesel for the fishing fleet in the future. These alternative fuels could be imported and/or domestically produced.

Biodiesel produced from used cooking oil and slaughterhouse waste by Orkey[28] in Northern Iceland has been used by selected ships as an admixture to conventional fuel. This results in an increase in local fuel production with a corresponding reduction in import and fuel transport. Results have been promising.

4.2.5 International air transport and shipping

Iceland recognizes the importance of the work that has been accomplished at the ICAO and IMO levels, respectively, to limit emissions from international traffic, and has actively participated in the implementation and promotion of these efforts.

4.2.5.1 European obligations

With regard to European obligations, Iceland as a member of the European Economic Area has implemented the EU ETS. The EU ETS has been applicable to the aviation sector in Iceland since 2012. As member of the European Civil Aviation Conference (ECAC), Iceland also actively participates in European cooperation and coordination in the field of aviation, including efforts to reduce greenhouse gas emissions.

Iceland adopted EU regulation 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport in the spring of 2017, with an amendment of the Icelandic Act on Climate Change No. 70/2012. The EU regulation, which is part of the EEA Agreement, took effect, 1 January 2018. The regulation stipulates that CO2 emissions from all ships above 5,000 gross tonnes, shall be monitored during voyages to and from ports in the EU. It should be mentioned in this regard that there are no ships above 5.000 gross tonnes registered in Iceland which means that the regulation has minimal effect in Iceland.

Iceland has in effect, regulation No 124/2015 on sulphur content of marine fuels which is a transposition of EU Directives on the same subject.

4.2.5.2 ICAO

With regard to international obligations in the field of aviation, Iceland as a member of the International Civil Aviation Organization (ICAO) has participated in the adoption of a global emission reduction scheme, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Iceland is

[28] Orkey

among the nations that have confirmed that they will voluntarily participate in the scheme from the beginning. Preparation is ongoing and will include the adoption and implementation of the new proposed Volume IV of Annex 16 of the Chicago Convention, once it has been adopted by ICAO.

In 2016 Iceland submitted a revised version of the State Action Plan, which includes a common section for the ECAC area, and a national section dedicated to national initiatives and national participation in international initiatives. The national section includes information about aircraft-related technology development, improved air traffic management and infrastructure use and economic/market-based measures.

4.2.5.3 IMO

With regard to international obligations in the field of maritime affairs, Iceland is a member of the International Maritime Organization (IMO). Iceland has contributed actively in the discussions and development of the IMO Strategy on reduction of GHG Emissions from ships.

In November 2017, Iceland ratified Annex VI of the MARPOL Convention covering the prevention of air pollution from ships, which takes effect in February 2018.

The Icelandic fleet of ships mainly consists of fishing vessels, domestic ferries, tugs, dredgers and passenger boats. Some decades ago Icelandic shipping companies, although based in Iceland, began to register their cargo ships on foreign registries and in 2017, no merchant ships on international voyages are flying the Icelandic flag.

Iceland will implement the Comprehensive IMO Strategy on Reduction of GHG Emissions from Ships, which sets out an initial strategy to be adopted in 2018, as much as it applies to ships on the Icelandic Register of Ships. Iceland also welcomes the development of the Energy Efficiency Design Index (EEDI) requirements. Iceland will apply the above measures to Icelandic fishing vessels and other vessels, to the extent that they fall under the scope of Annex VI, in the absence of cargo and passenger ships engaged on international voyages on the Icelandic Registry of Ships.

4.2.5.3.1 IMO participation

The Environment Agency now takes part and attends all MEPC meetings of the International Maritime Organisation (IMO). The Agency has though, not been able to participate in the development of IMO strategy meetings due to lack of human resources. Furthermore, the Transport Agency takes part in all MSC Committee meetings of the IMO.

4.2.5.4 Black carbon and alternative fuels

In addition to the aforementioned efforts, Iceland recognizes the importance of the reduction of emissions of black carbon, particularly in the Arctic environment, and the important role that alternative fuels play in the reduction of greenhouse gas emissions. The national transport plan for 2015-2018 includes goals to support research in the field of black carbon emission reduction and sustainable fuel production, which Iceland is working actively towards. One of the projects currently under development is the production of marine fuel through rapeseed cultivation.

4.2.6 Industry

Table 4-4 Policies and measures in the industry sector – ETS system

Name of mitigation action	Sectors affected	GHGs affected	Type of instrument	Brief description	Start year of implementation	Implementing entity or entities
EU emission trading scheme	Industry/industrial processes	CO2, PFCs	Economic	Cap set on emissions from certain installations. The cap is reduced over time. An EEA-wide market with emission permits.	2013	Environment Agency, Ministry for the Environment and Natural Resources
EU emission trading scheme	Transport	CO2	Economic	Trading emission allowances for flights within the EEA-area.	2012	Environment Agency, Ministry for the Environment and Natural Resources
EU emission trading scheme	Industry/industrial processes	CO2, PFCs	Economic	Cap set on emissions from certain installations. The cap is reduced over time. An EEA-wide market with emission permits.	2013	Environment Agency, Ministry for the Environment and Natural Resources

The EU Emissions Trading Scheme (EU-ETS) was implemented in Iceland under the provisions of the EEA Agreement and took effect with respect to aviation in 2012. Three aluminium plants, a ferrosilicon plant and one fishmeal factory have been operating under the ETS from 1 January 2013 and in 2015 a data centre started operation and entered the scheme. Total emissions from operators under the EU-EST have amounted to approximately 40% of annual greenhouse gas emissions from Iceland. In addition, four small installations, three fishmeal factories and a mineral wool producer, have been excluded from the ETS and are subject to equivalent measures.

The carbon tax (see 4.2.2.2) covers emissions from fossil fuels that are not included in the trading system. Economic instruments cover more than 90% of CO_2 emissions in Iceland with these measures. Thereby, a long-term foundation has been laid where the message is embedded in the economy that it pays to reduce greenhouse gas emissions. Responsibility and management of emissions from activities covered by the EU-ETS will only in a minor way be influenced by the Government and specific measures to reduce emissions therefore focuses mainly on sectors outside the ETS.

The fishmeal industry has for decades been the biggest industrial user of oil in Iceland. Oil boilers used in the industry have gradually been replaced with electric boilers resulting in less oil consumption as can be seen in Figure 4-10.

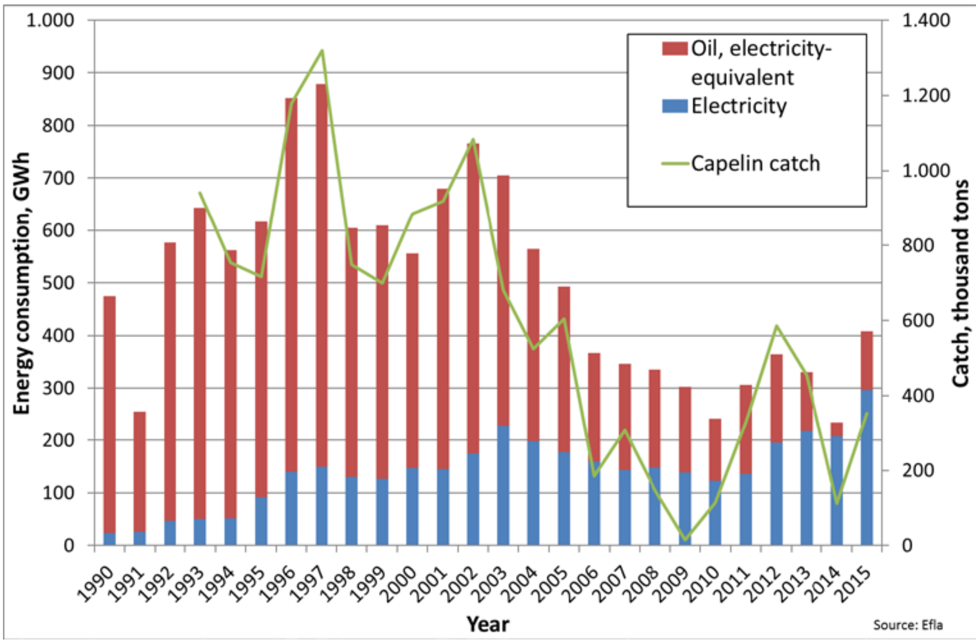

Figure 4-10 Energy use in the fish meal industry 1990-2015.

This development is expected to continue as more fishmeal factories convert to electric boilers. Industries in remote locations have faced barriers because of limited access to electricity, due to bottle necks in the transmission system. Recently a new electric cable with increase capacity was installed between the Mainland and the Vestmanna Islands which will open up the possibilities to connect the fish meal factory there to the grid and reduce oil consumption in the islands.

4.2.6.1 Ozone depleting substances and fluorinated greenhouse gases

Iceland's fulfilment of its obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer is based on the Chemicals Act No. 61/2013, and Regulation No. 970/2013, on ozone depleting substances.

Ozone depleting substances are not produced in Iceland and no imports of ozone depleting substances of its obligations under the Montreal Protocol have been registered after 2010. Uses of recycled ozone depleting substances are not permitted after 31 December 2014.

There are provisions in the legislation to control fluorinated gases, i.e. PFCs, HFC and SF_6. A regulation on fluorinated greenhouse gases was set in 2010 (Regulation No 834/2010). The Act implements Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases. The legislation covers limitations with respect to releases, uses, management, as well as registration, marketing, labelling and leakage checks. It also sets requirements regarding training and certification. Efforts are being made to implement the "new" F-Gas Regulation (EU) No 517/2014 on fluorinated greenhouse gases. In addition, Iceland's membership of the Kigali amendment to the Montreal Protocol on ozone-depleting substances is being undertaken.

4.2.7 Agriculture

Icelandic agriculture is largely based on the cultivation of grass fields and extensive use of rangelands for pasture. Annual crops are only cultivated on 10-15% of the cultivated areal.

Numerous fertilizer experiments were performed on grass fields in Iceland during the years 1930-1970. The aim of these experiments was to find out suitable doses of fertilizer for Icelandic grass fields and which time of the spring was best for fertilizer application. Most of these experiments lasted only a few years. However, quite a few of them continued for 50-70 years and became long term experiments. Those experiments have been used to evaluate long term effects of mineral fertilizer on soil and to trace the track of the fertilized nutrients, how much of them were found in the yield, how much were accumulated in the soil and how much were lost.

Several experiments with different amounts of fertilizer on grass fields have been performed the last twenty years, especially in Northern Iceland. Some experiments with manure as fertilizer have also been performed, both experiments with different amounts of manure and experiments with different application time. Cultivation of barley has increased much in the last twenty years. Many experiments have been made to determine the best fertilizer doses for barley cultivation. The experiments mentioned above contribute to the goal of decreasing losses of nutrients from the soil.

One of the challenges of future agriculture is to improve the productivity of agricultural land and resource-efficiency, including fertilizers and energy. The Agricultural University of Iceland conducts research into targeted use of legumes in grassland forage systems. Experiments with red and white clover in agricultural grasslands have shown that a well-balanced grass-legume mixture with 70 kg/ha N-fertilization produces about the same net energy as a grass monoculture with 220 kg/ha N.

4.2.8 Waste management

Table 4-5 Policies and measures in the waste sector

Name of mitigation action	Sectors affected	GHGs affected	Type of instrument	Brief description	Start year of implementation	Implementing entity or entities
National plan on waste management	Waste management/waste	CO2, CH4, N2O	Implementation plan	Strategic approach on waste management	2013	Ministry for the Environment and Natural Resources, Municipalities, Environment Agency
Landfill policy	Waste management/waste	CH4	Regulatory	The share of organic wast shall not to be more than 35% of total waste in 202 with 1995 as reference year.	2013	Ministry for the Environment and Natural Resouces, Municipalities, Environment Agency
Landfill policy	Waste management/waste	CH4	Regulatory	Requierments in Reg. NO 738/2003 collection on landfill gases	2003	Ministry for the Environment and Natural Resources, Municipalities, Envionment Agency
Action against food waste	Waste management/waste	CH4	Action plan	Actions to prevent food waste. Information campaign, new web page with relevant information, etc.	2016	Environment Agency

The government´s waste management policy is manifested in legislation on waste management, regulations based on the legislation and in the national plan for waste management.

Icelandic legislation covering waste management is in accordance with EU legislation. Iceland has transposed into national law the *acquis* on waste covered by the EEA (European Economic Area) Agreement.

A National Plan (2013-2024) on waste management was published by the Ministry for the Environment and Natural Resources in 2013. A revision of that plan is foreseen in 2018 to emphasise the change to circular economy. Most municipalities have developed regional waste management plans based on the National Plan. The first waste prevention programme for Iceland was published by the Ministry in 2016. Its main objective is to reduce the generation of waste and it contains specific measures for these categories; food, plastics, textile, electronics, buildings and paper.

Regulation No. 737/2003 on waste management prescribes that municipalities must, in their regional waste management plans, describe what measure they will take to reduce bio-waste destined for landfills. By 2020 bio-waste going to landfills must be reduced to 35% of the total amount of bio-waste produced in 1995.

Regulation No. 738/2003 on landfilling of waste, requires collection of landfill gases to be further outlined in operating permits. Landfill gas is now collected at two of Iceland‘s largest landfills, and the methane is used for powering vehicles in those areas.

Waste management in Iceland has undergone positive changes in the past but nowadays there are several indications that authorities should be alert in this policy area. With increased prosperity waste generation is on the rise and the implementation of the circular economy could be challenging.

In the period 1995 – 2015, around 87-89% of GHG emissions from waste management came from solid waste disposal on land based on the National Inventory Report 2017. Greenhouse gas emissions from the waste management sector increased until 2007 with more waste being landfilled. Emissions from waste management have been decreasing steadily since 2007 with a decrease in the share of landfilled waste. The emissions due to the management of each kilo of waste has consequently been decreasing steadily since 2010 as less waste goes to landfill. See Figure 4-11, Figure 4-12 and Figure 4-13.

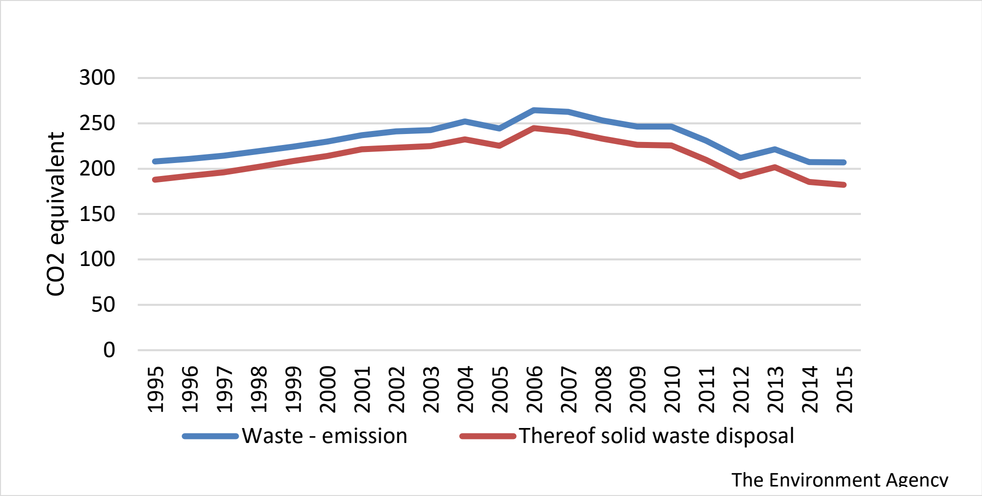

Figure 4-11 Emissions (in CO_2 eq.) from waste management in the years 1995 – 2015.

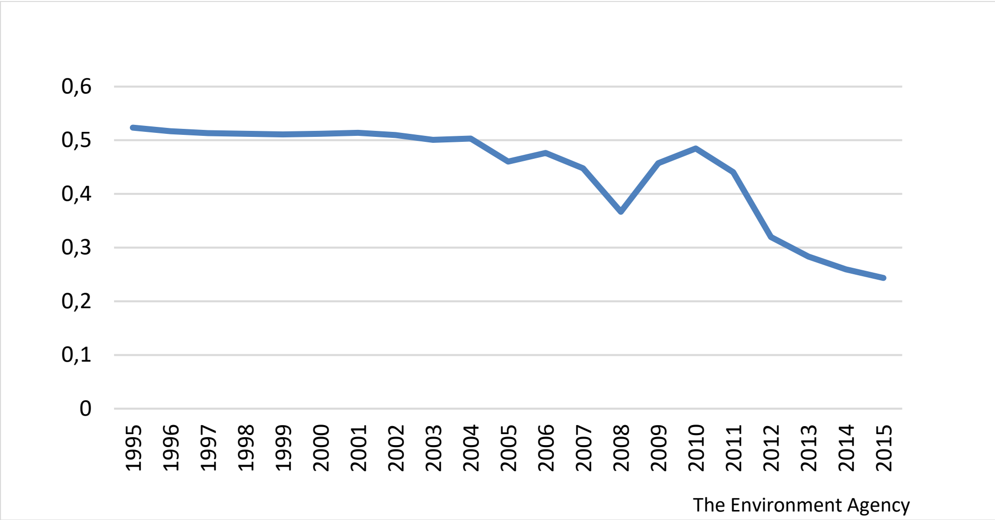

Figure 4-12 Emissions per 1000 tons of treated waste in the years 1995 – 2015.

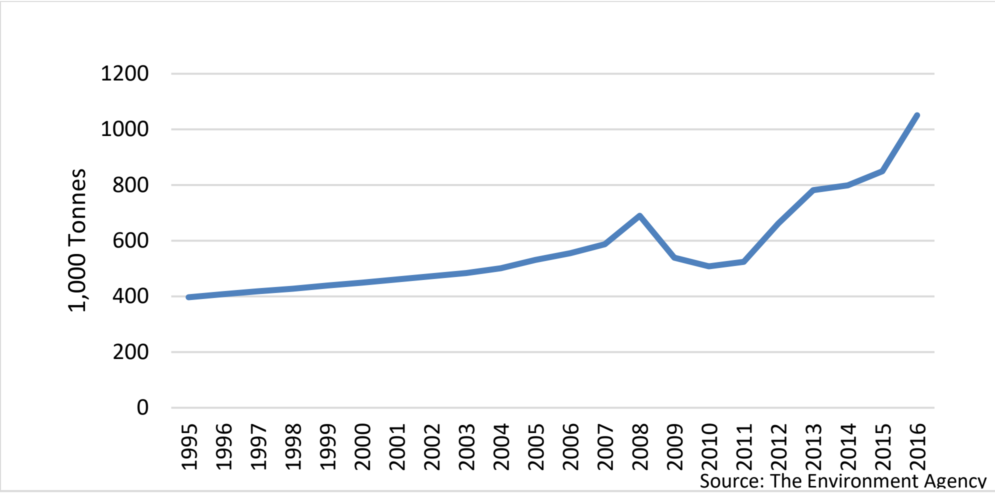

Figure 4-13 Total waste in Iceland 1995-2016

4.2.8.1 Food waste

As stated above, by 2020 bio-waste going to landfills must be reduced to 35% in of the total amount of bio-waste produced in 1995.

In 2014 the Ministry appointed a committee to look in to the problem of food waste and to propose recommendations on what could be done to reduce food waste. The committee issued a report in 2015 with proposals on action plan. Research on the status of food waste in Iceland as well as increase the information and access to information given to the public where among the main proposals. [29]

One of the projects funded under the Special Action plan for 2016-2019 was on reduction of food waste. The main goal of the project was to open a website with information on how to reduce food waste. The Environment Agency has led the project. In 2016 the Environment Agency conducted a research on food waste in Iceland. The project was partially funded by the EU.

The results of the project indicate that Icelandic households waste substantial amount of food, or that each individual waste up to 23 kg of edible and 39 kg of inedible food and pour down 22 kg of cooking oil and fat and 199 kg of liquid a year. This amounts to 283 kg of food and drink per person per year. In other words, annually Icelandic homes waste in total 7,649 tonnes of edible food, 13,024 tonnes of inedible food, 7,214 tonnes of cooking oil and fat, and 66,072 tons of drinks and other liquid food, or total annual waste of 93,959 tonnes. The figures are significantly higher than the 92 kg of food and drink per person per year that was estimated for the EU-28 in 2016. The Icelandic figures on the waste of edible food are more in line with the results from 2012 research from Finland. Notably, however, research on food waste are still at an early stage and caution should be taken when comparing results. The results on the food waste of Icelandic companies are somewhat limited because of lack of data. Therefore, figures on the waste within fishing, fish processing, manufacture of dairy products and manufacture of beverages are lacking. The available figures amount to annual food waste of 83,240 tonnes, or 250 kg per person per year. Again, the figures are significantly higher than the estimate for the EU-28 from 2016 of 81 kg per person per year, and where the whole food chain (except for households) is reached. It should be noticed that the food service sector is responsible for more than half of the Icelandic company food waste, and that this sector has expanded extensively in recent years in line with the extensive expansion of tourism in the country. Also, again it should be emphasised that research on food waste are still at an early stage and caution should be taken when comparing results. [30]

4.2.9 Land use land use change and forestry (LULUCF)

Land use, land use change and forestry is a sector of major importance and has figured prominently in Iceland's climate policy from the start. Opportunities for mitigation efforts by carbon sequestration through afforestation and revegetation are abundant, and rewetting of drained wetlands provides possibilities for halting carbon dioxide emissions. Activities in the LULUCF sector are among 10 priority actions in the 2010 Climate Mitigation Action Plan.

Iceland elected revegetation under Article 3.4 for the first commitment period of the Kyoto Protocol. The revegetation activity involves establishing vegetation on eroded or desertified land or reinforcing existing vegetation.

The Soil Conservation Service of Iceland (SCSI) was founded in 1907. Its main tasks are to combat desertification, sand encroachment and other soil erosion, promotion of sustainable land use and reclamation and restoration of degraded land. Much experience and knowledge has been gained during over 100 years of fighting soil erosion and restoring land quality in Iceland. This experience is the basis for a Land Restoration Training program launched by the Government of Iceland in 2007. The training

[29] Matarsóun – Food waste 2015
[30] Food waste in Iceland

program, which is since 2010 a United Nations University program, is open for post-graduates and/or professionals from the developing countries. The aim is to increase the capacity of the students to lead projects on land restoration in their home countries.

A Parliament resolution was passed in 2002 on a revegetation action plan. Sequestration of carbon in vegetation and soil was among four main objectives stated in the action plan. The action plan set the framework for revegetation activities in the period 2003 – 2014. A new bill on soil conservation is being prepared and proposes fundamental changes to current act on land reclamation, no. 17/1965, including provisions which would transform the objectives of soil conservation work and allow for further development of the organized approach, to conserve biological diversity, mitigating climate change and manage land sustainably.

A new bill on forestry is also being prepared and will replace current act on forestry, no. 3/1955. The bill also includes objectives for conserving biological diversity, mitigating climate change and manage forests sustainably.

The first general act on regional afforestation projects was passed in 1999 (Act No. 56/1999). Earlier acts covered projects in East-Iceland (Act No. 32/1991) and South-Iceland (Act No. 93/1997). These acts were repealed by Act No. 95/2006 on regional afforestation projects. Afforestation on at least 5% of land area below 400 m above sea level should be aimed for in each of the regional projects. Regional afforestation plans spanning 40 years shall be made for each of the five regions. Contracts spanning at least 40 years on participation in afforestation projects shall be made with each landowner who receives funding. The regional projects fund up to 97% of agreed afforestation costs.

Hekluskógar, the Mt. Hekla afforestation project, was launched in 2007. The project is based on a recently renewed and revised 10 year funding agreement and is run in collaboration between The Soil Conservation Service of Iceland and The Iceland Forest Service. The area covers about 90 thousand hectares of eroded land with little vegetation, in the vicinity of Mt. Hekla.

The first forestry degree program in Iceland was started in 2004 at the Agricultural University. The first foresters graduated with a BSc degree in 2007 and the first MSc degree was awarded in 2008.

In 2016 the Soil Conservation Service initiated a program aiming at wetland restoration through which landowners receive advice and funding to restore wetlands on organic soils. The program includes the development of methods for monitoring the success of the projects with respect to the release of greenhouse gases and impact on biodiversity.

4.2.10 Planning

Environmental assessment of public plans or programs is based on the Strategic Environmental Assessment Act No. 105/2006. The objective of the Strategic Environmental Assessment Act is to promote sustainable development and reduce environmental impacts by environmental assessments of public plans and programs that are likely to have a significant environmental impact. Environmental assessment for individual projects in Iceland is based on the Environmental Impact Assessment Act No. 106/2000. The objectives of the law are e.g. to ensure that an assessment of the environmental impact of a relevant project has been carried out before a consent is granted and to minimize as far as possible the negative environmental impacts of projects. Public consultation is a key feature of the legislation. Legislation on Environmental Assessments in Iceland is harmonized with European legislation through participation in the European Economic Area.

The National Planning Strategy is based on provision in the Planning Act No. 123/2010. The National Planning Strategy propose a policy on planning which is intended to ensure common interests in local authority plans and to support sustainable development and efficient planning. It should also support the coordination of policy making on land use on both state and local authority levels. The National Planning Strategy is a policy document, a parliamentary resolution for a 12-year period which is implemented primarily through local authority plans (regional plans, municipal plans and detail plans). It can also influence government programmes in specific issues concerning land use. Additionally, it can entail planned projects, such as guidelines or development projects to implement certain policy objectives.

The first National Planning Strategy was approved by the Parliament in 2016 (NPS 2015-2026), prepared by the National Planning Agency on behalf of Minister for the Environment and Natural Resources. NPS 2015-2026 propose a policy on planning in the central highlands, rural areas, urban areas and marine spatial planning. In addition, a general policy concerning sustainability, resilience, quality of life and competitiveness issues in planning.

The current policy (NPS 2015-2026) addresses climate change in planning, a mitigation as well as an adaptation. It sets out a vision for local authority plans, in order to contribute reductions in greenhouse gas emissions. Local authorities are encouraged to improve the quality of urban environment, with emphasis on higher density of urban areas and integrated development and transport planning. Local authorities should also take account of climate change over the longer term, including factors such as coastal change, flood risk and avalanche. [31]

4.3 Policies and measures in accordance with Article 2 of the Kyoto protocol

(Minimisation of adverse impacts in accordance with Article 2.3 and 3.14 of the Kyoto Protocol)

4.3.1 Bunker fuels

The EU Emissions Trading Scheme (EU-ETS) was transposed into Icelandic law in 2011 (Act No. 64/2011). The transposition included directive 2008/101/EC by which aviation became included in the trading scheme. Act No. 64/2011 was repealed by Act No. 70/2012 on Climate Change. Iceland‘s participation in the EU-ETS started on 1 January 2012 when aviation became part of the emission trading system.

The initial scope of the trading system with respect to aviation covered all flights departing from or arriving in an aerodrome in the European Economic Area. With a temporary derogation from the directive, enforcement of the trading system has been limited to flights within the European Economic Area. Fights within Iceland and flights between Iceland and destinations in the European Economic Area fall under Act No. 70/2012, which requires airline operators to remit allowances to competent authorities to cover their greenhouse gas emissions.

4.3.2 Minimization of adverse effects

Adverse effects of climate change can be reduced by limiting global warming through reductions in greenhouse gas emissions. Iceland‘s efforts to reduce emissions and increase carbon sequestration can therefore be expected to contribute to limiting adverse effects in other countries.

Iceland has focused on supporting developing countries with projects that aim at strengthening infrastructure in order to increase resilience to climate change (see chapter 7, Financial assistance and transfer of technology).

[31] NPS 2015-2026

Table 4.2 Policies and measures

Coss-Cutting	Included in with measures GHG projection scenario	Sectors affected	GHGs affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of implementation	Implementing entity or entities
Climate Change Strategy	Yes	Cross-cutting	CH4, CO2, HFCs, N2O,	Cross cutting	Strategy	Implemented	A framework for action and government involvement in climate change issues	2007	Ministry for the Environment and Natural Resourses
Climate Changes implementation plan	Yes	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs, SF6	Cross cutting	Strategy	Implemented	A general frameworkd for policies set by authorieis in fields relation to sustainable development.	2002	Ministry for the Environment and Natural Resouces
National strategy for sustainable development	Yes	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs	Cruss cutting	Action plan	Implemented	Supplementary action plan to the plan from 2010	2015	Ministry for the Environment and Natural Resouces
Special Action Plan	Yes	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs	Cross cutting	Action plan	Implemented	Supplementary action plan to the plan from 2010	2015	Ministry for the Environment and Natural Resouces
Transport and energy	Included in with measures GHG projection scenario	Sectors affected	GHGs affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of implementation	Implementing entity or entities
Implementation Plan for clean transport	Yes	Transport, Energy	CO2	Sustainable transportation	Action plan	Implemented	Action plan with the aim to increase the use of low-emisson cars	2017	Ministry for the Industry and Innovation , Ministry for Transport
Carbon tax	Yes	Transport, Energy	CO2	Reduce emission from fossil fuels	Fiscal	Implemented	Tax on liquid and gaseous fossil fuels	2010	Ministry of Finance and Econimic Affaris
Excise duty on vehicles based on CO2 emission	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	The excise duty varies from 0%-60% depending on CO2 emissions	2011	Ministry of Finance and Econimic Affaris
Biannual fee on vehicles	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Basic fee with additional fee for higher emission levels or weight depending on weight class	2011	Ministry of Finance and Econimic Affaris
No WAT on zero-emission vehicles with a cap	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Elecric, hydrogen and hybrid vehicles exempted from VAT up to a certain maximum limit.	2012	Ministry of Finance and Econimic Affaris
Reduced excise duty and semiannual car tax on methane vehicles	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Methane vehicles get a discount from levied excise duty an dpay only minumum semiannual car tax.	2011	Ministry of Finance and Econimic Affaris
Parking benefits for low emission vehicles	Yes	Transport, Energy	CO2	Reduce emissions from transport	Fiscal	Implemented	Vehicles emitting less that 120 gr.	2007	Municipalities
Incresed public transportation and cycling	Yes	Transport, Energy	CO2	Reduce emissions from transport	Fiscal	Implemented	The Icelandic Transport Administration supports public transportation and construction of bike and walking paths.	2012	Ministry of Transport, Municipalities
Implementation Plan for transport	Yes	Transport, Energy	CO2	Sustainable transportation	Policy	Implemented	Action plan on infrastructure for transport	2011	Minstry for Transport
Exemption from excise duty an carbon tax for CO2 neutral fuels	Yes	Transport	CO2	Reduce emission from transport	Fiscal	Implemented	No excise duty and carbon tax on CO2 nautral fuels	2010	Ministry of Finance and Econimic Affaris
Renewables in fuel for transport	Yes	Transport	CO2	Reduce emission from transport	Regulatory	Implemented	Requirement of blending fossil fuels with renewables	2014	Ministry for the Industry and Innovation
National Renewable Energy Action Plan	Yes	Energy	CO2	Reduce emissions from energy productio and use	Action plan	Implemented	Strategic approach and concreate measures on how Iceland will meet mandatory national targets for renewable energy in 2020	2015	Ministry for Industry and Innovation
Waste management	Included in with measures GHG projection scenario	Sectors affected	GHGs affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of implementation	Implementing entity or entities
National plan on waste management	Yes	Waste management/waste	CO2, CH4, N2O	Waste reduction and more efficient use of natural resources	Implementation plan	Implemented	Strategic approach on waste management	2013	Ministry for the Environment and Natural Resources, Municipalities, Environment Agency
Landfill policy	Yes	Waste management/waste	CH4	Reduce organic waste in landfills	Regulatory	Implemented	The share of organic wast shall not to be more than 35% of total waste in 202 with 1995 as reference year.	2013	Ministry for the Environment and Natural Resouces, Municipalities, Environment Agency
Landfill policy	Yes	Waste management/waste	CH4	Colletion of landfill gas	Regulatory	Implemented	Requierments in Reg. NO 738/2003 collection on landfill gases	2003	Ministry for the Environment and Natural Resources, Municipalities, Envionment Agency
Action against food waste	Yes	Waste management/waste	CH4	Reduce organic waste in landfills	Action plan	Implemented	Actions to prevent food waste. Information campaign, new web page with relevant information, etc.	2016	Environment Agency
EU emission trading scheme	Included in with measures GHG projection scenario	Sectors affected	GHGs affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of implementation	Implementing entity or entities
EU emission trading scheme	Yes	Industry/industrial processes	CO2, PFCs	Reduce emission from industry	Economic	Implemented	Cap set on emissions from certain installations. The cap is reduced over time. An EEA-wide market with emission permits.	2013	EU Emisson
EU emission trading scheme	Yes	Transport	CO2	Reduce emission from aviation	Economic	Implemented	Trading emission allowances for flights within the EEA-area.	2012	Ministry for the Environment and Natural Resources, Environment Agency
EU emission trading scheme	Yes	Industry/industrial processes	CO2, PFCs	Reduce emission from industry	Economic	Implemented	Cap set on emissions from certain installations. The cap is reduced over time. An EEA-wide market with emission permits.	2013	EU Emisson+A22A25A24:J28A21A21:J28

5 Projection

5.1 Introduction

National arrangements regarding projections of greenhouse gases in Iceland has not been properly in place and no authority has had the formal responsibility for greenhouse gas projection. This has led to the fact that the projection published in the NC 6 and BR2 has not been recalculated.

In order to set the task of greenhouse gas projections in place, the Ministry for the Environment and Natural resources, has formally assigned the Environment Agency the task to calculate greenhouse gas projection. In 2017, the agency was secured additional budget to build up the knowledge and employ additional personnel to take on the task. It is expected that the agency will be able to issue its first projection in 2019 to be published in BR4 in 2020. The projection is to be in accordance with UNFCCC requirements as well as the requirements of the EU decision on monitoring of greenhouse gases (EU Regulation 525/2013).

In February 2017, the Economic Institute of the University of Iceland (HHÍ), publish a study of Iceland´s mitigation potential and options in the report *Iceland and climate issues* (Ísland og loftslagsmál).[32] The study was conducted by assignment of the Ministry for the Environment and Natural Resources.

The main focus of the study was to identify mitigation potentials and options and evaluate the cost-effectiveness of the different mitigation options. Though not the main object of the study, it also included projection, using the same key variables and assumptions as the fuel projection, published by the National Energy Authority in 2016[33].

Although the projection is not fully in compliance with the UNFCCC projection guidelines, it though gives a broad picture of the status of the GHG profile and what to expect until 2030.

The projection is based on 2014 figures, presented in the Iceland´s National Inventory Report in 2016.

Iceland's individual assigned amount for the second commitment period of the Kyoto Protocol was established at 15 327 217 AAUs.

- Average emission per year in Iceland for the period 2010-2015 (with removals) amounted for 2,728 kt. CO2 eq.
- According to the calculations of the Environment Agency it is projected that without additional measures, Iceland will not be able to fulfil its commitments for the second commitment period of the Kyoto Protocol. Emissions above commitments are projected to be approximately 3.600 kt. co2 eq.
- The increase in the tourism sector is not reflected in these figures and therefor the total emission in the second commitment period of the Kyoto protocol therefor possibly underestimated.

Figure 5-1 shows the break down of the green house gas emission in 2014. Figure 5-2 and Figure 5-3 shows projection for greenhouse gas emission in 2030, base case scenario and case 2 scenario (medium case) respectively[34].

[32] Mitigation potentials in Iceland – Ísland og loftslagsmál
[33] Fuel projection – Eldsneytisspá 2016
[34] In this chapter Scenario 2 is the same scenario as Medium/Mid case scenario.

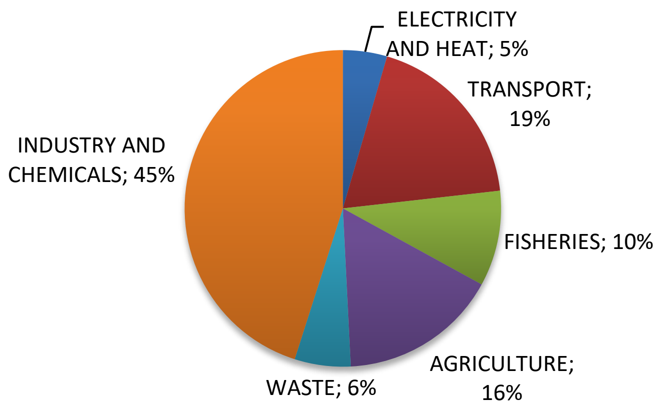

Figure 5-1 GHG emission in 2014

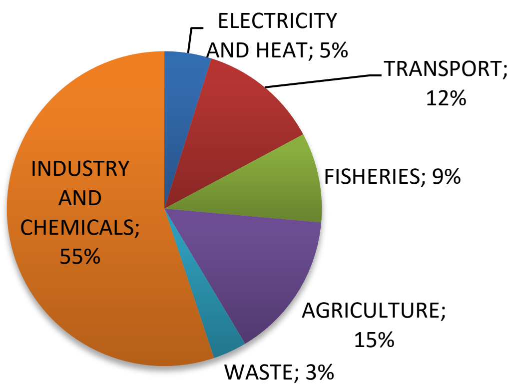

Figure 5-2 Projected GHG emission 2030 – Base case

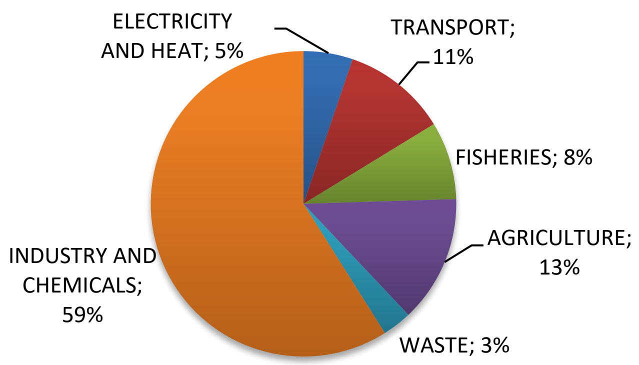

Figure 5-3 Projected GHG emission 2030 – Case 2 (Medium case.)

5.2 Emission trends and projection assumptions

The total emission in Iceland (without LULUCF) increased by 26% from 1990-2014, and 15% with LULUCF, with increase in all sectors except the fishing sector, see Table 5-1.

Table 5-1 Emission of greenhouse gases 1990 – 2014.

	1990	2014	Change (1000 tonnes) from 1990	Change (%) from 1990
Total (without LULUCF)	3638	4595	963	26
Total (with LULUCF)	3630	4172	541	15
ELECTRICITY AND HEATING	123	207	85	69
TRANSPORT	619	861	242	39
INDUSTRY AND CHEMICALS	1162	2074	913	79
FISHING	787	450	-337	-43
ACRICULTURE	780	748	-32	-4
WASTE	168	255	88	52
LANDUSE (total removal)	-7	-429	-429	-

The key assumption used for the projection are the same as used for the fuel projection, published by the National Energy Authority in 2016. See Table 5-2.

Table 5-2 Key underlying assumptions for the projection

Key underlying assumptions		*Historical* [b]						Projected		
Assumption	*Unit*	*1990*	*1995*	2000	2005	2010	2011	2020	2025	2030
GDP growth rate	*%*	0.58	0.76	2.64	8.07	1.56	4.67	2.50	2.50	2.50
Population	thousands	255.87	267.96	283.36	299.89	318.45	319.58	346.21	363.27	377.70
Population growth	%	0.82	0.37	1.55	2.15	0.26	0.35	1.06	0.90	0.70
International oil price	USD / boe	33.00	25.00	33.00	40.00	79.00	90.00	79.00	92.50	106.00
Gross domestic oil consumption	PJ	15.60	16.70	16.40	15.10	11.00	10.10	22.20	20.90	19.10
Gross electricity production, oil	GWh	6.00	8.00	4.00	8.00	2.00	2.00	2.00	2.00	2.00
Gross electricity production, hydropower	GWh	4,159.00	4,677.00	6,350.00	7,015.00	12,592.00	12,507.00	15,458.66	15,781.71	16,173.63
Gross electricity production, geothermal	GWh	283.00	290.00	1,323.00	1,658.00	4,465.00	4,701.00	6,314.10	6,446.05	6,606.13
Gross electricity production, other	GWh									
Aluminium production	kt	87.84	100.20	226.36	272.49	818.86	806.32	790.00	790.00	790.00
Ferrosilicon production	kt	62.79	71.41	108.40	110.96	102.21	105.19	120.00	120.00	120.00
Silicon production	kt							166.00	166.00	166.00
Solid waste generation amount	kg/head	1,485.99	1,494.88	1,594.19	1,504.26	1,386.23	1,276.73	1,642.39	1,642.08	1,642.15
Solid waste generation amount	kt	380.21	400.57	451.73	451.11	441.45	408.01	591.48	623.77	657.82

According to the projection it is most likely that the total emission in Iceland will increase substantially to 2030 or up to 53% (without LULUCF) according to base case scenario, in all sectors compared to 1990 and 15% if removals are accounted for, see Table 5-3. .

The main increase will occur in the industry sector which is regulated under the ETS-system. If the emission that falls under ETS-system is left out, the prediction is that there will be drop in the total emission.

According to the HHI report, there are many mitigation options available in all sectors, but they differ in both cost and effect. The report stresses the importance of starting as soon as possible to implement mitigation actions, that are most beneficial, both regarding effect and cost.

Table 5-3 Projection of GHG emission; Base case and medium case (case 2)-, in all sectors compared to 1990.

	Emissions 1990 Gg	% change from 1990	Base case % change from 1990	Medium case % change from 1990
	1990	**2014**	**2030**	**2030**
Total (without LULUCF)	3638	26%	53%	71%
Total (with LULUCF)	3630	15%	33%	51%
ELECTRICITY AND HEAT	123	69%	146%	164%
TRANSPORT	619	39%	11%	11%
INDUSTRY AND CHEMICALS	1162	79%	161%	213%
FISHERIES	787	-42%	-35%	-35%
AGRICULTURE	780	-4%	7%	7%
WASTE	168	52%	15%	15%
LULUCF (net sequestration tons CO_2 eq)	-7	-419	-744	-744

5.3 Projection in different sectors

Emission in Iceland has increase by 26% from 1990 to 2014, without LULUCF. If the LULUCF removals is accounted for the net increase is 15%. The largest increase is from industry that falls under the ETS sector. The sector that has shown the biggest decrease is the fishing sector, both percentage wise as well as in tonnes, which is mainly due to fewer and more fuel- efficient ships. As can been seen in Table 5-3, that the largest increase is in the industry sector both percentage wise as well as in tonnes.

According to the 2010 Action Plan, the prediction was that emission, without the ETS-sector and removals, would be 9% less in 2020 compared to 1990, and 32% less if the ETS-sector and removals where not accounted for. In 2014, the emission was 6% higher compared to 1990, but 9% less if removals where accounted for.

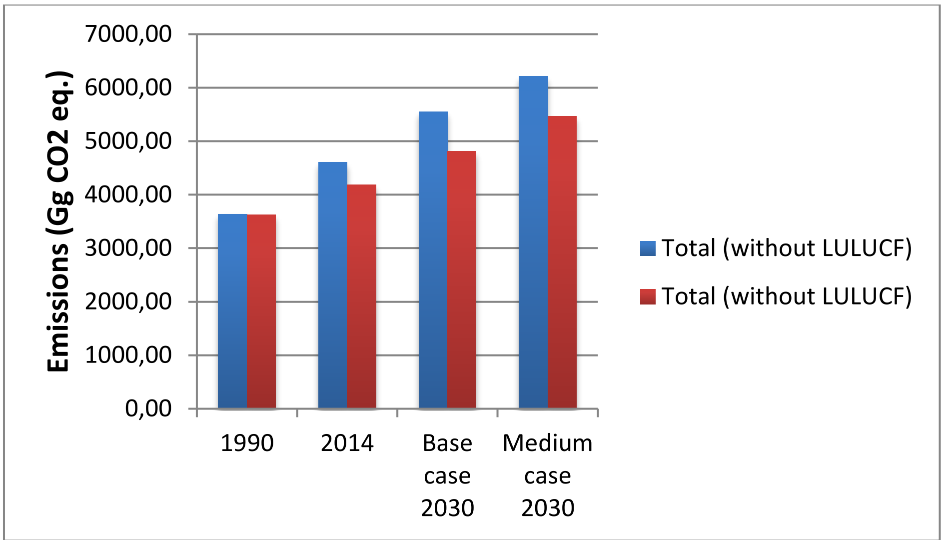

Figure 5-4 Projection, Base case and medium case (case 2)

5.4 Energy

The vast share of greenhouse gas emission from the energy sector in Iceland stems from transport and fisheries but only small fraction comes from energy production.

Table 5-4 shows historic and projected emission in the energy sector. The projection includes electricity and heating and emission from fisheries, but the transport sector is accounted for separately.

Table 5-4 Projection on GHG emission in the energy sector

Energy - GHG emission, historic and projected								
	1990	1995	2000	2005	2010	2015	2020	2030
(kt CO_2 eq)	1,160.01	1,296.91	1,377.78	1,234.73	976.29	808.83	955.64	1,047.61

5.4.1 Electricity and heating

Emission from energy production is relatively small compared to most other countries as the main energy sources are renewables; hydropower and geothermal. This difference is clearly shown in Figure 5-5.

Total emission from energy production accounted for 5% of total emission in 2014. The biggest share came from the geothermal power production. The share of geothermal in the total electricity production in 2014 was 29%.

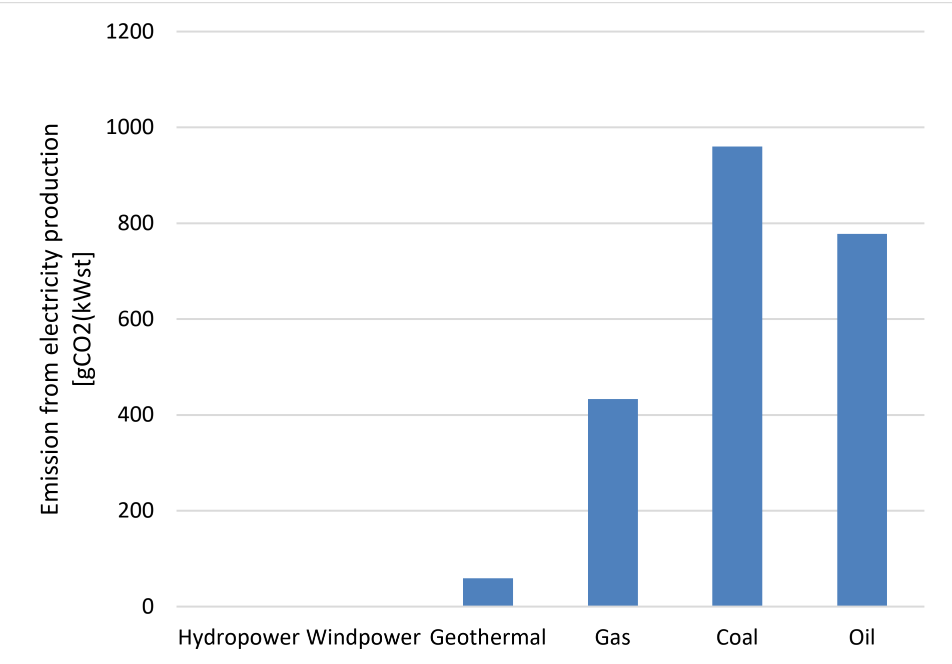

Figure 5-5 Comparison of emission from electricity production by different energy sources

Iceland relies heavily on its geothermal energy sources not only for electricity production but also for space heating with over 90% of all homes/buildings heated with geothermal water. Since electricity is used as main energy source for heating buildings that are located in “cold areas” (where geothermal cannot be harnessed), about 99% of all buildings in Iceland are heated with renewable energy sources. Electricity is produced with fuel combustion (0.01% of the total electricity production in 2014) on two small islands that are located far from the electrical distribution system. Some public electricity facilities have emergency backup fuel combustion power plants which they can use when problems occur in the distribution system. Those plants are however very seldom used, apart from testing and during maintenance.

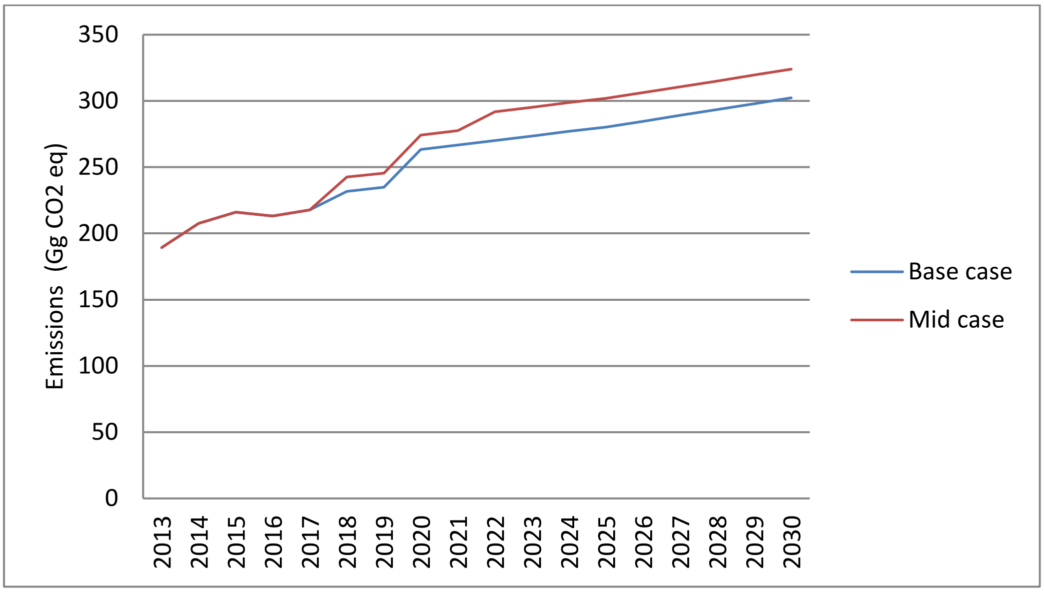

Figure 5-6 Projection on emission from electricity production

Power intensive industry that is projected to be built calls for increased power production. (see Chapter 5.8 on industry). The projection on emission from the electricity production is based on the assumption that with increased electricity production the share of geothermal in the total electricity production will stay the same as in 2014 that is around 30%. (Figure 5-6).

5.4.1.1 Mitigation option regarding electricity production

Identified mitigation options regarding electricity production is mainly gas injection to basalt. (See chapter 8.3.1 on Carb fix).

5.4.2 Fisheries

The fishing industry sector accounted for 10% of total emission in Iceland in 2014 and in total the emission had decreased about 42% since 1990, the only sector that had reduced its emission in the period. The main reason is fewer and more energy efficient ships, as in 2000 the number of trawlers where 91 but down to 49 in 2014. In the years 1993-1997 fishing in distant waters was a big part of the total fishing which is demonstrated in the emission figures from that time. Actions have also been taken to change the energy source of the fish meal factories from fossil to renewable electricity.

5.4.2.1 Mitigation options in the fishing sector

According to HHí-report there are still ample opportunities to emission reduction in the fishing industry. The action identified as the most cost effective is to exchange or blend fossil fuel with bio-diesel. Option also mentioned are methane gas and hydrogen. What kind of fishing gear is used can also be important when it comes to oil consumption of the vessel and research have been made to optimise the use of the most energy saving fishing gears to be used for the different types of fishing.

Electrification of the harbours is also mentioned as important action to take.

5.5 Transport

In 2014 emission from land transport accounted for 19% of total emission, second largest emission source after the industry sector, see Figure 5-1. Emission from road transport was 93% of the total transport emission, sea-transport accounted for 2% and domestic flight 5%.

Table 5-5 Projection on GHG emission in the transport sector

Transport - GHG emission, historic and projected								
	1990	1995	2000	2005	2010	2015	2020	2030
(kt CO_2 eq)	617.06	621.63	659.74	831.51	884.06	886.41	954.32	686.36

In the period 1990-2014 there was 51,7% increase in emission from road transport, the main increase occurring after 2002. Since 2009 there has been a 9% reduction of GHG emission from the road transport, which can both be traced to the recession after 2008 as well as increasing share of more fuel-efficient and low emission vehicles. In the period the emission from domestic flights increased by 27%.

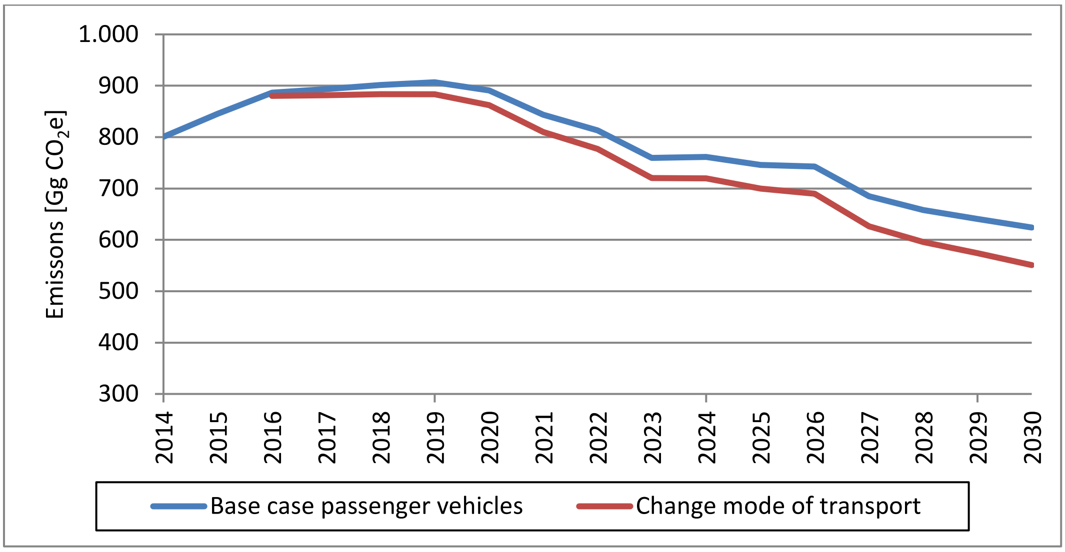

Figure 5-7 Emission from passenger vehicles compared to additional measures to change the mode of transportation.

The projection expects that the sale of electrical and other low emission cars will take off and the effects will be clear in the emission profile after 2020. The "Change mode of transport" case also includes further increase in cycling and public transport. See Figure 5-7.

5.5.1 Mitigation options in the transport sector

The HHI-report identifies various mitigation actions, such as increased public transport, more efficient vehicles, further incentives for electrical-, methane- and hybrid-vehicles; blend-in fossil fuel with bio fuel, and increased cycling. The projection takes all this different identified mitigation action into account. See Figure 5-8.

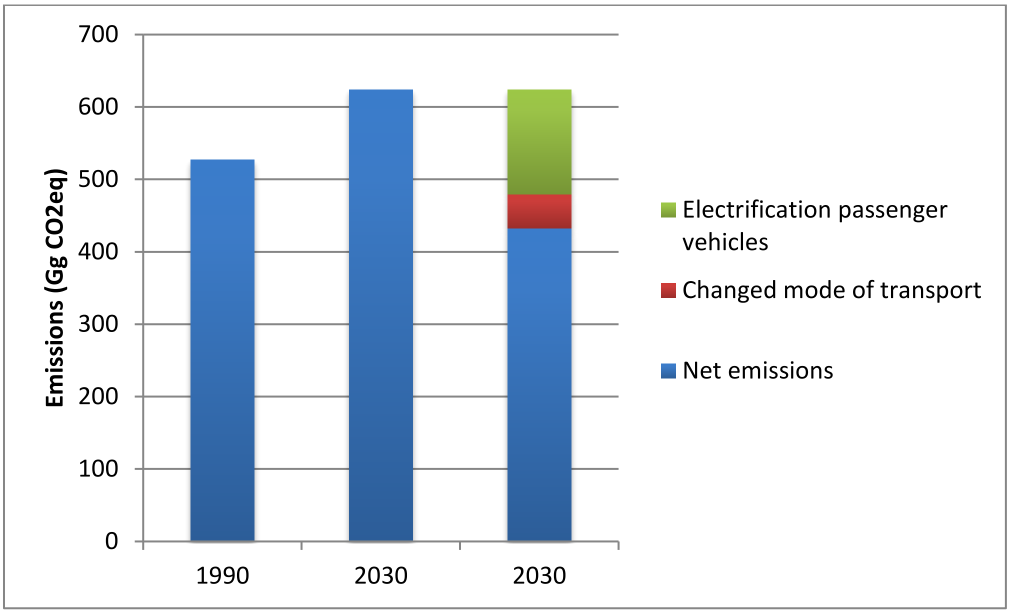

Figure 5-8 Projection on emission from the transport sector.

5.6 Agriculture

In 2014 the emission from agriculture was 16% of total emission in Iceland. The assumptions for the projection are that domestic consumption of agriculture-products will be percentage wise the same as the average consumption in 2012-2014. Projection of emission increase from agriculture of 11,7% compared to 1990 emission, is therefore mainly due to projected increase in domestic consumption based on projected increase in the total population in Iceland. See Table 5-6 and Figure 5-9.

Table 5-6 Projection on GHG emission in the agricultural sector

Agriculture - GHG emission, historic and projected								
	1990	1995	2000	2005	2010	2015	2020	2030
(kt CO_2 eq)	646.47	590.49	596.05	565.61	596.92	615.77	768.52	835.16

The biggest share of GHG emission from agriculture is enteric fermentation and manure management.

It is stated that emission from agriculture in Iceland might be overestimated. To be able to verify that, increased research is needed.

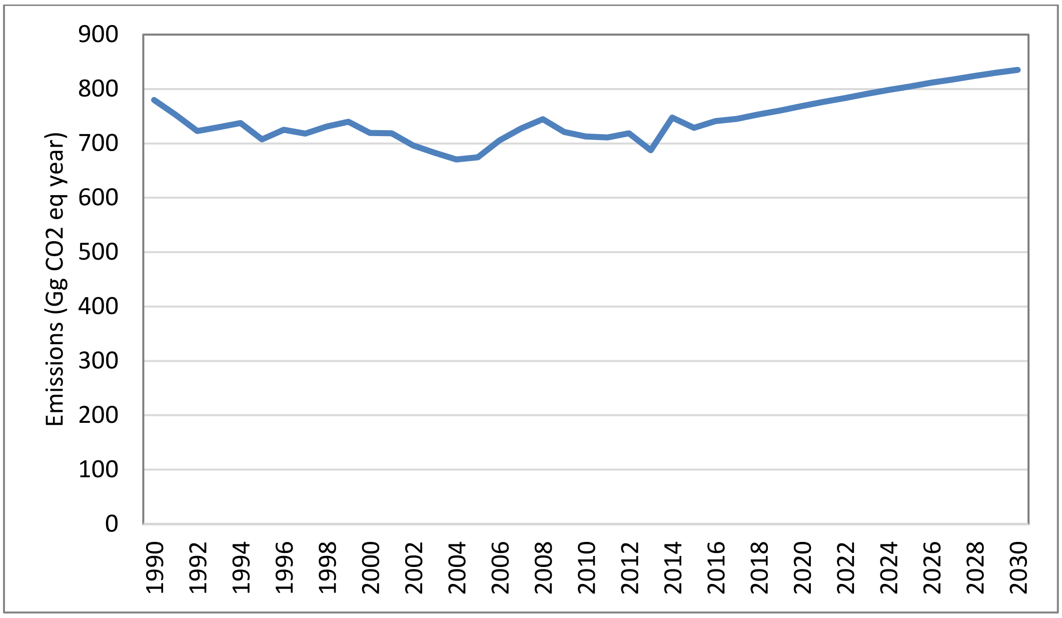

Figure 5-9 Projection on emission from agriculture – base case

5.6.1 Mitigation options in the agriculture-sector

The most feasible options identified to decrease GHG emissions from agriculture are improved composition of feed for livestock to decrease methane emissions, improved storage of manure, utilization of methane from manure as fuel and improved utilization of manure as fertilizer to reduce use of mineral fertilizer. Only limited research is available on the effectiveness of change in feed composition as a method to decrease methane emission from livestock. This particularly applies to Icelandic livestock breeds. Better utilization of livestock manure however is considered a feasible action, both to decrease the usage of imported mineral fertilizers and for the processing of methane as fuel.

5.7 Waste

In 2014 waste accounted for 6% of total emission. Assumptions in the projection are that waste treatment will change in the period to 2030. The total amount will be reflected in the total amount per inhabitant and total waste per GDP will continue to drop linearly as has been the case the last few years. See Table 5-7.

Table 5-7 Projection on GHG emission in the waste sector

Waste management/waste - GHG emission, historic and projected								
	1990	1995	2000	2005	2010	2015	2020	2030
(kt CO_2 eq)	165.01	207.86	229.87	244.38	246.36	207.00	272.52	192.83

The projection predicts that the total waste amount for 650.000 tonnes in 2030. In the base case waste to landfill will decrease linearly to 15% of total waste in 2030 and gas and compost reach 35% in 2020 and then be constant until 2030, see Figure 5-10

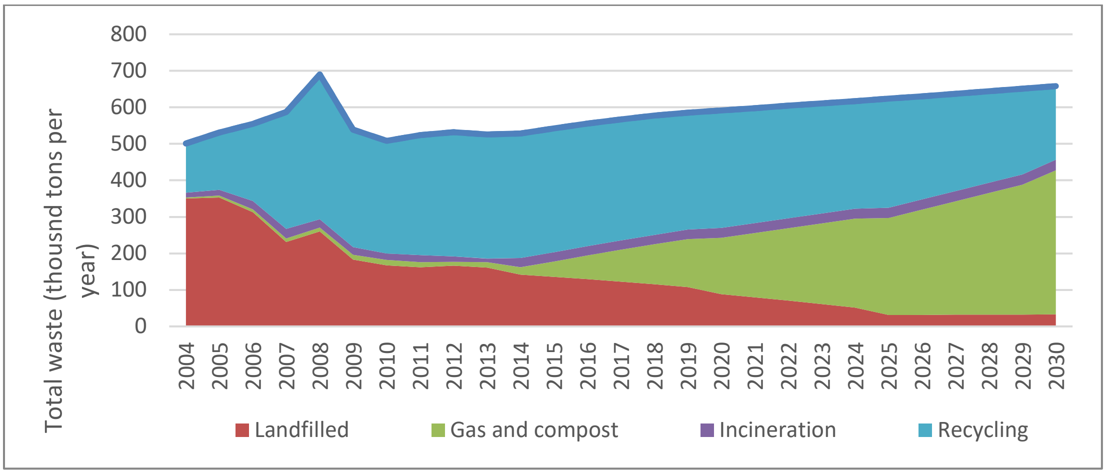

Figure 5-10 Emission from waste – Base case scenario.

5.7.1 Mitigation options in the waste sector.

The main mitigation options identified to decrease the emission from waste are to increase capture of methane gas from landfill sites, decrease the amount of landfilled bio-waste and increased recycling.

5.8 Industry and chemicals

The biggest share of emission in Iceland, 45% of total emission in 2014 (without LULUCF), was derived from the power intensive industry, other industries and chemicals. See Figure 5-1.

Table 5-8 Projection on GHG emission in the industry sector

Industry/industrial processes - GHG emission, historic and projected								
	1990	1995	2000	2005	2010	2015	2020	2030
(kt CO_2 eq)	954.20	567.39	1,003.78	960.15	1,947.05	2,020.97	2,818.92	2,827.70

Of total emission 2014, 30% came from the aluminium industry accounting for 67% of the industrial emission. Emission from ferrosilicon accounted for 18% of the industrial emission, chemicals 8% and other industries 7%.

There are two peaks in the emission from the power intensive industry, in 1998 when the Norðurál Aluminium smelter started production and in 2007 when the Alcoa Fjarðaál smelter started production. This increase in the aluminium production has led to total increase of GHG emission from the industrial sector by 78.5% in the period 1990-2014. See Figure 5-11.

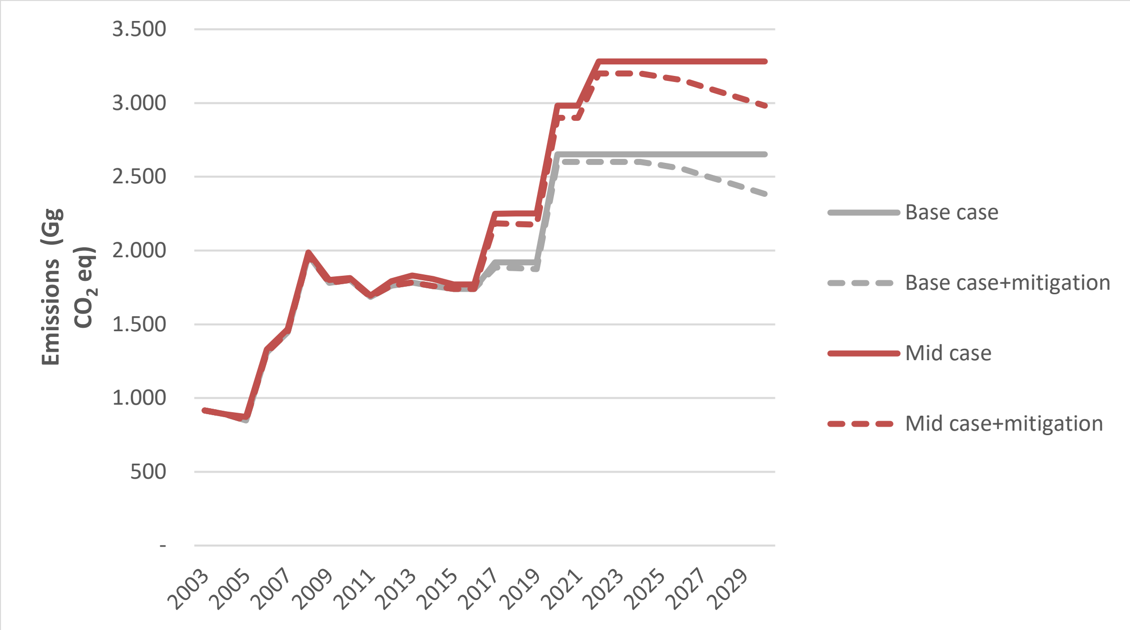

Figure 5-11 Projected emission from power intensive industry 2030

Table 5-9 Assumption for emission projection from power intensive industries in 2030

Plant	Location	Base-case	Case 2
RioTintoAlcan	Straumsvík	X	X
AlcoaFjarðaál	Reyðarfirði	X	X
Norðurál	Grundartanga	X	X
ELKEM	Grundartanga	X	X
PCC	Bakka	X	X
United Silicon	Helguvík	X	X
Thorsil	Helguvík		X
Silicor Materials	Grundartanga		X

Table 5-10 Assumptions on industrial production to 2030

Assumptions on industrial production – ferrosilicon, aluminium and silicon
Case 1: Base case
Aluminium: 790.000 tonnes to 2030
Ferrosilicon: 120.000 tonnes to 2030
Silicon 166.000 tonnes 2020; 166.000 tonnes to 2030
Case 2
Aluminium: 790.000 tonnes to 2030
Ferrosilicon: 120.000 tonnes to 2030
Silicon: 221.000 tonnes 2020; 276.00 tonnes to 2030

In the projection assumption regarding changes in the emission from the industry sector, possible changes in the sector where assessed. In the base case the assumption is that there will be no new industry, and the emission steady without additional measures. With additional measures there will be decrease in the emission. (Figure 5-13) In Case 2 (medium case) the assumptions are that there will be two additional silicon factories in 2030. See Table 5-10

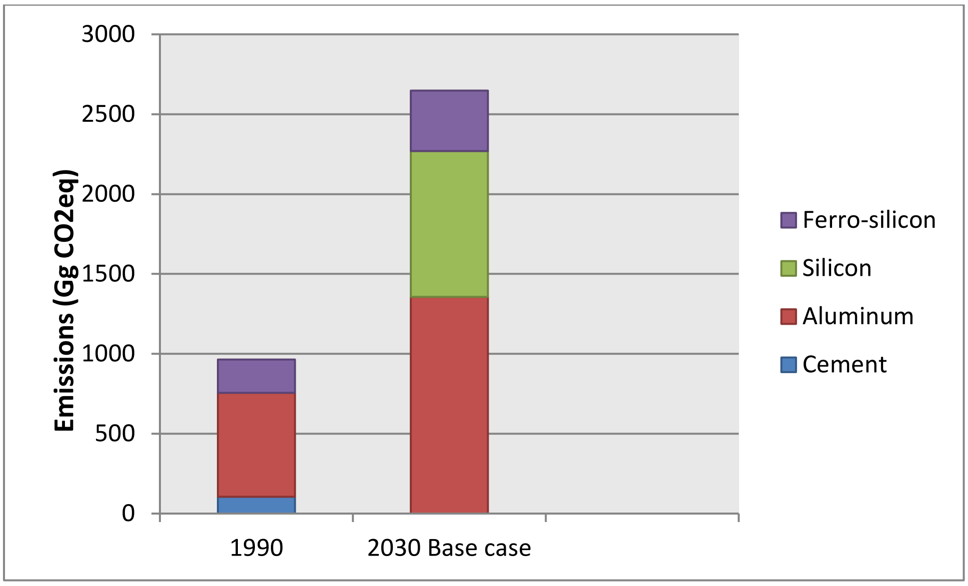

Figure 5-12 Emission from power intensive industry 1990 and base case scenario 2030

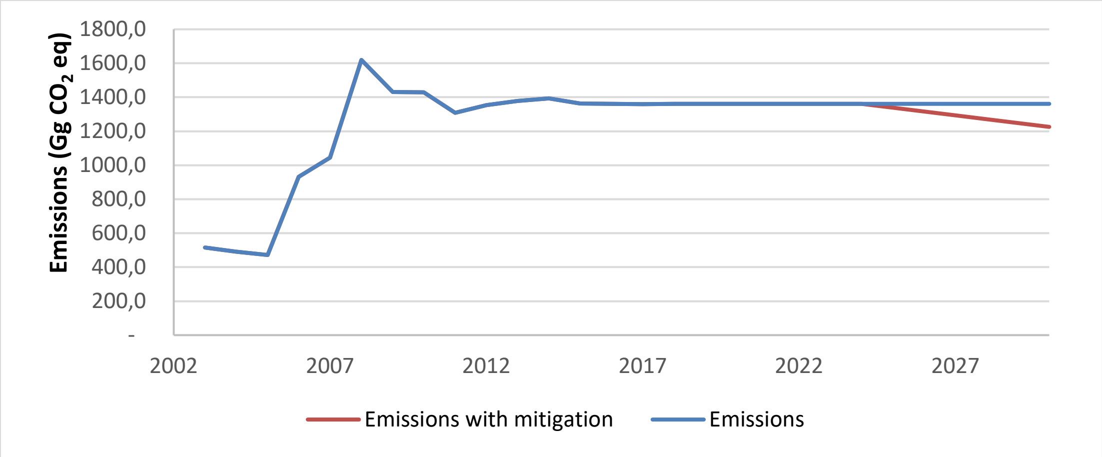

Figure 5-13 Projected total emission from aluminium industry – base case.

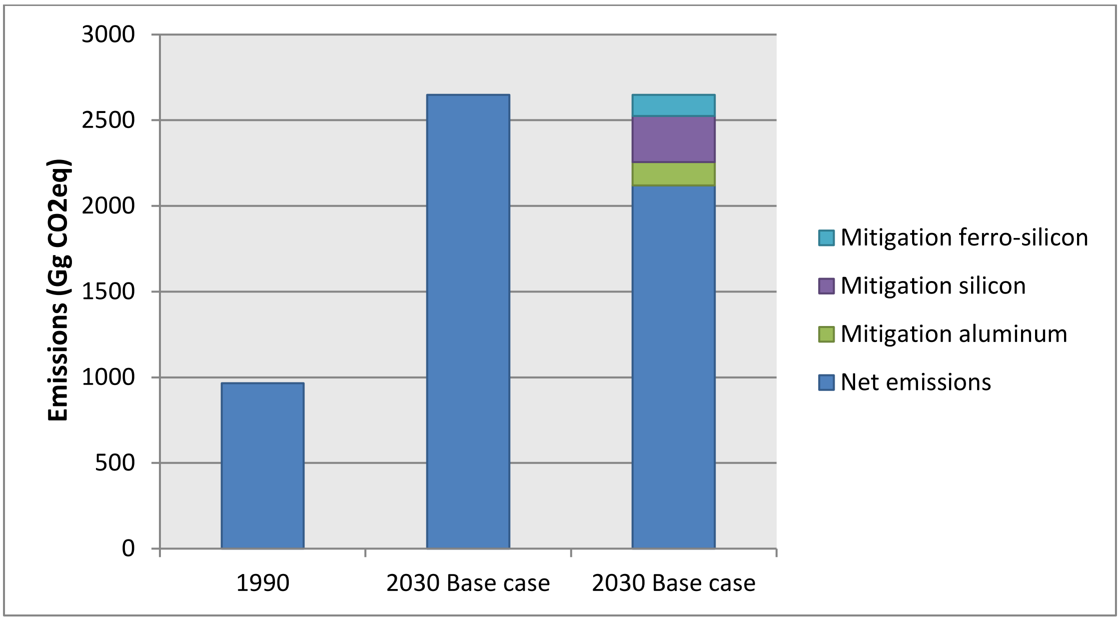

Figure 5-14 Emission from the power intensive industry – Base case and with measures 2030.

The main findings are that the projection predicts that according to base case scenario the emission from power intensive industry could be 163% higher in 2030 compared to 1990 emission and about 55% of the total emission in Iceland. The scenario 2 (mid case scenario) predicts industrial emission to be 215% higher than the 1990 emission or 59% of the total emission in Iceland in 2030.

5.8.1 Possible mitigation actions in the industry sector

5.8.1.1 Aluminium

In the international aluminium industry, the main mitigation potentials have been identified as optimisation of industrial processes, increased recycling of aluminium and promote that all aluminium plants implement best practises in the production. The circumstances in the aluminium industry in Iceland are generally good in comparison to the global industry and it can be stated that the aluminium industry in Iceland has optimized the possibilities of emission reduction given the processes and best practises used to day.

The projection predicts that there will be some development regarding better processes which will incur some emission reduction in the aluminium industry.

With optimisation of production processes, it is possible to decrease the emission from aluminium production, but as the Icelandic smelters are using best practises it is most likely that new technology is needed so that emission reduction from aluminium smelters in Iceland will be possible (Figure 5-13).

5.8.1.2 Ferro-silicon

The main mitigation actions identified for emission reduction in the ferro-silicon industry is to increase the use of biomass as energy source in the processes replacing coal and choke. Since 2005, the ferro-silicon plant has been using biomass in their process and the total share in 2014 was 12%. The projection indicates that this share of biomass as share of energy source will rise to 20% till 2020 with the same share until 2030.

5.8.1.3 Silicon

Production of silicon has been looked into with interest in Iceland and two factories are now in the building phase and accounted for in the base case scenario. Additional two factories have been planned and are accounted for in scenario 2 (Medium case). The main mitigation action identified for emission reduction in the silicon industry is to increase the use of biomass as energy source in the processes replacing coal and choke.

5.8.1.4 Chemicals

Emission from chemicals, mainly ozone-depleting substances such as HFC was about 7% of the total emission in 2014. The report did not identify any mitigation options, but as is stated in chapter 4.2.6.1 Iceland is member of the Kigali amendment to the Montreal Protocol on ozone-depleting substances, which is expected to decrease the use of HFC-substances.

5.9 Land use, land use change and forestry (LULUCF)

Land use, land use change and forestry is a sector of major importance or Iceland and has figured prominently in Iceland's climate policy from the start. Opportunities for mitigation efforts by carbon sequestration through afforestation and revegetation are abundant, and rewetting of drained wetlands provides possibilities for halting carbon dioxide emissions. Activities in the LULUCF sector are among 10 priority actions in the 2010 Climate Mitigation Action Plan.

Emission from land use, land use change and forestry (LULUCF) includes emission from six categories. The net emission from the LULUCF sector in 2014 was 11,870 tonnes CO2-eq) See Table 3-1.

Table 5-11 Emission from LULUCF 1990-2014

	1990	1995	2000	2005	2010	2013	2014
Forest land	-44,11	-66,28	-100,33	-150,01	-203,39	-265,42	-289,92
Cropland	2014,28	1963,50	1911,53	1858,55	1804,39	1771,60	1760,66
Grassland	6961,08	6987,60	7134,58	7315,20	7611,38	7710,20	7738,24
Wetland	1124,55	1128,60	1109,04	1082,36	1043,12	1029,68	1026,70
Settlement	13,19	6,22	14,91	19,95	5,50	4,60	4,70
Oher	1426,67	1440,02	1479,56	1526,37	1595,70	1621,26	1628,50
Total	11495,65	11459,65	11549,29	11652,42	11856,69	11871,92	11868,89

Forestry, land recreation and rewetting of drained wetland are the main mitigation actions identified.

The biggest share of emission is related to drainage of organic soils, mostly included under Grassland and cropland. Another important emission component is methane emission from managed wetlands. The removal by sinks reported is from sequestration of carbon to wetlands, revegetation and forest.

5.9.1 Mitigation options in the LULUCF-sector.

Only small fraction of land in Iceland is covered by trees, or less that 2% and for centuries desertification and soil erosion has been a problem, so there are ample opportunities regarding mitigation actions in the LULUCF sector, that is in the three main sectors of forestry, land recreation and rewetting of wetland.

5.9.1.1 Land recreation

In Figure 5-15 the actions taken in the land recreation sector since 1990 are demonstrated.

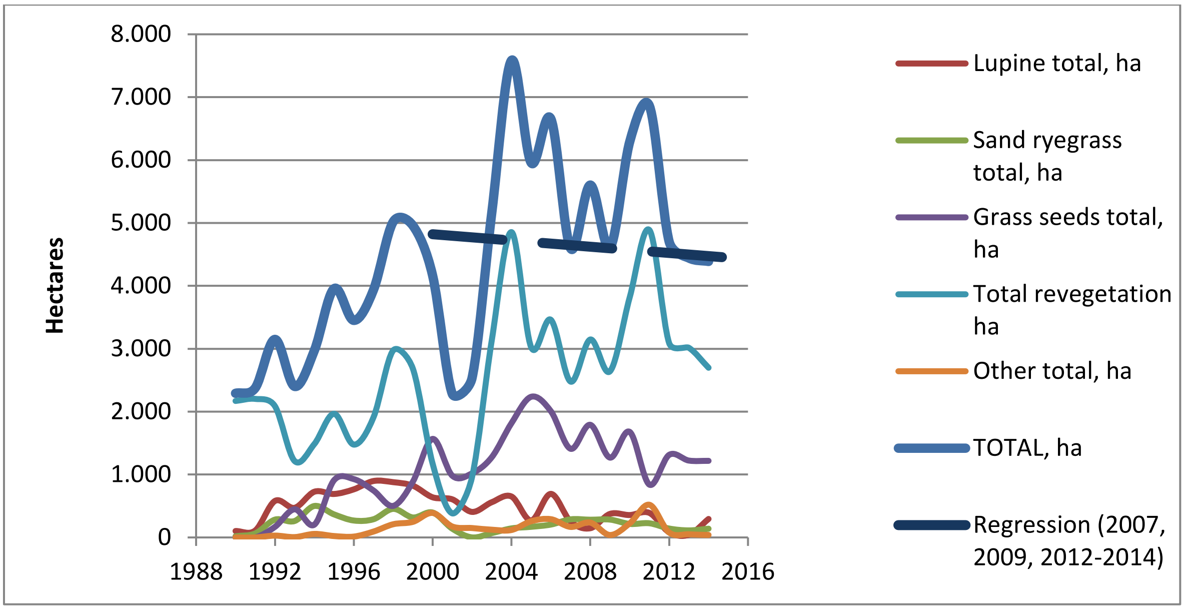

Figure 5-15 Action related to land recreations 1990-2014.

The Soil Conservation Service of Iceland, operating under the auspices of the Ministry for the Environment and Natural Resources, combats soil erosion in many areas in the county with direct actions.

The HHÍ report sets forth three different scenarios regarding actions on land recreation and how much sequestration can be expected to be gained by the different scenarios.

The base case expects the same actions as the Soil Conservation Service of Iceland has been working on hitherto. Scenario 2 and 3 expects that actions increases 2-fold and 4-fold respectively. See Figure 5-16.

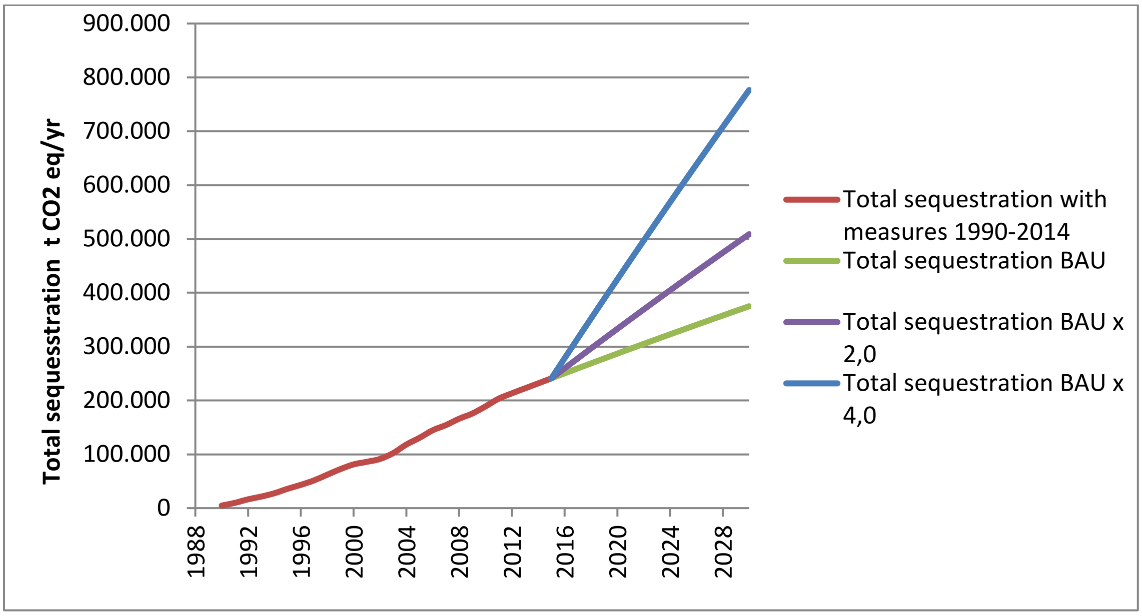

Figure 5-16 Total sequestration, 1990-2014 and projection, three scenarios

The three cases are demonstrated in Table 5-12, as the BAU case would give 286.986 t CO_2 per year in 2020 and 374.928 t per year in 2030, as the BAU x2 case would give 435.000 t CO_2 per year in 2030 and the BAU x4 would give 777.000 t pear year.

Table 5-12 Projected land recreation, there scenarios.

Year	Base case hectares	Bau x 2 hectares	BAU x 4 hectares	Sequestration Base case (t CO2/year)	Sequestration BAU x 2 (t CO2/year)	Sequestration BAU x 4 (t CO2/year)
2015	114.790	114.790	114.790	241.060	241.060	241.060
2020	136.660	158.530	202.270	286.986	332.913	424.767
2030	178.537	242.284	369.777	374.928	508.796	776.533

5.9.1.2 Forestry

Forestry covers less than 2% of land in Iceland. It is stated that the reason for this lack of forest is not the climate, rather past land-use with over-exploitation, as forests can grow as well in Iceland as they do in northern part of the world where forestry is a major industry.

The Icelandic forest service was established in 1908 and ever since, planting trees has been part of mitigation actions against afforestation in Iceland.

In the Act on regional forestry No 95 from 2006[35] the aim is set at 5% of all land under 400 m above sea level should be covered with forest.

As with the land recreation, three scenarios are set forth, BAU, BAU x 2 and BAU x 4. See Figure 5-17.

The assumptions in the BAU scenario are that the forestry industry would be the same as the average in 2011-2013, about 1,068 hectares a year. The other two scenarios predict that mid case would be BAU with increased action of x 2 and scenario 3 BAU with increased actions x 4.

[35] Act on regional forestry 95/2006

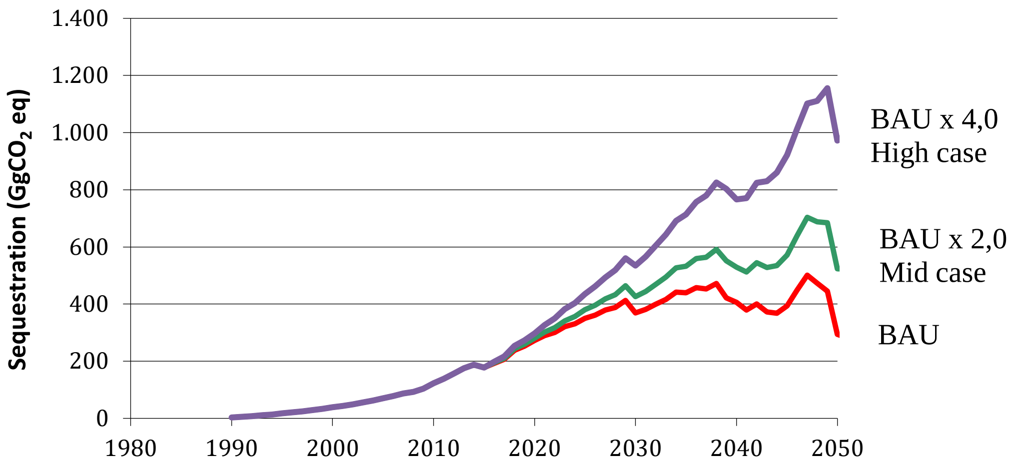

Figure 5-17 Total sequestration from forestation 1990-2014 and projection to 2050.

According to the scenarios, the total sequestration from forestry could be 369,000 tonnes according to the BAU scenario and 535,000 tonnes according to high case scenario (BAU x 4).

5.9.1.3 Rewetting of drained wetland

In 2013 emission from drained wetland was estimated 11.7 million tonnes CO2 eq which is 73% of about 16 million tonnes of overall emission in Iceland. It is estimated that 4,200 km^2 of wetland has been drained in Iceland with about 34,000 km of diches. Only about 600 km^2 of that land area is used for agricultural purposes.

It is stated that more research is needed to be able to estimate with accuracy how much of this land is available for rewetting, where ownership, other use etc., must be considered. The estimation is though that it should be technically possible to rewet around 900 km^2.

When the diches are filled up again, the water level in wetland area rises which prevents emission from the soil. It is though not net sequestration, but this action leads to emission reduction.

According to research conducted by the Agricultural University of Iceland, emission reduction from rewetted land is estimated 0.245 tonnes of CO_2–eq. per km^2.

The assumptions of the projection are that the 900 km^2 of drained wetland not in active use will be rewetted linearly until 2025, see Figure 5-18.

As stated, there are some reservation to the projection, but this is the estimation of what is technically possible to rewet until 2030.

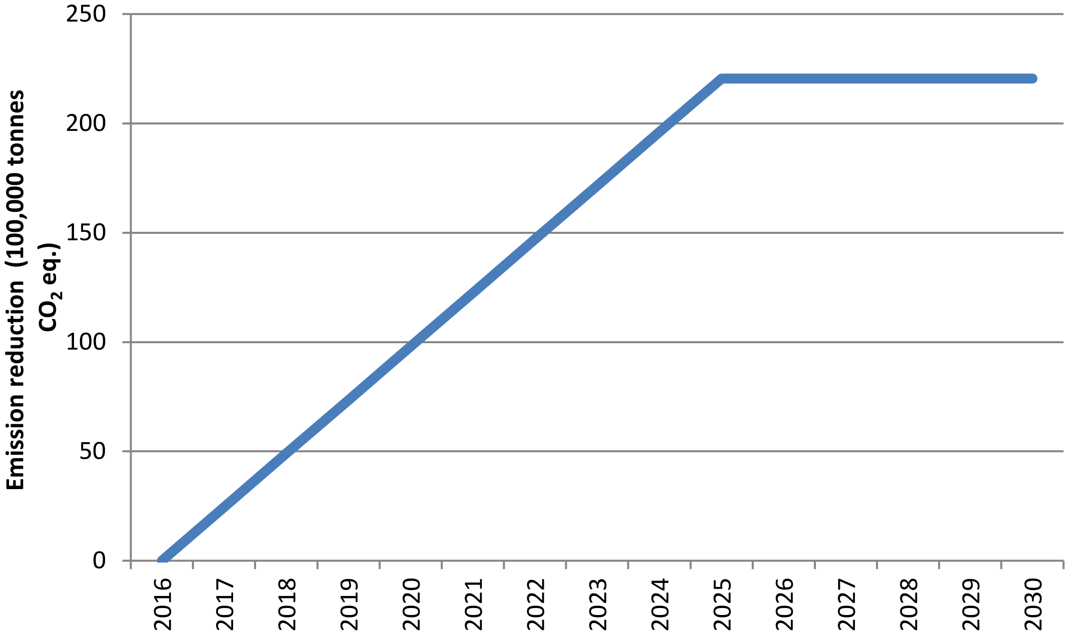

Figure 5-18 Emission reduction – GHG sequestration by rewetting drained wetland

6 Impacts and adaptation measures

6.1 Impacts on climate

6.1.1 Observed variability

Temperature in Iceland exhibits large inter-decadal variations. The longest continuous temperature record comes from Stykkishólmur on the west coast of Iceland. Statistical treatment of data from this station and of non-continuous measurements at other locations in Iceland, allows this record to be extended back to 1798, see Figure 6-1. This record shows that during the 19th century temperatures were cooler than in the 20th century, and the magnitude of inter-annual variations in temperature were larger. In the 1920s there was a period of rapid warming, similar to what is observed in global averages, but in Iceland the temperature change was greater and more abrupt. From the 1950s temperatures in Iceland had a downward trend with a minimum reached during the years of Great Salinity Anomaly in the late 1960s, when sea ice was prevalent during late winter along the north coast. Conditions were rather cool in the 1970's with 1979 being the coldest year of the 20th century in Iceland. Since the 1980's, Iceland has experienced considerable warming, and early in the 21st century temperatures reached values comparable to those observed in the 1930s. The warmest year in the series was 2016. While there are pronounced inter-decadal temperature swings in Iceland, the long term warming rate in Iceland is similar to the global one, suggesting that the recent warming is a combination of local variability and large-scale background warming.

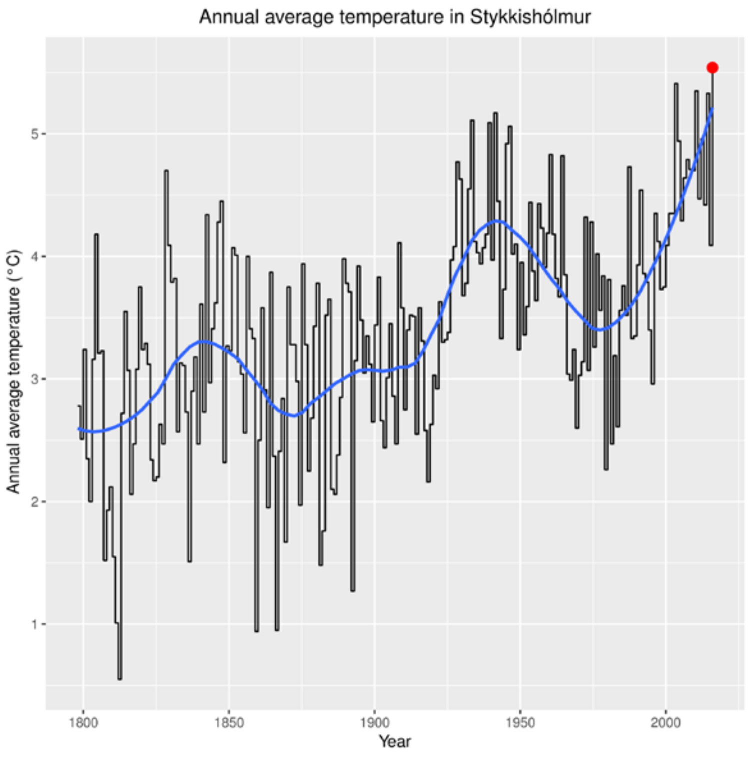

Figure 6-1 Mean annual temperature in Stykkishólmur 1798 – 2016.

Prior to 1850 the data is a composite of measurements from several stations and is thus less reliable than the post 1850 data. The trend for the entire period is about 0.8°C/century and to facilitate visualization a smoother that tracks inter-decadal variations has been added. The temperature during the warmest year in the record (2016) has been marked in read.

Decadal variations in precipitation are also significant in Iceland. Continuous precipitation records extend back to the late 19th century, but precipitation has been measured at several stations since the 1920s. The station network, however, had insufficient coverage in the highlands in Iceland where precipitation is greater than in lowland areas. Recently a precipitation records for the whole of Iceland during the last decades of the 20th century has been established using high resolution atmospheric reanalysis. The results show significant decadal variations in precipitation, and a tendency for higher amounts of precipitation during warmer decades. The long-term station records indicate that precipitation tends to increase by 4% to 8% for each degree of warming. Furthermore, several new studies suggest an increase in the precipitation intensity during the recent warming episode.

6.1.2 Climate projections

Based on the results of the Climate models, the warming observed is expected to continue. The warming rates differ between emission scenarios and between models. An analysis of the CMIP5 RCP scenarios for many models showed that over the 21st century the warming rate is likely to be 2 – 4 °C on average see Figure 6-2 and precipitation increase to be 2 – 3%. The uncertainty range is quite large, for temperature the span between the 5th and 95th percentile ranges was 4 – 5 °C but for precipitation 20 – 30%.

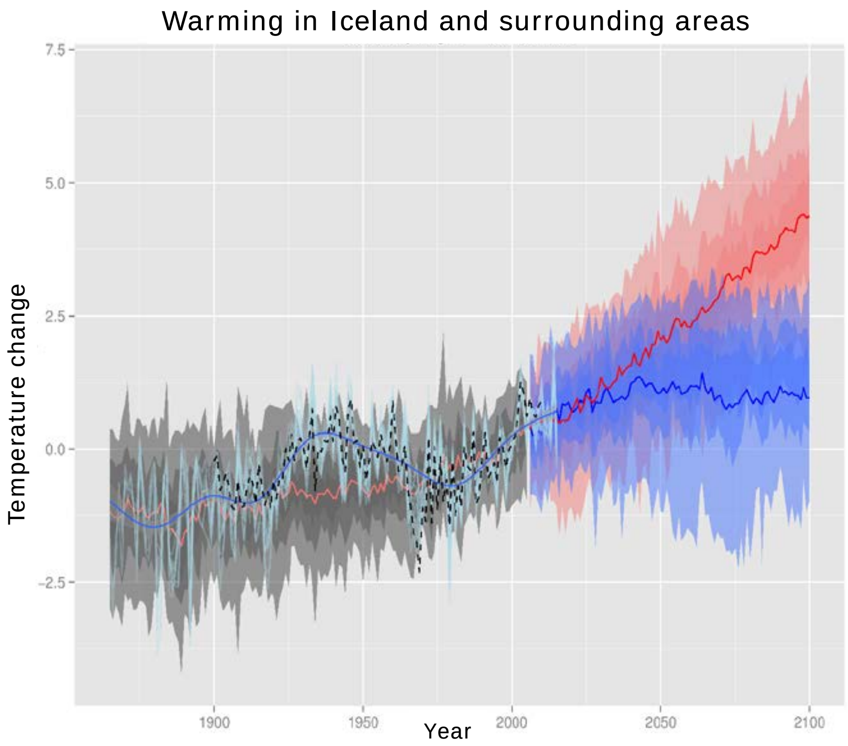

Figure 6-2 Warming in Iceland and surrounding areas.

Estimated warming in a region covering Iceland and neighbouring oceanic areas in the 21 century. According to the CMIP5 models for two different scenarios RCP2.6 (blue) and RCP8.5 (red). Thick lines indicate ensemble averages for the scenarios. Also shown in grey is the results of the 20th century CMIP5 experiments. Light blue and dashed lines indicate observations during the 20th century.

6.2 Impacts on oceanic currents

The climate of Europe and the North Atlantic is much milder than it is at comparable latitudes in Asia and North America. This is due to the heat transport from the south with air and water masses. A key process in this respect is the so-called Meridional Overturning Circulation (MOC) in the North Atlantic. This circulation is due to sinking of seawater, because of cooling of surface water and ice formation in high latitudes. After sinking this water is called deep water and it subsequently flows in the deep to southern latitudes. In the North Atlantic huge amounts of deep water is formed, e.g. in the Arctic Ocean, the Greenland Sea, the Iceland Sea and the Labrador Sea. The deep water that is formed north of the Greenland-Scotland Ridge flows over the submarine ridges on both sides of Iceland and also through the Faroe-Shetland Channel.

Many numerical models predict that the production of deep water will be reduced as a result of increasing greenhouse gas emissions. This happens when more fresh water is introduced to the Nordic Seas because of melting of glaciers, thawing of permafrost and increased precipitation that will make the surface layers fresher and therefore reduce the likelihood of convection. This in turn would lead to reduced deep water flow over the Greenland-Scotland ridge and a compensating reduction of flow of warm currents into the Nordic Seas thus inducing a relative cooling in the area. Ice core data from the Greenland Ice Sheet seem to indicate that this can happen rather quickly or within decades. Research projects measuring changes in the deep water fluxes over the ridges have succeeded in obtaining a time series of the flux of Atlantic water as well as of the deep water. With the time series available now it is, however, not possible to conclude that the flow of deep water is decreasing. In the fourth assessment report of the IPCC (2007) it was concluded that while it was "very likely that the MOC will slow down during the course of the 21st century", it was also "very unlikely that the MOC will undergo a large abrupt transition during the course of the 21st century". The slowdown of the MOC may reduce the warming rate near Iceland but is not likely to halt the warming or reverse it.

6.3 Impacts on marine ecosystems and fish stocks

To project the effects of climate change on the marine ecosystem is a challenging task. Available evidence suggests that, as a general rule, primary and secondary production and thereby the carrying capacity of the Icelandic marine ecosystem is enhanced in warm periods, while lower temperatures have the reverse effect. Within limits, this is a reasonable assumption since the northern and eastern parts of the Icelandic marine ecosystem border the Polar Front. In cold years the Polar Front can be located close to the coast northwest to northeast of Iceland. During warm periods it occurs far offshore, when levels of biological production are enhanced through nutrient renewal and associated mixing processes, resulting from an increased flow of Atlantic water onto the north and east Icelandic plateau.

Since 1998 and until present temperature and salinity of the waters around Iceland have usually been above the long-term average. Similarly, over the last twenty years the salinity and temperature levels of Atlantic water south and west off Iceland have almost continuously been above the average. At the same time, there have been indications of increased flow of Atlantic water onto the mixed water areas over the shelf north and east of Iceland in spring and, in particular, in late summer and autumn. Whether this indicates the beginning of a long-term period of increased presence of Atlantic water, resulting in higher temperatures and increased vertical mixing over the north Icelandic shelf is not possible to state at this stage.

Many parameters can affect how an ecosystem and its components, especially those at the upper trophic levels, will react to changes in temperature, salinity, and levels of primary and secondary production. However, observations by the Marine and Freshwater Research Institute indicate that changes in the marine ecosystem around Iceland during past two decades are likely to be related to the recent warming. The most marked ones and best registered are chances in abundance and distribution of many fish stocks.

To large extent the response of commercial fish stocks to a warming of the marine environment around Iceland has been similar to that which occurred during the warming between 1920s and 1960s. Thus, during recent warm period since 1996 marked changes have been observed in the distribution of many fish species during this warm period. Southern commercial species have extended farther north (e.g. haddock, monkfish, mackerel, blue whiting, saithe), a northern species is retreating (capelin), rare species and vagrants have been observed more frequently (e.g. greater fork beard, blue antimora, snake pipefish, sea lamprey, Ray’s bream, ocean sunfish), and 34 species, from both shelf and oceanic waters, have been recorded for the first time since 1996. In general, a moderate warming is likely to improve survival of larvae and juveniles of most southern species and thereby contribute to increased abundance of southern commercial stocks. The magnitude of these changes will, however, be no less dependent on the success of future fisheries management aiming at long term sustainable level for all commercial species.

The Marine and Freshwater Research Institute and the University of Iceland conduct studies on sea water carbonate chemistry and the air-sea flux of carbon dioxide. Research on seasonal biogeochemical processes enables evaluation of the magnitude of the ocean carbon dioxide sink and its relation to oceanographic conditions. The North Atlantic Ocean is overall a strong sink for carbon dioxide, but it is, however, evident that the conditions are both regionally variable and changing in response to rising atmospheric carbon dioxide.

There are long term time series from quarterly observations, since 1983, of ocean carbon dioxide at two sites near Iceland which differ significantly in oceanographic characteristics. The time series are invaluable for assessing long term trends and rates of change. They reveal rapid ocean acidification in the Iceland Sea at 68°N. The surface pH there falls 50% faster than is observed in the sub-tropical Atlantic. The rapid rate of change is because the Iceland Sea is a strong sink for carbon dioxide and the sea water is cold and relatively poorly buffered. The sea water calcium carbonate saturation state is low in these waters and it falls with the lowering pH. The calcium carbonate saturation horizon which lies at about 1700 m is shoaling which results in large areas of sea floor becoming exposed to undersaturated waters with respect to aragonite (calcium carbonate). At shallower depths the sea water saturation state is falling with unknown consequences for benthic calcifying organisms.

The biological effects and ecosystem consequences of the carbonate chemistry changes are of concern and are being studied. Thus it is hoped gain increased knowledge and to further understand the potential risk of ocean acidification in Icelandic waters.

6.4 Impacts on Glaciers

Glaciers are a distinctive feature of Iceland, covering about 10% of the total land area. The largest glacier is Vatnajökull in southeast Iceland with an area of 7,800 km^2. Climate changes are likely to have a substantial effect on glaciers and lead to major runoff changes in Iceland. The changes in glacier runoff are already substantial and expected to increase in the future and they are one of the most important consequences of future climate changes in Iceland. The runoff increase may, for example, have practical implications for the design and operation of hydroelectric power plants.

Rapid retreat of glaciers does not only influence glacier runoff but leads to changes in fluvial erosion from currently glaciated areas, and changes in the courses of glacier rivers, which may affect roads and other communication lines. A recent example of this is the change in drainage from Skeiðarárjökull, a south flowing outlet glacier from Vatnajökull ice cap., Due to thinning and retreat of the glacier the outlet of the river Skeiðará moved west in 2009 along the glacier and the river merged into another river, Gígjukvísl. As a consequence, little water now flows under the bridge over Skeiðará, the longest bridge in Iceland. In addition, glacier melting is of international interest due to the contribution of glaciers and small ice caps to rising sea level. Regular monitoring shows that today, all non-surging glaciers in Iceland are retreating.(Figure 6-3).

Figure 6-3 The bridge over Skeiðará, in June 2010. [36]

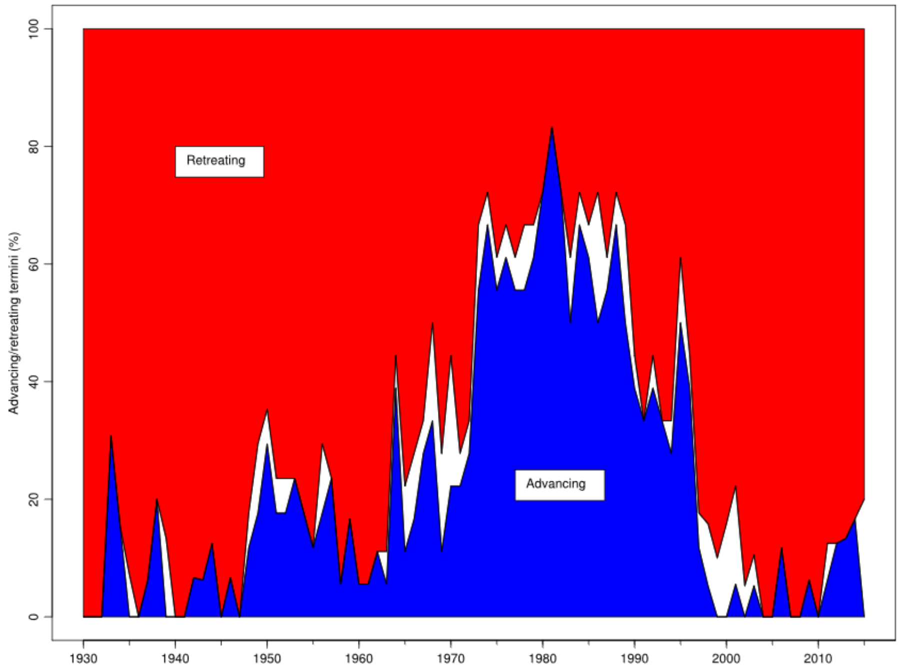

Figure 6-4 Fraction of monitored non-surging glacier-termin in Iceland 1930-2015

[36] Photo: Tómas Jóhannsson (IMO)

The fraction of monitored non-surging glacier termini in Iceland from 1930/31 to 2015/16 that are either advancing or retreating. Over most of the period the figure is based on measurements at 15 to 19 locations. From the database of the Icelandic Glaciological Society.

Recent airborne lidar measurements of glacier topography show significant amount of thinning in recent years. The picturesque Snæfellsjökull ice cap is the only ice cap that can be seen from Reykjavík. In the 1864 novel Journey to the Centre of the Earth, by Jules Verne, the ice cap serves as the entrance to a passage that led to the centre of the earth. It has persisted for many centuries, at least since Iceland was settled in the ninth century AD, but recent measurements show that the ice cap, which has an average thickness of less than 50 m, thinned by approximately 13 m in the last decade. At the current rate of thinning it will disappear within the century. Snæfellsjökull is not alone in this regard, other monitored ice caps are also thinning. The larger Hofsjökull ice cap thinned by a similar amount in the last decade See Figure 6-5. Recently the United States has made available digital elevation data based on satellite measurements (Arctic DEM), and this dataset will be useful in monitoring future changes to the Icelandic glaciers.

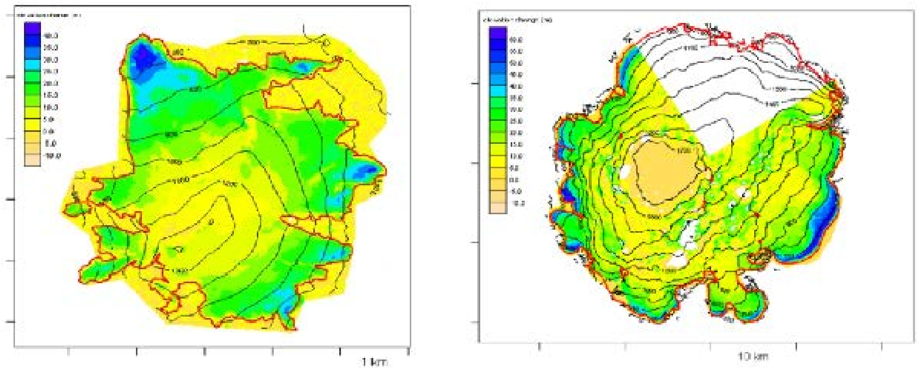

Figure 6-5 Recent thinning of Icelandic glaciers.

The left panel shows the thinning of Snæfellsjökull from 1999 to 2008, and the right panel shows results for Hofsjökull from 2004 to 2008. On average both icecaps thinned by about 13 m from 1999 to 2008

The thinning of large glaciers, such as the Vatnajökull ice cap, one of Europe's largest ice masses, reduces the load on the Earth's crust which rebounds. Consequently, large parts of Iceland are now experiencing uplift. The uplift does not, however, reach to the urban south west part of Iceland, where subsidence is occurring see Figure 6-6.

The uplift along the south coast may reduce the impacts of rising global sea levels during the 21st century. If subsidence continues in the south west part of Iceland, it will exacerbate the impact of rising sea levels.

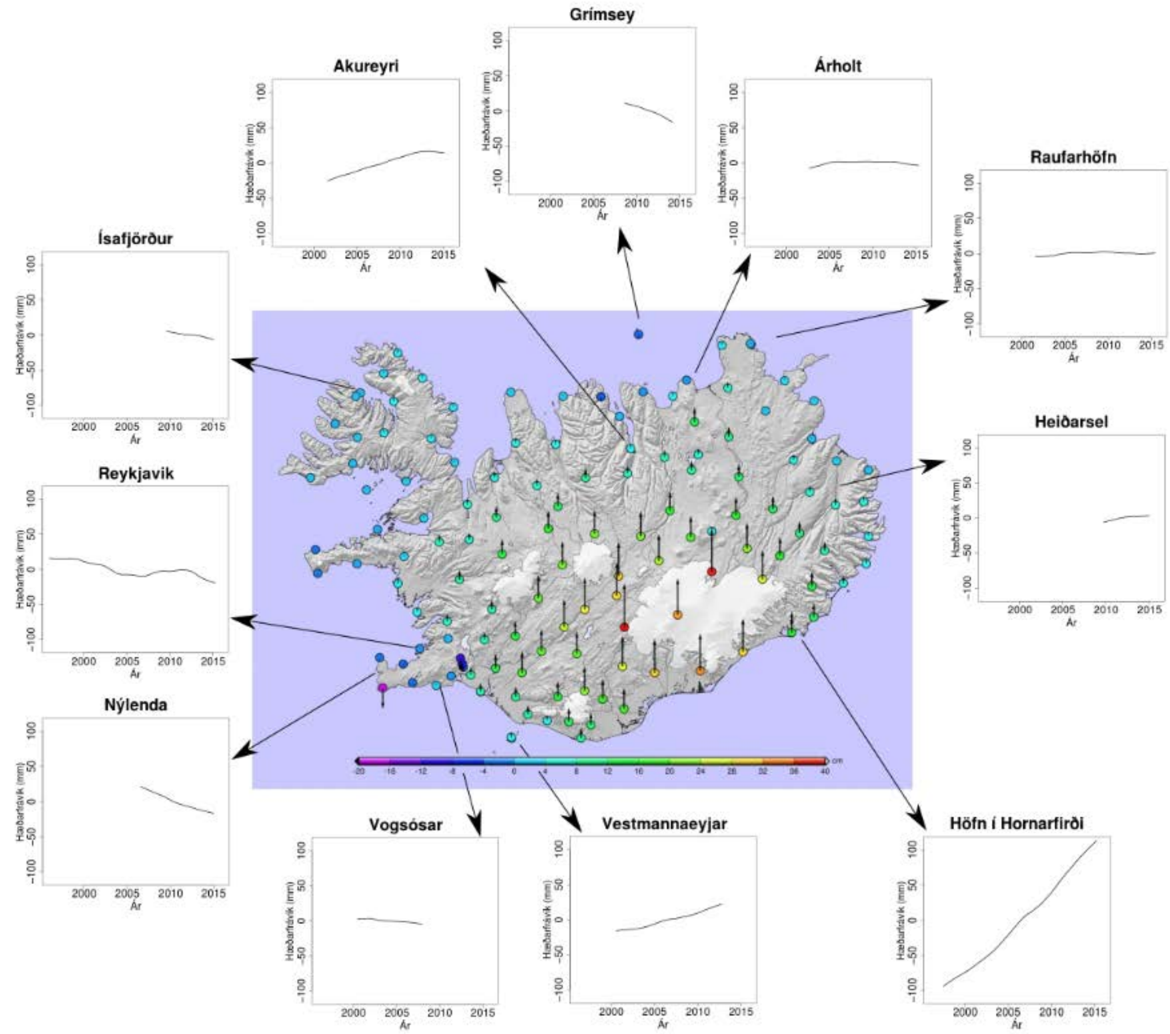

Figure 6-6 Vertical movement of land in Iceland.

The map is due to recent work by the National Land Survey of Iceland and the lines surrounding the map are from a network of continuous GPS stations run by the Icelandic Meteorological Office. Much of the interior and the south-eastern coast are experiencing uplift due to glacier thinning, but in many other coastal locations subsidence is occurring

Modeling of the Langjökull and Hofsjökull ice caps and the southern part of the Vatnajökull ice cap in Iceland reveals that these glaciers may essentially disappear over the next 100–200 years see Figure 6-7. Runoff from these glaciers is projected to increase and usable hydropower from these rivers is expected to increase by 20% until 2050. The current hydro-power system can capture about half of this increase. The peak runoff is expected to occur in the latter part of the 21st century.

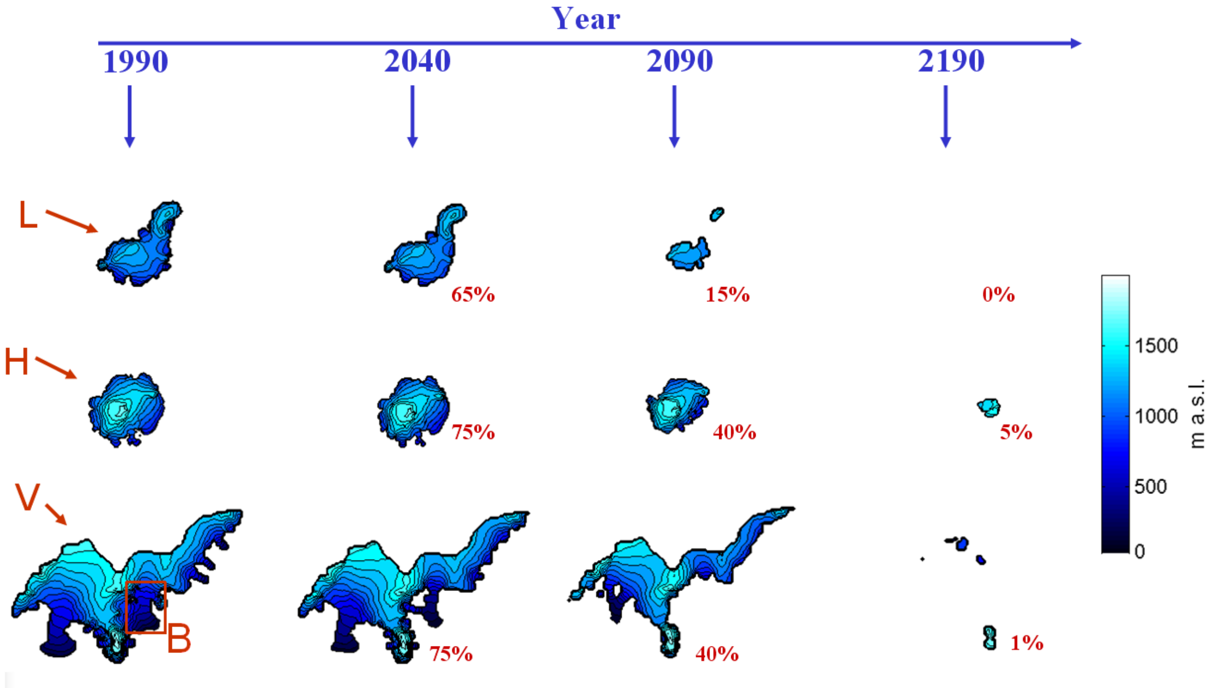

Figure 6-7 Response of Langjökull, Hofsjökull and Southern Vatnajökull to climate warming.
Response of Langjökull (L), Hofsjökull (H) and Southern Vatnajökull (V) to a climate warming scenario. The outlet glacier Breiðármerkurjökull on the south flank of Vatnajökull is indicated with a rectangle marked B in the left most map of Vatnajökull. The inset numbers are projected volumes relative to the initial stable glacier geometries in 1990. Note that Vatnajökull is only modelled south of the main east-west ice divide.

Although glaciers and ice caps in Iceland constitute only a small part of the total volume of ice stored in glaciers and small ice caps globally, studies of their sensitivity to climate changes have a general significance because these glaciers are among the best monitored glaciers in the world. Field data from glaciated regions in the world are scarce due to their remote locations and difficult and expensive logistics associated with glaciological field work. Results of monitoring and research of Icelandic glaciers are therefore valuable within the global context, in addition to their importance for evaluating local hydrological consequences of changes in glaciated areas in Iceland.

Studies on regional sea level rise reveal indicate that the sea level rise in Iceland may be quite different from the global average. The main reason for this is that the melting of the Greenland ice sheet will affect the gravitational field around Greenland in a way that, with other things being equal, would lower sea level in the vicinity of Greenland. This effect can be calculated given assumptions about glacial melt, and its "fingerprint" mapped. When other changes, such as the thermal expansion of the oceans and the residual isostatic adjustment from the last glaciation are factored in, sea level in the vicinity of Greenland does actually rise, but less than the global average.

Figure 6-8 shows results of such calculations (adapted from IPCC, 2013) for Iceland and the neighboring coastal ocean. The figure shows the sea level rise around Iceland as a percentage of global sea level rise for all four RCP scenarios examined by IPCC (2013) and includes sea level rise due to thermal expansion, glacier melt, dynamical changes and the fingerprint of gravitational changes. Around much of the Icelandic coast the sea level rise around Iceland is 30 – 40 % of global average. Once vertical land motion is added to this it becomes clear that along the south coast of Iceland the uplift is fast enough to out-pace the regional sea level rise

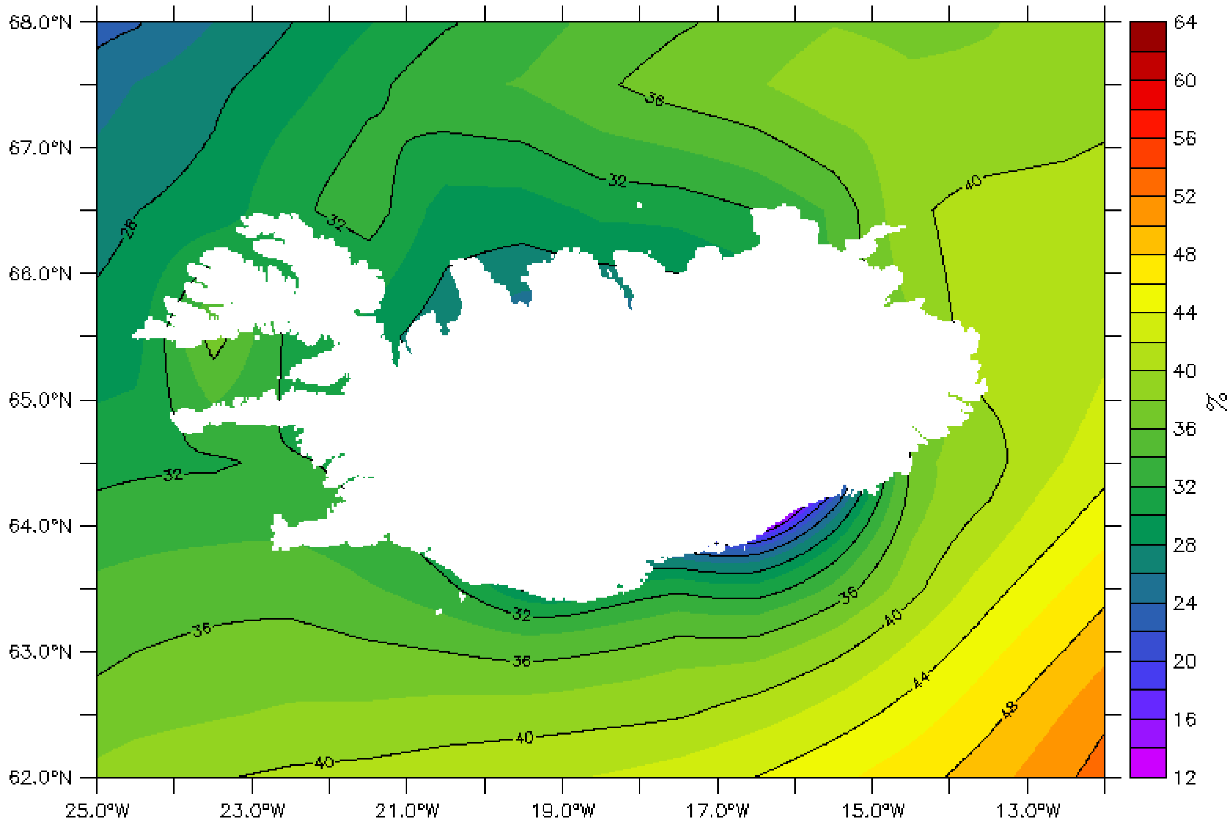

Figure 6-8 Sea level rise around Iceland by 2100.

Sea level rise around Iceland by 2100 as a fraction of the global averaged sea level change. Shown is the average fractional change for four different RCP scenarios spanning a significant range in warming during the 21st century. The effects included are sea level change due to thermal expansion, icemelt and changes in the gravitational field due to melting glaciers in Iceland and ice melt in Greenland. Adapted from IPCC, 2013.

6.5 Impacts on agriculture, land management and forestry

Approximately one fifth of the total land area of Iceland is suitable for grazing and fodder production and the raising of livestock. Around 6% of this area is cultivated, with the remainder devoted to raising livestock or left undeveloped. Production of meat and dairy products is mainly for domestic consumption. The principal crops have been hay, potatoes and other root vegetables. Cultivation of other crops, such as barley and oats, has increased rapidly in the recent years and they are now becoming one of the staples. In addition to this there is considerable cultivation of vegetables and flowers in greenhouses heated with geothermal water and lit with electricity in winter.

In Iceland the human impact on ecosystems is strong. The entire island was estimated to be about 65% covered with vegetation at the time of settlement in the year 874. Today, Iceland is only about 25% vegetated. This reduction in vegetative cover is the result of a combination of harsh climate and intensive land and resource utilization by a farming and agrarian society over 11 centuries. Estimates vary as to the percentage of the island originally covered with forest and woodlands at settlement, but a range of 25 to 30% is plausible.

Organized forestry is considered to have started in Iceland in 1899. Afforestation through planting did increase considerably during the 1990s from an average of around 1 million seedlings annually in the 1980s to 4 million in the 1990s. Planting reached a high of about 6 million seedlings per year during

2007 – 2009 but was reduced after the financial crisis to about 3.1 million seedlings in 2017. Around 1100-1900 ha was afforested annually in the period of 1990-2007 but has decreased to 500-800 ha in 2017. Planting of native birch has been increasing proportionate to the total afforestation, comprising 27% of seedlings planted in the period 1990-2013. From its limited beginnings in 1970, state supported afforestation on farms and privately-owned land has become the main channel for afforestation activity in Iceland, comprising about 80% of the afforestation effort today. The total area of forest and other wooded land in 2017 was around 1945 km^2 covering 1.9% of the total surface of Iceland. Native birch forest and woodland cover around 1520 km^2 and cultivated forest cover around 425 km^2.

The Soil Conservation Service of Iceland, an agency under the Ministry for the Environment and Natural Resources, was founded in 1907. The main tasks of the agency is combating desertification, sand encroachment and other soil erosion, the promotion of sustainable land use and reclamation and restoration of degraded land. A pollen record from Iceland confirms the rapid decline of birch and the expansion of grasses in 870-900 AD. Around 1900 more than 90% of the original Icelandic forest was gone and by 1700 about 40% of the soils had been washed or blown away. Vast gravel-covered plains were created where once there was vegetated land. Ecosystem degradation is one of the largest environmental problems in Iceland. Vast areas have been desertified after over-exploitation and the speed of erosion is often magnified in certain areas by volcanic activity and harsh weather conditions.

Land reclamation activities focused in the beginning on areas in south and south west Iceland where problems of drifting sand were most evident in threatening farms and fishing villages. After World War II the reclamation effort was spread more widely but still with a focus on south Iceland. With increased resources after 1974 reclamation activity was extended to many inland locations that were prime sources of sand along major rivers or near outlets of rivers. With detailed information acquired from mapping of erosion severity, recent reclamation activity has become wider spread, more selective and targeted. In 2013 the total extent of restored areas or areas undergoing restoration was estimated to be at least 2300 km^2.

6.6 Impacts on terrestrial ecosystems

This chapter has been reviewed by experts without any changes from the National communication published 2014.

Iceland‘s natural terrestrial ecosystems can be roughly divided into four main categories; wetlands, woodlands, grasslands, and barren or sparsely vegetated areas. Effects of warmer climate on most terrestrial ecosystems in Iceland are not expected to differ from those earlier described for forests. As for the managed ecosystems, the warmer climate is likely to extend the length of the growing season and increase plant production. Higher winter temperature is also likely to stimulate decomposition of litter and soil organic matter and thereby mineralization of nutrients, with more available for plant growth. These changes will have effects on the function, structure and distribution of terrestrial ecosystems. Similar changes are expected in Iceland as in other parts of the high-boreal, sub-arctic and arctic areas, as described e.g. in the ACIA 2005 report and in the IPCC‘s 4th Assessment Report from 2007.

Many areas in Iceland have suffered from extensive historic vegetation change and soil erosion due to, among other factors, heavy livestock grazing and periods of cold climate. The grazing pressure on many areas has decreased and one effect of the warmer climate is to enhance reestablishment of former vegetation and productivity of many of these areas. Indeed, it was recently shown (2011) that satellite-based vegetation index (NDVI) of the whole country during the period 1982-2010 has increased, especially after 2000. It has been concluded that vegetation of sparsely vegetated or barren areas should mostly benefit from warmer climate; at least if changes in precipitation patterns do not counteract its effects. Increased precipitation could lead to increased water erosion of barren soils.

The prediction of higher production of Icelandic plant communities in future climate was, however, only partly confirmed by the ITEX-project (International Tundra Experiment). It experimentally simulated during 3-5 years a climate warming of 1-2 °C in two widespread, but contrasting plant communities. A dwarf-shrub heath showed up to 100% increase in height growth, while biomass production in a moss heath was not affected. It was concluded that the sensitivity of Icelandic tundra communities to climate warming varies greatly depending on initial conditions in terms of species diversity, dominant species, soil and climatic conditions as well as land-use history. If, however, some large-scale changes occur in land cover, it would affect distribution and diversity of both flora and fauna, and some rare species might become endangered while other might benefit. Other possible negative impacts of climate change on terrestrial ecosystems include increasing risks of plant diseases and insect pests.

One rare plant community, highland permafrost string bogs (palsamires), is already under threat from the recent climate warming. The string bogs and their discontinuous permafrost areas might even disappear with further warming. Then their function as important habitats for plants and as breeding ground for birds would disappear as well. The permafrost string bogs hold much soil organic matter that currently is unavailable to decomposition. The thawing of these soils could therefore result in more emissions of GHGs.

Decomposition of organic matter and the subsequent CO_2 emission rate is primarily temperature controlled, where oxygen can access it. Warmer winters will increase decomposition of organic matter in terrestrial ecosystems, both litter and soil organic matter, and presumably increase the annual release of all GHGs (CO_2, CH_4 and N_2O). How this will affect the annual ecosystem GHG balance depends, however, on how fast and how much the summer carbon uptake (productivity) will be increased due to more plant cover, longer growing seasons, warmer temperatures, and increased nutrient availability in each ecosystem type.

Arctic Fox is the only native land mammal in Iceland. In a recent study (2009) it was shown that its growth and population size has varied with past climate fluctuations, mainly through effects on its food availability. Three bird species have become extinct in Iceland since 1844 but during the same period 14 new bird species have colonized and become regular breeding birds. The climate warming during this period could possibly have influenced one extinction; the Little Auk, which is an arctic seabird. Some of the colonizations could also possibly be linked to warmer climate, especially winter climate. Establishment of new habitats, such as coniferous forests and urban gardens, has also been an important contributing factor. There have been large-scale changes in many seabird colonies of e.g. puffins and guillemots in S- and W-Iceland since 2005. This collapse has been linked to less abundance of their feedstock fish, such as sand eel, in the same region. Oceanic temperatures have steadily risen off the S and W coast of Iceland during the past decades, but it is not fully understood how and if that has affected the population dynamics of the feedstock fish.

There have been some studies that have shown that biogeochemistry of rivers has changed during recent years. The amount of dissolved organic carbon has e.g. increased with increased annual temperature. Salmon has also shown more growth and higher production per unit area in NE Iceland during the past 20 years, which has been related to warmer climate. There are some indications that the Arctic Char, which is a sub-arctic freshwater fish, has been becoming less frequent in shallow lakes in Iceland during the past years. This has been linked to its low optimum temperature, but other factors may also be important. A new fish species, Flounder, has also colonized Icelandic freshwaters in S- and W-Iceland during the last decade and is currently increasing its distribution in N and E Iceland. Previously its northern limits were in the Faeroe Islands. How this will affect the river ecosystems is not known.

6.7 Adaptation measures

Climate change impacts on infra-structure sectors are the subject of ongoing studies. While the results of these studies show that significant impacts can be expected plans for adaptation to climate change are in most cases not well developed. The most notable exception is the Icelandic Power Company, but the likely impacts of expected climate change are taken fully into account in their operational strategies and investment planning.

Following recommendations from a 1992 report on expected sea level rise, consideration has been made for this in the design of new harbours in Iceland.

7 Financial assistance and transfer of technology

7.1 Iceland's International Development Cooperation

International development cooperation is one of the key pillars of Iceland's foreign policy, with the main goal of contributing to the fight against poverty in the world's poorest countries and guided by the Sustainable Development Goals (SDGs).

For nearly four decades, Iceland's official development cooperation has placed particular focus on the sustainable utilisation of natural resources, including fisheries and renewable energy. This has been grounded on Iceland's experience and expertise in utilizing its own resources for its social, economic and human development. This legacy is maintained in Iceland's Strategy for International Development Cooperation, which identifies three priority areas: sustainable use of natural resources, social infrastructure and peacebuilding, with gender equality and environmental sustainability as special cross-cutting themes.

In line with best practices in development cooperation and OECD-DAC guidelines thereto, all cooperation in bilateral partner countries is based on close cooperation with local communities and their needs and is based on detailed needs assessment. The same preconditions apply to the activities of multilateral partners. However, it is worth noting that Iceland's first OECD-DAC Peer Review (2017) highlighted that Iceland could make further efforts to improve the impact of environmental mainstreaming activities across its program and steps are being taken to address this shortcoming. This includes harmonization of climate change, business and development cooperation strategies within Iceland's Ministry for Foreign Affairs in accordance with the Kyoto Protocol.

In 2016, Iceland integrated its bilateral development agency, ICEIDA, within the Ministry for Foreign Affairs (MFA) – meaning almost all of Iceland's bilateral and multilateral development co-operation activities are now managed within the ministry.

7.2 Methodology

Iceland endeavours to follow best practices in international development cooperation and important efforts to that end have been made in recent years. In 2012, Iceland began the process of implementing the OECD Development Assistance Committee (DAC) statistical reporting methods (Creditor Reporting System, CRS), including the usage of the Rio Markers as a methodology for tracking finance for adaptation and mitigation. This applies to Iceland's bilateral public climate finance. While the Rio Markers have guidelines and technical eligibility criteria agreed within OECD-DAC, the process of assigning markers to projects and programmes is subjective and can vary between institutions and the quantification of climate relevant contribution can equally vary between countries. That being said, Iceland currently reports all programmes or projects as 100% climate relevant finance if it has been marked with either Rio-marker 1 ('Significant") or Rio-marker 2 ("Principal").

While core funding to multilateral institutions is not marked with Rio Markers, Iceland puts forth these contributions in the BR-CTF Table 7(a). With respect to core funding to multilateral institutions that don't have an explicit climate change mandate, it is possible to retrieve information on climate relevant proportions of the projects they support from OECD-DAC. Apart from core funding, reporting on climate-specific finance through multilateral institutions is identified based on an application of Rio markers in the same manner as bilateral climate-specific finance.

All climate finance figures in this report have been disbursed.

7.3 Financing

The Icelandic government is committed to the UN target of 0.7% of gross national income (GNI) dedicated to official development assistance (ODA). Iceland's ODA went from 0,26% of GNI in 2006 to 0,28% in 2016, but due to strong economic growth Iceland's ODA grew in nominal terms from ISK 2.9 billion in 2006 to ISK 7.1 billion in 2016[37].

Iceland channels a quarter of its ODA through core funding to multilateral institutions, and two-thirds through bilateral channels, including bilateral aid, NGOs and multi-bi projects, and including the four United Nations University (UNU) Training Programs based in Iceland.

In 2016 approximately 39,4% of Iceland's relevant ODA (bilateral, core support to NGOs, scholarships, etc.), or 1302 million ISK, had mitigation or adaptation to climate change (or both) as a significant or primary objective. This amounts to a 4,3% point decrease in climate related aid compared to the end of the previous reporting period in 2013, when 43,73% of relevant ODA was allocated to projects targeting mitigation or adaptation. This is most likely due to several factors. First, a thorough statistical review of climate related aid leading to a number of projects being reclassified in terms of the Rio markers. Secondly, Iceland has recently decreased the earmarking of funds and emphasized core contributions, to which DAC policy markers do not apply. In fact, core contributions increased by 90% between 2013 and 2016.

Table 7-1 Summary information on financial resources (million ISK)

Official Development Assistance (ODA)	2013	2014	2015	2016
Entire ODA (excluding in-country cost)	4.302	4.102	4.634	5.204
DAC sector-allocable ODA (bilateral)	2876	2675	2914	3302
Climate-related aid in bilateral ODA	1.253	1.271	1.347	1.302

Out of the 1302 million ISK allocated to climate-specific projects in 2016, 53,7% were allocated to projects with adaptation objectives only, 35,4% for mitigation objectives only and 10,9% for projects with both mitigation and adaptation to climate change as a significant or primary objective.

Table 7-2 Summary information climate-specific projects (ISK)

Mitigation projects	2013	2014	2015	2016
Geothermal Exploration Project East Africa	196.321.694	191.092.258	123.772.356	155.460.440
UNU Geothermal Training Programme	249.800.000	213.735.636	214.920.000	214.200.000
ESMAP	40.141.414	71.775.400	38.977.500	68.984.516
SEforALL	17.457.300	13.067.400	12.976.500	22.694.100
Ukraine geothermal project		8.500.000	6.000.000	265.372
Nicaragua geothermal project	10.049.645			
IRENA	11.638.700		13.150.400	
TOTAL	**525.408.753**	**498.170.694**	**409.796.756**	**461.604.428**

Adaptation projects	2013	2014	2015	2016
UNU Fisheries Training Programme	211.700.000	190.100.000	187.300.000	206.700.000
WASH Mangochi Malawi	86.008.588	97.669.399	116.826.111	94.667.920
WASH Zambezi Mozambique		78.549.872	241.986.122	213.067.419
Support to fishing industry Mozambique	222.989.720	202.308.122	180.558.799	144.692.734
Community resilience project Malawi			20.000.000	20.000.000
Jijiga WASH project Ethiopia	23.800.000	48.551.772	54.206.875	20.000.000
Uganda WASH	23.800.000	6.216.000		
TOTAL	**246.789.720**	**623.395.165**	**800.877.907**	**699.128.073**

[37] All the figures presented are in ISK. In 2016, USD 1 = 120,67 ISK

Cross-cutting projects	2013	2014	2015	2016
UNU Land Restoration Training Programme	85.100.000	87.500.000	79.400.000	88.100.000
UNU Gender Equality Studies & Traing Prog.	50.000.000	55.800.000	54.280.000	53.700.000
The Women's Delegate Fund	5.869.100	6.534.450		
Rio+20 gender & climate	17.347.950			
Gender and climate change Uganda			3.200.000	
TOTAL	**158.317.050**	**149.834.450**	**136.880.000**	**141.800.000**

Financial resources and transfer of technology for the purposes of adaptation to and mitigation of climate change have in recent years have been channelled mainly through the public sector and not through the private sector. However, Iceland recognises the role that the private sector can play in achieving the SDGs and is taking decisive steps for improvement in this area, including in its draft development cooperation strategy. Iceland is well-known for its technical expertise and multi-stakeholder partnerships, particularly in geothermal energy, and will build on this comparative advantage when engaging further with the private sector, especially in climate-related activities.

7.3.1 Provision of new and additional financial resources

Iceland is committed to assist developing countries adapt to and mitigate the adverse effects of climate change and in 2016 Iceland contributed approximately 2087 million ISK in 'new and additional' support, when compared to 2012 (last year of last NC reporting period).

There is no internationally agreed definition of what constitutes 'new and additional resources' under Article 4.3 of the UN Framework Convention on Climate Change. One definition, supported by a number of countries, is that 'new and additional financial resources' for climate-related activities should be additional to the international development aid goal of 0.7% of GNI. Utilizing this definition and bearing in mind that Iceland's ODA reached its peak of 0,37% in 2008, Iceland would not be in the position to identify any new and additional financial resources for climate-related activities.

However, as was done in the previous years, Iceland has decided to look at the increasing ODA volumes in 2016[38] (2087 million ISK increase from 2012 to 2016). The new and additional funding was therefore drawn from the growing aid program and has not diverted funds from existing development priorities or programs.

As of 2012 a separate budget line has been included on environmental issues and climate change in international development cooperation in the State budget. This budget item began with Iceland's Fast Start Finance commitments but has continued ever since. It shows the importance of the topic within Iceland's official development assistance. With the budget line, allocations to climate change projects now have earmarked funding, instead of being a part of the general budget line. When narrowing in on this budget line, a 32% increase in climate-related financing is noted between 2012 and 2016.

The budget line was, and continues to be, appropriately balanced between adaptation, mitigation and capacity building activities, and gives special attention to women's empowerment in the field of climate change and increasing access to renewable energy sources. The funding was delivered through multilateral and bilateral channels. Focus was given to Iceland's bilateral partner countries, Malawi, Mozambique and Uganda, which are all among the Least Developed Countries (LDCs).

Provision of financial resources, including financial resources under Article 11 of the Kyoto Protocol, are described further in sections 7.2.2 and 7.2.3.

[38] Excluding refugee costs in the donor country

7.3.2 Bilateral and regional financial contributions

Most emphasis is put on the LDCs in Iceland's international development cooperation strategy. In terms of priority regions, high emphasis is placed on Sub-Saharan Africa, and specifically Malawi, Mozambique and Uganda where Iceland has bilateral agreements on development cooperation. Sustainable use of natural resources is a key element in Iceland's development efforts, where developing countries benefit from Icelandic expertise and experience in the fields of renewable energy and sustainable fisheries.

Iceland emphasizes adaptation in its climate-specific financing through bilateral and regional channels, as detailed in Table 7.b in Annex II. The main sectors include water and sanitation, energy and fisheries. Iceland funds a water, sanitation and hygiene (WASH) program in Zambezia province in Mozambique, which constituted the largest share of Iceland's adaptation efforts in both 2015 and 2016. Iceland also supports a fisheries program in Mozambique which has the objective promoting sustainable and viable use of aquatic resources. Finally, the geothermal exploration project in the East African Rift Valley also helps build capacity and expertise in the field of geothermal utilization.

7.3.3 Multilateral financial contributions

More than half (60%) of Iceland's development cooperation is allocated to multilateral institutions. Iceland places strong emphasis on core contributions, rather than earmarked funding, and prioritizes the work of four international organizations: The World Bank, UNICEF, UN Women and the United Nations University.

Most of Iceland's multilateral environmental contributions are channelled through funds and projects that provide support to climate change adaptation and mitigation in LDCs, gender mainstreaming, capacity building through the UNU programs based in Iceland, in addition to active participation in the work of international organizations on renewable energy and fisheries. Of high importance to Iceland is the increased focus on energy and fisheries by the World Bank where Iceland supports projects such as Global Program on Fisheries (PROFISH) and the Energy Sector Management Assistance Program (ESMAP).

It should be noted that Iceland is not a member of the Global Environment Facility (GEF) and has therefore not made any financial contributions to the organization. Iceland has nevertheless continued to support adaptation and mitigation efforts in developing countries after the Fast Start Finance period, including contributing to the Least Developed Countries Fund (LDCF) and the Green Climate Fund (GCF).

BR-CTF Table 7a in Annex II, provides detailed information on Iceland's financial contributions to climate related development activities through multilateral channels.

7.4 Technology development and transfer and capacity building

Iceland is helping to build capacity in developing countries to mitigate and adapt to the impacts of climate change. Iceland has committed resources that are creating enabling environments for private sector investment, strengthening national and regional institutional and regulatory frameworks, and assisting developing countries to take practical actions to cut emissions. Recognising that climate change disproportionally affects developing countries and aligned with Iceland's emphasis on LDCs in its development cooperation strategy, the Government of Iceland focuses its technology transfer and capacity building in low-income countries.

Iceland's support to technology transfer in relation to the implementation of the UNFCCC includes a broad spectrum of activities. These activities comprise transfer of both hard and soft technologies. The extent of this technology transfer is significant and cannot be clearly separated from other activities in Iceland's international development cooperation, including financial flows. In fact, many development projects funded by Iceland include both technology transfer and capacity building components. Since they form an integral part of a project, it is not possible to accurately account for them separately. That being said, Table 7-3 (BR-Table 8 in Annex II) highlights projects that have a stronger technology transfer component, and Table 7-4 (BR Table 9 in Annex II) highlights projects have a stronger capacity building component.

Table 7-3 Provision of technology development and transfer support 2013-2016

Recipient country and/or region	Targeted area	Measures and activities related to technology transfer	Sector
Malawi	Adaptation	Water and Sanitation Project in Monkey Bay Health Zone: Infrastructure support to water- and sanitation project in Mangochi district	Water and sanitation
Nicaragua	Mitigation	Project to increase the use of geothermal resources by strengthening capacities at the government institutions that are involved	Energy
Latin America and the Caribbean	Mitigation	Support to IRENA's (International Renewable Energy Agency) Geothermal initiative in the Latin America Region	Energy
Africa	Mitigation	Assist countries in the East African Rift Valley conducting geothermal exploration and to build capacity and expertise in the field of geothermal utilization.	Energy
Mozambique	Adaptation	Assistance to the Fisheries Sector	Agriculture
Mozambique	Adaptation	WASH for Children in Zambézia Province: Infrastructure support to water- and sanitation project in rural communities and schools.	Water and sanitation

In terms of Iceland’s measures related to the promotion, facilitation and financing of the transfer of, or access to, environmentally-sound technologies, there is a particular focus on renewable energy. The sustainable utilization of natural resources is a priority area in Iceland’s development cooperation, where Icelandic technical expertise, extensive knowledge and experience of utilization of geothermal energy contributes to the SDGs. The UNU Geothermal Training Program (UNU-GTP) has for many years played an important role in that regard.

Iceland has a longstanding commitment to four United Nations University (UNU) training programs based in Iceland: The UNU-GTP since 1979, the UNU Fisheries Training Program, since 1998, the UNU Land Restoration Training Program, since 2010, and the UNU Gender Equality Studies and Training Program, since 2013. The focus of three of the programs is climate change mitigation and adaptation and the fourth has focused in part on gender and climate change. All four programs are directly linked to national and public institutions in Iceland and draw on their experts for lecturing and training of fellows who mostly come from LDCs and other developing countries.

The fellows are trained in applicable science and research, relevant to their home country, and usually conduct their research with involvement from an official or research institutions in their home country. Through this method, the research is more likely to have an impact in the respective field in the home country and bring about further technological transfer. Fellows are chosen for and encouraged to further develop their leadership skills in order to further the transfer of knowledge after they return to their home country. Many fellows return to work in national expert institutions. Through the UNU training programs, Iceland has helped enhance the capacity of participating countries to adapt to and mitigate climate change through training of officials in the fields of geothermal energy, fisheries and sustainable land management sectors, as well as in gender equality.

Success story from the UNU Fisheries Training Programme (UNU-FTP): Smoking/drying fish over hot fire is a common fish processing method in Africa. Commonly used methods are wasteful with regards to fuel and raw material and frequently pose health risks to those engaged in the activity. Over the last few years UNU-FTP fellows from several African countries have worked on refining a new type of solar dryer/smoker to improve the wholesomeness of the product and reduce the use of fuelwood. The UNU-FTP has also held several short courses in partner countries to introduce the new method to local communities.

Among the mitigation and adaptation programmes Iceland has supported through multilateral channels are the two World Bank programmes focused on the fisheries and renewable energy sectors. PROFISH aims at strengthening sustainable fisheries management, promote economic growth, ensure a healthy fish stock and enhance their yield. ESMAP is a renewable energy programme within the World Bank which assists low and middle-income countries to increase know-how and institutional capacity to achieve environmentally sustainable energy solutions for low carbon development, poverty reduction and economic growth.

As part of the World Bank’s response to the UN’s Sustainable Energy for All Initiative, the Bank made an agreement with Iceland to collaborate on advancing geothermal energy utilisation in East Africa through five-year project between 2013 and 2017. It is the largest initiative of its kind for promoting the utilisation of geothermal energy in developing countries. Participating countries should at the end of the project have three key outputs from the project: A realistic assessment of potential geothermal sites; plans for further action where applicable, and; capacity to move forward on the basis of those plans and submit exploration drilling projects into funding pipelines. The project could extend to up to thirteen countries[39] in the East Africa Rift Valley and is already under way in at least seven of them. The project in the East Africa Rift Valley is implemented in cooperation with a number of private partners and institutes, including technology transfer and capacity building to national experts and institutions in recipient countries.

The consequences of climate change affect women more severely than men. It is therefore important to include gender aspects in all discussion about climate change and programming. Iceland has actively promoted the important role of gender in the international climate negotiations, as well as supported several climate projects with the emphasis on women empowerment and gender equality, e.g. through organizations such as UN Women and the Women’s Environment and Development Organization (WEDO).

One of Iceland’s more notable efforts within the area of gender and climate change is a project promoting gender responsive climate change mitigation and adaptation in Uganda. The project included research on gender and climate change in rural Uganda by the local Makerere University, preparations of the Ugandan delegation for the COP meetings, conferences and the development of a short training course on how to mainstream gender into climate change actions. The training course was developed by the UNU Gender Equality and Studies Program in close collaboration with Ugandan partners, and training

[39] Burundi, Comoros, Djibouti, DR Congo, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda and Zambia.

and capacity building was provided for a selected number of experts and policy makers at the district level.

Another area important to Iceland is the promotion of sustainable land management. Land degradation and desertification rank among the world's greatest environmental challenges, significantly affecting a range of issues such as climate, biodiversity, soil quality, food and water security, peace and human well-being, especially for the more vulnerable rural poor. By supporting the UNU Land Restoration Training Programme, Iceland attempts to fight land degradation by strengthening institutional capacity and training of development country experts.

The steps taken by Iceland to facilitate and finance the transfer of technology to developing countries and to build their capacity are taken into accordance with both the UNFCCC and Article 10 of the Kyoto Protocol.

Table 7-4 Provision of capacity-building support 2013-2016

Recipient country / region	Targeted area	Programme or project title	Description of programme or project
LDCs	Mitigation	UNU Land Restoration Training Programme	Providing research and training in land restoration for experts from developing countries
LDCs	Adaptation	UNU Fisheries Training Programme	Research and training for practicing professionals from developing countries in the field of fisheries
LDCs	Adaptation	UNU Gender Equality Studies and Training Programme	Providing specialists from developing countries with training and education in gender equality, with a component focusing on the effects of climate change
Africa, LDCs	Mitigation	UNU Geothermal Training Programme	Research and training for practicing professionals from developing countries in the field of geothermal energy
Uganda	Multiple Areas	Gender & climate change	In partnership with UNU-GEST. Project promoting gender responsive climate change mitigation and adaptation in Uganda. Included research on gender and climate change in rural Uganda & preparations of the Ugandan delegation for the COP meetings.
LDCs	Multiple Areas	Women's Delegate Fund - WEDO	Increasing the participation of women in international negotiations regarding climate change (Women's Environment & Development Organization, WEDO)

8 Research and systematic observation

8.1 Climatic Research

Most of the climate-related research in Iceland is focused on climate processes and climate system studies and impacts of climate change. Other efforts involve modelling and prediction, and large ongoing projects deal with mitigation measures, but there has been less research on socio-economic analysis.

8.1.1 Climate process and climate system studies

The Icelandic Meteorological Office (IMO) is a governmental institute responsible for producing regular and specific weather forecasts. It conducts monitoring and scientific studies of geohazards and hazard zoning in Iceland. It is involved with several kinds of research within the fields of meteorology, hydrology and geosciences and has a leading role in climate change studies in Iceland both in research and in its role as an advising body to the government. It conducts glaciological measurements and modelling with a special focus on glacio-hydrology.

Although IMO research and evaluation of climate change is mainly centred on the climate of Iceland, the IMO has also been active in many inter-national climate research projects. Studies of the spatial characteristics and long-term changes in timeseries of temperature, precipitation, sea level pressure, river runoff and glacier changes have been conducted by IMO staff and published in international peer-reviewed journals.

Icelandic scientists have for many years contributed considerably to paleoclimatological work with their participation in many ice and sediment core projects. Most of this work has taken place within the University of Iceland. Some examples of research topics within that field and in related fields at the University include:

- A review of the size of Icelandic glaciers for the last 300 years and an estimate of their contribution to higher sea levels,
- Analysis of seafloor sediment cores from the coastal shelf north of Iceland to reconstruct changes in sedimentation, biota and ocean currents,
- Analysis of Tertiary and Quaternary oceanic paleo-fauna in order to chart changes in the system of ocean currents in that period,
- Reconstruction of climate change around the North Atlantic in the last 13,000 years by analysis of sedimentation (carbon content, pollen etc.) in lakes and fjords,

8.1.2 Modelling and prediction

The IMO has taken part in research projects where downscaling is used to generate projections of future climate change. In these studies, a numerical weather forecast model or a regional climate model is used to refine for a limited area the projected climate changes from a global climate model. Results from such studies have been used to drive models of glacier retreat, changes in river runoff. The results of this work have been published in reports and peer reviewed articles.

8.1.3 Impacts of climate change

The IMO has lead a series of Nordic-Baltic climate impact projects focusing on three main renewable energy resources; hydropower, bio-fuels and wind power. The current one, the Climate and Energy Systems (CES) project follows suit from the earlier Climate and Energy (CE) and the Climate, Water and Energy (CWE) project. These projects were funded by Nordic Energy Research. In these studies projects the objective was to make comprehensive assessment of the impact of climate change on Nordic renewable energy resources including hydropower, wind power, biofuels and solar energy. This included assessment of power production and its sensitivity and vulnerability to climate change on both temporal and spatial scales; assessment of the impacts of extremes including floods, droughts, storms, seasonal pattern and variability. The CE project finished with the release of the book "Impacts of Climate Change on Renewable Energy Resources - Their role in the Nordic Energy System" which was published by the Nordic Council of Ministers in 2007. The ensuing CES project had the goal of looking at climate impacts closer in time and assessing the development of the Nordic electricity system for the next 20-30 years. The project started in 2007 and finished in 2011 with the release of the book "Climate Change and Energy Systems. - Impacts, Risks and Adaptation in the Nordic and Baltic countries".

Following the CES project, two projects on the cryosphere and wind, were initiated by some of the participants in the previous climate and energy related projects. These were the SVALI and ICEWIND projects, both funded by the Top Research Initiative (TRI). The SVALI project examines the complex effects of climate change on the Arctic environment, especially as glaciers, ice and snow. The projects tackles questions such as How fast is land ice volume in the Arctic and North-Atlantic area changing, and why? Will these processes continue to accelerate? What are the consequences for sea-level and ocean circulation? What are the implications for society? The ICEWIND project focuses on wind energy in cold areas and it's main goal is to share knowledge between the Nordic countries and identify factors that delay or prevent the adoption of wind energy in the Nordic countries. In Iceland the main focus has been on establishment of atlases for wind and icing as well as integration of wind power with other energy sources.

8.2 Systematic observation

The institutions most important for the observation of climate change are the Icelandic Meteorological Office (IMO) and the Marine Research Institute (MRI). Other institutions monitor changes in natural systems that are affected by climate change, notably the Icelandic Institute of Natural History (IINH), which monitors the state of flora and fauna in Iceland and the Science Institute of the University of Iceland which monitors changes in glaciers and land movements. Furthermore, the National Land Survey of Iceland (NLSI) directs measurement campaigns for mapping vertical and horizontal land motion in Iceland.

8.2.1 Atmospheric, hydrological, glacier and earth observing systems

The IMO is responsible for atmospheric climate monitoring and observation. The IMO monitors and archives data from close to 200 stations. These stations are either manual (synoptic, climatological and precipitation stations) or automatic. The number of synoptic stations in operation (about 40) was relatively constant from 1960 to 2000 but with increasing numbers of automatic stations the synoptic network has been scaled down to 33 stations. The observations are distributed internationally on the WMO GTS (Global Telecommunication System). The manual precipitation network has been steadily expanding and now consists of about 70 stations measuring precipitation daily in addition to the synoptic stations. The majority of the precipitation stations report daily to the IMO database. The automation of measurements started in Iceland in 1987, and the number of automatic stations has been rapidly growing since then. The IMO now operates about 70 stations and about 35 in addition to this in cooperation with the National Power Company, The Energy Authority and the Maritime Administration. A repository of data from the about 50 stations operated by the Public Roads Administration is also located at the IMO. A majority of automatic stations observe wind and temperature every 10 minutes, a few once per hour, and most transmit data to the central database every hour. Many stations also include humidity, pressure and precipitation observations, and a few observe additional parameters (shortwave radiation and ground temperatures) or observe at more than one level.

The IMO participates in the Global Atmospheric Observing Systems (GAOS). The IMO has participated in the MATCH ozone-sounding program during the winter months since 1990, and the data are reported to the International Ozone Data base at NILU, Norway. The three GAW stations are: the BAPM at Írafoss and Stórhöfði, where tropospheric ozone, carbon dioxide, methane and isotopes of oxygen and carbon are monitored in cooperation with NOAA. Heavy metals and Persistent Organic Pollutants

(POPs) in air and precipitation are monitored and reported to AMAP and OSPAR. In Reykjavik, data on global radiation are collected and reported annually to the World Radiation Data Center in St. Petersburg (WRDC).

The IMO also monitors hydrological conditions in Iceland and runs a network of about 200 gauging stations in Icelandic Rivers. The network provides basic information for knowledge of the hydrology of Iceland. As the importance of monitoring and mediating information has been growing, the network has been updated and transmits data to the IMO centre at least once a day. The gauge network mainly measures water-flow, water-level and ground water, and in some cases other environmental factors.

Furthermore, the IMO runs flow monitoring network to watch, measure and warn against danger from floods originating in sub-glacial volcano and geothermal systems, or melt water, heavy rain and ice blockage of river-flow. The development of the network began in 1996, following jökulhlaup in Skeiðará, and has in the last decade been extended to the areas south and north of Vatnajökull, south of Mýrdalsjökull, the South Iceland lowland and to Borgarfjörður. Each monitoring station has electronic registration equipment, pressure sensor to measure the water level, sensors for the conductivity and temperature in the water, solar-panel which provides energy for the station, a telephone and a modem for the transfer of data. When conductivity or the water level reaches a given limit the IMO and the Icelandic Emergency Watch are alerted and a decision on actions can be taken.

The glaciers in Iceland have changed immensely in historic time, in particular in most recent decades, as the decrease amounts to approximately 0,3-0,5% every year. In an expedition twice a year, spring and autumn, scientists of the IMO keep track of the development of Hofsjökull and Drangajökull, measuring precipitation, ablation and ice-slide.

Another glacier measuring project was launched by the IMO jointly with the Institute of Earth Science of the University of Iceland, in 2008, aiming at the high-resolution mapping of the surface of the largest glaciers using laser technology from airplane. The project is endorsed by the Icelandic Polar Year Commission. It set out in September 2008, comprising Hofsjökull, Mýrdalsjökull, Eyjafjallajökull, Eiríksjökull and Snæfellsjökull.

The outlines of Icelandic glaciers have been registered, using maps, aerial photographs and satellite images. The data has been released, e.g. by World Glacier Monitoring Service in Zürich and Global Land Ice Measurements from Space (GLIMS) in Flagstaff, Arizona.

The Icelandic Meteorological Office operates a network of continuous geodetic GPS stations in Iceland to monitor crustal deformation related to plate movements, volcanic unrest and earthquakes. With geodetic quality instruments and specialized software, it is possible to achieve the daily position of the stations to within a few millimetres. CGPS stations are therefore an excellent tool to monitor crustal deformation. These stations allow IMO staff to monitor isostatic crustal changes that are occurring as a result of glacier thinning due to climate change.

8.2.2 Ocean climate observing systems

Both the IMO and the Marine and Freshwater Research Institute (MFRI) contribute to ocean climate observations. The IMO and MFRI have been supporting Meteo France in deploying surface drifters with barometers and SST for weather observations and climate in recent years. The Marine and Freshwater Research Institute (MFRI) maintains a monitoring net of about 70 hydrobiological stations on 10 standard sections (transects) around Iceland. These stations are monitored three to four times per year for physical (temperature, salinity) observations and once to two times a year (phosphate, nitrate, silicate) for chemical observations and once a year for biological observations (phytoplankton, zooplankton). Some of these stations have been monitored regularly since around 1950. The MFRI has monitored carbonate system parameters on two time series stations northeast and west of Iceland since

1983. A network of about 10 continuous sea surface temperature meters is maintained at coastal stations all around the country.

The MFRI has been involved in several monitoring projects of ocean currents, in cooperation with European and American scientists. This work has included projects such as the Meridional Overturning Exchange with the Nordic seas (MOEN), the Arctic-Subarctic Ocean Flux-array for European climate: West (ASOF-W), West-Nordic Ocean Climate, Thermohaline Overturning at Risk (THOR) and recently the North Atlantic Climate (NACLIM) project, which all involve the monitoring of fluxes over the Greenland – Scotland Ridge.

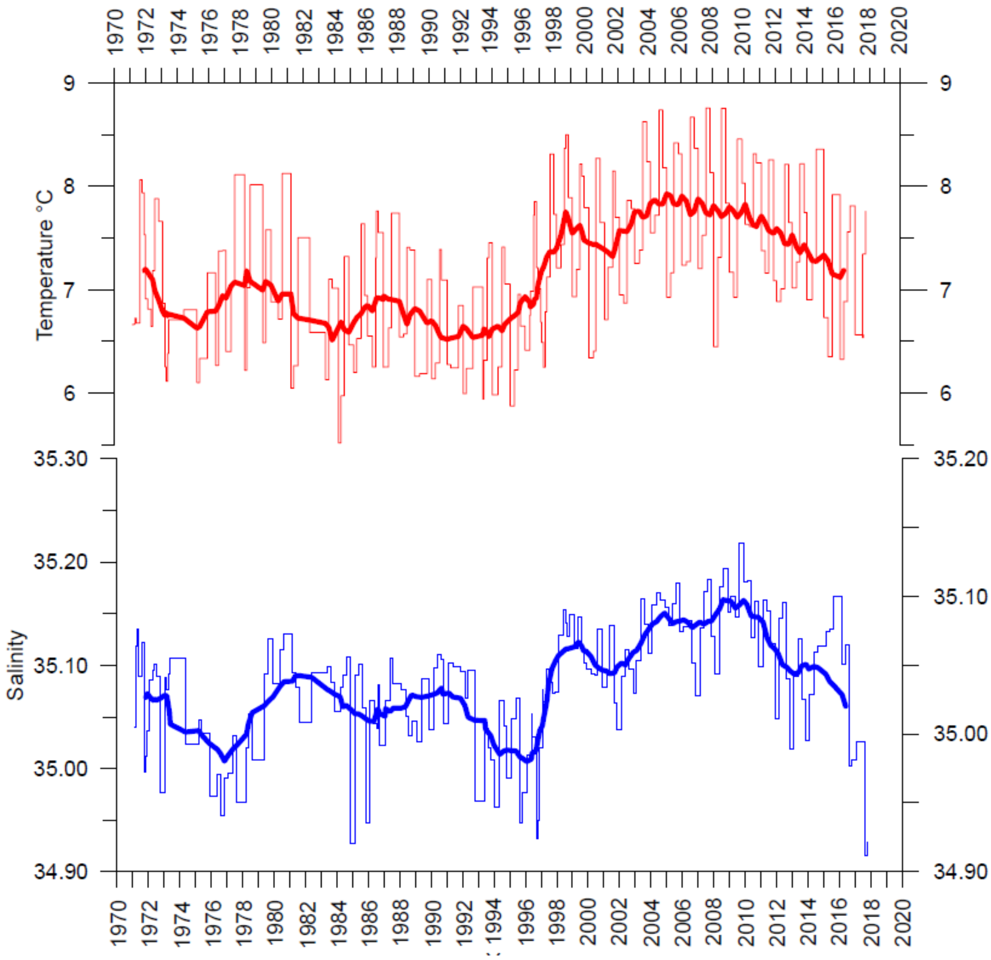

Table 8-1 Reykjanes-Faxaflói. Temperature and salinity, 1970-2017

8.3 Research on Mitigation options and Technology

8.3.1 The CarbFix project

CarbFix is a collaborative research project led by Reykjavik Energy, that aims to develop safe, simple and economical methods and technology for permanent CO_2 mineral storage in basalts. The project was founded in 2007 by Reykjavík Energy, The French National Center for Scientific Research (CNRS), the University of Iceland, and Columbia University. Since then, several additional universities and research institutes have participated in the project.

The CarbFix method involves capturing otherwise emitted CO_2 from Hellisheidi geothermal power plant through a scrubbing process and inject dissolved CO_2 into nearby basalt formations. After injection, chemical reactions between the basaltic host rock and injected CO_2 lead to the formation of carbonate minerals within the subsurface. These minerals are stable over geologic timescales, resulting in permanent removal of CO_2 from the atmosphere.

Pilot phase injections in CarbFix took place at Hellisheidi in SW-Iceland in 2012 and industrial scale CO_2 capture and injection began in 2014. Notably, the CarbFix method is not only being used to reduce CO_2 emissions from the Hellisheidi geothermal power plant but also to simultaneously capture and inject H_2S, another environmentally important gas. Currently about 1/3rd and 2/3rd of otherwise emitted CO_2 and H_2S are being captured and injected through the CarbFix method at the power plant and in the future the company aims towards near zero emissions for the power plant.

In 2017 the CarbFix team joined forces with a Swiss company, Climeworks, to demonstrate how direct capture of CO_2 from ambient air can be linked with CarbFix to clean up previously emitted CO_2 and permanently turn it to stone within the subsurface. A demonstration unit that captures 50 tons of CO_2 per year has been set up at the Hellisheidi geothermal power plant and linked to the ongoing CarbFix injection.

The CarbFix method significantly improves the safety and efficiency of sour gas capture and storage as it involves 1) injection of dissolved gasses, thereby eliminating risks of gas leaks back to the atmosphere, and 2) rapid chemical reactions between basaltic host rock and gas loaded injection water, resulting in permanent conversion of gas into rock within a year or two. Results from the project, confirming the rapid mineralization of injected CO_2 were published in Science in 2016[40]. In addition to being safer than conventional CCS methods, CarbFix is also cheaper. Assuming a 30-year lifetime of equipment, it has been estimated that the cost of capturing, transporting, injecting and monitoring CarbFix operations at the Hellisheidi power plant is less than US $30/ton. This is significantly lower than the ca. US $60-130/ton cost estimated for conventional carbon capture and storage[41].

CarbFix has received worldwide attention since its results were published in Science in 2016. PBS Newshour, CNBC, NY Times, Washington Post, the Economist and the Guardian are among media that have published stories on the project.

8.3.2 The Icelandic Deep Drilling Project

In 2000 an Icelandic energy consortium was established around the Icelandic Deep Drilling Project (IDDP). The main purpose of the project is to find out if it is economically feasible to extract energy and chemicals out of hydrothermal systems at supercritical conditions.

To begin with the consortium was composed of three Icelandic energy companies (HS Orka hf (HS), Landsvirkjun (LV), Reykjavik Energy (OR)) and the National Energy Authority of Iceland (OS). Alcoa Inc., the international aluminium company, joined the consortium as funding partner from 2007-2013, and Statoil ASA, the Norwegian oil company, joined in 2008-2011. Statoil Petroleum AS, joined the IDDP Consortium again in 2015, by a contract extending through 2020, in order to participate in the IDDP-2 drillhole at Reykjanes.

The first full scale deep well was bored by LV in 2009 at Krafla, NE-Iceland, which was to be deepened to 4.5 km to reach 400-600°C hot supercritical hydrous fluid. However, the drilling operation of IDDP-1 was abruptly terminated by late June at 2104 m depth when drilling penetrated molten rock (magma) over 900°C hot. It was decided to complete the well, in order to attempt a production test from the >500°C contact zone of the magma intrusion. A slotted liner reached from 1950 m to 2072 m depth. The well was then flow tested for two years, from 2010-2012, and proved to become the world hottest

[40] Matter, JM, Stute, M, Snæbjörnsdottir, SO. et al. (2016) Rapid carbon mineralization for permanent disposal of anthropogenic carbon dioxide emissions. Science, Volume 352, Issue 6291, pp 1312-1314
[41] Global CCS Institute, 2011. Economic Assessment of Carbon Capture and Storage Technologies: 2011 Update

geothermal production well with a wellhead temperature of more than 450°C, flowing dry superheated steam at very high pressures (40–140 bar) and high enthalpy (close to 3200 kJ/kg). Production tests indicated that the well at Krafla was capable of producing up to 36 MWe depending on design of turbine system. Series of pilot tests for power production were undertaken during and after the flow test – yielding breakthrough results in dealing with a magma within a geothermal system. A Special Issue of Geothermics (volume 49, January 2014) is devoted to the Iceland Deep Drilling Project. The well at Krafla had to be abruptly cooled due to valve failure and the pilot studies and flow test terminated. Many technical hurdles were met during drilling and the subsequent flow test of the first IDDP-1 well. The lessons learned are of very high value and the IDDP teams believe that proper engineering and geoscience carry the keys to a breakthrough in high enthalpy geothermal utilization worldwide.

Within 2015-2020, HS Orka has decided to go ahead and drill and test the second IDDP-welled at Reykjanes. Statoil Petroleum AS joined the IDDP consortium again in 2015 with a contract to 2020 to participate in the IDDP-2 well at Reykjanes. In addition, HS Orka and 9 other partners including ÍSOR, Statoil, Landsvirkjun and GEORG, receive a 20 M€ grant to a project called DEEPEGS, from the European Union Horizon 2020 program, extending from 1 December 2015 to 30 November 2019. About 40-45% of this grant is allocated to the IDDP-2 drillhole operation and related research at Reykjanes and research on casings and other materials to withstand supercritical conditions. A 2.5 km deep production well at Reykjanes (RN-15) was taken out of production and deepened as the IDDP-2 drillhole. The operation began in August 2016 and the well completed at 4,650 m depth by the end of January 2017. Following that, the well was stimulated for several months, until July 2017, by injecting cold fluid through a drill string which reached almost to the bottom of the well. The plan is to flow test the well late 2018, and then to continue into a pilot test for power production. The research could be close to completion in 2020. Supercritical conditions were measured during drilling at 4,550 m depth, 3 January 2917, before the final depth was reached, the temperature was 426°C at 340 bars.

Reykjavik Energy is already planning IDDP-3 to be drilled at Hellisheiði sometimes after 2020. In addition to the IDDP consortium, ICDP (International Continental Scientific Drilling Program) and the NSF (United States National Science Foundation) granted financial supports for core drilling within IDDP wells for scientific studies. The DEEPEGS project mentioned above, adds to the engineering and geoscience research. Numerous research proposals from the international science community are active, ranging from petrology and petrophysics to fluid chemistry, water rock reactions, surface and borehole geophysics and reservoir modeling and engineering. The IDDP is a long-term research and development project which will take at least a decade more to conclude. In the long term, however, the potential benefits of the IDDP regarding increased use of climate-friendly geothermal energy include:

- Increased power output per well, perhaps by an order of magnitude, and production of higher-value, high-pressure, high-temperature steam,
- Development of an environmentally benign high-enthalpy energy source below currently producing geothermal fields – and thereby diminishing environmental footprints of power production,
- Extended lifetime of the exploited geothermal reservoirs and power generation facilities, and
- Re-evaluation of the geothermal resource base worldwide.

8.3.3 Alternative fuel

8.3.3.1 Carbon Recycling International

Carbon Recycling International (CRI) was founded in 2006 in Reykjavik, Iceland by a team of entrepreneurs and developed new technology for fuel production based on one step catalytic synthesis of carbon dioxide (CO_2) and hydrogen. CRI’s carbon capture and utilization (CCU) technology reached industrial maturity in 2012 with commissioning of the company’s first commercial demonstration plant in Iceland. The plant produces renewable methanol by capturing CO_2 from the emissions of a local geothermal power plant and reacting the gas with hydrogen made by water electrolysis. Electricity for the production process comes from the Icelandic electricity mix, which is generated exclusively from hydro and geothermal sources. The output from the production plant is sold globally to, among others, oil and chemical companies, ferry operators and biodiesel manufacturers.

CRI's technology can also be applied globally to the reuse of CO_2 from the unavoidable emissions of operating industrial production plants – such as steel mills, cement kilns, ammonia plants and fermentation processes. Carbon capture and utilization technology such as the one developed by CRI can be used to store large quantities of surplus or stranded energy in liquid form for later use in different sectors and geographical locations.

Although CRI's technology was originally developed and proven in the context of Iceland's energy system, the same technology platform can be applied to a diverse set of available energy, emission streams and local conditions.

Currently CRI is working with other stakeholders in EU sponsored research consortia to adapt the chemical synthesis system to the characteristics of intermittent electricity production (such as from wind or solar energy) and to the utilization of energy rich residual gas from iron and steel works.

The product of the CRI process, methanol (CH_3OH), is widely used as industrial feedstock and fuel. As a liquid, it is as easy to transport or store as existing oil products. It can be used as fuel in both traditional spark plug ignited internal combustion engines and fuel cells, which transform methanol into electricity. Methanol combustion releases no particular matter, sulphur or any of the toxic and cancerous compounds emitted by the use of diesel and gasoline.

To further demonstrate the application of methanol to transport, CRI has been collaborating with Chinese automobile manufacturer Geely, which produces vehicles with engines operating on 100% methanol and with Danish fuel cell manufacturer Serenergy, which has fitted its methanol fuel cells into electric vehicles as well as ships with electric power trains. Methanol can be blended into gasoline directly or used as a building block for other fuels such as biodiesel or 'drop-in' fuels.

Methanol is a large platform chemical with a rapidly growing global market as a chemical intermediate for plastics, varnish and paint. When CO_2 derived methanol is used in production of durable and recyclable chemicals the material acts as a 'carbon sink'.

8.3.3.2 Renewable fuel in the fishing sector

The project, SAMBA, evolves around the design and construction of a 52 meter trawler where all aspects of energy efficiency are optimized to reduce fuel consumption and emissions as well as implementing methanol (produced with carbon capture) as a fuel, thus resulting in a near net carbon zero emissions, with reduced NOx emissions and no SOx or particulate matter. This will drastically reduce the carbon footprint of the catch and potentially, if successful, the total emissions on the Icelandic fishing fleet.

With regard to international cooperation, Iceland participated in the Martec II project, which aimed at supporting research in the field of shipping and sustainable fuel production and use. Martec II was supported by the European Commission ERA-Net scheme. Iceland is also participating in the follow-up project.

Furthermore, Iceland also participates in the Nordic Marina project, which aims to promote the use of sustainable fuel for shipping. Iceland co-lead a project on a plug-in hybrid electric propulsion system for sailboats, which is ongoing.

9 Education, Training and Public awareness

9.1 General policy toward education, training and public awareness

The educational system in Iceland is administered by the Ministry of Education, Science and Culture. The Ministry prepares educational policy, oversees its implementation, and is responsible for educational matters at all educational levels. Education has traditionally been organised within the public sector, but there are few private institutions in the school system, all of which receive public funding.

The National Curriculum Guide from 2013[42] applies to all grades and subjects in compulsory schools and further specifies what is to be coordinated in all Icelandic compulsory schools. Based on the objective articles of the preschool, compulsory school and upper secondary school acts, six fundamental pillars of education have been defined for the competence that pupils should achieve at compulsory school. One of the six pillars is "Education towards sustainability", which concerns the interplay of the environment, economy, society and welfare. Sustainability includes respect for the environment, sense of responsibility, health, democratic working methods and justice, not only at present time but also for future generations. Environmental protection, climate change and biodiversity are examples of tasks to be tackled. Sustainability is considered a prerequisite to understand the importance of one's own welfare and that of others. Education for sustainability further encompasses that in their studies children and youth come to grips with diverse problems and points of controversy. Teaching and working methods of the school are to be interwoven with the idea that the aim of education is capability for action. This involves training in democratic working methods and that children and youth are trained to be interested in and want to take part in society.

Key policy documents of the government contain the priorities of the Icelandic government regarding sustainability and climate change; Welfare for the future (first published in 2002 and revised in 2007 and 2010), the Climate Change strategy (2007) and Climate Action Plan (2010). Those policies contain sections and stipulations on actions regarding education, public participation, awareness raising, media and the role of civil society in general. In December 2015 the government launched a special climate change agenda to supplement the climate action plan from 2010 inter alia with projects aiming at increasing public awareness on climate change. A new Climate Action Plan is being developed looking at targets for 2030. The Climate Action plan is expected to include actions regarding education, training and public awareness, as the new government's manifesto from December 2017 emphasises public participation in decreasing CO_2 emissions.

Individual local authorities have taken steps toward increased sustainability and climate change awareness. Reykjavik city has, in cooperation with Festa – the Icelandic Centre for Corporate Social Responsibility (CSR)[43], taken decisive steps towards increased climate change awareness and actions within companies in the city. The companies were asked to sign a joint declaration on actions intended to fight climate change and adapt to it. The declaration has been signed by 107 companies. Those companies who sign are invited to participate in organised training, dialogue events, conferences and workshops on climate change and CSR. Furthermore, extensive information is available on Festa's website on the progress of the companies who have signed the declaration, along with other information on climate change and corporate responsibility.

Reykjavík is also one of three municipalities whose mayors have signed the Global Covenant of Mayors for Climate & Energy[44] - an international alliance of cities and local governments with a shared long-

[42] Curriculum
[43] Festa – Icelandic Center for Corporate Social Responsibility
[44] Global Covenant of Mayors

term vision of promoting and supporting voluntary action to combat climate change and move to a low emission, resilient society. The other two municipalities are Akureyri and Hveragerði.

Some other municipalities have chosen different paths for working towards increased sustainability and climate change awareness. Several municipalities have earned the EarthCheck[45] silver certification and another example is the small municipality Djúpavogur joined the international Cittaslow movement[46] in 2013.

9.2 Primary, secondary and higher education

A fundamental principle of the Icelandic education system is that everyone is to have equal access to education irrespective of sex, economic status, geographic location, religion, disability and cultural or social background. The educational system is divided into four levels. Pre-school is the first educational level and is intended for children below the compulsory age for education. Parents are free to decide whether their children attend preschool. Compulsory Level is the second educational level. Children and adolescents must by law attend 10 years of compulsory education from the age of 6 to 16. Upper Secondary Level is the third educational level which generally incorporates the age group from 16 to 20. Everyone has the legal right to enter school at that school level, irrespective of their results at the end of compulsory schooling. Those that have the right to enrol in upper secondary school also have the right to study until the age of 18.

There are currently seven higher education institutions in Iceland that fall under the auspices of the Ministry of Education, Science and Culture: The University of Iceland and the University of Akureyri are public universities. The Agricultural University of Iceland and Hólar University College are public universities formerly under the auspices of the Ministry of Agriculture. Reykjavik University, Bifröst University and Iceland Academy of the Arts are private institutions that receive state funding and operate under structural charters approved by the Ministry of Education, Science and Culture. At University Level emphasis on education and research in the field of natural resources and environmental science is growing. Thus there are several programmes available, such as a two year diploma studies and a master's programme in natural resources sciences at the University of Akureyri; a master's programme in Environment and Natural Resources studies at the University of Iceland and a doctor's degree in Environmental studies; BS degree in Nature and Environmental Science at the Agricultural University of Iceland, in addition to a variety of courses on sustainability, climate change and environmental issues available in all of those institutions.

The Eco-Schools Programme[47] is an international project funded by the government and managed in Iceland by the NGO Landvernd (The Icelandic Environment Association). Eco-Schools is a programme for environmental management and certification which aims at enhancing environmental education and to strengthen environmental policy in schools. It is designed to implement sustainable development education in schools by encouraging children and students to take an active role in how their school can be run for the benefit of the environment. Schools that fulfil the necessary criteria are awarded the Green Flag for their work, which they keep for two years, before they need to renew their permission to flag the Green Flag.

Each Eco-School forms an environmental committee and works towards an Eco-Code within the school. Schools can choose to work on up to 13 themes and set two-year goals for one or two of them at a time. Landvernd assesses their work and recognises those who meet the requirements with a Green Flag. The themes are: climate change, transportation, consumption, global equality, energy, water, waste,

[45] Earth Check
[46] Cittaslow
[47] Eco-schools

ecosystem restoration, biodiversity, nature conservation, local community, public health and wellness and landscapes.

New environment assessment checklists have been developed for students to evaluate the status of environmental issues within their schools, such as climate change, transportation and consumption.

As a part of the Eco-School programme, Landvernd participates in a European programme on climate change education. The goal of the programme is to design educational material for the upper secondary school level on complex environmental issues to support students' ability to take action on the climate change issue.

In 2017, 182 schools at all school levels participated in the programme, reaching 32% of all children at the Pre-School level, 46% of all children in the Compulsory (elementary) School Level and 42% of all students at the Upper Secondary Level.

The programme is open to other schools, such as Sunday schools and summer schools, according to the international guidelines of the Eco-Schools Programme. The programme is financially supported by the Ministry for the Environment and Natural Resources and the Ministry of Education, Science and Culture, as well as municipalities throughout the country.

Iceland runs four training programmes as a part of the UN University, three of which offer training that benefit directly the fight against climate change.

9.3 Public information campaigns

In November 2017, climate change was the theme of the biannual conference on environmental issues hosted by the Ministry for the Environment and Natural Resources. The conference is attended by the environmental sector, the public and stakeholders and is one of the largest regular environmental events held in Iceland. The conference got an extensive coverage by the Icelandic media and evoked experience exchange and discussions on climate change in the Icelandic society.

The special climate change agenda of the government issued in 2015 introduced the project “Melting glaciers – a natural laboratory to study climate change”, implemented by the Vatnajökull national park and the Icelandic Meteorological Office. The project evolves around the visibility of climate change derived from the melting glaciers in Iceland with the target to increase people’s awareness of climate change. The project involves dissemination of public information and education material on the melting glaciers, such as a brochure in Icelandic and English on the subject published in late 2017, both in paper and online[48]. A special web for the project, a newsletter and teaching material for guides working with tourists in the Vatnajökull glacier vicinity is in the making and expected in early 2018 as well as information signs that will be placed at walking paths where one can view the glaciers and picture the transformation caused by their melting.

The Ministry for the Environment and Natural Resources manages annually the Day of the Environment (April 25th) and the Day of the Icelandic Nature (September 16th), both of which are celebrated national wide. The former day is concentrated on international environmental issues such as climate change and sustainability. On those days the Minister for the Environment and Natural Resources grants chosen individuals, media, school children or companies awards for their commitment for the environment and these awards tend to get the attention of the main stream media.

Several public campaigns conducted in Iceland by public and private parties contribute to the reduction of emissions. One of those is the annual “Bike to work” campaign[49], conducted by the National Olympic and Sports Association of Iceland with financial support from i.a. the public sector. The campaign –

[48] A natural laboratory to study climate change
[49] Bike to work

which over a period of two weeks encourages the public to leave their car at home and bike, walk or use public transport to work – has been widespread and successful, with good participation from the public. The same association conducts other campaigns aiming at encouraging people to use their own powers to transport – such as the “Lífshlaupið” campaign (where all kind of physical movement or sport count), and the “Bike to School” and “Walk to School” campaigns directed towards students.

In 2017, six of the largest municipalities in Iceland with just under 70% of the population, participated in the European Mobility Week[50], September 16 – 25, encouraging people to use environmental friendly methods for transportation. In Iceland, this campaign is coordinated by the Ministry for the Environment and Natural Resources.

The Eco-School project has proven to be a successful method, not only for increasing environmental awareness at schools but also in the homes of the children as they bring forward their knowledge on environmental issues and climate change to their parents and other family members. At the university level awareness raising projects are conducted, such as the annual “Green Week” at the University of Iceland organised by the students of the masters Environment and Natural Resources Programme.

Over the past years, media interest in climate change issues have increased considerable, both before the Paris COP21 meeting and in the wake of it. Thus, during the past months, the media has provided an extensive coverage of climate change related issues and some key media have had climate change on the agenda on a regular basis; one example of this is a weekly coverage of climate change on the national radio morning programme. As a result, all the coverage nominated for the Ministries annual media prize in 2017 evolved directly or indirectly around climate change. The winner of the prize, Ævar, the Scientist, is a good representative for the National Broadcasting Service’s (RÚV) effort to reach out to children with information on science and nature. Ævar has had programmes on national TV, radio and the RÚV’s website[51] on these issues since 2014 and covered climate change on various occasions and from different perspectives.

Due to Iceland's small population, the government’s access to national and local media is relatively open, leading to a higher proportion of information dissemination on environmental issues. Information officers working for the Ministry for the Environment and Natural Resources and its institutions have a direct and personal contact to key players within the mass media which gives them unique opportunity to present information through the largest TV and radio channels as well as the main stream newspapers.

9.4 Training programmes

Iceland runs four training programmes as a part of the UN University, of which three benefit directly the fight against climate change.

The Geothermal Training Programme (UNU-GTP)[52] is a postgraduate training programme, aiming at assisting developing countries in capacity building within geothermal exploration and development to enhance their use of other energy sources than fossil fuel. The programme consists of six months annual training for practicing professionals from developing and transitional countries with significant geothermal potential, as well as an opportunity is given to outstanding fellows to pursue their MSc and/or their PhD degree through a cooperation with the University of Iceland and Reykjavík University. Also, the UNU-GTP offers annual workshops and short courses for specialists from developing countries working in the field of geothermal energy.

The objective of the Gender Equality Studies and Training Programme (UNU-GEST)[53] is to promote gender equality and women’s empowerment in developing countries and post-conflict societies through

[50] EU Mobility week
[51] Ævar the scientist – RUV
[52] UNU Geothermal Training Programme
[53] UNU Gender Equality Programme

education and training. UNU-GEST is currently involved with two projects in the field of women and sustainable energy. A Workshop on "Women Entrepreneurs and Sustainable Energy in Africa" (WESE) was held in Gabon in June 2017 with the theme "Unlocking Opportunities for Women Entrepreneurs in Sustainable Energy". The workshop was aimed at identifying the main barriers and challenges that hinder the establishment growth and development of women entrepreneurs, including micro to small and medium sized enterprises, serving the different markets, including last mile energy market.

UNU-GEST is also in partnership with the SDG no.7 on Sustainable Energy for All for a People-Centred Accelerator to support gender equality, social inclusion and women´s empowerment. In June 2017, the first design meeting for the People-Centred Accelerator was held in Iceland. Experts from across the world travelled to Iceland's Landsvirkjun power plant in Krafla to discuss how the Accelerator could support social inclusion, gender equality and women's empowerment in the energy sector.

Previous projects include study material and a training course on gender and climate change in Uganda. The overall objective of the course was to build knowledge and understanding of the causes of climate change and its impact on development and gender relations in Uganda, and thus building local capacity to design and implement gender-responsive climate change policies, strategies and programmes. Three pilot courses were run in Uganda in the years 2012 and 2013 before the project was transferred to the Ugandan actors.

The United Nations University Land Restoration Training Programme (UNU-LRT)[54] provides a postgraduate training for specialists from developing countries in the broad field of restoration of degraded land and sustainable land management and aims at assisting developing countries in capacity development within this field. This includes offering annually a six-month training programme in Iceland as well as shorter courses in partner countries. In 2017, UNU-LRT offered a short course in Uganda on "Sustainable land management, land restoration and linkages to climate change". The 9-day course was organised in cooperation with the Ugandan partner institutions of UNU-LRT, the National Environment Management Authority (NEMA) and Makerere University. The course was held in Kasese municipality in Western Uganda and the participants were 25 officers from 18 different districts in Western Uganda, who work on environmental issues (climate change, land degradation, land restoration, etc.) within their districts. During the course, the participants took part in interactive lectures, group assignments and exercises as well as two short field trips to visit restoration sites. A similar course is now being planned in another district in Uganda in mid-October 2018.

9.5 Resource or information centres

The website of the Icelandic government[55] contains official information on climate change; from relevant acts and regulations and policies to the latest news on climate change, Q&A's about climate change, information on the United Nations Framework Convention on Climate Change and important external links. Furthermore, a hub for ideas and suggestions from the public regarding the climate change action plan, was launched on the website in 2017 after the government called for proposals from the public for the plan. A new English version of the governments website was launched in January 2018, with updated information about Iceland and climate change issues and links to relevant information on websites of other institutions.

Extensive information about climate change is available on the websites of the main institutions in the field of climate change, such as the Environment Agency of Iceland (EAI)[56]. At the EAI website, general information on possible and probable effects is to be found, as well as information on the causes, types of greenhouse gases, the Paris agreement and the ETS. Also, the web contains specific pages on

[54] UNU Land Restoration Training Programme
[55] Government Offices of Iceland
[56] Environment Agency

how individuals can make a difference in their daily lives[57]. The latest NIR (inventory reports) are available online. Among the most popular webpages of the EAI site is www.graenn.is (e. green.is) on how consumers can decrease their negative impact on the environment, including the climate. The EAI website highlights few indicators on the state of the environment, where climate change is one of six main categories[58]. The indicators are updated yearly and include i.a. yearly average heat and changes in Vatnajökull glacier. The EAI also frequently disseminates information about climate change issues via it's Facebook page.

Another important resource is the official website of the Icelandic Meteorological Office[59], which has a sub section on climate change containing extensive information on the background and science material on climate change. There the mechanisms behind climate change are explained in a simple language that should appeal to the public; the content of the IPCC reports is made accessible, both in English and Icelandic as well as news and information on the climate change impact in Iceland.

The websites of the Soil Conservation Service of Iceland[60] and the Iceland Forest Service[61] provide information on climate-related challenges these institutions are engaged in.

Most of the institutions mentioned above, including the Ministry, have established and maintain Facebook pages to disseminate their information to the public, i.a. news and information on climate change. This has proven to be an important information channel, considered the limited financial resources of those institutions, as it is inexpensive, easily accessible and that the majority of Icelanders have a registered Facebook account.

Other information sources worth mentioning are e.g. the website of the Energy Centre[62] where the public can access information and calculators for diverse private energy use, such as on household electricity and heating, transportation and carbon emissions. The website also provides short informative videos on private energy use and how to reduce it.

A variety of educational material on environmental issues, climate change included, is accessible on the website of the Directorate of Education (DE)[63]. This includes electronic books, videos, an interactive web-hub etc. The material is facilitated in cooperation with different agents, such as the EAI, environmental NGO's and others. Also, educational material on climate change is to be found on the website http://www.erjordinihaettu.com (Is the Earth at Risk?) and on the Nordic web https://nordeniskolen.org. Finally, educational material on climate change is in the making and expected to be introduced by the NGO Landvernd (The Icelandic Environment Association) in 2018 as a part of their Eco-Schools programme.

In addition, several privately-run websites and Facebook-groups and -pages disseminate news and information on climate change, such as www.loftslag.is, www.tuttugututtugu.com, a Facebook-group for discussion and news on climate change, a Facebook-page called Paris 1,5 in addition to a number of pages and groups focusing on specific environmental issues contributing to climate change.

9.6 Involvement of the public and non-governmental organisations

In 2012 the ratification of the Aarhus Convention entered into force in Iceland, ensuring the public right to participation and information on environmental matters. The governments work on increasing NGO's and the public involvement in the field of climate change and environmental protection started over a

[57] Environment Agency - information
[58] Environment Agency
[59] Icelandic Met Office
[60] The Soil Conservation Service of Iceland
[61] Icelandic Forest Service
[62] Energy Agency
[63] Directorate of Education

decade earlier when the Ministry for the Environment established a formal platform for cooperation with environmental NGO's. The purpose is to ensure dialogue and consultation between the Ministry and the environmental NGO's, which is realised i.a. in an annual meeting between the Minister and the NGO's representatives. In all 18 NGOs participate in the platform, including Iceland's largest organisations in this field.

Many of the NGO's working in the field of environmental protection receive a financial support for their operation from the government as well as funding for specific projects. Amongst those projects are the Eco-School project described before, diverse projects enhancing bicycling as a climate friendly mean of transport and a long term educational project for youths on revegetation and land care in connection to biodiversity and climate change. Additionally, the government has sponsored the participation of the NGO's representatives in the COP meetings of the UNFCCC. The government support diverse other NGO's projects which fully or partially aim at fighting climate change.

One of the projects funded by the government aims at reducing green-house gas emissions in municipalities, focusing on transport, energy and waste recycling. The pilot project run in the years 2013 – 2015 resulted in an action framework with timed targets for the small municipality Hornafjörður for the years 2016 – 2020 and in 2017 an online handbook was published on how municipalities can make such an action plan, and how to account for baseline emission inventory.

The government also supports specific private projects on climate change, such as research projects on emissions from landfills in Iceland and a research comparing the legal framework of Iceland and Europe regarding climate change.

9.7 Participation in international activities

Iceland participates in many different international activities. The participation in the European Mobility Week, the Bike to work international campaign and Eco-Schools programme are examples of participation in public projects across borders. The UN University training programmes are examples of international cooperation with regards to education and training.

Icelandic authorities participate in diverse international cooperation programmes with regards to public information dissemination on the environment, including climate change. An example of this is the cooperation between the Environment Agency of Iceland with the European Environment Agency (EEA). Press releases from the EEA concerning climate change developments are distributed by the member countries on agency/Ministry websites and to national and local media. Information and best practice is also shared between member countries.

The Ministry for the Environment and Natural Resources participates in an active network of communication and information officers from environment Ministries and national environmental agencies in the Nordic countries: Denmark, Norway, Sweden and Finland as well as the Nordic Council of Ministers. The network meets annually and shares experience and information. Iceland has been active in the Nordic information cooperation during the latest COP meetings and has hosted various side events at the Nordic pavilion at the COP conference sites during the last years.

Iceland also participates in the platform for national coordinators working on the European Mobility Week. Iceland participates on average in one or two meetings of this platform annually, where participants exchange information and plan and coordinate the annual Mobility Week.

Annex I Third Biennial Report

1 Introduction

The third Biennial Report of Iceland under the UNFCCC is submitted as an annex to Iceland´s 7th National Communication. The Biennial Report has been prepared in accordance with the UNFCCC biennial reporting guidelines (FCCC/CP/2011/9/Add.1).

The report provides information on greenhouse gas emissions and trends, on Iceland´s quantified economy-wide emission reduction targets, progress in achievements of quantified economy-wide emission reduction target, projection and provision of financial, technological and capacity-building support.

As the Biennial Report is submitted as an Annex to the National Communication and given the complementary between these two documents, where information required by the BR is already reported in the National Communication, cross-references to relevant sections of the National Communication (NC) are provided in the BR.

Tabular information as defined in the common tabular format (CTF) for the UNFCCC biennial reporting guidelines for developed country Parties (UNFCCC decision 19/CP.18) are enclosed in the report and have been officially submitted to the UNFCCC secretariat. The CTF tabulars where submitted through the electronic reporting facility provided by the UNFCCC Secretariat.

2 Information on GHG emission and trends

The total amounts of greenhouse gases emitted in Iceland during the period 1990-2015 are presented in the following tables and figures, expressed in terms of contribution by gas and source. (See Annex III, Greenhouse gas inventorires 1990-2015).

BR3 Table 1 presents emission figures for greenhouse gases by sector in 1990, 2000, 2010, 2014 and 2015 expressed in kt. CO_2-equivalents along with percentage changes for both time periods 1990-2015 and 2014-2015.

BR3- Table 2 presents emission figures for all greenhouse gases by gas in 1990, 2000, 2010, 2014, and 2015 expressed in kt. CO_2-equivalents along with percentage changes for both time periods 1990-2015 and 2014-2015.

BR3 Table 1* Emissions *of GHG by sector in Iceland during the period 1990-2015 (kt. CO_2-eq.)

	1990	2000	2010	2014	2015	Changes ´90-´15	Changes ´14-´15
1 Energy	1,777	2,034	1,859	1,682	1,695	**-4.60%**	**0.80%**
2 Industrial Processes	954	1,004	1,947	1,939	2,021	**111.80%**	**4.23%**
3 Agriculture	647	596	594	623	616	**-4.88%**	**-1.74%**
4 Land Use, Land Use Change and Forestry	10,134	10,140	10,338	10,324	10,288	**1.52%**	**-0.35%**
5 Waste	164	229	247	208	207	**26.50%**	**-0.28%**
Total emissions without LULUCF	**3,541**	**3863**	**4,649**	**4,454**	**4,538**	**28.15%**	**1.88%**
Total emissions with LULUCF	**13,675**	**14,003**	**14,987**	**14,779**	**14,827**	**8.42%**	**0.32%**

BR3- Table 2 Emissions of greenhouse gases by gas in Iceland during the period 1990-2015 (without LULUCF) in kt. CO_2-eq..

	1990	2000	2010	2014	2015	1990	2000	Changes ´90-´15	Changes ´14-´15
CO_2	2,148	2,312	2,757	2,848	3,427	3,285	3,357	**56%**	**2%**
CH_4	522	540	559	563	585	549	552	**6%**	**1%**
N_2O	375	347	352	316	313	335	314	**-16%**	**-6%**
PFCs	495	69	150	31	172	99	104	**-79%**	**5%**
HFCs	0.3	10.2	43.3	69.3	145.8	181.7	207.0	**-**	**14%**
SF_6	1.1	1.2	1.3	2.5	4.7	2.2	1.5	**40%**	**-31%**
Total emissions	**3,541**	**3,281**	**3,863**	**3,830**	**4,647**	**4,452**	**4,536**	**-**	**-**
Total change	-	-	-	-	-	-	-	**28%**	**2%**

See further information on greenhouse gas emission and trends in NC, chapter 3.

3 National Inventory Arrangements

Act No. 70/2012 establishes the national system for the estimation of greenhouse gas emissions by sources and removals by sinks, a national registry, emission permits and establishes the legal basis for installations and aviation operators participating in the EU ETS.

Iceland’s greenhouse gas inventory is addressed in Chapter III, Article 6 of Act No. 70/2012. The Envionment Agency of Iceland (EA) is designated as the responsible authority for the national accounting and the inventory of emissions and removals of greenhouse gases according to Iceland’s international obligations. The Environment Agency compiles Iceland’s greenhouse gas inventory. Main data suppliers are listed and the type of information they are responsible for collecting and reporting to the Environment Agency:

- Soil Conservation Service of Iceland (SCSI)
- Iceland Forest Service (IFS)
- National Energy Authority (NEA)
- Agricultural University of Iceland (AUI)
- Iceland Food and Veterinary Authority
- Statistics Iceland
- The Road Traffic Directorate
- The Icelandic Recycling Fund
- Directorate of Customs

In June 2017, a new regulation No 520/2017 [64] was published, in according to the Act on data collection and information from institutions related to Iceland´s inventory on GHG emissions and removal. The new regulation clarifies institutional, legal and procedural arrangements between different government agencies, and sets deadlines for delivering information. The regulation replaces the role a Coordinating Team had previously, with regards to cooperation between different entities.

[64] Regulation No 520/2017 on data collection and information.

The Environment Agency of Iceland (EA), an agency under the auspices of the Ministry for the Environment and Natural Resources, carries the overall responsibility for the national inventory. EA compiles and maintains the greenhouse gas emission inventory, except for LULUCF which is compiled by the Agricultural University of Iceland (AUI). EA reports to the Convention

The contact person at the Environment Agency of Iceland is:

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Suðurlandsbraut 24
IS-108 Reykjavík
Iceland

See further on the Icelandic National Inventory and process in NC, chapter 3.4.

4 Quantified economy-wide emission reduction targets (QEWER)

Iceland has committed to a quantified economy-wide emission reduction target of 20% below 1990 levels by 2020 to be fullilled jointly with the EU and it´s 28 member states.

See BR-CTF tables 2(a) and 2(b). Further information in NC chapter 4.

4.1 Market based Mechanism

Iceland did not carry over any credits from the first commitment period of the Kyoto Protocol. In its policy Iceland does not expect to set forth any acquiring of carbon credits through market based mechanisms. Iceland will, however, retain an option to use market-based mechanisms to acquire carbon credits during the second commitment period, in line with the rules of relevant EU climate legislation applicable for Iceland.

See BR-CTF tables 2 (e)I 2(e) II and 2(f)

5 Progress in achievement of quantified economy-wide emission reduction targets and relevant information

5.1 A Mitigation actions and their effects

No economic analysis has been made to evaluate the impact of mitigation actions on Iceland‘s emissions in a quantitative manner, compared to business-as-usual. The overall emissions figures are small, and a detailed economic analysis costly when seen in that context. Iceland can point out that it has undertaken a number of comparative actions as many neighbouring countries, including setting up a carbon tax, introducing the EU-ETS in relevant sectors, and reducing taxes and fees on low-carbon fuels and vehicles. These measures should have a positive effect on net emissions, and there are signals in some sectors that this is the case, even if the evidence is not easily quantifiable.

Regarding transport, there are signals that mitigation actions have had an impact on emissions. A significant increase has been in the sale of plug-in hybrid cars and rapid build-up of charging stations, partly driven by government support, plays a part in that trend. It is hoped that the upward trend of sales of plug-in hybrid cars will continue, and that sales in pure electric cars will also go up. There is also a clear sign of increase in bicycling and use of public transport. Again, it is difficult to say if this is primarily due to government actions or other factors, such as increased awareness of a healthy lifestyle. But there has been effort in constructing bicycle paths in the capital area in recent years, and in schemes by workplaces to support climate-friendly transport.

There has also been a marked decrease in emissions from fisheries and fish-meal production, a significant sector in Iceland. This is perhaps primarily due to actions promoted by industry, but clearly supported in some instances by government action, such as by the carbon tax and a fisheries system that encourages minimum fishing effort for maximum gain.

It should be noted that the bulk of the increase in emissions – both in recent years and in projections – is from heavy industry that is regulated within the EU-ETS and needs to buy emissions permits within that system. These emissions are thus firmly regulated and accounted for under the regional climate regulation in the European Economic Area and the joint fulfilment arrangement Iceland has with the European Union and its Member States under the Kyoto Protocol in 2013-2020.

In February 2017, the Economic Institute of the University of Iceland (HHí), publish a study of Iceland´s mitigation potential and options in the report *Iceland and climate issues* (Ísland og loftslagsmál).[65] The study was conducted by assignment of the Ministry for the Environment and Natural Resources

The study sees considerable mitigation potential in Iceland, most notably in the LULUCF and transport sectors. The use of afforestation, revegetation and other actions under LULUCF to meet climate obligations may, however, be limited for Iceland, under EU rules on LULUCF. Transport is also the sector seen in many neighbouring countries as being one of the most difficult to achieve mitigation. (See chapter 5).

Compared to many other developed countries, Iceland can be said to have a limited amount of low-hanging fruit when it comes to cost-efficient climate change mitigation. Energy production, the main sector targeted for mitigation action in many developed countries, is almost entirely based on renewable energy in Iceland. Industrial emissions, the biggest sector, is regulated under the EU-ETS and is believed to have very limited mitigation potential. Emissions per ton of produced aluminium are probably nowhere lower in any country. Emissions from livestock, a significant source, are difficult to control.

Iceland puts an emphasis on reducing emissions from mobile sources, cars and ships, and in carbon sequestration in LULUCF. Mitigation action, however, are also undergoing in all other sectors, including industry and waste. Iceland´s unusual mitigation profile calls for different priorities than in many other developed countries.

In the short run Iceland faces a challenge regarding emissions development, in the effect of strong economic growth, mostly fuelled by a growth in tourism. This will clearly make it a big challenge for Iceland to meet targets for 2020, even if the increase in the EU-ETS sector is not counted in total emissions.

In the longer run Iceland hopes to carry out a similar energy transformation from fossil fuels to renewables regarding mobile sources as has already been carried out in stationary energy production. Iceland also plans to harness its great potential in LULUCF, and gradually reduce emissions in the agriculture, waste and industry sectors. There are clear signals that mitigation actions have had an impact, and it is hoped mitigation actions will help this development.

[65] Mitigation potentials in Iceland – Ísland og loftslagsmál

BR3- Table 3 Policies and measures

Coss-Cutting	Included in with measures GHG projection scenario	Sectors affected	GHGs affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of implementation	Implementing entity or entities
Climate Change Strategy	Yes	Cross-cutting	CH4, CO2, HFCs, N2O,	Cross cutting	Strategy	Implemented	A framework for action and government involvement in climate change issues	2007	Ministry for the Environment and Natural Resourses
Climate Changes implementation plan	Yes	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs, SF6	Cross cutting	Strategy	Implemented	A general frameworkd for policies set by authorieis in fields relation to sustainable development.	2002	Ministry for the Environment and Natural Resouces
National strategy for sustainable development	Yes	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs	Cruss cutting	Action plan	Implemented	Supplementary action plan to the plan from 2010	2015	Ministry for the Environment and Natural Resouces
Special Action Plan	Yes	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs	Cross cutting	Action plan	Implemented	Supplementary action plan to the plan from 2010	2015	Ministry for the Environment and Natural Resouces
Transport and energy	**Included in with measures GHG projection scenario**	**Sectors affected**	**GHGs affected**	**Objective and/or activity affected**	**Type of instrument**	**Status of implementation**	**Brief description**	**Start year of implementation**	**Implementing entity or entities**
Implementation Plan for clean transport	Yes	Transport, Energy	CO2	Sustainable transportation	Action plan	Implemented	Action plan with the aim to increase the use of low-emisson cars	2017	Ministry for the Industry and Innovation , Ministry for Transport
Carbon tax	Yes	Transport, Energy	CO2	Reduce emission from fossil fuels	Fiscal	Implemented	Tax on liquid and gaseous fossil fuels	2010	Ministry of Finance and Econimic Affaris
Excise duty on vehicles based on CO2 emission	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	The excise duty varies from 0%-60% depending on CO2 emissions	2011	Ministry of Finance and Econimic Affaris
Biannual fee on vehicles	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Basic fee with additional fee for higher emission levels or weight depending on weight class	2011	Ministry of Finance and Econimic Affaris
No WAT on zero-emission vehicles with a cap	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Elecric, hydrogen and hybrid vehicles exempted from VAT up to a certain maximum limit.	2012	Ministry of Finance and Econimic Affaris
Reduced excise duty and semiannual car tax on methane vehicles	Yes	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Methane vehicles get a discount from levied excise duty an dpay only minumum semiannual car tax.	2011	Ministry of Finance and Econimic Affaris
Parking benefits for low emission vehicles	Yes	Transport, Energy	CO2	Reduce emissions from transport	Fiscal	Implemented	Vehicles emitting less that 120 gr.	2007	Municipalities
Incresed public transportation and cycling	Yes	Transport, Energy	CO2	Reduce emissions from transport	Fiscal	Implemented	The Icelandic Transport Administration supports public transportation and construction of bike and walking paths.	2012	Ministry of Transport, Municipalities
Implementation Plan for transport	Yes	Transport, Energy	CO2	Sustainable transportation	Policy	Implemented	Action plan on infrastructure for transport	2011	Minstry for Transport
Excemption from excise duty an carbon tax for CO2 neutral fuels	Yes	Transport	CO2	Reduce emission from transport	Fiscal	Implemented	No excise duty and carbon tax on CO2 nautral fuels	2010	Ministry of Finance and Econimic Affaris
Renewables in fuel for transport	Yes	Transport	CO2	Reduce emission from transport	Regulatory	Implemented	Requirement of blending fossil fuels with renewables	2014	Ministry for the Industry and Innovation
National Renewable Energy Action Plan	Yes	Energy	CO2	Reduce emissions from energy productio and use	Action plan	Implemented	Strategic approach and concreate measures on how Iceland will meet mandatory national targets for renewable energy in 2020	2015	Ministry for Industry and Innovation
Waste management	**Included in with measures GHG projection scenario**	**Sectors affected**	**GHGs affected**	**Objective and/or activity affected**	**Type of instrument**	**Status of implementation**	**Brief description**	**Start year of implementation**	**Implementing entity or entities**
National plan on waste management	Yes	Waste management/waste	CO2, CH4, N2O	Waste reduction and more efficient use of natural resources	Implementation plan	Implemented	Strategic approach on waste management	2013	Ministry for the Environment and Natural Resources, Municipalities, Environment Agency
Landfill policy	Yes	Waste management/waste	CH4	Reduce organic waste in landfills	Regulatory	Implemented	The share of organic wast shall not to be more than 35% of total waste in 202 with 1995 as reference year.	2013	Ministry for the Environment and Natural Resouces, Municipalities, Environment Agency
Landfill policy	Yes	Waste management/waste	CH4	Colletion of landfill gas	Regulatory	Implemented	Requierments in Reg. NO 738/2003 collection on landfill gases	2003	Ministry for the Environment and Natural Resources, Municipalities, Envionment Agency
Action against food waste	Yes	Waste management/waste	CH4	Reduce organic waste in landfills	Action plan	Implemented	Actions to prevent food waste. Information campaign, new web page with relevant information, etc.	2016	Environment Agency
EU emission trading scheme	**Included in with measures GHG projection scenario**	**Sectors affected**	**GHGs affected**	**Objective and/or activity affected**	**Type of instrument**	**Status of implementation**	**Brief description**	**Start year of implementation**	**Implementing entity or entities**
EU emission trading scheme	Yes	Industry/industrial processes	CO2, PFCs	Reduce emission from industry	Economic	Implemented	Cap set on emissions from certain installations. The cap is reduced over time. An EEA-wide market with emission permits.	2013	EU Emisson
EU emission trading scheme	Yes	Transport	CO2	Reduce emission from aviation	Economic	Implemented	Trading emission allowances for flights within the EEA-area.	2012	Ministry for the Environment and Natural Resources, Environment Agency
EU emission trading scheme	Yes	Industry/industrial processes	CO2, PFCs	Reduce emission from industry	Economic	Implemented	Cap set on emissions from certain installations. The cap is reduced over time. An EEA-wide market with emission permits.	2013	EU Emisson+A22A25A24:J28A21A21:J28

See further in NC chapter 4, Policies and Measures and BR-CTF Tables 3 and 4.

6 Projection

National arrangements regarding projections of greenhouse gases in Iceland has not been properly in place and no authority has had the formal responsibility for greenhouse gas projection. This has led to the fact that the projection published in the NC 6 and BR2 has not been recalculated.

In order to set the task of greenhouse gas projections in place, the Ministry for the Environment and Natural resources, has formally assigned the Environment Agency the task to calculate greenhouse gas projection. In 2017, the agency was secured additional budget to build up the knowledge and employ additional personnel to take on the task. It is expected that the agency will be able to issue its first projection in 2019 to be published in BR4 in 2020. The projection is to be in accordance with UNFCCC requirements as well as the requirements of the EU decision on monitoring of greenhouse gases (EU Regulation 525/2013).

In February 2017, the Economic Institute of the University of Iceland (HHí), publish a study of Iceland´s mitigation potential and options in the report *Iceland and climate issues* (Ísland og loftslagsmál).[66] The study was conducted by assignment of the Ministry for the Environment and Natural Resources.

The main focus of the study was to identify mitigation potentials and options and evaluate the cost-effectiveness of the different mitigation options. Though not the main object of the study, it also included projection, using the same key variables and assumptions as the fuel projection, published by the National Energy Authority in 2016[67].

Although the projection is not fully in compliance with the UNFCCC projection guidelines, it though gives a broad picture of the status of the GHG profile and what to expect until 2030.

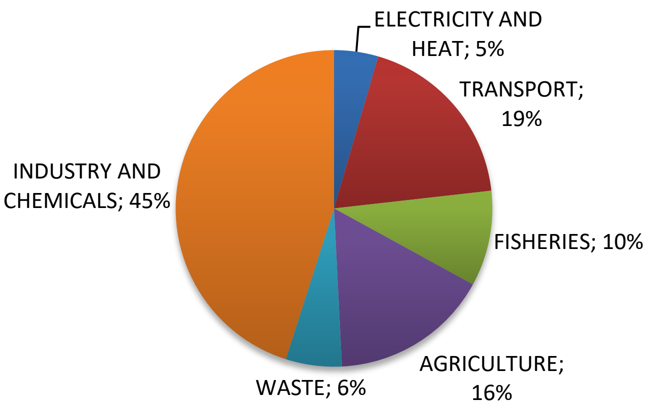
The projection is based on 2014 figures, presented in the Iceland´s National Inventory Report in 2016.

Iceland's individual assigned amount for the second commitment period of the Kyoto Protocol was established at 15 327 217 AAUs.

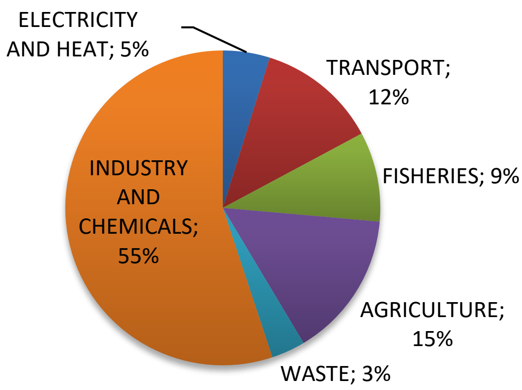
- Average emission per year in Iceland for the period 2010-2015 (with removals) amounted for 2,728 kt. CO2 eq.
- According to the calculations of the Environment Agency it is projected that without additional measures, Iceland will not be able to fulfil its commitments for the second commitment period of the Kyoto Protocol. Emissions above commitments are projected to be approximately 3.600 kt. co2 eq.
- The increase in the tourism sector is not reflected in these figures and therefor the total emission in the second commitment period of the Kyoto protocol therefor possibly underestimated.

BR 3 Figure 1, shows the break down of the green house gas emission in 2014. BR 3 Figure 2 and BR 3 Figure 3 shows projection for greenhouse gas emission in 2030, base case scenario and case 2 scenario (medium case) respectively[68].

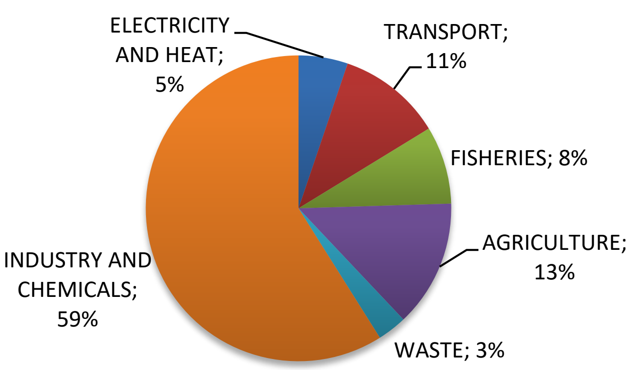
[66] Mitigation potentials in Iceland – Ísland og loftslagsmál
[67] Fuel projection – Eldsneytisspá 2016
[68] In this chapter Scenario 2 is the samce scenario as Medium/Mid case scenario.



BR 3 Figure 1 GHG emission in 2014



BR 3 Figure 2 Projected GHG emission 2030 – Base case



BR 3 Figure 3 Projected GHG emission 2030 – Case 2 (Me dium case.)

See further information on projection in NC, chapter 5.

7 Provision of financial, technological and capacity-building support to developing country Parties

International development cooperation is one of the key pillars of Iceland's foreign policy, with the main goal of contributing to the fight against poverty in the world's poorest countries and guided by the Sustainable Development Goals (SDGs).

For nearly four decades, Iceland's official development cooperation has placed particular focus on the sustainable utilisation of natural resources, including fisheries and renewable energy. This has been grounded on Iceland's experience and expertise in utilizing its own resources for its social, economic and human development. This legacy is maintained in Iceland's Strategy for International Development Cooperation, which identifies three priority areas: sustainable use of natural resources, social infrastructure and peacebuilding, with gender equality and environmental sustainability as special cross-cutting themes.

In line with best practices in development cooperation and OECD-DAC guidelines thereto, all cooperation in bilateral partner countries is based on close cooperation with local communities and their needs and is based on detailed needs assessment. The same preconditions apply to the activities of multilateral partners. However, it is worth noting that Iceland's first OECD-DAC Peer Review (2017) highlighted that Iceland could make further efforts to improve the impact of environmental mainstreaming activities across its program and steps are being taken to address this shortcoming. This includes harmonization of climate change, business and development cooperation strategies within Iceland's Ministry for Foreign Affairs in accordance with the Kyoto Protocol.

In 2016, Iceland integrated its bilateral development agency, ICEIDA, within the Ministry for Foreign Affairs (MFA) – meaning almost all of Iceland's bilateral and multilateral development co-operation activities are now managed within the ministry.

BR3- Table 4 Summary information on financial resources (million ISK)

Official Development Assistance (ODA)	2013	2014	2015	2016
Entire ODA (excluding in-country cost)	4.302	4.102	4.634	5.204
DAC sector-allocable ODA (bilateral)	2876	2675	2914	3302
Climate-related aid in bilateral ODA	1.253	1.271	1.347	1.302

Out of the 1302 million ISK allocated to climate-specific projects in 2016, 53,7% were allocated to projects with adaptation objectives only, 35,4% for mitigation objectives only and 10,9% for projects with both mitigation and adaptation to climate change as a significant or primary objective.

BR3- Table 5 Summary information climate-specific projects (ISK)

Mitigation projects	2013	2014	2015	2016
Geothermal Exploration Project East Africa	196.321.694	191.092.258	123.772.356	155.460.440
UNU Geothermal Training Programme	249.800.000	213.735.636	214.920.000	214.200.000
ESMAP	40.141.414	71.775.400	38.977.500	68.984.516
SEforALL	17.457.300	13.067.400	12.976.500	22.694.100
Ukraine geothermal project		8.500.000	6.000.000	265.372
Nicaragua geothermal project	10.049.645			
IRENA	11.638.700		13.150.400	
TOTAL	**525.408.753**	**498.170.694**	**409.796.756**	**461.604.428**

Adaptation projects	2013	2014	2015	2016
UNU Fisheries Training Programme	211.700.000	190.100.000	187.300.000	206.700.000
WASH Mangochi Malawi	86.008.588	97.669.399	116.826.111	94.667.920
WASH Zambezi Mozambique		78.549.872	241.986.122	213.067.419
Support to fishing industry Mozambique	222.989.720	202.308.122	180.558.799	144.692.734
Community resilience project Malawi			20.000.000	20.000.000
Jijiga WASH project Ethiopia	23.800.000	48.551.772	54.206.875	20.000.000
Uganda WASH	23.800.000	6.216.000		
TOTAL	**246.789.720**	**623.395.165**	**800.877.907**	**699.128.073**

Cross-cutting projects	2013	2014	2015	2016
UNU Land Restoration Training Programme	85.100.000	87.500.000	79.400.000	88.100.000
UNU Gender Equality Studies & Traing Prog.	50.000.000	55.800.000	54.280.000	53.700.000
The Women's Delegate Fund	5.869.100	6.534.450		
Rio+20 gender & climate	17.347.950			
Gender and climate change Uganda			3.200.000	
TOTAL	**158.317.050**	**149.834.450**	**136.880.000**	**141.800.000**

See further information in NC, chapter 7 on Financial assistance and transfer of technology and BR-CTF tables 7 - 9

Annex II BR-CTF Tables

Table 1 ISL_BR3_v0.1

Emission trends: summary [(1)]
(Sheet 1 of 3)

GREENHOUSE GAS EMISSIONS	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997
	kt CO_2 eq								
CO_2 emissions without net CO_2 from LULUCF	2,148.34	2,148.34	2,077.73	2,203.87	2,331.38	2,275.46	2,312.33	2,402.20	2,489.47
CO_2 emissions with net CO_2 from LULUCF	9,852.69	9,852.69	9,783.03	9,898.46	10,015.64	9,958.21	9,971.07	10,061.78	10,154.56
CH_4 emissions without CH_4 from LULUCF	521.64	521.64	516.53	523.19	533.16	543.93	540.28	549.16	549.14
CH_4 emissions with CH_4 from LULUCF	2,883.91	2,883.91	2,880.53	2,885.38	2,894.57	2,904.48	2,898.36	2,907.18	2,903.51
N_2O emissions without N_2O from LULUCF	376.69	376.69	364.17	342.80	352.49	356.24	350.83	366.70	363.54
N_2O emissions with N_2O from LULUCF	443.72	443.72	431.69	410.88	420.79	424.76	419.84	436.00	433.34
HFCs	0.34	0.34	0.70	0.70	1.45	2.33	10.22	18.59	28.77
PFCs	494.64	494.64	410.61	183.04	88.24	52.53	69.36	29.64	97.08
Unspecified mix of HFCs and PFCs	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
SF_6	1.10	1.10	1.24	1.24	1.24	1.24	1.24	1.24	1.24
NF3	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
Total (without LULUCF)	3,542.75	3,542.75	3,370.98	3,254.85	3,307.97	3,231.74	3,284.28	3,367.54	3,529.25
Total (with LULUCF)	13,676.40	13,676.40	13,507.79	13,379.70	13,421.94	13,343.56	13,370.10	13,454.45	13,618.50
Total (without LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997
	kt CO_2 eq								
1. Energy	1,777.06	1,777.06	1,740.88	1,864.33	1,947.69	1,891.10	1,918.53	2,010.08	2,045.56
2. Industrial processes and product use	954.20	954.20	834.05	604.27	561.29	527.39	567.39	542.52	671.40
3. Agriculture	646.47	646.47	625.15	603.98	608.53	614.21	590.49	604.10	597.81
4. Land Use, Land-Use Change and Forestry[b]	10,133.65	10,133.65	10,136.81	10,124.85	10,113.97	10,111.82	10,085.83	10,086.91	10,089.25
5. Waste	165.01	165.01	170.90	182.27	190.47	199.03	207.86	210.84	214.48
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (including LULUCF)	13,676.40	13,676.40	13,507.79	13,379.70	13,421.94	13,343.56	13,370.10	13,454.45	13,618.50

Note: All footnotes for this table are given on sheet 3.

[1] The common tabular format will be revised, in accordance with relevant decisions of the Conference of the Parties and, where applicable, with decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol."

Table 1 ISL_BR3_v0.1

Emission trends: summary (1)
(Sheet 2 of 3)

GREENHOUSE GAS EMISSIONS	*1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007
CO_2 emissions without net CO_2 from LULUCF	2,498.18	2,704.42	2,757.46	2,762.86	2,854.79	2,846.73	2,917.80	2,851.86	3,029.12	3,293.48
CO_2 emissions with net CO_2 from LULUCF	10,176.89	10,402.47	10,490.79	10,518.14	10,645.19	10,645.69	10,720.00	10,670.45	10,918.15	11,253.18
CH_4 emissions without CH_4 from LULUCF	560.97	565.96	559.49	569.77	567.59	564.83	566.73	562.68	589.98	591.45
CH_4 emissions with CH_4 from LULUCF	2,909.83	2,909.02	2,893.05	2,898.08	2,887.94	2,880.31	2,877.58	2,866.38	2,886.93	2,872.06
N_2O emissions without N_2O from LULUCF	363.48	378.12	355.79	349.22	322.08	315.95	314.84	319.30	334.37	346.88
N_2O emissions with N_2O from LULUCF	434.00	449.24	428.27	422.23	395.94	390.43	389.82	395.06	416.66	424.65
HFCs	43.22	48.85	43.28	48.69	45.74	56.79	59.52	69.26	69.55	73.33
PFCs	212.33	204.17	149.89	108.05	85.51	70.47	45.48	30.76	392.79	331.39
Unspecified mix of HFCs and PFCs	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
SF_6	1.24	1.24	1.31	1.31	1.31	1.31	1.31	2.52	2.52	2.86
NF3	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
Total (without LULUCF)	3,679.42	3,902.77	3,867.22	3,839.90	3,877.02	3,856.08	3,905.69	3,836.38	4,418.32	4,639.38
Total (with LULUCF)	13,777.51	14,015.00	14,006.60	13,996.50	14,061.63	14,044.99	14,093.72	14,034.43	14,686.60	14,957.46
Total (without LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007
1. Energy	2,028.21	2,094.29	2,037.52	1,999.81	2,074.14	2,062.57	2,111.66	2,066.24	2,133.63	2,197.64
2. Industrial processes and product use	823.64	970.85	1,003.78	1,007.12	983.14	980.14	981.11	960.15	1,431.16	1,572.51
3. Agriculture	608.40	613.26	596.05	596.10	578.50	570.89	560.86	565.61	589.02	606.50
4. Land Use, Land-Use Change and Forestry[b]	10,098.09	10,112.23	10,139.38	10,156.59	10,184.61	10,188.91	10,188.03	10,198.05	10,268.28	10,318.09
5. Waste	219.18	224.37	229.87	236.87	241.24	242.47	252.06	244.38	264.51	262.73
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (including LULUCF)	13,777.51	14,015.00	14,006.60	13,996.50	14,061.63	14,044.99	14,093.72	14,034.43	14,686.60	14,957.46

Note: All footnotes for this table are given on sheet 3.

Table 1 ISL_BR3_v0.1

Emission trends: summary [(1)]
(Sheet 3 of 3)

GREENHOUSE GAS EMISSIONS	*2008*	2009	2010	2011	2012	2013	2014	2015	Change from base to latest reported year
									(%)
CO_2 emissions without net CO_2 from LULUCF	3,608.32	3,566.24	3,429.35	3,329.57	3,322.87	3,334.54	3,288.98	3,360.65	56.43
CO_2 emissions with net CO_2 from LULUCF	11,627.84	11,606.88	11,425.76	11,314.17	11,323.01	11,340.48	11,288.53	11,314.16	14.83
CH_4 emissions without CH_4 from LULUCF	586.45	585.44	585.08	567.49	545.11	547.27	548.64	552.26	5.87
CH_4 emissions with CH_4 from LULUCF	2,856.33	2,846.61	2,845.09	2,823.10	2,795.20	2,792.38	2,790.00	2,791.18	-3.22
N_2O emissions without N_2O from LULUCF	351.28	325.96	314.15	290.85	314.06	308.33	334.52	313.85	-16.68
N_2O emissions with N_2O from LULUCF	430.03	405.40	393.86	370.94	394.66	389.39	415.95	395.73	-10.82
HFCs	83.75	113.06	145.78	144.50	171.73	179.91	181.70	206.98	59,899.28
PFCs	411.38	180.05	171.67	74.52	94.00	88.16	99.03	103.70	-79.03
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	0.00
SF_6	3.01	3.02	4.66	3.05	5.32	3.20	2.22	1.53	39.54
NF3	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total (without LULUCF)	5,044.18	4,773.78	4,650.69	4,409.97	4,453.09	4,461.41	4,455.09	4,538.98	28.12
Total (with LULUCF)	15,412.34	15,155.03	14,986.81	14,730.27	14,783.93	14,793.52	14,777.43	14,813.28	8.31
Total (without LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Total (with LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	0.00

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*2008*	2009	2010	2011	2012	2013	2014	2015	Change from base to latest reported year
									(%)
1. Energy	2,067.52	2,009.09	1,860.35	1,760.21	1,707.08	1,692.68	1,682.45	1,695.23	-4.60
2. Industrial processes and product use	2,104.28	1,913.47	1,947.05	1,841.54	1,933.50	1,959.36	1,939.02	2,020.97	111.80
3. Agriculture	619.33	604.66	596.92	577.40	600.78	587.85	626.24	615.77	-4.75
4. Land Use, Land-Use Change and Forestry[b]	10,368.15	10,381.24	10,336.12	10,320.30	10,330.83	10,332.10	10,322.33	10,274.30	1.39
5. Waste	253.05	246.56	246.36	230.81	211.73	221.52	207.38	207.00	25.44
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total (including LULUCF)	15,412.34	15,155.03	14,986.81	14,730.27	14,783.93	14,793.52	14,777.43	14,813.28	8.31

Notes:

(1) Further detailed information could be found in the common reporting format tables of the Party's greenhouse gas inventory, namely "Emission trends (CO_2)", "Emission trends (CH_4)", "Emission trends (N_2O)" and "Emission trends (HFCs, PFCs and SF_6)", which is included in an annex to this biennial report.

(2) 2011 is the latest reported inventory year.

(3) 1 kt CO_2 eq equals 1 Gg CO_2 eq.

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] 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 Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[b] Includes net CO_2, CH_4 and N_2O from LULUCF.

Custom Footnotes

Table 1 (a) ISL_BR3_v0.1

Emission trends (CO_2)

(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year [a]	1990	1991	1992	1993	1994	1995	1996	1997
	kt								
1. Energy	1,735.96	1,735.96	1,699.88	1,823.10	1,902.67	1,846.13	1,866.31	1,957.46	1,985.80
A. Fuel combustion (sectoral approach)	1,674.60	1,674.60	1,629.93	1,755.49	1,817.30	1,776.01	1,784.08	1,876.20	1,921.95
1. Energy industries	13.79	13.79	15.39	13.83	17.22	16.90	21.85	15.35	11.86
2. Manufacturing industries and construction	242.82	242.82	171.89	235.48	254.25	230.15	218.31	265.17	303.23
3. Transport	599.53	599.53	610.86	621.00	621.60	624.17	599.90	590.24	601.93
4. Other sectors	818.46	818.46	831.79	885.18	924.23	904.79	944.02	1,005.44	1,004.93
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
B. Fugitive emissions from fuels	61.36	61.36	69.95	67.61	85.37	70.12	82.23	81.26	63.85
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
2. Oil and natural gas and other emissions from energy production	61.36	61.36	69.95	67.61	85.37	70.12	82.23	81.26	63.85
C. CO2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Industrial processes	405.03	405.03	370.56	373.67	422.65	423.75	441.09	440.31	499.40
A. Mineral industry	52.28	52.28	48.65	45.69	39.68	37.37	37.87	41.78	46.55
B. Chemical industry	0.36	0.36	0.31	0.25	0.24	0.35	0.46	0.40	0.44
C. Metal industry	348.01	348.01	317.42	323.55	378.27	381.64	397.93	393.47	448.00
D. Non-energy products from fuels and solvent use	4.37	4.37	4.17	4.17	4.45	4.38	4.83	4.64	4.41
E. Electronic industry									
F. Product uses as ODS substitutes									
G. Other product manufacture and use	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.06
A. Enteric fermentation									
B. Manure management									
C. Rice cultivation									
D. Agricultural soils									
E. Prescribed burning of savannas									
F. Field burning of agricultural residues									
G. Liming	NE	NE	NE	NE	NE	NE	NE	NE	NE
H. Urea application	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.06
I. Other carbon-containing fertilizers	NE	NE	NE	NE	NE	NE	NE	NE	NE
J. Other									
4. Land Use, Land-Use Change and Forestry	7,704.35	7,704.35	7,705.29	7,694.59	7,684.26	7,682.74	7,658.74	7,659.58	7,665.09
A. Forest land	-42.21	-42.21	-43.76	-48.20	-53.36	-56.14	-65.76	-69.95	-76.69
B. Cropland	1,919.45	1,919.45	1,910.44	1,900.69	1,890.88	1,881.04	1,871.22	1,861.43	1,851.56
C. Grassland	6,486.49	6,486.49	6,490.76	6,493.43	6,497.66	6,500.71	6,509.48	6,517.18	6,535.93
D. Wetlands	-672.57	-672.57	-665.33	-664.52	-664.11	-663.67	-662.41	-659.90	-657.90
E. Settlements	13.19	13.19	13.19	13.19	13.19	20.81	6.22	10.71	12.08
F. Other land	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE
G. Harvested wood products	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	0.11	0.11
H. Other	IE	IE	IE	IE	IE	IE	IE	IE	IE
5. Waste	7.30	7.30	7.24	7.04	6.00	5.53	4.87	4.37	4.21
A. Solid waste disposal	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
B. Biological treatment of solid waste									
C. Incineration and open burning of waste	7.30	7.30	7.24	7.04	6.00	5.53	4.87	4.37	4.21
D. Waste water treatment and discharge									
E. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO
International bunkers	315.49	315.49	256.92	260.91	290.17	304.15	376.61	391.67	436.71
Aviation	217.24	217.24	219.55	201.39	193.49	211.28	233.56	268.53	288.91
Navigation	98.25	98.25	37.37	59.52	96.68	92.87	143.05	123.14	147.80
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO2 emissions from biomass	NO, NA	NO, NA	NO, NA	NO, NA	0.31	0.31	0.31	0.31	0.31
CO2 captured	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Long-term storage of C in waste disposal sites	NO	NO	NO	NO	NO	NO	NO	NO	NO
Indirect N2O									
Indirect CO2 (3)	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE
Total CO2 equivalent emissions with land use, land-use change and forestry	9,852.69	9,852.69	9,783.03	9,898.46	10,015.64	9,958.21	9,971.07	10,061.78	10,154.56
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	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 6.									

Note: All footnotes for this table are given on sheet 3.

Table 1 (a) ISL_BR3_v0.1

Emission trends (CO_2)

(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007
1. Energy	1,967.50	2,025.32	1,968.90	1,931.98	2,006.83	1,995.82	2,040.10	1,990.68	2,059.05	2,121.34
A. Fuel combustion (sectoral approach)	1,883.80	1,914.05	1,815.76	1,788.21	1,859.27	1,859.31	1,917.20	1,872.52	1,922.41	1,973.97
1. Energy industries	14.83	11.91	10.90	10.21	12.18	11.44	11.17	13.89	16.09	33.27
2. Manufacturing industries and construction	278.49	288.48	236.66	286.64	301.69	263.38	263.65	208.07	214.03	194.64
3. Transport	604.72	626.24	628.98	639.70	643.32	737.96	789.78	795.18	938.40	974.14
4. Other sectors	985.76	987.41	939.22	851.66	902.07	846.52	852.59	855.38	753.90	771.92
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
B. Fugitive emissions from fuels	83.70	111.27	153.14	143.77	147.56	136.51	122.90	118.16	136.64	147.37
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
2. Oil and natural gas and other emissions from energy production	83.70	111.27	153.14	143.77	147.56	136.51	122.90	118.16	136.64	147.37
C. CO2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Industrial processes	527.03	676.11	785.74	828.22	845.48	846.42	869.93	852.92	961.66	1,159.35
A. Mineral industry	54.39	61.43	65.48	58.69	39.34	33.00	50.84	55.01	62.20	64.36
B. Chemical industry	0.40	0.43	0.41	0.49	0.45	0.48	0.39	NO	NO	NO
C. Metal industry	467.90	610.13	715.56	765.37	801.83	809.34	814.54	793.98	895.02	1,091.13
D. Non-energy products from fuels and solvent use	4.34	4.10	4.29	3.66	3.85	3.58	4.14	3.92	4.41	3.80
E. Electronic industry										
F. Product uses as ODS substitutes										
G. Other product manufacture and use	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.05
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	0.08	0.07	0.07	0.08	0.08	2.45	2.60	3.53	3.61	4.93
A. Enteric fermentation										
B. Manure management										
C. Rice cultivation										
D. Agricultural soils										
E. Prescribed burning of savannas										
F. Field burning of agricultural residues										
G. Liming	NE	NE	NE	NE	NE	2.36	2.52	3.46	3.54	4.80
H. Urea application	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.08	0.13
I. Other carbon-containing fertilizers	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
J. Other										
4. Land Use, Land-Use Change and Forestry	7,678.71	7,698.05	7,733.33	7,755.28	7,790.40	7,798.95	7,802.20	7,818.59	7,889.03	7,959.69
A. Forest land	-85.00	-91.35	-101.06	-106.86	-115.96	-127.04	-133.24	-152.74	-158.86	-166.52
B. Cropland	1,841.71	1,831.74	1,821.81	1,811.76	1,801.68	1,791.59	1,781.56	1,771.40	1,761.18	1,750.91
C. Grassland	6,563.79	6,596.04	6,644.16	6,679.19	6,729.32	6,752.72	6,772.54	6,810.05	6,881.81	6,958.77
D. Wetlands	-654.75	-651.57	-646.60	-643.54	-639.21	-636.60	-634.05	-630.17	-623.64	-616.59
E. Settlements	12.85	13.07	14.91	14.63	14.46	18.17	15.28	19.95	28.45	33.02
F. Other land	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NO, NA, NE
G. Harvested wood products	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10
H. Other	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
5. Waste	3.57	2.92	2.74	2.58	2.40	2.05	5.17	4.73	4.79	7.86
A. Solid waste disposal	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
B. Biological treatment of solid waste										
C. Incineration and open burning of waste	3.57	2.92	2.74	2.58	2.40	2.05	5.17	4.73	4.79	7.86
D. Waste water treatment and discharge										
E. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
International bunkers	510.00	522.10	620.47	493.27	512.30	472.14	570.73	527.40	630.95	712.06
Aviation	334.42	359.38	403.26	345.29	306.45	329.34	375.83	417.02	494.41	505.92
Navigation	175.58	162.72	217.21	147.98	205.85	142.80	194.90	110.38	136.54	206.14
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO2 emissions from biomass	0.31	0.40	0.40	0.40	0.40	0.59	0.52	0.39	0.40	0.54
CO2 captured	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Long-term storage of C in waste disposal sites	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Indirect N2O										
Indirect CO2 (3)	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE
Total CO2 equivalent emissions with land use, land-use change and forestry	10,176.89	10,402.47	10,490.79	10,518.14	10,645.19	10,645.69	10,720.00	10,670.45	10,918.15	11,253.18
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	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 6.										

Note: All footnotes for this table are given on sheet 3.

Table 1(a) ISL_BR3_v0.1
Emission trends (CO_2)
(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*2008*	2009	2010	2011	2012	2013	2014	2015	Change from base to latest reported year
									%
1. Energy	1,995.22	1,943.04	1,800.71	1,705.87	1,654.76	1,641.72	1,626.85	1,643.37	-5.33
A. Fuel combustion (sectoral approach)	1,810.24	1,774.59	1,611.11	1,527.08	1,484.58	1,469.26	1,444.79	1,482.89	-11.45
1. Energy industries	15.01	12.62	11.73	10.61	10.47	3.63	2.52	3.63	-73.66
2. Manufacturing industries and construction	160.54	120.13	99.49	96.38	82.64	72.56	33.73	68.21	-71.91
3. Transport	919.83	893.25	849.84	815.23	806.60	822.20	824.70	855.85	42.75
4. Other sectors	714.87	748.59	650.05	604.86	584.87	570.87	583.84	555.20	-32.17
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA			
B. Fugitive emissions from fuels	184.97	168.45	189.60	178.78	170.18	172.46	182.06	160.48	161.53
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NO	0.00
2. Oil and natural gas and other emissions from energy production	184.97	168.45	189.60	178.78	170.18	172.46	182.06	160.48	161.53
C. CO2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	0.00
2. Industrial processes	1,601.30	1,612.97	1,620.32	1,614.77	1,657.57	1,683.60	1,651.94	1,704.47	320.83
A. Mineral industry	61.84	28.70	10.42	20.16	0.53	0.58	0.57	0.75	-98.57
B. Chemical industry	NO	NO	NO	NO	NO, IE	NO, IE	NO, IE	NO, IE	
C. Metal industry	1,536.09	1,582.10	1,607.25	1,591.77	1,654.33	1,680.35	1,648.76	1,700.82	388.73
D. Non-energy products from fuels and solvent use	3.36	2.14	2.63	2.82	2.68	2.65	2.58	2.88	-34.09
E. Electronic industry									
F. Product uses as ODS substitutes									
G. Other product manufacture and use	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	327.96
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	5.67	4.17	2.41	2.37	4.20	3.82	3.96	4.19	7,518.02
A. Enteric fermentation									
B. Manure management									
C. Rice cultivation									
D. Agricultural soils									
E. Prescribed burning of savannas									
F. Field burning of agricultural residues									
G. Liming	5.52	4.02	2.28	2.22	4.03	3.61	3.61	3.61	100.00
H. Urea application	0.15	0.16	0.13	0.15	0.17	0.21	0.35	0.58	947.27
I. Other carbon-containing fertilizers	NE	NE	NE	NE	NE	NE	NE	NE	0.00
J. Other									
4. Land Use, Land-Use Change and Forestry	8,019.52	8,040.64	7,996.40	7,984.60	8,000.14	8,005.94	7,999.55	7,953.51	3.23
A. Forest land	-170.74	-184.84	-207.96	-235.45	-246.21	-265.51	-289.98	-339.78	705.05
B. Cropland	1,740.59	1,730.21	1,719.81	1,709.40	1,698.99	1,688.57	1,678.14	1,667.71	-13.12
C. Grassland	7,028.17	7,084.72	7,083.94	7,108.36	7,142.00	7,174.76	7,200.71	7,213.31	11.21
D. Wetlands	-610.59	-605.61	-605.01	-602.53	-599.49	-596.69	-594.21	-592.77	-11.87
E. Settlements	31.97	16.05	5.50	4.68	4.70	4.64	4.70	4.82	-63.47
F. Other land	NA, NE	NA, NE	NO, NA, NE	NO, NA, NE	NA, NE	NA, NE	NA, NE	NE, NA	0.00
G. Harvested wood products	0.11	0.11	0.12	0.13	0.15	0.17	0.19	0.22	100.00
H. Other	IE	IE	IE	IE	IE	IE	IE	IE	0.00
5. Waste	6.13	6.06	5.91	6.55	6.35	5.39	6.24	8.62	18.11
A. Solid waste disposal	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
B. Biological treatment of solid waste									
C. Incineration and open burning of waste	6.13	6.06	5.91	6.55	6.35	5.39	6.24	8.62	18.11
D. Waste water treatment and discharge									
E. Other	NA	NA	NA	NA	NA	NA	NA		
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	0.00
International bunkers	651.24	494.79	555.19	615.73	619.05	702.66	782.74	974.34	208.83
Aviation	423.13	330.21	373.12	417.30	437.30	493.58	553.99	667.26	207.15
Navigation	228.11	164.58	182.07	198.43	181.75	209.08	228.75	307.08	212.55
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CO2 emissions from biomass	0.28	0.21	0.22	0.15	0.11	NO, NA	NA, NO	NA, NO	0.00
CO2 captured	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00
Long-term storage of C in waste disposal sites	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Indirect N2O									
Indirect CO2 (3)	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	0.00
Total CO2 equivalent emissions with land use, land-use change and forestry	11,627.84	11,606.88	11,425.76	11,314.17	11,323.01	11,340.48	11,288.53	11,314.16	14.83
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Note: All footnotes for this table are given at the end of the table on sheet 6.									

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] 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 Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[b] Fill in net emissions/removals as reported in CRF table Summary 1.A of the latest reported inventory year. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

Custom Footnotes

Table 1(b) ISL_BR3_v0.1

Emission trends (CH_4)

(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year [a]	1990	1991	1992	1993	1994	1995	1996	1997
	kt								
1. Energy	0.26	0.26	0.26	0.28	0.28	0.28	0.26	0.26	0.25
A. Fuel combustion (sectoral approach)	0.23	0.23	0.24	0.25	0.25	0.25	0.22	0.23	0.21
1. Energy industries	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	0.00	0.01	0.01	0.01	0.01	0.01	0.01
3. Transport	0.15	0.15	0.16	0.16	0.16	0.16	0.13	0.14	0.11
4. Other sectors	0.07	0.07	0.08	0.08	0.09	0.08	0.08	0.09	0.09
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
B. Fugitive emissions from fuels	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
2. Oil and natural gas and other emissions from energy production	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04
C. CO2 transport and storage									
2. Industrial processes	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
A. Mineral industry									
B. Chemical industry	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
C. Metal industry	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03
D. Non-energy products from fuels and solvent use	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA
E. Electronic industry									
F. Product uses as ODS substitutes									
G. Other product manufacture and use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	14.57	14.57	14.13	13.92	13.93	14.00	13.49	13.70	13.56
A. Enteric fermentation	12.55	12.55	12.15	11.99	11.99	12.07	11.59	11.76	11.67
B. Manure management	2.02	2.02	1.98	1.93	1.94	1.93	1.90	1.94	1.89
C. Rice cultivation	NO	NO	NO	NO, NA	NO	NO, NA	NO	NO	NO, NA
D. Agricultural soils	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO
E. Prescribed burning of savannas									
F. Field burning of agricultural residues	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
G. Liming									
H. Urea application									
I. Other carbon-containing fertilizers									
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Land use, land-use change and forestry	94.49	94.49	94.56	94.49	94.46	94.42	94.32	94.32	94.17
A. Forest land	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
B. Cropland	3.79	3.79	3.77	3.75	3.73	3.71	3.69	3.67	3.65
C. Grassland	19.12	19.12	19.15	19.18	19.21	19.24	19.30	19.34	19.42
D. Wetlands	71.58	71.58	71.63	71.55	71.51	71.46	71.33	71.30	71.09
E. Settlements	NE	NE	NE	NE	NE	NE	NE	NE	NE
F. Other land	NE	NE	NE	NE	NE	NE	NE	NE	NE
G. Harvested wood products									
H. Other	IE	IE	IE	IE	IE	IE	IE	IE	IE
5. Waste	6.00	6.00	6.24	6.71	7.08	7.45	7.83	7.97	8.12
A. Solid waste disposal	5.68	5.68	5.87	6.34	6.75	7.13	7.52	7.68	7.84
B. Biological treatment of solid waste	NA	NA	NA	NA	NA	NA	0.01	0.01	0.01
C. Incineration and open burning of waste	0.24	0.24	0.24	0.24	0.20	0.19	0.17	0.15	0.15
D. Waste water treatment and discharge	0.08	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total CH4 emissions with CH4 from LULUCF	115.36	115.36	115.22	115.42	115.78	116.18	115.93	116.29	116.14
Memo items:									
Aviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navigation	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO2 emissions from biomass									
CO2 captured									
Long-term storage of C in waste disposal sites									
Indirect N2O									
Indirect CO2 (3)									

Note: All footnotes for this table are given on sheet 3.

Table 1(b) ISL_BR3_v0.1

Emission trends (CH_4)

(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1. Energy	0.26	0.25	0.25	0.25	0.26	0.25	0.26	0.25	0.30	0.34
A. Fuel combustion (sectoral approach)	0.21	0.18	0.17	0.16	0.17	0.17	0.17	0.15	0.16	0.16
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	0.01	0.01	0.01
3. Transport	0.11	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.08	0.09
4. Other sectors	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
B. Fugitive emissions from fuels	0.05	0.07	0.08	0.09	0.09	0.08	0.09	0.10	0.14	0.18
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
2. Oil and natural gas and other emissions from energy production	0.05	0.07	0.08	0.09	0.09	0.08	0.09	0.10	0.14	0.18
C. CO2 transport and storage										
2. Industrial processes	0.02	0.03	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05
A. Mineral industry										
B. Chemical industry	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO	NO	NO
C. Metal industry	0.02	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05
D. Non-energy products from fuels and solvent use	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA
E. Electronic industry										
F. Product uses as ODS substitutes										
G. Other product manufacture and use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	13.81	13.77	13.27	13.39	13.11	12.95	12.75	12.88	13.14	13.35
A. Enteric fermentation	11.86	11.85	11.38	11.45	11.24	11.12	10.96	11.03	11.21	11.37
B. Manure management	1.95	1.92	1.89	1.94	1.87	1.83	1.79	1.85	1.93	1.98
C. Rice cultivation	NO	NO, NA	NO, NA	NO	NO	NO	NO	NO	NO	NO
D. Agricultural soils	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO
E. Prescribed burning of savannas										
F. Field burning of agricultural residues	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
G. Liming										
H. Urea application										
I. Other carbon-containing fertilizers										
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Land use, land-use change and forestry	93.95	93.72	93.34	93.13	92.81	92.62	92.43	92.15	91.88	91.22
A. Forest land	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
B. Cropland	3.63	3.61	3.59	3.57	3.55	3.53	3.51	3.49	3.47	3.44
C. Grassland	19.54	19.66	19.83	19.94	20.10	20.20	20.31	20.45	20.85	20.94
D. Wetlands	70.78	70.44	69.91	69.60	69.14	68.87	68.60	68.19	67.54	66.82
E. Settlements	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
F. Other land	NE	NE	NE	NE	NE	NE	NE	NE	0.00	NO
G. Harvested wood products										
H. Other	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
5. Waste	8.34	8.58	8.81	9.10	9.28	9.35	9.61	9.32	10.11	9.91
A. Solid waste disposal	8.08	8.33	8.56	8.86	8.93	9.00	9.29	9.01	9.79	9.63
B. Biological treatment of solid waste	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.04
C. Incineration and open burning of waste	0.13	0.11	0.10	0.09	0.09	0.07	0.05	0.02	0.02	0.02
D. Waste water treatment and discharge	0.13	0.14	0.14	0.14	0.26	0.26	0.26	0.27	0.27	0.22
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total CH4 emissions with CH4 from LULUCF	116.39	116.36	115.72	115.92	115.52	115.21	115.10	114.66	115.48	114.88
Memo items:										
Aviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navigation	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.02
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO2 emissions from biomass										
CO2 captured										
Long-term storage of C in waste disposal sites										
Indirect N2O										
Indirect CO2 (3)										

Note: All footnotes for this table are given on sheet 3.

Table 1(b) ISL_BR3_v0.1

Emission trends (CH_4)

(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*2008*	2009	2010	2011	2012	2013	2014	2015	Change from base to latest reported year
									%
1. Energy	0.35	0.38	0.34	0.29	0.26	0.29	0.30	0.31	18.85
A. Fuel combustion (sectoral approach)	0.15	0.15	0.14	0.13	0.13	0.13	0.12	0.13	-45.79
1. Energy industries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-47.30
2. Manufacturing industries and construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-62.65
3. Transport	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.07	-50.52
4. Other sectors	0.06	0.07	0.06	0.05	0.05	0.05	0.05	0.05	-34.65
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA			
B. Fugitive emissions from fuels	0.20	0.23	0.20	0.16	0.13	0.16	0.18	0.18	525.10
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NO	0.00
2. Oil and natural gas and other emissions from energy production	0.20	0.23	0.20	0.16	0.13	0.16	0.18	0.18	525.10
C. CO2 transport and storage									
2. Industrial processes	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	83.95
A. Mineral industry									
B. Chemical industry	NO	NO	NO	NO	NO, IE	NO, IE	NO, IE	NO, IE	0.00
C. Metal industry	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	91.56
D. Non-energy products from fuels and solvent use	NE, NA	NE, NA	NE, NA	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	0.00
E. Electronic industry									
F. Product uses as ODS substitutes									
G. Other product manufacture and use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-27.63
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	13.47	13.66	13.70	13.69	13.57	13.21	13.87	14.12	-3.12
A. Enteric fermentation	11.48	11.65	11.72	11.69	11.61	11.35	11.88	12.04	-4.10
B. Manure management	1.99	2.01	1.98	2.00	1.96	1.86	1.99	2.08	2.98
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Agricultural soils	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NA, NE, NO	NA, NE, NO	0.00
E. Prescribed burning of savannas									
F. Field burning of agricultural residues	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	0.00
G. Liming									
H. Urea application									
I. Other carbon-containing fertilizers									
J. Other	NA	NA	NA	NA	NA	NA	NO	NO	0.00
4. Land use, land-use change and forestry	90.80	90.45	90.40	90.22	90.00	89.80	89.65	89.56	-5.22
A. Forest land	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	555.70
B. Cropland	3.42	3.40	3.38	3.36	3.34	3.32	3.30	3.28	-13.53
C. Grassland	21.16	21.34	21.38	21.49	21.61	21.73	21.82	21.90	14.56
D. Wetlands	66.18	65.67	65.61	65.35	65.03	64.73	64.50	64.35	-10.10
E. Settlements	NE	NE	NE	NE	NE	NE	NE	NE	0.00
F. Other land	0.00	0.00	NO	NO	0.00	NA	NA	0.00	100.00
G. Harvested wood products									
H. Other	IE	IE	IE	IE	IE	IE	IE	IE	0.00
5. Waste	9.59	9.33	9.31	8.67	7.93	8.34	7.72	7.61	26.74
A. Solid waste disposal	9.32	9.05	9.03	8.39	7.66	8.06	7.42	7.29	28.35
B. Biological treatment of solid waste	0.04	0.05	0.06	0.06	0.04	0.06	0.08	0.09	100.00
C. Incineration and open burning of waste	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-94.40
D. Waste water treatment and discharge	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.22	175.00
E. Other	NO	NO	NO	NO	NO	NO	NO		
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total CH4 emissions with CH4 from LULUCF	114.25	113.86	113.80	112.92	111.81	111.70	111.60	111.65	-3.22
Memo items:									
Aviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	206.97
Navigation	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	207.32
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CO2 emissions from biomass									
CO2 captured									
Long-term storage of C in waste disposal sites									
Indirect N2O									
Indirect CO2 (3)									

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and fores

[a] 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 Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

Custom Footnotes

Table 1(c) ISL_BR3_v0.1

Emission trends (N_2O)

(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year [a]	1990	1991	1992	1993	1994	1995	1996	1997
	kt								
1. Energy	0.12	0.12	0.12	0.12	0.13	0.13	0.15	0.15	0.18
A. Fuel combustion (sectoral approach)	0.12	0.12	0.12	0.12	0.13	0.13	0.15	0.15	0.18
1. Energy industries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Manufacturing industries and construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Transport	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.08
4. Other sectors	0.07	0.07	0.07	0.06	0.08	0.08	0.09	0.09	0.10
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
B. Fugitive emissions from fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
2. Oil and natural gas and other emissions from energy production	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
C. CO2 transport and storage									
2. Industrial processes	0.18	0.18	0.17	0.15	0.16	0.16	0.15	0.17	0.15
A. Mineral industry									
B. Chemical industry	0.16	0.16	0.15	0.14	0.14	0.14	0.14	0.16	0.13
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Non-energy products from fuels and solvent use	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA
E. Electronic industry									
F. Product uses as ODS substitutes									
G. Other product manufacture and use	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	0.95	0.95	0.91	0.86	0.87	0.89	0.85	0.88	0.87
A. Enteric fermentation									
B. Manure management	0.20	0.20	0.18	0.17	0.17	0.17	0.16	0.16	0.17
C. Rice cultivation									
D. Agricultural soils	0.75	0.75	0.73	0.69	0.70	0.72	0.69	0.71	0.70
E. Prescribed burning of savannas									
F. Field burning of agricultural residues	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
G. Liming									
H. Urea application									
I. Other carbon containing fertlizers									
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Land use, land-use change and forestry	0.22	0.22	0.23	0.23	0.23	0.23	0.23	0.23	0.23
A. Forest land	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
B. Cropland	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE
C. Grassland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Wetlands	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
E. Settlements	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE
F. Other land	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE
G. Harvested wood products									
H. Other	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.23
5. Waste	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
A. Solid waste disposal									
B. Biological treatment of solid waste	NA	NA	NA	NA	NA	NA	0.00	0.00	0.00
C. Incineration and open burning of waste	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
D. Waste water treatment and discharge	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total direct N2O emissions with N2O from LULUCF	1.49	1.49	1.45	1.38	1.41	1.43	1.41	1.46	1.45
Memo items:									
Aviation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Navigation	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
CO2 emissions from biomass									
CO2 captured									
Long-term storage of C in waste disposal sites									
Indirect N2O	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE
Indirect CO2 (3)									

Note: All footnotes for this table are given on sheet 3.

Table 1(c)
Emission trends (N_2O)
(Sheet 2 of 3)

ISL_BR3_v0.1

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1. Energy	0.18	0.21	0.21	0.21	0.20	0.20	0.22	0.23	0.23	0.23
A. Fuel combustion (sectoral approach)	0.18	0.21	0.21	0.21	0.20	0.20	0.22	0.23	0.23	0.23
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Transport	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.12	0.12	0.12
4. Other sectors	0.10	0.11	0.11	0.11	0.10	0.10	0.11	0.11	0.10	0.11
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
B. Fugitive emissions from fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
2. Oil and natural gas and other emissions from energy production	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
C. CO2 transport and storage										
2. Industrial processes	0.13	0.13	0.08	0.07	0.01	0.01	0.01	0.01	0.01	0.01
A. Mineral industry										
B. Chemical industry	0.12	0.12	0.06	0.05	NA, NO	NA, NO	NA, NO	NO	NO	NO
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Non-energy products from fuels and solvent use	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA	NE, NA
E. Electronic industry										
F. Product uses as ODS substitutes										
G. Other product manufacture and use	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	0.88	0.90	0.89	0.88	0.84	0.82	0.80	0.81	0.86	0.90
A. Enteric fermentation										
B. Manure management	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16
C. Rice cultivation										
D. Agricultural soils	0.71	0.73	0.72	0.71	0.68	0.66	0.64	0.64	0.70	0.73
E. Prescribed burning of savannas										
F. Field burning of agricultural residues	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
G. Liming										
H. Urea application										
I. Other carbon containing fertlizers										
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Land use, land-use change and forestry	0.24	0.24	0.24	0.24	0.25	0.25	0.25	0.25	0.28	0.26
A. Forest land	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02
B. Cropland	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	NA, NE, IE	0.00	NA, IE
C. Grassland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
D. Wetlands	NO, NA, NE	NO, NA, NE	NO, NA, NE	NO, NA, NE	NO, NA, NE	NO, NA, NE	NO, NA, NE	NO, NA, NE	0.00	NO, NA, NE
E. Settlements	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE
F. Other land	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	NA, NE	0.00	NO, NA
G. Harvested wood products										
H. Other	0.23	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24
5. 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										
B. Biological treatment of solid waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Incineration and open burning of waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Waste water treatment and discharge	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total direct N2O emissions with N2O from LULUCF	1.46	1.51	1.44	1.42	1.33	1.31	1.31	1.33	1.40	1.43
Memo items:										
Aviation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Navigation	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO2 emissions from biomass										
CO2 captured										
Long-term storage of C in waste disposal sites										
Indirect N2O	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE
Indirect CO2 (3)										

Note: All footnotes for this table are given on sheet 3.

Table 1(c) ISL_BR3_v0.1

Emission trends (N_2O)

(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*2008*	2009	2010	2011	2012	2013	2014	2015	Change from base to latest reported year
									%
1. Energy	0.21	0.19	0.17	0.16	0.15	0.15	0.16	0.15	27.54
A. Fuel combustion (sectoral approach)	0.21	0.19	0.17	0.16	0.15	0.15	0.16	0.15	27.54
1. Energy industries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-61.63
2. Manufacturing industries and construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-77.35
3. Transport	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	108.48
4. Other sectors	0.10	0.08	0.06	0.05	0.05	0.05	0.06	0.05	-24.37
5. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA			
B. Fugitive emissions from fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	0.00
1. Solid fuels	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	0.00
2. Oil and natural gas and other emissions from energy production	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00
C. CO2 transport and storage									
2. Industrial processes	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-94.43
A. Mineral industry									
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Non-energy products from fuels and solvent use	NE, NA	NE, NA	NE, NA	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	NE, NA, NO	0.00
E. Electronic industry									
F. Product uses as ODS substitutes									
G. Other product manufacture and use	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-50.22
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	0.93	0.87	0.85	0.78	0.86	0.85	0.92	0.87	-8.32
A. Enteric fermentation									
B. Manure management	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	-13.78
C. Rice cultivation									
D. Agricultural soils	0.77	0.70	0.68	0.61	0.70	0.68	0.76	0.70	-6.88
E. Prescribed burning of savannas									
F. Field burning of agricultural residues	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	0.00
G. Liming									
H. Urea application									
I. Other carbon containing fertlizers									
J. Other	NA	NA	NA	NA	NA	NA			
4. Land use, land-use change and forestry	0.26	0.27	0.27	0.27	0.27	0.27	0.27	0.27	22.15
A. Forest land	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	550.59
B. Cropland	NA, IE	NA, IE	NA, IE	NA, IE	NA, IE	NA, IE	NA, IE	NA, IE	0.00
C. Grassland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	734.63
D. Wetlands	0.00	NO, NA, NE	0.00	NO, NA, NE	NO, NA, NE	NO, NA, NE	0.00	0.00	100.00
E. Settlements	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	NE, IE	0.00
F. Other land	0.00	0.00	NO, NA	NO, NA	0.00	NA	NA	0.00	100.00
G. Harvested wood products									
H. Other	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	14.53
5. Waste	0.02	0.02	0.03	0.03	0.02	0.03	0.03	0.03	6.91
A. Solid waste disposal									
B. Biological treatment of solid waste	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	100.00
C. Incineration and open burning of waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-82.22
D. Waste water treatment and discharge	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00
E. Other	NO	NO	NO	NO	NO	NO	NO		
6. Other (as specified in the summary table in CRF)	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total direct N2O emissions with N2O from LULUCF	1.44	1.36	1.32	1.24	1.32	1.31	1.40	1.33	-10.82
Memo items:									
Aviation	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	207.14
Navigation	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.01	207.46
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CO2 emissions from biomass									
CO2 captured									
Long-term storage of C in waste disposal sites									
Indirect N2O	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE	0.00
Indirect CO2 (3)									

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and fores

[a] 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 Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

Table 1(d) ISL_BR3_v0.1

Emission trends (HFCs, PFCs and SF_6)

(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year [a]	1990	1991	1992	1993	1994	1995	1996	1997
	kt								
Emissions of HFCs and PFCs - (kt CO2 equivalent)									
Emissions of HFCs - (kt CO2 equivalent)	0.34	0.34	0.70	0.70	1.45	2.33	10.22	18.59	28.77
HFC-23	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-32	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-41	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-43-10mee	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-125	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00	0.00	0.00	0.00
HFC-134	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-134a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-143	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-143a	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00	0.00	0.00
HFC-152	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
HFC-152a	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00	0.00	0.00	0.00
HFC-161	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
HFC-227ea	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-236cb	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
HFC-236ea	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
HFC-236fa	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-245ca	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HFC-245fa	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
HFC-365mfc	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
Unspecified mix of HFCs(4) - (kt CO_2 equivalent)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
CF_4	0.06	0.06	0.05	0.02	0.01	0.01	0.01	0.00	0.01
C_2F_6	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C_3F_8	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
C_4F_{10}	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
$c\text{-}C_4F_8$	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
C_5F_{12}	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
C_6F_{14}	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
C10F18	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
c-C3F6	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
Unspecified mix of PFCs(4) - (kt CO_2 equivalent)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Unspecified mix of HFCs and PFCs - (kt CO2 equivalent)	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
SF_6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NF3	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA

Note: All footnotes for this table are given on sheet 3.

Table 1(d) ISL_BR3_v0.1

Emission trends (HFCs, PFCs and SF_6)

(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007
Emissions of HFCs and PFCs - (kt CO2 equivalent)										
Emissions of HFCs - (kt CO2 equivalent)	43.22	48.85	43.28	48.69	45.74	56.79	59.52	69.26	69.55	73.33
HFC-23	NA, NO	NA, NO	NA, NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-32	NA, NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-41	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-43-10mee	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-125	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
HFC-134	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-134a	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
HFC-143	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-143a	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
HFC-152	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-152a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-161	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-227ea	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00	0.00	0.00	0.00
HFC-236cb	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-236ea	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-236fa	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-245ca	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-245fa	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
HFC-365mfc	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
Unspecified mix of HFCs(4) - (kt CO_2 equivalent)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
CF_4	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.04	0.04
C_2F_6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
C_3F_8	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
C_4F_{10}	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
$c\text{-}C_4F_8$	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
C_5F_{12}	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
C_6F_{14}	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
C10F18	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
c-C3F6	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
Unspecified mix of PFCs(4) - (kt CO_2 equivalent)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO	NO	NO
Unspecified mix of HFCs and PFCs - (kt CO2 equivalent)	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO
SF_6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NF3	NO, NA	NO, NA	NO, NA	NO, NA	NA, NO	NA, NO	NA, NO	NO	NO	NO

Note: All footnotes for this table are given on sheet 3.

Table 1(d) ISL_BR3_v0.1

Emission trends (HFCs, PFCs and SF_6)

(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	*2008*	2009	2010	2011	2012	2013	2014	2015	Change from base to latest reported year
									%
Emissions of HFCs and PFCs - (kt CO2 equivalent)									
Emissions of HFCs - (kt CO2 equivalent)	83.75	113.06	145.78	144.50	171.73	179.91	181.70	206.98	59,899.28
HFC-23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-41	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-43-10mee	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-125	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	100.00
HFC-134	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-134a	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	7,744.00
HFC-143	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-143a	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	100.00
HFC-152	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-152a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-161	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-227ea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-236cb	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-236ea	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-236fa	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-245ca	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-245fa	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-365mfc	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Unspecified mix of HFCs(4) - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CF_4	0.05	0.02	0.02	0.01	0.01	0.01	0.01	0.01	-79.04
C_2F_6	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-79.02
C_3F_8	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
C_4F_{10}	NO	NO	NO	NO	NO	NO	NO	NO	0.00
c-C_4F_8	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C_5F_{12}	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C_6F_{14}	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C10F18	NO	NO	NO	NO	NO	NO	NO	NO	0.00
c-C3F6	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Unspecified mix of PFCs(4) - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Unspecified mix of HFCs and PFCs - (kt CO2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	0.00
SF_6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.54
NF3	NO	NO	NO	NO	NO	NO	NO	NO	0.00

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] 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 Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[c] 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 CO2 equivalent emissions.

[d] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories", 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 kt of CO2 equivalent and that appropriate notation keys should be entered in the cells for the individual chemicals.)

Custom Footnotes

Table 2(a) ISL_BR3_v0.1

Description of quantified economy-wide emission reduction target: base year[a]

Party	*Iceland*	
Base year /base period	1990	
Emission reduction target	% of base year/base period	% of 1990 [b]
	20.00%	20.00%
Period for reaching target	BY-2020	

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Optional.

Table 2(b) ISL_BR3_v0.1

Description of quantified economy-wide emission reduction target: gases and sectors covered[a]

Gases covered		*Base year for each gas (year):*
CO_2		1990
CH_4		1990
N_2O		1990
HFCs		1990
PFCs		1990
SF_6		1990
NF_3		1990
Other Gases (specify)		
Sectors covered[b]	Energy	Yes
	Transport[f]	Yes
	Industrial processes[g]	Yes
	Agriculture	Yes
	LULUCF	Yes
	Waste	Yes
	Other Sectors (specify)	

Abbreviations : LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] More than one selection will be allowed. If Parties use sectors other than those indicated above, the explanation of how these sectors relate to the sectors defined by the IPCC should be provided.

[f] Transport is reported as a subsector of the energy sector.

[g] Industrial processes refer to the industrial processes and solvent and other product use sectors.

Table 2(c) ISL_BR3_v0.1

Description of quantified economy-wide emission reduction target: global warming potential values (GWP)[a]

Gases	*GWP values* [b]
CO_2	4th AR
CH_4	4th AR
N_2O	4th AR
HFCs	4th AR
PFCs	4th AR
SF_6	4th AR
NF_3	4th AR
Other Gases (specify)	

Abbreviations: GWP = global warming potential

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Please specify the reference for the GWP: Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) or the Fourth Assessment Report of the IPCC.

Table 2(d) ISL_BR3_v0.1

Description of quantified economy-wide emission reduction target: approach to counting emissions and removals from the LULUCF sector[a]

Role of LULUCF	LULUCF in base year level and target	Included
	Contribution of LULUCF is calculated using	Activity-based approach

Abbreviation : LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

Table 2(e)I ISL_BR3_v0.1

Description of quantified economy-wide emission reduction target: market-based mechanisms under the Convention[a]

Market-based mechanisms under the Convention	*Possible scale of contributions (estimated kt CO_2 eq)*
CERs	
ERUs	
AAUs[i]	
Carry-over units[j]	
Other mechanism units under the Convention (specify)[d]	

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[d] As indicated in paragraph 5(e) of the guidelines contained in annex I of decision 2/CP.17 .

[i] AAUs issued to or purchased by a Party.

[j] Units carried over from the first to the second commitment periods of the Kyoto Protocol, as described in decision 13/CMP.1 and consistent with decision 1/CMP.8.

Table 2(e)II ISL_BR3_v0.1

Description of quantified economy-wide emission reduction target: other market-based mechanisms[a]

Other market-based mechanisms	*Possible scale of contributions*
(Specify)	*(estimated kt CO_2 eq)*
NA	

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

Table 2(f) ISL_BR3_v0.1

Description of quantified economy-wide emission reduction target: any other information[a,b]

The QELRC for Iceland for the second commitment period under the Kyoto Protocol is based on the understanding that it will be fulfilled jointly with the European Union and its member States, in accordance with Article 4 of the Kyoto Protocol.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] This information could include information on the domestic legal status of the target or the total assigned amount of emission units for the period for reaching a target. Some of this information is presented in the narrative part of the biennial report.

Custom Footnotes

Table 3 ISL_BR3_v0.1

Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action [a]	*Sector(s) affected* [b]	*GHG(s) affected*	*Objective and/or activity affected*	*Type of instrument* [c]	*Status of implementation* [d]	*Brief description* [e]	*Start year of implementation*	*Implementing entity or entities*	*Estimate of mitigation impact (not cumulative, in kt CO_2 eq)* [f] 2020
Climate Change Strategy *	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs, SF6	Cross cutting	Strategy	Implemented	A framework for action and government involvement in climate change issues	2007	Ministry for the Environment and Natural Resourses	
Climate Changes implementation plan*	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs, SF6	Cross cutting	Action plan	Implemented	An instrument for implementation of policies and monitoring of progress	2010	Ministry for the Environment and Natural Resources	
National strategy for sustainable development*	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs, SF6	Cross cutting	Strategy	Implemented	A general frameworkd for policies set by authorieis in fields relation to sustainable development.	2002	Ministry for the Environment and Natural Resouces	
Special Action Plan*	Cross-cutting	CH4, CO2, HFCs, N2O, NF3, PFCs	Cross cutting	Action plan	Implemented	Supplementary action plan to the plan from 2010	2015	Ministry for the Environment and Natural Resouces	
Implementation Plan for clean transport*	Transport, Energy	CO2	Sustainable transportation	Action plan	Implemented	Action plan with the aim to increase the use of low-emisson cars	2017	Ministry for the Industry and Innovation , Ministry for Transport	
Carbon tax*	Transport, Energy	CO2	Reduce emission from fossil fuels	Fiscal	Implemented	Tax on liquid and gaseous fossil fuels	2010	Ministry of Finance and Econimic Affaris	
Excise duty on vehicles based on CO2 emission*	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	The excise duty varies from 0%-60% depending on CO2 emissions	2011	Ministry of Finance and Econimic Affaris	
Biannual fee on vehicles*	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Basic fee with additional fee for higher emission levels or weight depending on weight class	2011	Ministry of Finance and Econimic Affaris	
No WAT on zero-emission vehicles with a cap*	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Elecric, hydrogen and hybrid vehicles exempted from VAT up to a certain maximum limit.	2012	Ministry of Finance and Econimic Affaris	
Reduced excise duty and semiannual car tax on methane vehicles*	Transport, Energy	CO2	Reduce emission from transport	Fiscal	Implemented	Methane vehicles get a discount from levied excise duty an dpay only minumum semiannual car tax.	2011	Ministry of Finance and Econimic Affaris	
Parking benefits for low emission vehicles*	Transport, Energy	CO2	Reduce emissions from transport	Fiscal	Implemented	Vehicles emitting less that 120 gr.	2007	Municipalities	
Incresed public transportation and cycling*	Transport, Energy	CO2	Reduce emissions from transport	Fiscal	Implemented	The Icelandic Transport Administration supports public transportation and construction of bike and walking paths.	2012	Ministry of Transport, Municipalities	
Implementation Plan for transport*	Transport, Energy	CO2	Sustainable transportation	Policy	Implemented	Action plan on infrastructure for transport	2011	Minstry for Transport	
Excemption from excise duty and carbon tax for CO2 neutral fuels*	Transport	CO2	Reduce emission from transport	Fiscal	Implemented	No excise duty and carbon tax on CO2 nautral fuels	2010	Ministry of Finance and Econimic Affaris	
National Renewable Energy Action Plan*	Energy	CO2	Reduce emissions from energy productio and use	Action plan	Implemented	Strategic approach and concreate measures on how Iceland will meet mandatory national targets for renewable energy in 2020	2015	Ministry for Industry and Innovation	
Renewables in fuel for transport*	Transport	CO2	Reduce emission from transport	Regulatory	Implemented	Requirement of blending fossil fuels with renewables	2014	Ministry for the Industry and Innovation	
National plan on waste management*	Waste management/wast e	CO2, CH4, N2O	Waste reduction and more efficient use of natural resources	Implementation plan	Implemented	Strategic approach on waste management	2013	Ministry for the Environment and Natural Resources, Municipalities, Environment Agency	
Landfill policy*	Waste management/wast e	CH4	Reduce organic waste in landfills	Regulatory	Implemented	The share of organic wast shall not to be more than 35% of total waste in 202 with 1995 as reference year.	2013	Ministry for the Environment and Natural Resouces, Municipalities, Environment Agency	
Landfill policy*	Waste management/wast e	CH4	Colletion of landfill gas	Regulatory	Implemented	Requierments in Reg. NO 738/2003 collection on landfill gases	2003	Ministry for the Environment and Natural Resources, Municipalities, Envionment Agency	
Action against food waste*	Waste management/wast e	CH4	Reduce organic waste in landfills	Action plan	Implemented	Actions to prevent food waste. Information campaign, new web page with relevant information, etc.	2016	Environment Agency	
EU emission trading scheme *	Transport	CO2	Reduce emission from aviation	Economic	Implemented	Trading emission allowances for flights within the EEA-area.	2012	Ministry for the Environment and Natural Resources, Environment Agency, EU Commission	
EU emission trading scheme*	Industry/industria l processes	CO2, PFCs	Reduce emission from industry	Economic	Implemented	Cap set on emissions from certain installations. The cap is reduced over time. An EEA-wide market with emission permits.	2013	Ministry for the Environment and Natural Resources, Environment Agency, EU Commission	
Renewables in fuel for transport*	Transport	CO2	Reduce emission from transport	Regulatory	Implemented	Requirement of blending fossil fuels with renewables	2014	Ministry for the Industry and Innovation	

Note : The two final columns specify the year identified by the Party for estimating impacts (based on the status of the measure and whether an ex post or ex ante estimation is available).

Abbreviations : GHG = greenhouse gas; LULUCF = land use, land-use change and forestry.

[a] Parties should use an asterisk (*) to indicate that a mitigation action is included in the 'with measures' projection.

[b] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors, cross-cutting, as appropriate.

[c] To the extent possible, the following types of instrument should be used: economic, fiscal, voluntary agreement, regulatory, information, education, research, other.

[d] To the extent possible, the following descriptive terms should be used to report on the status of implementation: implemented, adopted, planned.

[e] Additional information may be provided on the cost of the mitigation actions and the relevant timescale.

[f] Optional year or years deemed relevant by the Party.

Custom Footnotes

No economic analysis has been made to evaluate the impact of mitigation actions on Iceland's emissions in a quantitative manner, compared to business-as-usual.

Table 4 ISL_BR3_v0.1

Reporting on progress[a, b]

	Total emissions excluding LULUCF	*Contribution from LULUCF*[d]	*Quantity of units from market based mechanisms under the Convention*		*Quantity of units from other market based mechanisms*	
Year[c]	*(kt CO_2 eq)*	*(kt CO_2 eq)*	*(number of units)*	*(kt CO_2 eq)*	*(number of units)*	*(kt CO_2 eq)*
Base year/period (1990)	3,542.75*					
2010	4,650.69*					
2011	4,409.97*					
2012	4,453.09*					
2013	4,461.41*					
2014	4,455.09*					
2015	4,538.98*					
2016						

Abbreviation : GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For the base year, information reported on the emission reduction target shall include the following: (a) total GHG emissions, excluding emissions and removals from the LULUCF sector; (b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for; (c) total GHG emissions, including emissions and removals from the LULUCF sector. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraphs 9(a–-c) of the UNFCCC biennial reporting guidelines for developed country Parties, information on the use of units from market-based mechanisms.

[c] Parties may add additional rows for years other than those specified below.

[d] Information in this column should be consistent with the information reported in table 4(a)I or 4(a)II, as appropriate. The Parties for which all relevant information on the LULUCF contribution is reported in table 1 of this common tabular format can refer to table 1.

Custom Footnotes

Table 4(a)I ISL_BR3_v0.1

Progress in achieving the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector in 2015 [a,b]

	Net GHG emissions/removals from LULUCF categories [c]	*Base year/period or reference level value [d]*	*Contribution from LULUCF for reported year*	*Cumulative contribution from LULUCF [e]*	*Accounting approach [f]*
	(kt CO_2 eq)				
Total LULUCF					Activity-based approach
A. Forest land					Activity-based approach
1. Forest land remaining forest land					Activity-based approach
2. Land converted to forest land					Activity-based approach
3. Other [g]					Activity-based approach
B. Cropland					Activity-based approach
1. Cropland remaining cropland					Activity-based approach
2. Land converted to cropland					Activity-based approach
3. Other [g]					Activity-based approach
C. Grassland					Activity-based approach
1. Grassland remaining grassland					Activity-based approach
2. Land converted to grassland					Activity-based approach
3. Other [g]					Activity-based approach
D. Wetlands					Activity-based approach
1. Wetland remaining wetland					Activity-based approach
2. Land converted to wetland					Activity-based approach
3. Other [g]					Activity-based approach
E. Settlements					Activity-based approach
1. Settlements remaining settlements					Activity-based approach
2. Land converted to settlements					Activity-based approach
3. Other [g]					Activity-based approach
F. Other land					Activity-based approach
1. Other land remaining other land					Activity-based approach
2. Land converted to other land					Activity-based approach
3. Other [g]					Activity-based approach
G. Other					Activity-based approach
Harvested wood products					Activity-based approach

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Parties that use the LULUCF approach that is based on table 1 do not need to complete this table, but should indicate the approach in table 2. Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

[c] For each category, enter the net emissions or removals reported in the most recent inventory submission for the corresponding inventory year. If a category differs from that used for the reporting under the Convention or its Kyoto Protocol, explain in the biennial report how the value was derived.

[d] Enter one reference level or base year/period value for each category. Explain in the biennial report how these values have been calculated.

[e] If applicable to the accounting approach chosen. Explain in this biennial report to which years or period the cumulative contribution refers to.

[f] Label each accounting approach and indicate where additional information is provided within this biennial report explaining how it was implemented, including all relevant accounting parameters (i.e. natural disturbances, caps).

[g] Specify what was used for the category “other”. Explain in this biennial report how each was defined and how it relates to the categories used for reporting under the Convention or its Kyoto Protocol.

Custom Footnotes

Table 4(a)I ISL_BR3_v0.1

Progress in achieving the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector in 2016 [a, b]

	Net GHG emissions/removals from LULUCF categories [c]	*Base year/period or reference level value [d]*	*Contribution from LULUCF for reported year*	*Cumulative contribution from LULUCF [e]*	*Accounting approach [f]*
	(kt CO_2 eq)				
Total LULUCF					Activity-based approach
A. Forest land					Activity-based approach
1. Forest land remaining forest land					Activity-based approach
2. Land converted to forest land					Activity-based approach
3. Other [g]					Activity-based approach
B. Cropland					Activity-based approach
1. Cropland remaining cropland					Activity-based approach
2. Land converted to cropland					Activity-based approach
3. Other [g]					Activity-based approach
C. Grassland					Activity-based approach
1. Grassland remaining grassland					Activity-based approach
2. Land converted to grassland					Activity-based approach
3. Other [g]					Activity-based approach
D. Wetlands					Activity-based approach
1. Wetland remaining wetland					Activity-based approach
2. Land converted to wetland					Activity-based approach
3. Other [g]					Activity-based approach
E. Settlements					Activity-based approach
1. Settlements remaining settlements					Activity-based approach
2. Land converted to settlements					Activity-based approach
3. Other [g]					Activity-based approach
F. Other land					Activity-based approach
1. Other land remaining other land					Activity-based approach
2. Land converted to other land					Activity-based approach
3. Other [g]					Activity-based approach
G. Other					Activity-based approach
Harvested wood products					Activity-based approach

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Parties that use the LULUCF approach that is based on table 1 do not need to complete this table, but should indicate the approach in table 2. Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

[c] For each category, enter the net emissions or removals reported in the most recent inventory submission for the corresponding inventory year. If a category differs from that used for the reporting under the Convention or its Kyoto Protocol, explain in the biennial report how the value was derived.

[d] Enter one reference level or base year/period value for each category. Explain in the biennial report how these values have been calculated.

[e] If applicable to the accounting approach chosen. Explain in this biennial report to which years or period the cumulative contribution refers to.

[f] Label each accounting approach and indicate where additional information is provided within this biennial report explaining how it was implemented, including all relevant accounting parameters (i.e. natural disturbances, caps).

[g] Specify what was used for the category "other". Explain in this biennial report how each was defined and how it relates to the categories used for reporting under the Convention or its Kyoto Protocol.

Custom Footnotes

Table 4(a)II

ISL_BR3_v0.1
Source: Submission 2018 v5, ICELAND

Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol[a,b,c]

GREENHOUSE GAS SOURCE AND SINK ACTIVITIES	*Base year [d]*	*Net emissions/removals [e]*									*Accounting parameters [h]*	*Accounting quantity [i]*
		2013	2014	*2015*	*2016*	2017	2018	2019	2020	Total[g]		
	($kt\ CO_2$ eq)											
A. Article 3.3 activities												
A.1. Afforestation/reforestation		-180.05	-201.25	-251.36						-632.66		-632.66
Excluded emissions from natural disturbances(5)												
Excluded subsequent removals from land subject to natural disturbances(6)												
A.2. Deforestation		0.16	0.11	0.22						0.49		0.49
B. Article 3.4 activities												
B.1. Forest management										-244.49		217.51
Net emissions/removalse		-79.42	-82.83	-82.24						-244.49		
Excluded emissions from natural disturbances(5)												
Excluded subsequent removals from land subject to natural disturbances(6)												
Any debits from newly established forest (CEF-ne)(7),(8)												
Forest management reference level (FMRL)(9)											-154.00	
Technical corrections to FMRL(10)											NE	
Forest management capl											991.97	217.51
B.2. Cropland management (if elected)												
B.3. Grazing land management (if elected)												
B.4. Revegetation (if elected)	-347.70	-548.93	-557.51	-569.58						-1,676.03		-632.91
B.5. Wetland drainage and rewetting (if elected)												

Note: 1 kt CO_2 eq equals 1 Gg CO_2 eq.

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Developed country Parties with a quantified economy-wide emission reduction target as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document, that are Parties to the Kyoto Protocol, may use table 4(a)II for reporting of accounting quantities if LULUCF is contributing to the attainment of that target.

[c] Parties can include references to the relevant parts of the national inventory report, where accounting methodologies regarding LULUCF are further described in the documentation box or in the biennial

[d] Net emissions and removals in the Party's base year, as established by decision 9/CP.2.

[e] All values are reported in the information table on accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, of the CRF for the relevant inventory year as reported in the current submission and are automatically entered in this table.

[f] Additional columns for relevant years should be added, if applicable.

[g] Cumulative net emissions and removals for all years of the commitment period reported in the current submission.

[h] The values in the cells "3.3 offset" and "Forest management cap" are absolute values.

[i] The accounting quantity is the total quantity of units to be added to or subtracted from a Party's assigned amount for a particular activity in accordance with the provisions of Article 7, paragraph 4, of the Kyoto Protocol.

[j] In accordance with paragraph 4 of the annex to decision 16/CMP.1, debits resulting from harvesting during the first commitment period following afforestation and reforestation since 1990 shall not be greater than the credits accounted for on that unit of land.

[k] In accordance with paragraph 10 of the annex to decision 16/CMP.1, for the first commitment period a Party included in Annex I that incurs a net source of emissions under the provisions of Article 3 paragraph 3, may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[l] In accordance with paragraph 11 of the annex to decision 16/CMP.1, for the first commitment period of the Kyoto Protocol only, additions to and subtractions from the assigned amount of a Party resulting from Forest management under Article 3, paragraph 4, after the application of paragraph 10 of the annex to decision 16/CMP.1 and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

Table 4(b) ISL_BR3_v0.1

Reporting on progress[a, b, c]

Units of market based mechanisms			Year 2015	Year 2016
Kyoto Protocol units[d]	Kyoto Protocol units	(number of units)		
		(kt CO_2 eq)		
	AAUs	(number of units)		
		(kt CO2 eq)		
	ERUs	(number of units)		
		(kt CO2 eq)		
	CERs	(number of units)		
		(kt CO2 eq)		
	tCERs	(number of units)		
		(kt CO2 eq)		
	lCERs	(number of units)		
		(kt CO2 eq)		
Other units[d,e]	Units from market-based mechanisms under the Convention	(number of units)		
		(kt CO_2 eq)		
	Units from other market-based mechanisms	(number of units)		
		(kt CO_2 eq)		
	NA	(number of units)		
		(kt CO2 eq)		
		(number of units)		
		(kt CO2 eq)		
Total		(number of units)		
		(kt CO_2 eq)		

Abbreviations: AAUs = assigned amount units, CERs = certified emission reductions, ERUs = emission reduction units, lCERs = long-term certified emission reductions, tCERs = temporary certified emission reductions.
Note: 2011 is the latest reporting year.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For each reported year, information reported on progress made towards the emission reduction target shall include, in addition to the information noted in paragraphs 9(a-c) of the reporting guidelines, on the use of units from market-based mechanisms.

[c] Parties may include this information, as appropriate and if relevant to their target.

[d] Units surrendered by that Party for that year that have not been previously surrendered by that or any other Party.

[e] Additional rows for each market-based mechanism should be added, if applicable.

Table 5 ISL_BR3_v0.1

Summary of key variables and assumptions used in the projections analysis[a]

Key underlying assumptions		*Historical* [b]						Projected			
Assumption	*Unit*	*1990*	*1995*	2000	2005	2010	2011	2015	2020	2025	2030
GDP growth rate	*%*	0.58	0.76	2.64	8.07	1.56	4.67		2.50	2.50	2.50
Population	thousands	255.87	267.96	283.36	299.89	318.45	319.58		346.21	363.27	377.70
Population growth	%	0.82	0.37	1.55	2.15	0.26	0.35		1.06	0.90	0.70
International oil price	USD / boe	33.00	25.00	33.00	40.00	79.00	90.00		79.00	92.50	106.00
Gross domestic oil consumption	PJ	15.60	16.70	16.40	15.10	11.00	10.10		22.20	20.90	19.10
Gross electricity production, oil	GWh	6.00	8.00	4.00	8.00	2.00	2.00		2.00	2.00	2.00
Gross electricity production, hydropower	GWh	4,159.00	4,677.00	6,350.00	7,015.00	12,592.00	12,507.00		15,458.66	15,781.71	16,173.63
Gross electricity production, geothermal	GWh	283.00	290.00	1,323.00	1,658.00	4,465.00	4,701.00		6,314.10	6,446.05	6,606.13
Gross electricity production, other	GWh										
Aluminium production	kt	87.84	100.20	226.36	272.49	818.86	806.32		790.00	790.00	790.00
Ferrosilicon production	kt	62.79	71.41	108.40	110.96	102.21	105.19		120.00	120.00	120.00
Silicon production	kt								166.00	166.00	166.00
Solid waste generation amount	kg/head	1,485.99	1,494.88	1,594.19	1,504.26	1,386.23	1,276.73		1,642.39	1,642.08	1,642.15
Solid waste generation amount	kt	380.21	400.57	451.73	451.11	441.45	408.01		591.48	623.77	657.82
Afforestation area since 1990, cultivated forest	kha	0.89	6.66	14.36	23.14	30.39	32.20				
Afforestation area since 1990, natural birch expansion	kha	0.41	2.48	4.55	6.62	8.69	9.11				
Deforestation area, accumulation since 1990	kha				0.02	0.04	0.05				
Revegetation area since 1990	*kha*	2.13	16.24	38.56	62.41	83.21	87.09				

[a] Parties should include key underlying assumptions as appropriate.

[b] Parties should include historical data used to develop the greenhouse gas projections reported.

Custom Footnotes

Table 6(a) ISL_BR3_v0.1

Information on updated greenhouse gas projections under a 'with measures' scenario [a]

	GHG emissions and removals [b]							GHG emission projections	
	(kt CO_2 eq)							(kt CO_2 eq)	
	Base year (1990)	1990	1995	2000	2005	2010	2015	2020	2030
Sector [d,e]									
Energy	1,160.01	1,160.01	1,296.91	1,377.78	1,234.73	976.29	808.83	955.64	1,047.61
Transport	617.06	617.06	621.63	659.74	831.51	884.06	886.41	954.32	686.36
Industry/industrial processes	954.20	954.20	567.39	1,003.78	960.15	1,947.05	2,020.97	2,818.92	2,827.70
Agriculture	646.47	646.47	590.49	596.05	565.61	596.92	615.77	768.52	835.16
Forestry/LULUCF	10,133.65	10,133.65	10,085.83	10,139.38	10,198.05	10,336.12	10,274.30	10,274.30	10,274.30
Waste management/waste	165.01	165.01	207.86	229.87	244.38	246.36	207.00	272.52	192.83
Other (specify)									
Gas									
CO_2 emissions including net CO_2 from LULUCF	9,852.69	9,852.69	9,971.07	10,490.79	10,670.45	11,425.76	11,314.16	NE	NE
CO_2 emissions excluding net CO_2 from LULUCF	2,148.34	2,148.34	2,312.33	2,757.46	2,851.86	3,429.35	3,360.65	NE	NE
CH_4 emissions including CH_4 from LULUCF	2,883.91	2,883.91	2,898.36	2,893.05	2,866.38	2,845.09	2,791.18	NE	NE
CH_4 emissions excluding CH_4 from LULUCF	521.64	521.64	540.28	559.49	562.68	585.08	552.26	NE	NE
N_2O emissions including N_2O from LULUCF	443.72	443.72	419.84	428.27	395.06	393.86	395.73	NE	NE
N_2O emissions excluding N_2O from LULUCF	376.69	376.69	350.83	355.79	319.30	314.15	313.85	NE	NE
HFCs	0.34	0.34	10.22	43.28	69.26	145.78	206.98	NE	NE
PFCs	494.64	494.64	69.36	149.89	30.76	171.67	103.70	NE	NE
SF_6	NO	NO	NO	NO	NO	NO	NO	NE	NE
NF_3	1.10	1.10	1.24	1.31	2.52	4.66	1.53	NE	NE
Other (specify)									
Total with LULUCF [f]	13,676.40	13,676.40	13,370.09	14,006.59	14,034.43	14,986.82	14,813.28	16,044.21*	15,863.97*
Total without LULUCF	3,542.75	3,542.75	3,284.26	3,867.22	3,836.38	4,650.69	4,538.97	5,769.91*	5,589.67*

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", at a minimum Parties shall report a 'with measures' scenario, and may report 'without measures' and 'with additional measures' scenarios. If a Party chooses to report 'without measures' and/or 'with additional measures' scenarios they are to use tables 6(b) and/or 6(c), respectively. If a Party does not choose to report 'without measures' or 'with additional measures' scenarios then it should not include tables 6(b) or 6(c) in the biennial report.

[b] Emissions and removals reported in these columns should be as reported in the latest GHG inventory and consistent with the emissions and removals reported in the table on GHG emissions and trends provided in this biennial report. Where the sectoral breakdown differs from that reported in the GHG inventory Parties should explain in their biennial report how the inventory sectors relate to the sectors reported in this table.

[c] 20XX is the reporting due-date year (i.e. 2014 for the first biennial report).

[d] In accordance with paragraph 34 of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", projections shall be presented on a sectoral basis, to the extent possible, using the same sectoral categories used in the policies and measures section. This table should follow, to the extent possible, the same sectoral categories as those listed in paragraph 17 of those guidelines, namely, to the extent appropriate, the following sectors should be considered: energy, transport, industry, agriculture, forestry and waste management.

[e] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors (i.e. cross-cutting), as appropriate.

[f] Parties may choose to report total emissions with or without LULUCF, as appropriate.

Table 7 ISL_BR3_v0.1

Provision of public financial support: summary information in 2015[a]

Allocation channels	Year									
	Icelandic króna - ISK					USD [b]				
	Core/ general [c, 1]	Climate-specific [d, 2]				Core/ general [c, 1]	Climate-specific [d, 2]			
		Mitigation	Adaptation	Cross-cutting [e]	Other [f]		Mitigation	Adaptation	Cross-cutting [e]	Other [f]
Total contributions through multilateral channels:	947,401,500.00		21,897,500.00	62,551,975.00		7,185,449.38		166,078.88	474,417.71	
Multilateral climate change funds[g]			19,597,500.00	31,551,975.00				148,634.81	239,302.05	
Other multilateral climate change funds[h]										
Multilateral financial institutions, including regional development banks	621,700,000.00			31,000,000.00		4,715,206.67			235,115.66	
Specialized United Nations bodies	325,701,500.00		2,300,000.00			2,470,242.71		17,444.07		
Total contributions through bilateral, regional and other channels		274,276,756.00	800,877,907.00	275,580,000.00			2,080,218.10	6,074,159.32	2,090,258.56	
Total	947,401,500.00	274,276,756.00	822,775,407.00	338,131,975.00		7,185,449.38	2,080,218.10	6,240,238.20	2,564,676.27	

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviation: USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should provide an explanation of the methodology used for currency exchange for the information provided in tables 7, 7(a) and 7(b) in the documentation box.

[c] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[d] Parties should explain in their biennial reports how they define funds as being climate-specific.

[e] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

[f] Please specify.

[g] Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

[h] Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

Custom Footnotes

Documentation Box:

1: Core/general
UNFCCC Trust Fund for Supplementary Activities: core contribution to UNFCCC. World Bank: IDA, IBRD. World Bank climate specific: ESMAP. UNDP, UNICEF, UN Women etc: core funding. Climate specific: UNICEF WASH Zambezi,
2: Climate-specific
3: Status
4: Funding source
5: Financial instrument
6: Type of support
7: Sector
Each Party shall provide an indication of what new and additional financial resources they have provided, and clarify how they have determined that such resources are new and additional. Please provide this information in relation to table 7(a) and (b).
New: Green Climate Fund. Additional: World Bank, UNICEF

Table 7 ISL_BR3_v0.1

Provision of public financial support: summary information in 2016[a]

Allocation channels	*Year*									
	Icelandic króna - ISK					*USD[b]*				
	Core/ general[c, 1]	*Climate-specific[d, 2]*				*Core/ general[c, 1]*	*Climate-specific[d, 2]*			
		Mitigation	*Adaptation*	*Cross-cutting[e]*	*Other[f]*		*Mitigation*	*Adaptation*	*Cross-cutting[e]*	*Other[f]*
Total contributions through multilateral channels:	1,055,996,504.00		13,641,800.00	38,446,100.00		8,751,110.49		113,050.47	318,605.29	
Multilateral climate change funds[g]			11,341,800.00	38,446,100.00				93,990.22	318,605.29	
Other multilateral climate change funds[h]										
Multilateral financial institutions, including regional development banks	634,200,000.00					5,255,655.92				
Specialized United Nations bodies	421,796,504.00		2,300,000.00			3,495,454.57		19,060.25		
Total contributions through bilateral, regional and other channels		461,604,428.00	699,128,073.00	141,800,000.00			3,825,345.39	5,793,719.01	1,175,105.66	
Total	1,055,996,504.00	461,604,428.00	712,769,873.00	180,246,100.00		8,751,110.49	3,825,345.39	5,906,769.48	1,493,710.95	

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviation: USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should provide an explanation of the methodology used for currency exchange for the information provided in tables 7, 7(a) and 7(b) in the documentation box.

[c] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[d] Parties should explain in their biennial reports how they define funds as being climate-specific.

[e] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

[f] Please specify.

[g] Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

[h] Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

Custom Footnotes

Documentation Box:

1: Core/general
UNFCCC Trust Fund for Supplementary Activities: core contribution to UNFCCC. World Bank: IDA, IBRD. World Bank climate specific: ESMAP. UNDP, UNICEF, UN Women etc: core funding. Climate specific: UNICEF WASH Zambezi,
2: Climate-specific
3: Status
4: Funding source
5: Financial instrument
6: Type of support
7: Sector
Each Party shall provide an indication of what new and additional financial resources they have provided, and clarify how they have determined that such resources are new and additional. Please provide this information in relation to table 7(a) and (b).
New: Green Climate Fund. Additional: World Bank, UNICEF

Table 7(a) ISL_BR3_v0.1

Provision of public financial support: contribution through multilateral channels in 2015[a]

Donor funding	*Total amount*				*Status* [b, 3]	*Funding source* [f, 4]	*Financial instrument* [f, 5]	*Type of support* [f, g, 6]	*Sector* [c, f, 7]
	Core/general [d, 1]		*Climate-specific* [e, 2]						
	Icelandic króna - ISK	*USD*	*Icelandic króna - ISK*	*USD*					
Total contributions through multilateral channels	947,401,500.00	7,185,449.38	84,449,475.00	640,496.59					
Multilateral climate change funds			51,149,475.00	387,936.86					
1. Global Environment Facility									
2. Least Developed Countries Fund			19,597,500.00	148,634.81	Disbursed	ODA	Grant	Adaptation	Cross-cutting
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund			19,597,500.00	148,634.81	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
6. UNFCCC Trust Fund for Supplementary Activities			11,954,475.00	90,667.24	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
7. Other multilateral climate change funds									
Multilateral financial institutions, including regional development banks	621,700,000.00	4,715,206.67	31,000,000.00	235,115.66					
1. World Bank	621,700,000.00	4,715,206.67			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
2. International Finance Corporation									
3. African Development Bank									
4. Asian Development Bank									
5. European Bank for Reconstruction and Development									
6. Inter-American Development Bank									
7. Other			31,000,000.00	235,115.66					
Nordic Development Fund NDF			31,000,000.00	235,115.66	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
Specialized United Nations bodies	325,701,500.00	2,470,242.71	2,300,000.00	17,444.07					
1. United Nations Development Programme	12,001,500.00	91,023.89							
United Nations Development Programme UNDP	12,001,500.00	91,023.89			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
2. United Nations Environment Programme									
3. Other	313,700,000.00	2,379,218.82	2,300,000.00	17,444.07					
UN Women	99,200,000.00	752,370.12			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
UNICEF	99,000,000.00	750,853.24			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
FAO	8,800,000.00	66,742.51			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
WFP	29,800,000.00	226,014.41			Disbursed	ODA	Grant	Adaptation	Cross-cutting
IAEA	9,500,000.00	72,051.57			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
UNRWA	6,500,000.00	49,298.45			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
WHO	12,200,000.00	92,529.39			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
UNESCO	9,800,000.00	74,326.89			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
ILO	11,900,000.00	90,254.08			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
OCHA	27,000,000.00	204,778.16			Disbursed	ODA	Grant	Adaptation	Cross-cutting
UNU-DOALOS			2,300,000.00	17,444.07	Disbursed	ODA	Grant	Adaptation	Not applicable

Abbreviations: ODA = official development assistance, OOF = other official flows, USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[c] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under “Other”.

[d] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[e] Parties should explain in their biennial reports how they define funds as being climate-specific.

[f] Please specify.

[g] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Custom Footnotes

Table 7(a) ISL_BR3_v0.1

Provision of public financial support: contribution through multilateral channels in 2016[a]

Donor funding	Total amount				Status [b, 3]	Funding source [f, 4]	Financial instrument [f, 5]	Type of support [f, g, 6]	Sector [c, f, 7]
	Core/general [d, 1]		Climate-specific [e, 2]						
	Icelandic króna - ISK	*USD*	*Icelandic króna - ISK*	*USD*					
Total contributions through multilateral channels	1,055,996,504.00	8,751,110.49	52,087,900.00	431,655.76					
Multilateral climate change funds			49,787,900.00	412,595.51					
1. Global Environment Facility									
2. Least Developed Countries Fund			11,341,800.00	93,990.22	Disbursed	ODA	Grant	Adaptation	Cross-cutting
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund			22,946,100.00	190,155.80	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
6. UNFCCC Trust Fund for Supplementary Activities			15,500,000.00	128,449.49	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
7. Other multilateral climate change funds									
Nordic Development Fund NDF									
Multilateral financial institutions, including regional development banks	634,200,000.00	5,255,655.92							
1. World Bank	611,500,000.00	5,067,539.57			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
2. International Finance Corporation									
3. African Development Bank									
4. Asian Development Bank									
5. European Bank for Reconstruction and Development									
6. Inter-American Development Bank									
7. Other	22,700,000.00	188,116.35							
SEforALL	22,700,000.00	188,116.35			Disbursed	ODA	Grant	Cross-cutting	Energy
Specialized United Nations bodies	421,796,504.00	3,495,454.57	2,300,000.00	19,060.25					
1. United Nations Development Programme	41,996,504.00	348,027.71							
United Nations Development Programme UNDP	41,996,504.00	348,027.71			Disbursed	ODA	Grant	Cross-cutting	Energy
UN-DOALOS									
2. United Nations Environment Programme									
3. Other	379,800,000.00	3,147,426.86	2,300,000.00	19,060.25					
UN Women	120,900,000.00	1,001,906.02			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
UNICEF	109,900,000.00	910,748.32			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
FAO	8,700,000.00	72,097.46			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
WFP	48,900,000.00	405,237.42			Disbursed	ODA	Grant	Adaptation	Cross-cutting
IAEA	7,900,000.00	65,467.80			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
WHO	12,800,000.00	106,074.42			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
UNESCO	10,300,000.00	85,356.76			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
ILO	12,200,000.00	101,102.18			Disbursed	ODA	Grant	Cross-cutting	Cross-cutting
OCHA	48,200,000.00	399,436.48			Disbursed	ODA	Grant	Adaptation	Cross-cutting
UNU-DOALOS			2,300,000.00	19,060.25	Disbursed	ODA	Grant	Adaptation	Not applicable

Abbreviations: ODA = official development assistance, OOF = other official flows, USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[c] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under “Other”.

[d] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[e] Parties should explain in their biennial reports how they define funds as being climate-specific.

[f] Please specify.

[g] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Custom Footnotes

Table 7(b) ISL_BR3_v0.1

Provision of public financial support: contribution through bilateral, regional and other channels in 2015[a]

Recipient country/ region/project/programme [b]	*Total amount*		*Status [c, 3]*	*Funding source [g, 4]*	*Financial instrument [g, 5]*	*Type of support [g, h, 6]*	*Sector [d, g, 7]*	*Additional information [e]*
	Climate-specific [f, 2]							
	Icelandic króna - ISK	*USD*						
Total contributions through bilateral, regional and other channels	1,350,734,663.00	10,244,635.98						
Malawi / WASH Mangochi	116,826,111.00	886,053.17	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Mozambique / WASH Zambezi	241,986,122.00	1,835,313.78	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Mozambique / Support to fishing industry	180,558,799.00	1,369,425.86	Disbursed	ODA	Grant	Adaptation	Agriculture	
Uganda / Gender & climate change	3,200,000.00	24,270.00	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting	
Africa / Geothermal Exploration Project	123,772,356.00	938,736.11	Disbursed	ODA	Grant	Mitigation	Energy	
LDCs / UNU Geothermal Training Programme	214,900,000.00	1,629,882.44	Disbursed	ODA	Grant	Cross-cutting	Energy	
LDCs / UNU Fisheries Training Programme	187,300,000.00	1,420,553.66	Disbursed	ODA	Grant	Adaptation	Cross-cutting	
LDCs / UNU Land Restoration Training Programme	79,400,000.00	602,199.47	Disbursed	ODA	Grant	Mitigation	Forestry	
LDCs / UNU Gender Equality Studies and Training Programme	54,280,000.00	411,836.12	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting	
LDCs / ESMAP	38,977,500.00	295,620.02	Disbursed	ODA	Grant	Mitigation	Energy	
LDCs / SEforALL	12,976,500.00	98,418.66	Disbursed	ODA	Grant	Mitigation	Energy	
Ethiopia / Jijiga WASH project	54,206,875.00	411,125.33	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Malawi / Community resilience project	20,000,000.00	151,687.52	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Ukraine / Geothermal project Ukraine	6,000,000.00	45,506.26	Disbursed	ODA	Grant	Mitigation	Energy	
LDCs / IRENA	13,150,400.00	99,737.58	Disbursed	ODA	Grant	Mitigation	Energy	
Uganda / Gender and climate change	3,200,000.00	24,270.00	Disbursed	ODA	Grant	Cross-cutting	Cross-cutting	

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[c] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Table 7(b) ISL_BR3_v0.1

Provision of public financial support: contribution through bilateral, regional and other channels in 2016[a]

Recipient country/ region/project/programme [b]	*Total amount*		*Status* [c, 3]	*Funding source* [g, 4]	*Financial instrument* [g, 5]	*Type of support* [g, h, 6]	*Sector* [d, g, 7]	*Additional information* [e]
	Climate-specific [f, 2]							
	Icelandic króna - ISK	*USD*						
Total contributions through bilateral, regional and other channels	1,302,532,501.00	10,794,170.06						
Malawi / WASH Mangochi	94,667,920.00	784,519.10	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Mozambique / WASH Zambezi	213,067,419.00	1,765,703.31	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Mozambique / Support to fishing industry	144,692,734.00	1,199,077.93	Disbursed	ODA	Grant	Adaptation	Agriculture	
Africa / Geothermal Exploration Project	155,460,440.00	1,288,310.60	Disbursed	ODA	Grant	Mitigation	Energy	
LDCs / UNU Geothermal Training Programme	214,200,000.00	1,775,089.09	Disbursed	ODA	Grant	Mitigation	Energy	
LDCs / UNU Fisheries Training Programme	206,700,000.00	1,712,936.11	Disbursed	ODA	Grant	Adaptation	Cross-cutting	
LDCs / UNU Land Restoration Training Programme	88,100,000.00	730,090.33	Disbursed	ODA	Grant	Cross-cutting	Forestry	
LDCs / UNU Gender Equality Studies and Training Programme	53,700,000.00	445,015.33	Committed	ODA	Grant	Cross-cutting	Cross-cutting	
LDCs / ESMAP	68,984,516.00	571,679.09	Disbursed	ODA	Grant	Mitigation	Energy	
LDCs / SEforALL	22,694,100.00	188,067.46	Disbursed	ODA	Grant	Mitigation	Energy	
Ethiopia / Jijiga WASH project	20,000,000.00	165,741.28	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Malawi / Community resilience project	20,000,000.00	165,741.28	Disbursed	ODA	Grant	Adaptation	Water and sanitation	
Ukraine / Geothermal project Ukraine	265,372.00	2,199.15	Committed	ODA	Grant	Mitigation	Energy	

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[c] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under “Other”.

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Table 8 ISL_BR3_v0.1

Provision of technology development and transfer support[a,b]

Recipient country and/or region	*Targeted area*	*Measures and activities related to technology transfer*	*Sector* [c]	*Source of the funding for technology transfer*	*Activities undertaken by*	*Status*	*Additional information* [d]
Malawi	Adaptation	Water and Sanitation Project in Monkey Bay Health Zon: Infrastructure support to water- and sanitation project in Mangochi district	Water and sanitation	Public	Public	Implemented	
Nicaragua	Mitigation	Project to increase the use of geothermal resources by strengthening capacities at the government institutions that are involved	Energy	Public	Public	Implemented	Implemented 2008-2013
Latin America and the Caribbean	Mitigation	Support to IRENA's (International Renewable Energy Agency) Geotherma initiative in the Latin America Region	Energy	Public	Public	Implemented	
Africa	Mitigation	Assist countries in the East African Rift Valley conducting geothermal exploration and to build capacity and expertise in the field of geothermal utilisation.	Energy	Public	Public	Implemented	In partnership with NDF and World Bank
Mozambique	Adaptation	Assistance to the Fisheries Sector	Agriculture	Public	Public	Implemented	Co-financed by Norway and Iceland
Mozambique	Adaptation	WASH for Children in Zambézia Province: Infrastructure support to water- and sanitation project in rural communities and schools.	Water and sanitation	Public	Public	Implemented	

[a] To be reported to the extent possible.

[b] The tables should include measures and activities since the last national communication or biennial report.

[c] Parties may report sectoral disaggregation, as appropriate.

[d] Additional information may include, for example, funding for technology development and transfer provided, a short description of the measure or activity and co-financing arrangements.

Custom Footnotes

Table 9 ISL_BR3_v0.1

Provision of capacity-building support[a]

Recipient country/region	*Targeted area*	*Programme or project title*	*Description of programme or project* [b,c]
LDCs	Mitigation	UNU Land Restoration Training Programme	Providing research and training in land restoration for experts from developing countries
LDCs	Adaptation	UNU Fisheries Training Programme	Research and training for practicing professionals from developing countries in the field of fisheries
LDCs	Adaptation	UNU Gender Equality Studies and Training Programme	Providing specialists from developing countries with training and education in gender equality, with a component focusing on the effects of climate change
Africa, LDCs	Mitigation	UNU Geothermal Training Programme	Research and training for practicing professionals from developing countries in the field of geothermal energy
LDCs	Multiple Areas	Womens Delegate Fund - WEDO	Increasing the participation of women in international negotiations regarding climate change (Women's Environment & Development Organization, WEDO)
Uganda	Multiple Areas	Gender & climate change	In partnership with UNU-GEST. Project promoting gender responsive climate change mitigation and adaptation in Uganda. Included research on gender and climate change in rural Uganda & preparations of the Ugandan delegation for the COP meetings.

[a] To be reported to the extent possible.

[b] Each Party included in Annex II to the Convention shall provide information, to the extent possible, on how it has provided capacity-building support that responds to the existing and emerging capacity-building needs identified by Parties not included in Annex I to the Convention in the areas of mitigation, adaptation and technology development and transfer.

[c] Additional information may be provided on, for example, the measure or activity and co-financing arrangements.

Annex III Greenhouse gas inventories 1990-2015

1990

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1990
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	9852.69	2883.91	443.72	0.34	494.64	1.10	NO,NA	NO,NA	13676.40
1. Energy	1735.96	6.51	34.59						1777.06
A. Fuel combustion (sectoral approach)	1674.60	5.77	34.59						1714.97
1. Energy industries	13.79	0.01	0.02						13.82
2. Manufacturing industries and construction	242.82	0.16	0.60						243.58
3. Transport	599.53	3.76	13.76						617.06
4. Other sectors	818.46	1.84	20.21						840.51
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	61.36	0.74	NO,NA						62.10
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	61.36	0.74	NA,NO						62.10
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	405.03	0.75	52.35	0.34	494.64	1.10	NO,NA	NO,NA	954.20
A. Mineral industry	52.28								52.28
B. Chemical industry	0.36	NO,NA	46.49	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	46.85
C. Metal industry	348.01	0.70	NO	NO	494.64	NO	NO	NO	843.35
D. Non-energy products from fuels and solvent use	4.37	NE,NA	NE,NA						4.37
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				0.34	NO				0.34
G. Other product manufacture and use	0.01	0.05	5.86		NO	1.10			7.01
H. Other	NA	NA	NA						NA
3. Agriculture	0.06	364.30	282.11						646.47
A. Enteric fermentation		313.80							313.80
B. Manure management		50.50	58.69						109.20
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	223.42						223.42
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.06								0.06
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7704.35	2362.26	67.03						10133.65
A. Forest land	-42.21	0.10	0.84						-41.26
B. Cropland	1919.45	94.83	NA,NE,IE						2014.28
C. Grassland	6486.49	477.89	0.07						6964.45
D. Wetlands	-672.57	1789.44	NO,NA,NE						1116.87
E. Settlements	13.19	NE	NE,IE						13.19
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	NO,NE								NO,NE
H. Other	IE	IE	66.11						66.11
5. Waste	7.30	150.09	7.63						165.01
A. Solid waste disposal	NO,NE,NA	142.00							142.00
B. Biological treatment of solid waste		NA	NA						NA
C. Incineration and open burning of waste	7.30	6.09	1.67						15.05
D. Waste water treatment and discharge		2.00	5.96						7.96
E. Other	NA	NO	NO						NO,NA
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO
Memo items:[(2)]									
International bunkers	315.49	0.27	2.63						318.39
Aviation	217.24	0.04	1.83						219.11
Navigation	98.25	0.23	0.80						99.28
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	NO,NA								NO,NA
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3542.75
Total CO_2 equivalent emissions with land use, land-use change and forestry									13676.40
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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
(2) See footnote 7 to table Summary 1.A.
(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1991

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1991
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	9783.03	2880.53	431.69	0.70	410.61	1.24	NO,NA	NO,NA	13507.79
1. Energy	1699.88	6.56	34.44						1740.88
A. Fuel combustion (sectoral approach)	1629.93	5.90	34.44						1670.27
1. Energy industries	15.39	0.01	0.02						15.42
2. Manufacturing industries and construction	171.89	0.11	0.46						172.47
3. Transport	610.86	3.89	14.22						628.97
4. Other sectors	831.79	1.89	19.73						853.41
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	69.95	0.66	NO,NA						70.61
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	69.95	0.66	NA,NO						70.61
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	370.56	0.63	50.31	0.70	410.61	1.24	NO,NA	NO,NA	834.05
A. Mineral industry	48.65								48.65
B. Chemical industry	0.31	NO,NA	45.00	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	45.31
C. Metal industry	317.42	0.58	NO	NO	410.61	NO	NO	NO	728.61
D. Non-energy products from fuels and solvent use	4.17	NE,NA	NE,NA						4.17
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				0.70	NO				0.70
G. Other product manufacture and use	0.01	0.05	5.31		NO	1.24			6.61
H. Other	NA	NA	NA						NA
3. Agriculture	0.06	353.30	271.79						625.15
A. Enteric fermentation		303.80							303.80
B. Manure management		49.50	54.96						104.46
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	216.83						216.83
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.06								0.06
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7705.29	2364.00	67.52						10136.81
A. Forest land	-43.76	0.15	1.21						-42.40
B. Cropland	1910.44	94.32	NA,NE,IE						2004.76
C. Grassland	6490.76	478.68	0.09						6969.54
D. Wetlands	-665.33	1790.85	NO,NA,NE						1125.52
E. Settlements	13.19	NE	NE,IE						13.19
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	NO,NE								NO,NE
H. Other	IE	IE	66.22						66.22
5. Waste	7.24	156.04	7.62						170.90
A. Solid waste disposal	NO,NE,NA	146.75							146.75
B. Biological treatment of solid waste		NA	NA						NA
C. Incineration and open burning of waste	7.24	6.04	1.66						14.94
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NO,NA
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO
Memo items:[(2)]									
International bunkers	256.92	0.13	2.15						259.20
Aviation	219.55	0.04	1.85						221.43
Navigation	37.37	0.09	0.30						37.76
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	NO,NA								NO,NA
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3370.98
Total CO_2 equivalent emissions with land use, land-use change and forestry									13507.79
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1992

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1992
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	9898.46	2885.38	410.88	0.70	183.04	1.24	NO,NA	NO,NA	13379.70
1. Energy	1823.10	6.89	34.34						1864.33
A. Fuel combustion (sectoral approach)	1755.49	6.15	34.34						1795.97
1. Energy industries	13.83	0.01	0.02						13.86
2. Manufacturing industries and construction	235.48	0.16	0.53						236.17
3. Transport	621.00	3.98	14.54						639.53
4. Other sectors	885.18	2.00	19.24						906.42
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	67.61	0.74	NO,NA						68.35
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	67.61	0.74	NA,NO						68.35
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	373.67	0.65	44.96	0.70	183.04	1.24	NO,NA	NO,NA	604.27
A. Mineral industry	45.69								45.69
B. Chemical industry	0.25	NO,NA	40.23	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	40.48
C. Metal industry	323.55	0.60	NO	NO	183.04	NO	NO	NO	507.18
D. Non-energy products from fuels and solvent use	4.17	NE,NA	NE,NA						4.17
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				0.70	NO				0.70
G. Other product manufacture and use	0.01	0.05	4.73		NO	1.24			6.03
H. Other	NA	NA	NA						NA
3. Agriculture	0.06	348.00	255.92						603.98
A. Enteric fermentation		299.75							299.75
B. Manure management		48.25	49.94						98.19
C. Rice cultivation		NO,NA							NO,NA
D. Agricultural soils		NE,NA,NO	205.98						205.98
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.06								0.06
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7694.59	2362.18	68.09						10124.85
A. Forest land	-48.20	0.20	1.65						-46.36
B. Cropland	1900.69	93.81	NA,NE,IE						1994.50
C. Grassland	6493.43	479.47	0.11						6973.01
D. Wetlands	-664.52	1788.70	NO,NA,NE						1124.18
E. Settlements	13.19	NE	NE,IE						13.19
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	NO,NE								NO,NE
H. Other	IE	IE	66.33						66.33
5. Waste	7.04	167.65	7.58						182.27
A. Solid waste disposal	NO,NE,NA	158.50							158.50
B. Biological treatment of solid waste		NA	NA						NA
C. Incineration and open burning of waste	7.04	5.90	1.62						14.56
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NO,NA
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	260.91	0.18	2.18						263.26
Aviation	201.39	0.04	1.69						203.12
Navigation	59.52	0.14	0.48						60.14
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	NO,NA								NO,NA
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3254.85
Total CO_2 equivalent emissions with land use, land-use change and forestry									13379.70
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1993

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1993
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10015.64	2894.57	420.79	1.45	88.24	1.24	NO,NA	NO,NA	13421.94
1. Energy	1902.67	7.04	37.97						1947.69
A. Fuel combustion (sectoral approach)	1817.30	6.31	37.97						1861.58
1. Energy industries	17.22	0.01	0.02						17.25
2. Manufacturing industries and construction	254.25	0.17	0.58						254.99
3. Transport	621.60	3.95	14.42						639.97
4. Other sectors	924.23	2.18	22.96						949.36
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	85.37	0.73	NO,NA						86.10
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	85.37	0.73	NA,NO						86.10
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	422.65	0.73	46.97	1.45	88.24	1.24	NO,NA	NO,NA	561.29
A. Mineral industry	39.68								39.68
B. Chemical industry	0.24	NO,NA	42.32	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	42.56
C. Metal industry	378.27	0.69	NO	NO	88.24	NO	NO	NO	467.20
D. Non-energy products from fuels and solvent use	4.45	NE,NA	NE,NA						4.45
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				1.45	NO				1.45
G. Other product manufacture and use	0.01	0.04	4.65		NO	1.24			5.94
H. Other	NA	NA	NA						NA
3. Agriculture	0.06	348.28	260.19						608.53
A. Enteric fermentation		299.78							299.78
B. Manure management		48.50	50.43						98.93
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	209.76						209.76
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.06								0.06
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7684.26	2361.41	68.29						10113.97
A. Forest land	-53.36	0.21	1.73						-51.42
B. Cropland	1890.88	93.30	NA,NE,IE						1984.18
C. Grassland	6497.66	480.26	0.13						6978.05
D. Wetlands	-664.11	1787.64	NO,NA,NE						1123.53
E. Settlements	13.19	NE	NE,IE						13.19
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	NO,NE								NO,NE
H. Other	IE	IE	66.44						66.44
5. Waste	6.00	177.11	7.37						190.47
A. Solid waste disposal	NO,NE,NA	168.75							168.75
B. Biological treatment of solid waste		NA	NA						NA
C. Incineration and open burning of waste	6.00	5.11	1.41						12.51
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NO,NA
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO
Memo items:[(2)]									
International bunkers	290.17	0.26	2.41						292.85
Aviation	193.49	0.03	1.63						195.15
Navigation	96.68	0.23	0.78						97.69
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.31								0.31
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3307.97
Total CO_2 equivalent emissions with land use, land-use change and forestry									13421.94
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1994

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1994
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	9958.21	2904.48	424.76	2.33	52.53	1.24	NO,NA	NO,NA	13343.56
1. Energy	1846.13	6.93	38.04						1891.10
A. Fuel combustion (sectoral approach)	1776.01	6.19	38.04						1820.24
1. Energy industries	16.90	0.01	0.02						16.92
2. Manufacturing industries and construction	230.15	0.15	0.52						230.82
3. Transport	624.17	3.99	14.54						642.70
4. Other sectors	904.79	2.04	22.96						929.79
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	70.12	0.74	NO,NA						70.86
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	70.12	0.74	NA,NO						70.86
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	423.75	0.70	46.83	2.33	52.53	1.24	NO,NA	NO,NA	527.39
A. Mineral industry	37.37								37.37
B. Chemical industry	0.35	NO,NA	42.61	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	42.97
C. Metal industry	381.64	0.66	NO	NO	52.53	NO	NO	NO	434.83
D. Non-energy products from fuels and solvent use	4.38	NE,NA	NE,NA						4.38
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				2.33	NO				2.33
G. Other product manufacture and use	0.01	0.05	4.22		NO	1.24			5.52
H. Other	NA	NA	NA						NA
3. Agriculture	0.06	350.05	264.10						614.21
A. Enteric fermentation		301.80							301.80
B. Manure management		48.25	50.64						98.90
C. Rice cultivation		NO,NA							NO,NA
D. Agricultural soils		NE,NA,NO	213.46						213.46
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.06								0.06
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7682.74	2360.55	68.53						10111.82
A. Forest land	-56.14	0.22	1.83						-54.08
B. Cropland	1881.04	92.79	NA,NE,IE						1973.83
C. Grassland	6500.71	481.05	0.15						6981.91
D. Wetlands	-663.67	1786.49	NO,NA,NE						1122.82
E. Settlements	20.81	NE	NE,IE						20.81
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	NO,NE								NO,NE
H. Other	IE	IE	66.54						66.54
5. Waste	5.53	186.24	7.26						199.03
A. Solid waste disposal	NO,NE,NA	178.25							178.25
B. Biological treatment of solid waste		NA	NA						NA
C. Incineration and open burning of waste	5.53	4.74	1.30						11.57
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NO,NA
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	304.15	0.26	2.53						306.94
Aviation	211.28	0.04	1.78						213.09
Navigation	92.87	0.22	0.75						93.84
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.31								0.31
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3231.74
Total CO_2 equivalent emissions with land use, land-use change and forestry									13343.56
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1995

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1995
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	9971.07	2898.36	419.84	10.22	69.36	1.24	NO,NA	NO,NA	13370.10
1. Energy	1866.31	6.57	45.65						1918.53
A. Fuel combustion (sectoral approach)	1784.08	5.58	45.65						1835.30
1. Energy industries	21.85	0.01	0.03						21.88
2. Manufacturing industries and construction	218.31	0.14	0.46						218.91
3. Transport	599.90	3.32	18.41						621.63
4. Other sectors	944.02	2.11	26.75						972.88
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	82.23	1.00	NO,NA						83.23
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	82.23	1.00	NA,NO						83.23
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	441.09	0.73	44.75	10.22	69.36	1.24	NO,NA	NO,NA	567.39
A. Mineral industry	37.87								37.87
B. Chemical industry	0.46	NO,NA	40.53	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	40.98
C. Metal industry	397.93	0.68	NO	NO	69.36	NO	NO	NO	467.98
D. Non-energy products from fuels and solvent use	4.83	NE,NA	NE,NA						4.83
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				10.22	NO				10.22
G. Other product manufacture and use	0.01	0.05	4.22		NO	1.24			5.51
H. Other	NA	NA	NA						NA
3. Agriculture	0.06	337.30	253.13						590.49
A. Enteric fermentation		289.80							289.80
B. Manure management		47.50	47.80						95.30
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	205.33						205.33
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.06								0.06
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7658.74	2358.08	69.01						10085.83
A. Forest land	-65.76	0.26	2.11						-63.39
B. Cropland	1871.22	92.28	NA,NE,IE						1963.50
C. Grassland	6509.48	482.38	0.17						6992.03
D. Wetlands	-662.41	1783.16	NO,NA,NE						1120.75
E. Settlements	6.22	NE	NE,IE						6.22
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	NO,NE								NO,NE
H. Other	IE	IE	66.73						66.73
5. Waste	4.87	195.68	7.30						207.86
A. Solid waste disposal	NO,NE,NA	188.00							188.00
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	4.87	4.23	1.17						10.27
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
Memo items:[(2)]									
International bunkers	376.61	0.38	3.12						380.11
Aviation	233.56	0.04	1.97						235.56
Navigation	143.05	0.34	1.16						144.55
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.31								0.31
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3284.28
Total CO_2 equivalent emissions with land use, land-use change and forestry									13370.10
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1996

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1996
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10061.78	2907.18	436.00	18.59	29.64	1.24	NO,NA	NO,NA	13454.45
1. Energy	1957.46	6.60	46.03						2010.08
A. Fuel combustion (sectoral approach)	1876.20	5.81	46.03						1928.03
1. Energy industries	15.35	0.01	0.01						15.36
2. Manufacturing industries and construction	265.17	0.17	0.53						265.87
3. Transport	590.24	3.38	18.78						612.40
4. Other sectors	1005.44	2.25	26.70						1034.39
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	81.26	0.79	NO,NA						82.05
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	81.26	0.79	NA,NO						82.05
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	440.31	0.70	52.02	18.59	29.64	1.24	NO,NA	NO,NA	542.52
A. Mineral industry	41.78								41.78
B. Chemical industry	0.40	NO,NA	47.38	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	47.78
C. Metal industry	393.47	0.66	NO	NO	29.64	NO	NO	NO	423.77
D. Non-energy products from fuels and solvent use	4.64	NE,NA	NE,NA						4.64
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				18.59	NO				18.59
G. Other product manufacture and use	0.01	0.05	4.64		NO	1.24			5.94
H. Other	NA	NA	NA						NA
3. Agriculture	0.07	342.58	261.46						604.10
A. Enteric fermentation		294.08							294.08
B. Manure management		48.50	48.59						97.09
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	212.86						212.86
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.07								0.07
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7659.58	2358.02	69.31						10086.91
A. Forest land	-69.95	0.27	2.23						-67.45
B. Cropland	1861.43	91.77	NA,NE,IE						1953.20
C. Grassland	6517.18	483.56	0.19						7000.93
D. Wetlands	-659.90	1782.42	NO,NA,NE						1122.53
E. Settlements	10.71	NE	NE,IE						10.71
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	66.89						66.89
5. Waste	4.37	199.28	7.19						210.84
A. Solid waste disposal	NO,NE,NA	192.00							192.00
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	4.37	3.83	1.05						9.25
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	391.67	0.34	3.26						395.27
Aviation	268.53	0.05	2.26						270.84
Navigation	123.14	0.29	1.00						124.43
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.31								0.31
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3367.54
Total CO_2 equivalent emissions with land use, land-use change and forestry									13454.45
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1997

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1997
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10154.56	2903.51	433.34	28.77	97.08	1.24	NO,NA	NO,NA	13618.50
1. Energy	1985.80	6.20	53.56						2045.56
A. Fuel combustion (sectoral approach)	1921.95	5.16	53.56						1980.67
1. Energy industries	11.86	0.00	0.01						11.87
2. Manufacturing industries and construction	303.23	0.20	0.64						304.07
3. Transport	601.93	2.72	22.80						627.45
4. Other sectors	1004.93	2.24	30.12						1037.28
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	63.85	1.04	NO,NA						64.89
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	63.85	1.04	NA,NO						64.89
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	499.40	0.74	44.17	28.77	97.08	1.24	NO,NA	NO,NA	671.40
A. Mineral industry	46.55								46.55
B. Chemical industry	0.44	NO,NA	39.51	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	39.95
C. Metal industry	448.00	0.69	NO	NO	97.08	NO	NO	NO	545.78
D. Non-energy products from fuels and solvent use	4.41	NE,NA	NE,NA						4.41
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				28.77	NO				28.77
G. Other product manufacture and use	0.01	0.05	4.65		NO	1.24			5.95
H. Other	NA	NA	NA						NA
3. Agriculture	0.06	339.08	258.67						597.81
A. Enteric fermentation		291.83							291.83
B. Manure management		47.25	49.24						96.49
C. Rice cultivation		NO,NA							NO,NA
D. Agricultural soils		NE,NA,NO	209.43						209.43
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.06								0.06
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7665.09	2354.37	69.80						10089.25
A. Forest land	-76.69	0.30	2.42						-73.98
B. Cropland	1851.56	91.25	NA,NE,IE						1942.82
C. Grassland	6535.93	485.59	0.20						7021.73
D. Wetlands	-657.90	1777.22	NO,NA,NE						1119.32
E. Settlements	12.08	NE	NE,IE						12.08
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	67.17						67.17
5. Waste	4.21	203.12	7.15						214.48
A. Solid waste disposal	NO,NE,NA	196.00							196.00
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	4.21	3.67	1.01						8.89
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
International bunkers	436.71	0.40	3.63						440.74
Aviation	288.91	0.05	2.43						291.39
Navigation	147.80	0.35	1.19						149.35
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.31								0.31
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								

Total CO_2 equivalent emissions without land use, land-use change and forestry	3529.25
Total CO_2 equivalent emissions with land use, land-use change and forestry	13618.50
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1998

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1998
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10176.89	2909.83	434.00	43.22	212.33	1.24	NO,NA	NO,NA	13777.51
1. Energy	1967.50	6.46	54.25						2028.21
A. Fuel combustion (sectoral approach)	1883.80	5.15	54.25						1943.20
1. Energy industries	14.83	0.01	0.01						14.85
2. Manufacturing industries and construction	278.49	0.19	0.63						279.31
3. Transport	604.72	2.77	23.46						630.96
4. Other sectors	985.76	2.18	30.14						1018.08
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	83.70	1.31	NO,NA						85.01
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	83.70	1.31	NA,NO						85.01
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	527.03	0.55	39.26	43.22	212.33	1.24	NO,NA	NO,NA	823.64
A. Mineral industry	54.39								54.39
B. Chemical industry	0.40	NO,NA	34.45	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	34.85
C. Metal industry	467.90	0.51	NO	NO	212.33	NO	NO	NO	680.74
D. Non-energy products from fuels and solvent use	4.34	NE,NA	NE,NA						4.34
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				43.22	NO				43.22
G. Other product manufacture and use	0.01	0.04	4.81		NO	1.24			6.10
H. Other	NA	NA	NA						NA
3. Agriculture	0.08	345.35	262.97						608.40
A. Enteric fermentation		296.60							296.60
B. Manure management		48.75	50.49						99.24
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	212.48						212.48
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.08								0.08
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7678.71	2348.86	70.52						10098.09
A. Forest land	-85.00	0.33	2.73						-81.93
B. Cropland	1841.71	90.74	NA,NE,IE						1932.45
C. Grassland	6563.79	488.41	0.22						7052.43
D. Wetlands	-654.75	1769.38	NO,NA,NE						1114.63
E. Settlements	12.85	NE	NE,IE						12.85
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	67.56						67.56
5. Waste	3.57	208.60	7.01						219.18
A. Solid waste disposal	NO,NE,NA	202.00							202.00
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	3.57	3.15	0.87						7.59
D. Waste water treatment and discharge		3.25	5.96						9.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	510.00	0.48	4.23						514.71
Aviation	334.42	0.06	2.82						337.30
Navigation	175.58	0.42	1.42						177.41
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.31								0.31
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3679.42
Total CO_2 equivalent emissions with land use, land-use change and forestry									13777.51
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

1999

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 1999
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions) [(1)]	10402.47	2909.02	449.24	48.85	204.17	1.24	NO,NA	NO,NA	14015.00
1. Energy	2025.32	6.22	62.75						2094.29
A. Fuel combustion (sectoral approach)	1914.05	4.39	62.75						1981.18
1. Energy industries	11.91	0.00	0.01						11.93
2. Manufacturing industries and construction	288.48	0.19	0.65						289.33
3. Transport	626.24	2.00	29.29						657.53
4. Other sectors	987.41	2.19	32.79						1022.40
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	111.27	1.84	NO,NA						113.11
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	111.27	1.84	NA,NO						113.11
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	676.11	0.82	39.64	48.85	204.17	1.24	NO,NA	NO,NA	970.85
A. Mineral industry	61.43								61.43
B. Chemical industry	0.43	NO,NA	34.78	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	35.21
C. Metal industry	610.13	0.77	NO	NO	204.17	NO	NO	NO	815.08
D. Non-energy products from fuels and solvent use	4.10	NE,NA	NE,NA						4.10
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				48.85	NO				48.85
G. Other product manufacture and use	0.02	0.05	4.87		NO	1.24			6.18
H. Other	NA	NA	NA						NA
3. Agriculture	0.07	344.33	268.86						613.26
A. Enteric fermentation		296.33							296.33
B. Manure management		48.00	50.86						98.86
C. Rice cultivation		NO,NA							NO,NA
D. Agricultural soils		NE,NA,NO	218.01						218.01
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.07								0.07
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry [(1)]	7698.05	2343.06	71.12						10112.23
A. Forest land	-91.35	0.35	2.89						-88.11
B. Cropland	1831.74	90.23	NA,NE,IE						1921.97
C. Grassland	6596.04	491.53	0.24						7087.81
D. Wetlands	-651.57	1760.94	NO,NA,NE						1109.38
E. Settlements	13.07	NE	NE,IE						13.07
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	67.99						67.99
5. Waste	2.92	214.59	6.86						224.37
A. Solid waste disposal	NO,NE,NA	208.25							208.25
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	2.92	2.64	0.73						6.28
D. Waste water treatment and discharge		3.50	5.96						9.46
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items: [(2)]									
International bunkers	522.10	0.45	4.35						526.90
Aviation	359.38	0.06	3.03						362.47
Navigation	162.72	0.39	1.32						164.43
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.40								0.40
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3902.77
Total CO_2 equivalent emissions with land use, land-use change and forestry									14015.00
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2000

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2000
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10490.79	2893.05	428.27	43.28	149.89	1.31	NO,NA	NO,NA	14006.60
1. Energy	1968.90	6.30	62.32						2037.52
A. Fuel combustion (sectoral approach)	1815.76	4.20	62.32						1882.28
1. Energy industries	10.90	0.00	0.01						10.91
2. Manufacturing industries and construction	236.66	0.15	0.57						237.38
3. Transport	628.98	1.96	28.80						659.74
4. Other sectors	939.22	2.08	32.94						974.25
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	153.14	2.10	NO,NA						155.24
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	153.14	2.10	NA,NO						155.24
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	785.74	1.09	22.47	43.28	149.89	1.31	NO,NA	NO,NA	1003.78
A. Mineral industry	65.48								65.48
B. Chemical industry	0.41	NO,NA	17.91	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	18.32
C. Metal industry	715.56	1.05	NO	NO	149.89	NO	NO	NO	866.50
D. Non-energy products from fuels and solvent use	4.29	NE,NA	NE,NA						4.29
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				43.28	NO				43.28
G. Other product manufacture and use	0.01	0.04	4.56		NO	1.31			5.92
H. Other	NA	NA	NA						NA
3. Agriculture	0.07	331.83	264.15						596.05
A. Enteric fermentation		284.58							284.58
B. Manure management		47.25	49.68						96.93
C. Rice cultivation		NO,NA							NO,NA
D. Agricultural soils		NE,NA,NO	214.47						214.47
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.07								0.07
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7733.33	2333.56	72.48						10139.38
A. Forest land	-101.06	0.44	3.66						-96.96
B. Cropland	1821.81	89.72	NA,NE,IE						1911.53
C. Grassland	6644.16	495.64	0.26						7140.06
D. Wetlands	-646.60	1747.77	NO,NA,NE						1101.17
E. Settlements	14.91	NE	NE,IE						14.91
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	68.56						68.56
5. Waste	2.74	220.28	6.85						229.87
A. Solid waste disposal	NO,NE,NA	214.00							214.00
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	2.74	2.58	0.71						6.03
D. Waste water treatment and discharge		3.50	5.96						9.46
E. Other	NA	NO	NO						NA,NO
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	620.47	0.59	5.15						626.21
Aviation	403.26	0.07	3.40						406.72
Navigation	217.21	0.52	1.76						219.48
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.40								0.40
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3867.22
Total CO_2 equivalent emissions with land use, land-use change and forestry									14006.60
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2001

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2001
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10518.14	2898.08	422.23	48.69	108.05	1.31	NO,NA	NO,NA	13996.50
1. Energy	1931.98	6.34	61.48						1999.81
A. Fuel combustion (sectoral approach)	1788.21	4.06	61.48						1853.75
1. Energy industries	10.21	0.00	0.01						10.22
2. Manufacturing industries and construction	286.64	0.19	0.68						287.51
3. Transport	639.70	1.99	29.05						670.73
4. Other sectors	851.66	1.88	31.75						885.29
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	143.77	2.28	NO,NA						146.05
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	143.77	2.28	NA,NO						146.05
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	828.22	1.07	19.79	48.69	108.05	1.31	NO,NA	NO,NA	1007.12
A. Mineral industry	58.69								58.69
B. Chemical industry	0.49	NO,NA	15.53	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	16.02
C. Metal industry	765.37	1.03	NO	NO	108.04	NO	NO	NO	874.44
D. Non-energy products from fuels and solvent use	3.66	NE,NA	NE,NA						3.66
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				48.69	0.01				48.70
G. Other product manufacture and use	0.01	0.04	4.26		NO	1.31			5.62
H. Other	NA	NA	NA						NA
3. Agriculture	0.08	334.85	261.17						596.10
A. Enteric fermentation		286.35							286.35
B. Manure management		48.50	48.66						97.16
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	212.52						212.52
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.08								0.08
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7755.28	2328.31	73.01						10156.59
A. Forest land	-106.86	0.45	3.76						-102.64
B. Cropland	1811.76	89.21	NA,NE,IE						1900.96
C. Grassland	6679.19	498.56	0.28						7178.03
D. Wetlands	-643.54	1740.09	NO,NA,NE						1096.55
E. Settlements	14.63	NE	NE,IE						14.63
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	68.97						68.97
5. Waste	2.58	227.51	6.78						236.87
A. Solid waste disposal	NO,NE,NA	221.50							221.50
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	2.58	2.31	0.64						5.53
D. Waste water treatment and discharge		3.50	5.96						9.46
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	493.27	0.41	4.11						497.79
Aviation	345.29	0.06	2.91						348.26
Navigation	147.98	0.35	1.20						149.53
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.40								0.40
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3839.90
Total CO_2 equivalent emissions with land use, land-use change and forestry									13996.50
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2002

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2002
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)(1)	10645.19	2887.94	395.94	45.74	85.51	1.31	NA,NO	NA,NO	14061.63
1. Energy	2006.83	6.53	60.77						2074.14
A. Fuel combustion (sectoral approach)	1859.27	4.23	60.77						1924.27
1. Energy industries	12.18	0.01	0.01						12.20
2. Manufacturing industries and construction	301.69	0.21	0.67						302.57
3. Transport	643.32	2.00	29.29						674.61
4. Other sectors	902.07	2.02	30.79						934.88
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	147.56	2.30	NO,NA						149.86
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	147.56	2.30	NA,NO						149.86
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	845.48	1.15	3.95	45.74	85.51	1.31	NA,NO	NA,NO	983.14
A. Mineral industry	39.34								39.34
B. Chemical industry	0.45	NO,NA	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.45
C. Metal industry	801.83	1.11	NO	NO	85.50	NO	NO	NO	888.44
D. Non-energy products from fuels and solvent use	3.85	NE,NA	NE,NA						3.85
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				45.74	0.01				45.75
G. Other product manufacture and use	0.01	0.05	3.95		NO	1.31			5.31
H. Other	NA	NA	NA						NA
3. Agriculture	0.08	327.80	250.62						578.50
A. Enteric fermentation		281.05							281.05
B. Manure management		46.75	48.25						95.00
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	202.37						202.37
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	NE								NE
H. Urea application	0.08								0.08
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry(1)	7790.40	2320.35	73.86						10184.61
A. Forest land	-115.96	0.49	4.04						-111.43
B. Cropland	1801.68	88.69	NA,NE,IE						1890.37
C. Grassland	6729.32	502.57	0.30						7232.18
D. Wetlands	-639.21	1728.60	NO,NA,NE						1089.39
E. Settlements	14.46	NE	NE,IE						14.46
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	69.52						69.52
5. Waste	2.40	232.10	6.73						241.24
A. Solid waste disposal	NO,NE,NA	223.25							223.25
B. Biological treatment of solid waste		0.20	0.18						0.38
C. Incineration and open burning of waste	2.40	2.15	0.59						5.15
D. Waste water treatment and discharge		6.50	5.96						12.46
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:(2)									
International bunkers	512.30	0.54	4.25						517.09
Aviation	306.45	0.05	2.58						309.08
Navigation	205.85	0.49	1.67						208.01
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.40								0.40
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 (3)	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3877.02
Total CO_2 equivalent emissions with land use, land-use change and forestry									14061.63
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2003

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2003
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10645.69	2880.31	390.43	56.79	70.47	1.31	NA,NO	NA,NO	14044.99
1. Energy	1995.82	6.23	60.52						2062.57
A. Fuel combustion (sectoral approach)	1859.31	4.21	60.52						1924.04
1. Energy industries	11.44	0.01	0.01						11.46
2. Manufacturing industries and construction	263.38	0.20	0.57						264.14
3. Transport	737.96	2.06	29.84						769.86
4. Other sectors	846.52	1.95	30.10						878.57
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	136.51	2.02	NO,NA						138.53
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	136.51	2.02	NA,NO						138.53
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	846.42	1.12	4.03	56.79	70.47	1.31	NA,NO	NA,NO	980.14
A. Mineral industry	33.00								33.00
B. Chemical industry	0.48	NO,NA	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.48
C. Metal industry	809.34	1.08	NO	NO	70.47	NO	NO	NO	880.89
D. Non-energy products from fuels and solvent use	3.58	NE,NA	NE,NA						3.58
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				56.79	0.00				56.79
G. Other product manufacture and use	0.02	0.04	4.03		NO	1.31			5.41
H. Other	NA	NA	NA						NA
3. Agriculture	2.45	323.80	244.65						570.89
A. Enteric fermentation		278.05							278.05
B. Manure management		45.75	48.23						93.98
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	196.42						196.42
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	2.36								2.36
H. Urea application	0.08								0.08
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7798.95	2315.48	74.48						10188.91
A. Forest land	-127.04	0.52	4.29						-122.22
B. Cropland	1791.59	88.18	NA,NE,IE						1879.77
C. Grassland	6752.72	505.09	0.32						7258.13
D. Wetlands	-636.60	1721.69	NO,NA,NE						1085.09
E. Settlements	18.17	NE	NE,IE						18.17
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	69.87						69.87
5. Waste	2.05	233.67	6.75						242.47
A. Solid waste disposal	NO,NE,NA	225.00							225.00
B. Biological treatment of solid waste		0.30	0.27						0.57
C. Incineration and open burning of waste	2.05	1.87	0.52						4.45
D. Waste water treatment and discharge		6.50	5.96						12.46
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO
Memo items:[(2)]									
International bunkers	472.14	0.40	3.93						476.47
Aviation	329.34	0.06	2.77						332.17
Navigation	142.80	0.34	1.16						144.30
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.59								0.59
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3856.08
Total CO_2 equivalent emissions with land use, land-use change and forestry									14044.99
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2004

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2004
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions) [(1)]	10720.00	2877.58	389.82	59.52	45.48	1.31	NA,NO	NA,NO	14093.72
1. Energy	2040.10	6.62	64.94						2111.66
A. Fuel combustion (sectoral approach)	1917.20	4.27	64.94						1986.41
1. Energy industries	11.17	0.01	0.01						11.19
2. Manufacturing industries and construction	263.65	0.19	0.64						264.48
3. Transport	789.78	2.16	30.93						822.87
4. Other sectors	852.59	1.91	33.36						887.87
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	122.90	2.35	NO,NA						125.26
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	122.90	2.35	NA,NO						125.26
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	869.93	1.15	3.72	59.52	45.48	1.31	NA,NO	NA,NO	981.11
A. Mineral industry	50.84								50.84
B. Chemical industry	0.39	NO,NA	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.39
C. Metal industry	814.54	1.10	NO	NO	45.47	NO	NO	NO	861.11
D. Non-energy products from fuels and solvent use	4.14	NE,NA	NE,NA						4.14
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				59.52	0.00				59.53
G. Other product manufacture and use	0.02	0.05	3.72		NO	1.31			5.10
H. Other	NA	NA	NA						NA
3. Agriculture	2.60	318.78	239.49						560.86
A. Enteric fermentation		274.03							274.03
B. Manure management		44.75	47.65						92.40
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	191.84						191.84
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	2.52								2.52
H. Urea application	0.08								0.08
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry [(1)]	7802.20	2310.85	74.98						10188.03
A. Forest land	-133.24	0.53	4.41						-128.29
B. Cropland	1781.56	87.67	NA,NE,IE						1869.22
C. Grassland	6772.54	507.71	0.33						7280.59
D. Wetlands	-634.05	1714.94	NO,NA,NE						1080.89
E. Settlements	15.28	NE	NE,IE						15.28
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	70.23						70.23
5. Waste	5.17	240.19	6.70						252.06
A. Solid waste disposal	NO,NE,NA	232.25							232.25
B. Biological treatment of solid waste		0.30	0.27						0.57
C. Incineration and open burning of waste	5.17	1.14	0.47						6.78
D. Waste water treatment and discharge		6.50	5.96						12.46
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items: [(2)]									
International bunkers	570.73	0.53	4.74						576.00
Aviation	375.83	0.07	3.17						379.06
Navigation	194.90	0.46	1.58						196.94
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.52								0.52
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									3905.69
Total CO_2 equivalent emissions with land use, land-use change and forestry									14093.72
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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
(2) See footnote 7 to table Summary 1.A.
(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2005

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2005
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)(1)	10670.45	2866.38	395.06	69.26	30.76	2.52	NO	NO	14034.43
1. Energy	1990.68	6.36	69.20						2066.24
A. Fuel combustion (sectoral approach)	1872.52	3.76	69.20						1945.48
1. Energy industries	13.89	0.01	0.02						13.91
2. Manufacturing industries and construction	208.07	0.14	0.46						208.67
3. Transport	795.18	1.75	34.58						831.51
4. Other sectors	855.38	1.86	34.14						891.39
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	118.16	2.59	NO,NA						120.76
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	118.16	2.59	NA,NO						120.76
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	852.92	1.30	3.39	69.26	30.76	2.52	NO	NO	960.15
A. Mineral industry	55.01								55.01
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	793.98	1.27	NO	NO	30.76	NO	NO	NO	826.01
D. Non-energy products from fuels and solvent use	3.92	NE,NA	NE,NA						3.92
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				69.26	0.00				69.26
G. Other product manufacture and use	0.01	0.04	3.39		NO	2.52			5.95
H. Other	NA	NA	NA						NA
3. Agriculture	3.53	322.08	240.01						565.61
A. Enteric fermentation		275.83							275.83
B. Manure management		46.25	48.20						94.45
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	191.81						191.81
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	3.46								3.46
H. Urea application	0.07								0.07
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry(1)	7818.59	2303.70	75.76						10198.05
A. Forest land	-152.74	0.56	4.67						-147.50
B. Cropland	1771.40	87.15	NA,NE,IE						1858.55
C. Grassland	6810.05	511.33	0.35						7321.73
D. Wetlands	-630.17	1704.66	NO,NA,NE						1074.49
E. Settlements	19.95	NE	NE,IE						19.95
F. Other land	NA,NE	NE	NA,NE						NA,NE
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	70.73						70.73
5. Waste	4.73	232.94	6.71						244.38
A. Solid waste disposal	NO,NE,NA	225.25							225.25
B. Biological treatment of solid waste		0.50	0.45						0.95
C. Incineration and open burning of waste	4.73	0.44	0.30						5.48
D. Waste water treatment and discharge		6.75	5.96						12.71
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
Memo items:(2)									
International bunkers	527.40	0.33	4.40						532.13
Aviation	417.02	0.07	3.51						420.60
Navigation	110.38	0.26	0.89						111.53
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.39								0.39
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 (3)	NO,NE								

Total CO_2 equivalent emissions without land use, land-use change and forestry	3836.38
Total CO_2 equivalent emissions with land use, land-use change and forestry	14034.43
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2006

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2006
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	10918.15	2886.93	416.66	69.55	392.79	2.52	NO	NO	14686.60
1. Energy	2059.05	7.49	67.09						2133.63
A. Fuel combustion (sectoral approach)	1922.41	3.89	67.09						1993.39
1. Energy industries	16.09	0.01	0.01						16.10
2. Manufacturing industries and construction	214.03	0.15	0.52						214.70
3. Transport	938.40	2.08	35.35						975.83
4. Other sectors	753.90	1.65	31.21						786.76
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	136.64	3.60	NO,NA						140.24
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	136.64	3.60	NA,NO						140.24
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	961.66	1.18	3.47	69.55	392.79	2.52	NO	NO	1431.16
A. Mineral industry	62.20								62.20
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	895.02	1.15	NO	NO	392.79	NO	NO	NO	1288.96
D. Non-energy products from fuels and solvent use	4.41	NE,NA	NE,NA						4.41
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				69.55	0.00				69.55
G. Other product manufacture and use	0.02	0.04	3.47		NO	2.52			6.04
H. Other	NA	NA	NA						NA
3. Agriculture	3.61	328.58	256.83						589.02
A. Enteric fermentation		280.33							280.33
B. Manure management		48.25	47.97						96.22
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	208.86						208.86
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	3.54								3.54
H. Urea application	0.08								0.08
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7889.03	2296.95	82.29						10268.28
A. Forest land	-158.86	0.59	4.86						-153.42
B. Cropland	1761.18	86.65	0.02						1847.84
C. Grassland	6881.81	521.32	4.72						7407.85
D. Wetlands	-623.64	1688.38	1.13						1065.87
E. Settlements	28.45	NE	NE,IE						28.45
F. Other land	NA,NE	0.01	0.01						0.01
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	71.56						71.56
5. Waste	4.79	252.73	6.99						264.51
A. Solid waste disposal	NO,NE,NA	244.75							244.75
B. Biological treatment of solid waste		0.80	0.72						1.52
C. Incineration and open burning of waste	4.79	0.43	0.31						5.53
D. Waste water treatment and discharge		6.75	5.96						12.71
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	630.95	0.41	5.26						636.63
Aviation	494.41	0.09	4.16						498.66
Navigation	136.54	0.32	1.10						137.96
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.40								0.40
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4418.32
Total CO_2 equivalent emissions with land use, land-use change and forestry									14686.60
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2007

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2007
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)(1)	11253.18	2872.06	424.65	73.33	331.39	2.86	NO	NO	14957.46
1. Energy	2121.34	8.62	67.68						2197.64
A. Fuel combustion (sectoral approach)	1973.97	4.00	67.68						2045.65
1. Energy industries	33.27	0.01	0.02						33.30
2. Manufacturing industries and construction	194.64	0.13	0.54						195.31
3. Transport	974.14	2.16	34.95						1011.25
4. Other sectors	771.92	1.71	32.18						805.80
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	147.37	4.62	NO,NA						151.99
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	147.37	4.62	NA,NO						151.99
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1159.35	1.30	4.29	73.33	331.39	2.86	NO	NO	1572.51
A. Mineral industry	64.36								64.36
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	1091.13	1.24	NO	NO	331.38	NO	NO	NO	1423.76
D. Non-energy products from fuels and solvent use	3.80	NE,NA	NE,NA						3.80
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				73.33	0.00				73.33
G. Other product manufacture and use	0.05	0.06	4.29		NO	2.86			7.25
H. Other	NA	NA	NA						NA
3. Agriculture	4.93	333.85	267.72						606.50
A. Enteric fermentation		284.35							284.35
B. Manure management		49.50	48.85						98.35
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	218.87						218.87
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	4.80								4.80
H. Urea application	0.13								0.13
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry(1)	7959.69	2280.62	77.78						10318.09
A. Forest land	-166.52	0.60	4.97						-160.95
B. Cropland	1750.91	86.12	NA,IE						1837.04
C. Grassland	6958.77	523.42	0.40						7482.59
D. Wetlands	-616.59	1670.47	NO,NA,NE						1053.88
E. Settlements	33.02	NE	NE,IE						33.02
F. Other land	NO,NA,NE	NO	NO,NA						NO,NA,NE
G. Harvested wood products	0.10								0.10
H. Other	IE	IE	72.41						72.41
5. Waste	7.86	247.67	7.19						262.73
A. Solid waste disposal	NO,NE,NA	240.75							240.75
B. Biological treatment of solid waste		1.00	0.89						1.89
C. Incineration and open burning of waste	7.86	0.42	0.34						8.62
D. Waste water treatment and discharge		5.50	5.96						11.46
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:(2)									
International bunkers	712.06	0.57	5.91						718.55
Aviation	505.92	0.09	4.26						510.27
Navigation	206.14	0.49	1.65						208.28
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.54								0.54
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 (3)	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4639.38
Total CO_2 equivalent emissions with land use, land-use change and forestry									14957.46
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2008

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2008
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	11627.84	2856.33	430.03	83.75	411.38	3.01	NO	NO	15412.34
1. Energy	1995.22	8.85	63.45						2067.52
A. Fuel combustion (sectoral approach)	1810.24	3.78	63.45						1877.48
1. Energy industries	15.01	0.00	0.01						15.02
2. Manufacturing industries and construction	160.54	0.10	0.45						161.09
3. Transport	919.83	2.14	33.80						955.77
4. Other sectors	714.87	1.54	29.20						745.60
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	184.97	5.07	NO,NA						190.04
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	184.97	5.07	NA,NO						190.04
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1601.30	1.06	3.78	83.75	411.38	3.01	NO	NO	2104.28
A. Mineral industry	61.84								61.84
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	1536.09	1.02	NO	NO	411.38	NO	NO	NO	1948.49
D. Non-energy products from fuels and solvent use	3.36	NE,NA	NE,NA						3.36
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				83.75	0.00				83.75
G. Other product manufacture and use	0.02	0.04	3.78		NO	3.01			6.85
H. Other	NA	NA	NA						NA
3. Agriculture	5.67	336.83	276.83						619.33
A. Enteric fermentation		287.08							287.08
B. Manure management		49.75	48.26						98.01
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	228.57						228.57
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	5.52								5.52
H. Urea application	0.15								0.15
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	8019.52	2269.88	78.75						10368.15
A. Forest land	-170.74	0.61	5.07						-165.05
B. Cropland	1740.59	85.61	NA,IE						1826.20
C. Grassland	7028.17	529.08	0.48						7557.72
D. Wetlands	-610.59	1654.57	0.02						1044.01
E. Settlements	31.97	NE	NE,IE						31.97
F. Other land	NA,NE	0.00	0.00						0.00
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	73.18						73.18
5. Waste	6.13	239.71	7.21						253.05
A. Solid waste disposal	NO,NE,NA	233.00							233.00
B. Biological treatment of solid waste		1.06	0.95						2.01
C. Incineration and open burning of waste	6.13	0.40	0.30						6.83
D. Waste water treatment and discharge		5.25	5.96						11.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
Memo items:[(2)]									
International bunkers	651.24	0.61	5.38						657.22
Aviation	423.13	0.07	3.56						426.76
Navigation	228.11	0.53	1.82						230.46
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.28								0.28
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								

Total CO_2 equivalent emissions without land use, land-use change and forestry	5044.18
Total CO_2 equivalent emissions with land use, land-use change and forestry	15412.34
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2009

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2009
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)(1)	11606.88	2846.61	405.40	113.06	180.05	3.02	NO	NO	15155.03
1. Energy	1943.04	9.61	56.43						2009.09
A. Fuel combustion (sectoral approach)	1774.59	3.81	56.43						1834.84
1. Energy industries	12.62	0.00	0.01						12.63
2. Manufacturing industries and construction	120.13	0.09	0.30						120.52
3. Transport	893.25	2.07	33.67						928.99
4. Other sectors	748.59	1.65	22.46						772.70
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	168.45	5.80	NO,NA						174.25
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	168.45	5.80	NA,NO						174.25
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1612.97	1.09	3.28	113.06	180.05	3.02	NO	NO	1913.47
A. Mineral industry	28.70								28.70
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	1582.10	1.05	NO	NO	180.05	NO	NO	NO	1763.20
D. Non-energy products from fuels and solvent use	2.14	NE,NA	NE,NA						2.14
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				113.06	0.00				113.06
G. Other product manufacture and use	0.02	0.04	3.28		NO	3.02			6.36
H. Other	NA	NA	NA						NA
3. Agriculture	4.17	341.60	258.89						604.66
A. Enteric fermentation		291.35							291.35
B. Manure management		50.25	49.39						99.65
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	209.49						209.49
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	4.02								4.02
H. Urea application	0.16								0.16
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry(1)	8040.64	2261.16	79.44						10381.24
A. Forest land	-184.84	0.63	5.20						-179.01
B. Cropland	1730.21	85.09	NA,IE						1815.31
C. Grassland	7084.72	533.62	0.43						7618.77
D. Wetlands	-605.61	1641.82	NO,NA,NE						1036.21
E. Settlements	16.05	NE	NE,IE						16.05
F. Other land	NA,NE	0.00	0.00						0.00
G. Harvested wood products	0.11								0.11
H. Other	IE	IE	73.82						73.82
5. Waste	6.06	233.14	7.36						246.56
A. Solid waste disposal	NO,NE,NA	226.25							226.25
B. Biological treatment of solid waste		1.27	1.14						2.41
C. Incineration and open burning of waste	6.06	0.37	0.26						6.69
D. Waste water treatment and discharge		5.25	5.96						11.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:(2)									
International bunkers	494.79	0.44	4.09						499.32
Aviation	330.21	0.06	2.78						333.05
Navigation	164.58	0.38	1.31						166.28
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.21								0.21
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 (3)	NO,NE								

Total CO_2 equivalent emissions without land use, land-use change and forestry	4773.78
Total CO_2 equivalent emissions with land use, land-use change and forestry	15155.03
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2010

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2010
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[1]	11425.76	2845.09	393.86	145.78	171.67	4.66	NO	NO	14986.81
1. Energy	1800.71	8.55	51.09						1860.35
A. Fuel combustion (sectoral approach)	1611.11	3.56	51.09						1665.76
1. Energy industries	11.73	0.00	0.00						11.74
2. Manufacturing industries and construction	99.49	0.08	0.22						99.79
3. Transport	849.84	2.02	32.20						884.06
4. Other sectors	650.05	1.46	18.66						670.17
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	189.60	4.99	NO,NA						194.59
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	189.60	4.99	NA,NO						194.59
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1620.32	1.06	3.57	145.78	171.67	4.66	NO	NO	1947.05
A. Mineral industry	10.42								10.42
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	1607.25	1.02	NO	NO	171.66	NO	NO	NO	1779.93
D. Non-energy products from fuels and solvent use	2.63	NE,NA	NE,NA						2.63
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				145.78	0.01				145.78
G. Other product manufacture and use	0.02	0.04	3.57		NO	4.66			8.29
H. Other	NA	NA	NA						NA
3. Agriculture	2.41	342.60	251.92						596.92
A. Enteric fermentation		293.10							293.10
B. Manure management		49.50	49.58						99.08
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	202.34						202.34
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	2.28								2.28
H. Urea application	0.13								0.13
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[1]	7996.40	2260.01	79.71						10336.12
A. Forest land	-207.96	0.65	5.31						-202.00
B. Cropland	1719.81	84.58	NA,IE						1804.39
C. Grassland	7083.94	534.56	0.45						7618.95
D. Wetlands	-605.01	1640.22	0.00						1035.21
E. Settlements	5.50	NE	NE,IE						5.50
F. Other land	NO,NA,NE	NO	NO,NA						NO,NA,NE
G. Harvested wood products	0.12								0.12
H. Other	IE	IE	73.95						73.95
5. Waste	5.91	232.87	7.57						246.36
A. Solid waste disposal	NO,NE,NA	225.75							225.75
B. Biological treatment of solid waste		1.52	1.36						2.89
C. Incineration and open burning of waste	5.91	0.35	0.25						6.51
D. Waste water treatment and discharge		5.25	5.96						11.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[2]									
International bunkers	555.19	0.49	4.59						560.27
Aviation	373.12	0.07	3.14						376.33
Navigation	182.07	0.43	1.45						183.95
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.22								0.22
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [3]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4650.69
Total CO_2 equivalent emissions with land use, land-use change and forestry									14986.81
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2011

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2011
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	11314.17	2823.10	370.94	144.50	74.52	3.05	NO	NO	14730.27
1. Energy	1705.87	7.35	47.00						1760.21
A. Fuel combustion (sectoral approach)	1527.08	3.34	47.00						1577.42
1. Energy industries	10.61	0.00	0.00						10.62
2. Manufacturing industries and construction	96.38	0.07	0.24						96.69
3. Transport	815.23	1.92	30.85						848.01
4. Other sectors	604.86	1.34	15.90						622.11
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	178.78	4.01	NO,NA						182.79
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	178.78	4.01	NA,NO						182.79
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1614.77	1.03	3.68	144.50	74.52	3.05	NO	NO	1841.54
A. Mineral industry	20.16								20.16
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	1591.77	0.99	NO	NO	74.52	NO	NO	NO	1667.28
D. Non-energy products from fuels and solvent use	2.82	NE,NA,NO	NE,NA,NO						2.82
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				144.50	0.00				144.50
G. Other product manufacture and use	0.02	0.04	3.68		NO	3.05			6.79
H. Other	NA	NA	NA						NA
3. Agriculture	2.37	342.35	232.68						577.40
A. Enteric fermentation		292.35							292.35
B. Manure management		50.00	50.22						100.22
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	182.45						182.45
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	2.22								2.22
H. Urea application	0.15								0.15
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	7984.60	2255.60	80.09						10320.30
A. Forest land	-235.45	0.64	5.34						-229.46
B. Cropland	1709.40	84.06	NA,IE						1793.46
C. Grassland	7108.36	537.19	0.44						7645.99
D. Wetlands	-602.53	1633.71	NO,NA,NE						1031.18
E. Settlements	4.68	NE	NE,IE						4.68
F. Other land	NO,NA,NE	NO	NO,NA						NO,NA,NE
G. Harvested wood products	0.13								0.13
H. Other	IE	IE	74.31						74.31
5. Waste	6.55	216.76	7.49						230.81
A. Solid waste disposal	NO,NE,NA	209.75							209.75
B. Biological treatment of solid waste		1.43	1.28						2.70
C. Incineration and open burning of waste	6.55	0.34	0.26						7.15
D. Waste water treatment and discharge		5.25	5.96						11.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	615.73	0.54	5.09						621.36
Aviation	417.30	0.07	3.51						420.88
Navigation	198.43	0.46	1.58						200.47
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.15								0.15
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4409.97
Total CO_2 equivalent emissions with land use, land-use change and forestry									14730.27
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2012

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2012
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	11323.01	2795.20	394.66	171.73	94.00	5.32	NO	NO	14783.93
1. Energy	1654.76	6.49	45.83						1707.08
A. Fuel combustion (sectoral approach)	1484.58	3.23	45.83						1533.64
1. Energy industries	10.47	0.00	0.01						10.47
2. Manufacturing industries and construction	82.64	0.06	0.15						82.85
3. Transport	806.60	1.86	29.51						837.98
4. Other sectors	584.87	1.30	16.17						602.34
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	170.18	3.26	NO,NA						173.44
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	170.18	3.26	NA,NO						173.44
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1657.57	1.30	3.58	171.73	94.00	5.32	NO	NO	1933.50
A. Mineral industry	0.53								0.53
B. Chemical industry	NO,IE	NO,IE	NO	NO	NO	NO	NO	NO	NO,IE
C. Metal industry	1654.33	1.26	NO	NO	94.00	NO	NO	NO	1749.59
D. Non-energy products from fuels and solvent use	2.68	NE,NA,NO	NE,NA,NO						2.68
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				171.73	0.00				171.73
G. Other product manufacture and use	0.03	0.04	3.58		NO	5.32			8.97
H. Other	NA	NA	NA						NA
3. Agriculture	4.20	339.13	257.46						600.78
A. Enteric fermentation		290.13							290.13
B. Manure management		49.00	49.78						98.78
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	207.68						207.68
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	4.03								4.03
H. Urea application	0.17								0.17
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry[(1)]	8000.14	2250.09	80.60						10330.83
A. Forest land	-246.21	0.66	5.42						-240.13
B. Cropland	1698.99	83.55	NA,IE						1782.53
C. Grassland	7142.00	540.22	0.46						7682.67
D. Wetlands	-599.49	1625.67	NO,NA,NE						1026.18
E. Settlements	4.70	NE	NE,IE						4.70
F. Other land	NA,NE	0.00	0.00						0.00
G. Harvested wood products	0.15								0.15
H. Other	IE	IE	74.73						74.73
5. Waste	6.35	198.20	7.19						211.73
A. Solid waste disposal	NO,NE,NA	191.50							191.50
B. Biological treatment of solid waste		1.12	1.00						2.12
C. Incineration and open burning of waste	6.35	0.33	0.23						6.90
D. Waste water treatment and discharge		5.25	5.96						11.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO
Memo items:[(2)]									
International bunkers	619.05	0.50	5.13						624.69
Aviation	437.30	0.08	3.68						441.06
Navigation	181.75	0.43	1.45						183.62
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	0.11								0.11
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4453.09
Total CO_2 equivalent emissions with land use, land-use change and forestry									14783.93
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2013

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2013
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)(1)	11340.48	2792.38	389.39	179.91	88.16	3.20	NO	NO	14793.52
1. Energy	1641.72	7.17	43.78						1692.68
A. Fuel combustion (sectoral approach)	1469.26	3.16	43.78						1516.20
1. Energy industries	3.63	0.00	0.01						3.64
2. Manufacturing industries and construction	72.56	0.06	0.13						72.76
3. Transport	822.20	1.85	29.10						853.16
4. Other sectors	570.87	1.24	14.54						586.65
5. Other	NO,NA	NO,NA	NO,NA						NO,NA
B. Fugitive emissions from fuels	172.46	4.01	NO,NA						176.48
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA
2. Oil and natural gas	172.46	4.01	NA,NO						176.48
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1683.60	1.37	3.13	179.91	88.16	3.20	NO	NO	1959.36
A. Mineral industry	0.58								0.58
B. Chemical industry	NO,IE	NO,IE	NO	NO	NO	NO	NO	NO	NO,IE
C. Metal industry	1680.35	1.32	NO	NO	88.16	NO	NO	NO	1769.83
D. Non-energy products from fuels and solvent use	2.65	NE,NA,NO	NE,NA,NO						2.65
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				179.91	0.00				179.91
G. Other product manufacture and use	0.02	0.04	3.13		NO	3.20			6.39
H. Other	NA	NA	NA						NA
3. Agriculture	3.82	330.15	253.87						587.85
A. Enteric fermentation		283.65							283.65
B. Manure management		46.50	49.75						96.25
C. Rice cultivation		NO							NO
D. Agricultural soils		NE,NA,NO	204.13						204.13
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	3.61								3.61
H. Urea application	0.21								0.21
I. Other carbon-containing fertilizers	NE								NE
J. Other		NA	NA						NA
4. Land use, land-use change and forestry(1)	8005.94	2245.10	81.06						10332.10
A. Forest land	-265.51	0.66	5.45						-259.40
B. Cropland	1688.57	83.03	NA,IE						1771.60
C. Grassland	7174.76	543.16	0.48						7718.40
D. Wetlands	-596.69	1618.25	NO,NA,NE						1021.56
E. Settlements	4.64	NE	NE,IE						4.64
F. Other land	NA,NE	NA	NA						NA,NE
G. Harvested wood products	0.17								0.17
H. Other	IE	IE	75.13						75.13
5. Waste	5.39	208.58	7.54						221.52
A. Solid waste disposal	NO,NE,NA	201.50							201.50
B. Biological treatment of solid waste		1.50	1.34						2.83
C. Incineration and open burning of waste	5.39	0.33	0.25						5.97
D. Waste water treatment and discharge		5.25	5.96						11.21
E. Other	NA	NO	NO						NO,NA
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:(2)									
International bunkers	702.66	0.58	5.82						709.06
Aviation	493.58	0.09	4.16						497.83
Navigation	209.08	0.49	1.66						211.23
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	NO,NA								NO,NA
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 (3)	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4461.41
Total CO_2 equivalent emissions with land use, land-use change and forestry									14793.52
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2014

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2014
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[1]	11288.53	2790.00	415.95	181.70	99.03	2.22	NO	NO	14777.43
1. Energy	1626.85	7.62	47.98						1682.45
A. Fuel combustion (sectoral approach)	1444.79	3.09	47.98						1495.86
1. Energy industries	2.52	0.00	0.01						2.53
2. Manufacturing industries and construction	33.73	0.03	0.06						33.82
3. Transport	824.70	1.84	28.68						855.22
4. Other sectors	583.84	1.22	19.23						604.29
5. Other									
B. Fugitive emissions from fuels	182.06	4.53	NA,NO						186.59
1. Solid fuels	NA,NO	NA,NO	NA,NO						NA,NO
2. Oil and natural gas	182.06	4.53	NA,NO						186.59
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1651.94	1.26	2.88	181.70	99.03	2.22	NO	NO	1939.02
A. Mineral industry	0.57								0.57
B. Chemical industry	NO,IE	NO,IE	NO	NO	NO	NO	NO	NO	NO,IE
C. Metal industry	1648.76	1.23	NO	NO	99.03	NO	NO	NO	1749.01
D. Non-energy products from fuels and solvent use	2.58	NE,NA,NO	NE,NA,NO						2.58
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				181.70	0.01				181.71
G. Other product manufacture and use	0.02	0.03	2.88		NO	2.22			5.15
H. Other	NA	NA	NA						NA
3. Agriculture	3.96	346.65	275.63						626.24
A. Enteric fermentation		296.90							296.90
B. Manure management		49.75	50.51						100.26
C. Rice cultivation		NO							NO
D. Agricultural soils		NA,NE,NO	225.12						225.12
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	3.61								3.61
H. Urea application	0.35								0.35
I. Other carbon-containing fertilizers	NE								NE
J. Other		NO							NO
4. Land use, land-use change and forestry[1]	7999.55	2241.35	81.43						10322.33
A. Forest land	-289.98	0.67	5.47						-283.85
B. Cropland	1678.14	82.51	NA,IE						1760.66
C. Grassland	7200.71	545.61	0.49						7746.80
D. Wetlands	-594.21	1612.56	0.01						1018.36
E. Settlements	4.70	NE	NE,IE						4.70
F. Other land	NA,NE	NA	NA						NA,NE
G. Harvested wood products	0.19								0.19
H. Other	IE	IE	75.47						75.47
5. Waste	6.24	193.11	8.03						207.38
A. Solid waste disposal	NO,NE,NA	185.50							185.50
B. Biological treatment of solid waste		2.01	1.80						3.81
C. Incineration and open burning of waste	6.24	0.34	0.27						6.85
D. Waste water treatment and discharge		5.25	5.96						11.21
E. Other	NA	NO	NO						NA,NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[2]									
International bunkers	782.74	0.63	6.48						789.85
Aviation	553.99	0.10	4.66						558.75
Navigation	228.75	0.53	1.82						231.10
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	NA,NO								NA,NO
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [3]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4455.09
Total CO_2 equivalent emissions with land use, land-use change and forestry									14777.43
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

2015

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2015
Submission 2017 v5
ICELAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total
	CO_2 equivalent (kt)								
Total (net emissions)[(1)]	11314.16	2791.18	395.73	206.98	103.70	1.53	NO	NO	14813.28
1. Energy	1643.37	7.74	44.12						1695.23
A. Fuel combustion (sectoral approach)	1482.89	3.13	44.12						1530.14
1. Energy industries	3.63	0.00	0.01						3.64
2. Manufacturing industries and construction	68.21	0.06	0.14						68.41
3. Transport	855.85	1.86	28.69						886.41
4. Other sectors	555.20	1.20	15.28						571.69
5. Other									
B. Fugitive emissions from fuels	160.48	4.61	NA,NO						165.09
1. Solid fuels	NO	NO	NA,NO						NA,NO
2. Oil and natural gas	160.48	4.61	NA,NO						165.09
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1704.47	1.37	2.92	206.98	103.70	1.53	NO	NO	2020.97
A. Mineral industry	0.75								0.75
B. Chemical industry	NO,IE	NO,IE	NO	NO	NO	NO	NO	NO	NO,IE
C. Metal industry	1700.82	1.34	NO	NO	103.69	NO	NO	NO	1805.84
D. Non-energy products from fuels and solvent use	2.88	NE,NA,NO	NE,NA,NO						2.88
E. Electronic Industry				NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				206.98	0.02				206.99
G. Other product manufacture and use	0.03	0.03	2.92		NO	1.53			4.51
H. Other	NA	NA	NA						NA
3. Agriculture	4.19	352.93	258.65						615.77
A. Enteric fermentation		300.93							300.93
B. Manure management		52.00	50.61						102.61
C. Rice cultivation		NO							NO
D. Agricultural soils		NA,NE,NO	208.04						208.04
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA
G. Liming	3.61								3.61
H. Urea application	0.58								0.58
I. Other carbon-containing fertilizers	NE								NE
J. Other		NO							NO
4. Land use, land-use change and forestry[(1)]	7953.51	2238.92	81.88						10274.30
A. Forest land	-339.78	0.67	5.50						-333.62
B. Cropland	1667.71	82.00	NA,IE						1749.71
C. Grassland	7213.31	547.49	0.62						7761.41
D. Wetlands	-592.77	1608.76	0.04						1016.04
E. Settlements	4.82	NE	NE,IE						4.82
F. Other land	NE,NA	0.00	0.00						0.00
G. Harvested wood products	0.22								0.22
H. Other	IE	IE	75.71						75.71
5. Waste	8.62	190.22	8.16						207.00
A. Solid waste disposal	NO,NE,NA	182.25							182.25
B. Biological treatment of solid waste		2.13	1.90						4.03
C. Incineration and open burning of waste	8.62	0.34	0.30						9.26
D. Waste water treatment and discharge		5.50	5.96						11.46
E. Other									
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[(2)]									
International bunkers	974.34	0.84	8.07						983.25
Aviation	667.26	0.12	5.62						672.99
Navigation	307.08	0.72	2.46						310.26
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	NA,NO								NA,NO
CO_2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N_2O			NO,NE						
Indirect CO_2 [(3)]	NO,NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4538.98
Total CO_2 equivalent emissions with land use, land-use change and forestry									14813.28
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (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

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Annex IV Summary of supplementary information

Summary of reporting of supplementary information under the Kyoto Protocol

Information reported under Article 7, paragraph 2	NC7 Chapter
National system in accordance with Article 5, para. 1	3.4
National registry	3.4.1
Policies and measures in accordance with Article 2	4
Legislative arrangements and enforcement and administrative procedure	4.1
Information under article 10	
Article 10 a	3
Article 10 b	4.2; 6
Article 10 c	7
Article 10 d	8
Article 10 e	7; 9
Financial resources	7

Annex V Report on recalculation

Iceland submitted to UNFCCC the 2017 annual Inventory data (CRF) on April 13th 2017. During UNFCCC´s in-country review (28 August – 2 September 2017) the expert review team (ERT) raised some issues that where solved during the review week and lead to recalculations of Iceland´s inventory. Iceland therefore resubmitted the 2017 inventory data (CRF) to the UNFCCC on 31st of August 2017. Iceland´s 2017 National Inventory Report (NIR) was not updated in accordance to the recalculations. Iceland´s 2018 NIR will include information on the recalculations done during the UNFCCC review week, as well as information on other recalculations.

All recalculations were done for the timeseries 1990-2015 and increased Iceland´s total emissions (without LULUCF) by 0,37% in 1990 and 0,40% in 2015. Recalculations were done on all 1.A sectors and in sectors 1.B.2, 2C.2 and 3.A. No recalculations were done in the LULUCF or waste sector. Table 1 and 2 contain information on recalculations for each sector in 1990 and 2015, further information on recalculations for each subsector can be seen in the tables in this annex.

Member State:	Iceland
Recalculated year	1990
Greenhouse gas	CO2-eq.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gas	Previous submission (CO2-eq, kt)	Latest submission (CO2-eq, kt)	Difference (CO2-eq, kt)	Difference %	Impact of recalculation on total emissions excluding LULUCF %	Impact of recalculation on total emissions including LULUCF %	Explanation for recalculations
Total National Emissions and Removals (incl. LULUCF)	**CO2-eq.**	**13676,40**	**13689,67**	**13,27**	**0,10%**	**0,37%**	**0,10%**	**Recalculations due to comments during UNFCCC review in August 2017. Recalculations in all 1.A sectors and in sectors 1.B.2, 2.C.2 and 3.A. No recalculations to the LULUCF sector**
Total National Emissions and Removals (excl.LULUCF)	**CO2-eq.**	**3542,75**	**3556,02**	**13,27**	**0,37%**	**0,37%**	**0,10%**	**Recalculations due to comments during UNFCCC review in August 2017. Recalculations in all 1.A sectors and in sectors 1.B.2, 2.C.2 and 3.A.**
1. Energy	**CO2-eq.**	**1777,06**	**1788,72**	**11,66**	**0,66%**	**0,33%**	**0,09%**	**Recalculation due to changed oxidation factor in 1.A.1-4 and EF for N2O and CH4 changed for diesel . Emissions added in sector 1.B.2**
A. Fuel combustion activities	**CO2-eq.**	1714,97	1726,62	11,65	0,68%	0,33%	0,09%	Oxidation factor changed in 1.A.1-4 and EF for N2O and CH4 changed for diesel
1. Energy industries	**CO2-eq.**	13,82	13,82	0,00	-0,01%	0,00%	0,00%	Oxidation factor changed to 1 (from 0.98/0.99)
2. Manufacturing industries and construction	**CO2-eq.**	243,58	244,61	1,03	0,42%	0,03%	0,01%	Oxidation factor changed to 1 (from 0.98/0.99)
3. Transport	**CO2-eq.**	617,06	619,89	2,83	0,46%	0,08%	0,02%	Oxidation factor changed to 1 (from 0.98/0.99); EF for N2O and CH4 changed for diesel to be in line with 2006 Guidelines.
4. Other sectors	**CO2-eq.**	840,51	848,30	7,79	0,93%	0,22%	0,06%	Oxidation factor changed to 1 (from 0.98/0.99)
5. Other	**CO2-eq.**	NO,NA	NO,NA					
B. Fugitive Emissions from Fuels	**CO2-eq.**	62,10	62,10	0,00	0,00%	0,00%	0,00%	Emissions added in sector 1.B.2.
1. Solid fuels	**CO2-eq.**	NO,NA	NO,NA					
2. Oil and natural gas	**CO2-eq.**	62,10	62,10	0,00	0,00%	0,00%	0,00%	Emissions from Þeistareykir added (were omitted previously)
C. CO2 transport and storage	**CO2-eq.**	NO	NO					
2. Industrial processes and product use	**CO2-eq.**	**954,20**	**955,07**	**0,87**	**0,09%**	**0,02%**	**0,01%**	**Recalculations to sector 2.C.2 due to recalculations of CH4 emissions**
A. Mineral industry	**CO2-eq.**	52,28	52,28	0,00	0,00%	0,00%	0,00%	
B. Chemical industry	**CO2-eq.**	46,85	46,85	0,00	0,00%	0,00%	0,00%	
C. Metal industry	**CO2-eq.**	843,35	844,22	0,87	0,10%	0,02%	0,01%	Recalculation of CH4 emissions (changed EF) for Ferroalloys 2C2
D. Non-energy products from fuels and solvent use	**CO2-eq.**	4,37	4,37	0,00	0,00%	0,00%	0,00%	
E. Electronic Industry		NO	NO					
F. Product uses as ODS substitutes		0,34	0,34	0,00	0,00%	0,00%	0,00%	
G. Other product manufacture and use	**CO2-eq.**	7,01	7,01	0,00	0,00%	0,00%	0,00%	
H. Other	**CO2-eq.**	NA	NA					
3. Agriculture	**CO2-eq.**	**646,47**	**647,22**	**0,75**	**0,12%**	**0,02%**	**0,01%**	Recalculation of emissions from CH4 from sector 3.A.
A. Enteric fermentation	**CO2-eq.**	313,80	314,55	0,75	0,24%	0,02%	0,01%	Recalculation of CH4 emissions from enteric fermentation. Ym factor for cattle and sheep changed from CS to default IPCC 2006.
B. Manure management	**CO2-eq.**	109,20	109,20	0,00	0,00%	0,00%	0,00%	
C. Rice cultivation	**CO2-eq.**	NO	NO					
D. Agricultural soils	**CO2-eq.**	223,42	223,42	0,00	0,00%	0,00%	0,00%	
E. Prescribed burning of savannahs	**CO2-eq.**							
F. Field burning of agricultural residues	**CO2-eq.**	NO,NA	NO,NA					
G. Liming	**CO2-eq.**	NE	NE					
H. Urea application	**CO2-eq.**	0,06	0,06	0,00	0,00%	0,00%	0,00%	
I. Other carbon-containing fertilizer	**CO2-eq.**	NE	NE					
J. Other	**CO2-eq.**	NA	NA					
4. Land use, land-use change and forestry (net) (4)	**CO2-eq.**	**10133,65**	**10133,65**	**0,00**	**0,00%**	**0,00%**	**0,00%**	**No recalculations where done to the LULUCF sector during the 2017 UNFCCC review**
A. Forestland	**CO2-eq.**	-41,26	-41,26	0,00	0,00%	0,00%	0,00%	
B. Cropland	**CO2-eq.**	2014,28	2014,28	0,00	0,00%	0,00%	0,00%	
C. Grassland	**CO2-eq.**	6964,45	6964,45	0,00	0,00%	0,00%	0,00%	
D. Wetlands	**CO2-eq.**	1116,87	1116,87	0,00	0,00%	0,00%	0,00%	
E. Settlements	**CO2-eq.**	13,19	13,19	0,00	0,00%	0,00%	0,00%	
F. Other land	**CO2-eq.**	NA,NE	NA,NE					
G. Harvested wood products	**CO2-eq.**	NO,NE	NO,NE					
H. Other	**CO2-eq.**	66,11	66,11					
5. Waste	**CO2-eq.**	**165,01**	**165,01**	**0,00**	**0,00%**	**0,00%**	**0,00%**	**No recalculations where done to the Waste sector during the 2017 UNFCCC review**
A. Solid waste disposal	**CO2-eq.**	142,00	142,00					
B. Biological treatment of solid waste	**CO2-eq.**	NA	NA					
C. Incineration and open burning of waste	**CO2-eq.**	15,05	15,05	0,00	0,00%	0,00%	0,00%	
D. Waste water treatment and discharge	**CO2-eq.**	7,96	7,96	0,00	0,00%	0,00%	0,00%	
E. Other	**CO2-eq.**	NO,NA	NO,NA					
6. Other (As specified in summary 1.A)	**CO2-eq.**	NO	NO					**No emissions reported under sector 6.**
Memo items:								
International bunkers	**CO2-eq.**	318,39	321,58	3,19	1,00%	0,09%	0,02%	
Aviation	**CO2-eq.**	219,11	221,31	2,20	1,00%	0,06%	0,02%	
Navigation	**CO2-eq.**	99,28	100,28	1,00	1,01%	0,03%	0,01%	Emissions recalculated for aviation and navigation.
Multilateral operations	**CO2-eq.**	NO	NO					Oxidation factor changed to 1 (from 0.98/0.99)
CO2 emissions from biomass	**CO2-eq.**	NA,NO	NA,NO					Oxidation factor changed to 1 (from 0.98/0.99)
CO2 captured	**CO2-eq.**	NA,NO	NA,NO					
Long-term storage of C in waste disposal sites	**CO2-eq.**	NO	NO					
Indirect N2O	**CO2-eq.**							
Indirect CO2	**CO2-eq.**	NO,NE	NO,NE					

Member State:	Iceland
Recalculated year	2015
Greenhouse gas	CO2-eq.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gas	Previous submission (CO2-eq, kt)	Latest submission (CO2-eq, kt)	Difference (CO2-eq, kt)	Difference %	Impact of recalculation on total emissions excluding LULUCF %	Impact of recalculation on total emissions including LULUCF %	Explanation for recalculations
Total National Emissions and Removals	**CO2-eq.**	**14813,28**	**14831,48**	**18,20**	**0,12%**	**0,40%**	**0,12%**	**Recalculations due to comments during UNFCCC review in August 2017. Recalculations in all 1.A sectors and in sectors 1.B.2, 2.C.2 and 3.A. No recalculations to the LULUCF sector**
Total National Emissions and Removals (without LULUCF)	**CO2-eq.**	**4538,98**	**4557,17**	**18,20**	**0,40%**	**0,40%**	**0,12%**	**Recalculations due to comments during UNFCCC review in August 2017. Recalculations in all 1.A sectors and in sectors 1.B.2, 2.C.2 and 3.A.**
1. Energy	**CO2-eq.**	**1695,23**	**1710,10**	**14,86**	**0,88%**	**0,33%**	**0,10%**	**Recalculation due to changed oxidation factor in 1.A.1-4 and EF for N2O and CH4 changed for diesel . Emissions added in sector 1.B.2**
A. Fuel combustion activities	**CO2-eq.**	1530,14	1542,71	12,57	0,82%	0,28%	0,08%	Oxidation factor changed in 1.A.1-4 and EF for N2O and CH4 changed for diesel
1. Energy industries	**CO2-eq.**	3,64	3,64	0,00	0,00%	0,00%	0,00%	Oxidation factor changed to 1 (from 0.98/0.99)
2. Manufacturing industries and construction	**CO2-eq.**	68,41	68,40	0,00	-0,01%	0,00%	0,00%	Oxidation factor changed to 1 (from 0.98/0.99)
3. Transport	**CO2-eq.**	886,41	893,45	7,04	0,79%	0,15%	0,05%	Oxidation factor changed to 1 (from 0.98/0.99); EF for N2O and CH4 changed for diesel to be in line with 2006 Guidelines.
4. Other sectors	**CO2-eq.**	571,69	577,22	5,53	0,97%	0,12%	0,04%	Oxidation factor changed to 1 (from 0.98/0.99)
5. Other	**CO2-eq.**							
B. Fugitive Emissions from Fuels	**CO2-eq.**	165,09	167,39	2,30	1,39%	0,05%	0,02%	Emissions added in sector 1.B.2.
1. Solid fuels	**CO2-eq.**	NA,NO	NA,NO	NO				
2. Oil and natural gas	**CO2-eq.**	165,09	167,39	2,30	1,39%	0,05%	0,02%	Emissions from Þeystareikir added (were omitted previously)
C. CO2 transport and storage	**CO2-eq.**	NO	NO	NO				
2. Industrial processes and product use	**CO2-eq.**	**2020,97**	**2022,58**	**1,61**	**0,08%**	**0,04%**	**0,01%**	**Recalculations to sector 2.C.2 due to recalculations of CH4 emissions**
A. Mineral industry	**CO2-eq.**	0,75	0,75	0,00	0,00%	0,00%	0,00%	
B. Chemical industry	**CO2-eq.**	NO,IE	NO,IE					
C. Metal industry	**CO2-eq.**	1805,84	1807,45	1,61	0,09%	0,04%	0,01%	Recalculation of CH4 emissions (changed EF) for Ferroalloys 2C2
D. Non-energy products from fuels and solvent use	**CO2-eq.**	2,88	2,88	0,00	0,00%	0,00%	0,00%	
E. Electronic Industry	**CO2-eq.**	NO	NO					
F. Product uses as ODS substitutes	**CO2-eq.**	206,99	206,99	0,00	0%	0,00%	0,00%	
G. Other product manufacture and use	**CO2-eq.**	4,51	4,51					
H. Other	**CO2-eq.**	NA	NA					
3. Agriculture	**CO2-eq.**	**615,77**	**617,49**	**1,73**	**0,28%**	**0,04%**	**0,01%**	**Recalculation of emissions from CH4 from sector 3.A.**
A. Enteric fermentation	**CO2-eq.**	300,93	302,65	1,72	0,57%	0,04%	0,01%	
B. Manure management	**CO2-eq.**	102,61	102,61	0,00	0,00%	0,00%	0,00%	
C. Rice cultivation	**CO2-eq.**	NO	NO					Recalculation of CH4 emissions from enteric fermentation. Ym factor for cattle and sheep changed from CS to default IPCC 2006.
D. Agricultural soils	**CO2-eq.**	208,04	208,04	0,00	0,00%	0,00%	0,00%	
E. Prescribed burning of savannahs	**CO2-eq.**							
F. Field burning of agricultural residues	**CO2-eq.**	NO,NA	NO,NA					
G. Liming	**CO2-eq.**	3,61	3,61	0,00	0,00%	0,00%	0,00%	
H. Urea application	**CO2-eq.**	0,58	0,58	0,00	0,00%	0,00%	0,00%	
I. Other carbon-containing fertilizer	**CO2-eq.**	NE	NE					
J. Other	**CO2-eq.**	NO	NO					
4. Land use, land-use change and forestry (net) (4)	**CO2-eq.**	**10274,30**	**10274,30**	**0,00**	**0,00%**	**0,00%**	**0,00%**	**No recalculations where done to the LULUCF sector during the 2017 UNFCCC review**
A. Forestland	**CO2-eq.**	-333,62	-333,62	0,00	0,00%	0,00%	0,00%	
B. Cropland	**CO2-eq.**	1749,71	1749,71	0,00	0,00%	0,00%	0,00%	
C. Grassland	**CO2-eq.**	7761,41	7761,41	0,00	0,00%	0,00%	0,00%	
D. Wetlands	**CO2-eq.**	1016,04	1016,04	0,00	0,00%	0,00%	0,00%	
E. Settlements	**CO2-eq.**	4,82	4,82	0,00	0,00%	0,00%	0,00%	
F. Other land	**CO2-eq.**	0,00	0,00	0,00	0,00%	0,00%	0,00%	
G. Harvested wood products	**CO2-eq.**	0,22	0,22	0,00	0,00%	0,00%	0,00%	
H. Other	**CO2-eq.**	75,71	75,71	0,00	0,00%	0,00%	0,00%	
5. Waste	**CO2-eq.**	**207,00**	**207,00**	**0,00**	**0,00%**	**0,00%**	**0,00%**	**No recalculations where done to the Waste sector during the 2017 UNFCCC review**
A. Solid waste disposal	**CO2-eq.**	182,25	182,25	0,00	0,00%	0,00%	0,00%	
B. Biological treatment of solid waste	**CO2-eq.**	4,03	4,03	0,00	0,00%	0,00%	0,00%	
C. Incineration and open burning of waste	**CO2-eq.**	9,26	9,26	0,00	0,00%	0,00%	0,00%	
D. Waste water treatment and discharge	**CO2-eq.**	11,46	11,46	0,00	0,00%	0,00%	0,00%	
E. Other	**CO2-eq.**							
6. Other (As specified in summary 1.A)	**CO2-eq.**	**NO**	**NO**					**No emissions reported under sector 6.**
Memo items:								
International bunkers	**CO2-eq.**	983,25	993,09	9,84	1,00%	0,22%	0,07%	
Aviation	**CO2-eq.**	672,99	679,73	6,74	1,00%	0,15%	0,05%	
Navigation	**CO2-eq.**	310,26	313,36	3,11	1,00%	0,07%	0,02%	Emissions recalculated for aviation and navigation.
Multilateral operations	**CO2-eq.**	NO	NO					Oxidation factor changed to 1 (from 0.98/0.99)
CO2 emissions from biomass	**CO2-eq.**	NA,NO	NA,NO					Oxidation factor changed to 1 (from 0.98/0.99)
CO2 captured	**CO2-eq.**	NA,NO	NA,NO					
Long-term storage of C in waste disposal sites	**CO2-eq.**	NO	NO					
Indirect N2O	**CO2-eq.**							
Indirect CO2	**CO2-eq.**	NO,NE	NO,NE					

Member State:	Iceland
Recalculated year	2015
Greenhouse gas	CO2-eq.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Previous submission (CO2-eq, kt)	Latest submission (CO2-eq, kt)	Difference (CO2-eq, kt)	Difference %	Impact of recalculation on total emissions excluding LULUCF %	Impact of recalculation on total emissions including LULUCF %	Explanation for recalculations
Total National Emissions and Removals (incl. LULUCF)	**14813,28**	**14831,48**	**18,1984**	**0,12%**	**0,40%**	**0,12%**	**Recalculations due to comments during UNFCCC review in August 2017. Recalculations in all 1.A sectors and in sectors 1.B.2, 2.C.2 and 3.A. No recalculations to the LULUCF sector**
Total National Emissions and Removals (excl. LULUCF)	**4538,98**	**4557,17**	**18,1984**	**0,40%**	**0,40%**	**0,12%**	**Recalculations due to comments during UNFCCC review in August 2017. Recalculations in all 1.A sectors and in sectors 1.B.2, 2.C.2 and 3.A.**
1. Energy	**1695,23**	**1710,10**	**14,8627**	**0,88%**	**0,33%**	**0,10%**	**Recalculation due to changed oxidation factor in 1.A.1-4 and EF for N2O and CH4 changed for diesel . Emissions added in sector 1.B.2**
2. Industrial processes and product use	**2020,97**	**2022,58**	**1,6107**	**0,08%**	**0,04%**	**0,01%**	**Recalculations to sector 2.C.2 due to recalculations of CH4 emissions**
3. Agriculture	**615,77**	**617,49**	**1,7250**	**0,28%**	**0,04%**	**0,01%**	**Recalculation of emissions from CH4 from sector 3.A.**
4. Land use, land-use change and forestry (net) (4)	**10274,30**	**10274,30**	**0,00**	**0,00%**	**0,00%**	**0,00%**	**No recalculations where done to the LULUCF sector during the 2017 UNFCCC review**
5. Waste	**207,00**	**207,00**	**0,00**	**0,00%**	**0,00%**	**0,00%**	**No recalculations where done to the Waste sector during the 2017 UNFCCC review**
6. Other (As specified in summary 1.A)	**NO**	**NO**					**No emissions reported under sector 6.**

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