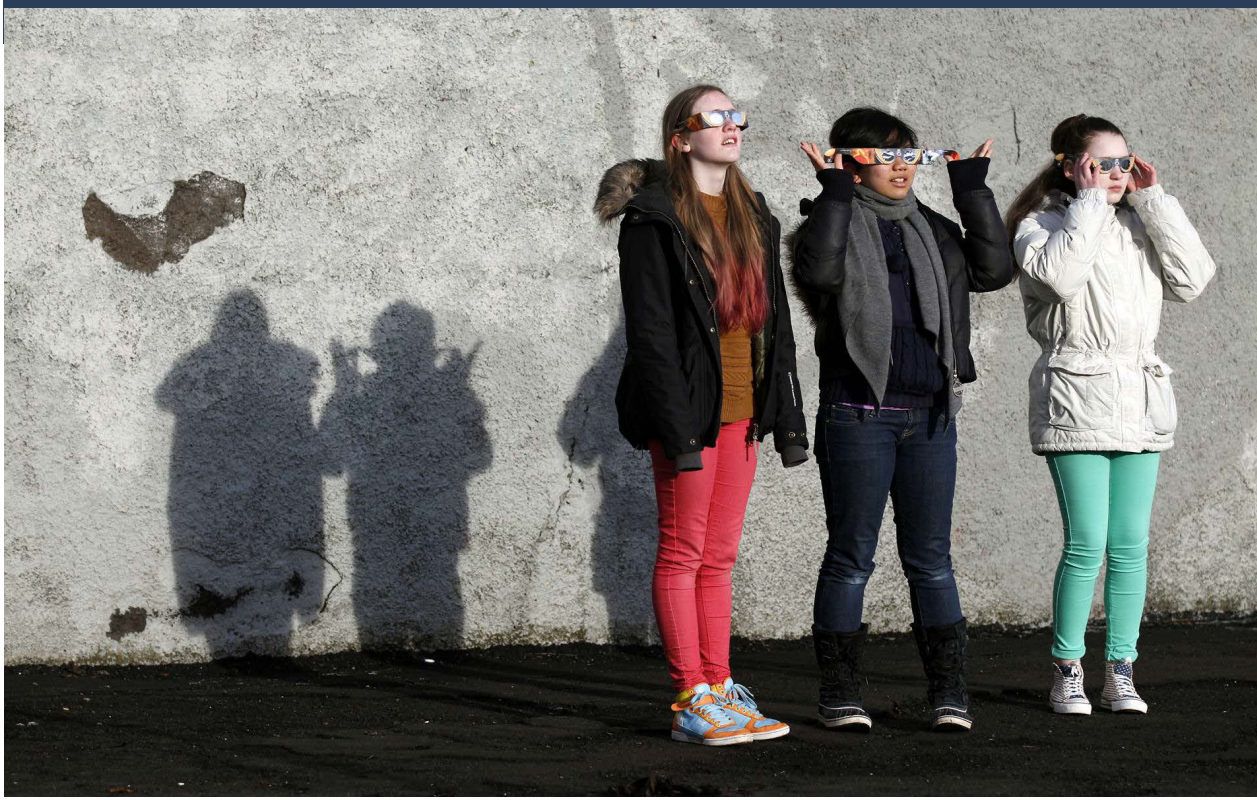
2020

Iceland's Fourth Biennial Report

Under the United Nations Framework Convention on Climate Change

Government of Iceland
Ministry for the Environment and Natural Resources



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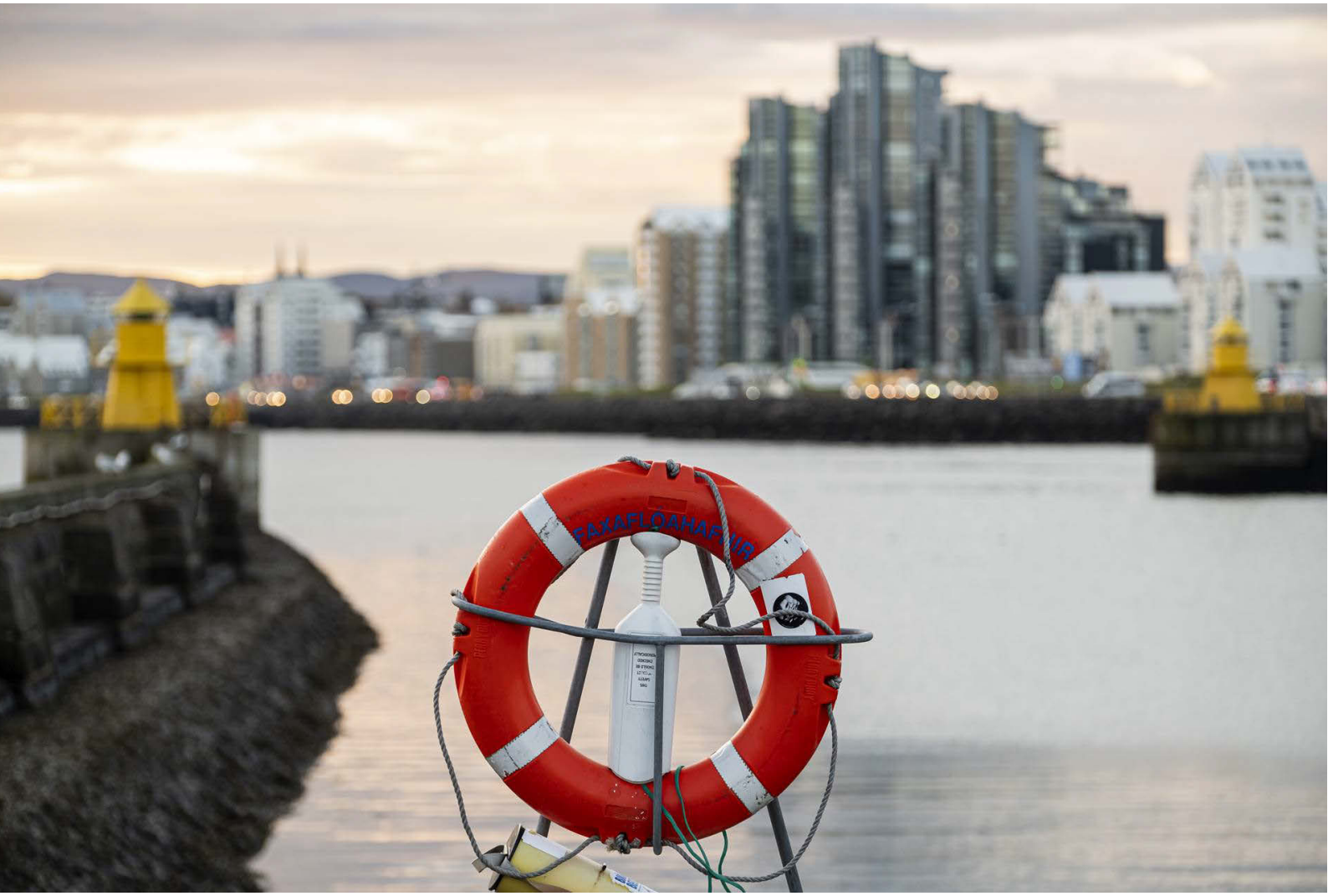

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Abbreviations

AAU	Assigned Amount Units
AUI	Agricultural University of Iceland
BR4	Fourth Biannual Report
CO_2e	CO_2 equivalents
CTF	Common Tabular Format
EA	Environment Agency of Iceland
EEA	European Economic Area
EEA-Agreement	European Economic Area Agreement
ESD	Effort Sharing Decision (Decision No 406/2009/EC)
EU ETS	European Union Emission Trading System
EV	Electric Vehicle
F-gas	Fluorinated gas
GCF	Green Climate Fund
GDP	Gross domestic product
GHG	Green House Gas
HFO	Heavy Fuel Oil
ICAO	The International Civil Aviation Organization
IFS	Forest Service of Iceland
IMO	International Maritime Organization (UN)
IPPU	Industrial Processes and Product Use
ISK	The Icelandic currency "Króna"
kt CO2e	Kilotonnes carbon dioxide equivalent
ktoe	Kiloton oil equivalents
LPG	Liquid Petroleum Gas
LULUCF	Land Use, Land Use Change and Forestry
Marpol	International Convention for the Prevention of Pollution from Ships
MMR	Monitoring Mechanism Regulation
NC	National Communication
NDC	National Determined Contribution
NIR	National Inventory Report
NO	Not Occurring
NREAP	National Renewable Energy Action Plan
ODS	Ozone Depleting Substances
OECD	Organisation for Economic Co-operation and Development
PFC	Perfluorocarbons
RMUs	Removal Units
SCSI	Soil Conservation Service of Iceland
SWDS	Solid Waste Disposal Sites
UNFCCC	UN Framework Convention on Climate Change
WAM	With additional measures
WEM	With existing measures

1. Introduction

This report is Iceland's fourth biennial report (BR4) on national emission trends, emission targets and mitigation regarding climate change and on the provision of support to non-Annex 1 parties under the UN Framework Convention on Climate Change (UNFCCC).

In this report information on greenhouse gas emission and trends is based on the National Inventory Report (NIR) submitted to UNFCCC by Iceland in April 2019[1] and prepared in accordance with UNFCCC biennial reporting guidelines for developed country Parties contained in Decision 2/CP.17. Information on Projection is based on Report on Policies, Measures and Projections - Projections of Greenhouse Gas emissions in Iceland till 2035 submitted by Iceland in 2019 to the European Union under the bilateral agreement between Iceland and the EU.

The Common Tabular Format (CTF) tables have been prepared to be in accordance with the common tabular format for "UNFCCC biennial reporting guidelines for developed country Parties" as specified in decision 19/CP.18.

The report contains information on greenhouse gas emissions and trends, both in the past and projected for the future; emission reduction targets; progress in achievement of quantified economy-wide emission reduction targets and relevant information and; provision of financial, technological and capacity-building support to developing country Parties.

Recommendations for improvements from the expert review team reviewing Iceland's third Biannual Report have been taken into consideration for the BR4 to the extent possible.

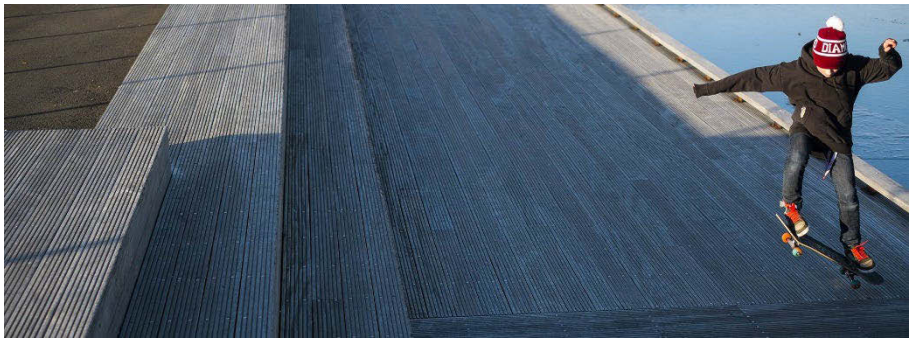
[1] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

2. Information on greenhouse gas emissions and trends

2.1 Emissions trends for aggregated greenhouse gas emissions

The data used in Iceland's 4th biennial report is based on the Icelandic National Inventory Report (NIR)[2] that was submitted by the Environment Agency to the Secretariat of the UNFCCC April 15 2019 (resubmission in November 2019) in compliance to reporting guidelines set forth in decision 24/CP.19.

A detailed information on GHG emissions and removal trends is to be found in Iceland's NIR. Therefore, this BR4 includes a summary on GHG emissions and removal trends for Iceland over the period 1990-2017 as well as a summary on Iceland's aggregated GHG emissions and removal for 2017.



Iceland's GHG inventory covers the four main UNFCCC sectors; Energy, Industrial Processes and Product Use, Agriculture and Waste, all reported with and without Land Use, Land Use Change and Forestry (LULUCF). The total GHG emissions are reported in CO_2 equivalents (CO_2e).

Total emission in Iceland in 2017 was 4.755 kt. CO_2e (without LULUCF). This constitutes a 2,4% increase from 2016 and 32,1% increase from the year 1990.

Total GHG emissions (without LULUCF) increased by approximately a third from 1990 – 2017. In 2017, Industrial Processes were the largest contributor of GHG emissions in Iceland (without LULUCF), followed by Energy, Agriculture, and Waste. The contribution of Industrial Processes to total net emissions (without LULUCF) has more than doubled over the time series, overtaking emissions from the Energy sector in 2012.

[2] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

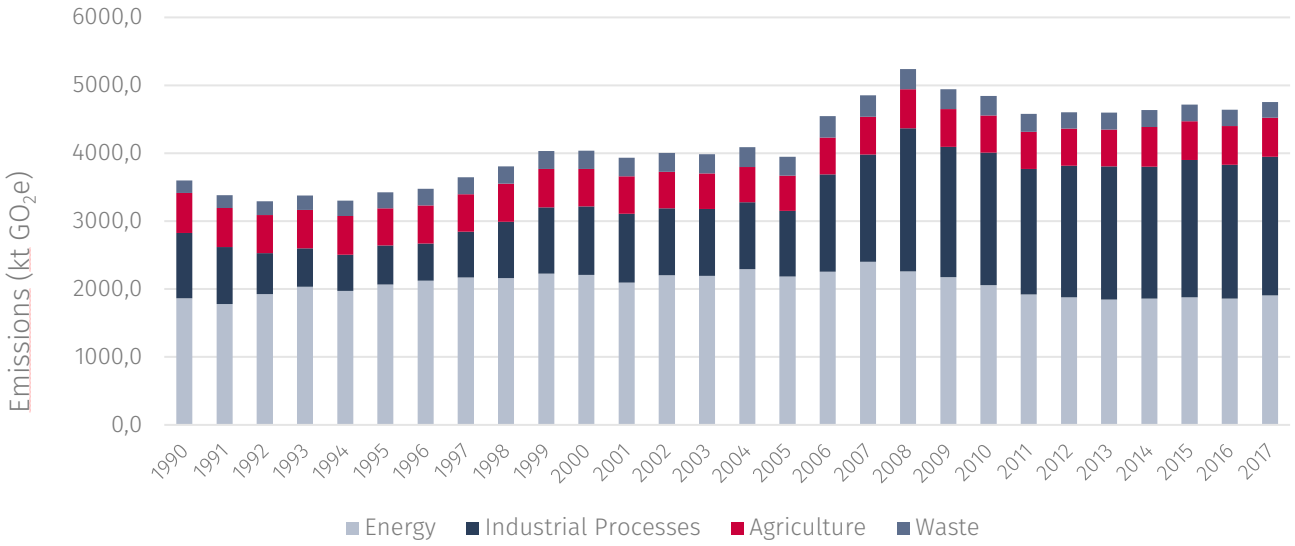


Figure 2.1 Emissions of GHG by UNFCCC sector, without LULUCF, from 1990 to 2017 (kt. CO_2e)

Total emissions somewhat decreased between 1990 and 1994, except for 1993. From 1995-1999 total emissions increased slightly. Emissions plateaued from 2000 to 2005 but increased more rapidly between 2005 and 2007. Between 2008 and 2011 annual emissions steadily decreased. Emissions have been increasing steadily since 2011, apart from the year 2016 which saw a slight decrease. From year 2016 to 2017 emissions increased by 2% when considering the total emissions without LULUCF.

By the middle of the 1990s, economic growth started to gain momentum in Iceland. The main driver behind increased emissions since 1990 is the expansion of the metal production sector. In 1990, about 87,800 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 2017 around 800,000 tonnes aluminium was produced in these three factories all together.[3]

The overall increasing trend of GHG 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 GHG emissions between 2006 and 2008, when emissions from the aluminium sector peaked.

Until 2007, Iceland experienced one of the highest GDP growth rates among OECD countries. A knock-off effect of the increased levels of economic growth until 2007 was an increase in construction, especially residential building in the

[3] https://www.mbl.is/media/84/2384.pdf

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.

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 of Iceland. 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 GHGs decreased from most sectors between 2008 and 2011.

Emissions from fuel combustion in the transport and construction sector decreased each year between 2008 and 2011, because of the economic crisis. In 2015 the emissions were 5% higher than in 2011, yet still 19% below the peak in 2007.

Table 2.1 Emissions of GHG by sector in Iceland during the period 1990-2017 (kt. CO_2e).

	1990	1995	2000	2005	2010	2015	2016	2017	Changes '90-'17	Changes '16-'17
1. Energy	1,867	2,069	2,210	2,184	2,057	1,877	1,858	1,907	2%	3%
2. Industrial Processes	958	571	1,009	965	1,951	2,023	1,974	2,039	113%	3%
3. Agriculture	593	548	552	519	546	571	571	578	-3%	1%
5. Waste	181	239	267	279	291	245	237	230	27%	-3%
Total emissions without LULUCF	3,598	3,426	4,038	3,947	4,845	4,715	4,640	4,755	32%	2%
4. Land Use, Land Use Change and Forestry (LULUCF)	9,407	9,361	9,387	9,427	9,472	9,363	9,345	9,321	-1%	0%
Total emissions w/ LULUCF	13,005	12,787	13,425	13,375	14,317	14,078	13,985	14,075	8%	1%

The increase in GDP since 1990 explains the general growth in emissions together with population growth (37% increase between 1990 and 2017). This has resulted in higher emissions from most sources, in particular from transport and the construction sector.

In 2017, aluminium production had increased almost tenfold compared to 1990. Parallel investments in increased power capacity were needed to accommodate for this increase. The size of these investments is large compared to the size of Iceland's economy. In 2017 total emissions from the aluminium sector were 18% lower than in 2008 due to reduced PFC emissions from the sector.

2.2 National inventory arrangements and changes

Following is a summary of the main components in the national inventory arrangements. A detailed description of the national inventory arrangements, process and QA/QC procedures are to be found in Iceland's 2019 National Inventory Report (NIR).[4]

2.2.1 Institutional arrangements

Act No 70/2012 on Climate issues, with later amendments,[5] is a comprehensive act on climate matters. The purpose of the legislation is twofold, to set a comprehensive act covering regulations set to mitigate and adapt to climate change, and to cover the regulatory framework related to the European Union Emission Trading System, EU ETS.

The Climate Act establishes the national system for the estimation of GHG emissions. In accordance with the Act 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 GHG emission inventory, except for LULUCF which is compiled by the Soil Conservation Service and the Icelandic Forest Service of Iceland (IFS), with a contribution from the Agricultural University of Iceland (AUI). EA reports to the Convention under the UNFCCC reporting guidelines and to the EU. The Act specifies which institutions are obligated to collect data necessary for the GHG inventory and report it to the EA; the obligations are further elaborated in Regulation No 520/2017 on data collection and information from institutions related to Iceland's inventory, see Chapter 1, Section 1.2. and 1.3 of Iceland's National Inventory Report, where further information can also be found.

2.2.2 Changes in inventory arrangements since BR3

In June 2019, changes were made to Chapter III, Article 6 of Act No. 70/2012 which addresses Iceland's GHG inventory. The changes strengthen the legal mandate of the EA to collect information and data from the relevant institutions, businesses and individuals necessary for the GHG inventory as well as legal obligations of institutions, businesses and individuals to provide EA

[4] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

[5] https://www.althingi.is/lagas/150c/2012070.html

with such information. Implementation and application of Regulation 520/2017 is still ongoing, and several improvements are planned in this regard.

3. Quantified economy-wide emission reduction targets (QEWER)

3.1 Iceland's national emissions reduction target

Iceland communicated to the UNFCCC a commitment to a quantified economy-wide emission reduction target of 20% below 1990 levels by 2020 in the second commitment period of the Kyoto Protocol.[6] This target is to be fulfilled jointly with the EU and its 28 Member States according to a bilateral agreement between Iceland and EU where Iceland participates in the overall target of EU and its member states to reduce the emission of 20% to 2020.

Iceland did not carry over any credits from the first commitment period of the Kyoto Protocol.

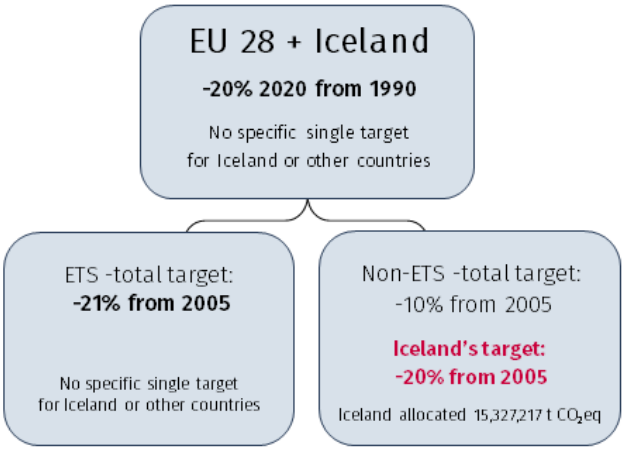


Figure 3.1 EU's 2020 target.

3.2 Bilateral agreement between Iceland and EU on the 2020 target

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.[7] Therein the Parties agree to fulfil

[6] https://unfccc.int/sites/default/files/resource/docs/2012/awglca15/eng/misc01a02.pdf: Additional information relating to the quantified economywide emission reduction targets contained in document FCCC/SB/2011/INF.1/Rev.1

[7] http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2010941%202014%20INIT

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.

According to Article 4, cf. Annex I, of the 2015 Joint Fulfilment Agreement, Regulation (EU) No 525/2013 ("MMR") and current and future Delegated and Implementing Acts based on Regulation (EU) No 525/2013 shall be binding upon Iceland. This includes for instance Commission Implementing Regulation (EU) No 749/2014, which further details the content and format required for the various reporting requirements under Regulation (EU) No 525/2013. The legal acts were rendered applicable in Iceland in 2015 with an amendment to Act No 70/2012, cf. Act No 62/2015.

Iceland does not take up all EU climate-related regulations according to the agreement, such as "effort sharing" and LULUCF, but takes on a comparable numerical target as it would do if it was a Member State of the EU. Iceland can use RMUs from LULUCF-activities to meet its target, but the target was set taking estimated benefits from afforestation and revegetation into account. The emission levels of Iceland (before application of Article 3 (7bis)) in terms of tonnes of carbon dioxide equivalent for the second commitment period of the Kyoto Protocol is set at 15,327,217 t CO_2eq.

The Environment Agency has estimated that there will be excess of allocated emission for the second commitment period of the Kyoto Protocol and it is therefore foreseen that Iceland will have to use market-based mechanism under the Kyoto Protocol to comply with the bilateral agreement with the EU, to meet its target for the non-ETS sector and thus its overall target. The credits acquired, will be in line with the rules of relevant EU climate legislation applicable for Iceland.

According to the latest inventory (NIR 2019)[8] the estimation set forth by the Environment Agency is as follows:

Total emission CP2: 22,812 kt. CO_2e

Allocated allowances CP2: 15,327,217 (t CO_2e)

Removal units: 3,698-3970 kt. CO_2e

Estimate for CP2 excess of allocated emissions: 3,514-3,787.

The assumptions for the estimate are: Emissions 2018-2020 estimated with average 2013-2017 emissions; Removal units 2018-2020 estimated with average

[8] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

2013-2017 RMUs; Removals and therefore estimated emissions are dependent on method of estimation of removal units (linear increase vs. average).

3.2.1 The European Emission Trading Scheme (EU - ETS)

As a party to the EEA-Agreement, Iceland participates in the European Emission Trading Scheme (ETS).[9] Emission that falls outside of the ETS, and relevant climate-related regulations, does not fall under the provisions of the EEA-Agreement.

Under the revised EU ETS Directive, there are no differentiated caps by country as there is one single EU ETS cap that covers the EU Member States and the three participating non-EU Member States, the EFTA-states Norway, Iceland and Liechtenstein. For allowances allocated to the EU ETS sectors, annual caps have been set for the period from 2013 to 2020; these decrease by 1.74 % annually, starting from the average level of allowances issued by Member States for the second trading period (2008–2012). The annual caps imply interim targets for emission reductions in sectors covered by the EU ETS for each year until 2020.

Within the cap, companies receive or buy emission allowances, which they can trade with one another as needed. They can also buy limited amounts of international credits from emission-saving projects around the world. The limit on the total number of allowances available ensures that they have a value.

After each year a company must surrender enough allowances to cover all its emissions, otherwise heavy fines are imposed. If a company reduces its emissions, it can keep the spare allowances to cover its future needs or else sell them to another company that is short of allowances.

3.3 2030 target under the Paris Agreement

Under the Paris Agreement, Iceland will along with Norway, in accordance with Joint Committee Decision No 269/2019,[10] 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 and apply the key pieces of EU climate legislation accordingly. The intention to deliver the target in cooperation with the EU is stated in Iceland's first NDC.[11]

The agreement entails that Iceland will a) continue participation in the EU Emissions Trading Scheme and b) a target for emissions outside the EU-ETS is set by the same methodology as applied to EU Member States. The target for Iceland within the collective delivery has been set at -29%.

[9] https://www.efta.int/eea/eea-agreement

[10] https://www.efta.int/sites/default/files/documents/legal-texts/eea/other-legal-documents/adopted-joint-committee-decisions/2019%20-%20English/269-2019.pdf

[11] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Iceland%20First/INDC-ICELAND.pdf

Work is underway to finalise the legal implementation of Iceland's joint fulfilment with the EU Member States and Norway for the commitments under the Paris Agreement. Iceland will implement the LULUCF Regulation (EU) 2018/84, and the Effort Sharing Regulation (EU) 2018/842, as well as parts of the Governance of the Energy Union Regulation, (EU) 2918/1999 replacing the MMR Regulation (EU) No 525/2013 – which will be repealed as per 1 January 2021.

4. Progress in achievement of quantified economy-wide emission reduction targets and relevant information

4.1 Background and recent policy development

Iceland has adopted numerical targets for its emissions under the Kyoto Protocol since 2008 and ratified the Doha Amendments to the Kyoto Protocol.

In 2015, Iceland, The European Union and its Member States, signed agreement on joint fulfilment of the second commitment period of the Kyoto Protocol, on jointly achieve a 20% reduction in their combined greenhouse gas emissions for the period 2013-2020.

Iceland submitted its Nationally Determined Contribution (NDC) under the Paris Agreement in June 2015. According to the NDC, Iceland aims to be part of a joint fulfilment of a -40% emissions target for 2030 (compared to 1990 emissions), with the European Union and its Member States (See Chapter 3). In October 2019 the EEA Joint Committee adopted Decision No 269/2019 which extends the cooperation on climate change, by including greenhouse gas emissions and removals from land use, land use change and forestry (LULUCF) in the EEA Agreement. By the Decision, Iceland and Norway take action to fulfil the target of reducing their greenhouse gas emissions jointly with the European Union and in accordance with the objectives of the Paris Agreement. The Joint Committee decision was confirmed by Alþingi, the Icelandic Parliament, on 5th of March 2020.

In the Governmental agreement from November 2017 is a strong focus on climate issues, including a pledge for Iceland to become carbon neutral no later than 2040.[12] In the agreement it is also stated that new action plan will be published, including all sectors; Climate committee will be established, and the carbon tax will be increased.

The focus has been set on action and measures to enable 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.

Information on previous actions, see Iceland's 7th National Communication.[13]

[12] https://www.government.is/library/05-Rikisstjorn/agreement2017.pdf

[13] https://unfccc.int/documents/64741

4.2 Policies and measures in Iceland's climate strategy

Climate change will have a big impact on Iceland and Icelandic waters, as on most other countries and regions. Almost all of Iceland's glaciers are receding. Glaciers cover some 11% of Iceland today, but scientists warn that they may largely vanish in the next 100-200 years if warming trends are not halted. Of special concern to Iceland is ocean acidification, which may have a profound impact on the marine ecosystem. Rapid acidification is observed in parts of Icelandic waters, changing the habitats and viability of bivalves and many other organisms.

Iceland has in many ways a unique profile among developed countries, when it comes to greenhouse gas (GHG) emissions and mitigation of climate change and can be said to have a limited amount of low-hanging fruits when it comes to cost-efficient climate change mitigation.

Iceland started using geothermal water to heat houses around 1930, replacing imported coal and oil. The transformation took several decades, supported by a push by the Government to bring clean heating to areas outside the main geothermal areas. Energy production, the main sector targeted for mitigation action in many developed countries, is almost entirely based on renewable energy in Iceland. Electricity is mostly produced by hydro energy, but also by harnessing geothermal steam. About 90% of house heating comes from geothermal energy and the remaining 10% from green electricity. That leads to the fact that today Iceland enjoys virtually carbon-free electricity and heating.

The main sources of GHG emissions (not counting LULUCF) are energy, industrial processes and agriculture. Energy accounts for 40%, where the largest share comes from fossil fuel for road transport (21%) and fisheries (11%), heavy industrial processes and chemicals for 43%, agriculture for 12% and waste management for 5% (See Figure 4.1).

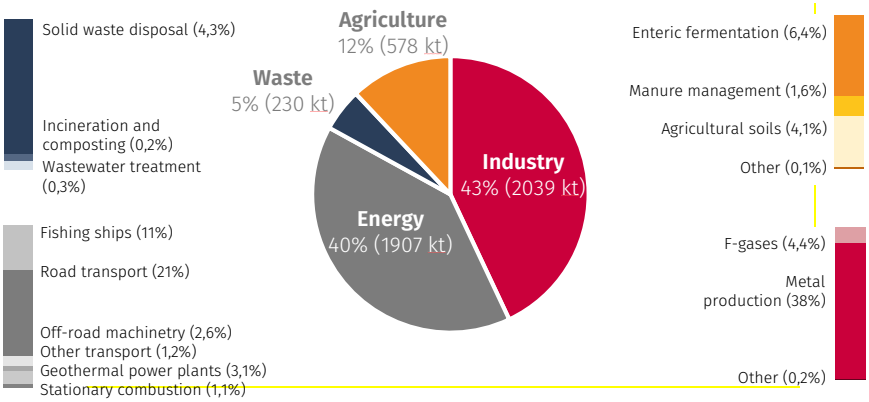


Figure 4.1 Iceland's GHG Emissions by sector 2017 with ETS* (without LULUCF).

* Without international aviation/shipping

As most industrial emissions come from stationary installations regulated under the EU ETS (see Chapter 3), the Government focuses mainly on implementing measures in sectors outside the EU ETS. The aim is to rapidly decarbonize those sectors outside the EU ETS, with the main focus on transport and fisheries. Increased government resources have been allocated in this effort (see Section 4.4). 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 gradually reduce emissions in the agriculture, waste and industry sectors. There are clear signals that mitigation actions have had an impact.

Iceland's mitigation measures seek to reduce GHG emissions while ensuring sustainable growth, and providing synergies with other environmental goals, such as improving air quality and protecting biodiversity.

Iceland has significant mitigation potential in the LULUCF sector. Iceland has lost much of its woodlands and soil since settlement some 1100 years ago. Reforestation, revegetation efforts and afforestation aim to reverse this historical decline, resulting in uptake of carbon from the atmosphere. Scientists have also discovered that wetlands drained in the 20th Century are a large source of greenhouse gas emissions. Wetland restoration is a part of the Government efforts to halt emissions and mitigate climate change.

Forests, agricultural land and wetlands play a central role in Iceland's climate policy and efforts to reach carbon neutrality. The land use, land use change and forestry (LULUCF) sector has the potential to provide long-term climate benefits, and thereby to contribute to the achievement of Iceland's GHG emissions reduction targets.

Sustainable management practices in the LULUCF sector can contribute to climate change mitigation in several ways, by reducing emissions and maintaining and enhancing sinks and carbon stocks.

The LULUCF sector has a direct and significant impact on biodiversity and ecosystems services. Climate mitigation actions in the LULUCF sector are seen as nature-based solutions, and efforts are made to ensure coherence between such actions and Iceland's biodiversity strategy objectives.

The first comprehensive projection on Iceland's climate action was published in 2019 based on the Climate Action Plan published in 2018, (see Chapter 5).

All the measures included in the 2018 Acton Plan are listed in Table 4.1 (see also BR CTF 3).

Regarding transport, there are signals that mitigation actions have had an impact on emissions. A significant increase occurred in the sale of electric and plug-in hybrid cars. Generous Government tax incentives and the rapid build-up of charging stations, partly driven by Government support, contributes to that trend. 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 commuting.

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, support for electricity to ships in harbours and a fisheries system that encourages minimum fishing effort for maximum gain.

It should be noted that the bulk of the increase in emissions in recent years 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.

4.3 Climate action plan 2018

The Icelandic Government announced a new Climate Action Plan in September 2018, intended to boost efforts in cutting net emissions to meet its Paris Agreement targets for 2030 and reach the Governments ambitious aim to make Iceland carbon neutral before 2040. The Action Plan consists of 34 measures, ranging from an increase in reforestation to a ban on new registration of fossil fuel cars by 2030.

The Ministry for the Environment and Natural Resources, co-ordinates the work on the different projects conducted regarding climate action plan, which replaces previous action plans, the latest from 2010. (see Iceland's 7th National Communication). The projection presented in Chapter 5 is based on the 2018 action plan.

The 2018 action plan marks a turning point in combatting climate change in Iceland. In the five-year plan for the state-budget for the period 2019-2023 a severe increase in funding, almost 7 billion ISK, was secured to implement the mitigation measures. There is also broad political support for the action plan, as was demonstrated by the fact that it was introduced by seven ministers.

The main emphasis presented in the plan is to phase out fossil fuels in transport, and to increase carbon sequestration in land use, by restoration of woodlands and wetlands, revegetation and afforestation.

Among the measures to provide clean transportation are: Increase in government support for charging stations and other infrastructure for electrical transport and other clean fuels; support for biofuel production; a strengthening of already generous subsidies for electrical cars and other clean vehicles; and

support for public transport and bicycling. Iceland has seen a considerable increase in the purchase of electrical cars recently, and the new measures are intended to ensure that this trend will go up in the coming years. The carbon tax already in place will be gradually increased.

Iceland will according to the 2018 Climate Action Plan ban new registrations of fossil fuel cars after 2030. An announcement of this policy is seen as important inter alia as a signal to producers and importers of cars.

Reforestation, revegetation and afforestation will receive increased government funding, as well as efforts to reclaim drained wetlands. Efforts in land use should result in greatly increased uptake of carbon from the atmosphere, which is essential for Iceland's aims to achieve carbon neutrality by 2040.

In preparing the carbon sequestration strategy, Iceland also emphasizes to achieving other environmental goals than those related to climate. Namely, combating soil erosion and revegetating degraded lands, and conserving and restoring biological diversity, thus addressing three major global environmental challenges simultaneously.

The package of actions in the Climate Action Plan also includes such measures as: The launching of a new fund to support low-carbon technology; a phase-out for landfilling organic waste; a phase-out programme for climate-warming chemical F-gases (HFCs); participation in emissions trading for industry and aviation and other sectors; public education campaigns, and other measures. The Action Plan was put forward for public consultation for two months to prepare for the work on update that took place in 2020.

Table 4.1 gives a short description of the measures introduced in the 2018 Climate Action plan. Further information on all implemented and planned measures are in the following chapters.

Table 4.1 List of measures in Iceland's Climate Action Plan 2018

Action	Brief description
A. CLEAN ENERGY TRANSFER IN TRANSPORT	
1. Tax incentives for clean cars and fuels	Iceland already has in place generous tax incentives for the purchase of electric cars and other clean vehicles. These incentives will be extended and strengthened under a government parliamentary bill.
2. Carbon tax – increase in rate	Iceland has a general tax on carbon in place, which covers all fossil fuels. This tax was increased by 50% in 2018, by 10% in 2019, and again by 10% in the beginning of 2020.
3. Support for infrastructure for electric cars and other clean vehicles	The Government has allocated 210 million ISK in the years 2016-2018 to support the build-up of charging stations for electric cars. This government support has been increased and extended to infrastructure for other types of clean energy and fuels, such as hydrogen and methane. The support will be based on a needs-analysis, by identifying bottlenecks and opportunities in consultation with local governments, rental car operators etc.
4. Building and spatial planning rules – changes to support electric cars	Regulations have been revised to ensure that new buildings be designed allowing for infrastructure for charging electric cars.
5. Ban on new registration of diesel and gasoline cars after 2030	New registration of diesel and gasoline cars will be unlawful after 2030. Exceptions, such as for remote areas, will be considered. The purpose of this government proclamation is inter alia to send a signal to car manufacturers and importers.
6. Rebate system for older polluting cars	As new clean cars are gradually added to the vehicle fleet, the share of older high-polluting cars of emissions will grow. A system of rebates for decommissioning high-polluting cars might speed up their phase-out. A first step will be an economical study of the feasibility of such a system.
7. Improved use of methane from landfills	Methane is collected from gas emissions from two landfills in Iceland, and part of it is sold as fuel for vehicles. Opportunities to increase landfill gas collection and the use of methane will be charted.
8. Improved infrastructure for electric and regular bicycles	A plan for bicycle paths in urban areas will be developed, as prescribed in the Government transport plan. The plan will also consider charging stations for electric bikes. A parliamentary bill will cut taxes on bikes to encourage their use for transport.
9. Domestic fuel production from biomass and waste	A thorough analysis will be made on the possibilities of producing fuel from biomass and waste in Iceland. This analysis has been published, and follow-up actions are planned.
10. Support for public transport and shared services in transport	The Government will promote public transport, including by supporting infrastructure development (transport hubs, priority lanes etc.) and reviewing regulation that might support shared services in transport and other innovative solutions.
11. Clean cars in government and state enterprises	Government offices and state enterprises will be in the forefront of cleaning up transport, by buying electric cars or other non-emitting vehicles for their own use and providing charging stations and other infrastructure for them.

B. CLEAN ENERGY TRANSFORMATION IN OTHER SECTORS	
12. Clean energy for ferries	A new ferry between the Westman Islands and the mainland of Iceland will be powered by electricity. Future replacements of ferries will take into account the need to move towards clean energy.
13. Increased share of renewable energy for ships	Economic instruments will be employed to increase the use of renewable energy for ships. A Roadmap for decreased emissions in fisheries will be produced and implemented, including pilot projects for innovative solutions.
14. Electrical infrastructure in harbours	Efforts have been made in recent years to provide electricity for ships in harbours, so they do not have to run engines when docked for lighting etc. Such efforts will be stepped up so that most ships can use electricity by 2025.
15. Electrical connection for airplanes	Electrical connection for stationary airplanes will be made mandatory.
16. Electricity for fishmeal production	Fishmeal production traditionally relies on heavy fuel oil and was until recently responsible for up to 5% of Iceland's emissions. The industry has now largely switched to clean electricity. These gains need to be preserved, and ways found to complete the switch to electricity before 2030.
17. Phase-out of heavy fuel oil	Heavy fuel oil is still used to a substantial extent in the fishing fleet and in other ships. The aim is to phase out its use and eventually abandon it altogether. A ban on the use of oil with more than 0.1% sulphur content in Icelandic waters took effect on 1 January 2020.

C. CLIMATE MITIGATION IN LAND USE AND FORESTRY	
18. Reforestation and afforestation for carbon uptake	Reforestation and afforestation will be strengthened by a substantial increase in government funding to increase carbon uptake from the atmosphere, as well as for meeting other objectives. A special reforestation and afforestation plan has been made to allocate increased resources, which should lead to increased carbon sequestration.
19. Revegetation for carbon uptake	Revegetation efforts will be increased by a substantial increase in government funding. A special plan has been made to allocate new funds. Emphasis is put on halting land degradation and reducing emissions from soil and vegetation.
20. Strengthened protection of wetlands	Efforts will be made to ensure the protection of wetlands, as drained wetlands are a source of carbon dioxide emissions. Monitoring of wetland drainage will be improved.
21. Restoration of drained wetlands	A plan for wetland restoration will be made and funded, in order to reduce emissions from drained wetlands, as well as restoring natural habitats.
22. Cooperation with sheep farmers on climate mitigation measures	The Government will launch a cooperative project with sheep farmers to ensure reduced emissions and increased carbon sequestration from farming and land use activities.

D. OTHER MEASURES	
23. Climate Fund – support for clean innovation and public education	A special Climate Fund started working in 2019 and will primarily support projects in the field of green technology innovation and public education.
24. Climate policy for government offices	A climate policy and action plan for government offices has been drafted and is being implemented. The plan measures emissions, such as from transport and waste, and aims for the carbon neutrality of government offices.
25. Carbon trading: Participation in EU ETS and CORSIA	Iceland will adopt a revised legislation for the EU Emissions Trading Scheme for the period 2021-2030, which primarily covers heavy industry and aviation. Iceland will also take part in a voluntary carbon trading scheme in international aviation (CORSIA), when it commences in 2020.
26. Climate education in schools	A plan will be made for education on climate issues in kindergartens, primary and secondary schools, in cooperation with schools and non-governmental organizations.
27. Public education on climate change	A public information strategy on climate change will be planned, with emphasis on information for individuals on how to reduce their carbon footprint.
28. Taxation and eventual ban on the landfilling of organic waste	A landfill tax will be charged, with the aim to discourage the landfilling of organic waste. A ban on the landfilling of organic waste is planned when feasible.
29. Phase-out of F-Gases	A tax on F-gases will be charged, to encourage a shift to climate-friendly cooling agents.
30. Actions against food waste	Increased resources will be allocated to programmes intended to minimize food waste.
31. Green accounting	A regulation on green accounting will be strengthened, to cover the carbon footprint of companies.
32. Reduction in use of fertilizers	Efforts will be made to reduce the importation and use of synthetic fertilizers, inter alia by greater use of domestic organic waste for fertilizing.
33. Tackling emissions from manure	A study will be made to examine possibilities of better management of manure, to reduce methane emissions and replace synthetic fertilizers.
34. Climate policy guidelines in spatial planning	A revised National Planning Strategy will include a policy and guidelines to municipalities on how spatial planning can be employed to support climate mitigation actions, such as by reducing commuting, supporting public transport and other climate-friendly transport, and actions in land use.

4.3.1 Energy

The Icelandic energy sector is unique in many ways, not 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.

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 is set out in the National Renewable Energy Action Plan, (NREAP).[14] As reported in the NREAP progress report from Iceland in 2020 the share of energy from renewable energy sources was 72,18% in 2018, compared to 70,69% in 2017, whereas the target for the overall RES share (%) in 2020 is 67%, see Table 4.2.

Table 4.2 The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources

	2017 (%)	2018 (%)
RES-H &C%	68,94	66,74
RES-E	93,38	98,5
RES-T	6,99	8,52
RES total	**70,69**	**72,18**

The electricity and space heating sectors in Iceland rely almost completely on renewable energy sources. Therefore, climate mitigation in the energy sector focuses on mobile sources: Fishing ships and the transport sector.

The total share of renewable energy in gross final consumption of energy in 2018 was 72,18%, there of the renewable energy share in transport was 8,52%.

Clean energy transition in the transport sector

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

In 2011 the share of renewable energy in the transport sector was less than 1% but had reached 8,52% in 2018. 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, see Figure 4.2 and 4.3.[15]

[14] https://ec.europa.eu/energy/sites/ener/files/is_-_5th_progress_report_red_for_2017_and_2018.pdf

[15] https://nea.is/the-national-energy-authority/energy-data/data-repository/

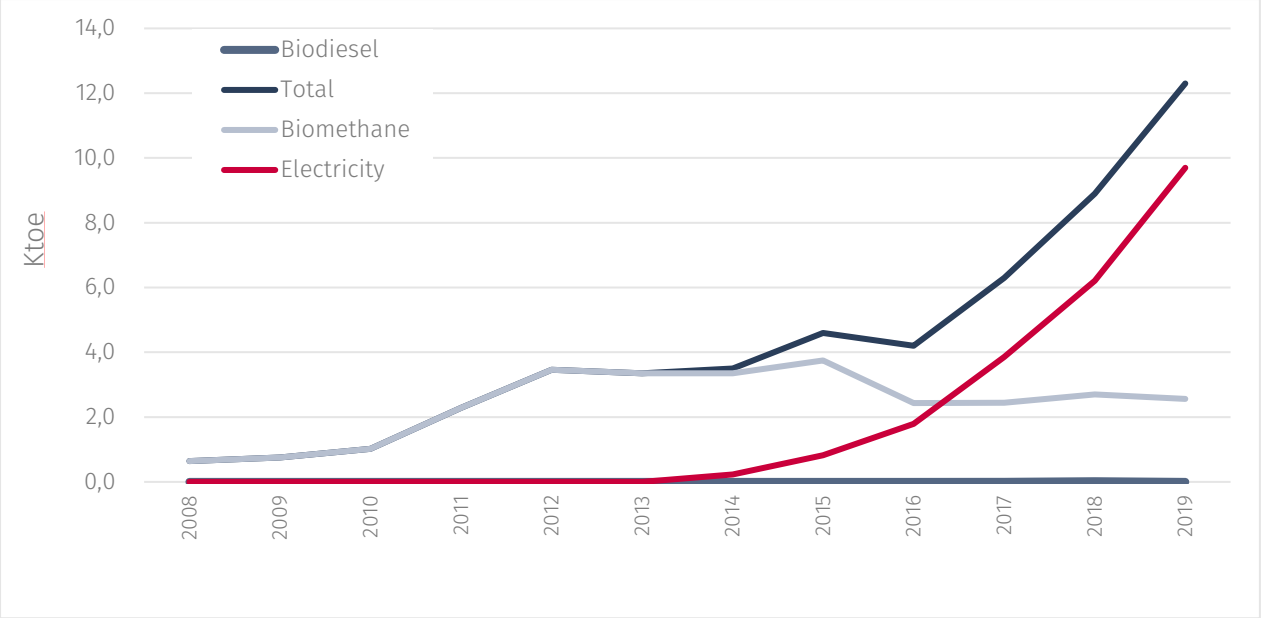


Figure 4.2 Domestically produced fuels used in transport (ktoe)

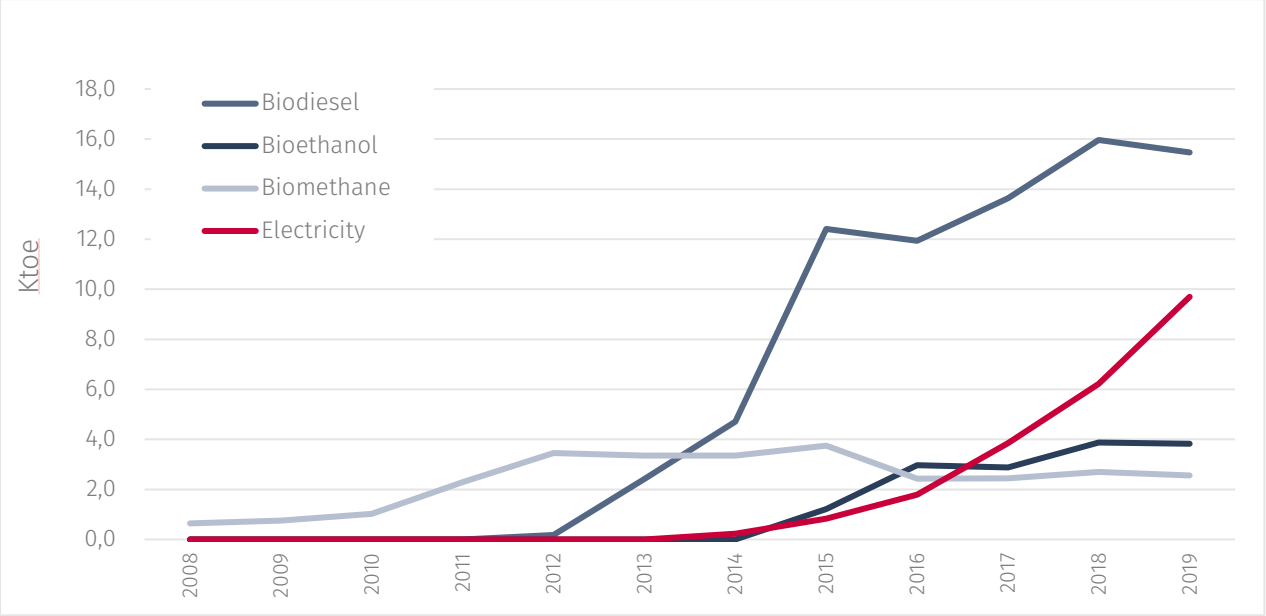


Figure 4.3 Renewable fuels used in transport (ktoe)

In May 2017, a Resolution No 18/156[16] on action plan on energy change was adopted by the Parliament According to the energy action plan, the goal is to

[16] Parliamentary Resolution 18/146

increase the share of renewable energy in the energy budget and at the same time reducing the share of fossil fuels.

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. 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.

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 Figures 4.4 and 4.5.

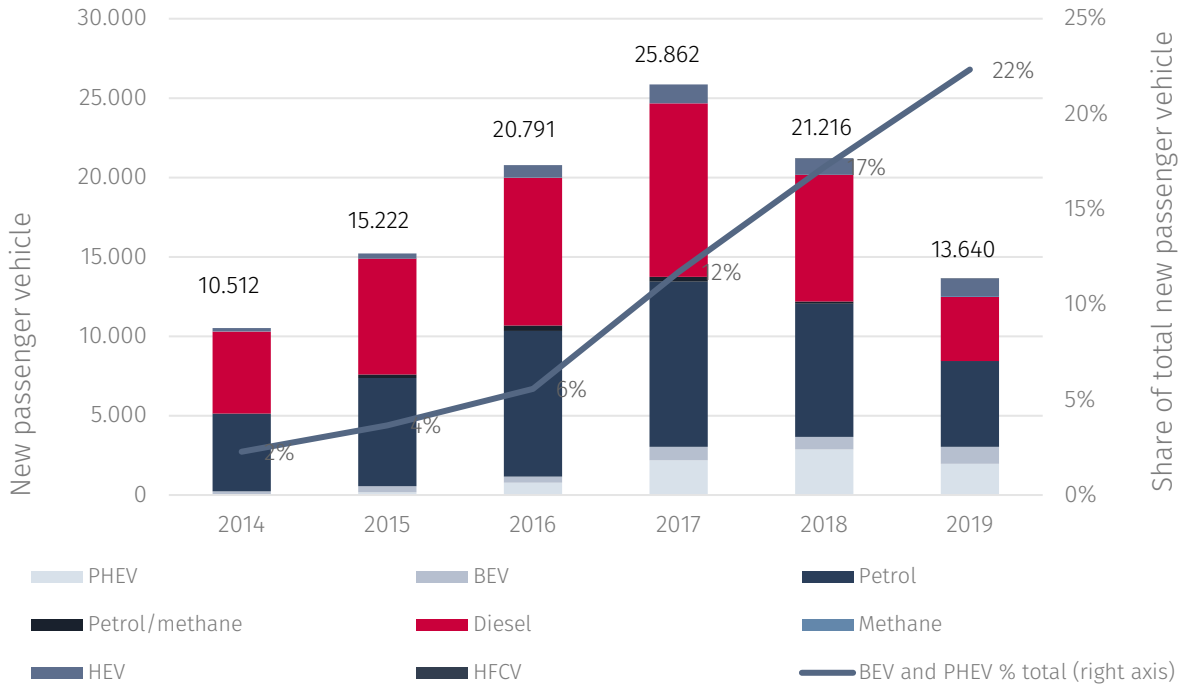


Figure 4.4 New registered passenger vehicles 2014-2019

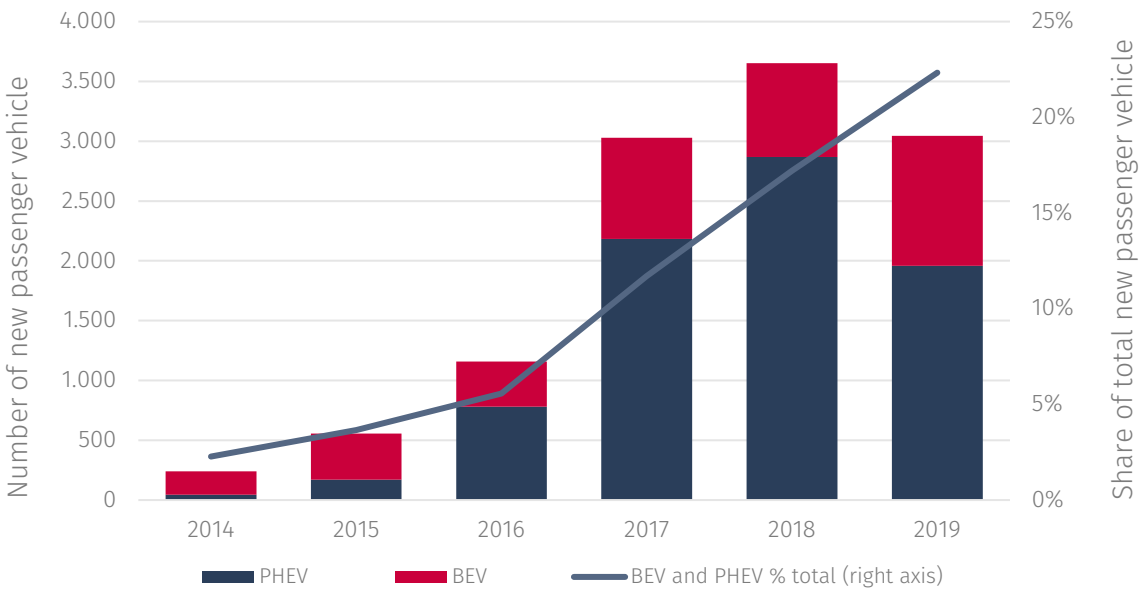


Figure 4.5 New PHEV and BEV as share of all new registered passenger vehicles 2014-2019

Renewable fuels and low emission vehicles

Directive 009/28/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 Icelandic legislation by Act No 40/2013,[17] on renewable fuel in ground transportation and Act No 30/2008,[18] 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.[19]

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, has been required from 1 January 2014. A minimum of 5% has been required from 1 January 2015.

[17] https://www.althingi.is/lagas/nuna/2013040.html

[18] https://www.althingi.is/lagas/nuna/2008030.html

[19] https://ec.europa.eu/energy/sites/ener/files/is_-_5th_progress_report_red_for_2017_and_2018.pdf

Fuels

Oils that are not fossil fuels are exempt from a levy on fuels, according to Act No 87/2004.[20] 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.[21] The fossil fuel parts of oil and gasoline mixtures are not exempt from the levy as prescribed by Acts No 87/2004 and No 29/1993.

Excise duty and semi-annual car tax based on CO_2 emission

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.

According to Act No 29/1993,[22] 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 of the Act, excise duty shall be levied under the Main Category in Table 4.3 based on the vehicles registered emissions of carbon dioxide (CO_2), measured in grams per kilometre driven.

Some special provisions are 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.

[20] https://www.althingi.is/lagas/150c/2004087.html

[21] https://www.althingi.is/lagas/nuna/1993029.html

[22] Act No 29/1993 on excise duties, see https://www.althingi.is/lagas/nuna/1993029.html

Table 4.3 Registered emissions and excise duty categories

Price Band	Registered emissions	Main Category	Exception Category
	(g CO_2/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 No 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 special vehicles, such as for handicapped, ambulances, vehicles used by the rescue forces, vehicles owned by foreign embassies, vintage cars (40 years and older) and machines used in the construction sector.

Biannual fee on vehicles is based on CO_2 emissions

According to Act No 39/1988[23] 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 2019, semi-annual road tax on each vehicle, weighing 3,500 kg or less, shall be ISK 6,075 for emission up to 121 gram of carbon dioxide emissions registered and ISK 146 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 56,900 plus ISK 2,43 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 89,560 for each payment period.

No VAT on zero-emission vehicles with a cap

With the aim to favour zero-emission vehicles, according to Act No 50/1988[24] 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 2019 ISK 1,440,000 and to a

[23] https://www.althingi.is/lagas/nuna/1988039.html

[24] https://www.althingi.is/lagas/nuna/1988050.html

maximum of ISK 960,000 on a plug-in 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 plug in hybrid cars. The first years the provision was 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 31 December 2020.

Carbon tax – increase in rate

A carbon tax on fossil fuel use was introduced on 1 January 2010 by Act No 129/2009, on environment and natural resources taxes.[25] The tax is levied on all fossil fuels in liquid or gaseous form with respect to the carbon content of the fuels. The carbon tax was increased by 50% in the beginning of 2018, 10% in 2019, and by 10% in 2020.

The Icelandic carbon tax rate increased by 10 percent to approximately ISK 2850/tCO_2 (US$36/$tCO_2$) on January 1, 2019. The higher tax rate will generate ISK 550 million (US$ 39 million) in additional carbon tax revenue including additional revenues related to the value added tax (VAT). The carbon tax rate will grow with further 10 percent on January 1, 2020, increasing the carbon tax to about 15% of the total excise tax rate on transport fuels. These increases are part of the Climate Action Plan 2018-2030 to bolster Iceland's efforts in reaching its NDC and to help meet their goal of carbon Neutrality by 2040. The focus on the carbon tax increase is to phase out fossil fuels in the transport sector. Iceland has already been making headway in greening its transportation with the electric vehicle purchases having more than tripled in 2018 compared to 2016. The abolishment of excise taxes and VAT for electric vehicles played a significant role in this surge.[26]

Table 4.4 Carbon tax 2017-2020[27]

Carbon tax	Unit	2017	2018	2019	2020
Gasoline	ISK/L	5,50	8,25	9,10	10,00
Diesel oil	ISK/L	6,30	9,45	10,40	11,45
Fuel oil	ISK/L	7,75	11,65	12,80	14,10
Natural gas	ISK/L	6,90	10,35	11,40	12,55

[25] https://www.althingi.is/lagas/nuna/2009129.html

[26] http://documents1.worldbank.org/curated/en/191801559846379845/pdf/State-and-Trends-of-Carbon-Pricing-2019.pdf

[27] Ministry of Finance and Economic Affairs

Table 4.5 Carbon tax with VAT[28]

Price	Unit	2017 VAT	2019 VAT
Carbon tax – gasoline	ISK/L	6,82	11,28
Carbon tax - diesel oil	ISK/L	7,81	12,9

The carbon tax on diesel and gasoline with VAT corresponded to about € 10 per ton of emitted CO_2 at the beginning.

Support for infrastructure for electric cars and other clean vehicles

The Government has allocated 210 million ISK in the years 2016-2018 to support the build-up of charging-stations for electric cars and in 2019 further 230 million ISK where allocated to support of build-up of 150Kw charging stations. The Energy fund has been mobilized to handle the infrastructure funding, based on calls, where the funding can be up to 33% of the total project cost.

In 2019, the Energy Fund supported 26 hotel locations and 11 high-speed charging station located at busy locations around the country.

The plan is to increase further the governmental support and extend the funding to infrastructure for other types of clean energy and fuels, such as hydrogen and methane. The support will be based on an analysis, where bottlenecks and opportunities will be identified, in consultation with local governments and stakeholders, such as rental car operators etc, see Figure 4.6.

When the program started in 2016, there were only 13 fast charging stations in Iceland, most of them in the greater Reykjavík area.

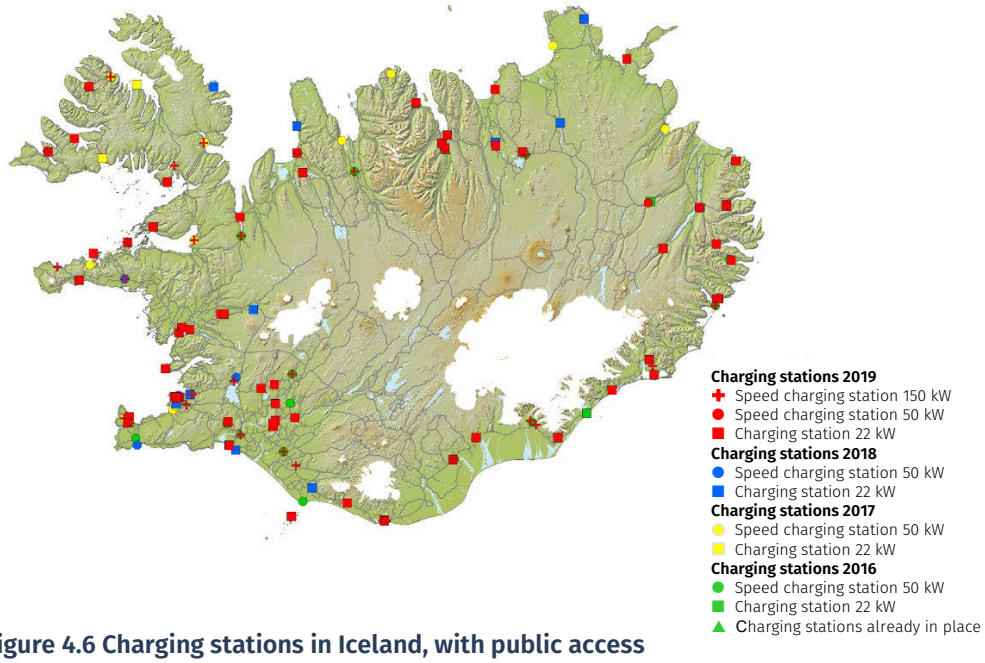


Figure 4.6 Charging stations in Iceland, with public access

[28] Ministry of Finance and Economic Affairs

Regulation on the performance of vehicles

The European Union has made an effort to reduce CO_2 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 incorporates energy-related EU-regulations regarding energy into 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,[29] on vehicle design and equipment, with later amendments and Regulation No 855/2012,[30] 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.

Ban on new registration of diesel and gasoline cars after 2030

New registration of diesel and gasoline cars will be unlawful after 2030. Exceptions, such as for remote areas, will be considered. The purpose of this government proclamation is inter alia to send a signal to car manufacturers and importers.

Support for public transport and shared services in transport

The Government will promote public transport, including by supporting infrastructure development (transport hubs, priority lanes etc.) and reviewing regulation that might support shared services in transport and other innovative solutions. This is ongoing work in cooperation of the Ministry for the Environment and Natural Resources, and the Ministry for Transport and Local Government.[31]

Borgarlína (High-class public transport in the capital area)

In order to facilitate the switch to alternative methods of transportation for the general public, a new high-class public transport system (Borgarlína) has been planned to replace buses on the main commuting routes in the capital area. The planning phase started in 2016, with an agreement between all the municipalities in the capital are.

[29] https://www.reglugerd.is/reglugerdir/allar/nr/822-2004

[30] https://www.reglugerd.is/reglugerdir/allar/nr/855-2012

[31] https://borgarlinan.is/

Clean cars in government and state enterprises

Government offices and state enterprises will be in the forefront of cleaning up transport, by buying electric cars or other non-emitting vehicles for their own use and providing charging stations and other infrastructure for them.

Building and spatial planning rules – changes to support electric cars

Regulations will be reviewed to ensure that new buildings will be designed allowing for infrastructure for charging electric cars. In July 2018, the Building Regulation was amended. With the amendments, it is now mandatory in all new buildings to plan for the possibility to connect charging stations for electric cars in all parking spaces and garages. This also applies for major renovation of older buildings.

4.3.2 Energy transfer in other sectors

Clean energies for ferries

A new ferry between the Westman Islands and the mainland of Iceland will be powered by electricity. Future replacements of ferries will take into consideration the need to move towards clean energy and minimizing emissions.

Increased share of renewable energy for ships

Economic instruments will be employed to increase the use of renewable energy for ships. A Roadmap for decreased emissions in fisheries will be produced and implemented, including pilot projects for innovative solutions.

Electrical infrastructure in harbours and airports

Some efforts have been made in recent years to bring electricity for ships in harbours, so that they do not have to run engines when docked for lighting etc., but these will be stepped up so that most ships can use electricity by 2025. High voltage charging stations for cruise ships etc. will also be considered, while they are not as cost-effective. Electrical connection for stationary airplanes will be made mandatory.

Electricity for fishmeal production

The fishmeal industry has for decades been the biggest industrial user of oil in Iceland and was once responsible for up to 5% of Iceland's emissions. Oil boilers used in the industry have gradually been replaced with electric boilers resulting in less oil consumption. 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 increased capacity was installed between the mainland and the Westman Islands which will open the possibilities to connect the fish meal factory there to the grid and reduce oil consumption in the islands.

Phase-out of heavy fuel oil

Heavy fuel oil is still used to a substantial extent in the fishing fleet and in other ships. The aim is to phase out its use and eventually abandon it altogether. A total ban of HFO in Icelandic waters requires international approvement through the MARPOL-convention,[32] but more limited restrictions can be applied by the Icelandic Government.

From 1 January 2020, the allowed maximum percentage of sulphur in ship fuel for use inside Icelandic territorial waters will be 0,1% (m/m), in accordance to amendments to Regulation 124/2015[33] on tightening fuel requirements, which effectively bans the use of heavy fuel oil in the territorial sea of Iceland. The regulation is intended to promote improved air quality in harbours and coastal areas and conforms with the climate action plan.

4.3.3 Agriculture

Reduction in use of fertilizers

Efforts will be made to reduce import and use of synthetic fertilizers, inter alia by greater use of domestic organic waste for fertilizing. Project in cooperation with the Farmers association.

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

[32] https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx

[33] https://www.reglugerd.is/reglugerdir/allar/nr/124-2015

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.

Tackling emissions from manure

A study will be made to examine possibilities of better management of manure, to reduce methane emissions and replace synthetic fertilizers.

Cooperation with sheep farmers on climate mitigation measures

The Government will launch a cooperative project with sheep farmers to ensure reduced emissions and increased carbon sequestration from farming and land use activities.

4.4 Industry

Carbon trading: Participation in EU ETS and CORSIA

The EU Emissions Trading System (EU ETS) was transposed into Icelandic law in 2011 (Act No 64/2011) under the provision of the EEA-agreement. 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, aluminium and ferro-silicon plants, 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 issues. The emission trading system covers about 40% of 2018 emissions in Iceland.

In addition, four small installations, three fishmeal factories and a mineral wool producer, have been exempted from the ETS and are subject to equivalent measures.

Iceland will adopt a revised legislation for the EU Emissions Trading System for the period 2021-2030, which primarily covers heavy industry and aviation. Iceland will also take part in the voluntary Carbon Trading Scheme in International Aviation (CORSIA), when it commences in 2020.

The carbon tax (see Carbon tax in Section 4.3.1) 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.

4.4.2 Waste management

The Government´s waste management policy is manifested in legislation on waste management, in Act N0 55/2003, with later amendments,[34] regulations based on the legislation and a National Waste Management plan, published by the Ministry for the Environment and Natural Resources in 2013.[35]

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 Agreement.

Drafting of a new National Waste Management Plan is well underway and the new plan will be published in early 2021. In the new plan, emphasis will be put on the change to circular economy. Most municipalities have developed regional waste management plans based on the National Waste Management Plan 2013-2024, but they will have to be revised after the new national plan is published. The first National 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, paper, by-products from slaughtering and from fisheries, waste from aluminium and silicon-metal industries, and single-use beverage packaging.

Regulation No 737/2003 on waste management[36] 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,[37] requires collection of landfill gases to be further outlined in operating permits. Landfill gas is now collected at four of Iceland's largest landfills. At two of the landfills, the gas is flared but at the other two, the gas is cleaned, and the methane is used for powering vehicles in those areas.

Waste management in Iceland has undergone positive changes in the past but continuing improvement cannot be taken for granted. Waste generation is on

[34] https://www.althingi.is/lagas/nuna/2003055.html

[35] https://www.stjornarradid.is/media/umhverfisraduneyti-media/media/PDF_skrar/Landsaaetlun-2013-2024-(utgafa).pdf

[36] https://www.reglugerd.is/reglugerdir/allar/nr/737-2003

[37] https://www.reglugerd.is/reglugerdir/allar/nr/738-2003

the rise and the implementation of the circular economy will be challenging. Among the most challenging tasks will be to decrease landfilling rapidly and to increase recycling.

Emissions from the Waste sector accounted for 6% of total GHG emissions in 2018. Approximately 78% of these emissions originated from landfilling of solid waste. The remaining emissions arose from wastewater treatment, waste incineration and the biological treatment of waste, i.e. composting.

Emissions from waste management have been decreasing steadily since 2007 with a decrease in the share of landfilled waste and increased collection of landfill gas at landfill sites. The emissions due to the management of each kilo of waste has consequently been decreasing steadily since 2010 as less waste goes to landfill.

Actions against food waste

Increased resources will be allocated to programmes intended to minimize food waste.

The Minister for the Environment and Natural Resources appointed a working group in November 2019. The working group was given the task to evaluate the scope of food waste in Iceland and set forth ideas of actions to prevent food waste. The Project on reduction of food-waste was funded by the Ministry for the Environment and Natural Resources in 2016-2019. The main goal of the project was to open a website with information on how to reduce food waste. The website is up and running, presenting information material and news feeds on how to prevent food waste.[38]

In the autumn 2019, the Environment Agency started a comprehensive research on food waste, including 1.000 households. Each household is to weight and register all food waste over one week. The result will be measured against a similar research conducted in 2016.

The results of the project in 2016, 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.

[38] http://www.matarsoun.is

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 due to lack of data but will be included in the research conducted in 2019.

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.[39]

Improved use of methane from landfills

Methane is collected from gas emissions from two landfills in Iceland, and part of it is sold as fuel for vehicles. Opportunities to increase landfill gas collection and the use of methane will be charted.

Domestic fuel production from biomass and waste

A thorough analysis will be made on the possibilities of producing fuel from biomass and waste in Iceland. Such possibilities include rapeseed oil production, using plastic waste and waste from slaughterhouses. Pilot projects in all these fields have been conducted. Current regulations may be a bottleneck for fuel production from waste and will be reviewed.

4.4.3 Other measures

Climate Fund – support for clean innovation and public education

A special Climate Fund was established by law in 2012 but was neither funded nor operationalized until 2019. The role of the fund is described in Art. 29 of the Climate Act No 70/2012.[40] The fund will primarily support projects in the field of green technology innovation that aims at strengthening research and development related to the introduction of new climate-friendly technology solutions and design and public education related to the impact of climate change.

The fund will allocate 550 million ISK in the period 2019-2023. The Ministry for the Environment and Natural Resources is responsible for the fund, and

[39] https://ust.is/library/Skrar/Einstaklingar/Graenn-lifstill/Food%20Waste%20in%20Iceland%20-%20Methodological%20report%20with%20Abstract%20in%20IS%2028%2011%202016.pdf

[40] https://www.althingi.is/lagas/150c/2012070.html

appoints the board of the fund, but has assigned Rannis, the Icelandic Centre for Research, to coordinate and oversee calls and the application processes.[41]

The Climate Council

The Climate Council was established in 2018 and was given a legal basis with amendment to the Icelandic Climate Act in 2019. Members of the Climate Council are appointed for four years at a time. The Climate Council is an independent body whose role is to hold authorities accountable and provide advice on policy objectives and specific measures related to climate change.

Members of the Council represent the business community, academia, municipalities, and environmental NGOs. Additionally, representatives from other stakeholders can be asked to participate as considered necessary at any given point in time. The Minister for the Environment and Natural Resources appoints the chair and the vice chair of the Council and has also appointed representatives of youth. The Council shall provide advice on the reduction of greenhouse gas emissions and on measures for carbon sequestration; provide advice on climate change adaptation; review climate policies and plans of the Government during the preparation phases; have an overview of educational initiatives and dissemination of information on climate issues to the public, businesses, institutions, and municipalities; review proposals from government agencies about monitoring and climate related research; work on other tasks the Minister assigns to the Council at any given time.[42]

Climate policy for government offices

Work on a Climate policy and action plan for government offices was commenced in May 2018 and the action plan on the Governments climate policy was issued in April 2019.[43] The plan contains statistics and targets on emissions, such as from transport and waste, and aim for the carbon neutrality of government offices, which can be an example for other actors.

Climate education in schools and public education on climate change

A plan will be made for education on climate issues in kindergartens, primary and secondary schools, in cooperation with schools and non-governmental organizations. A public information campaign on climate change will be planned, with emphasis on information on how individuals can decrease their carbon footprint. Emphasis will be placed on student participation in formulating solutions to climate and environmental issues and democratic and empowering education techniques. Environmental Associations have already

[41] https://en.rannis.is/funding/research/icleandic-climate-fund/icleandic-climate-fund

[42] https://loftslagsrad.is/english/v

[43] https://www.stjornarradid.is/library/01--Frettatengt---myndir-og-skrar/FOR/Fylgiskjol-i-frett/STJ_UAR_LoftslagsstefnaStjornarradsins_lokautgafa.pdf

done great work in environmental education and training in Icelandic schools, a work that can be built on.

Taxation and eventual ban on the landfilling of organic waste

A landfill tax will be designed and employed, with the aim to decrease the landfilling of organic waste. A total ban on the landfilling of organic waste is planned when feasible.

Phase-out of F-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,[44] and Regulation No 970/2013 on ozone depleting substances.[45] Ozone depleting substances are not produced in Iceland and no imports of ozone depleting substances have been registered after 2010 beyond those exempted for small-scale laboratory use.

There are provisions in the legislation to control fluorinated greenhouse gases, i.e. PFCs, HFCs and SF6. The current regulation on fluorinated greenhouse gases is Regulation No 1066/2019,[46] which implements Regulation (EU) No 517/2014 on fluorinated greenhouse gases. The legislation covers limitations with respect to releases, uses, management, registration, marketing, labelling and leakage checks as well as the consumption of F-gases. It also sets requirements regarding training and certification. The ratification of the Kigali Amendment to the Montreal Protocol is expected to be finalised in 2020.

Additionally, from 1 January 2020 taxes are levied of all fluorinated greenhouse gases (HFCs, PFCs and SF6) in proportion to their GWPs up to a designated price ceiling which is reached at GWP = 4000. These taxes apply to single substances as well as mixtures.

Green accounting

The Regulation No 851/2002 on green accounting[47] will be strengthened, to cover the carbon footprint of companies. The obligation to report green accounts will, furthermore, be extended so that it covers the Government, government entities and all main industries who burn fossil fuels, such as contractors, fishing-, transport- and tourism.

[44] https://www.althingi.is/lagas/nuna/2013061.html

[45] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/umhverfis--og-audlindaraduneyti/nr/18841

[46] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/umhverfis--og-audlindaraduneyti/nr/1066-2019

[47] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/umhverfisraduneyti/nr/4548

Improved infrastructure for electric and regular bicycles

A plan on bicycle paths in urban areas will be developed, as prescribed in the Government transport plan. The plan will also consider charging stations for electric bikes.

Græna orkan

Græna orkan (Icelandic Green Transition Alliance) 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. Among the objectives of the cluster are to link actors working toward energy shift in transportation, visualize steps taken, identify, organize and create consensus on key actions that need to be implemented, promote education and sharing of information and encourage research and development.

Græna orkan has played an important role in supporting the authorities in identify the main priorities to enhance the speed of the energy transition.[48]

4.4.4 Planning

Climate policy guidelines in spatial planning

A revised National Planning Strategy will include a policy and guidelines to municipalities on how spatial planning can be employed to support climate mitigation actions, such as by reducing commuting, supporting public transport and other climate-friendly transport, and actions in land use.

Environmental assessment of public plans or programs is based on the Strategic Environmental Assessment Act No 105/2006.[49] 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.[50] 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.

[48] https://graenaorkan.is/

[49] https://www.althingi.is/lagas/nuna/2006105.html

[50] https://www.althingi.is/lagas/nuna/2000106.html

The National Planning Strategy is based on provision in the Planning Act No 123/2010.[51] 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. The NPS 2015-2026 proposes 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 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.[52]

Carbfix

CarbFix is a collaborative research project led by Reykjavik Energy, that aims to develop safe and economically viable methods and technology for permanent CO_2 capture and mineral storage underground. The mineralization process takes less than two years, according to results from experimental projects. In June 2019 the Government and heads of heavy industry operators in Iceland signed a declaration of intent to explore possibilities for carbon capture and mineralization of industrial emissions, using the Carbfix method.[53]

[51] https://www.althingi.is/lagas/nuna/2010123.html

[52] https://www.landsskipulag.is/english/

[53] https://www.government.is/news/article/?newsid=ccd3e130-ff11-11e9-944e-005056bc530c

4.4.5 International air transport and shipping

Iceland recognizes the importance of the work that has been accomplished at the ICAO[54] and IMO[55] levels, respectively, to limit emissions from international traffic, and has actively participated in the implementation and promotion of these efforts.

European obligations

With regards 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 Climate Act No 70/2012. The EU regulation, which is part of the EEA Agreement, took effect, 1 January 2018. The regulation stipulates that CO_2 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 (see Phase-out of heavy fuel oil in section 4.3.2).

ICAO

With regards 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 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.

[54] https://www.icao.int/

[55] https://www.imo.org/

In 2019[56] 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.

IMO

With regards 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 took 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.

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. In 2015 the Arctic states agreed upon an Artic Council Framework for Action on Enhanced Black Carbon and Methane

[56] https://www.icao.int/environmental-protection/Lists/States_Action_Plans/Attachments/39/20180630%20Action%20plan%20of%20Iceland%202018%20updated%20(2).pdf

Emissions Reductions.[57] Iceland has delivered a report according to the framework.[58]

The national transport plan for 2015-2018[59] 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.

4.4.6 Climate mitigation in land use land use change and forestry (LULUCF)

On the bases of the forestry and soil conservation act of 1907, The Soil Conservation Service of Iceland (SCSI) (Landgræðslan)[60] and the Icelandic Forest Service (IFS) (Skógræktin)[61] were established. Both institutions are under the auspices of the Ministry of the Environment and Natural Resources.

The main tasks of the Soil Conservation Service are to combat desertification and 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.

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.

The Icelandic Forest Service manages the National Forests, totalling about 7000 ha or 5% of Icelandic forests and woodlands. Most of the forest and woodland area within the National Forests is protected native birch woodland, but there are also cultivated forests of various species, experimental forests and arboreta.

Efforts in revegetation and afforestation have received increased government funding, as well as efforts to reclaim drained wetlands. Actions in land use should result in significantly increased uptake of carbon from the atmosphere, which is essential for Iceland's aim to achieve carbon neutrality by 2040. In July 2019 the Icelandic Government published a mitigation plan in the LULUCF

[57] https://oaarchive.arctic-council.org/bitstream/handle/11374/610/ACMMCA09_Iqaluit_2015_SAO_Report_Annex_4_TFBCM_Framework_Document.pdf?sequence=1&isAllowed=y

[58] https://oaarchive.arctic-council.org/bitstream/handle/11374/2442/EGBCM2_2018_National-Report-Arctic-State-Iceland.pdf?sequence=6&isAllowed=y

[59] https://www.althingi.is/altext/145/s/1801.html

[60] https://land.is/english/

[61] https://www.skogur.is/en

sector,[62] outlining concrete measures and funding in accordance to the 2018 Climate Action Plan. The LULUCF mitigation plan outlines efforts to increase carbon sequestration and to decrease carbon emissions from soils and vegetation.

Iceland is using land (ecosystem) restoration, reforestation and afforestation as mitigation efforts against climate change. These efforts are carried out in collaboration with farmers and other landowners, NGOs and local authorities and include restoring native vegetation in degraded areas, restoring drained wetlands and afforestation to create a woodland resource.

The Icelandic Government has increased these efforts with the aim to restore ecosystems to conserve and enhance biological diversity, increase ecosystem resilience against natural disasters and increase the potential of rural societies relying on these ecosystems to sustain their livelihoods.

It should be noted that the 2019 submission of the report on Policies and Measures only included partial projections for emissions and carbon sequestration from the LULUCF sector. However, extensive work is currently being conducted by the Icelandic Government to develop holistic projections for emissions and carbon sequestration from the LULUCF sector, in line with accounting rules in the LULUCF Regulation 2018/841. Iceland's upcoming 2021 submission of Policies and Measures and Projections will be based on updated LULUCF projections and measures presented in the updated 2020 Climate Action Plan (see Section 4.5).

Reforestation and afforestation for carbon uptake

Reforestation and afforestation will be strengthened by a substantial increase in government funding to increase carbon uptake from the atmosphere, as well as for meeting other objectives. A special reforestation and afforestation plan will be made to allocate the increased resources.

Revegetation for carbon uptake

Revegetation efforts will be increased by a substantial increase in government funding. A special plan will be made to ensure the effective allocation of new funds. Emphasis will be put on halting land degradation and reduce emissions from soil and vegetation.

Strengthened protection of wetlands

Efforts will be made to ensure the protection of wetlands, as drained wetlands are a source of carbon dioxide emissions. Monitoring of wetland drainage will

[62] https://www.stjornarradid.is/lisalib/getfile.aspx?itemid=f8c0433d-9cca-11e9-9443-005056bc4d74

be improved, and regulations reviewed, inter alia to look into setting requirements of wetland rehabilitation to compensate for draining activities.

Restoration of drained wetlands

A plan for wetland restoration will be made and funded, in order to reduce emissions from drained wetlands, as well as restoring natural habitats.

4.5 Updated Climate Action Plan 2020

In June 2020 the Government published an updated version of the Climate Action Plan,[63] that presents new and elaborated measures and contains significantly improved analysis to estimate the individual and collective mitigation gains of the measures presented. Climate mitigation measures received a substantial increase in government funding. A minimum of ISK 46 billion is expected to be spent on key climate measures in the period 2020-2024. The new plan is based on the Climate Action Plan from 2018 and is intended to increase efforts in cutting net emissions so that Iceland can meet its objectives under the Paris Agreement for 2030 and reach the Government's goal of carbon neutrality in 2040.

According to the updated Climate Action Plan, emission reductions from the Effort Sharing sectors (non-ETS) are estimated to be more than one million tonnes of CO_2 equivalents lower in 2030 than 2005 levels, or 35%. This means that Iceland expects to meet its binding Effort Sharing reduction target of 29%,

In addition to this, further 5-11% emission reduction is expected from measures that are presented in the plan but remain yet to be quantified, a total of 40-46% reduction.

With the 2020 Climate Action Plan Iceland expects to achieve a substantial reduction in greenhouse gas emissions – still greater reduction is aimed at through additional measures currently in preparation.

[63] https://www.government.is/library/01-Ministries/Ministry-for-The-Environment/201004%20Umhverfisraduneytid%20Adgerdaaaetlun%20EN%20V2.pdf

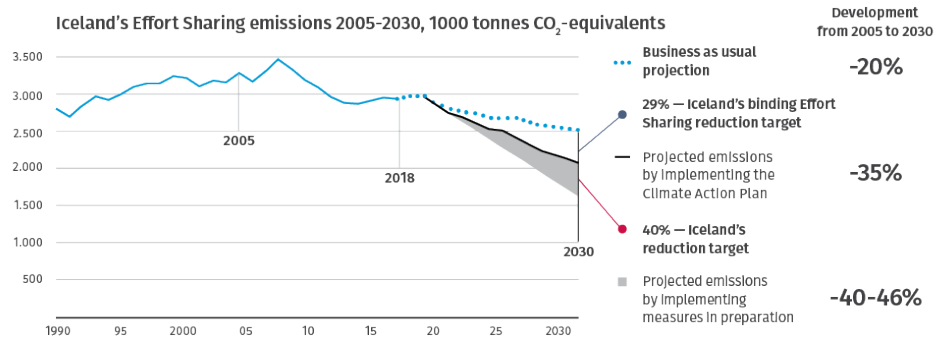
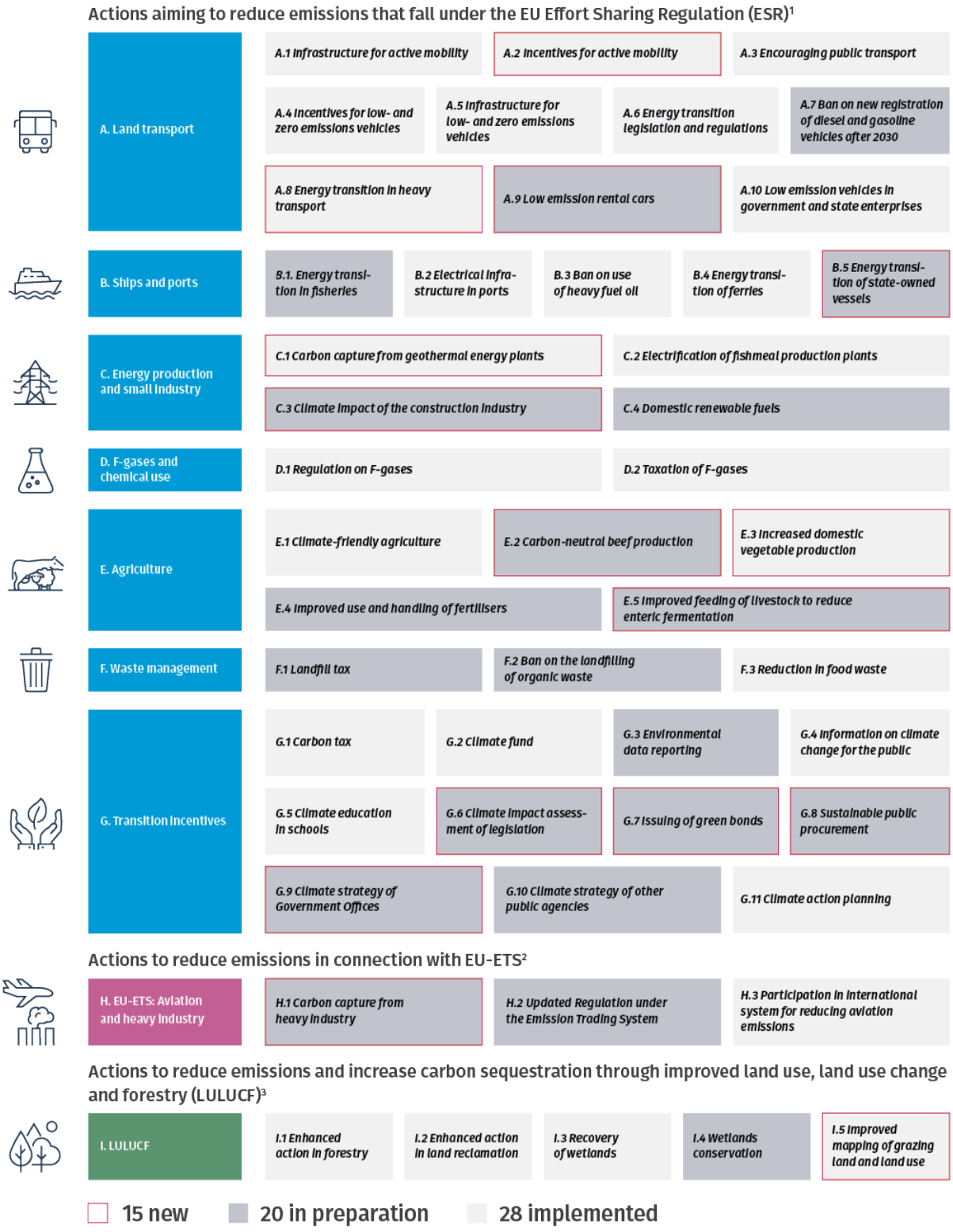


Figure 4.7 Iceland's historical GHG emissions that fall under the Effort Sharing Regulation to 2018, and projected emissions in 2030 without the Action Plan, with the Action Plan and plus measures currently in preparation.

Over a five-year period, from 2020 to 2024, ISK 46 billion will be allocated to climate mitigation measures. The Action Plan consists of 48 measures, including 15 new ones, which have been added since the plan was released in 2018, see Figure 4.8. In tandem with the extensive consultation process for the new version of the Action Plan, emphasis has been placed on implementing these measures immediately. As a result, 28 of the 48 measures have already been set in motion.

The updated version of the Action Plan is based on detailed calculations of the estimated effect of the measures presented. It was possible to assess the expected benefits of 23 measures, through which Iceland will achieve an estimated 35% reduction in emissions by 2030. Further 5-11% reduction of emissions, is expected from 16 measures presented in the plan but remain yet to be quantified, which is estimated to make the total reduction 40-46%. In addition, it was not possible to assess the impact of nine measures, such as on climate education and information, due to their general nature.



1 ESR: Effort Sharing Regulation. Regulation on joint fulfilment. Effort Sharing emissions with binding annual greenhouse gas reduction targets for each state.

2 EU-ETS: EU - Emissions Trading System.

3 LULUCF: Land Use, Land-Use Change, and Forestry.

Figure 4.8 Summary of measures in the updated version of the Climate Action Plan

4.6 Sustainable Development Goals

The UN Sustainable Development Goals (SDGs) serve as an important guide for the Icelandic Government in working towards increased sustainability. Iceland took an active part in the negotiations on the Sustainable Development Goals and adoption of the 2030 Agenda for Sustainable Development in 2015.

Iceland's Voluntary National Review on Iceland's implementation of the 2030 Agenda for Sustainable Development from June 2019[64] sets out the next phase of Iceland's implementation of the SDGs, including the Government's 2018 Climate Action Plan, which is an example of a co-ordinated policy made in consultation with various stakeholders, which was presented by seven ministers.

The preparation and implementation of Iceland's Climate Action Plan is done in in line with several SDG targets, but mainly: Affordable and clean energy, Sustainable Cities and communities, Climate action and Partnership for the goals.

Figure 4.9 The Climate Action Plan's main SDGs.

[64] https://sustainabledevelopment.un.org/content/documents/23408VNR_Iceland_2019_web_final.pdf

5. Projections

In 2017 the Ministry for the Environment and Natural Resources assigned the Environment Agency to work on greenhouse gas projections. With that aim, the agency was secured additional budget to build up the knowledge and employ additional personnel to take on the task.

The Environment Agency published its first projection in April 2019 (Report on Policies, Measures and Projection) which this chapter is based on.[65]

The report is in accordance to Article 12, 13, and 14 of Regulation (EU) 525/2013 of the European Parliament and of the Council on a mechanism for monitoring and reporting, implementing the UNFCCC reporting and monitoring requirements.

It is important to have in mind that the projection presented in this report is a new projection using new methods and parameters and is therefore not an update of the projection published in Iceland's third Biennial Report.

The obligation to report to the EU is based on the bilateral agreement between Iceland and the EU on cooperation on climate issues, see Section 3.2.

The extensive work regarding policies and measures that has been conducted in relation to the 2020 Climate Action plan and ongoing improvements to the LULUCF accounting will be reflected in Iceland's 2021 submission of report on Policies and Measures and Projections.

5.1 Total GHGs

The basis for the projections presented in this report is the Climate Action Plan published in 2018. The Action Plan included 34 measures, all of which are described in this chapter.[66]

Iceland's total historical and projected emissions of GHGs are presented in Figure 5.2 for the WEM scenario. The total emissions are projected to increase until they reach a peak in 2021, after which the total emissions begin to decrease. Emissions are projected to be higher in 2035 than they were in 1990 but will be below 2017 levels.

The main cause for the projected decrease in emissions is the impact of the electrification of the car fleet on energy emissions. Industrial Processes and Product Use (IPPU) and Agriculture emissions are also projected to decrease slightly. IPPU will mainly decrease because of a projected reduction in emissions from heavy industry and the newly implemented F-gas regulation

[65] https://ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/PaMs%20final%20April%202019.pdf

[66] https://www.stjornarradid.is/lisalib/getfile.aspx?itemid=b1bda08c-b4f6-11e8-942c-005056bc4d74

which limits the import of F-gases. Agriculture will decrease because of a projected decrease in livestock population numbers. Waste emissions will decrease until 2027, after which they begin to increase again in line with a projected population increase.

GHG emissions savings from the following measures were quantified for the projection: electrification of harbours and electrification of fishmeal factories, electrification of ferries, the new gas and composting plant, and increased afforestation for carbon capture. Most measures included in this report are part of the "with additional measures" (WAM) scenario. Here, Iceland has, however, only included projections for the "with existing measures" (WEM) scenario.

Based on the Environment Agency´s (EA) calculations and assumptions, emissions from Iceland are expected to increase between 2015 and 2021, after which the total emissions begin to decrease until 2035 (see Figure 5.1).

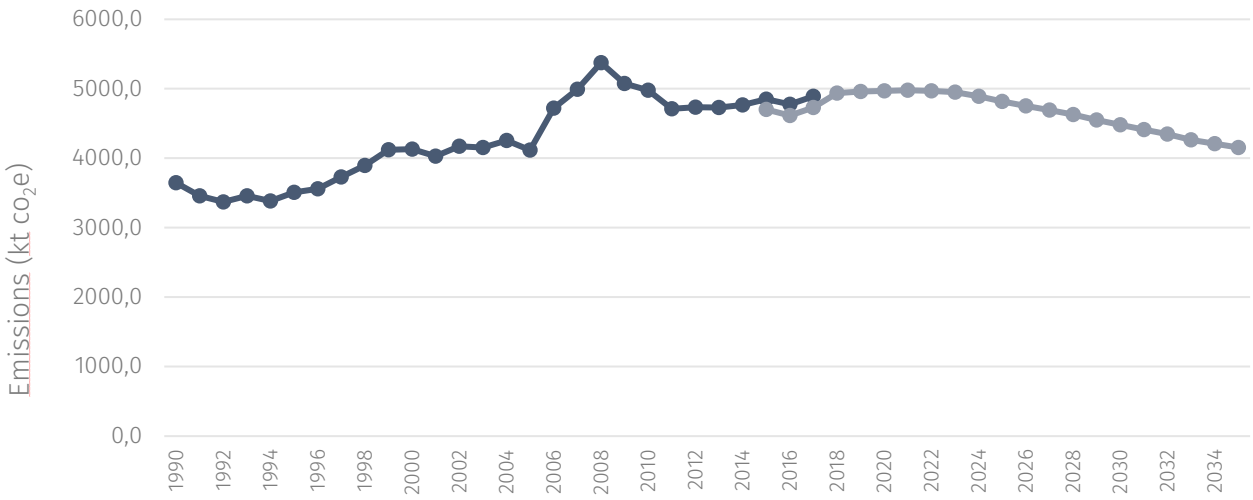
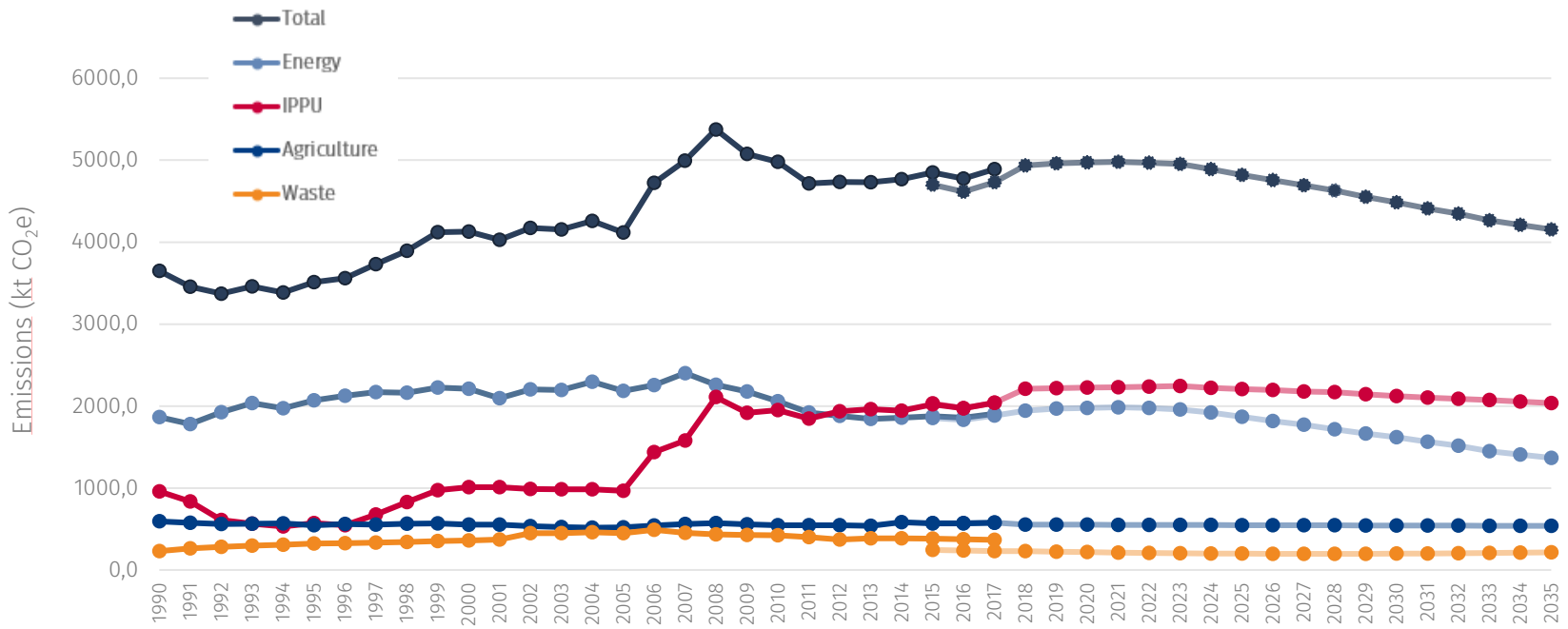


Figure 5.1 Total GHG emissions from 1990 to 2035 (excluding LULUCF)

It should be noted that the current projections do not include any carbon emissions or removals from the LULUCF sector as sufficient data was not available for integrating LULUCF policy into the projections. From 2021, carbon removal will, however, only be counted against Iceland's emissions if Iceland is in compliance with the requirements of the LULUCF Regulation (Regulation (EU) No 2018/841. Only Total emissions excluding LULUCF are presented.



Emissions (kt. CO_2e)

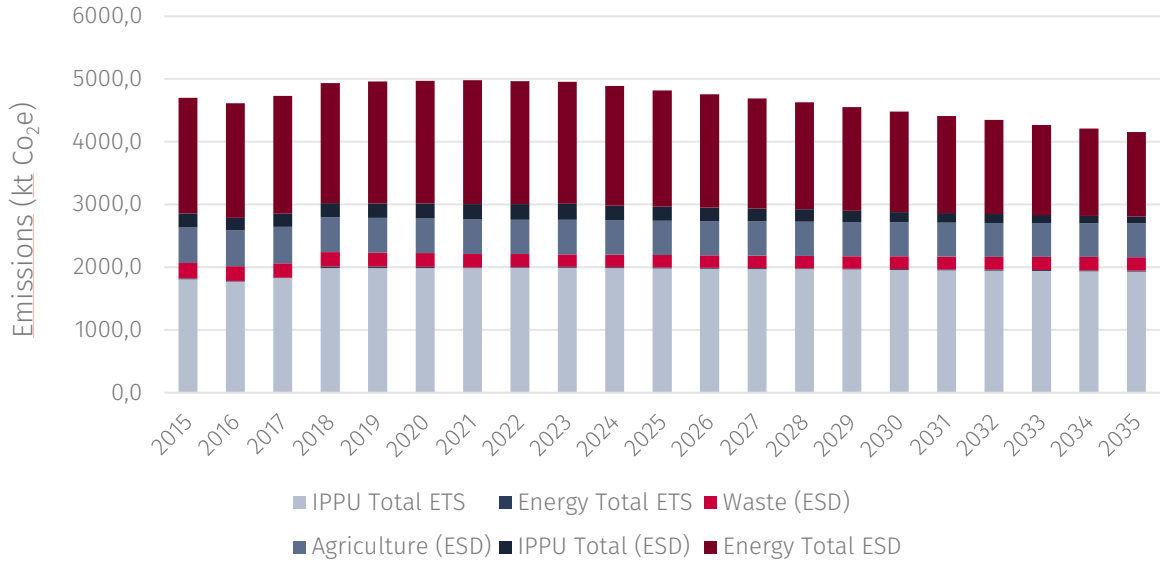
Sector	1990	2015	2020	2025	2030	2035
Energy (1)	1 823	1 855	1 978	1 871	1 621	1 371
IPPU (2)	958	2 032	2 226	2 206	2 122	2 036
Agriculture (3)	593	571	552	548	543	538
Waste (5)	172	245	218	198	200	213
Total excluding LULUCF	**3 546**	**4 702**	**4 974**	**4 822**	**4 486**	**4 158**

Figure 5.2 Total historical and projected GHG emissions (excluding LULUCF) in the WEM scenario 1990-2035, kt. CO_2e

5.1.1 Total Effort sharing ("ESD") and ETS GHG Projections

Iceland's total historical and projected emissions, split into ETS and Effort sharing ("ESD") (see Section 3.1), can be seen in Figure 5.3 below for the WEM scenario. In Iceland, all emissions currently generated from the Production of Iron and Steel and Non-Ferrous Metals (1A2a and 1A2b) and industrial emissions from the Metal Industry (2C) are covered under the EU ETS. As can be seen in Figure 5.3, emissions from ETS industry have increased between 2015 and 2020 due to the addition of a new ferrosilicon plant. ETS emissions are, however, projected to decrease again until 2035, mainly due to a projected decrease in GHG emissions from one ETS industry plant.

Based on the current projections, ETS emissions will increase by almost a quarter between 2005 and 2035. ESD emissions are, however, expected to decrease between 2005 and 2035 (see Figure 5.3).



Emissions (kt. CO_2e)

Sector	2005	2015	2020	2025	2030	2035
Total ETS	1 823	1 855	1 978	1 871	1 621	1 371
Total ESD (kt. CO_2e)	958	2 032	2 226	2 206	2 122	2 036

Figure 5.3 Sectoral ETS and ESD GHG projections, WEM scenario

The projected Effort sharing emissions ("ESD") for the year 2030 amount to approximately 2513 kt. CO_2e, which corresponds to 19% less than the year 2005. Iceland's commitment for the year 2030 has yet to be finalised and the exact terms laid down in the EEA agreement (see Section 3.3). According to the JCD 269/2019, Iceland's target under the Effort Sharing Regulation (Regulation (EU) No 2018/842) is to reduce emissions by 29%, or 10% more ambitious than the current projections show.

The gap between projected emissions and Iceland's expected 2030 target is partly due to the fact that the effect of most of the actions in the Action plan 2018 could not be quantified or considered to be a part of the WEM projections scenario due to a lack of precise information or of a strategic implementation plan. This will be addressed in the next projection expected to be published in 2021 that will be based on the revised Action Plan published in 2020 (see Section 4.5).

Furthermore, these projections do not include any carbon removals from the LULUCF sector, as sufficient data to integrate LULUCF measures into the projections was not available. It has to be noted, though, that from 2021 carbon removal will only be counted against Iceland's emissions if Iceland is in compliance with the requirements of the LULUCF Regulation (Regulation (EU) No 2018/841); additionally, according to the Effort Sharing Regulation, in the case the requirements for compliance with the LULUCF Regulation are met, there is nevertheless a cap on the quantity of removal units that may be used for compliance under the Effort Sharing Regulation. In Iceland's case, that cap is 200 kt. CO_2e for the period 2021-2030.

It should be noted that extensive work is currently being conducted by the Icelandic Government to develop holistic projections for emissions and carbon sequestration from the LULUCF sector, in line with accounting rules in the LULUCF Regulation 2018/841. Iceland's upcoming 2021 submission of Policies and Measures and Projections will be based on updated LULUCF projections and measures presented in the updated 2020 Climate Action Plan (see Section 4.5).

5.1.2 Methodology Overview

The methodologies used to calculate GHG projections are consistent with the latest NIR (2019).[67] For information on the sectoral methods see the NIR. Where methodologies are not described within the sectoral chapters the method from the NIR has been followed. The following exceptions should be noted:

- Road transport emissions have been calculated using COPERT. COPERT will be used to calculate historical emissions for the first time in the 2020 historical GHG inventory. The use of COPERT to calculate projected GHG emissions has resulted in a small discrepancy (~3%) in years reported in both the historical and projected inventories emissions for road transport.

[67] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

5.2 Energy (excluding Transport)

The Energy Sector (1) contains all emissions from fuel combustion, energy production, and distribution of fuels. Historically, transport has contributed to approximately one fifth of Iceland's GHG emissions (excluding LULUCF) and is therefore reported in a separate section (see Section 5.3).

Iceland almost exclusively uses renewable energy sources (hydropower, geothermal energy and wind power) for electricity and heat production, and therefore emissions from Public Electricity and Heat Production (1A1) are low (<1% of Iceland's emission from Energy) compared to other countries that utilize a higher share of fossil fuels.

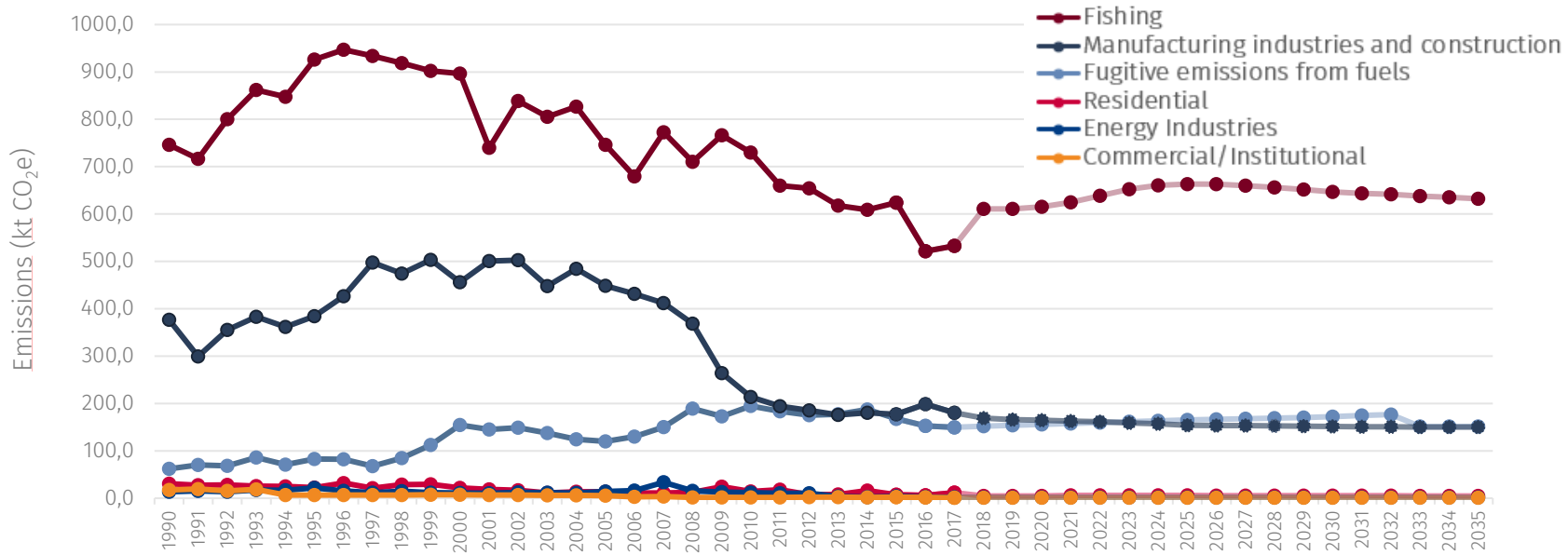
The largest contributor of GHG emissions from the Energy Sector (excluding Transport) is Fishing (1A4c). Emissions from fishing ships have accounted for approximately a third of total emissions from the Energy Sector in recent years, however emissions have been steadily decreasing over the past years.

Manufacturing Industries and Construction (1A2) and Residential Stationary Combustion (1A4b) combined account for approximately a third of emissions from the energy sector in Iceland in recent years.

5.2.1 Trends

The historical and projected trend for the Energy Sector (excluding Transport) can be seen in Figure 5.1. Overall, emissions from the Energy Sector (excluding Transport) have declined by approximately 20% between 1990 and 2015. In contrast, only a small decline is currently projected up until 2035.

Emissions from Fishing (1A4c) have been steadily decreasing over the time period, with some annual variations. Emissions are projected to peak in 2025, and steadily decline between 2025 and 2035. The decline in emissions from fishing ships in 2016 is due to the lack of available historical fuel data for 2016 and 2017. No major changes are expected in the sector for the time period; however, some emission savings are reported due to the electrification of harbours and fishmeal factories. There are, however, plans to increase the share of renewable fuels instead of fossil fuels in fishing (EC01), but because it is currently unclear which fuels will replace fossil fuels and in which quantities, this has not been included in the projections. Therefore, it is likely that the projected emissions from Fishing (1A4c) have been overestimated. Emissions from Manufacturing Industries and Construction (1A2) have also been decreasing over the historical time series but are projected to remain relatively constant until 2035. Emissions from geothermal energy (Fugitive Emissions 1B) have historically been increasing but are projected to remain steady until 2035. Other sectors are also projected to remain steady.



Emissions (kt. CO_2e)

Sector	1990	2015	2020	2025	2030	2035
Energy industries (1A1)	14	4	1	1	1	1
Manufacturing industries and construction (1A2)	377	177	164	154	151	150
Commercial/Institutional (1A4a)	17	2	1	1	1	1
Residential (1A4b)	31	7	5	6	5	5
Fishing (1A4c)	746	624	615	663	647	632
Fugitive emissions from fuels (1B)	62	168	156	165	172	151
Energy excluding Transport (1A1, 1A2, 1A4, 1B)	**1 247**	**982**	**944**	**991**	**978**	**941**

Figure 5.4 Energy (excluding Transport) Emissions of Total GHGs (kt. CO_2e), WEM scenario

ESD vs EU ETS emissions in Energy

In Iceland, all emissions from the production of Non-Ferrous Metal (1A2a and 1A2b) are accounted for under the EU ETS. Overall, this contributes to approximately 1% of the total emissions from Energy (excluding Transport). The split between ESD and ETS emissions is projected to remain fairly constant over the time series (Figure 5.2).

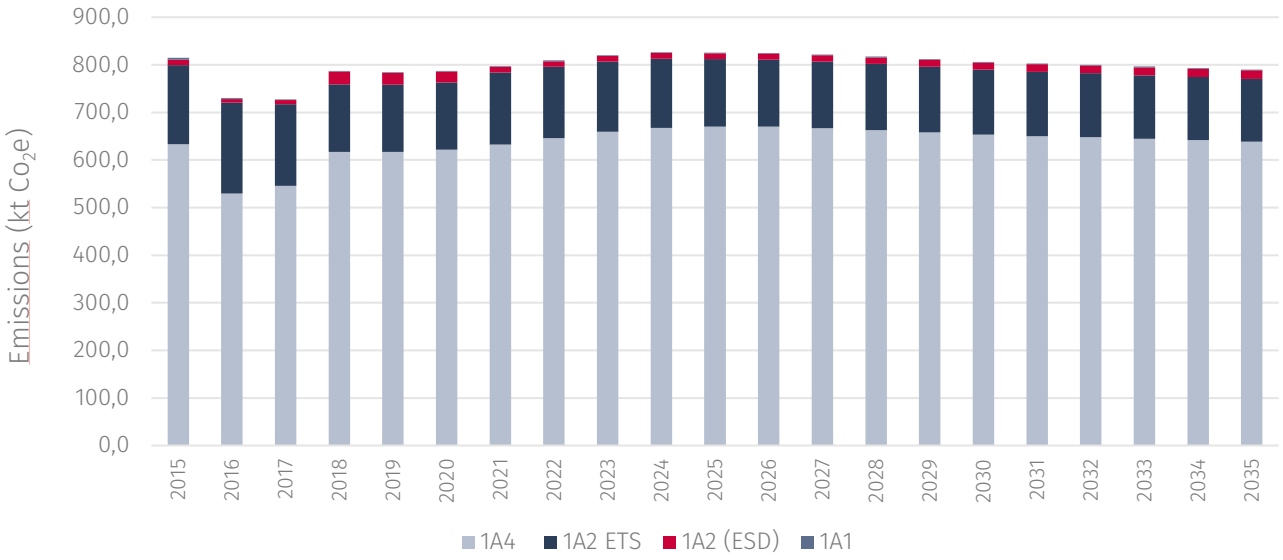


Figure 5.5 ETS and ESD GHG projections in the Energy Sector (excluding Transport), WEM scenario

5.2.2 Projections – WEM scenario

The methodology used to generate projections for the Energy Sector (excluding Transport) are based on the historical inventory, see NIR (2019).

Data & Assumptions

An overview of the data and assumptions used as a basis for the energy projections is presented in Table 5.1. A further description is provided below.

Table 5.1 Basis for Energy projections

Energy	Basis for projections
1.A.1 Energy industries	Fuel projections
1.A.2 Manufacturing industries and construction	Fuel projections
1.A.4 Other sectors	Fuel projections
1.B.1 Solid Fuels	Not relevant in Iceland
1.B.2 Oil and gas and other emissions from energy	Geothermal utilization projections (2003), fuel projections for Oil Distribution (1B2aiii)

Projections for the energy sector are based on fuel projections generated by the National Energy Authority[68]. Fuel projections were available by fuel type and activity. In instances where fuel splits by activity were not available, the most recent historical split was used. This has only been applied to relatively small subsectors within Iceland and is therefore not considered to be a priority for improvement. In addition, no projections for the use of Liquified Petroleum Gas (LPG) in the energy sector were available. In 2017, approximately 2 kt. of LPG were consumed in the energy sector, primarily in the residential sector. Currently, projections of LPG consumption have not been estimated. Future stakeholder engagement is planned to generate LPG projections.

Reductions in fuel use from quantified policies have been assumed not to be included in the fuel projections generated by the National Energy Authority. Therefore, fuel savings from quantified WEM policies have been subtracted from the projected fuel consumption for the WEM scenario.

5.3 Transport

The Transport Sector (1A3) in Iceland includes road transport, domestic aviation and domestic navigation. There are no railways in Iceland and, therefore, these are reported as not occurring (NO). Emissions from the transport sector have accounted for approximately half of the energy sector's total GHG emissions in Iceland in recent years and road transport has historically accounted for approximately 95% of the emissions in the transport sector. There is a link between Waste and the Transport Sector. Policies described in Chapter 4 includes increased methane recovery, which in Iceland is primarily utilised as a vehicle fuel. Despite this, the uncertainties of how the increased methane captured will be used in the future (incl. for which types of vehicles) did not allow for the impact of increased methane recovery on transport emissions to be incorporated into the Transport projections.

5.3.1 Trends

Figure 5.6 presents an overview of the historical and projected emissions from transport. The trend in transport emissions is dominated by the increase in road transport emission between 1990 and 2007. A marked increase in road transport emissions from 2014 can clearly be seen in the historical data. In the WEM scenario, emissions from road transport are projected to peak in 2020 and steadily decline after that, dropping below 1990 levels by 2035. This reduction in emissions is due to the rapid electrification of the vehicle fleet from 2015. By 2025 it is expected that approximately 20% of all road vehicles will be electric, rising to 55 % by 2035.

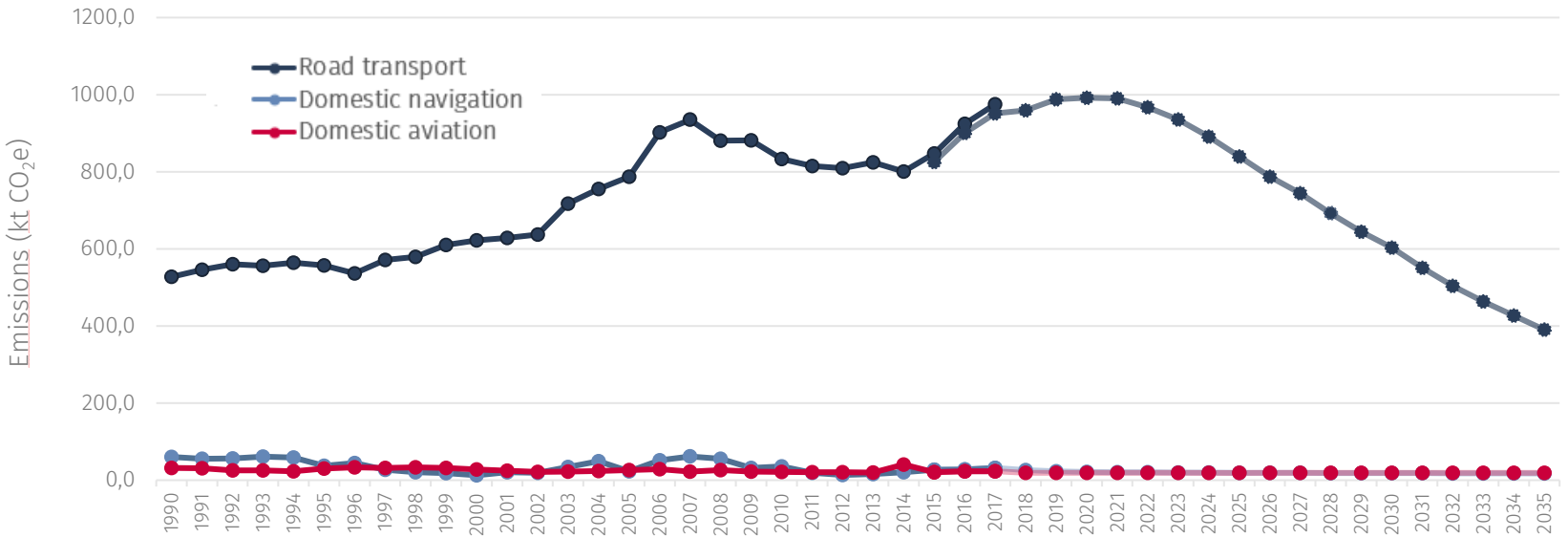
[68] https://orkustofnun.is/gogn/Skyrslur/OS-2016/OS-2016-02.pdf

The cause for the small discrepancy (~3%) in historical and projected emissions from road transport is due to the updated method applied in the projections (see Section 5.3.2). Road transport emissions split by vehicle type are presented in Figure 5.6. The majority of emissions are from passenger cars. However, the rate uptake of electric vehicles (EVs) is greatest in passenger cars and results in the most rapid decline in emissions. It is predicted that in 15 years, the proportion of EVs will rise from 4% in 2020 to 60% in 2035.

Fuel use for domestic aviation is projected to remain constant from 2017 and therefore a linear emissions trend has been projected.

A slight decline in fuel use in domestic navigation has been projected between 2017 and 2035. However, the projections presented in Figure 5.6 consider additional reductions in fuel use in domestic navigation due to two policies in the WEM scenario (see Section 5.3.2):

- The electrification for ferries
- The electrification of harbours

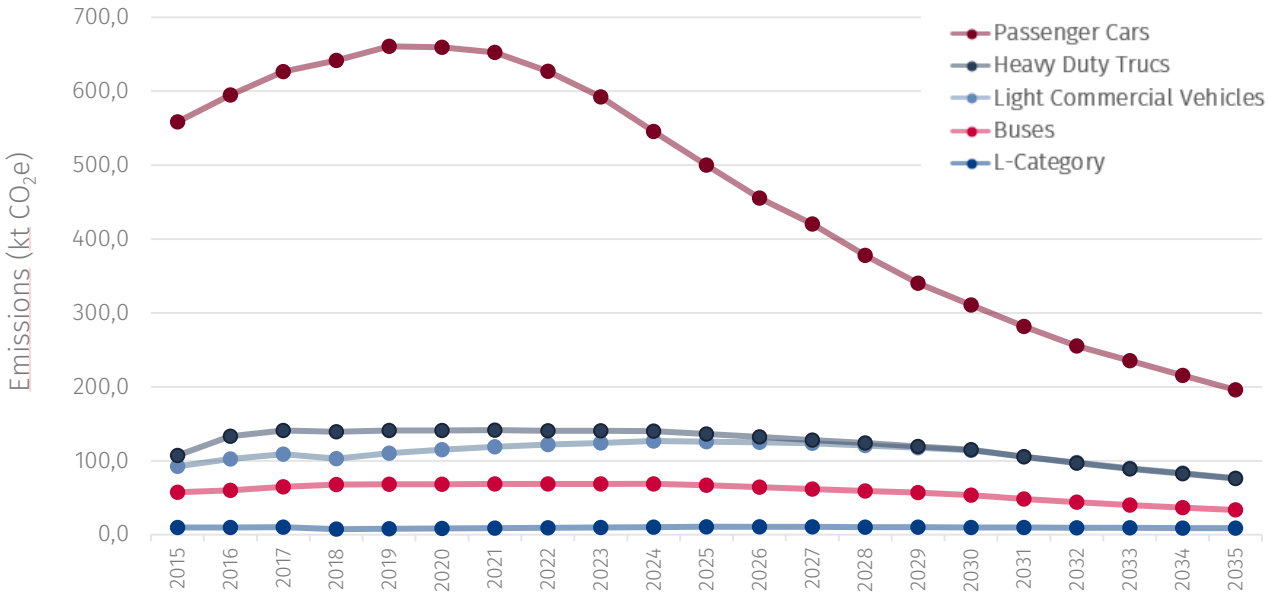


Emissions (kt. CO_2e)

Sector	1990	2015*	2020	2025	2030	2035
Domestic aviation (1A3a)	32	21	19	19	19	19
Road transport (1A3b)	527	825	992	839	603	390
Domestic navigation (1A3d)	60	27	23	22	21	20
Transport (1A3)	**620**	**872**	**1 034**	**880**	**643**	**430**

*Note: the 2015 value for Road Transport is taken from the projections data not the historical data. For other categories, the 2015 value is equal in the projections and historical data.

Figure 5.6 Transport Emissions of Total GHGs (kt. CO_2e), WEM scenario



Emissions (kt. CO_2e)

Sector	2015	2020	2025	2030	2035
Passenger Cars	559	660	500	311	196
Heavy Duty Trucks	107	141	136	115	76
Light Commercial Vehicles	93	115	126	114	76
Buses	57	68	67	54	33
L-Category	10	8	11	10	9
Total	**825**	**992**	**839**	**603**	**390**

Figure 5.7 Road transport Emissions Total GHGs (kt. CO_2e) by vehicle type

5.3.2 Projections – WEM scenario

Except for road transport, the methodology used to calculate projected emissions from transport are based on the historical inventory. For information on the methodology for aviation and navigation, see NIR (2019).[69]

There is a discrepancy in the historical and projected GHG inventories for road transport emission (see Figure 5.6). This is due to the projected data being based on COPERT. For the 2020 submission of the historical GHG inventory Iceland will use COPERT for road transport emissions, thus becoming consistent with projections.

[69] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

Data & Assumptions

An overview of the data and assumptions used as a basis for the transport projections can be found in Table 5.2. A further description is provided below.

Table 5.2 Basis for Transport projections

Transport	Basis for projections
1.A.3.a Domestic Aviation	Fuel projections
1.A.3.b Road transportation	Fuel projections
1.A.3.c Railways	NA
1.A.3.d Domestic Navigation	Fuel projections
1.A.3.e Other transportation	Fuel projections
Memo items: international bunkers	
M. IB International Aviation	Fuel projections
M. IB International Navigation	Fuel projections

Projections for aviation and navigation are based on fuel projections generated by the National Energy Authority.[70] Fuel projections were available by fuel type and activity. The fuel projections generated by the National Energy Authority for domestic navigation have been assumed not to consider the implementation of related quantified policies. Therefore, fuel savings from quantified WEM policies have been subtracted from the projected fuel consumption for the WEM scenario.

Road Transport

Projected vehicle numbers up to 2035 were obtained from the National Energy Authority. Projected information on EV numbers were obtained from the National Energy Authority and Reykjavik Energy. The projections on which the Reykjavik Energy EV numbers are based were made before the 2018 Action Plan was published and it is, therefore, uncertain whether any of the proposed Transport measures can be considered to have been included in the projections. The data provider, is, however, considered to be an expert authority on this matter and their projections considered the expectation that there would be more measures to accelerate the electrification of the car fleet in the near future. It was, therefore, assumed that TR1, TR2 and TR8 from the 2018 Action Plan are included in these projections, even though they were published after the projection was made.

Reykjavik Energy provided projections for EVs under three different scenarios for low/middle/high electric vehicle infiltration into the traffic fleet. The "mid" scenario has been applied to the WEM scenario. A sensitivity analysis considering the impact of the low and high EV infiltration scenarios on

[70] https://orkustofnun.is/gogn/Skyrslur/OS-2016/OS-2016-02.pdf

emissions is presented in the Report on Policies, Measures and Projection.[71] No information is available on the future phasing in/out of different Euro standards. Therefore, COPERT stock and activity projections have been made using expert judgement based on historical trends and applying rate of change curves from the UK fleet to Iceland data. Euro standards for petrol and diesel vehicles are modelled to be 100% Euro 6 2020+ for passenger cars, Euro 6 2021+ for light commercial vehicles, Euro VI for heavy duty vehicles and Euro 5 for L-Category vehicles by 2040, if not earlier. The projections of 'Fuel' and 'Segment' splits in each COPERT category was assumed to remain constant to an average of years 2014-2018 i.e. for lack of better information, it is assumed there will be no big changes between petrol and diesel or size of vehicles.

5.4 Industrial Processes and Product Use (IPPU)

Emissions from Industrial Processes and Product Use (IPPU) are dominated by the Metal Industry (2C), specifically ferroalloys and aluminium production and the use of fluorinated gases (F-gases) in Products as Substitutes for Ozone Depleting Substances (ODS, 2F). Currently, there are two ferroalloy plants and three aluminium smelters operating in Iceland. The largest contributor to F-gas emissions is the fishing industry. There is no Electronics Industry (2E) in Iceland and therefore this is reported as NO.

It has been assumed that the number of aluminium and ferroalloy plants remains at 2017 levels for the projected years. Permits for more plants have been released, but due to a lack of information on whether or when these plants will begin operating, they are not included in the WEM projections. For more information on other possible GHG emissions projections scenarios for the heavy industry sector, including a scenario considering the addition of two more ferrosilicon plants and the expansion of existing aluminium plants, see the University of Iceland's report Iceland and climate issues.[72]

5.4.1 Trends

The historical and projected emissions trend in IPPU is presented in Figure 5.8. Emissions from the Metal Industry (2C) have increased considerably during the past 30 years due to the expansion of existing aluminium smelters and the addition of new smelter facilities. The most recent aluminium smelter started operating in 2007. CO_2 emissions increased linearly with production. In contrast, perfluorocarbons (PFC) emissions occur mostly during the first years of operation, causing the spike in emissions in 2008, and in case of increased voltage in the production line (anode effect).

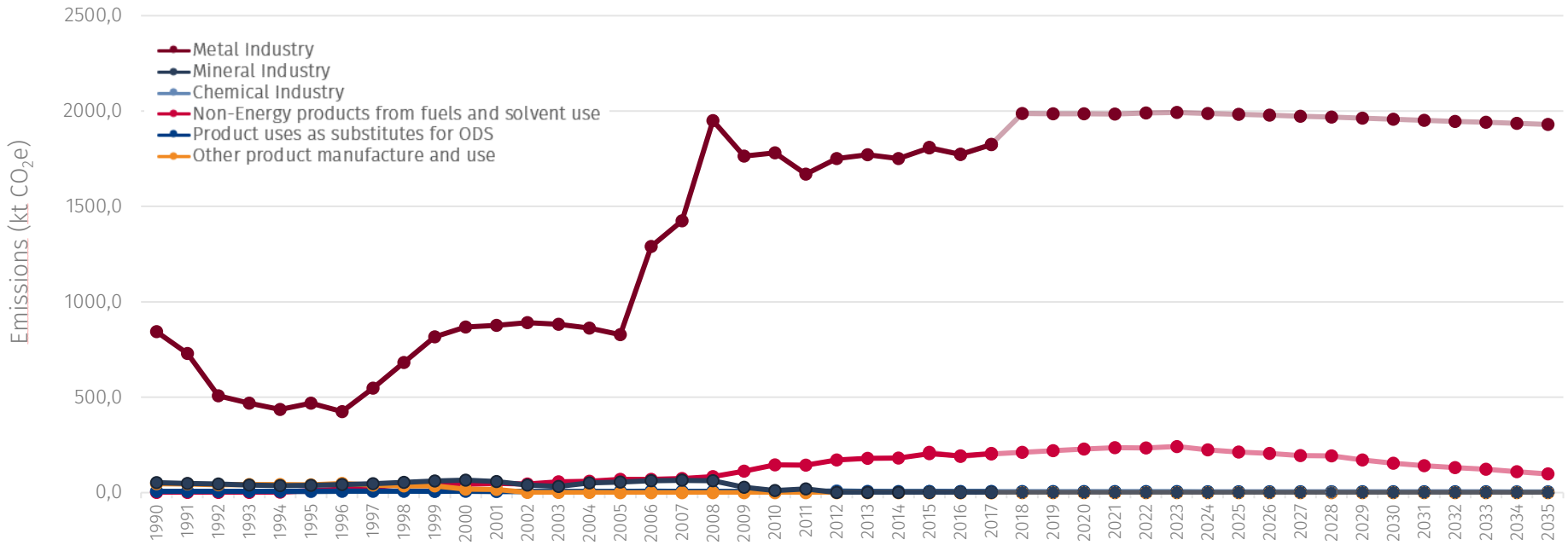
[71] https://ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/PaMs%20final%20April%202019.pdf

[72] https://www.stjornarradid.is/media/umhverfisraduneytimedia/media/PDF_skrar/island_og_loftslagsmal_hhi_feb_2017.pdf

The Ferroalloys industry currently has two operating plants which produce ferrosilicon and silicon metal. One plant has operated since 1979, and the other one started operation in 2018. There is a third silicon metal plant which is currently not operating, and it is unclear whether operations are to be resumed. Due to this uncertainty, this plant was excluded from the projections.

The aluminium industry has already nearly reached maximal production capacity indicating that the maximal CO_2 emissions from IPPU have been reached and the projections show a slight increase in emissions compared to 2017 emissions and relatively constant PFC emissions. The ferroalloys industry on the other hand, shows a decrease in the emissions, primarily due to the efforts of one company who communicated a decrease of their emissions of 130 kt. CO_2e until 2035. Details about how the plant plans to achieve this decrease in emissions with constant production were not communicated to the EA.

F-gases are mostly used for refrigeration and air conditioning in Iceland. The biggest share in F-gas emissions derives from the fishing fleet, which relies on HFCs for the cooling and freezing systems on board. The EU Directive 517/2004 was implemented into the Icelandic Regulation system with Regulation No 1279 from 31/12/2018 defining a quota system on the amount of F-gases to be imported each year and steps for phasing it out. Applying this regulation in the projection of F-gas emissions shows that the peak of emissions will be reached in 2023 and from this point the emissions will decrease.



Emissions (kt. CO_2e)

Sector	1990	2015	2020	2025	2030	2035
Mineral industry (2A)	52	1	1	1	1	1
Chemical industry (2B)	47	NO	NO	NO	NO	NO
Metal industry (2C)	844	1 809	1 986	1 983	1 958	1 929
Non-energy products from fuels and solvent use (2D)	7	6	5	4	4	3
Electronics industry (2E)	NO	NO	NO	NO	NO	NO
Product use as substitutes for ODS(2) (2F)	1	212	228	212	155	98
Other product manufacture and use (2G)	7	5	5	5	5	5
Other (please specify) (2H)	NO	NO	NO	NO	NO	NO
IPPU (2)	**958**	**2 032**	**2 226**	**2 205**	**2 122**	**2 036**

Figure 5.8 IPPU Emissions Total GHGs (kt. CO_2e), WEM scenario

5.4.2 Projections – WEM scenario

The methodology used to generate projections for the IPPU Sector are based on the historical inventory, see NIR (2019).[73]

Data & Assumptions

An overview of the data and assumptions used as a basis for the IPPU projections can be found in Table 5.3. A further description is provided below.

Table 5.3 Basis for IPPU projections

IPPU	Basis for projections
2.A Mineral Industry	Activity data provided by the stakeholders
2.B Chemical Industry	Not relevant in Iceland
2.C Metal Industry	Activity/emission data provided by the stakeholders, trends over the past 5 years
2.D Non-energy products from fuels and solvent use	GDP, population projection
2.E Electronics Industry	Not relevant in Iceland
2.F Product uses as substitutes for ODS(2)	Legislation (Import quota)
2.G Other product manufacture and use	GDP, population projection, trends over the past 10 years

The main companies (mineral wool, ferroalloys and aluminium) were asked to provide a production and emission estimate until the year 2035 or to confirm or reject the calculated emission estimates based on historical inventory data. Half of the companies responded to the request and provided own emission and production estimates or rectified the calculated projections. Where companies did not respond a mixture of (1) activity data projected based on production trends, and (2) maximum production allowances according to valid permits, was applied to generate projections.

According to the Icelandic Ministry of Industries and Innovation there are currently no plans for adding new aluminium smelters, ferroalloys plants or for resuming production of cement, fertilizer, diatomite or steel.[74] Therefore, the projections based on the current production, have been increased to reflect the maximal permitted allowance according to the operation permits or to reach production amounts communicated by the individual companies.

[73] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

[74] E-mail communication from 05/02/2019, Director General, Department of Energy, Industry and Business Affairs, Ministry of Industries and Innovation

The F-gas projections are based on the import allowance of HFCs. Information on the single blends and their use is not available. The historical data show a strong fluctuation in the amount and composition of imported blends which does not correlate to any macroeconomic parameter. A simplified approach was chosen by applying initial emission factors, operation emission factors, recovery and lifetimes averaged from the inventory calculations of the 2F1 subsector. A comparison shows that in the subsector 2F1 the transport refrigeration (2F1d) is the most significant contribution to the F-gas emissions. Therefore, the emission factors of the transport refrigeration were applied to the whole time series. This resulted in a 1% discrepancy between the historical and projected inventory which was considered satisfactory given the difficulty of obtaining activity data.

5.5 Agriculture

Iceland is self-sufficient in all major livestock products, such as meat, milk and eggs. Traditional livestock production is grassland based and most farm animals are native breeds, i.e. dairy cattle, sheep, horses and goats, which are all of an ancient Nordic origin, one breed for each species. These animals are generally smaller than the breeds common elsewhere in Europe and, therefore, the calculated emissions from these breeds based on default IPCC emission factors[75] might be slightly overestimated. Beef production, however, is partly through imported breeds, as is most poultry and all pork production. There is not much arable crop production in Iceland, due to a cold climate and short growing season. Cropland in Iceland consists mainly of cultivated hayfields, although potatoes, barley, beets, and carrots are grown on limited acreage.

The total GHG emissions from Agriculture in 2017 were 4% below the 1990 level. The main sources of GHG emissions in agriculture are CH_4 emissions from enteric fermentation and manure management, and N_2O emissions from manure management and fertilizers. Emissions of CH_4 and N_2O have historically accounted for over 99% of the total emissions from agriculture in Iceland, with less than 1% arising from CO_2. In 2017, 85% of CH_4 emissions were caused by enteric fermentation, the rest by manure management. In the same year, 80% of N_2O emissions were caused by agricultural soils, the rest by manure management, i.e. storage of manure.

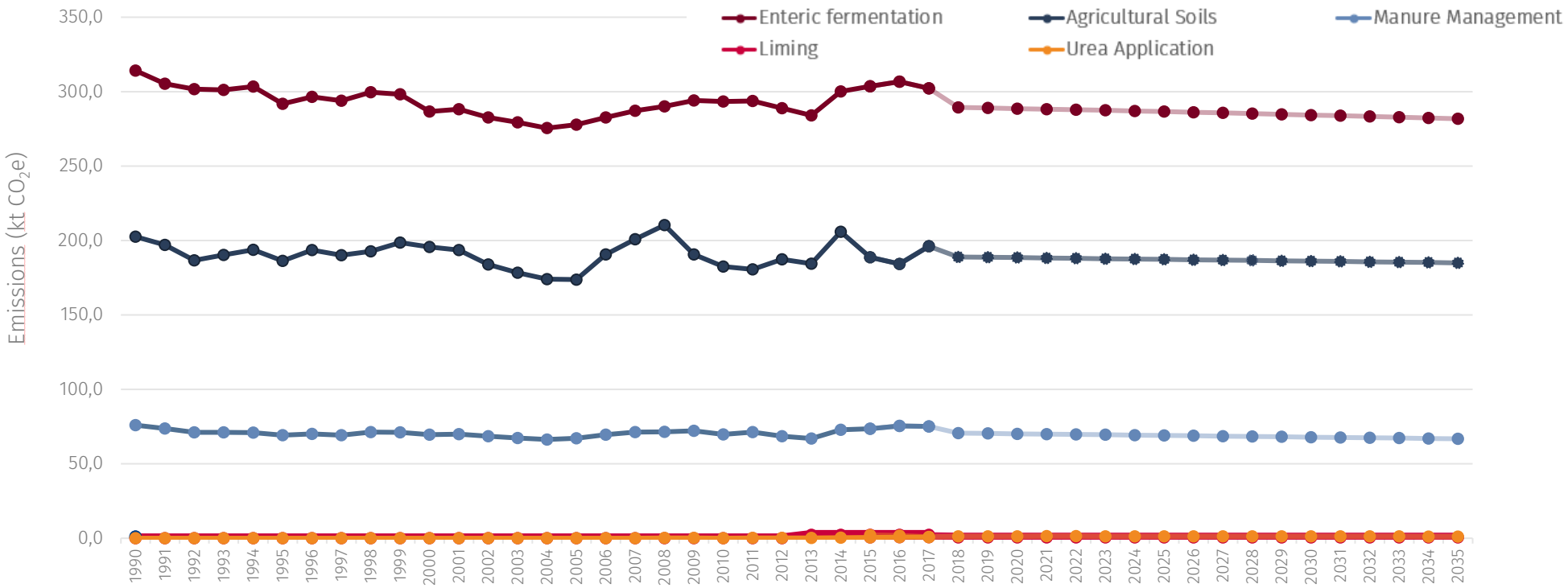
5.5.1 Trends

Historically the biggest source of GHG emissions from the agriculture sector in Iceland is enteric fermentation, although manure management and agricultural soils are also significant sources. The decrease of GHG emissions since 1990 is mainly due to a decrease in sheep livestock population, reducing methane

[75] IPCC Guidelines (2006) *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. (H. Eggleston, L. Buendia, K. Miwa, T. Ngara, & K. Tanabe, Eds.) IGES, Japan

emissions from enteric fermentation, and reduced fertilizer application reducing N_2O emissions from agricultural soils. The historical and projected trend can be seen in Figure 5.9. Emissions from agriculture are projected to decrease slightly due to a projected decrease in most livestock numbers. This reduces emissions from enteric fermentation and manure management. Emissions from liming and urea application remain steady however, in line with the historical trend.

Emissions from enteric fermentation and manure management are both projected to decrease by 7% from the 2015 until 2035. Emissions from agricultural soils are projected to remain relatively steady and only decrease by 2%. Projections for Liming and Urea were based on the average emissions from 2013-2017 and are, therefore, constant for the projected time series and only slightly higher or lower than emissions in the base year.



Emissions (kt. CO_2e)

Sector	1990	2015	2020	2025	2030	2035
Enteric fermentation (3A)	314	304	289	287	284	282
Manure Management (3B)	112	102	98	97	96	95
Agricultural Soils (3D)	203	189	188	187	186	185
Liming (3G)	IE	4	4	4	4	4
Urea application (3H)	0.1	1	1	1	1	1
Agriculture (3)	**628**	**599**	**580**	**576**	**571**	**566**

Figure 5.9 Agriculture Emissions Total GHGs (kt. CO_2e), WEM scenario

5.5.2 Projections – WEM scenario

The methodology used to generate projections for the Agriculture Sector are based on the historical inventory, see NIR (2019).[76]

Data & Assumptions

An overview of the data and assumptions used as a basis for the Agriculture projections can be found in Table 5.4. A further description is provided below.

Table 5.4 Basis for Agriculture projections

Agriculture	Basis for projections
3.A Enteric fermentation	Historical trends
3.B Manure management	Historical trends
3.C Rice cultivation	Not relevant in Iceland
3.D Agricultural soils	Historical trends
3.E Prescribed burning of savannahs	Not relevant in Iceland
3.F Field burning	Not relevant in Iceland
3.G Liming	Historical trends
3.H Urea application	Historical trends
3.I Other carbon-containing fertilizers	Historical trends

The projections on how the agriculture sector will develop in Iceland have been based on historical trends, proxy projections and expert judgement.

The trend in livestock populations has been extrapolated forwards to 2035, based on the historical trend in populations between 1990 and 2017. Exceptions were made for a few livestock categories (foxes, rabbits, broilers in the chicken category and hens in the duck category), which were kept constant at 2017 livestock numbers, due to the trend over the time series being dominated by large, one-off drops/increases in some years, or the trend falling into sub-zero numbers.

Milk yield per dairy cow in kg/year was projected using the historical trend.

[76] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

Table 5.5 Livestock number projections and milk yield per dairy cow (kg/year)

Category	2015	2020	2025	2030	2035	% change ´15-´35
Dairy Cattle	27 441	23 466	22 306	21 146	19 986	-27%
Milk yield	5 851	6 310	6 707	7 105	7 502	28%
Cattle	51 335	49 315	50 508	51 701	52 895	3%
Sheep	739 754	709 097	698 544	687 990	677 436	-8%
Goats	1 476	1 565	1 786	2 007	2 228	51%
Horses	75 450	77 473	77 869	78 265	78 661	4%
Swine	42 542	42 788	42 556	42 325	42 093	-1%
Poultry	718 935	889 531	983 279	1 077 027	1 170 775	63%

The livestock projections in Table 5.5 show that the number of dairy cattle is projected to decrease by 27% from 2015 until 2035, while the average annual milk yield per dairy cow is projected to increase by 28%. This is comparable to the projected annual milk yield by other countries. This increase in productivity per dairy cow leads to an increase of gross energy (GE) intake and consequently higher CH_4 enteric fermentation emissions per dairy cow, offsetting the emissions reductions from lower population numbers which would otherwise have been more significant.

Emission factors and other key parameters have been held constant at 2017 values.

Historical livestock numbers on which the trends are based are from the Icelandic Food and Veterinary Authority (IFVA) and the same numbers which are used for agriculture calculations in the NIR (2019).

Projections of mineral fertiliser use and mineralisation of N from histosols are made by taking the average of the last 5 years of data (2014-2017) and using this fixed value for the whole projected series due to a lack of activity data.

5.6 Waste

This sector includes emission projections from Solid Waste Disposal (5A), Biological Treatment of Solid Waste (5B), Incineration and Open Burning of Waste (5C) and Wastewater Treatment and Discharge (5D).

For most of the 20th century Solid Waste Disposal Sites (SWDS) in Iceland were numerous, small, and located close to the locations of waste generation. In 1991 the SWDS Álfsnes was opened, which is currently the biggest SWDS site in Iceland and is serving the capital and all surrounding municipalities, where approximately two thirds of the population of Iceland lives. A new biogas and composting plant is expected to start operating at Álfsnes in 2020. The plant is expected to turn 25 kt. of waste into compost and methane gas annually. The methane will mostly be used as fuel for vehicles, but this has not yet been incorporated into the transport projections (see Section 5.3). There was a trial to produce electricity from the recovered methane, but this could not compete

with the cheaper electricity production from geothermal or hydropower, so the methane is mostly used for vehicle fuel.

Until the 1970s, the most common form of waste management outside the capital area was open burning of waste. However, this practice was banned in 1999 and is non-existent today. In the beginning of 2012, a total of four waste incinerators were operating. However, by the end of 2012 all incineration plants except one (Kalka) had closed; therefore, emissions from the single plant are reported from 2013. Kalka mostly handles mixed general waste, but also clinical waste, hazardous waste, slaughterhouse waste and other waste categories in smaller quantities.

Recycling and biological treatment of waste started on a larger scale in the beginning of the 1990s. Their share of total waste management has increased rapidly since then and the amount of waste composted doubled between 2007 and 2017.

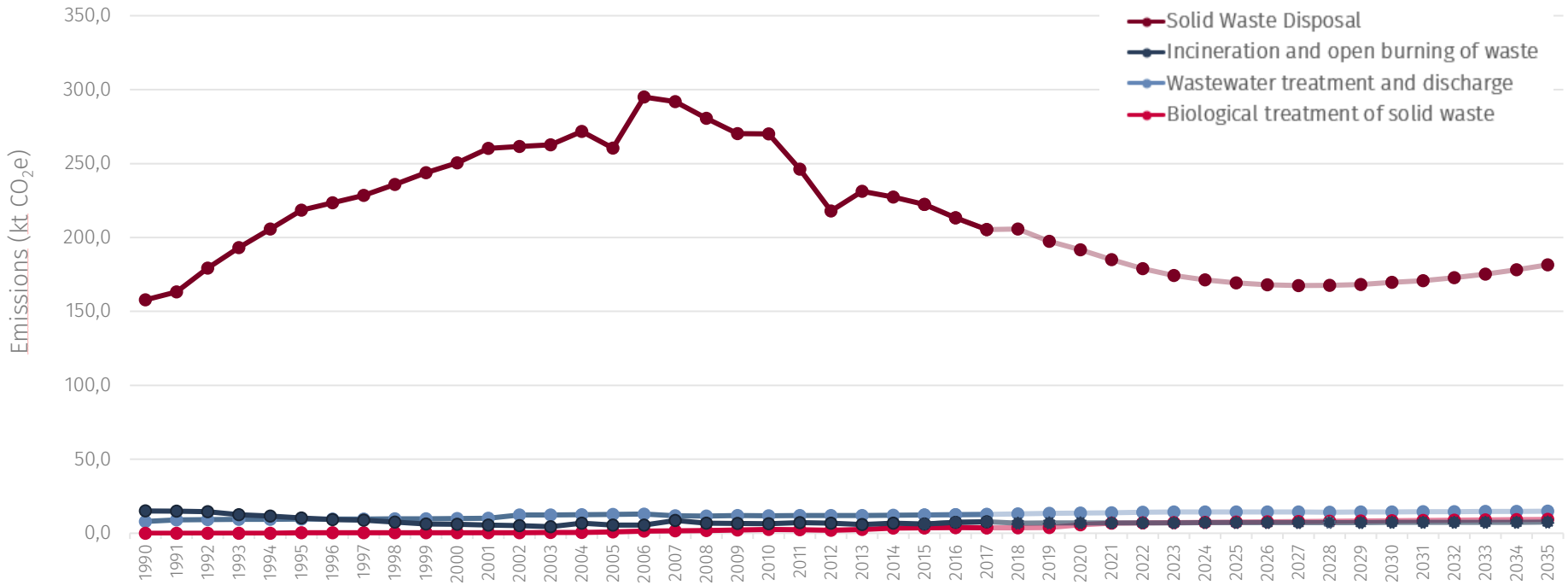
Wastewater treatment in Iceland consists mainly of basic treatment with subsequent discharge into the sea. In recent years, more advanced wastewater treatments have been commissioned in some smaller municipalities but their share of total wastewater treatment systems in Iceland does not exceed 2%.

5.6.1 Trends

Historically 80 – 90% of GHG emission from the waste sector in Iceland have come from Solid Waste Disposal (5A). In recent years the emissions from SWDS have been decreasing due to reduced landfilling and increased methane collection. The historical and projected trend is presented in Figure 5.10.

The emissions from Solid Waste Disposal (5A) are projected to decrease until 2027 when they will begin to increase again. The decrease up to 2027 is due to the addition of the new gas and composting plant. After 2027, emissions are projected to increase again, this linked to increasing GDP and a projected increase in population whilst methane collection and the capacity of the gas and compost plant remains constant.

Figure 5.11 shows historical and projected emissions from the waste sector, excluding emissions from Solid Waste Disposal (5A). Biological Treatment of Waste (5B) and Wastewater Treatment and Discharge (5D) are projected to slightly increase whilst emissions from Incineration and Open Burning of Waste (5C) are projected to remain relatively steady.



Emissions (kt. CO_2e)

Sector	1990	2015	2020	2025	2030	2035
Solid Waste Disposal (5A)	158	222	189	169	166	175
Biological treatment of solid waste (5B)	0	4	6	8	8	9
Incineration and open burning of waste (5C)	15	6	7	7	7	7
Wastewater treatment and discharge (5D)	8	12	14	14	14	15
Other (please specify) (5E)	NO	NO	NO	NO	NO	NO
Waste (5)	**181**	**245**	**218**	**198**	**200**	**213**

Figure 5.10 Waste Emissions Total GHGs (kt. CO_2e), WEM scenario

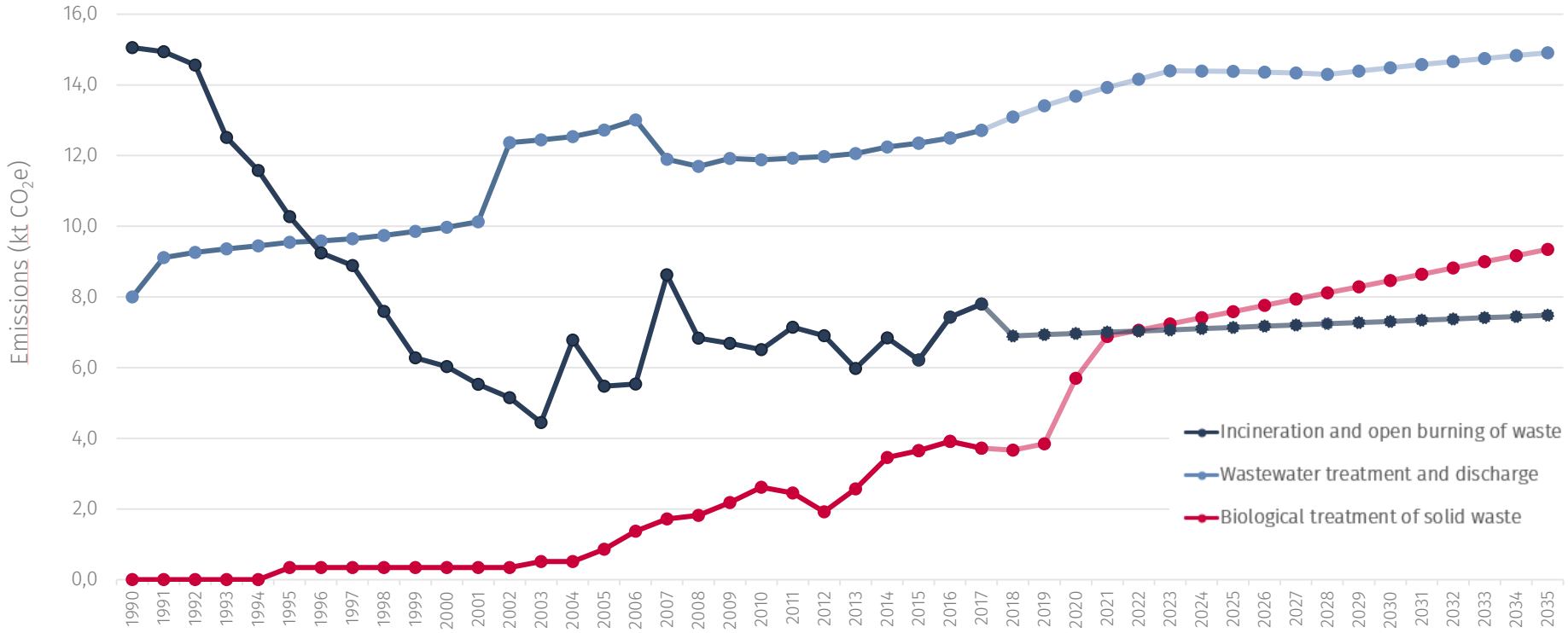


Figure 5.11 Waste Emissions Total GHGs (kt. CO_2e), excluding Solid Waste Disposal (5A), WEM scenario

5.6.2 Projections – WEM scenario

The methodology used to generate projections for the Waste Sector are based on the historical inventory, see NIR (2019).[77]

Data & Assumptions

An overview of the data and assumptions used as a basis for the Waste projections can be found in Table 5.6. A further description is provided below.

Table 5.6 Basis for Waste projections

Waste	Basis for projections
5.A Solid Waste Disposal	GDP, methane recovery projections and gas and composting plants projections from stakeholders
5.B Biological treatment of solid waste	Historical trends
5.C Incineration and open burning of waste	Historical average
5.D Wastewater treatment and discharge	Population projections (Statistics Iceland)
5.E Other (please specify)	Not relevant in Iceland

For projections of emissions from Solid Waste Disposal (5A) the amount of waste going to landfills had to be projected. Proxy data analysis was preformed comparing the correlation of waste per capita with OECD GDP in one case and population in the second case. The result was that waste per capita is better correlated with GDP, which was then used as proxy data to project waste amounts going to landfills. It was evident that there is decoupling between GDP and waste generation for more recent years in the historical timeseries, which will contribute to increased uncertainty of projected emissions. It is planned to improve the waste sector projections in future submissions by identifying improved proxy data rather than GDP for the projection of annual waste generation in Iceland.

[77] https://www.ust.is/library/Skrar/Atvinnulif/Loftslagsbreytingar/NIR%202019%20Iceland%2015%20April%20final_submitted%20to%20UNFCCC.pdf

6. Financial, technological and capacity-building support

6.1 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 focus on the sustainable utilization of natural resources, including fisheries and geothermal and other renewable energy sources. 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 Policy for International Development Cooperation for 2019-2023 which identifies two priority areas: (1) enhancing social infrastructure and peace efforts and (2) the protection of the earth and sustainable use of natural resources. Under the second pillar, five areas are identified as priority areas;

a) Increased use of geothermal energy and other renewable energy sources (pursuant to UN SDG no. 7).
b) The protection and sustainable management of the oceans and waters (pursuant to SDG no. 14).
c) Recovering land quality and limiting land degradation (pursuant to SDG no. 15).
d) Increasing the resilience and adaptability of societies due to the impacts of climate change (pursuant to SDG no. 13).
e) Sustainable economic growth and decent work opportunities for all (pursuant to SDG no. 8).

In line with best practices in development cooperation and OECD-DAC guidelines, Iceland's development 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 the need to further mainstreaming environmental activities across its development cooperation portfolio and strengthen the harmonization of climate change, business and development cooperation strategies within Iceland's Ministry for Foreign Affairs in accordance with the Kyoto Protocol.

The Ministry for Foreign Affairs is developing an environment and climate change strategy, that will be supported by an action plan that will guide environmental mainstreaming in all development cooperation.

Iceland's Policy for International Development Cooperation 2019-2023[78] highlights the need to increase the leverage of public development cooperation with participation from private sector actors and Iceland's commitments to the OECD/DAC will be used as basis for private sector partnerships. A new department within the Ministry for Foreign Affairs was established in 2018; Regional Cooperation and Partnerships. This department has oversight over the three-year experimental project called the Sustainable Development Goal Fund (Heimsmarkmiðasjóður) aimed at increasing partnership with the business community in development cooperation. The purpose of the fund is also to encourage participation and contribution to development cooperation by the business community, with the objective of reducing poverty and supporting job creation and sustainable growth in the world's poorest countries, in accordance with the UN Sustainable Development Goals (SDGs). Projects should provide benefits and generate revenue in developing countries and have clear linkages to one or more of the UN SDGs.

Iceland continues to utilize Icelandic expertise, especially in the field of geothermal and renewable energy, sustainable use of marine resources and waters, soil conservation, and measures to enhance the actions of societies to mitigate and adapt to climate change.

6.2 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, mitigation, desertification and biodiversity. 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. 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 or accounted for in the OECD DAC marker, Iceland puts forth these contributions in BR-CTF 7a. Contributions to multilateral agencies which main mandate is climate actions such as UNCCD, SEforALL, Green Climate Fund and IRENA are included in this report.

[78] https://www.stjornarradid.is/verkefni/utanrikismal/throunarsamvinna/

With respect to core funding to multilateral institutions that don't have an explicit climate change mandate, although possible to retrieve information on climate relevant proportions of the projects they support from OECD-DAC, these contributions are not part of the information provided in the total climate related summary in this report. 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. Climate specific projects are those with climate change mitigation and climate change adaption markers, marked as having significant or principal objective in applicable category. Additional are cross– cutting projects which have more than one climate category with marked either significant or principal marker.

All funds specified in this report have been disbursed.

6.3 Financing

The Icelandic Government is committed to reach the UN target of 0.7% of gross national income (GNI) dedicated to official development assistance (ODA). The conceivable objective is to slowly and steadily raise the targets, going from 0.28% in 2019, 0.30% in 2021 and up to 0.35% 2022-2024. Iceland's ODA went from 0.26% of GNI in 2006 to 0.28% in 2017 and 0.28% in 2018, but due to strong economic growth Iceland's ODA grew in nominal terms from ISK 2.9 billion in 2006 to ISK 8.1 billion in 2018.[79]

Table 6.1 shows the breakdown of Iceland's ODA contribution to climate´s categories divided; mitigation, adaptation and cross-cutting environmental topics.

In 2017 approximately 21% of Iceland's climate ODA (both multi- and bilateral funds); 362 million ISK, had mitigation as a significant or primary objective. Adaptation had approximately 46% of Iceland's climate ODA or about 806 million ISK, as a significant or primary objective. Crosscutting had approximately 34% of Iceland's climate ODA or about 598 million ISK, as a significant or primary objective.

There is no significant change in direction or trends between years. Most climate categories have consistent correlation of division between 2017 and 2018 comparing to total climate ODA with close to 50% of climate related funding dedicated to projects that focus on adaptation to climate change. There is an overall 5% increase of funding to climate related projects between 2017 and 2018 (Table 6.2), which is in line with increased focus on earth and

[79] All the figures presented are in ISK.

In December 2017, USD 1 = 113,09 ISK, EUR 1 = 119,46

In December 2018, USD 1 = 122,94 ISK, EUR 1 = 139,79

sustainable use of natural resources in the newly adopted International development cooperation policy.

Table 6.1 Summary information on climate categories

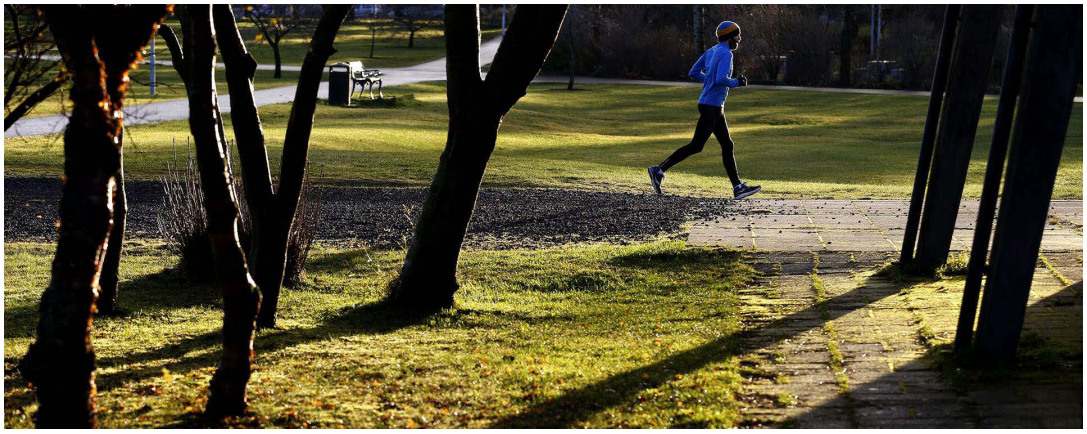
Type of support division of total ODA	2017	2018
Mitigation	5%	6%
Adaptation	11%	15%
Cross – cutting	8%	8%

Type of support division of climate ODA	2017	2018
Mitigation	21%	20%
Adaptation	46%	52%
Cross – cutting	34%	28%

Table 6.2 provides a summary from table 6.3 and 6.4 which enlist both bilateral and multilateral projects with a marked focus on mitigation, adaptation and cross-cutting environmental issues. The following tables represent BR-CTF Tables 7a and 7b.[80]

Table 6.2 Summary information climate-specific projects (ISK)

Climate-specific projects	2017	2018
Total bilateral climate related funds	1.497.824.466	2.050.678.303
Total multilateral climate related funds	268.925.681	294.612.941
Total climate ODA	1.766.750.147	2.345.291.244
Grand Total ODA	**7.273.698.913**	**8.034.170.841**
Total share of climate ODA of total ODA	24%	29%



[80] See Iceland's Fourth Biennial Reporting Common Tabular Format (BR CTF)

Table 6.3 Summary information climate-specific bilateral projects (ISK) categorized by type of support

Mitigation	2017	2018
UNU Geothermal Training Programme	234.200.000	245.900.000
UNU Land Restoration Training Programme	128.100.000	138.300.000
Geothermal Exploration Project		
EXGFI Geothermal Technical Expert Advice - Fiji		459.923
EXGKA -Geothermal Development Experts - Kazakhstan		9.590.050
Geothermal Exploration Project		8.582.262
EXGEL - Technical Assistance Programme in Geothermal Development - EL Salvador		38.796.010
RGMA Geothermal Exploration Project - Malawi		3.348.099
RGET Geothermal Exploration Project - Ethiopia		12.271.035
RGDJ Geothermal Exploration Project - Djibouti		6.249.582
RGRW Geothermal Exploration Project - Rwanda		5.799.675
Total Mitigation funds	**362.300.000**	**469.296.636**

Adaptation	2017	2018
WASH Mozambique	141.402.021	268.894.400
WASH Uganda	369.231.875	477.049.730
WASH Liberia		90.984.000
WASH Sierra Leone		90.984.000
WASH Malawi	16.256.184	
WASH Ethiopia		
Drought Emergency Response ACT Alert		25.000.000
Drought Emergency Response – SOM171	15.000.000	
Support to fishing industry		
Fisheries project - Island Growth Initiative (IGI/SIDS)		1.962.384
Research, monitoring and development of Cahorra Bassa fishing grounds		3.223.491
UGA-Support to Quality Assurance from Fish Marketing Project (QAFMP)	6.669.845	
MOZ-Assistance to the Fisheries Sector in Mozambique: co-financed by Norway and Iceland	99.457.837	
UGA-Support to the Implementation of Kalangala District Development Plan (KDDP)	145.312.179	167.065.034
Rural development programs in Buikwe and Kalangala districts, Uganda		73.261.973
Total Adaptation funds	**793.329.941**	**1.198.425.012**

Cross-cutting	2017	2018
Gender & climate change		
Kebribeyjah Sustainable Livelihood Project	20.000.000	20.000.000
JDICDP - Integrated Community Development Project	11.794.525	
UNU Fisheries Training Programme		
UNU Fisheries training programme Core contribution	216.700.000	217.000.000
RFSL Regional co-operation in fisheries, component by UNU FTP.		28944455
UNU Gender Equality Studies and Training Programme	93.700.000	117.012.200
Total cross-cutting funds	**342.194.525**	**382.956.655**

Table 6.4 Summary information climate-specific multilateral projects (ISK) categorized by type of support

Adaptation	2017	2018
Least Developed Countries Fund UNFCCC	9.861.700	10.669.500
DOALOS	3.000.000	3.000.000
Total Adaptation funds	**12.861.700**	**13.669.500**

Cross-cutting	2017	2018
Green Climate Fund (GCF) core contribution	19.723.400	21.326.500
UNFCCC Core contribution	15.500.000	
WBG - ESMAP Core Contribution	31.980.000	84.039.000
WBG - REG-Geothermal Exploration Project	129.806.956	
WBG - PROBLUE - Word Bank´s Blue Economy Programme		48.570.300
WBG - WARFP - West Africa Regional Program		2.871.808
WBG - PROFISH Core contribution	20.918.500	20.473.200
SEforAll - Sustainable Energy for All core contribution	25.095.950	20.111.200
The Women's Delegate fund (WEDO - WDF)	7.995.375	8.023.875
FAO - PSMA		24.225.700
AMCEN Women entrepreneurs and sustainable energy workshop	5.043.800	18.165.150
IRENA-International Renewable Energy Agency		1.038.308
UNCCD, Convention to Combat Desertification		214.625
Support to ARGeo (African Rift Geothermal Development Facility)		31.883.775
Total cross-cutting funds	**256.063.981**	**280.943.441**

6.3.1 Provision of new and additional financial resources

Iceland is committed to assist developing countries in adapting to and mitigating the adverse effects of climate change and in 2018 Iceland contributed approximately 1.043 million ISK in 'new and additional' support, when compared to 2016 (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.

As reported in previous years, Iceland defines the increasing ODA volumes in 2018 (1.043 million ISK increase from 2016 to 2018) as new and additional funding to the ODA portfolio. The new and additional funding is drawn from the

growing aid program and has not diverted funds from existing development priorities or programs. To reiterate, Iceland looks at the increasing ODA volumes in nominal terms in ISK from 2016 to 2018 to identify new and additional financial resources in climate-related activities, but not as a percentage of GNI. This is Iceland's definition of new and additional financial resources in lack of international standard classification.

There is a separate budget line in the State budget for environment and climate actions in international development cooperation. This budget line has been earmarked since 2012 and commenced with Iceland's Fast Start Finance commitments. When narrowing in on this budget line, a 5% increase in climate-related financing is noted between 2016 and 2018.

The environment and climate action portfolio is 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 is channelled through multilateral agencies and trough bilateral work. Focus has been given to Iceland's long-standing bilateral partner countries, Malawi and Uganda, in addition to a special focus on Mozambique which are all among the Least Developed Countries (LDCs).

6.3.2 Bilateral and regional financial contributions

There was a significant increase to bilateral development cooperation between 2017 and 2018; with 35% increase. This increase to bilateral development work is mainly due to delays in large projects during 2017, resulting in funds committed in 2017 were disbursed according to original purpose during 2018.

Iceland's bilateral work is with Iceland's long-standing government partner's in Malawi and Uganda, but Iceland closed its development cooperation operations in Mozambique in December 2017. However, through a multiyear exit strategy Iceland continues to support development projects through UNICEF, UN Women and WFP in the country. In accordance with OEDC DAC markers, Iceland classifies development support through international NGO's, to UN earmarked projects implemented by country offices and financial funding of the four United Nations University (UNU) Training Programs based in Iceland as bilateral work.

Iceland prioritizes development cooperation in LDC's and about 44% of total ODA in 2018 and 27% in 2017 went to LDC countries. Iceland emphasizes adaptation to climate changes in its climate-related bilateral work, mostly in East and West Africa, BR-CTF Table 7b[81] contains detailed description of projects. The largest adaptation project in 2017 and 2018 was Iceland's support

[81] See Iceland's Fourth Biennial Reporting Common Tabular Format (BR CTF)

to UNICEF's water, sanitation and hygiene project in Zambezia province in Mozambique with close to 400.000 m ISK over the reporting period. Iceland and Norway provided financial and technical support to Mozambique's fisheries sector since 2009 to 2018 with the objective to promote sustainable and viable use of aquatic resources. Finally, a geothermal exploration project in the East African Rift Valley aims to build capacity and expertise in the field of geothermal utilization. Iceland started a new initiative in Liberia and Sierra Leone in 2018 with UNICEF, forming a holistic and integrated approach to sustainably improve livelihoods and conditions in coastal communities and increase the institutional capacity of fisheries authorities to sustainably use marine resources and combatting illegal fishing in fishing communities.

Most of Iceland's bilateral environmental contributions are channelled through UN University training programs based in Iceland. The UNU provide support to climate change adaptation and mitigation in LDCs, gender mainstreaming, capacity building through the four programmes; UNU-Geothermal Training Programme, the UNU Fisheries Training Program, the UNU Land Restoration Training Program, and the UNU Gender Equality Studies and Training Program.

Regarding environmental contributions to multilateral agencies, Iceland is a founding member or SEforALL, the only donor to African Women Energy Entrepreneurs Framework (AWEEF) which is hosted under UNEP and contributes to both UNFCCD and LDC fund under UNFCCC. 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[82] provides detailed information on Iceland's financial contributions to climate related development activities through multilateral channels.

[82] See Iceland's Fourth Biennial Reporting Common Tabular Format (BR CTF)

6.4 Technology development and transfer and capacity building

Iceland contributes to strengthened capacity building in developing countries to enhance mitigation and adaptation efforts. 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. Recognizing 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.

Financial resources and transfer of technology for the purposes of adaptation to and mitigation of climate change have in recent years been channelled mainly through the public sector and not through the private sector. However, Iceland recognizes 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.

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. BR-CTF Table 8[83] highlights projects that have a stronger technology transfer component, and Table 6.5 (BR-CTF Table 9) highlights projects with a stronger capacity building component.

Iceland's measures related to the promotion, facilitation and financing of the transfer of, or access to, environmentally-sound technologies, have a 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.

[83] See Iceland's Fourth Biennial Reporting Common Tabular Format (BR CTF)

Iceland has a longstanding commitment to four United Nations University (UNU) training programs based in Iceland: The UNU-Geothermal Training Propgramme 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.

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 (SEforAll), 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. 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[84] 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 several 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).

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.

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.

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

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 6.5 Provision of capacity-building support 2017-2018

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. Degradation of environmental systems, degraded land, erosion and desertification are among the most urgent environmental problems facing the world today. This affects climate change, biological diverseness, poverty and food security in a negative way. It is important to overcome these problems and regain and rebuild land quality. Related problems affect the poorest countries most. Circumstances in Iceland make the country suitable for education and training in land restoration and soil conservation in cooperation with developing countries. The nature causes and consequences of erosion and land degradation are parallel to many of the developing countries. The professional knowledge that has been gained in Iceland is built on local research and experience. This knowledge can be shared with different countries, despite different climatic conditions and puts Iceland in a unique position in this area.
LDCs	Adaptation	UNU Fisheries Training Programme	Research and training for practicing professionals from developing countries in the field of fisheries. The programme is structured in a similar way to the Geothermal programme and the programmes consult in many areas. The Fisheries Training programme falls under the Icelandic marine research institute as an independent entity.
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. The students have attained a university degree and work in energy research or energy production and distribution in their home countries. The Geothermal training programme is located on the National Energy Authority´s premises as an independent entity. The programme also enjoys services from the National Energy Authority according to an agreement.
LDCs	Multiple Areas	Women Delegate Fund - WEDO	Increasing the participation of women in international negotiations regarding climate change (Women's Environment & Development Organization, WEDO). The aim is to increase women's participation in international negotiations on climate issues. The participation of women from the developing countries is funded by WEDO which enables them to participate in the negotiations on the behalf of their countries. The project also includes capacity building and the women receive a varied training, including negotiation techniques.
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.