Norwegian Ministry
of Climate and Environment

Norway's National Plan

related to the Decision of the EEA Joint Committee No. 269/2019 of 25 October 2019

December 2019

Content

1. Overview

1.1 Introduction

Norway's nationally determined contribution under the Paris Agreement is to reduce our emissions by at least 40 per cent compared to 1990 levels by 2030. Norway will cooperate with Iceland and EU to fulfil their respective emission reduction targets under the Paris Agreement.

The European Union, Iceland and Norway are committed to reduce their overall greenhouse gas emissions, in view of holding the increase in the global average temperature well below 2 degrees above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5 degrees above pre-industrial levels.

In June 2019, the Norwegian Parliament gave its assent for the agreement with EU on a climate cooperation to fulfil the 2030 emission reduction goal.

In Decision No 269/2019 of 25 October 2019 the EU, Iceland and Norway formally agreed to extend, for period 2021-2030, the climate cooperation by including the Effort Sharing Regulation[1] and the Regulation on greenhouse gas emissions and removals from land use, land use change and forestry (the LULUCF-regulation)[2], into Protocol 31 of the EEA Agreement. By this decision, Iceland and Norway are taking action to fulfil our respective emission reduction targets of an at least 40 per cent reduction of greenhouse gas emissions by 2030 compared to 1990 levels.

According to the agreement, Norway will fulfil its respective greenhouse gas emission reduction target for the period 1 January 2021 to 31 December 2030 in accordance with the ETS-directive, LULUCF-Regulation and the Effort Sharing Regulation.

Under the Effort Sharing Regulation Norway will have a commitment to reduce 40 per cent of emission in the non-ETS-sectors in 2030 compared to 2005.
Under the LULUCF-regulation, Norway will have a commitment to a no-debit rule for this sector.

This document outlines existing Norwegian measures and policies as well as updated projections of emissions and removals until 2030. The Government will present a White Paper on how we plan to meet the 2030-commitments.

[1] Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013

[2] Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry

1.2 Executive summary

The Norwegian Climate Change Act establishes by law Norway's emission reduction targets for 2030 of at least 40 per cent reduction of GHG emissions by 2030 compared with 1990, and the 2050 target to become a low emission society.
Norway has implemented several policies and measures to reduce or remove greenhouse gas emissions in all sectors.

The polluter pays principle is a cornerstone of the Norwegian policy framework on climate change. CO_2-taxes on mineral oil and petrol (alongside with a tax on emissions from petroleum extraction on the continental shelf which is included in ETS) were introduced in 1991 to cost-efficiently limit greenhouse gas emissions. CO_2 taxes on natural gas and LPG were introduced in 2010. In 2020, the *standard rate of CO_2 taxes* will amount to approximately NOK 545, corresponding to EUR 55, per tonne of CO_2 (petrol, diesel, natural gas, LPG, and mineral oil).

About 50 per cent of the present Norwegian emissions are covered by the EU Emission Trading Scheme (ETS), and more than 80 per cent of domestic greenhouse gas emissions are covered by the emissions trading scheme or/and are subject to tax on greenhouse gas emissions.

In addition, support to research on and innovation of climate-friendly technologies provide complementary support where markets do not provide the solutions. A range of public-sector funding instruments and other support schemes have been established to promote zero- and low-emission solutions.

Preliminary calculations of the gap of the commitment under the Effort Sharing regulation, i.e the difference between the projected emissions based on current policy and measures under the sectors covered by the Effort Sharing Regulation and the preliminary estimate of emission allocation, return a gap of in the magnitude of 12 million ton CO_2-eqv. for the period 2021-2030. These calculations are uncertain both regarding the final emission allocation and the assumptions underpinning the projection.

Preliminary calculations of the gap of the commitment under the LULUCF regulation, i.e of the projections of all land use categories in the LULUCF sector applying the accounting rules from the LULUCF Regulation, show that the projected net emissions are approximately 12 million tons CO_2-eqv. above the no-debit commitment for the period 2021-2030. Again, these calculations are uncertain and strongly dependent on the assumptions made for the projection of future harvesting of timber, and the deforestation rate.

These calculations indicate that the commitments are not met without additional policies and measures, or by the use of EU flexible mechanisms.

In the Government's most recent political platform (Granavolden-platform), it is stated that the government intends to reduce emissions covered by the effort sharing regulation by 45 per cent compared to 2005-levels. This will represent a fulfilment beyond the 40 percent commitment Norway will get under the Effort Sharing Regulation.

2. Current National Climate Goals and Policies

Norway ratified the UNFCCC on 9 July 1993, ratified the Kyoto Protocol on 30 May 2002, became a Party when the Kyoto Protocol entered into force on 16 February 2005, and ratified the Doha amendment in June 2014. Under the second commitment period of Kyoto Protocol, Norway is committed to emissions reduction over the period 2013 – 2020 consistent with a target of 30 per cent reduction in emissions by 2020, compared to 1990.

Norway ratified the Paris Agreement on 20 June 2016. Norway has through its National Determined Contribution (NDC) under the Paris Agreement committed to a target of at least 40 per cent by 2030 compared to 1990.

Norway's climate targets and policy are set out in various policy documents: the updated cross-party agreement on climate policy from 2012 (published as a recommendation to the Storting (Innst. 390 S (2011–2012)) in response to the White Paper on Norwegian climate policy from the same year (Meld. St. 21 (2011–2012)). *New emission commitment for Norway for 2030 – towards joint fulfilment with the EU* (Meld. St. 13 (2014–2015)) and a subsequent recommendation to the Parliament (Innst. 211 S (2014–2015)); the documents relating to the Norwegian Parliaments consent to ratification of the Paris Agreement (Innst. 407 S (2015–2016) and Prop. 115 S (2015–2016). The targets were reiterated in the White Paper on the Government's strategy for fulfilling the 2030 climate target (Meld St. 41 (2016-2017) issued in June 2017. These targets are also described in detail in Norway's fourth biennial report under the UNFCCC, chapter 4.

In June 2017, the Norwegian Parliament adopted the Climate Change Act, which establishes by law Norway's emission reduction targets for 2030 and 2050. The purpose of the act is to promote the implementation of Norway's climate targets as a part of the transformation of Norway to a low-emissions society by 2050. The act states the Norwegian target of at least 40 per cent reduction of GHG emissions by 2030 compared with 1990, and to become a low emission society in 2050 with a reduction of greenhouse gas emissions of the order of 80-95 per cent from the level in the reference year 1990. The effect of Norway's participation in the EU Emissions Trading System is to be taken into account in assessing progress towards this target.

Under the Effort Sharing Regulation (EU) 2018/842 Norway will get a commitment to achieve a 40 per cent reduction of emissions not covered by the ETS by 2030 compared to 2005-levels.

Under the LULUCF Regulation (EU) 2018/841, Norway shall ensure that emissions do not exceed removals calculated as the sum of total emissions and total removals of the land accounting categories, according to the accounting rules and flexibilities provided.

In the Government's most recent political platform (Granavolden-platform), it is stated that the government intends to reduce emissions covered by the effort sharing regulation by 45 per cent compared to 2005-levels. This will represent a fulfilment beyond the 40 per cent commitment Norway will get under the Effort Sharing regulation and is thus not a commitment covered by Decision No 269/2019.

3. Policies and measures for CO2 reduction and removals

3.1 Introduction

The polluter pays principle is a cornerstone of the Norwegian policy framework on climate change. Generally, policy instruments should ensure that reductions in emission are implemented in a way that leads to the lowest cost to society as a whole.

General policy instruments are a key element of domestic climate policy. Cross-sectoral economic policy instruments (i.e. CO_2 tax and emissions trading system) form the basis for decentralized, cost-effective and informed actions, where the polluter pays. In areas subject to general policy instruments, additional regulation should as a main rule be avoided. At the same time, the possibility of employing other policy instruments in addition to emission trading and taxes is to be continued, also in these sectors. In its White Paper on the 2030 climate strategy (Meld St. 41 (2016-2017) the Government *states that it will promote the use of cost-effective mitigation measures to meet the 2030 commitment*. If the CO_2 tax is not considered to be an adequate or appropriate instrument, other instruments that provide equally strong incentives to reduce emissions will be considered, including direct regulation and voluntary agreements.

CO_2 taxes were introduced in 1991. A national emissions trading scheme was established in 2005. From 2008 Norway became part of EU ETS phase II, and about 50 per cent of the present Norwegian emissions are covered by the EU ETS. Today more than 80 per cent of domestic greenhouse gas emissions are covered by the emissions trading scheme or/and subject to tax on greenhouse gas emissions. Certain sources of emissions may be difficult to incorporate into the emissions trading scheme or to make subject to a CO_2 tax. In such cases, other instruments to reduce greenhouse gas emissions may be more appropriate.

In addition to pricing instruments, support to research on and innovation of climate-friendly technologies do provide complementary support where markets do not provide the solutions. A range of public-sector funding instruments and other support schemes have been established to promote zero- and low-emission solutions.

A detailed description of the existing Norwegian national policies and measures for GHG reduction and removals are given in the Norwegian Biennial Report 4, to be submitted to the UN by year end. In this document, a brief summary of the policies and measures for emissions covered by Effort Sharing Regulation and the LULUCF Regulation is given.

3.2 Cross-sectoral policies and measures

CO2-tax scheme in the non-ETS sector

CO_2-taxes on mineral oil, petrol (alongside the tax on emissions from petroleum extraction on the continental shelf which is included in ETS) were introduced in 1991 as a cost-efficient instrument for limiting greenhouse gas emissions. CO_2 taxes on natural gas and LPG were introduced in 2010. The tax is increased by 5 per cent in real terms in 2020. In 2020, the

standard rate of CO_2 taxes will amount to approximately NOK 545, corresponding to EUR 55, per ton of CO_2 (petrol, diesel, natural gas, LPG, and mineral oil).

Over several years, the number of reduced rates and exemptions from the CO_2-tax has been drastically reduced. Currently, national emissions from natural gas and LPG used in commercial greenhouses is the only exemption in the CO_2-tax on the use of fossil fuels in the national non-ETS sector.

A levy on HFC and PFC was introduced in 2003. The levy is designed in such a way that emissions of HFC and PFC face the same price per CO_2-equiv. as emissions of CO_2 from mineral products.

Currently, emissions of approximately 8.8 million ton CO_2-eqv., close to one third of non-ETS emissions, remains outside the scope of national taxes on GHG-emissions. The majority of these emissions stem from emissions of methane and nitrous oxide in agriculture and CO_2 in waste management.
Some taxes in the non- ETS sector do not target greenhouse gas emissions directly, nevertheless they increase the total tax burden companies and households face and therefore indirectly affect their emissions. The road usage tax on fuels is levied to internalise the costs inflicted on the society from accidents, congestion, noise, road wear and tear as well as health and environmentally harmful emissions other than CO_2. Moreover, there is a base tax on mineral oil, the purpose of which was to avoid substitution of electricity due to the electricity tax.

The Pollution Control Act

The Pollution Control Act lays down a general prohibition against pollution. Pollution is prohibited unless one has a specific permission to pollute according to law or a decision made by the relevant authority. The Pollution Control Act in principal applies also to greenhouse gas emissions. In the industry sector, the relevant authority may set technology requirements relevant for climate emissions as conditions in the permit in accordance with the Pollution Control Act.

In the waste sector, regulations under the Pollution Control Act are used to ensure minimum environmental standards of landfills and incineration plants, and to regulate the handling of certain waste fractions. See chapter 3.7).

Enova

Enova (www.enova.no) is a state-owned enterprise, which was established in 2001. The purpose of Enova is to contribute to reduced greenhouse gas emissions and strengthened energy security of supply, as well as technology development that also contributes to reduced greenhouse gas emissions in the longer run. Enova provide financial support to industry, households, local and regional governments.
Enova's work is funded by the Climate and Energy Fund. A four-year rolling agreements with the Ministry of Climate and Environment governs its activity. In 2020, financing totals about NOK 3.2 billion.

Enova has programmes aimed at reducing emissions from the transport sector and other sectors which are not part of the emissions trading system, with emphasis on innovative solutions adapted to a low-emission society. An aim is to achieve lasting market change and that climate-friendly and energy-efficient solutions should succeed in the market without government support.

Klimasats

Klimasats is a financial support scheme introduced in 2016 to promote emissions reduction projects in Norwegian municipalities and counties Klimasats is administered by the Norwegian Environment Agency, which allocated NOK 234 million to around 365 different projects allocated in 2019. An additional NOK 24 million was allocated during autumn 2019 to promote the introduction of zero and low emission solutions for high speed vessels in the public transport system. Examples of supported projects are the use of climate friendly building materials in public buildings, reduction of food waste, zero emission construction sites, reduction of methane emissions from former landfills, infrastructure for electric vehicles, as well as urban planning projects.

The Government has in the 2020 budget allocated 181,8 million NOK to Klimasats. In addition, 77 million NOK is allocated for development of zero- and low emission high speed vessels.

Nysnø Klimainvesteringer AS (Nysnø)

Nysnø Klimainvesteringer AS (Nysnø) is an investment company wholly owned by the Norwegian State, through the Ministry of Trade, Industry and Fisheries. Nysnø was established in 2017 in order to contribute to reducing greenhouse gas emissions through investments with such effect direcly or indicretly. Nysnø shall invest in non-listed companies and funds aimed at non-listed companies that have operations in Norway. It invests primarily in the transition from technology development to commercialisation. Nysnø has received NOK 725 million in capital and has made its first investments. Together with private investors, Nysnø provides both capital and competence. Nysnø's overall effect on greenhouse gas emissions will be determined by Nysnø's ability to identify and invest in high-return companies and funds, within its mandate.

In the budget for 2020, the Government has allocated NOK 700 million in additional capital to the company.

Green technology grants (Miljøteknologiordningen)

To supplement the competitive research and innovation grant schemes in the Research Council and Innovation Norway, a grant scheme (Miljøteknologiordningen) for close-to-market demonstration and piloting projects was introduced in 2010. In 2018, NOK 522,7 million NOK was granted from the environmental technology scheme to 225 projects. Total investments in these projects (including the companies' own funds) are NOK 2,64 billion. The projects are based across a range of different technologies, including metallurgic industry, bio-refinery, renewable energy, water treatment, maritime sector and aquaculture.

In the 2020 budget, the Government has allocated NOK 566 million for the Green technology grant.

3.3 Policies and measures in transport

In the White Paper *Norway's Climate Strategy for 2030: a transformational approach within a European cooperation framework* (Meld. St. 41 (2016–2017) Report to the Storting), the Government set a working target of a cut of 35–40 per cent in emissions from the transport sector by 2030 compared with 2005 in order to support efforts to reduce emissions in the transport sector. This target is based on the assumption that the technological maturity of zero-emission solutions in different transport segments will improve so that they become competitive with fossil-based transport solutions. In their most recent political platform (Granavolden-platform), the government has gone even further, and set as an ambition to reduce emissions from the transport by 50 per cent by 2030 compared to 2005. This ambition is also contingent on the technological maturity.

Furthermore, the White Paper on Transportation (NTP) (Meld. St. 33 (2016–2017)) set new targets for the sales of zero emission vehicles. For instance, all new passenger cars and light vans should be zero emission in 2025. Improvements of technological maturity in the vehicle segment that makes zero emission cars competitive with fossil solutions is a prerequisite for the target figure.

There are several measures in place that are affecting greenhouse gas emissions from the transport sector.

The CO_2 tax is the main instrument for limiting CO_2 emissions from the transport sector. The CO2-tax is a cross-sectoral measure. See chapter 3.2 for a description of the tax.

Norway provides strong incentives for zero emission vehicles, both tax advantages and other user incentives. Electric cars (EVs), including both battery and fuel cell cars, are exempted from the motor vehicle registration tax. As a comparison, the average tax level for new passenger cars subject to the registration tax was 100 000 NOK in 2018. EVs also have an exemption for the traffic insurance tax and the re-registration tax. Moreover, the purchase of EVs and equipment are exempt from value added tax (VAT) and there is not road usage tax on the fuel for electric cars since electricity is not subject to the road usage tax. The value of the special tax advantages for EVs that has been estimated, amounts to 12.4 billion NOK in total in 2019. Plug-in hybrid electric vehicles (PHEVs) have a weight deduction in the motor vehicle registration tax set at maximum 23 per cent of the vehicle weight. An electric driving range of minimum 50 km is necessary to get the maximum deduction. In addition to the tax benefits, EVs have other benefits, such as free access to bus lanes (decided locally), reduced toll fares, a rebate on car ferry crossings, and reduced parking fees on public parking spots. The Parliament has agreed on implementing a national rule, stating that EVs cannot be charged more than 50 per cent of the price for fossil fuel cars on ferries, public parking spots and toll roads. More than 13 000 public charging points have also been established. Enova has provided support to a network of fast charging infrastructure along the main highway corridors and has launched a support program for fast charging in municipalities with less than two fast charging points.

In order to increase the use of biofuels, there is a mandatory biofuels turnover in Norway. A quota obligation was introduced in 2009, committing the economic operators to sell at least 2.5 per cent biofuels as a share of the total yearly amount of fuel sold for road transport. This share was increased to 12 per cent from January 1st 2019, and will be further increased to 20 per cent from January 1st 2020, including double counting of advanced biofuels. A certain percentage of the quota obligation must be met by the use of advanced biofuels. In 2019, this share is 2.25 per cent, and it will increase to 4 per cent from 2020.

In the quota obligation, 'advanced biofuels' means biofuels that are produced from the feedstock listed in Part A and part B of Annex IX in the EU ILUC-directive (Directive (EU) 2015/1513). As of January 1st 2014, sustainability criteria must be met by all biofuels and bioliquids included in renewable energy obligations or government support schemes. The sustainability criteria are the same as the EU criteria implemented in the Fuel Quality Directive and the Renewable Energy Directive.

Before October 1st 2015, biodiesel that met the sustainability criteria was subject to a reduced road usage tax, corresponding to half of the rate for autodiesel. Bioethanol was exempted from the road usage tax in blends containing more than 50 per cent bioethanol. In lower blends, bioethanol had the same road usage tax as petrol. Since October 1st 2015, biodiesel and bioethanol are subject to a road usage tax at the same level as autodiesel and petrol when used to fulfil the quota obligation for biofuels. However, volumes of biodiesel and bioethanol sold beyond the level of the sales mandate were exempted from the road usage tax since the same date. From July 1st 2020 all biofuels used in road transportation will be subject to the road usage tax.

In addition to the above mentioned, there are several other measures in place that contribute to reducing greenhouse gas emissions from the transport sector, including Enova's grant schemes and requirements in public procurement processes.

3.4 Policies and measures for buildings and spatial planning

Heating of buildings

In June 2017, the Government put forward a regulation on **the banning of use of mineral oil** (fossil oil) for heating of buildings from 2020. The ban covers the use of mineral oil for both main heating (base load) and additional heating (peak load) in residential buildings, public buildings and commercial buildings. The purpose of the ban is to reduce greenhouse gas emissions.

Nearly all of Norway's electricity production is based on hydro power, hence the electricity use will not affect greenhouse gas emissions in Norway.

Heating of buildings and tap water is thus mainly done by electrical appliances (ovens, heat pumps). District heating and wood stoves contributes with a total share of approximately 10 per cent each. Total emissions from district heating in non-ETS sector is below 1 mill. tons CO_2 eqv. and relates to waste incinerating.

Spatial planning

The purpose of the **Planning and Building Act** is to promote sustainable development, with an emphasis on long-term solutions. Land-use planning is a cross-sectoral activity, and land use and development patterns have a strong influence on transport needs and the choice of modes of transport. Thus, planning processes under the Act may influence greenhouse gas emissions for a long time to come, including emissions from sources such as transport, stationary energy use and land use, land-use change and forestry (the LULUCF sector). Under the Act, decision makers have the primary responsibility for weighing up the importance to be given to various relevant considerations and interests. The part the Act plays in reducing greenhouse gas emissions will therefore depend on how much weight climate change considerations are given compared with other and quite possibly conflicting interests. To ensure that planning processes give sufficient weight to climate change concerns, the Government has adopted central government planning guidelines for coordinated housing, land-use and transport planning by municipalities and counties. There are also central government planning guidelines on municipal and county climate and energy planning and climate adaptation. These set out requirements for planning in these fields in order to reduce greenhouse gas emissions and ensure more efficient energy use and a shift towards more environmentally friendly energy use in municipalities and counties.

3.5 Policies and measures in agriculture

Current policies and practices to control GHG emissions in Norwegian agriculture include a combination of regulatory, economic and information measures. CO2 from the use of fossil fuel in activities related to agriculture meets CO2-taxation similar to other sectors, and the general ban on mineral oil for heating buildings is imposed for agriculture from 2025. Emissions related to transport and energy are accounted for in the respective sector.

Emissions from agriculture include methane from livestock and manure, nitrous oxide from manure and fertilized soils, and losses of carbon- and nitrogen-compounds from soils, particularly organic soils. While abatement of such emissions is considered important, it is difficult to decouple the volumes of emissions from the volumes of production. Such emissions from biological processes are covered neither by the emissions trading system, nor subject to GHG taxation, rather they are covered by other measures as specified below.

Lands suitable for agriculture are scarce in Norway, so good management and limited conversion of cropland is a priority. This requires good land use planning at the municipal level. To limit further emissions from organic soils, nation-wide restrictions on cultivation of peatland are under establishment. Regulations towards manure and fertilizer management are in place to control emissions from such sources.

In addition to regulations, there are support schemes for various measures which will have positive effect on GHG emissions. Examples are investment support for improved storage of manure, environmentally friendly dispersion of manure, delivery of manure to biogas plants and improved drainage of agricultural soils.

The government presented a national, cross-sectoral biogas strategy in autumn 2014. In the follow-up of the strategy, funding has been granted for pilot plants and research on biogas through Innovation Norway from 2015. Additionally, through the Value Added Program for Renewable Energy in Agriculture, funding is granted for on-farm biogas projects.

An industry agreement with the food industry to reduce food waste, was completed and signed in June 2017. The goal is to half the food waste within 2030.

In June the Government and farmer's organisations negotiated a climate agreement for agriculture in June 2019. The deal sets targets for abatement of greenhouse gas (GHG) emissions and removals from agriculture over 2021-2030. Improvement in on-farm livestock, manure and soil management will be key to deliver the targets, alongside improvements in consumption and reduction in food losses and waste. The deal specifies that the agricultural sector must be in charge of on-farm improvements, while authorities must take charge of improvements elsewhere in food consumption and food systems.

The agreement does not put bindings on future policy measures or agricultural agreements, and cannot presuppose increased subsidies.

In Norway, farmer co-operatives have a strong position in various supply chains, and are key to secure farmers with adequate support, also for containing climate change. Numerous organizations and companies in Norwegian agriculture have joined forces in a project called "climate-smart agriculture" to succeed in these fields.

3.7 Policies and measures for "other sources", incl. f-gases and waste treatment

F-gas regulation and the Kigali Amendment to the Montreal Protocol

Norway implemented EU Regulation No. 842/2006 on certain fluorinated greenhouse gases in 2010. The revised EU regulation No. 517/2014 was implemented in 2018. Norway is exempted from the EU HFC phase-down scheme (Articles 14-18). This is mainly justified by the implementation of the Kigali Amendment to the Montreal Protocol. Norway has ratified the Kigali Amendment, and the phase-down scheme for HFCs entered into force in national legislation by 1 January 2019. Norway has implemented a stricter phase-down scheme in its national legislation than its obligations under the Montreal Protocol. HFCs are also subject to the general tax on GHG emissions, see chapter 3.2 for a description of the tax.

Waste treatment

In the waste sector, regulations under the Pollution Control Act are used to ensure minimum environmental standards of landfills and incineration plants, and to regulate the handling of certain waste fractions. The EU directives on waste are implemented through the Pollution Control Act and through different parts of the Waste Regulation under the Pollution Control Act. The Waste Regulation includes the following measures:

- Requirement to collect methane from landfills (gradually introduced from 1998).
- Prohibition of depositing biodegradable waste (introduced 1 July 2009 with an opening for exemptions until 2013).

- Requirement to utilise energy from incineration from incineration plants.

From 2002 landfilling of wet-organic waste has been prohibited. This prohibition was replaced by the wider prohibition of depositing (2009) that applies to all biodegradable waste.

The Waste Regulation includes a formulation that incineration plants should be designed and operated with a view to energy utilisation. This is normally followed up in the concessions of the plants by a condition that at least 50 per cent of the energy from the incineration should be utilised.

The Norwegian Government wants to contribute to a cost efficient technology for CO2 capture, transport and storage (CCS). The Government's ambition is to realize a cost efficient solution for CCS in Norway, provided this results in technology development internationally. The project is currently at an advanced stage. After Front End Engineering and Design is finalized, the government will decide whether to make a positive funding proposal to the parliament in 2020 or 2021. A positive funding proposal could include one or two capture projects. Fortum Oslo Varme's waste incineration plant is one of two possible capture projects. The other capture project is Norcem's cement production in Brevik. The emissions from Fortum Oslo Varme are part of the Effort Sharing Regulation. With a mix of wastes from fossil and biogenic sources, some of the CO_2 captured at Fortum Oslo Varme would contribute to a net outtake of CO_2 from the atmosphere, so-called negative emissions, if this project is realised.

3.8. Policies and measures in Forestry and Land use

The IPCC has highlighted the importance of the LULUCF sector in climate policy. Forests absorb CO_2 and store large quantities of carbon, and are also an important source of renewable energy and wooden materials that can be used to replace materials with a larger carbon footprint. Other terrestrial ecosystems and organic soils are also large carbon sinks. On the other hand, human activity can cause large greenhouse gas emissions through land use and conversion of areas and ecosystems to other forms of use. To achieve a balance between anthropogenic greenhouse gas emissions and removals by sinks in the second half of this century, which is one of the aims of the Paris Agreement, it will be vital to reduce emissions and increase removals by the LULUCF sector.

A wide range of measures, including legislation, taxation, economic support schemes, research, extension services and administrative procedures, support the implementation of forest policy and mitigation actions. The current Forestry Act was adopted by the Norwegian Parliament in 2005 and came into force in 2006. Its main objectives are to promote sustainable management of forest resources with a view to promote local and national economic development, and to secure biological diversity, consideration for the landscape, outdoor recreation and the cultural values associated with the forest. The forestry Act also contributes to the conservation of biodiversity and the sustainable use of natural resources. However, the measures implemented will also influence CO_2 sequestration. The Forestry Act requires the forest owner to regenerate areas within three years after harvesting.

In addition to ordinary support schemes for silviculture and forestry, the Government has implemented climate motivated support schemes for regeneration, increased seedling density on regeneration sites, enhanced breeding of forest seedlings and fertilization of forest stands to increase the forest sink capacity in the future. In addition, a pilot-project on afforestation has been carried out. Norway has in the latest years increased support for these measures significantly. Owing to a slow rate of growth in boreal forests, fertilisation is for the time being the only implemented measure in managed forests that can achieve a significant effect in the short term (2030). With 5-10 000 ha of forests fertilized yearly, removals can increase with 0.14 - 0.27 million tons of CO2 per year after 10 years. Since fertilization of forest as a climate measure was adopted in 2016, this initiative will contribute to the 2030 commitment.

To inform spatial planning decision making processes, LULUCF-inventories have been developed and made available for all municipalities, as well as simple LULUCF calculation tools. This tool can calculate emissions or sinks related to land use and land use change.

SECTION B: ANALYTICAL BASIS

4. Current situation and projections with existing policies and measures

4.1 Historic development

In 2018, total greenhouse gas (GHG) emissions in Norway were 52 million tons of CO2- eqv. Over the last two decades total emissions have been relatively stable.

The emissions covered by the Effort Sharing rRegulation (non-ETS emissions) totalled 25.9 million tons carbon dioxide eqv. in 2018, which is 50 per cent of the total emissions. These emissions have been reduced with 6 per cent from 2005 to 2018.

Figure 1 and table 1 shows the historic development of the non-ETS greenhouse gas emissions.

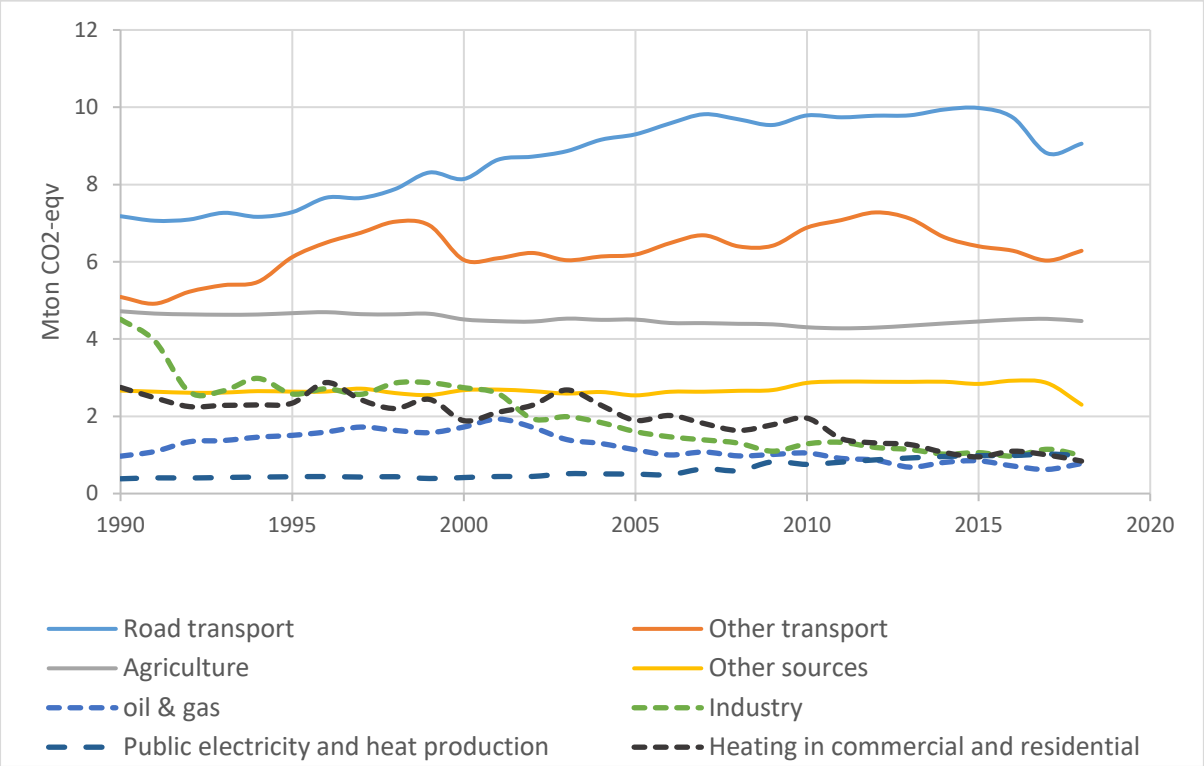

Figure 1: Historic development of emissions sources covered by the Emissions Sharing Regulation. Source: Norwegian Environment Agency, Statistics Norway.

Emission from road transport was 9.1 million tons in 2018, and is the largest non-ETS source. Emission from other transport sectors (including domestic shipping and fishing vessels) was 6.3 million tons CO2-eqv. in 2018, the second largest emission source. These transport emissions have increased since 1990 but are approximately at the same level as in 2005. Emissions from industry have been reduced since 1990 and 2005 to a large degree due to technical and operational measures to reduce N2O from fertilizer production and PFCs from aluminium industry. Emissions from heating in domestic and commercial buildings are reduced since 1990 and 2005 due to transfer from use of mineral oil to electricity and district heating. The use of mineral oil for heating purposes in buildings is banned from 2020. Emissions from agriculture has been stable since 1990 and 2005.

In 2017, the lower emissions from road transport is explained by a higher amount of biofuels in the fuel blend compared with both 2016 and 2018. However, the amount of advanced biofuels increased in 2018 compared with 2017.

Table 1: Emissions covered by the Emissions Sharing Regulation (1990, 2005, 2016, 2017 and 2018). Source: The Norwegian Environment Agency.

	1990	2005	2016	2017	2018
Road transport	7,2	9,3	9,7	8,8	9,1
Other transport[3],	5,1	6,2	6,3	6,0	6,3
Agriculture	4,7	4,5	4,5	4,5	4,5
Other sources, waste treatment and f-gases in products	2,7	2,5	2,9	2,9	2,3
Oil & gas	1,0	1,1	0,7	0,6	0,8
Industry	4,5	1,6	1,0	1,1	1,0
Public electricity and heat production	0,4	0,5	1,0	1,0	1,0
Heating in commercial and residential buildings	2,7	1,9	1,1	1,0	0,8
Total	**28,3**	**27,7**	**27,2**	**26,0**	**25,7**

LULUCF

In 2017, the net greenhouse gas removals in the LULUCF sector were 25.0 million CO2 eqv., which would offset almost half of the total greenhouse gas emissions in Norway that year. The average annual net removals from the LULUCF sector were about 23.7 million tons of CO_2 eqv. for the period 1990-2017. The carbon stocks depend upon several factors, such as growing conditions, harvest levels, age-class effects and land use changes. In particular, variations in annual harvest will in the short term directly influence the carbon stocks and dead organic matter.Net removals from forest land has increased from 1990 to 2017 due to an active forest management policy and large afforestation efforts in the 1950's and 1960's.

Figure 2 illustrates net CO2-emissions and removals from the different land use categories from 1990 to 2017.

[3] including naval transport, fishing vessels, non-road machinery and aviation (not included in ETS)

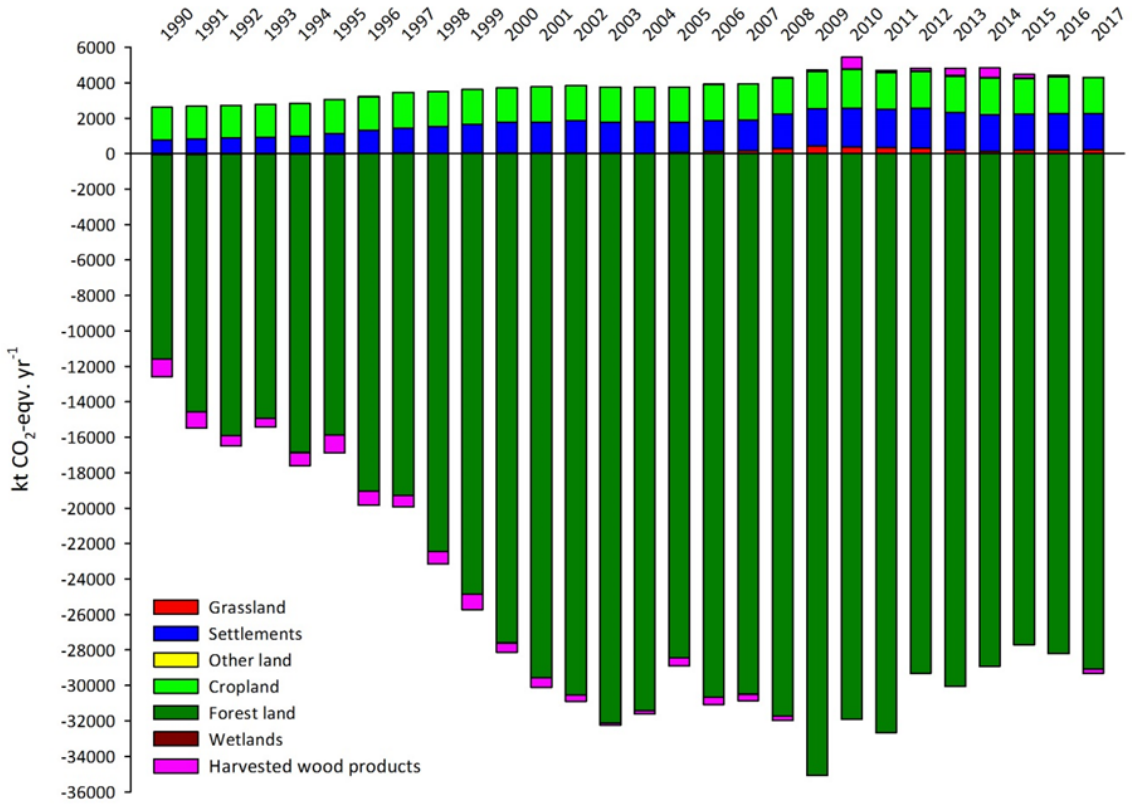

Figure 2. Net CO_2 emissions and removals (kt CO_2-eqv. per year) from the LULUCF sector by land-use category (forest land, cropland, grassland, wetlands, settlements, other land, and harvested wood products) from 1990 to 2017, including emissions of N_2O and CH_4. Source: Norwegian Institute of Bioeconomy Research

4.2. Projections of emissions

This chapter presents projections of greenhouse gas emissions in Norway for the years 2020 and 2030.[4] In the projections both emissions form the EU ETS and non-ETS sectors are presented. In the following we concentrate the on non-ETS emissions.

4.2.1 Methods and assumptions

The projections are based on the Norwegian greenhouse gas inventory and the National Account of Statistics Norway, which constitute the descriptive underpinnings of the economic model SNOW. More detailed calculation models supplement the SNOW model calculations.

The projections are based on a number of assumptions, including, inter alia, a continuation of current climate policy, in Norway and abroad. Other key assumptions may be summarised as follows:

- The long-term macroeconomic analyses underpinning the 2017 white paper on long-term perspectives for the Norwegian economy (presented in NC7/BR3) have been updated with new population projections. Long-term crude oil and natural gas price

[4] Presented in the National Budget 2019 (Meld. St. 1 (2018-2019)).
https://www.regjeringen.no/contentassets/b09f08d81c134eea92830aba435850db/no/pdfs/stm201820190001000dddpdfs.pdf
Adjusted in the National Budget 2020 (Meld. St. 1 (2019-2020)) to reflect revisions in the Emission Inventory and taking on board the latest sales numbers for EVs.

assumptions are the same as in the 2017 white paper on long-term perspectives for the Norwegian economy.

- Implemented and adopted policies and measures by summer 2018 are maintained, including the scope and rates of the CO_2 tax.
- The EU ETS price is assumed to increase from an average of NOK 150 for 2018 to about NOK 230 per tonne of CO_2 in 2030, at 2018 prices.
- Road traffic emissions. The Norwegian Environment Agency has developed a projection model based on Statistics Norway's model for calculating national road traffic emissions to air. It is assumed that the share of electric cars will increase to 75 per cent of new car sales in 2030. Plug-in hybrids are also assumed to account for an increasing share of new car sales, which share is put at 25 per cent in 2020 and 30 per cent in 2025. This share is thereafter assumed to decline, as electric cars capture more of the market. These assumptions imply that new diesel and petrol cars (including non-plug-in hybrid cars) will not be sold in 2030. Traffic activity is assumed to trace population developments. Emissions per kilometre driven by cars based on fossil energy carriers are assumed to decline by just over 1 per cent per year. Biofuel blending is set at 16 per cent in real terms from 2020 in accordance with the requirement.
- The Norwegian Environment Agency prepares, on the basis of activity data from NIBIO, agricultural emissions projections. Some efficiency improvement is assumed, thus reducing emissions per produced unit.

The SNOW-model

Projections of emissions use Statistics Norway's general equilibrium model SNOW. SNOW-model is a computable general equilibrium (CGE) model. The model gives a detailed description of the structures of economic policy, production and consumption in the Norwegian economy. Agents are represented as optimising individuals who interact with each other in national and international markets. Factor prices and prices of deliveries to the domestic markets are all determined by market equilibria. Consumption and savings result from the decisions of the representative household, which maximizes welfare, given income from labour, capital and natural resources.

The model is a recursive dynamic, integrated economy and emissions model that can project energy-related and process emissions based on macroeconomic assumptions. The model gives a detailed description of the production and consumption structures in the Norwegian economy. The model specifies 46 industries (42 private production sectors and 4 government sectors), classified to capture important substitution possibilities with environmental implications. The model includes 20 consumption goods with detailed description of use of energy and transport. Moreover, detailed description of governmental taxes and transfers such as environmental policy, trade policy, subsidies, tax rates, and real government spending is also included.

The model provides a relatively detailed description of the markets for energy and transport. A detailed emission module is incorporated into the SNOW model, turning it into an effective tool for assessing environmental consequences of changes in economic activity. Both emissions related to energy use and emissions from industrial processes are modelled.

Energy-related emissions are linked in fixed proportions to the use of fossil fuels, with emission coefficients differentiated by the specific carbon content of the fuels. A recent addition is a detailed modelling of electric vehicles, which allows us to study the policies targeting emissions from transport. Various environmental and climate policy instruments are included, e.g., emission trading, taxes and subsidies.

GHG emissions from road traffic

Emissions of CH_4, N_2O, CO_2 from road traffic are projected in an Excel spreadsheet model. The model is based on data from the model used by Norway to estimate historical emissions from road traffic (Handbook of Emissions Factors (HBEFA) v3.3 using activity data for 1990-2017). Emissions are projected using time series estimates for the following parameters: population growth, km driven per person for different vehicle classes, emission factors, biofuel blending, and a factor that adjust for the discrepancy between fuel sales and bottom-up estimates of fuel consumption.

For heavy vehicles (buses and HGV), the trend in the emission factor is specified directly at an aggregated level. For light duty vehicles, the trend in the emission factor is specified by technology (gasoline, diesel, plug-in hybrids, and zero emission vehicles such as electric cars). The fraction in the vehicle stock of different technologies is estimated using simple stock models for passenger cars and other light duty vehicles.

GHG emissions from the Agriculture sector

We have used the same estimation methodologies for projections of CH_4, N_2O and NH_3 from agriculture as for calculation historical emissions. Model descriptions of the side models used to project emissions for enteric CH_4 from cattle and sheep, CH_4 and N_2O from manure management and the NH_3 model are given annually in chapter five of the Norwegian National Inventory Report (NIR) and Annex IX to the NIR. Calculations are in Excel.

The projection of CH_4, N_2O and NH_3 emissions from agriculture are based on projected development in animal stock, share of concentrate in fodder, milk yield, mineral fertiliser use and assumption about the development in cultivation of peat land. The emission trends are dependent on the expected development in number of inhabitants and expected food consumption trend, and scenarios for agriculture polices nationally.

Activity assumptions are given by the Ministry of Agriculture and Food for animal population development and for the rate at which increase in supply of animal manure substitutes for synthetic fertiliser (1 kg manure-N: 0.45 kg fertilizer-N).

In addition, expert estimates are used for the share of concentrates, milk yield and acreage of organic soils, which depends on the rate of cultivation of new peatland as well as the rate of abandonment (trend from Norwegian Institute of Bioeconomy Research).

GHG emissions from solid waste disposal

The emissions model for estimating methane from Solid Waste Disposal Sites (SWDS) uses the model in the IPCC 2006 Guidelines. From 2009 deposition of wet organic waste on landfills is prohibited. The effect of this measure and all other policy measures concerning

the waste sector are taken into account in the baseline scenario. The effect of licensing requirements for collection and combustion of methane from landfills is also taken into account in the projections. This implies that in the projection, only minor amounts of paper and sewage sludge are deposited, and this corresponds with Statistics Norway's waste account. In the projection, about 15 per cent of produced methane is recovered. This equal to the actual recovery in 2016.

Descriptions of the model for calculating CH_4 from landfills are given annually in chapter 7 of the Norwegian NIR.

Macroeconomic forecasts (GDP and population growth)

In the baseline scenario average annual GDP growth is estimated at 2.4 per cent in 2017-2020 and at 1.5 per cent in 2020-2030. Growth in the mainland economy, i.e. total GDP excluding petroleum activities and ocean transport, is estimated at 2.6 per cent in 2017-2020 and 2.0 per cent in 2020-2030.

***Table 2: Macroeconomic forecasts. Sources*: Statistics Norway and Ministry of Finance**.

	2016	2017	2020	2030
	Billion 2016 NOK		Annual average growth rate	
Gross domestic product	3 119	3 182	2,4	1,5
- Petroleum activities and ocean transport	407	413	0,9	-1,7
- Mainland Norway	2 713	2 767	2,6	2,0
Goods	458	472	2,7	1,9
Services	1 120	1 141	4,6	2,1
Consumption	1 412	1 444	2,8	2,8
Gross fixed capital formation	790	819	2,4	0,3
- Petroleum activities and ocean transport	179	169	4,7	-1,9
- Mainland Norway	613	656	1,5	0,7
Population in 1000 persons	5 258	5 296	0,7	0,7
Number of persons employed in 1000	2 761	2 791	1,2	0,4
			Level	
Oil price (2016-NOK)	658	437	514	500
Gas price (2016-NOK)	2,38	1,94	1,59	1,81
EU-ETS price (2016-NOK)	50	54	160	227

Sources: Statistics Norway and Ministry of Finance.

In the baseline scenario, the EU ETS price is assumed to increase to NOK 160 by 2020, measured in 2016-prices. In 2030 the price will increase to NOK 230 measured in 2016-prices.

The high population growth in the period 2007-2014 of about 1.2 per cent annually has the past couple of years come somewhat down. From 2017 to 2030 the population is estimated to increase by 0.7 per cent annually on average. All in all the population is estimated to increase by around 9 per cent during the projection period.

4.2.2 Projections

Greenhouse gas emissions are estimated to decline by 1.2 per cent a year from 2017 to 2030, see Table 3, which present projections of sectoral developments with existing national policies and measures for the years 2020 and 2030. Emissions will in such case be close to 8 million tons of CO_2 eqv. lower in 2030 than in 2017. The predominant part of this decline is expected to occur in non-EU ETS emissions, which emissions are estimated to decline by almost 6 million tons from 2017 to 2030; see Table 3. The emissions trajectory must be considered in the context of, inter alia, the phase-out of oil-fired heating towards 2020, the closure of the gas power plant at Mongstad and a slight reduction in emissions from petroleum activities after 2020. The effect of an estimated reduction in transport emissions as the result of the uptake of more zero-emission vehicles only becomes truly significant after 2020.

Table 3: Greenhouse gas emissions in Norway by EU-ETS and non-ETS. Million tons CO_2 eqv.

	1990	2005	2010	2017	2020	2030
GHG emissions in Norway	51.2	55.4	55.5	52.7	51.0	45.0
EU-ETS emissions		27.7	26.6	26.5	26.2	24.5
Non-ETS emissions		27.6	28.9	26.3	24.8	20.5
– Transport[1]		15.5	16.7	14.7	14.1	11.2
Of this. Road traffic		9.3	9.8	8.8	8.2	6.1
– Agriculture		4.4	4.2	4.5	4.5	4.5
– Other sources[2]		7.7	8.0	7.1	6.1	4.8
Mainland Norway	43.0	41.1	41.3	38.1	35.7	31.2

[1] Includes non-ETS emissions from road transport, navigation, fishing, non-ETS aviation, motor equipment etc.
[2] Includes non-ETS emissions from manufacturing industries, oil and gas extraction and energy supply, and emissions form heating and other sources.

Sources: Statistics Norway, Norwegian Environment Agency, NIBIO and Ministry of Finance.

Details of the estimates

Road transport emissions are expected to decline from 8.8 million tons CO_2 eqv. in 2017 to 6.1 million tons in 2030. The decline is primarily caused by the assumption that the phase-in of low- and zero-emission cars will accelerate further in coming years. Biofuel blending was already in 2017 at the level of the blending requirement for 2020, of 16 per cent (20 per cent when double-counting advanced biofuel). This blending percentage has been maintained throughout the projection period.

In 2017, electric vehicles (EVs) accounted for about 23 per cent of new passenger car sales, and in 2018 sales increased to somewhat above 30 per cent. In 2019, when the projections presented in the National Budget 2019 were revised, sales of EVs had been close to 45 per

cent that year. The projections assume that this share will increase to 75 per cent in 2030. The share of plug-in hybrids of new car sales are also assumed to increasing to 25 per cent in 2020 and 30 per cent in 2025. Moreover, it is assumed, that the share of new van sales accounted for by electric vans in 2030 will be half of that for passenger cars. The estimates are based, inter alia, on observations that the uptake of EVs goes much faster than previously assumed. Slightly stronger technological development is also assumed for heavy goods vehicles, but this happens later and more slowly than for light vehicles. There are currently few zero-emission solutions and those that are available involve very high costs. Uncertainty about the outlook is high.

Emissions from domestic shipping and fisheries have declined significantly in recent years. The decline in emissions is likely to be linked to lower activity for offshore supply vessels, a changeover to less emission-intensive fuel and the adoption of new technology. It may also be the result of a higher percentage of vessels having bunkered fuel abroad. The projections assume that the observed decline is permanent and that further technological development and the enhancement of policy measures over the last few years will cause emissions to keep declining after 2020. In addition to Enova devoting considerable resources to supporting the introduction of zero- and low-emission technology in the maritime sector, a number of contracts that require zero- or low-emission solutions have been concluded, and it has been assumed, inter alia, that about one third of Norway's ferries will have batteries on board by the end of 2021.

Emissions from the use of fossil oils in the heating of businesses and households have declined by 84 per cent since 1990. The prohibition against the use of mineral oil in heating of buildings means that households will already in 2020 have close to no emissions from the use of oil. There will, however, still be minor emissions from the use of gas, as well as from wood burning. The prohibition will also accelerate the decline in the use of oil for heating in service industries. It has for projection purposes been assumed that some emissions will remain, as the result of the prohibition allowing for exemptions in, inter alia, areas where this is justified for security of supply reasons. Emissions are estimated at ¼ million tons of CO_2 eqv. in 2030.

Emissions from non-EU ETS energy supply stem from the burning of waste containing fossil elements such as plastic and the use of fossil energy carriers in minor energy plants. These emissions are in the projections estimated to remain at about the current level of 1 million tons. As before, landfill emissions are estimated to continue to decline as the result of the prohibition against the depositing of wet organic waste. Agricultural emissions are estimated to remain fairly stable in coming years.

Uncertainty

The projections illustrates how Norwegian greenhouse gas emission can evolve when current climate policy is being continued, both in Norway and abroad. The picture is uncertain, among others because the development of new climate friendly technology will influence on what a continuation of current policy means for future emissions. Such uncertainty is greater the longer into the future the projections extend. Moreover, the uncertainty is not only related to developments in, and access to, low- and zero-emission

technology and the costs of implementing such technology but also to the economic outlook and future population developments.
Between 1990 and 2017, the population growth in Norway has been about 25 per cent. A considerable part of this increase comes from immigration, mainly from EU-countries. Calculations done by Statistics Norway show that CO_2 emissions could have been around 6 per cent lower in 2030 if the population growth had been more in line with the EU-average of about 2 per cent since 2005.[5] In the same analysis, Statistics Norway estimates that a supply shock that causes oil and gas prices to fall by 24 per cent could cause Norwegian CO_2 emissions to increase by 8 per cent in 2030. Lower prices on fossil fuels causes emissions in the mainland economy to increase more than the fall in emissions from lower production of oil and gas. An international set back that causes Norwegian export prices, including on oil and gas, to decline by 25 per cent is estimated to reduce CO_2 emissions by 14 per cent in 2030.

4.3. Projections of the LULUCF sectors

4.3.1 Method and assumptions

New projections of removals and emissions from the LULUCF sector were published by the Norwegian Institute of Bioeconomy Research (NIBIO) in December 2019. The projections cover removals and emissions of all greenhouse gases in the LULUCF sector from 2018 to 2100 based on the Climate Convention, the Kyoto protocol and the LULUCF regulation under the EU climate and energy 2030 framework, respectively. The projections include all land categories, and take the following existing policy measures into account: Increased seedling density, enhanced breeding of forest seedlings, fertilization of forest and protection of 10 percent of the forest area.

NIBIO based the projections on the best available and most updated data and models. The reference period was from 2010- 2017. The report is based on the SiTree model, updated numbers from the The National Forest Inventory (NFI) database and the RCP 4.5 climate scenario.

The SiTree model is an individual growth simulator, and imputation methods to project the future growth, mortality, ingrowth, and natural regeneration. The emissions and removals of total soil organic C (dead wood, litter, and soil pools) from forest land on mineral soil are estimated using the decomposition model Yasso07 (NIBIO 2019).

4.3.2 Projections

Figure 3 shows net removals and emissions of greenhouse gases from 1990 to 2017 (historic data) and projections until 2100 for all categories in accordance with the reporting to the UNFCCC.

[5] Greaker, M. og O. Rosnes (2015): Robuste norske klimamålsetninger. Samfunnsøkonomen nr. 1-2015, pp. 67–
77

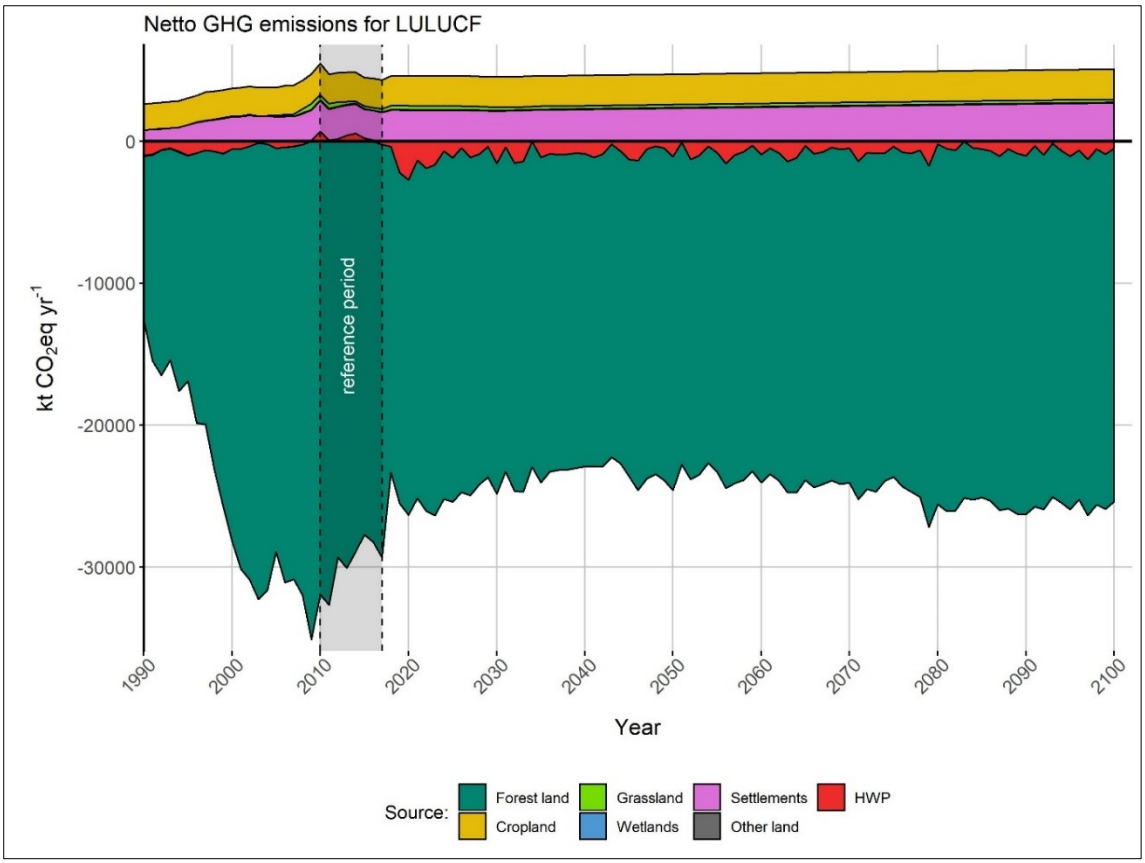

Figure 3. Total net emissions from all categories, including CO2, N2O and CH4, expressed as CO2-eqvivalents for the period 1990 – 2100. The figure shows emissions from areas in transition and areas remaining in their category (i.e. was the same category in 1990, or changed category more than 20 years ago).
Source: Norwegian Institute of Bioeconomy Research.

The total net removals of the LULUCF-sector for the historic period 1990 – 2017 and projections for 2020 and 2030 is given in table 4.

Table 4: Net removals in the LULUCF sector (historic and projections). Source: Norwegian Institute of Bioeconomy Research

	1990	2005	2010	2017	2020	2030
LULUCF	-10,0	-25,1	-25,6	-25	-21,7	-20,3

The projections show that the total sink is expected to be reduced in the period 2021-2030. The projections indicate that the carbon sink capacity of the current forest stock has reached a peak. This is primarily due to low harvest intensity over the recent years and a skewed age class structure of the Norwegian forest with 43 per cent mature stands. The annual increment and removals will inevitably decline towards 2030 and 2050 due to ageing forests and higher harvesting rates. Nevertheless, since the annual timber harvest is approximately 50 per cent of the annual increment, the carbon stocks in the Norwegian forests are still increasing. The projections indicate that the forests' capacity to act as a sink will increase again after 2050 towards 2100 as a result of the implementation of new forest management measures, a more normal age class structure but also better growing conditions due to global warming.

5. Impact assessment of planned policies and measures

5.1 Planned policies and measures under the Effort Sharing Commitment

5.1.1. Annual emissions level vs latest projections

Under the Effort Sharing Regulation Norway has a commitment to reduce the emissions covered by this regulation with 40 per cent in 2030 compared to 2005-levels. According to the regulation Norway will have a binding annual emission level for the years from 2021 to 2030.

The binding annual emission level for the period 2021-2030 will become final in 2020 after revision of the emission inventory for the period 1990 – 2018 according to the procedures in the Effort sharing regulation and decision No 269/2019.

An estimate of the annual emission level for the period 2021 to 2030 based on preliminary figures returns a preliminary emission allocation of 210 million tons CO2 for the period. Preliminary calculations of the difference between the projections of non-ETS emissions and the preliminary allocation, return a gap in the magnitude of 12 million ton CO_2-eqv. for the period 2021-2030 (Figure 4).

These calculations are uncertain both regarding the final emission allocation and the assumptions underpinning the projection.

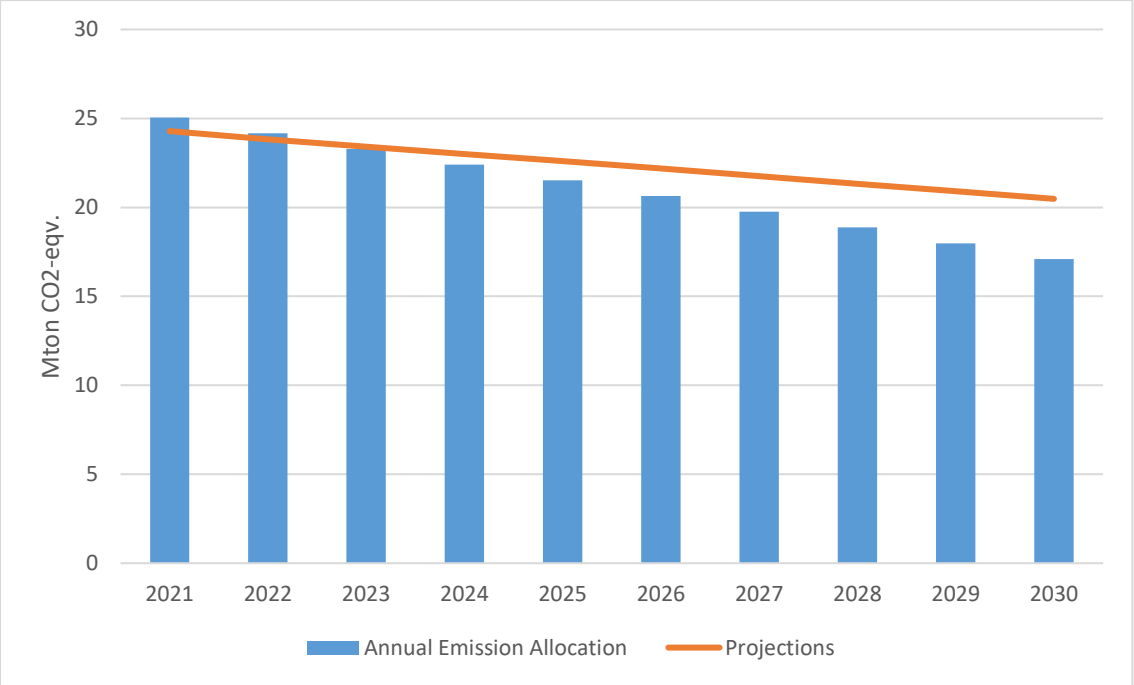

Figure 4. The preliminary calculations of the annual emission budget for the period from 2021-2030 (yellow bars), and the projections of the emissions in the Non-ETS-emissions (blue line). Source: Norwegian Ministry of Finance, Norwegian Ministry of Climate and Environment, The Norwegian Environment Agency.

According to the Effort Sharing Regulation, a possible gap can be covered both with emission reductions nationally and by the use of EU flexibility mechanisms to cut emissions

in other sectors or in other countries. The Governments ambition is to reduce the non-ETS emissions through domestic policies and measures, and is planning for this. If strictly necessary, the flexibility in the EU framework can be used.

The Government has requested the transfer of credits from the EU ETS to the Effort Sharing Regulation. If necessary, Norway may use a maximum of 2 per cent AAU (Assigned Amounts Units) of the 2005-emissions under the Effort Sharing Regulation. Preliminary estimations indicate that these may add up to approximately 6 million ton GHG-emissions for the period 2021–2030.

5.1.2 Planned policies and measures

The projections are based on existing policies and measures implemented by June 2018. Since then, the Government has agreed on further policy instruments to reduce emissions. The following policy instruments are strengthened or added in the 2020-budget, and will thus contribute to reduce the gap between the projections and the emission allocation.

The general CO2-tax is increased by 5 per cent in real terms from 2020. The levy on HFK/PFK is increased accordingly.

In 2019 the state enterprise Enova was tasked by the Ministry of Climate and Environment to establish a Zero emission fund for commercial transport with an aim to reduce GHG emissions from commercial transport and contributing to its transition to a low emission society through an increased marked introduction and growth in battery, hydrogen and biogas solutions for commercial vehicles and vessels. Over the two years 2019 and 2020 funding totals over 1 billion NOK.

Further, the Norwegian government will continue to explore ways to mitigate the sources of emissions not covered by CO2-tax or ETS. Emissions from waste management, emissions of SF_6 and emissions from industrial lubricants will be given a special consideration in the time moving forward.

Also, the Government has issued strategies and roadmaps to reduce GHG emission in different sectors. However, decisions about policy instruments must await the outcome of the budgetary process.

A National Action Plan for Alternative Fuels Infrastructure in the Transport Sector was published in June 2019. The plan describes the Government's actions to contribute to the development of infrastructure for alternative fuels in Norway. The action plan contributes to predictable market signals for future alternative fuels infrastructure development. The Government's goal is that the development of infrastructure for alternative fuels is market-driven, and that this takes place as soon as possible without public support.

The Government's action plan for green shipping was published in June 2019. The plan presents the Government's efforts on green shipping with an ambition to reduce emissions from fisheries and domestic shipping with 50 per cent within 2030. The government will promote the development of low- and zero emission solutions for all vessel categories. Further development of policies and measures includes, among other things, consideration

of introducing requirements to use zero- and low emission solutions for new offshore supply vessels and aquaculture service vessels, in public procurement processes for ferries and high-speed passenger vessels, and Enova's investment grants. The government will continue to work on a longer-term grant scheme for county authorities that includes requirements for low- and zero emission solutions in procurement processes for high-speed vessels.

A national plan for fossil free public transport in 2025 was published in July 2019. The plan shows which efforts the Government is planning regarding fossil free public transport by 2025. The Government wants to continue the emphasis on Enova in order to support low- and zero-emission technology in busses, ferries and high speed passenger boats. The Government also want to assess a legal demand for fossil free public transport. The Government will assess a minor scale test trial for hydrogen trains, and make efforts to support efficient public procurement of fossil free public transport. The plan points to that fossil free public transport is moving towards competitiveness compared to conventional public transport.

5.2 Planned policies and measures under the LULUCF commitment

5.2.1. "No-debit" commitment in the LULUCF sector vs latest projections

According to the LULUIC Regulation, accounted CO_2 emissions from land use shall be entirely compensated by an equivalent removal of CO_2 from the atmosphere through action in the LULUCF sector. The LULUCF-projections (NIBIO 2019) have been used to calculate the potential "gap" of this commitment for the period 2021-2030.
If the carbon removals in Norwegian forests develop in line with the assumptions made for the projections, the calculated removals of CO_2 from managed forest land will be slightly higher than in the reported Forestry Reference Level (FRL) informally submitted to ESA for the period 2021-2025.In the projections, the removals of CO_2 in managed forest is calculated to an annual average of 25,1 million ton CO_2 eqv. for the period 2021-2025 when HWP is included. In the FRL, an annual average of 24,5 million tons CO_2 eqv. of removals was reported, thus giving a potential annual "removal" of approximately 0,6 million tons CO_2-eqvivalents. There are large uncertainties in the projections and thus this calculation. Norway has not submitted a FRL for the period 2026-2030, thus it is not possible to calculate a possible gap between the projection and the FRL for this period.

The annual removals from of HWP in the latest projections from NIBIO are presumed to be approximately 1,5 million tons of CO2 in the period from 2021-2025. Deviations from HWP in the FRL end up with removals in the range of 0,08 million tons of CO_2 annually in the first commitment period 2021-2025. These credits are included in the numbers mentioned in the previous section.

These potential removals from forest management including HWP must be added to emissions or sinks from the other categories; i.e. deforestation, afforestation, cropland management and grassland management and wetland (from 2026). Calculations made with basis in the newest projections show that deforestation and afforestation will have the largest impact. Total contribution from all categories except managed forest may amount to net

emission of a magnitude of 17-18 million tons CO_2-eqvivalents for the period 2021-2030 (1,7-1,8 million tons CO_2-eqvivalents annually). Again, these calculations are subject to large uncertainties.

Thus, these preliminary calculations of the projections of all land use categories in the LULUCF sector applying the LULUCF accounting rules from the LULUCF Regulation, show that the projected net emissions are approximately 1,1-1,2 million tons CO_2-eqvivalents per year above the no debit commitment for the period 2021-2025. If we assume that the gap in the LULUCF sector can be the same for second period as for the first, this estimation is valid for the total period 2021-2030. Again, these calculations are uncertain and very dependent on the assumptions made for the projection of future harvesting of timber and the deforestation rate.

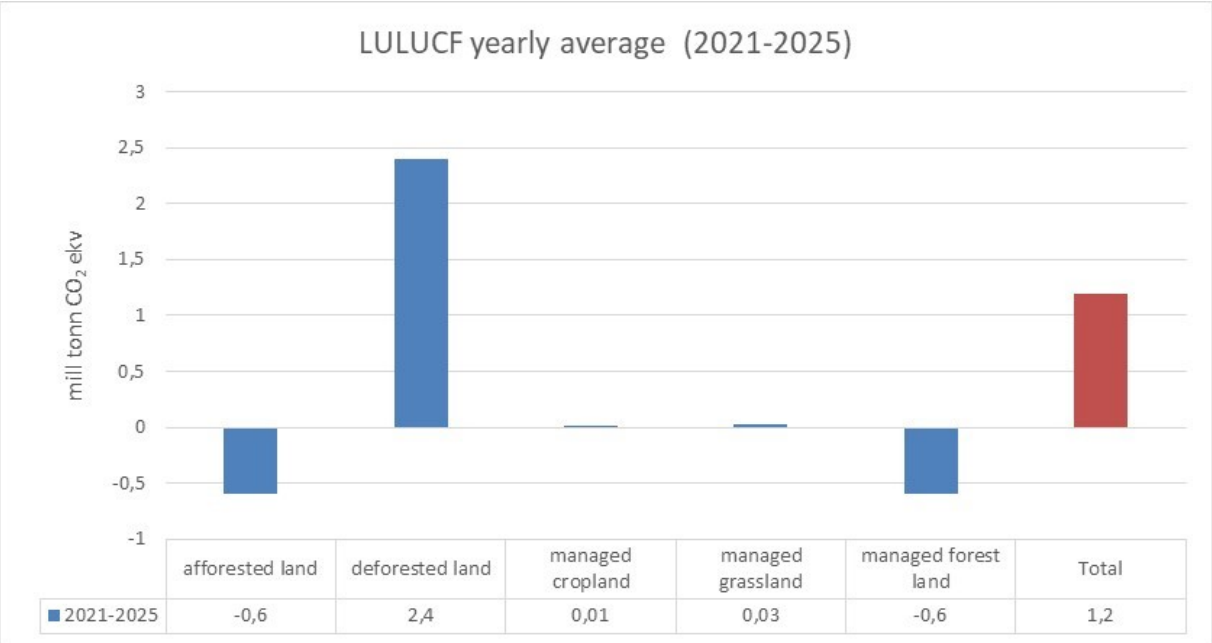

Figure 5: Preliminary calculations of the projections of all land use categories in the LULUCF sector. Source: Norwegian Institute of Bioeconomy Research.

Figure 5 illustrates the total result of the preliminary calculations of the projections of all land use categories in the LULUCF sector applying the LULUCF accounting rules from the LULUCF Regulation. It shows that the projected net emissions are approximately 1,2 million tons per year above the no-debit commitment for the period 2021-2025.

These calculations indicate that the commitments cannot be met without additional measures and policies, or by the use of flexible mechanisms.

5.2.2 Planned policies and measures

The Government is in the process of establishing restrictions on the cultivation of peatlands in order to reduce the GHG emissions associated with this practice. The potential effect of the restrictions on national emissions is estimated to 450,000 tons of CO2-eqv. for the 2021 – 2030 period, based on an assumption that the restrictions prevents cultivation of 200 hectares per year. The effect of the restrictions are increasing over time because the

emissions from each hectare of drained peatlands continue for decades after the drainage have happened. This policy proposal is not included in the current projections, and will thus contribute to reaching the no debit requirement in the LULUCF-sector.

The Government will introduce new measures designed to maintain or increase the carbon stock in forest and facilitate greater use of biomass as a substitute for fossil energy sources and fossil-intensive building materials, thus ensuring that forests can continue to play their crucial role in the context of climate change.

The Government will promote more use of wood in buildings and will consider other measures that can play a part in increasing the carbon stock in long-lived wood products. More use of wood in buildings also results in substitution effects in other sectors.

Many measures in the LULUCF sector will primarily have long-term effects, after 2030. This means that measures must be implemented in the LULUCF sector in the period up to 2030 in order to facilitate emission reductions and increases in removals in the longer term. The Government has also issued strategies and roadmaps to increase removals and reduce emissions in the LULUCF sector. The relevant policy instruments must be decided in budgets and propositions at a later stage.

5.3 Further policy development

The Government will present a White Paper on how we plan to meet the 2030-commitments. The Government intends to present this White Paper in 2020. As part of this work, the Government has also given a group of agencies and institutions the task to assess possible policy and measures for further emission cuts in the effort sharing sector and LULUCF-sector in Norway until 2030 ("Klimakur 2030"). The study will assess possible measures to reduce the climate emissions with at least 50 per cent in the effort sharing-sectors within 2030.

In the Government's most recent political platform (Granavolden-platform), it is stated that the Government intends to voluntarily reduce Norway's non-ETS emissions by 45 per cent from 2005 to 2030. This will represent additional efforts beyond the 40 per cent Norway will be committed to under the Effort Sharing Regulation. The Government’s ambition is to reduce the non-ETS emissions through domestic policies and measures, and are planning for this. If strictly necessary, the flexibility in the EU framework can be used.

Decision of the EEA Joint Committee No 269/2019 requires Norway to report on the progress and fulfilment of the commitments in the Effort Sharing regulation and LULUCF-regulation. Norway shall every other year report on greenhouse gas policies and measures and on projections. In these reports, Norway will provide status on the development of policies and measures and their effect on emissions towards 2030.