



Norwegian Ministry
of Climate and Environment

Report

Norway's first Biennial Transparency Report under the Paris Agreement

Original submission in December 2024 and resubmitted in February 2025



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Foreword

Transparency is the backbone of the Paris Agreement, facilitating understanding and trust among Parties as well as the civil society. Parties submit Nationally Determined Contributions (NDCs) to the UN, and report on the progress and the reports are reviewed. Information from Parties guide decisions on all aspects of climate change under the agreement. Reporting under Paris for the first time is a landmark. I am proud to present Norway's first Biennial Transparency Report (BTR) which is a direct response to the main goals of the Paris Agreement.

This report describes how Norway follows up our NDC to reduce emissions in 2030 by at least 55 per cent compared to 1990, in line with pathways needed to realize the Paris Agreement temperature goal. We are building on and gradually tightening an active climate policy over decades, and we are reinforcing these policies every year. We are now finally seeing reductions in domestic emissions. A further transformation of our energy, industry, transport and agricultural sectors as well as amongst private citizens is needed to reach our 2050 target of becoming a low emission society where only minor emissions remain.

We already see the dramatic effects of climate change around the world. These effects pose major challenges also in Norway. It changes both our weather and our nature and the way we can live off the land and sea – not least in the Arctic. We are experiencing droughts, floods, snow and landslides more frequently and with greater impact than we have seen in the past. Our response to climate change engages wide parts of society on all levels. This report also presents our efforts towards building a climate resilient society in line with the Paris agreement.

In the Paris spirit of cooperation, we pursue realization of our target together with other countries, in particular the EU. Since 2008, Norway has been part of the European

Emissions Trading System with its steadily decreasing number of allowances and emissions. For other sectors we will meet our obligations in accordance with our Climate Status and Plan, that lays a course towards realizing our targets.

We have also launched an initiative to reduce emissions in developing countries through purchasing credits – NOGER.no. This is additional to our domestic efforts. The carbon credits acquired will contribute to achieving Norwegian climate neutrality from 2030. Units from this program can also be used in case cooperation with the EU does not fully realize our NDC of reducing our emissions by at least 55 per cent as compared to 1990. The BTR also summarises our outreach to developing countries in the form of technical and financial support. We see this, together with NOGER – as contributions to «making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development» emphasised.

Producing the BTR has engaged many institutions and individuals, and I would like to take the opportunity to thank them sincerely for their great efforts in developing and implementing the policies, as well as monitoring and reporting results.



*Andreas Bjelland Eriksen
Minister of Climate and Environment*

Oslo, January 2025

Table of Contents

Foreword	3
Overview chapter	9
1 National inventory report	10
1.1 Background	11
1.2 Summary of greenhouse gas emissions and removals	12
1.3 Black carbon emissions	16
2 Information necessary to track progress made in implementing and achieving NDCs	18
2.1 National circumstances and institutional profile.....	19
2.1.1 National circumstances	19
2.1.2 Sector details	25
2.1.3 Institutional arrangements	32
2.2 Norway's climate policy and targets.....	35
2.3 Description of Norway's NDC for 2030	36
2.4 Information necessary to track progress made in implementing and achieving Norway's NDC	42
2.4.1 Indicator, methodologies and structured summary	42
2.5 Mitigation policies and measures, actions and plans	50
2.5.1 Introduction	50
2.5.2 Cross-sectoral	51
2.5.3 Petroleum sector	59
2.5.4 Carbon capture and storage (CCS).....	62
2.5.5 Energy and transformation industries	64
2.5.6 Transport.....	65
2.5.7 Industrial process and product use (IPPU)	75
2.5.8 Agriculture	78
2.5.9 Land Use, Land-Use Change and Forestry (LULUCF)	80
2.5.10 Waste	82
2.5.11 Planned measures	84
2.5.12 PaMs no longer in place	88
2.5.13 PaMs that influence GHG emissions from international transport	88
2.5.14 Black carbon	90
2.5.15 How PaMs are modifying longer-term trends in GHG emissions and removals.....	90
2.5.16 Assessment of economic and social impacts of response measures	91

2.6	Summary of greenhouse gas emissions and removals.....	94
2.7	Projections of greenhouse gas emissions and removals	94
2.7.1	Introduction	94
2.7.2	With existing measures (WEM) projections	94
2.7.3	Details for the WEM projections (without LULUCF)	99
2.7.4	Details for the WEM projections for LULUCF	113
2.7.5	Main differences in WEM from previously reported WEM	115
2.7.6	With additional measures (WAM) projection	116
2.7.7	Without measures (WOM) projection	118
2.7.8	Sensitivity analysis	118
2.7.9	Projections of black carbon	122
3	Information related to climate change impacts and adaptation	123
3.1	National circumstances, institutional arrangements and legal frameworks	124
3.1.1	National circumstances relevant to adaptation actions	124
3.1.2	Institutional arrangements and governance	125
3.1.3	Legal and policy frameworks and regulations	126
3.2	Impacts, risks and vulnerabilities	127
3.2.1	Current and projected climate trends and hazards	127
3.2.2	Observed and potential impacts of climate change	128
3.2.3	Approaches, methodologies and tools, and associated uncertainties and challenges	129
3.3	Adaptation priorities and barriers.....	130
3.3.1	Domestic priorities	130
3.3.2	Barriers to adaptation	131
3.4	Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies.....	132
3.4.1	Implementation of adaptation actions in accordance with the global goal on adaptation	132
3.4.2	Adaptation goals, actions, objectives, undertakings, efforts, plans	132
3.4.3	How best available science, gender perspectives and indigenous, traditional and local knowledge are integrated into adaptation	132

3.4.4	Development priorities related to climate change adaptation and impacts	133
3.4.5	Plans leading to mitigation co-benefits	133
3.4.6	Efforts to integrate climate change into development efforts, plans, policies and programming	133
3.4.7	Nature-based solutions to climate change adaptation	133
3.4.8	Stakeholder involvement	134
3.5	Progress on implementation of adaptation	135
3.5.1	Implementation of the actions identified	135
3.5.2	Steps taken to formulate, implement, publish and update national and regional frameworks	141
3.5.3	Implementation of adaptation actions identified in current and past adaptation communications.....	141
3.5.4	Implementation of adaptation actions identified in the adaptation component of NDCs, as applicable	141
3.5.5	Coordination activities and changes in regulations, policies and planning	141
3.6	Monitoring and evaluation of adaptation actions and processes.....	142
3.6.1	Domestic systems to monitor and evaluate the implementation of adaptation actions.....	142
3.6.2	The effectiveness and sustainability of adaptation actions	142
3.7	Information related to averting, minimizing and addressing loss and damage associated with climate change impacts.....	142
3.8	Cooperation, good practices, experience and lessons learned.....	143
3.8.1	Efforts to share information, good practices, experience and lessons learned	143
3.8.2	Strengthening scientific research and knowledge	144

4	Information on financial, technology development and transfer and capacity-building support provided and mobilized	145
4.1	National circumstances and institutional arrangements	146
4.2	Underlying assumptions, definitions and methodologies	149
4.3	Information on financial support provided and mobilized	155
4.4	Information on support for technology development and transfer provided	160
4.5	Information on capacity-building support provided	162
5	Improvements in reporting over time	166
5.1	Areas of improvement identified by the Party and technical expert review team	167
5.2	How the Party is addressing or intends to address areas of improvement.....	167
5.3	Parties' domestic plans and priorities.....	168
Annexes	169	
Annex 1: Common tabular formats for the electronic reporting of:.....	170	
1.1 Information necessary to track progress in implementing and achieving NDC	170	
1.2 Information on financial, technology development and transfer and capacity-building support provided and mobilized.....	170	
Annex 2: Information in relation to Norway's participation in cooperative approaches	171	
Annex 3: Methodologies and assumptions used to estimate greenhouse gas impacts of policies and measures	172	
Cross-sectoral	173	
Petroleum.....	187	
Carbon capture and storage (CCS).....	189	
Energy and transformation industries	191	
Transport.....	196	
Industrial processes and product use	221	
Agriculture	228	
Land use, land use change and forestry (LULUCF)	237	
Waste	243	
Planned measures	247	

Overview chapter

This document is Norway's first biennial transparency report (BTR) under the Paris Agreement and has been prepared in accordance with decisions 18/CMA.1 and 5/CMA.3. The structure of this biennial transparency report is generally in accordance with the outline in annex IV of decision 5/CMA.3. It contains the chapters that are relevant for Norway and some of the headings have been removed or slightly modified.

Chapter 1 presents a summary of the Norwegian GHG emissions and removals. Norway has submitted its national inventory report as a stand-alone report.

Chapter 2 includes information necessary to track progress made in implementing and achieving Norway's nationally determined contribution under Article 4 of the Paris Agreement for 2030. This includes national circumstances and institutional arrangements, description of the Nationally Determined Contribution (NDC), information necessary to track progress made in implementing and achieving the NDC, mitigation policies and measures, summary of greenhouse gas emissions and removals and projections of greenhouse gas emissions and removals.

Chapter 3 contains information related to climate change impacts and adaptation under Article 7 of the Paris Agreement. The information has been updated since Norway reported its 8th National Communication.

Chapter 4 includes information on financial, technology development and transfer and capacity-building support provided and mobilized under Articles 9–11 of the Paris Agreement.

Chapter 5 contains information related to improvements in reporting over time.

Annex 1 includes information on common tabular formats for the electronic reporting of tracking progress and financial, technology development and transfer and capacity-building support provided and mobilized. **Annex 2** contains information in relation to Norway's participation in cooperative approaches and **Annex 3** reports information related to methodologies and assumptions used to estimate greenhouse gas impacts of policies and measures.

Information related to research and systematic observation and education, training and public awareness was last reported in Norway's 8th National Communication (NC). This information will be reported when NC and biennial transparency report (BTR) are submitted jointly. Norway's 9th NC will be reported as part of the second BTR.

1 National inventory report



1.1 Background

Norway's national inventory report, consisting of the national inventory document (NID) and the common reporting tables (CRT) is reported as a stand-alone report and not as a component of this biennial transparency report. This is available at the UNFCCC website.¹

The NID for the year 2024 covers the inventory for the years 1990-2022. It has been prepared in accordance with the modalities, procedures and guidelines in the annex of decision 18/CMA.1 and is structured in line with the annex of decision 5/CMA.3. The reporting of Norway's greenhouse gas inventory also includes the associated CRT tables. The NID and the CRT tables serve as Norway's reporting both under the Paris Agreement and under the Convention.

The methodologies used in the calculation of emissions are consistent with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories supplemented by aspects of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2019 IPCC Refinement), and the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (IPCC 2013 Wetlands Supplement). As recommended by the IPCC Guidelines, country specific methods have been used where appropriate.

The Norwegian Environment Agency, a directorate under the Norwegian Ministry of Climate and Environment, is responsible for the reporting. Statistics Norway has been the principal contributor while the Norwegian Institute of Bioeconomy Research is responsible all information regarding Land Use, Land Use Change and Forestry.

Since Norway submits a stand-alone national inventory report, only a summary of the GHG emissions and removals are reported in this BTR.

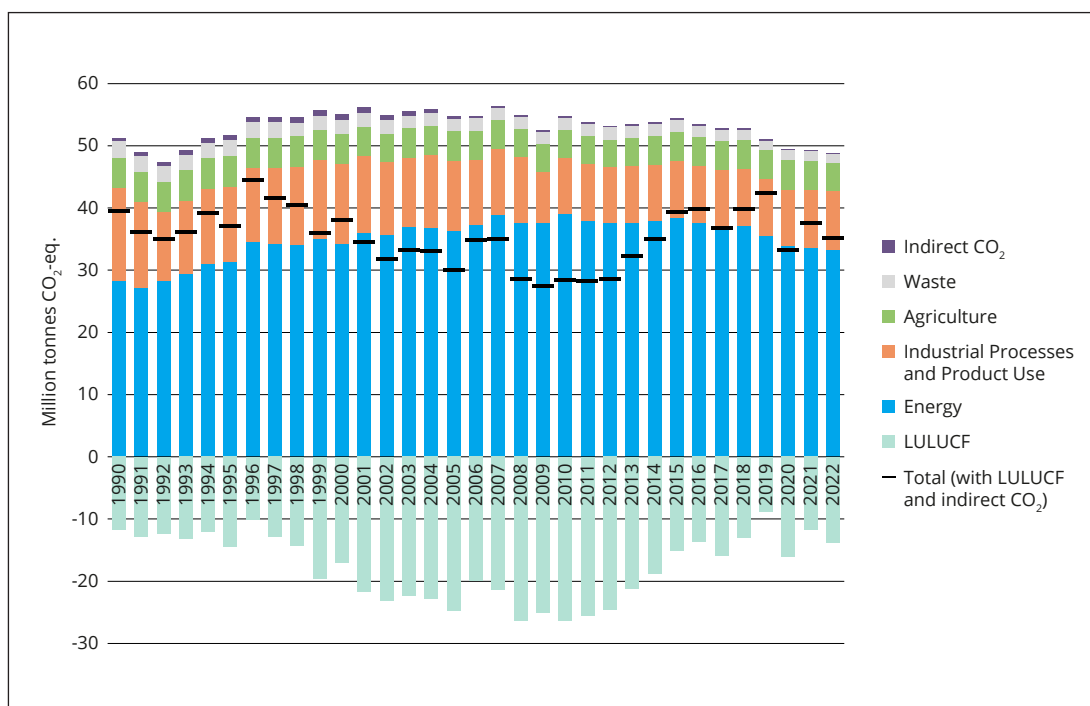
¹ [UNFCCC First Biennial Transparency Reports](#)



1.2 Summary of greenhouse gas emissions and removals

If not otherwise specified, total emission figures include indirect CO₂ emissions,² but not emissions and removals from land use, land-use change and forestry (LULUCF). In 2022, total greenhouse gas (GHG) emissions in Norway were 48.9 million tonnes of carbon dioxide equivalents, which is a decrease of 0.4 million tonnes compared to 2021. Emissions reached their peak at 56.4 million tonnes in 2007. They have since decreased by 13 per cent, and were in 2022 2.4 million tonnes, or 4.6 per cent, lower than in 1990. The net GHG emissions, including all sources and sinks, were 35.1 million tonnes of CO₂ equivalents in 2022. The total emissions distribution among the CRT sectors from 1990 to 2022, as well as net removals in the LULUCF sector, are illustrated in Figure 1.1.

Figure 1.1 Total emissions of greenhouse gases by sources and removals from LULUCF in Norway, 1990–2022 (million tonnes of CO₂ equivalents)



Source: Statistics Norway/Norwegian Environment Agency/Norwegian Institute of Bioeconomy Research

The emissions and removals are also shown in Table 1.1

² Non-CO₂, carbon-containing gases (methane (CH₄), CO or NMVOC) will eventually be oxidised to CO₂ in the atmosphere. The CO₂ emissions formed are termed «indirect CO₂ emissions».

Table 1.1 Total emissions of greenhouse gases by sources and removals in Norway 1990-2022 (million tonnes of CO₂ equivalents)

Year	Energy	Industrial processes and product use	Agriculture	LULUCF	Waste	Indirect CO ₂ emissions	Total with indirect CO ₂ and without LULUCF	Total with indirect CO ₂ and with LULUCF	Total without indirect CO ₂ and without LULUCF	Total with-out indirect CO ₂ and with LULUCF
1990	28.3	14.8	5.0	-11.8	2.7	0.5	51.3	39.5	50.8	39.0
1995	31.4	12.0	4.9	-14.5	2.6	0.8	51.7	37.1	50.9	36.4
2000	34.2	12.9	4.7	-17.0	2.3	0.9	55.0	38.0	54.1	37.1
2005	36.3	11.3	4.7	-24.8	2.0	0.4	54.8	30.0	54.4	29.6
2010	39.2	8.9	4.5	-26.3	2.0	0.2	54.7	28.4	54.6	28.3
2011	38.0	9.0	4.5	-25.6	2.1	0.2	53.8	28.2	53.6	28.1
2012	37.6	8.9	4.5	-24.6	2.0	0.1	53.2	28.5	53.0	28.4
2013	37.7	9.0	4.5	-21.2	2.0	0.2	53.4	32.2	53.2	32.0
2014	37.9	9.1	4.6	-18.9	1.9	0.2	53.8	34.9	53.6	34.8
2015	38.4	9.2	4.7	-15.1	1.9	0.2	54.3	39.3	54.1	39.1
2016	37.7	9.1	4.7	-13.7	1.8	0.2	53.5	39.8	53.3	39.6
2017	37.1	9.1	4.7	-16.0	1.7	0.2	52.7	36.8	52.6	36.6
2018	37.2	9.1	4.7	-13.0	1.7	0.2	52.8	39.8	52.7	39.7
2019	35.6	9.1	4.7	-8.8	1.6	0.2	51.1	42.3	50.9	42.2
2020	33.8	9.1	4.7	-16.1	1.6	0.2	49.4	33.3	49.3	33.1
2021	33.6	9.3	4.8	-11.7	1.5	0.1	49.3	37.5	49.1	37.4
2022	33.4	9.3	4.6	-13.7	1.4	0.1	48.9	35.1	48.8	35.0

Source: Statistics Norway/Norwegian Environment Agency/Norwegian Institute of Bioeconomy Research

The energy sector is by far the most important source of GHG emissions in Norway, contributing to 68 per cent of the national GHG emissions in 2022. The major sources of emissions within the energy sector are energy industries and transport, which both contributed to 38 per cent of emissions from the energy sector in 2022. The GHG emissions from the energy sector increased by 18 per cent from 1990 to 2022. This was primarily due to increased activity within oil and gas extraction and transport, specifically road transportation. Since 2015, emissions have decreased by 13 per cent. From 2021 to 2022, emissions decreased by 0.8 per cent.

The Norwegian electricity production is dominated by hydroelectric power. Thus, emissions from the category energy industries origin almost completely from fuel combustion in oil and gas extraction and related activities.

GHG emissions from road transportation increased by 17 per cent from 1990 to 2022, mainly due to the increase of activity in goods transport, as a response to increased population and higher economic activity. Emissions from road transport went up considerably from 1990 until 2007. They then were relatively stable until 2015 and have since plunged by 15 per cent from 2015 to 2022. In 2022 they contributed to 18 per cent of the national GHG emissions. The downward trend from 2015 – is primarily a result of increased sales of electric vehicles due to economic incentives and a blending requirement of biofuels that has led to increased consumption of bio diesel and bio ethanol and hence reduced CO₂ emissions.

The industrial processes and other product use (IPPU) sector accounted for 19 per cent of the national GHG emissions in 2022. The emissions from this sector decreased by 37 per cent from 1990 to 2022. The downward trend in GHG emissions can be explained by the implementation of policies and measures in the metal industry, resulting in less emission intensive production methods. Later, in the 2000s, the decrease was largely caused by close-downs and production reductions, this also mainly in the metal industry.

In 2022, 9.5 per cent of the national GHG emissions originated from agriculture, corresponding to 4.6 million tonnes of CO₂ equivalents. Emissions from agriculture have decreased by 6.8 per cent since 1990. The largest sources of GHGs within the agriculture sector are enteric fermentation (CH₄) and agricultural soils (N₂O). In 2022, these categories represented 52 per cent and 33 per cent of the emissions from the agriculture sector, respectively, while manure management represented 12 per cent. The main driver behind the emission trend in agriculture is the development of the number of animals in the dominant animal groups. Important reasons for the decreasing trend in GHG emissions are use of more concentrate and more effective milk production, which have led to a reduction of the number of dairy cows. For beef cows there has instead been an increase in the animal numbers since 1990.

The LULUCF sector includes both emissions of greenhouse gasses to the atmosphere, and removal of atmospheric CO₂. The balance of the two is the net emissions or removals in the LULUCF sector. The changes in carbon depend upon several factors such as growing conditions, harvest levels, management practices and land use changes (area distribution). In 2022, the net removal in the LULUCF sector was 13.7 million tonnes CO₂ equivalents, which corresponds to about 28 per cent of the

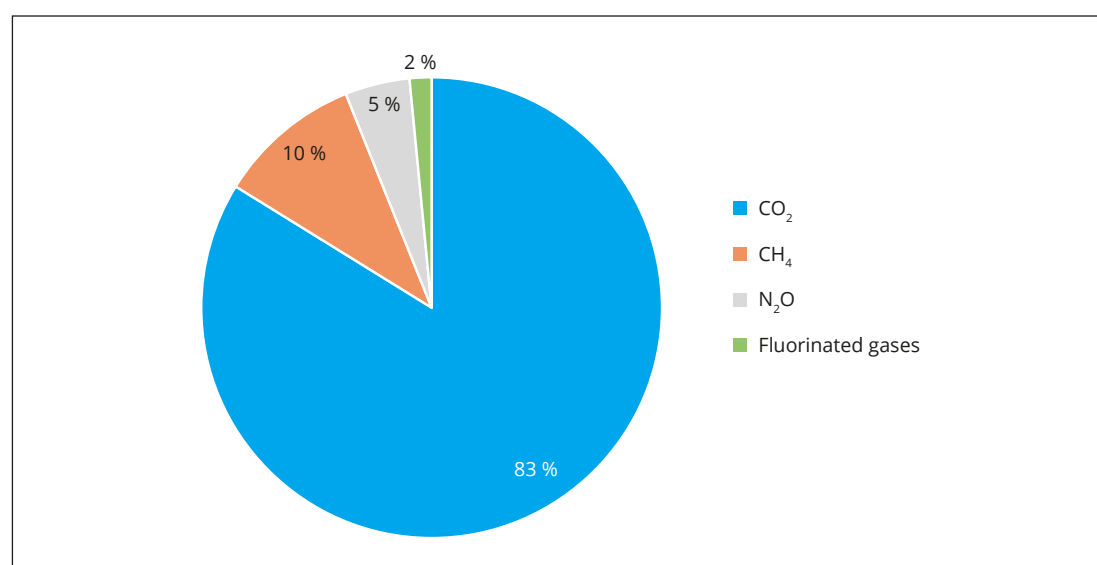
national GHG emissions (from all other sectors than LULUCF) that year. Forest land, grasslands and harvested wood products had net removals in 2022, while emissions came from cropland, settlements and wetlands (about 4.7 million tonnes of CO₂ equivalents). Forest land was the major contributor to the net sequestration of CO₂ in the sector, with total net removals of 17.9 million tonnes of CO₂.

The waste sector, with emissions of 1.4 million tonnes of CO₂ equivalents in 2022, accounted for 2.9 per cent of the national GHG emissions. This sector includes emissions from landfills, wastewater handling, biological treatment of solid waste and small-scale waste incineration. Waste incineration with utilization of energy is included in the energy sector.

Solid waste disposal on land (landfills) is the main source category within the waste sector. It accounted for 61 per cent of the sector's total emissions in 2022. Wastewater handling accounted for 19 per cent, waste incineration for 15 per cent, and biological treatment of solid waste accounted for 4.6 per cent. The downward trend in GHG emissions from the waste sector is due to reductions of waste amounts disposed at disposal sites.

As shown in Figure 1.2, CO₂ is by far the largest contributor to the total GHG emissions, followed by CH₄, N₂O, and the fluorinated gases (PFCs, SF₆ and HFCs).

Figure 1.2 Distribution of emissions of greenhouse gases in Norway by gas in 2022 (CO₂ equivalents)



Source: Statistics Norway/Norwegian Environment Agency

Table 1.2 shows that the CO₂ emissions increased significantly from 1990 to 2022 with 5.8 million tonnes. Emissions of CH₄ and N₂O decreased by 1.9 and 1.6 million tonnes CO₂ equivalents, respectively. During the same period, PFCs and SF₆ emissions significantly decreased with 3.4 and 2.1 million tonnes CO₂ equivalents, respectively, while HFCs has increased from almost 0 to 0.7 million tonnes CO₂ equivalents. The fluorocarbons constituted a larger share of the GHG emission total in the early 1990s than in 2022, while CO₂ represented a smaller share in 1990 than in 2022.

Table 1.2 Emissions in million tonnes of CO₂ equivalents and changes in per cent for each greenhouse gas

	CO ₂	CH ₄	N ₂ O	PFCs	SF ₆	HFCs	Total with indirect CO ₂ and without LULUCF
1990	35.0	6.8	3.8	3.5	2.2	0.0	51.3
2021	41.0	5.0	2.2	0.2	0.1	0.7	49.3
2022	40.8	4.9	2.2	0.1	0.1	0.7	48.9
Changes 1990–2022	16.6 %	-27.5 %	-42.0 %	-96.5 %	-96.7 %	1,503,091.8 %	-4.6 %
Changes 2021–2022	-0.5 %	-1.0 %	-0.4 %	-45.1 %	-1.4 %	0.5 %	-0.8 %

Source: Statistics Norway/Norwegian Environment Agency

1.3 Black carbon emissions

Decisions 18/CMA.1 and 5/CMA.3 do not require the reporting of black carbon (BC) emissions. On a voluntarily basis, Norway has reported BC annually under the Convention on Long-range Transboundary Air Pollution (LRTAP) and Arctic Council since 2015.³ The methodology for emissions estimation was published by Statistics Norway in 2013.⁴ BC is emitted by incomplete combustion from fossil fuels, biofuels, and biomass. BC is always co-emitted with organic carbon (OC). While BC warms the climate, emissions of OC have a cooling effect. The emissions are primarily estimated based on shares of BC and OC of fine particulate matter (PM_{2.5}). In addition, other warming and cooling climate forcers like CO₂ and SO₂, are co-emitted with BC. The Norwegian Environment Agency has assessed mitigation measures both in the short- and long term as well as health effects.^{5,6} The emissions of black carbon amounted to approximately 3,100 metric tons in 2022, a reduction of 40 per cent since 1990 (Figure 1.3). The long-term reduction is primarily due to a decrease in emissions from residential stationary plants, heavy duty vehicles and buses and venting and flaring (oil and gas).

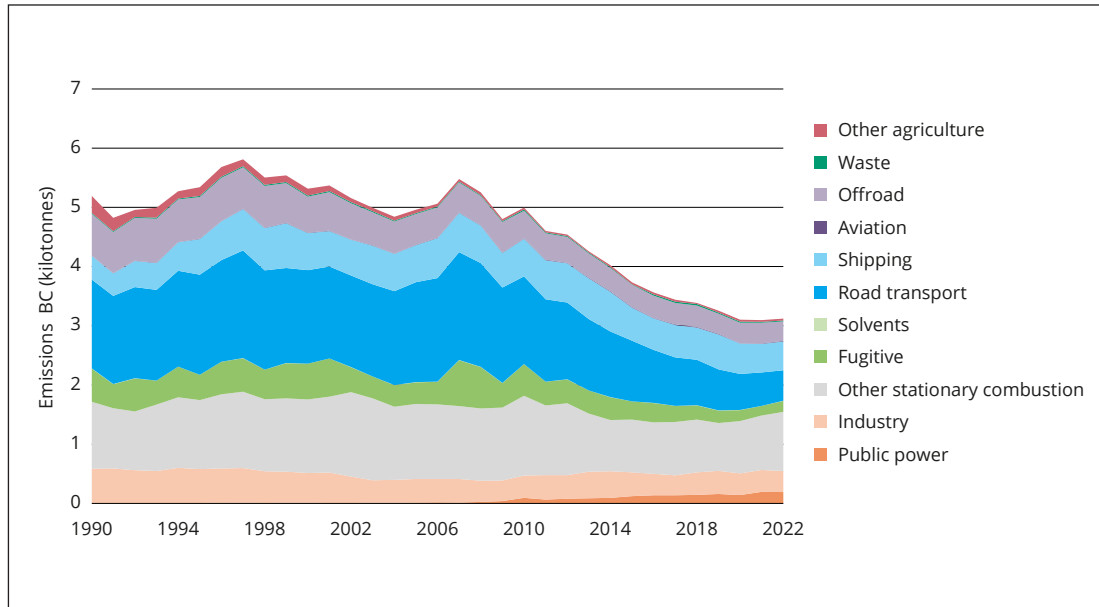
³ [EMEP Centre on Emission Inventories and Projections: Status of reporting and review results 2024](#)

⁴ [SSB: Emissions of Black carbon and Organic carbon in Norway 1990-2011](#)

⁵ [Norwegian Environment Agency: Mitigation analysis for Norway 2021–2030: short-term climate impacts and co-benefits](#)

⁶ [Norwegian Environment Agency: Klimatiltak i Norge – kunnskapsgrunnlag 2024](#) (in Norwegian only)

Figure 1.3 Emissions of black carbon in Norway (kilotonnes)



Source: Norway's reporting to the UNECE in 2024

In 2022, the largest emission source was wood combustion in private households (other stationary combustions in Figure 1.3). Emissions have been reduced by 12 per cent since 1990. Wood burning increased significantly between 2020 and 2022 because of high electricity prices. The second most important emission source sector was Road transport. The most prominent sources within this sector are light duty vehicles, followed by passenger cars and heavy-duty vehicles and buses. Emissions in the Road Transport sector have been reduced by 9 per cent since 1990. National navigation (shipping in Figure 1.3) was the third most important emission source. Emissions have fluctuated throughout the period but reached a peak in 1998. Emissions from national navigation in 2022 were 22 per cent higher than in 1990.

2 Information necessary to track progress made in implementing and achieving NDCs



2.1 National circumstances and institutional profile

2.1.1 National circumstances

Below, information is reported on national circumstances relevant to progress made in implementing and achieving Norway's NDC under Article 4 of the Paris Agreement and how national circumstances affect GHG emissions and removals over time.

Government structure

Norway is a constitutional monarchy with a democratic parliamentary system of governance. The current Government (the Støre Government) took power in October 2021. It is a minority coalition between the Labour Party and the Centre Party. The Storting (Norwegian parliament) determines Norway's overall climate policy, and the government implements and administers the policies and measures.

Although it is not a member of the EU, Norway has, since 1994, been part of the European Union's internal market through the Agreement on the European Economic Area (EEA Agreement). The objective of the EEA Agreement is to strengthen trade and economic relations between the EEA/EFTA States and the EU Member States, based on a level playing field throughout the EEA. The Agreement gives the EFTA countries opportunities to influence EU policy making also in areas of relevance to the internal market, including environmental policies. A practical implication of the EEA agreement is that Norway adopts the same legislation as EU where relevant. Details on legislation relevant to climate change are given in chapter 2.5.

Population profile

With a total area of almost 324,000 km² and only 5.5 million inhabitants, Norway has the lowest population density in Europe after Iceland and Russia. The large majority of the Norwegian population is settled along the coast and the fjords, and an increasing percentage, at present about 80 per cent of the population, lives in urban settlements. Most of the urban settlements are small and have under 20,000 inhabitants. Only six areas – Oslo, Bergen, Stavanger/Sandnes, Trondheim, Fredrikstad/Sarpsborg and Drammen – have more than 100,000 residents. More than a third of Norway's population lives in the six largest city areas. Population has grown from 4.2 million in 1990 to 5.5 million in 2023, about 31 per cent.

Geographical profile

The mainland of Norway is 1,752 km from north to south, spanning about 13 degrees of latitude. The total area of the mainland is 323,781 km². In addition, the Norwegian continental shelf is 2,039,951 km². The mainland coastline is more than 2,500 km long, excluding fjords and bays. In the east, Norway shares borders with Sweden, Finland and Russia. In addition, the Arctic archipelago of Svalbard is under Norwegian jurisdiction. Except for the LULUCF sector, the inventory includes emissions on the archipelago Svalbard as well as on mainland Norway. In particular, emissions from coal mining on Svalbard are included.



The long and narrow shape of Norway is accompanied by wide variations in climate, geology and topography. This gives large variation in conditions for land use. Only about 30 per cent of the land area is lowland below 300 meters, and this is where most people live and where agricultural production is most prominent. As much as 20 per cent of the land area is mountainous areas more than 900 meters above sea level. Cultivated land account for only 3 per cent of the mainland, while about 37 per cent is covered by forest. The remaining area consists of other cultivated and developed land, scrub, and heath along the coast, mountain forest and marginal forest, and sparsely vegetated mountains and mountain plateaus. About 46 per cent of the land is above the tree line. Currently, 25.7 per cent of the land area including Svalbard and Jan Mayen is protected under the Nature Conservation Act and the Svalbard Environmental Act. Of the Norwegian mainland, 17.6 per cent is protected. Nevertheless, the proportion of wilderness-like areas, defined as areas more than 5 km from major infrastructure development, has been reduced dramatically from about 48 per cent of the land area in 1900 to about 11.2 per cent today. From 1988 to 2023 this area was reduced with about 2890 km². Only about 5 per cent of the area of southern Norway is characterised as wilderness-like.

Economical profile

Norway is a small, open economy. In 2023, exports constituted about 47 per cent of GDP. Together with foreign shipping, the production of crude oil and natural gas account for about a fourth of GDP in Norway, but only a small proportion of employment, see Table 2.1. Around 30 per cent of the workforce are employed in the public sector.

Table 2.1 GDP and employment in 2023

	GDP (2023 prices, million NOK)	Share of Total GDP	Employment (1000 persons)	Share of total employment
Norway	4,643.1	1.00	2,968.1	1.00
Mainland Norway	3,420.2	0.74	2,923.6	0.98
Public sector	841.5	0.18	889.5	0.30 ¹
Oil and gas extraction ² and foreign shipping	1,222.9	0.26	44.5	0.02

¹ Share of the employment in mainland Norway

² Including transport via pipelines

Source: Statistics Norway

Norway has greatly benefitted from cross-border trade and investments. Globalisation facilitates access to financing, capital and labour inputs, export markets, technological transfers, and increases competition. The result is a more efficient use of available resources, which has contributed to strong global growth during the past decades. Norway has for a long time benefitted from rising export prices and falling import prices. However, the Norwegian krone has weakened in recent years. This depreciation has increased profitability in export-oriented industries, but at the same time

it contributes to higher import prices and costs for households and businesses that purchase goods and services from abroad.

High price growth, combined with higher interest rates to combat inflation, has reduced the growth in activity in the Norwegian economy. Growth is now lower than the initial period following the global Covid-19 pandemic. The labour market is however still characterized by high demand for labour and the unemployment is low.

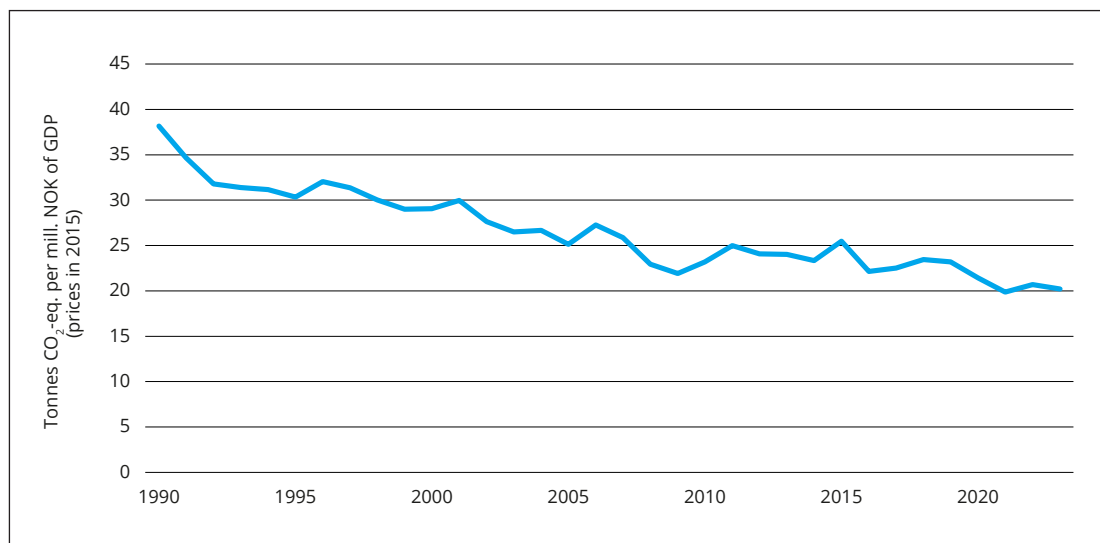
The petroleum industry remains important for the Norwegian economy for years to come, but as share of GDP it is expected to decline as remaining resources are depleted.

A continually stricter global climate policy and an ever faster technological development changes the overall conditions for Norwegian business. Norway's ambitious climate goals require higher growth and new jobs in less carbon-intensive sectors. The strategy for green competitiveness sets the direction for this change.

The emissions for 2023 were published by Statistics Norway in November 2024. The numbers for 2023, that have not yet been reported to the UNFCCC, show that Norway's emissions totalled 46.7 million tonnes of CO₂ equivalents, excluding LULUCF. This is a decrease of 9.1 per cent since 1990, and a 4.7 per cent decrease from 2022 levels.

Emission intensity fell by 56 per cent from 1990 to 2022 (see Figure 2.1). Emission intensity does not include inflation. Greenhouse gas emissions relative to GDP normally decline as scarce resources are utilised more efficiently. Use of taxes or quotas on emissions, resulting in higher energy costs, reinforce this trend. Norway introduced a CO₂ tax as early as 1991. This tax has subsequently been supplemented by the participation of Norwegian installations in the EU's emissions trading system. About 85 per cent of all greenhouse gas emissions in Norway are subject to economic instruments. The use of economic instruments has contributed to the significant decline in emission intensity.

Figure 2.1 Emission intensity in Norway



Source: Statistics Norway

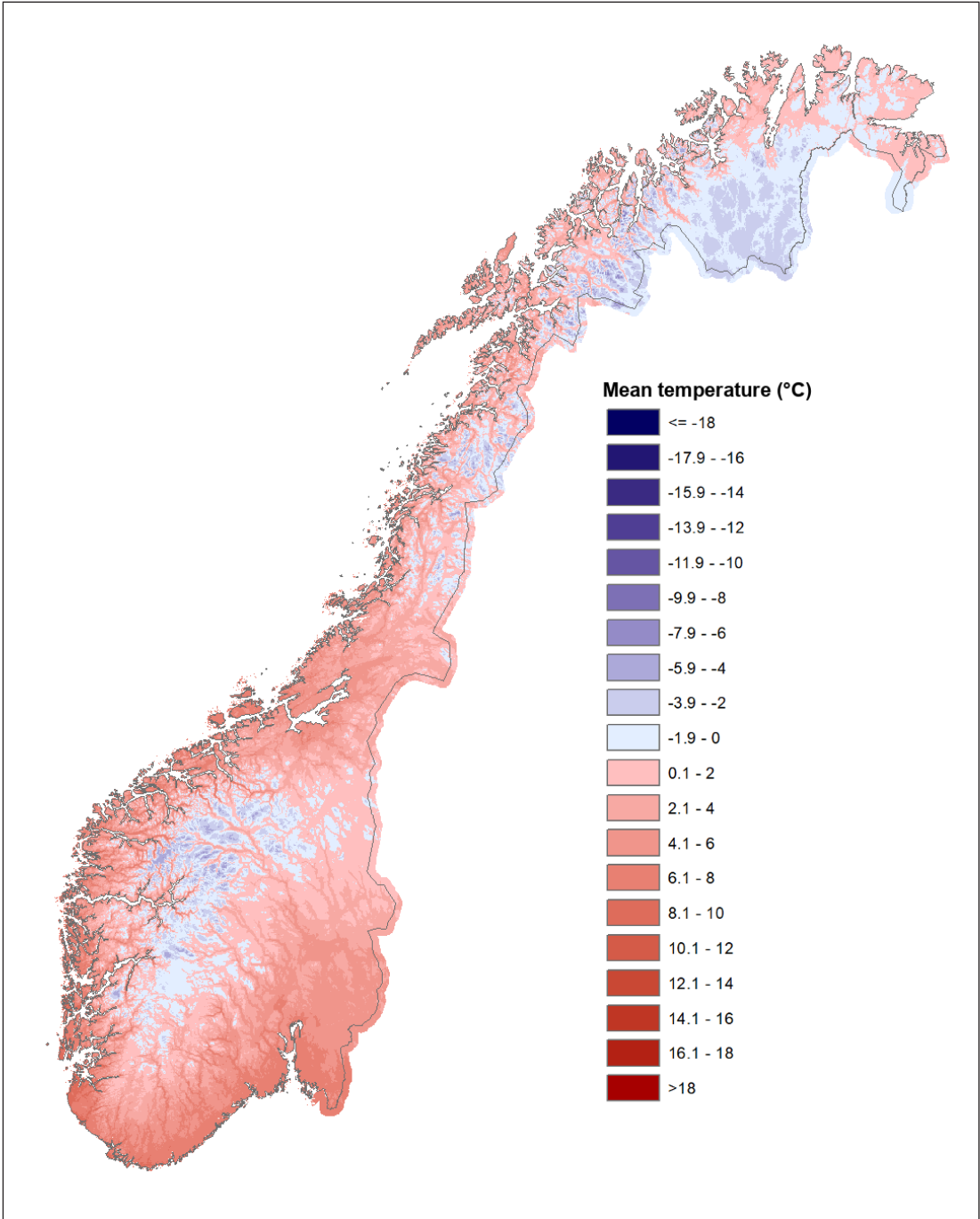
Climate profile

Because of the influence of the North Atlantic Ocean, Norway has a much warmer climate than its latitudinal position would indicate. Therefore, most of Norway has a maritime climate with relatively mild winters and cool summers. On an annual basis, the highest normal (1991–2020) annual air temperatures, (up to 8.6°C) are found along the south-western coast (see Figure 2.2). Outside the mountain regions, the lowest annual mean temperatures (down to -1.9°C) are found on the Finnmark Plateau. During winter, the coast from Lindesnes to Lofoten has normal monthly mean temperatures above 0°C. The absolute lowest and highest temperatures measured at official weather stations on the mainland are -51.4°C and +35.6°C, respectively.

In the cool Norwegian climate, there is a substantial need for heating of buildings. The «heating degree days» (defined as the number of degrees the daily mean temperature is below 17 °C, added up for every day of the year) for the 1991-2020 period was between 3,000–4,000 in the coastal lowland areas. In the northernmost parts of Norway, the value can be up to 7,000.

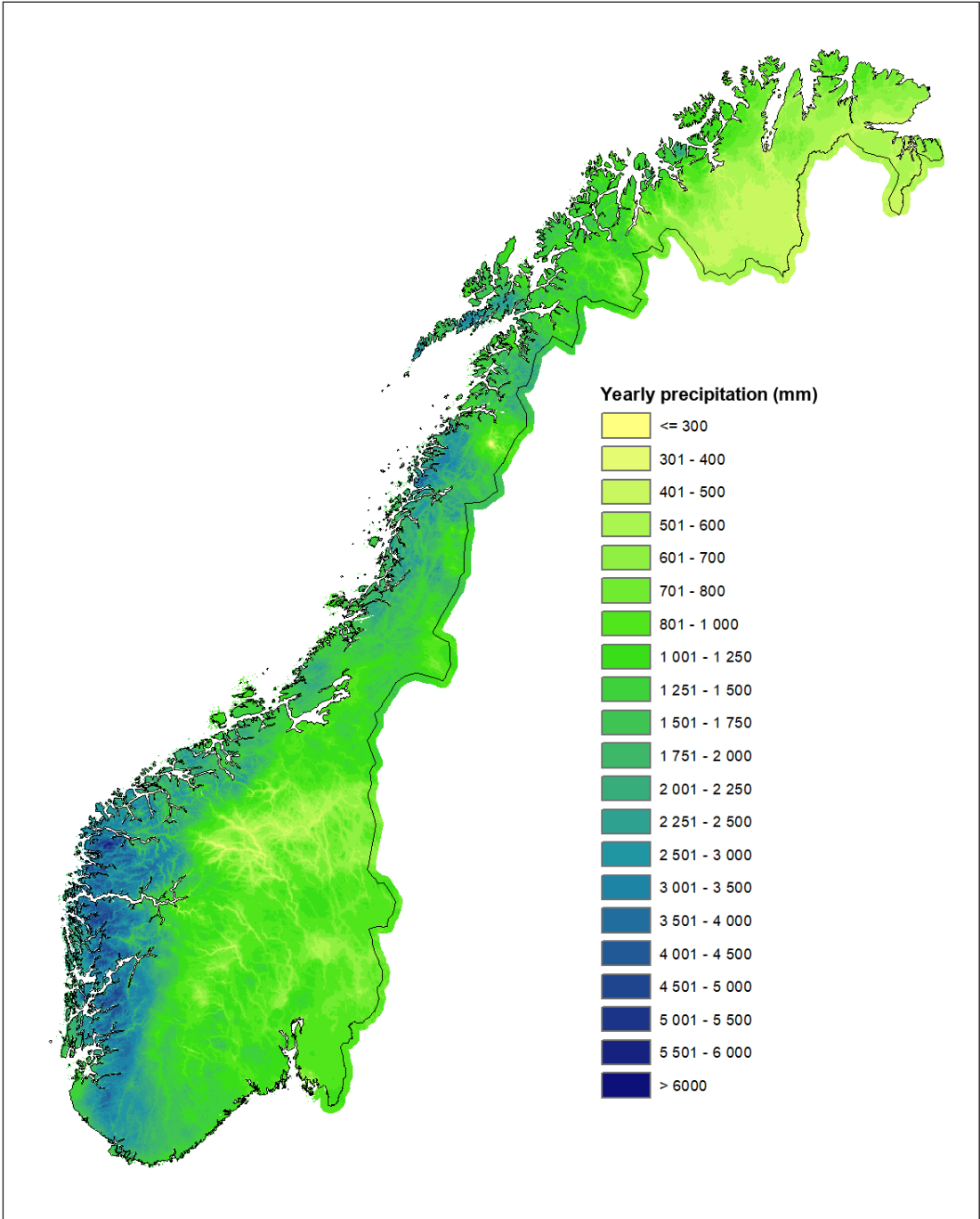
Because of prevailing westerly winds, moist air masses flow regularly in from the ocean giving abundant precipitation over most of Norway. Areas just inland of the coast of western Norway get the most precipitation (see Figure 2.3). This zone of maximum precipitation is one of the wettest in Europe, and several sites in this region have normal annual precipitation of more than 3,500 mm. On the leeward side of the mountain ranges, the annual precipitation is much lower, and a few sheltered stations in the inland areas of south-eastern Norway and one station in Nordland have normal annual precipitation less than 350 mm.

Figure 2.2 Normal annual temperature in Norway 1991–2020



Source: Norwegian Meteorological Institute

Figure 2.3 Normal annual precipitation in Norway 1991–2020



Source: Norwegian Meteorological Institute

2.1.2 Sector details

Energy

Energy use and electricity production

Nearly all of Norway's electricity production is based on renewable energy sources, and the proportion of energy use accounted for by electricity is considerably higher than in most other countries.

Norway has a large energy-intensive manufacturing sector, and electricity is more widely used to heat buildings and water than in most other countries. Because renewable energy is the main source of energy usage, greenhouse gas emissions associated with stationary energy use are low in Mainland-Norway.⁷

Emissions to air from energy use are therefore mainly concentrated in manufacturing, transportation, construction, and agriculture where the use of fossil fuels is still widespread. Emissions to air from offshore petroleum activities largely originate from the combustion of natural gas and diesel in turbines, engines and boilers, flaring of natural gas for safety reasons, venting and diffuse emissions of gas, and storage and loading of crude oil.

Important drivers of energy use

There are various factors that influence the energy usage in Norway. Variations in energy use from year to year are often related to fluctuations in weather conditions and in the prices of energy and energy-intensive goods and services. Longer-term trends are related to population growth and other demographic factors, industrial structure and to the rate of economic growth and structural changes in the economy.

Norway's population has grown about 31 per cent from 1990 to 2023. Strong economic growth has resulted in a tripled GDP since 1990. Both demand for goods and services that use energy are growing steadily. However, final energy consumption has risen by only 14 per cent, demonstrating that the Norwegian economy gradually has become less energy-intensive.

Norway has a national target to improve energy intensity in the mainland economy by 30 per cent from 2015 until 2030. The Ministry of Energy reports every year on the development in energy intensity in the state budget. In 2023 the government presented an action plan for energy efficiency, presenting several instruments that will contribute to more energy efficiency, including legal requirements and targeted information measures.

Energy usage, by sector

Energy use in absolute numbers is highest in the manufacturing and transport sectors, followed by households and services. Other sectors such as construction, agriculture, and fisheries account for only a small proportion of energy use. Energy use has

⁷ Mainland Norway consists of all domestic production activity, except exploration of crude oil and natural gas, transport via pipelines and ocean transport

increased since 1990, with most of the increase taking place before 2000. In 2023, the final energy consumption was about 217 TWh (Statistics Norway).

Electricity is the dominant energy carrier, followed by petroleum products. Electricity dominates energy use in manufacturing, the household sector and service industries, while petroleum products account for a large proportion of energy use in sectors that make heavy use of transportation and machinery. District heating account for only a small share of energy use, but this has been increasing in recent years. Consumption of district heating has risen slightly in recent years. These energy carriers have been replacing fossil fuels and petroleum products for heating and in industrial processes.

The energy intensity of the Norwegian economy has declined by 45 per cent since 1990. This indicates a decoupling of economic growth and energy use.

Per capita energy use has also declined in Norway during this period and was about 10 per cent lower in 2023 than in 1990.

Features of the Norwegian energy system

Renewable energy sources account for 98 per cent of Norwegian electricity production and the power sector has very low emissions compared to most other countries. In a normal year renewable electricity generation exceeds gross domestic consumption.

At the end of 2023, the installed capacity of the Norwegian power supply system was 40 077 MW with an estimated annual production of 157.8 TWh in a normal year.

Over the past few years, Norway has been developing more renewable power production capacity than it has done for over 25 years due to increased profitability for more renewable technologies. Wind power currently accounts for only a relatively modest share of production capacity, but between 2016 and 2022 the installed capacity increased from about 874 MW to about 5,073 MW. At the end of 2023, estimated annual wind power production corresponded to almost 17 TWh in a normal year. In recent years, the installed capacity of solar power has increased sharply, and in 2023 the installed capacity was doubled from about 300 MW to about 600 MW by the end of the year.

Hydropower accounts for approximately 88 per cent of Norwegian power supply, and the resource base for production depends on the precipitation levels between years. Norway has half of Europe's reservoir storage capacity, and more than 75 per cent of Norwegian production capacity is flexible. Production can be rapidly increased and decreased and serves as an important provider of flexibility in the power system. This is a distinctive feature of the Norwegian power system.

The Norwegian power system is closely integrated with the other Nordic systems, both in physical terms and through market integration. In turn, the Nordic market is integrated with the rest of Europe through cross-border interconnectors with the Netherlands, Germany, the Baltic states and Poland.

In 2023, district heating deliveries totalled 7.9 TWh, about five times as much as in 2000. This is equivalent to about one sixth of the total energy consumption in households per year in Norway.

District heating can be produced using many different types of fuel. In 2023, almost 42 per cent of district heating was produced from waste and about 38 per cent from bioenergy. The use of petroleum products has declined since 2018. Mineral oil accounts for only 1 per cent of district heating production.

Bioenergy is an important energy source for heat production in Norway. Annual consumption of bioenergy in Norway rose from 10 TWh in 1990 to about 17.5 TWh in 2010. Since then, the consumption has varied and was about 20 TWh in 2023. Fuelwood consumption in households accounts for a large proportion of biofuel consumption and totalled more than 6 TWh in 2023. The second largest user is the manufacturing sector, where chippings and other wood waste are used as fuel in production processes.

The Norwegian government has an ambition to award areas that has potential for 30 GW of offshore wind capacity by 2040. In 2020, the first areas on the Norwegian continental shelf were opened for offshore renewable energy production. In 2023, Sørilige Nordsjø II was announced as the first project area, and, following a successful auction, was awarded in April 2024.

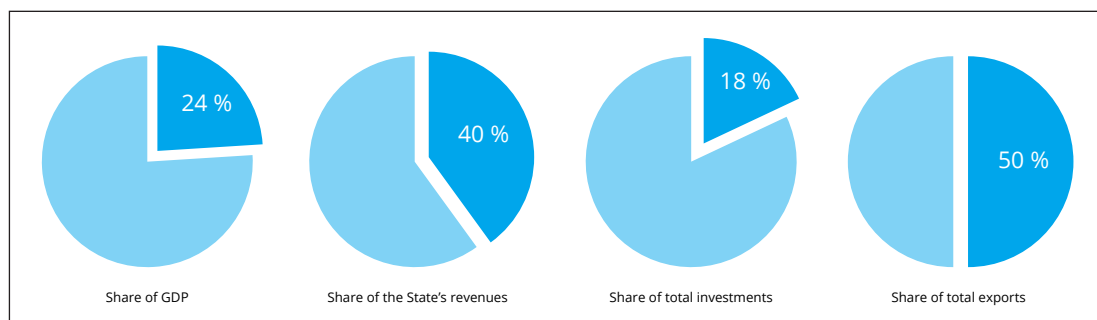
The Hywind Tampen wind farm is the world’s largest floating offshore wind farm, which supplies 88 MW of power to the Snorre and Gullfaks petroleum fields. In 2022, the Hywind Tampen was set in operation.

Petroleum

Petroleum activities have given substantial impetus to Norway’s economic growth and has helped finance the Norwegian welfare system. According to the Norwegian Offshore Directorates latest resource account, about half of the estimated recoverable resources on the Norwegian shelf have been produced and sold so far.

According to data for 2023 published by Statistics Norway in November 2024, greenhouse gas emissions from petroleum activities amounted to 11.6 million tonnes of CO₂ equivalents in 2023. These emissions account for about a quarter of the total Norwegian greenhouse gas emissions. Emissions have increased by 40.1 per cent since 1990. Emissions peaked in 2015 and have declined since, mainly due to increased use of renewable power from shore on petroleum installations.

Figure 2.4 Macroeconomic indicators for the petroleum sector in 2023



The service and supply industry is not included.

Source: National Accounts, the National Budget 2025

Since production started, oil and gas have been produced from a total of 123 fields⁸ on the Norwegian shelf. At the end of 2023, 92 fields were in production: 67 in the North Sea, 23 in the Norwegian Sea and two in the Barents Sea.

In 2023, Norwegian petroleum production accumulated to 233.2 million Sm³ o.e., which is about the same level as production in 2022. By comparison, total production in the record year of 2004 was 264.2 million Sm³ o.e. Total production is expected to reach a peak in 2025, and then decrease over time.

Oil production in 2023 was higher than in 2022. The main reason is startup of production from new fields. Gas sales totalled 116 billion Sm³ (40 MJ) in 2023, a decrease from the production in 2022. The reason for the reduction is mainly extended maintenance activities on the onshore facilities. In 2023, natural gas accounted for 50 per cent of the total production measured in oil equivalents.

Like oil, gas is one of Norway's most important export commodities. Domestic consumption of gas is low, and nearly all the gas produced is exported. An extensive network of subsea pipelines links Norway's offshore gas fields and onshore terminals directly to recipient countries in Europe. In addition, liquefied natural gas (LNG) is shipped out from the Snøhvit field off Hammerfest on LNG carriers.

About 46 per cent of Norway's estimated gas resources have been produced and sold so far. Gas production is expected to remain at a high level for the next years.

Norway is the largest producer and only net-exporter of oil and gas in Europe. In 2023, Norway exported about 116 billion Sm³ gas. In large parts of Europe, gas is an important source of energy for heating, industrial use and for electricity generation in gas-fired power plants. Norwegian gas now covers nearly 30 per cent of the EU's and the UK's combined gas consumption and provides an important contribution to energy security in Europe. The total length of the Norwegian gas pipeline network is about 8,800 kilometres. Most Norwegian gas sold in the European market is delivered to Germany, the UK, Belgium and France. In the short and medium term, Norwegian natural gas may support the phasing-out of coal in the European power sector, and may be an important co-player with renewables in the efforts to reduce emissions. Gas can be stored and serve as a flexible energy source for heat and electricity production, balancing supply and demand.

Transport

Norway's decentralised settlement gives rise to a relatively high demand for transport. In addition, the Norwegian economy is largely based on the extraction of raw materials and exports of goods, which means that there is a large volume of goods transport. About one third of the total Norwegian greenhouse gas emissions originated from transport in 2023.

According to data for 2023 published by Statistics Norway in November 2024, the emissions from road transport were approximately 8 per cent above 1990-levels in 2023. Road transport emissions have decreased since 2015, partly due to biofuels

⁸ A field is one or more petroleum deposits, which together are comprised by an approved plan for development and operation (PDO) or for which exemption from the PDO requirement has been granted.

replacing fossil fuels. The rise in zero-emission vehicle usage is another factor contributing to the reduction in road transport emissions. The market share for electric vehicles has increased steadily in recent years. So far in 2024, electric vehicles has had a market share close to 90 per cent for new passenger cars, while in 2020 the share was 53 per cent. For light-duty vehicles, the market share for new electric vehicles has risen from 9 per cent in 2020 to almost 30 per cent so far in 2024. Also, for heavy duty vehicles there has been an increase in the market share of electric vehicles in the recent years. Electric city buses had a market share of almost 70 per cent so far in 2024. For long distance buses and trucks, the development has been somewhat slower. So far in 2024, electric long-distance buses and trucks held market shares of 24 per cent and 12 per cent, respectively. These shares are expected to increase in the coming years, driven by technological improvements and climate policies.

Since more than 80 per cent of railway traffic in Norway is electric, railway transport only account for a small share of the total emissions. Direct emissions from the railway sector mainly comes from transport on the diesel driven tracks, and from construction, operations and maintenance of the railway infrastructure. Emissions from railways (including passenger and freight transport) has remained more or less constant at 50,000 tonnes CO₂-equivalents in the last few years, accounting for about 0.1–0.3 per cent of the total emissions from the transport sector.

In 2023 there were 78.2 million railway passengers. Passenger traffic by railways was strongly affected by the pandemic. Even though there has been growth in recent years, there are still 2 million fewer passengers than in the peak year of 2019.

For domestic goods transport, there was an increase in tonne-kilometres from 2019 to 2023. For goods transport excluding cabotage, the increase was 11.1 per cent, while for goods transport including cabotage, the increase was 9.3 per cent. Transportation of goods by railways witnessed an increase during the pandemic but has decreased since 2021. In 2023 freight transport decreased with 7.5 per cent. The extreme weather event «Hans» and other weather events have led to increased and prolonged downtime on the railway network. In August 2023, the Randklev bridge collapsed due to flooding, preventing freight transport on the Dovrebanen. The bridge was reopened in May 2024.

Domestic civil aviation was greatly affected by the travel restrictions enforced due to COVID-19. These were partly still in place in beginning of 2022. The subsequent increase in price levels and cost of living, higher interest rates and geopolitical unrest have resulted in people travelling less by plane compared to 2019. The overall number of passengers was down 10 per cent in 2023 compared to pre-Covid levels. The travel pattern has also changed. There are fewer business travellers than before, and domestic travel activity has flattened. There is however an increasing trend in international air passengers (mainly from increased tourism) in the domestic market. As a result of this greenhouse gas emissions from domestic civil aviation (including helicopters) are still slightly below 2019 levels.

Industrial processes and product use (IPPU)

A considerable part of Norwegian manufacturing industries is based on natural resources. The historic availability of low-cost hydro power created a basis for the establishment of metal and fertilizer production. Some chemical production is based on the petroleum resources. Production of pulp and paper derived from the forest resources has also been considerable, and the fisheries have also given a base for industry. Norwegian industry therefore has a high share of production of raw materials and semi-manufactured goods including iron and steel, non-ferrous metals, chemicals, fertilisers, pulp and paper, mineral industries, food processing industries, building and construction industry.

The emissions from the IPPU sector were at about 19 per cent of the national totals in 2022. The emissions have decreased by 37 per cent from 1990.

Waste

The waste sector, with emissions of 1.4 million tonnes of CO₂ equivalents in 2022, accounted for 2.9 per cent of the national GHG emissions. Most of the emissions from the waste sector originate from solid waste disposal on land (61 per cent).

Economic growth, or growth in production and consumption, is the key driver behind the growing waste volume. Even though the total amount of waste generated has increased, GHG emissions from the waste sector have generally decreased since 1990. This is due to the increase in material recycling and the ban issued in 2009 on disposing biodegradable waste to landfill. The central government authorities set the general framework, while municipalities and industry are responsible for waste collection and treatment.

In general, targets set in EU waste directives, such as EU targets for preparing for reuse and recycling of municipal waste, also apply for Norway owing to the EEA agreement.

Agriculture

Stretched along the western side of the Scandinavian Peninsula, approximately one fourth of the surface area of Norway lies north of the Arctic Circle. The long coastline has an Atlantic, humid climate, while the inland climate is continental. Approximately 3 per cent of Norway's land area is cultivated soil. The most suitable lands, approximately 1 per cent, is mostly allocated to arable crops, while grassland and ruminant livestock are allocated to regions less suitable for arable crops. While cultivated soil is a scarce resource in Norway, in addition we have extensive pastureland that is used extensively by reindeer husbandry and summer pasture for other ruminant livestock.

Agriculture is estimated to account for about 9.5 per cent of Norway's emissions of greenhouse gases in 2022. This particularly includes methane and nitrous oxide from animal husbandry and fertilisation. In addition, nitrous oxide emissions from cultivation of peatland are allocated to agriculture, while CO₂ emissions from the same source are allocated to LULUCF. Use of fossil fuels for agricultural activities are allocated to other sectors, e.g. transport. The agricultural emissions have been reduced by approximately 6.8 per cent since 1990.

2.1.2.1 Land use, land-use change and forestry (LULUCF)

Forest and wooded land cover about 12 million hectares and constitute approximately 38 per cent of the land area in Norway. Approximately 88 per cent – that is 120,000 properties – of the forest area is privately owned. The majority of the forest holdings are farm and family forests. Grassland has the second largest area covering as much as 35 per cent of the mainland, with the vast majority categorized as extensive grasslands.

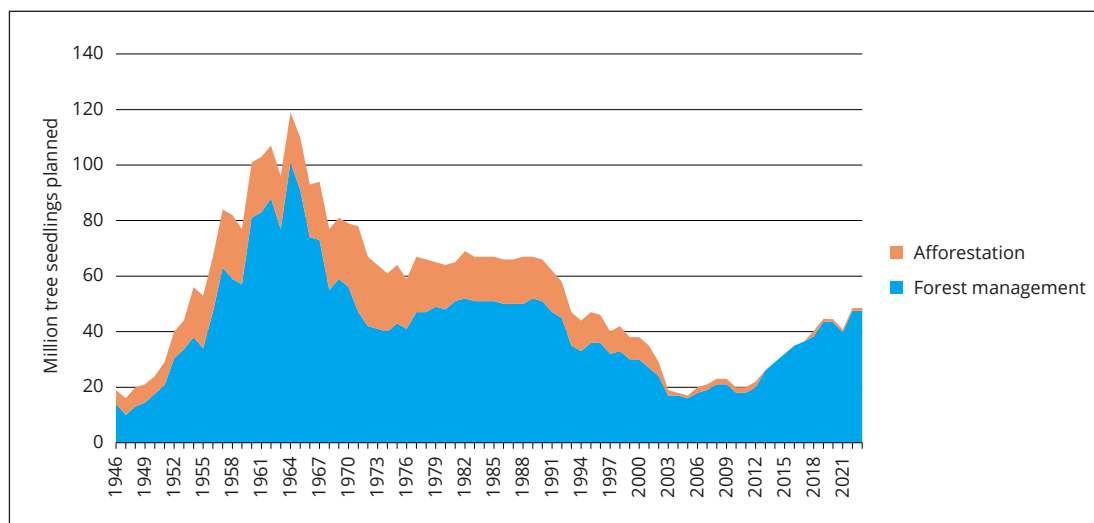
Net land-use changes in Norway from 1990 to 2022 are small compared to the total area. Overall, the area of settlements has increased from 1.8 per cent of the total area in 1990 to 2.2 per cent in 2022. Forest land, grasslands, and wetlands have shown a slight decline in area, while cropland and other land have remained more or less constant.

The most widespread species are Norway spruce (47 per cent), Scots pine (33 per cent) and birch (18 per cent). The historical levels of tree planting in the Norwegian forestry are shown in Figure 2.5. Norway spruce (*picea abies*) and Scots pine account for more than 95 per cent of the seedlings. Broadleaves and foreign tree species are only planted to a small extent.

From 1990 to 2010, both carbon sequestration and emissions in the LULUCF sector increased, while the net carbon sequestration declined from 2011 to 2022. In 2022, net sequestration in the sector was estimated at 13.8 million tonnes of CO₂ equivalents, equivalent to 28 per cent of Norway's total greenhouse gas emissions. Forests are the primary source of carbon sequestration, accounting for 17.9 million tonnes of CO₂ equivalents in 2022, compared to 14.7 million tonnes in 1990. Due to methodological changes after UN revisions, the LULUCF removals are significantly lower (approximately 6.5 million tonnes) than in Norway's 8th National Communication. Post-war forest planting has played an important role in this sequestration. However, the decline in sequestration since 2010 has been driven by drought in 2018 with delayed recovery, increased logging, a rise in the proportion of mature forests with slower growth rates, and reduced forest planting and silvicultural activities in recent decades.

Emissions from deforestation, associated with land-use change from forest to other land categories (e.g., agriculture and urban development), increased from 2.1 million tonnes in 1990 to 2.5 million tonnes of CO₂ equivalents in 2022. Emissions from settlements contribute to yearly emissions of about 1.9 million tonnes, and these emissions are projected to remain stable towards 2050.

Figure 2.5 Historical levels of tree planting in the Norwegian forestry



Source: Ministry of Agriculture and Food

2.1.3 Institutional arrangements

The overall national climate policy is decided by the Storting (Norwegian Parliament), and the government implements and administers the most important policies and measures, such as economic instruments and direct regulations. Most policies and measures in the area of climate policy are developed through interministerial processes before the political proposals are tabled. The Ministry of Climate and Environment has the overarching responsibility for coordinating climate efforts and reporting on the overall achievement of climate goals. The Ministry of Finance is responsible for the tax schemes. The other ministries are responsible for policies in their respective sectors. The Ministry of Climate and Environment organizes the work of developing and further refining the decision-making basis through a climate governance system.

Norway has several legislative arrangements in place in order to help reduce emissions of greenhouse gases, such as the Pollution Control Act, the Greenhouse Gas Emissions Trading Act, the CO₂ Tax Act, and the Petroleum Act, as well as requirements under the Planning and Building Act. The relevant arrangements will be discussed in more detail in chapter 2.5.

The Climate Change Act

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 long-term transformation of Norway in a climate-friendly direction. See further description of Norway's climate targets in 2.2.

The act has an overarching function in addition to existing environmental legislation. The Climate Change Act introduces a system of five year reviews of Norway's climate targets, on the same principle as the Paris Agreement. In addition, the act introduces an annual reporting mechanism. The Government shall each year

submit to the Parliament updated information on status and progress in achieving the climate targets under the law, and how Norway prepares for and adapts to climate change. Information on the expected effects of the proposed budget on greenhouse gas emissions and projections of emissions and removals are also compulsory elements of the annual reporting mechanism. Since 2018, the Government has annually reported information as required by the Climate Change Act as part of the state budget process in October each year. Since 2022, the reporting has been submitted to the Storting as separate annex to the state budget named Climate Status and Plan, which is further explained in Box 2.1 in chapter 2.3.

On 1 October the Government issued on a public consultation a proposal for a new climate target for 2035 to be included in the Norwegian Climate Change Act⁹. The consultation ends 1 January 2025. After the consultation the Government will send a concrete proposal to the Parliament for approval and adoption.

Climate Governance System

In addition to complying with the reporting mechanism of the Climate Change Act, the Government's Climate Status and Plan presented a Climate Governance System in 2022. The purpose of the climate governance system is to facilitate the achievement of Norway's climate goals. The system aims to provide processes for improved coordination for informed decisions, implementation, and reporting. It establishes annual routines and milestones for the design, follow-up, and reporting, as well as milestones for further development of climate policies. Some decision-making milestones are coordinated with the Government's internal budgetary processes, enabling budgetary decisions as well as decisions on other climate policies to be informed by their estimated effect on emissions and the achievement of climate targets. The government's annual Climate Status and Plan and regular white papers to the Storting present updates on climate policy developments and plans as well as progress towards meeting climate goals. Policies developed for purposes other than climate mitigation but still affecting greenhouse emissions are developed across sectors and presented in different white papers, action plans, and strategies. The system is being developed further.

Institutional arrangements related to cooperation with the EU

Norway intends to fulfil its climate target (Nationally Determined Contribution) for 2030 under the Paris Agreement in cooperation with the EU. The Emissions Trading System is a part of the EEA agreement. This cooperation will be reflected through transfers and acquisitions of ITMOs pursuant to Article 6 of the Paris Agreement. Details of the cooperation including the institutional arrangements for Article 6 will be reported in a forthcoming Initial Report pursuant to Decisions 2/CMA. 3 and 6/CMA. 4. The Ministry for Climate and Environment has however established arrangements for acquisition of units under the pillars ESR and LULUCF in the cooperation with EU, as well as a program for acquisition of ITMOs, both pursuant

⁹ [Regjeringen: Høring av forslag om endring av klimaloven – Regjeringens forslag til Norges nye klimamål for 2035](#) (in Norwegian only)

to allotments in the state budget.¹⁰ These programs are expected to acquire ITMOs and can be drawn upon in case domestic measures and cooperation with the EU does not lead to a full realisation of emission/removal budgets under the cooperation with EU and/or the cooperation does not fully realize Norway's climate target in the NDC for 2030.

Local governments

Local governments are responsible for implementing policies and measures at the local level, for example through waste management, spatial and societal planning and some transport measures. In 2009, central government planning guidelines (Nw. *statlige planretningslinjer*) for climate and energy planning were introduced in municipalities. Since 2018, these guidelines also include a description of how municipalities and counties can incorporate climate adaptation work into their planning activities. The government is in the process of revising the guidelines, with the goal of clarifying expectations for municipalities' ambitions and results in energy and climate work. The work is now in its final phase, and the new guideline is expected to be finished in the beginning of 2025.

Public participation

The Environmental Information Act, implementing the Aarhus Convention, establishes public participation in decision making processes relevant for the environment. For example, the Climate Change Act was on a public hearing including all stakeholders. All plans made in accordance with the Planning and Building Act must also be subject to public participation.

The Norwegian Environment Agency

The Norwegian Environment Agency is a government agency under the Ministry of Climate and Environment. The Environment Agency implements government pollution and nature management policy. Important fields of work in relation to pollution control include climate, hazardous substances, water and the marine environment, waste management, air quality and noise. The Environment Agency manages and enforces the Pollution Control Act, the Product Control Act and the Greenhouse Gas Emission Trading Act, and the Nature Diversity Act, among others. The Environment Agency grants pollution permits, establishes requirements and sets emission limits, and carries out inspections to ensure compliance.

The Norwegian Environment Agency provides analyses and impact assessments related to environmental policies and measures. One example is an annual mitigation analysis on climate, which informs the government and the public on possible mitigation actions to reduce Norwegian greenhouse gas emissions.¹¹

¹⁰ [Regjeringen: Norwegian Global Emission Reduction Initiative](#)

¹¹ [Norwegian Environment Agency: Klimatiltak i Norge](#) (in Norwegian only)

The Environment Agency monitors the state of the environment. The Agency provide environmental information to the public through their home page.¹² The Agency also informs about Norway's climate and environmental goals.¹³

The Environment Agency supervises and monitors the County Governors' work on pollution, coordinates the County Governors' inspection work and organises joint inspections. The Environment Agency provides guidelines for the County Governors and also deals with appeals against decisions made by the County Governors.

The Environment Agency participates in a series of international processes, to promote regional and global agreements that reduce serious environmental problems. Moreover, the Environment Agency also cooperates with the environmental authorities in other countries, sharing competence and furthering environmental improvements.

The Norwegian Environment Agency is appointed as a national entity with overall responsibility for the GHG inventory and the reporting of the inventory. The GHG inventory is produced and reported in collaboration with Statistics Norway and the Norwegian Institute of Bioeconomy Research. The three institutions are responsible for archiving necessary documentation.

There have not been any significant changes to the institutional arrangements since Norway reported its 8th National Communication in 2022.

2.2 Norway's climate policy and targets

Norway's climate policy is based on the objective of the United Nations Framework Convention on Climate Change and the Paris Agreement. The scientific understanding of the greenhouse effect set out in the reports from IPCC is an important factor in developing climate policy. Thus, the policies and measures reported are seen as modifying long-term trends in anthropogenic greenhouse gas emissions and removals.

Climate change and emissions of greenhouse gases have featured on the policy agenda in Norway since the late 1980s. Today, Norway has a comprehensive set of measures covering almost all emissions of greenhouse gases as well as removals.

Norway has ambitious climate targets, both under the Paris Agreement and within a domestic context, forming a basis for the policies and measures:

Paris Agreement NDC

The nationally determined contribution (NDC) is to reduce emissions by at least 55 per cent by 2030 compared to 1990. The NDC target is included in the Norwegian Climate Change Act.

On 1st October 2024 the Government issued a proposal for a new climate target for 2035 to be included in the Norwegian Climate Change Act for public consultation until 1st January 2025. After the consultation the Government will send a concrete

¹² [Norwegian Environment Agency](#)

¹³ [Norwegian Environment Agency: Miljøstatus – Norges klima- og miljømål](#) (in Norwegian only)

proposal to the Parliament for approval and adoption. After the Parliamentary approval Norway will submit its target as its new NDC under the Paris Agreement.

Targets in a domestic context

Become a low-emission society by 2050 and reduce emissions by 90–95 per cent compared to 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. The target is included in the Norwegian Climate Change Act.

As an interim goal on the road to net zero emissions and the low-emission society, the government has set a transition target for the entire economy in 2030. This is formulated in the government platform as a target to cut Norwegian emissions by 55 per cent compared to 1990.

Be climate neutral from 2030.

2.3 Description of Norway's NDC for 2030

This chapter of the BTR describes Norway's NDC under Article 4 of the Paris Agreement against which progress will be tracked. Following the decision 1/CMA.3 Glasgow Climate Pact paragraph 29, Norway revisited the 2030 target in its Nationally Determined Contribution (NDC). In November 2022, Norway communicated its updated NDC to reduce emissions by at least 55 per cent by 2030, compared to 1990 levels.¹⁴

Details of Norway's NDC are shown in Table 2.2. The NDC is economy wide and is a single-year target in 2030. It covers the gases carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃)¹⁵. The NDC covers all the sectors in the GHG inventory. Emissions and removals from the LULUCF sector that are additional will be accounted for when assessing achievement of the target.

Norway's intention is to fulfil this target in cooperation with the EU. This will be done within the framework set up by Article 6 of the Paris Agreement. In the event that the cooperation with the EU does not lead to a full realization of the target, Norway intends to use ITMOs acquired from countries outside the EEA.

¹⁴ [UNFCCC: Update of Norway's nationally determined contribution](#)

¹⁵ No sources for emissions of NF₃ are found, as reflected in the Norwegian greenhouse gas inventory

Table 2.2 Description of a Party's nationally determined contribution under Article 4 of the Paris Agreement, including updates

	Description
Target(s) and description, including target type(s), as applicable	Economy-wide, emission reductions by at least 55 per cent in 2030 compared to base year (1990) emissions.
Target year(s) or period(s), and whether they are single-year or multi-year target(s), as applicable	Single-year target in 2030.
Reference point(s), level(s), baseline(s), base year(s) or starting point(s), and their respective value(s), as applicable	Base year: 1990. Base year value: 51 263.14 kt tonnes CO ₂ equivalents
Time frame(s) and/or periods for implementation, as applicable	From 1st January 2021- 31st December 2030.
Scope and coverage, including, as relevant, sectors, categories, activities, sources and sinks, pools and gases, as applicable	<p>Gases: Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃).</p> <p>Sectors: Energy, industrial processes and product use, agriculture, land-use, land-use change and forestry, and waste.</p> <p>For the land-use, land-use change and forestry sector, emissions and removals the following reporting categories are included: forest land, cropland, grassland, and wetland (wetland remaining wetland only from 2026), including land use changes between the categories, and between these categories and settlements and other land. The five carbon pools above-ground biomass, below-ground biomass, litter, dead wood and soil organic matters are included. In addition, the carbon pool harvested wood products is included.</p> <p>Emissions and removals from the LULUCF sector that are additional will be accounted for when assessing achievement of the target, see chapter 2.3 for further details.</p>
Intention to use cooperative approaches that involve the use of ITMOs under Article 6 towards NDCs under Article 4 of the Paris Agreement, as applicable	Yes. Norway pursues cooperation with the EU on implementing the respective NDCs to be reflected in accordance with rules under Article 6 of the Paris Agreement. If the cooperation with the European union does not fully realize the NDC target, Norway will use voluntary cooperation with countries outside the European Economic Area to fulfil the part of the NDC that goes beyond what is achieved with the European Union. See chapter 2.3 of this BTR for details .
Any updates or clarifications of previously reported information, as applicable	<p>Norway will report on its choice of accounting method for cooperative approaches in its forthcoming Initial Report pursuant to the rules under Article 6 in Decision 2/CMA.3.</p> <p>EU and Norway need to agree on how to account for the reductions achieved in the common Emissions Trading System (such an agreement was made pursuant to the unit flow under the Kyoto Protocol) and rules pertaining to any flows of ITMOs reflecting flows of units under other pillars of the cooperation.</p>

Iceland and Norway entered into an agreement with the EU in October 2019 to cooperate to fulfil their respective climate targets for 2030. Under the agreement, Norway will take part in EU climate legislation from 2021 to 2030. Final accounting towards the target pursuant to the guidance under Article 6.2 may depend on any further arrangements in Norway's cooperation with the EU and Iceland, in particular resulting from participation in the European Emissions Trading System. Norwegian entities have undertaken and is expected to further undertake a net purchase of allowances in the ETS in the current NDC period. This net purchase will be reflected in a net acquisition of ITMOs to be accounted towards the NDC. Further specification of accounting method is to be developed by Norway and EU in accordance with rules set up by the CMA in Glasgow in 2021 so as to avoid double counting. If necessary, Norway will use voluntary cooperation with countries outside the EEA under Article 6 of the Paris Agreement to fulfil any part that goes beyond what is achieved through the climate cooperation with the European Union. Norway has established a purchase program for ITMOs from developing countries that could be used in such an event.¹⁶ The program is allotted NOK 8.2 billion through the state budget. An agreement is signed with Uzbekistan through the World Bank program Transitional Carbon Asset Facility (TCAF), and initial MoUs or agreements are developed with Benin, Indonesia, Jordan, Morocco, Senegal and Zambia for cooperation facilitated by the Global Green Growth Institute.

The EU's climate policy has three main pillars. The first pillar of EU climate policy deals with ETS emissions. The EU Emissions Trading System applies to the largest emission sources within Norwegian manufacturing industries and the petroleum industry through the European Economic Area (EEA). The cap, or number of emission allowances in the system, is being gradually reduced to achieve a reduction of 62 per cent in emissions in 2030 compared with 2005. This is an overall reduction for all installations covered by the EU ETS. Emissions from European aviation have been included in the EU ETS since 2012, while emissions from maritime transport are gradually included from 2024.

The second pillar of EU climate policy deals with emissions not covered by the EU ETS, but by the effort sharing regulation (ESR) mainly covering emissions from transport, agriculture, buildings and waste. Norway's current target for the ESR emissions under its agreement with the EU is a 40 per cent reduction by 2030 compared with the 2005 level. This has been translated into a binding emission budget with emission ceilings for each year in the period 2021–2030. The legislation allows for each country's emission budget to be met through a combination of emission reductions within the country and transfers of emission units from other EU countries.

The third pillar of EU climate policy deals with the Land Use, Land Use Change and Forestry (LULUCF) sector. This includes anthropogenic emissions and removals of greenhouse gases from land use, land use change and forestry. The factors that particularly influence emissions and removals are growth, mortality and the level of harvesting (relative to harvest level modelled in the forest reference level FRL (2021–2025, or reference period (2026–2030)), land-use change such as deforestation and afforestation, and the natural spread of forest and scrub. The EU's climate

¹⁶ [Regjeringen: Norwegian Global Emission Reduction Initiative](#)

legislation includes accounting rules for emissions and removals in the LULUCF sector. However, neither Norway nor EU are applying these rules for accounting contributions from LULUCF towards the NDC. Under the EU legislation, Norway currently has an obligation to ensure that overall greenhouse gas emissions from the LULUCF sector do not exceed removals (this is known as the 'no debit' rule). According to the regulation, the obligation can be fulfilled by implementing measures in the national LULUCF sector, and/or through extra national reductions in non-ETS emissions, for example in the transport and agriculture sectors, and/or through purchasing units from EU countries or Iceland.

When Norway and the EU concluded their agreement on implementing the EU legislation on ESR and LULUCF, the targets each of these parties had communicated to the UN was a 40 per cent reduction in emissions by 2030 compared with the 1990 level. Both the EU and Norway have communicated more ambitious targets to the UN after the conclusion of the agreement, and the EU has adopted amendments to its legislation in order to ensure that the more ambitious target is achieved. Norway is considering whether the updated EU legislation on ESR and LULUCF should also be made applicable in Norway, and if so on what conditions. The updated legislation will not apply to Norway until the Storting has given its consent.

Norway is not mentioned in the referenced updated EU legislation. Based on the targets for ESR emissions that apply for comparable countries, it is likely that Norway can get a reduction target of 50 per cent reduction compared to 2005 should the climate agreement with the EU be updated. Such a target will be translated into a binding emission budget with emission ceilings for each year in the period 2021–2030. For information on the climate status and plan for the 2030 climate target where assumed targets are pursued, see Box 2.1.

Box 2.1 Annual Climate Status and Plan

The Climate Status and Plan summarises the government's climate policy, and it is the government's annual report on the information required by the Climate Change Act. The Støre Government presented an updated Climate Status and Plan in a separate attachment to Prop. 1 S (2024–2025) in October 2024.

Since Norway and the EU both have individual NDCs/targets under the Paris Agreement, the cooperation is envisaged to include transfers and acquisitions of ITMOs and follow the guidance under Article 6 of the Paris Agreement. See Box 2.2 for further information.

ESR emissions

Chapter 2.7 of this BTR presents updated projections of GHG emissions. Table 2.8 shows that the projections for the ESR emissions are estimated to decrease from 25.2 million tonnes CO₂ eq. in 2022 to 19.8 million tonnes CO₂ eq. in 2030. The projections for the period 2021–2030 are about 13 million tonnes CO₂ eq. higher than the given emission budget under the current EU legislation for the ESR sector (40 per cent reduction in 2030 compared to 2005).

Correspondingly, the emissions are about 22 million tonnes CO₂ eq. higher than the estimated emission budget Norway may get, should the climate agreement with the EU be updated and Norway gets a reduction target of 50 per cent compared to 2005, based on the proposal from the EU Commission. The Støre-government is therefore making provisions for, and is planning to, reduce the ESR emissions by 50 per cent by 2030.

In the budget proposal for 2025 and the attached Climate Status and Plan, the Støre-government proposes climate measures that can reduce the GHG emissions. It is estimated that measures proposed in the Climate Status and Plan can reduce the non-ETS emissions by 16.5 million tonnes of CO₂ eq. in the period 2021–2030. The planned measures are reported as projections with additional measures (WAM), see chapter 2.5.11 and chapter 2.7.6 for further information.

With these measures the total estimated ESR emissions for the period 2021–2030 would be about 2.8 million less than the emission budget under the current EU legislation for the ESR sector (40 per cent reduction in 2030 compared to 2005). Estimated emissions including planned measures for the period 2021–2030 would be 5.4 million higher than the estimated emission budget Norway may get should the climate agreement with the EU be updated and Norway gets a reduction target of 50 per cent compared to 2005. For the year of 2030, estimated emission reductions including planned measures are about 46 per cent compared to 2005-levels.

Box 2.1 continued

Based on these projections, Norway is expecting to have to use flexible mechanisms in addition to national measures to meet the commitment over the period 2021–2030. Norway has access to approximately 5.8 million converted allowances from the EU ETS, which can be used under ERS and land-use regulations. The government has set aside funds for utilisation of further flexibility if needed through acquisition of units from other countries. However, the availability of units under both the ESR and the LULUCF from EU countries is unknown, as well as the price.

Box 2.2 Pursuing cooperation with the EU on implementing the respective NDCs

Norway pursues cooperation with the EU on implementing their respective NDCs. Norway, Iceland and Liechtenstein have been participating in the EU ETS since 2008. For the period from 1st January 2021 to 31st December 2030, Norway is pursuing its cooperation with the EU on implementing their respective NDCs and have together with Iceland agreed to implement the EU Effort Sharing Regulation (ESR) and LULUCF Regulation in accordance with the EEA Agreement Protocol 31.

Cooperation on implementation of the NDC enables Norway to have a higher level of ambition and thus gives a benefit to the atmosphere. In 2019, the EU, Iceland and Norway agreed on cooperation to fulfil our respective prevailing NDCs. Since then, the EU, Iceland and Norway have updated their respective NDCs and strengthened the targets substantially. The conditions for Norwegian participation in the updated European legislation (Effort Sharing Regulation and LULUCF Regulation) will need to be agreed between EU and Norway before arrangements related to cooperative approaches pursuant to Article 6 of the Paris Agreement on implementation of the updated NDCs can be finalised.

Details concerning the possible flow of internationally transferred mitigation outcomes (ITMOs), accounting approaches, national arrangements, registries, other reporting requirements including related to adaptation finance and overall mitigation of global emissions, will be addressed in future reporting under the Paris Agreement, in particular the Initial Report pursuant to the Article 6 guidance.

2.4 Information necessary to track progress made in implementing and achieving Norway's NDC

Norway's point of departure for accounting and showing progress towards the NDC target is the inventory figures. Voluntary cooperation with other countries, and subsequent accounting for ITMOs received, is a central element in the implementation of the NDC. There will be several years' delay in the transfer of ITMOs reflecting the underlying cooperative approaches with EU and potentially other countries outside of the European Economic Area.

Norway expects that the net flow of allowances between EU and Norway in the European ETS will be the basis for transfer of ITMOs also under the Paris Agreement, as was the case under the Kyoto Protocol. Further details defining such net flow is to be agreed between the parties. However, Norwegian companies have acquired and used significantly more allowances in the ETS than we expect that Norway will be held responsible for under this cooperative approach, which will then lead to a significant transfer of ITMOs from EU to Norway. Under the Kyoto Protocol such transfers closed most of the gap between the actual Norwegian emissions and the commitments in both periods; see the final compilation and accounting reports¹⁷. The remaining gap was closed using units from the Clean Development Mechanism and also some from Joint Implementation.

Norway, as well as the EU and other cooperating partner countries, will have to submit our respective Initial Reports pursuant to Decision 2/CMA.3 (and 6/CMA.4 and X/CMA.6) to spell out further details around the accounting.

2.4.1 Indicator, methodologies and structured summary

This section of the BTR contains information in accordance with paragraphs 65–77 and 79 of the MPGs. The information is also reported in CTF tables 1 to 4.

2.4.1.1 *Indicator for tracking progress*

Norway has selected the indicator «emissions without LULUCF» as the indicator representing the point of departure in tracking progress towards the implementation and achievement of Norway's NDC. The unit and metric are the same as the NDC's base year value and target value. Tables 2.3 and 2.4 provide more information on this indicator. Additional emissions and removals from the LULUCF sector and ITMOs acquired under Article 6 of the Paris agreement will add clarity on the progress towards the 2030 target and will be reported in future BTRs.

¹⁷ <https://unfccc.int/sites/default/files/resource/docs/2016/car/nor.pdf>, https://unfccc.int/sites/default/files/resource/car2024_NOR.pdf

Table 2.3 (CTF table 1) Structured summary: Description of selected indicators

Indicator(s) selected to track progress	Description
Emissions without LULUCF	Total CO ₂ equivalent emissions, including indirect CO ₂ , without LULUCF.
Information for the reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate	The reference level is the total CO ₂ equivalent emissions, including indirect CO ₂ , without LULUCF reported for the base year 1990. The reference level for Norway is 51 263.14 kt tonnes CO ₂ equivalents.
Updates in accordance with any recalculation of the GHG inventory, as appropriate ^b	This is the first time the reference level is reported in accordance with the MPGs, hence there are no updates. The value of the reference level has been recalculated since Norway updated its NDC and may be updated in the future due to methodological improvements to the GHG inventory.
Relation to NDC ^c	The indicator is defined in the same unit and metric as the target of the NDC.

Table 2.4 (CTF table 2) Structured summary: Definitions needed to understand NDC

	Definitions
<i>Definition needed to understand each indicator:</i>	
Emissions without LULUCF	The total is reported in the CRT tables of Norway's GHG inventory. The relevant total is «Total CO ₂ equivalent emissions, including indirect CO ₂ , without LULUCF».
<i>Any sector or category defined differently than in the national inventory report:</i>	
4. Land use, land-use change and forestry	For the LULUCF sector, only a subset of emissions and removals are included through them being identified as additional removals and emissions. There is ongoing work to clarify this method.
<i>Definition needed to understand mitigation co-benefits of adaptation actions and/or economic diversification plans:</i>	
Adaptation actions	Not applicable
Economic diversification plans	Not applicable
<i>Any other relevant definitions</i>	NA

For the emissions and removals from the LULUCF sector, additional emissions and removals in this sector will be accounted for towards the target.

Norway expects that the cooperation with the EU will be reflected through transfer of ITMOs based on net flow of allowances between EU and Norway in the ETS and possibly any flows of units under the pillars ESR and LULUCF. In the event that this cooperation does not fully realize the NDC target of at least 55, Norway will also use ITMOs acquired from countries outside the European Economic Area through its purchase program.

2.4.1.2 Methodologies and accounting approach

Norway will use the following accounting approach for tracking progress towards its NDC: Annual total CO₂ equivalent emissions, including indirect CO₂, without LULUCF are compared to the economy-wide absolute emission reduction as defined in the NDC.

For the emissions and removals from the LULUCF sector, the Government has not yet identified the concrete method that will be used to account for the additional emissions and removals. There is ongoing work to clarify this method.

The figures reflecting GHG emissions are then adjusted for any net transfers of ITMOs between Norway and the EU and between Norway other Parties. Norway's emissions balance would reflect the level of emissions and removals covered by its NDCs and adjusted using corresponding adjustments.

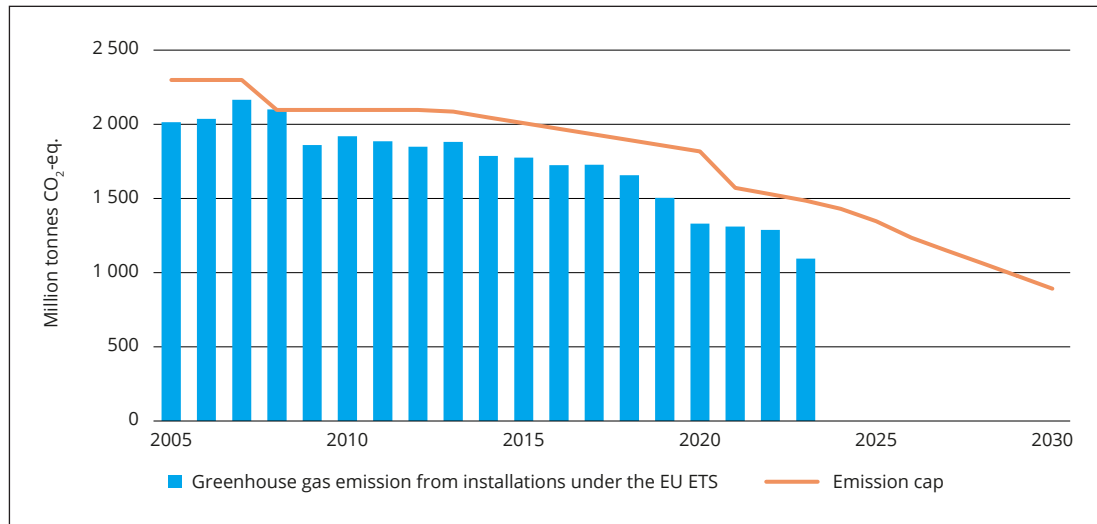
Details on methodologies and accounting approaches consistent with the accounting guidance¹⁸ under the Paris Agreement can be found in CTF table 3 ('Methodologies and accounting approaches'), which has been submitted electronically together with this BTR.

The national GHG inventory represents the starting point for accounting towards the 2030 single year target. Norway will also cooperate with other countries under Article 6; notably cooperation with the EU under Article 6.2, but also cooperation with other countries.

Norway will report on how it will account for the use of ITMOs towards its single year 2030 target in a forthcoming Initial Report pursuant to Decisions 2/CMA.3 and 6/CMA.4. Given that the pillars in the cooperation with the EU form budgets that can be seen as trajectories towards emissions levels in the target year, Norway sees the possibility of using a trajectory or trajectories in accordance with the guidance in decision 2/CMA.3 Annex para 7 a i. The pillars in the EU legislation are designed to realize an overall reduction of at least 55 per cent in 2030. EU and Norway have individual NDCs with single year targets individually accounted for. For Norway implementing the requirements under the pillars and reflecting ITMO flows through an Article 6.2 cooperative approach may, however, not ensure that Norway fully realizes a reduction of 55 per cent.

¹⁸ Decision 4/CMA.1 Further guidance in relation to the mitigation section of decision 1/CP21, <https://unfccc.int/documents/193407>, pages 6 to 13.

Figure 2.6 Greenhouse gas emissions and cap in the EU emission trading scheme (EU ETS)



Source: Ministry of Climate and Environment

Table 2.5 The Norwegian budget for ESR emissions (million tonnes CO₂ equivalents)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2021-2030
ESR Budget 50 per cent reduction	25.2	24.3	23.1	21.8	20.6	21.2	19.5	17.8	16.1	14.5	204.1
Actual GHG emissions	25.5	25.2	24.1	-	-	-	-	-	-	-	226.0
Projected GHG emissions				23.5	22.8	22.2	21.7	21.1	20.2	19.6	
Gap – 50 per cent reduction	0.3	0.9	1.1	1.7	2.2	1.1	2.2	3.3	4.1	5.1	21.9

In the calculation of the emissions gap, it is assumed that the EU will allow the accounting of negative emissions from carbon capture and storage under the effort sharing. If the EU does not allow this, the emissions gap will increase by approximately 0.7 million tonnes of CO₂ equivalents.

Source: Government’s Climate Status and Plan for 2025¹⁹

¹⁹ [Regjeringens klimastatus og -plan – regjeringen.no](https://www.regjeringen.no) (in Norwegian only)

For the ETS there is one trajectory common for all of the EEA trading partners. This trajectory will reduce the cap – the annual volume of allowances – by 62 per cent compared to 2005 levels in 2030. If we were to apply the trajectory of the overall cap to Norway, its emissions from stationary sectors included in the system would be reduced to about 10 Mt in 2030. It is expected that Norway and the EU will develop rules guiding transfers of ITMOs pursuant to the net flow of EUAs acquired and used in the ETS. Such an arrangement was already made under the Kyoto Protocol for 2008–2012 and 2013–2020, see documentation here; Norway’s multilateral assessment | UNFCCC; in particular chapter 4.5 in Norway’s fifth biennial report and relevant review reports.

The emission reduction target for Norway under the Effort Sharing Regulation (ESR) is expected to be a 50 per cent reduction in 2030, also compared to 2005 levels. The resulting emissions level would be 14.5 Mt in 2030, see Table 2.5. If the ESR trajectory is not fully realized through domestic emissions reductions as reflected in the inventory and other forms of flexibility (use of EUAs), there will be a need to acquire units from EU/EEA countries. It is envisaged that any net transfer of such units would be mirrored by transfers of ITMOs.

The trajectories for ETS plus ESR would result in a level of 24.5 Mt in 2030, corresponding to a reduction of 52.5 per cent.

Further, Norway will account additional domestic emissions and removals from the LULUCF-sector towards the target. Any net transfer or acquisition of LULUCF units within the EU/EEA cooperation may also be reflected as ITMO transfers and could thus be accounted for towards the target, subject to agreement with the EU on the matter.

2.4.1.3 Structured summary, status of progress

The key information for tracking progress towards achieving the NDC target is the most recent information on GHG emissions and removals in the scope of the NDC. Table 2.6 (CTF table 4 Tracking progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement) summarises the current status of progress.

Table 2.6 (CTF table 4) Structured summary: Tracking progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement

	Unit, as applicable	1990	2021	2022	Target level ^b	Target year or period	Progress made towards the NDC, as determined by comparing the most recent information for each selected indicator, including for the end year or end of period, with the reference point(s), level(s), baseline(s), base year(s) or starting point(s) (paras. 65 and 77(a) of the MPGs):
<i>Indicator(s) selected to track progress of the NDC or, portion of NDC under Article 4 of the Paris Agreement (paras. 65 and 77(a) of the MPGs):</i>							
Emissions without LULUCF	kt CO ₂ equivalent	51 263.14	49 254.43	48 879.49	23 068.41	2030	The most recent level of the indicator reported in the NIR is 4.7 per cent below the base year level. Preliminary estimate for 2023 is 9.1 per cent lower than in the base year. Information on ITMOs pursuant to Article 6 cooperative approaches will be submitted in future BTRs when such approaches have been agreed between Norway and other parties.
Where applicable, total GHG emissions and removals consistent with the coverage of the NDC (para. 77(b) of the MPGs)	kt CO ₂ equivalent		49 254.43	48 879.49			

	Unit, as applicable	Reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate (paras. 67 and 77(a)(i) of the MPGs)	Implementation period of the NDC covering information for previous reporting years, as applicable, and the most recent year, including the end year or end of period (paras. 68 and 77(a)(ii-iii) of the MPGs)	2022	Target level ^b	Target year or period	Progress made towards the NDC, as determined by comparing the most recent information for each selected indicator, including for the end year or end of period, with the reference point(s), level(s), baseline(s), base year(s) or starting point(s) (paras. 69-70 of the MPGs)
<p>Contribution from the LULUCF sector for each year of the target period or target year, if not included in the inventory time series of total net GHG emissions and removals, as applicable (para. 77(c) of the MPGs)</p> <p>Each Party that participates in cooperative approaches that involve the use of ITMOs towards an NDC under Article 4 of the Paris Agreement, or authorizes the use of mitigation outcomes for international mitigation purposes other than achievement of the NDC, shall provide (para. 77(d) of the MPGs):</p>	kt CO ₂ equivalent	1990	2021 NE	2022 NE			
			NA	NA			

Information on ITMOs pursuant to Article 6 cooperative approaches will be submitted in future BTRs when such approaches have been agreed between Norway and other parties, where the largest volume is expected to reflect cooperation with the EU on the ETS. For this BTR1, there is not yet any information to report in this table.

It is a priority for Norway to clarify the method for identifying additional removals and emissions from the LULUCF-sector, both for planning purposes and to reflect the contribution fully in future BTRs. Since the methodology to document additional emissions and removals in the LULUCF sector is not yet developed, the contribution from the LULUCF sector is reported as not estimated (NE) in the years 2021 and 2022.

Based on Norway's GHG inventory data, the emissions without LULUCF in 2022 were 4.7 per cent lower than the base year emissions in 1990. Preliminary estimates of the emissions in 2023 that have not yet been reported to the UNFCCC indicate that the emissions without LULUCF have decreased further and were 9.1 per cent lower than in 1990.

Norway has selected the indicator «emissions without LULUCF» as the indicator representing the point of departure in tracking progress towards the implementation and achievement of Norway's NDC. This includes the emissions of indirect CO₂. Norway's with existing measures (WEM) projections (see chapter 2.7) shows that emissions without LULUCF could decrease to a level of 26.2 per cent lower than in 1990. Table 2.7 shows the projected values for Norway's key indicator and these are identical to the values in the WEM projections without LULUCF.

Table 2.7 (CTF table 10) Projections of key indicator

Key indicator(s) ^c	Unit, as applicable	Most recent year in the Party's national inventory report, or the most recent year for which data are available	Projections of key indicators			
			2022	2025	2030	2035
Emissions without LULUCF	kt CO ₂ equivalent	48 879.49	45 137.64	37 842.04	32 283.55	27 915.49

Notes: The Party could add rows for each additional key indicator.

Further mitigation actions are planned and the with additional measures (WAM) projections (see chapter 2.7.6) show that domestic emissions without LULUCF could decrease 4.8 Mt further to a level of 35.5 per cent lower than in 1990. These 4.8 Mt refer to measures in the sectors covered by the ESR and would bring Norway closer to realizing the ESR budget. The government aims to close any remaining ESR gap with units acquired from EU countries. The government has set aside funding for such acquisitions and is exploring possible supply.

Assuming that the ESR target is met, emissions from the ETS sectors would represent the bulk of the remaining gap between actual emissions and the NDC target. Norway expects most, if not all of this gap to be covered by ITMOs representing a net flow of allowances between EU and Norway within the ETS. Additional removals and emissions from the LULUCF sector will also be accounted for towards the target. In the event that these contributions do not fully realize the target, Norway will account for ITMOs from countries outside the EEA. Funding for such acquisitions is available through the state budget; see [Norwegian Global Emission Reduction Initiative – regjeringen.no](https://www.regjeringen.no). Note that an annual emissions balance consistent with chapter III.B (Application of corresponding adjustment) will be provided in a subsequent BTR, based on the annual information that will be reported under Article 6.2. For expected content in such forthcoming reports, see the previous subchapter.

2.5 Mitigation policies and measures, actions and plans

2.5.1 Introduction

The main instruments of Norwegian climate policy are cross-sectoral. This includes taxes on greenhouse gas emissions and emissions trading. Use of these instruments will contribute to fulfilment of emission targets at lowest cost to society. In addition to instruments that put a price on emissions, the Government uses other policy instruments to reduce barriers and correct market failures related to technology development, and in specific markets. An effective transition requires combinations of measures. Pricing emissions forms the basis as a continuous incentive to reduce emissions. Since most climate measures face multiple barriers, a single measure is rarely sufficient. Support for research and technology development is important to bring about necessary new solutions for emission cuts, and taxes and regulations can be crucial to ensure that such solutions are actually implemented. Notification of regulation, in combination with support during a transition period, can be particularly effective, as support can accelerate the impact of announced requirements and additionally increase acceptance of such requirements.

This chapter describes some of the most important policies and measures (PaMs) for reducing greenhouse gas emissions in Norway. The chapter consists of textual descriptions of cross-sectoral and sectoral PaMs. Information on PaMs is also presented in CTF table 5 in accordance with decisions 18/CMA.1 and 5/CMA.3. PaMs with a * in CTF table 5 are considered to be reflected in the WEM-projection while the PaMs described in chapter 2.5.11 are included in the WAM-projection. Annex 3 of this BTR describes the methodologies and assumptions used to estimate the GHG emission reductions or removals and where relevant information related to

costs, non-GHG mitigation benefits and how the mitigation actions interact with each other.

2.5.2 Cross-sectoral

The Norwegian system of pricing GHG emissions

Important instruments of Norwegian climate policy are taxes on greenhouse gas emissions and emissions trading. Both these instruments put a price on emissions and make it more expensive to release greenhouse gases. Taxes provide an incentive to reduce emissions both through immediate action and through investment in research and development that will make it possible to reduce emissions at a later date. Cross-sectoral economic policy instruments (climate taxes) form the basis for decentralized, cost-efficient and informed actions, where the polluter pays.

CO₂ taxes on mineral oil, petrol and emissions from petroleum extraction on the continental shelf were introduced in 1991 to cost-efficiently limit greenhouse gas emissions. In addition to being subject to CO₂ taxes, emissions from extraction of petroleum were also included in the European emission trading system (EU ETS) in 2008. CO₂ taxes on natural gas and LPG were introduced in 2010.

In Norway, taxes on GHG emissions and quotas (EU ETS) cover approximately 85 per cent of greenhouse gas emissions. The system of taxes on GHG emissions consists of the CO₂-tax on mineral products (petrol, mineral oils, natural gas and LPG), the CO₂-tax on petroleum activities on the continental shelf, the tax on HFC and PFC, the tax on waste incineration and the tax on SF₆. The different taxes are harmonised, and in 2024, the standard tax rate on non-ETS emissions is 1 176 NOK per tonne. The tax rate on non-ETS emissions in the tax on waste incineration is 75 per cent of the standard rate for non-ETS emissions.

The price on greenhouse gas emissions varies between sectors and sources. The price on emissions is highest in the petroleum sector and in domestic aviation, which are also part of EU ETS. Both sectors are subject to taxes in addition to the EU ETS, and the total price on emissions is approximately NOK 1,500 per tonne of CO₂ in 2024. Emissions of methane or nitrous oxide from agriculture is not a part of the EU ETS, nor is it subject to tax on. However, standard rates of CO₂ tax and base tax on mineral oils apply to agriculture.

If natural gas and LPG is used in land-based manufacturing covered by EU ETS, the tax rate will either be reduced, or the activities may be exempted from the tax. For the time being, other sectors and activities exempted from the CO₂ tax on natural gas and LPG include (list not conclusive) fishing in distant waters, chemical reduction or electrolyses, metallurgical and mineralogical processes and international shipping and aviation. In the 2025 budget, it is proposed to introduce a reduced and separate tax rates for emissions from fishing in distant waters and international shipping. The Norwegian parliament has adopted a tax on chemical reduction etc., but the tax will only be put into effect in the case where an exemption for emissions covered by the ETS is accepted by The EFTA Surveillance Authority (ESA).

Overall price levels have increased due to increases in the tax rates and the increase in the price of allowances in the EU ETS. In the period 2020 to 2023, the reduced

rate for fisheries in domestic waters has been abolished, a new tax on emissions from waste incinerations is introduced, the CO₂ tax on mineral products has been expanded to include emissions from the greenhouse industry and there is introduced a tax on SF₆. It is further proposed base extensions for 2025.

Some taxes that do not target greenhouse gas emissions directly nevertheless increase the total tax on fossil fuels and therefore affect emissions. The road usage tax on fuels is levied to internalise the costs inflicted on the society in terms of accidents, congestion, noise, road wear and tear as well as health and environmentally harmful emissions other than CO₂. In recent years, the road usage tax has been reduced to compensate drivers for the increased CO₂ tax.

PaM cross-sectoral No. 1

The CO₂-tax on mineral products (excluding road transport and air transport under the ETS)

The standard tax rate on emissions under the ESR is NOK 1 176 in 2024. The tax covers close to 100 per cent of all use of fossil fuels covered by the ESR.²⁰

The CO₂-tax on emissions from road transport and emissions from aviation covered by the ETS are treated as separate policies and reported under transport below.

PaM cross-sectoral No. 2

EU Emissions Trading System (ETS)

Norway established a national emissions trading scheme in 2005. Most features of the scheme closely resembled the EU's emissions trading scheme (EU ETS) and covered 11 per cent of total Norwegian greenhouse gas emissions, mainly from industry. Emissions already subject to CO₂ tax were not included in the scheme.

From 2008 Norway became part of EU ETS phase II, which broadened the scheme to cover nearly 40 per cent of Norwegian greenhouse gas emissions. The petroleum sector and emissions from industries that had previously been subject to CO₂-taxes were included in the EU ETS at that stage. In addition to the sectors included in the EU ETS, Norway decided unilaterally in February 2009 (effective from 1 July 2008) to include nitrous oxide emissions from the production of nitric acid in Norway. Such emissions constituted about 4 per cent of Norwegian greenhouse gas emissions in 2005. Further installations and gases were included in ETS III as of 2013.

From 2021, phase IV (2021–2030), there is no change in the coverage of sectors and gases compared to phase III for stationary installations. Emissions covered by the EU ETS in this phase amounts to about 50 per cent of the Norwegian emissions. In July 2021, as part of the Fit for 55 legislative package, the European Commission proposed a comprehensive set of changes to Phase IV of the EU ETS, for instance an increased level of ambition and extending the scope of the scheme to cover maritime transport. In addition, the Commission proposed to create a new, separate emissions trading system named ETS2 for CO₂ emissions from fuel combustion in buildings, road transport and additional sectors (mainly small industry not covered by the existing EU ETS). The updated ETS directive applies to Norway, starting January 2024.

²⁰ ESR (Effort Sharing Regulation) is described in chapter 2.3.

Cap

Norway participates in the EU ETS. The aggregated future emissions covered by the scheme cannot exceed the EU-wide cap, which was set 21 per cent lower in 2020 compared with the emissions in 2005 from the covered sectors. Norwegian installations represent about 1 per cent of the total emissions. Norway's participation in the ETS from 2008 led to a tightening of the system, as Norwegian installations have had a higher demand for allowances than the number of allowances added pursuant to this expansion of the system. The reduction rate for the cap was further increased from 2021 so that overall reduction of the cap in 2030 will be 62 per cent compared to 2005.

Legal basis

The legal basis for emissions trading in Norway is the Greenhouse Gas Emissions Trading Act which entered into force on 1 January 2005. The Act has been amended several times since 2005 to reflect the developments in the EU ETS Directive. The Greenhouse Gas Emissions Trading Act provides the legal framework, while the detailed provisions are in the Norwegian Greenhouse Gas Emissions Trading Regulation.

Allocation and emissions

In the first (2005–2007) and second (2008–2012) phases of the EU ETS, allowances were allocated based on rules developed nationally (see NC6). The average amount of Norwegian emissions covered by EU ETS was 6 and 19.1 Mt/year in the respective phases. Up to and including 2020, the EU ETS allowed for the use of Kyoto units from the Clean Development Mechanism (CERs) and Joint Implementation (ERUs) for compliance purposes. A total volume of about 15 million CERs and ERUs have been surrendered from the installations for their compliance. Both during the first and the second commitment period under the Kyoto Protocol, there was a significant net transfer of Assigned Amount Units (AAUs) between EU and Norway corresponding to net purchases by Norwegian installations in the European market. The transferred AAUs have been used for compliance. Together with the volumes of Kyoto units surrendered by installations in the ETS, this volume of AAUs closed almost all the gap between actual emissions and the commitments. It will be necessary to apply a similar clearing mechanism between EU and Norway under the Paris Agreement.

Installations in sectors that are considered to be at risk of carbon leakage receive some or all of their allowances free of charge. Since 2013, the allocation methodology has been harmonized across Europe. The general rule for allocation free of charge is based on performance benchmarks rather than historical emissions levels.

Another measure aiming at preventing carbon leakage is that specific industries affected by higher electricity prices caused by the allowance price, since 2013 can be granted economic compensation (see chapter 2.5.7).

Compliance and reporting requirements

Operators have in general been in compliance with the requirements of the ETS. Those included within the scope of the emissions trading scheme must report their verified emissions yearly to the Norwegian Environment Agency by 31 March the following year. If an operator does not submit an emission report in accordance with the provisions on reporting by the deadline, the Norwegian Environment Agency suspends the operator's right to transfer allowances to other account holders. Emissions reports from Norwegian installations must be verified by an accredited third party (verifier).

The Norwegian Environment Agency may impose coercive fines and even penal measures in the event of serious contravention of the provisions in the Greenhouse Gas Emissions Trading Act. A fine for failure to comply is imposed if an insufficient number of allowances is surrendered by 30 September. In addition, the operator must surrender an amount of allowances equivalent to the deficit the following year.

The operators of installations to which free allocation has been given, must report their verified allocation data yearly to the Norwegian Environment Agency by 31 March. Where the report shows that there has been changes in the activity of the installation, the Norwegian Environment Agency adjusts the allocation accordingly.

PaM cross-sectoral No. 3 EU Emissions Trading System 2 (ETS2)

As part of the 2023 revisions of the ETS Directive, a new emissions trading system named ETS2 was created, separate from the existing EU ETS. This new system will cover and address the CO₂ emissions from fuel combustion in buildings (including construction), road transport and additional sectors (mainly small industry not covered by the existing EU ETS).

The ETS2 is meant to help states achieve their emission reduction targets under the Effort Sharing Regulation (ESR) and the GHG emission price set by the ETS2 will provide a market incentive for investments in building renovations and low-emissions mobility.

The ETS2 will become fully operational in 2027. Although it will be a 'cap and trade' system like the existing EU ETS, the ETS2 will cover emissions upstream. It will be fuel suppliers, rather than end consumers such as households or car users, that are regulated under the ETS2, which means they are required to monitor and report their emissions. Eventually they will be required to surrender sufficient allowances to cover their emissions. Regulated entities will purchase these allowances at auctions. The ETS2 cap will be set to bring emissions down by 42 per cent by 2030 compared to 2005 levels in the EU. In case of exceptionally high gas or oil prices in 2026, the start of the ETS2 system could be postponed to 2028 to ensure a smooth implementation.

Compliance and reporting requirements

Regulated entities covered by the ETS2 are required to hold a greenhouse gas emissions permit by 1 January 2025, as well as an approved monitoring plan for the

monitoring and reporting of their annual emissions. Monitoring plans form part of greenhouse gas emissions permits.

Every year, regulated entities must submit an emissions report by 30 April for the emissions of the previous year. From 2026, the data for a given year will have to be verified by an accredited verifier.

From 2028, once annual verified emissions are reported, regulated entities will have to surrender the equivalent number of allowances by 31 May of that year to cover emissions that took place the previous year.

Legal basis

Parts of the ETS2 have been transposed into Norwegian law, while other parts are in the process of being transposed. Requirements regarding the need to hold a greenhouse gas emissions permit by 1 January 2025 and most monitoring and reporting requirements are reflected in the Norwegian Greenhouse Gas Emissions Trading Regulation, with the Pollution Control Act providing the legal framework.

An amendment to the Norwegian Greenhouse Gas Emissions Trading Act (and a subsequent amendment of the Norwegian Greenhouse Gas Emissions Trading Regulation) is needed to implement the remaining parts of the ETS2, notably the requirement to surrender sufficient allowances, into Norwegian law.

The ETS2 and national CO₂ tax

Under the ETS directive, as amended for the EEA EFTA states, regulated entities in the ETS2 may be exempted from the obligation to surrender allowances if they are subject to a national CO₂ tax in force for the years 2027 to 2030. Norway has notified ESA of the Norwegian national CO₂ tax, which if approved, would be the first of many steps to apply such a derogation to regulated entities in Norway. In the case that such a derogation is not applied, it is not yet determined if and/or how the national CO₂ tax could be affected.

Other cross-sectoral policies and measures

PaM cross-sectoral No. 4

Regulation by the Pollution Control Act

The Pollution Control Act (Nw. *forurensningsloven*) lays down a general prohibition against pollution. Pollution is prohibited unless specific permission is granted by law or by a decision made by the relevant authority. The Pollution Control Act also applies to greenhouse gas emissions. Greenhouse gas emissions are, however, to a large extent covered by other specific policy instruments such as the CO₂ tax, the EU ETS and specific agreements with the industry on emission reductions.

The Act includes provisions aimed at ensuring the effective enforcement of its regulations and decisions. For example, breaching these provisions may result in closure, coercive fine or criminal liability.

In the waste sector, regulations under the Pollution Control Act ensure minimum environmental standards for landfills and incineration plants, and regulate the

handling of specific waste fractions. The EU directives on waste are implemented through the Pollution Control Act and various sections of the Waste Regulation (Nw. *avfallsforskriften*). 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.

Since 2002, landfilling of wet-organic waste has been prohibited. In 2009, this prohibition was expanded to include all biodegradable waste.

The Waste Regulation stipulates that incineration plants should be designed and operated to utilise the thermal energy generated as far as practically feasible. This is typically enforced through plant concessions by including a condition that at least 50 per cent of the energy generated from the incineration should be utilised.

PaM cross-sectoral No. 5 The Planning and Building Act

The Planning and Building Act sets the framework for the planning and use of land areas and building requirements. The vast majority of decisions to change land use are made by municipalities through the Planning and building act. Planning pursuant to the Act shall ensure sustainable development for the whole country and requires the participation of all those that are concerned by the decisions made in accordance with the Act.

The Act is a process law, regulating how decisions concerning land use and building must be made, as well as outlining some core topics that must be taken into consideration in decisions made in accordance with the Act. The legislative purpose of the Act is to ensure sustainable development in the interest of individuals, society and future generations. Among the core planning functions and considerations required in all planning in accordance with the Act, are climate change mitigation and adaptation.

The national government is currently assessing possible changes in the Act with regards to climate. The government is also in the process of revising central government planning guidelines (Statlige planretningslinjer) to clarify and strengthen the requirements for how to take climate into account in plans made in accordance with the Act.

PaM cross-sectoral No. 6 Enova

Enova is a state-owned enterprise, owned by the Ministry of Climate and Environment. Enova is managed by the ministry based on four-year agreements. The current agreement is valid until the end of 2024, and a new agreement will come into effect in 2025.

In recent years, Enova has become one of the most important policy tools for new solutions within the climate and energy transition. The current agreement states that Enova's purpose is to contribute to Norway's emissions reductions commitment and contribute to Norway's transition to a low-emission society. In the new agreement period, Enova will also contribute to an efficient energy transition that

supports the goals and initiatives of climate and energy policies, as well as innovation in climate and energy solutions. Enova currently contributes towards reducing non-ETS emissions towards 2030, and developing technology and innovation that contribute to reducing emissions to bring us to a low-emission society in 2050.

Enova provides funding and advice for climate and energy projects, and supports various sectors. Funding for projects is drawn from the Climate and Energy Fund, which was provided NOK 8.6 billion in 2024. The four-year agreements between Enova and the Ministry through the Climate and Energy Fund provides Enova with a significant degree of freedom and flexibility to respond quickly to new opportunities and to support those projects that offer the greatest opportunities to influence developments. Given uncertainties about the speed of technology developments in various sectors, freedom and flexibility within the framework of the four-year agreement is important.

Enova's activities focus on late-phase technology development and early-stage market introduction. Grants for late-phase technology development help to speed up the pace and scale of pilot and demonstration projects and full-scale testing, so that new technologies and solutions reach the market more quickly. Enova's programs deal with technologies and solutions at various stages of maturity. During the innovation process from technology development to market introduction, the goal is to reduce costs and the level of technological risk. Once a solution is technologically mature and ready for market roll-out, the goal is to achieve widespread deployment and market take-up. It is always necessary to overcome various market barriers as a solution proceeds through technology development and market introduction. Enova seeks to identify the most important of these and designs its programmes for the introduction and deployment of energy and climate solutions to lower such barriers.

New climate and energy technology developed in Norway can also play a part in reducing greenhouse gas emissions at the global level when deployed widely enough. Investment in new technology and innovation often carries a high level of investment risk. Using public funding to reduce risk is an important strategy, since new technologies often provide greater benefits for society than for individual investors.

It generally takes time for new technologies or solutions to become established and diffuse through the market. The reasons for the delay may vary. Possible barriers to the spread of new technologies and products include a lack of information, scepticism to new and relatively untried solutions, and costs. Enova's programmes for market change are designed to reduce these and other barriers and thus promote permanent market change.

PaM cross-sectoral No. 7 Klimasats

In 2016, the Solberg Government introduced a financial support scheme to promote emissions reduction projects in Norwegian municipalities and counties. The scheme is called Klimasats («Climate leap») and is administered by the Norwegian Environment Agency that assesses and prioritises the applications based on given criteria.

The objective of Klimasats is to reduce emissions at the local level and contribute to the transition to a low emission society.

A recent analysis²¹ (2024) by the Norwegian Environment Agency shows that municipalities play a key role in the transition to a low-emission society, and reducing national emission. Klimasats is a suitable scheme to support municipalities in this work and has supported projects with immediate emission reductions from transport, waste handling, buildings and public procurement. Examples of supported projects are the use of climate friendly building materials in public buildings, reduction of food waste in local institutions and zero emission construction sites. It also supports a wide range of projects aiding a more long-term transition to a low emission future through urban planning, capacity building and cross-sectoral cooperation.

From 2016 to 2024, the Klimasats funding scheme has partially funded more than 2200 municipal emissions reductions and green transformation projects throughout the country, with a total of 1.8 billion NOK. All projects can be found at the Norwegian Environment Agency's website.²²

PaM cross-sectoral No. 8

The environmental technology scheme – Innovation Norway

The Environmental Technology Scheme was established in 2010. The overall target of the scheme is to encourage the Norwegian industry to introduce new and better products and processes related to environmental technology to the market. The scheme aims at promoting profitable business opportunities and helping to realize Norway's environmental goals.

In this context, the definition of environmental technology is all technology that directly or indirectly improves the environment, including technology and services that limits pollution through purification processes, more environmentally friendly products and production processes, more efficient handling of resources and technological systems that reduce the impact on the environment.

The Environmental Technology Scheme offers grants and other support for development and investments in pilot and demonstration projects for new Norwegian environmental technology.

It is a nationwide scheme to which all Norwegian companies can apply. The companies apply for grants related to the costs for planning and development of the project, investment costs during the development and pilot phase, and costs relating to start-up and testing after the initial work to establish the pilot. The criteria for receiving grants are related both to the projects' economic and commercial effects, environmental effect and level of innovation.

²¹ [Norwegian Environment Agency: Klimatiltak i Norge](#) (in Norwegian only)

²² [Norwegian Environment Agency: Klimasats-prosjekter](#) (in Norwegian only)

In 2023, NOK 425.9 million was granted from the environmental technology scheme to 75 projects. Total investments in these projects (including the companies' own funds) are NOK 2.2 billion. The projects are based across a range of different technologies, including energy systems, metallurgic industry, bio-refinery, renewable energy, water treatment, maritime sector and aquaculture.

PaM cross-sectoral No. 9

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 December 2017 in order to contribute to reducing greenhouse gas emissions through investments with such an effect directly or indirectly. Nysnø invests in non-listed companies, and in funds aimed at non-listed companies that have operations in Norway. Nysnø focuses on early-stage companies and invests primarily in the transition from technology development to commercialisation. Nysnø has so far received NOK 5,382 million in capital. Capital and competence are drivers for developing and applying new technology for a low-emission society. Together with private investors, Nysnø provides both.

PaM cross-sectoral No. 10

Climate and environmental requirements for public procurements

From 2024, a regulatory requirement regarding public procurement came into effect. This mandates that climate and environmental considerations must generally be weighted with a minimum of 30 per cent in public procurements. Alternatively, climate and environmental requirements can be included in the specifications if it is clear that this will provide a better climate and environmental effect. The aim of the climate and environmental requirements is to reduce the GHG emissions or environmental impact of public procurements. A survey conducted by DFØ from 2024 shows a clear trend toward increased use of climate and environmental considerations in public procurement.²³

2.5.3 Petroleum sector

Environmental and climate considerations are an integral part of Norway's policy for the petroleum industry. A range of policy measures ensures that actors in the industry take environmental and/or climate considerations into account during all phases of their activities, from exploration to development, operations, and field cessation.

Environmental and climate standards in the Norwegian petroleum industry are very high compared with those in other petroleum producing countries. This is a result of effective policy instruments and joint initiatives between the authorities and oil companies on research, technology development and increased knowledge.

²³ DFØ: Statistikk om klima- og miljøhensyn i offentlige anskaffelser | [Anskaffelser.no](https://anskaffelser.no) (in Norwegian only)

Emissions to air from petroleum activities originate from the combustion of natural gas and diesel in turbines, engines, and boilers, flaring of natural gas for safety reasons, venting of diffuse emissions of gas, and storage and loading of crude oil. These activities result in emissions of waste gas containing CO₂, NO_x (nitrogen oxides), NMVOCs (non-methane volatile organic compounds), CH₄ (methane) and sulphur dioxide (SO₂).

Emissions from Norwegian petroleum activities are regulated through several acts, including the Petroleum Act, the CO₂ Tax Act on petroleum activities, the Sales Tax Act, the Greenhouse Gas Emission Trading Act and the Pollution Control Act.

Requirements for impact assessments and approval of plans for new developments (PDOs/PIOs) are cornerstones of the petroleum legislation. Facilities onshore and within the territorial waters are also subject to the provisions of the Planning and Building Act.

Emissions from the petroleum sector in Norway are well documented. The industry's own organisation, the Norwegian Oil and Gas Association (NOROG), has established a national database for reporting all releases from the industry, called EPIM Environmental Hub (EEH). All operators on the Norwegian continental shelf report data on emissions to air and discharges to the sea directly in EEH.

PaM petroleum No. 1

Climate policies that affect the petroleum sector

The CO₂ tax on petroleum activities on the continental shelf

The CO₂ tax is levied on all combustion of natural gas, oil and diesel in petroleum operations on the continental shelf and on releases of CO₂ and natural gas, in accordance with the CO₂ Tax Act on Petroleum Activities. For 2024, the tax rate is NOK 1.85 per standard cubic metre of gas or 2.10 NOK per litre of mineral oil. For combustion of natural gas, this is equivalent to NOK 790 per tonne of CO₂. Emissions of natural gas to the atmosphere is not subject to the ETS. The tax rate is NOK 16.89 per standard cubic metre, equivalent to the standard rate for non-ETS emissions of NOK 1 176 per tonne of CO₂.

Emission Trading

Norwegian installations in the petroleum industry are included in the EU ETS, and subject to the same rules for emissions trading as those within the EU.

Emission allowances are allocated by auctioning or given free of charge. Sectors that are considered to be at risk of carbon leakage receive more of their allowances free of charge, following harmonised allocation rules. A certain proportion of the petroleum-sector emissions to which the ETS applies, is considered to be at risk of carbon leakage. Allowances for emissions from electricity generation on offshore installations are not allocated free of charge.

The combination of the CO₂ tax and the emissions trading system means that emissions covered by the ETS on the Norwegian shelf, in 2024, face a price of approximately NOK 1 500 per tonne for their CO₂ emissions, which is high compared to emission prices in other petroleum producing countries.

Other regulations

Routine flaring and venting of natural gas have been prohibited since 1971. Flaring of natural gas is only permitted when necessary for safety reasons. Permit for flaring are issued by the Ministry of Energy.

A permit under the Pollution Control Act is required for emissions to air from petroleum operations.

There is also requirements to use best available technologies (BAT). Technological developments influence what is regarded as BAT, which over time results in stricter requirements for use of technologies reducing emissions.

PaM petroleum No. 2

Indirect CO₂ emissions from offshore and onshore NMVOC regulation

Emissions of non-methane volatile organic compounds (NMVOC) lead to indirect CO₂ emissions as NMVOC oxidises to CO₂ in the atmosphere. Measures taken to reduce the NMVOC emissions therefore also reduce CO₂ emissions.

In 2023, the petroleum sector accounted for 17 per cent of the total NMVOC emissions, with 23 kilotonnes emitted. The NMVOC emissions in the petroleum sector in Norway peaked in 2001. Since then, there has been a decline of 91 per cent until 2023. From 1990, NMVOC emissions in the petroleum sector have been reduced by 82 per cent in total.

The NMVOC emissions in the petroleum sector are mainly from loading of crude oil offshore, with offshore storage as another important source. The petroleum sector's share of total NMVOC emissions has decreased as a result of regulations and because oil production has been reduced by approximately 45 per cent from 2001 to 2020. Starting from 2001, emissions of NMVOC linked to offshore loading and storage of crude oil have been governed under the emission permit system, pursuant to the Pollution Control Act. Since 1 January 2003, all vessels have been required to install equipment for recovering NMVOCs (vapour recovery units, VRUs). A large proportion of the shuttle tankers operating on the NCS have integrated VRUs that are designed for a 100 per cent recovery rate, of which an estimated 80 per cent is recovered as VOCs in liquid form (LVOC) and where almost 100 per cent recovery rate is achieved by incineration of residual NMVOC and methane in a steam boiler or gas turbine for energy production in the plant.

Several fields on the Norwegian Continental Shelf employ floating storage installations. This type of installation may produce higher emissions of NMVOCs than fields where the oil is stored in the base of the platforms (Statfjord, Draugen and Gullfaks). This is because, in the case of floating storage installations, the need to gas-free the tanks for inspections.

Regulations onshore are based on the Industrial Emission Directive (2010/75/EU) and corresponding BAT conclusion 2014/738/EU. Loading of crude oil and other hydrocarbons has been governed under the emission permit system, pursuant to the Pollution Control Act. A vapour recovery unit (VRU) for NMVOCs was in operation at the crude oil terminal at Sture in 1996. The VRU at Mongstad crude oil terminal came into operation in June 2008. On the Nyhamna gas processing plant,

gas displaced from loading condensate cargo tanks of the ship is returned to a VRU, which has been in operation since start-up of the gas processing plant in 2007. At the Kårstø gas processing plant, gas return from condensate loading is burned in an incinerator.

2.5.4 Carbon capture and storage (CCS)

The Norwegian government will continue its work on promoting CO₂ management as a global climate mitigation tool. The Norwegian Government's CCS policy spans activities from research, development and demonstration to large-scale projects and international work promoting CCS.

CCS comprises capture, transport and permanent geological storage of CO₂ emissions from fuel combustion, industrial production and waste incineration. According to the findings of the Intergovernmental Panel on Climate Change (IPCC), CCS is a key measure for reducing global greenhouse gas emissions. Technology development in an international perspective and ways of reducing costs are key to the deployment of CCS at a global scale.

Norway has decades worth of experience with environmentally safe CCS. Since 1996, CO₂ from natural gas production on the Norwegian Continental shelf has been captured and reinjected into sub-seabed formations in the Sleipner and Snøhvit petroleum fields. Nearly one million tonnes of CO₂ per year have been separated during processing of natural gas from the Sleipner Vest field and stored in the Utsira formation. Since 2014, CO₂ from natural gas production at the Gudrun field has also been separated out at the Sleipner Vest platform and stored there.

Since 2008, the Snøhvit LNG facility on Melkøya has separated CO₂ from the well stream before the natural gas is chilled to produce liquefied natural gas (LNG). The CO₂ is transported back to the Snøhvit field by pipeline and injected into a subsea formation. During normal operations, up to 700 000 tonnes of CO₂ is stored annually.

PaM CCS No. 1

Carbon capture and storage (CCS)

CO₂ Technology Centre Mongstad (TCM)

- The Technology Centre Mongstad (TCM) is the world's largest facility for testing and improving CO₂ capture technologies. TCM has been operating since 2012, providing an arena for targeted development, testing and qualification of CO₂ capture technologies on an industrial scale. It is a collaborative project between the Norwegian Government, Equinor, Shell and Total. From 2012 to 2017 the South African Company Sasol was a partner. It was designed for long-term operation, with two plants testing two different CO₂ capture technologies: Amine technology, in which CO₂ is captured by scrubbing flue gas with a water-based solution of amines.
- Ammonia technology, which uses chilled ammonia as the solvent for absorbing CO₂ from the flue gas.

The TCM facility was designed to be versatile enough to test CO₂ capture using flue gas either from the combined heat and power (CHP) plant or from the refinery at Mongstad. So far, the companies Aker, Alstom, Shell Cansolv, Carbon Clean Solutions, IoN Engineering and Fluor have used the test facility.

Research and technology development

In Norway, government funding for CCS research is provided through the CLIMIT programme and a Centre for Environmental-friendly Energy Research. The CLIMIT programme is a national programme for research, development and demonstration of technologies for capture, transport and storage of CO₂ from fossil-based power production and industry. The programme supports projects in all stages of the development chain, from long-term basic research to build expertise to demonstration projects for CCS technologies. Projects under the CLIMIT programme have yielded important results for the development of CCS in Norway and internationally.

In addition, a Centre for Environment-friendly Energy Research for CCS, NCCS, has been established. The centre is co-financed by the Research Council of Norway (governmental agency), industry and research partners.

Large-scale CCS

A full-scale CCS demonstration project, Longship, for capture, transport and storage of CO₂ is under construction in Norway. The Longship project is a central part of the Norwegian government's policy for CO₂ management, and part of Norway's contributions to technology development and transfer (see chapter 4.4). Longship will be fully operational in 2025. The project consists of two Norwegian CO₂ capture facilities, Hafslund Celsio (waste incineration) and Heidelberg Materials (cement), and a CO₂ transport and storage solution, provided by Northern Lights Joint Venture (Equinor, Shell and Total). The Northern Lights project was ready to receive CO₂ in 2024. In its first phase, the capacity is 1.5 million tonnes of CO₂ stored annually for 25 years. In its second phase, the capacity is 5 million tonnes of CO₂ stored annually. The CO₂ will be stored on the Norwegian continental shelf. Northern Lights is working with industry with emissions around the North Sea, and has already signed commercial agreements with Ørsted in Denmark and Yara in the Netherlands for transport and storage of CO₂.

The Longship project is a result of close cooperation between the Government and the industrial partners over many years. Gassnova, the state enterprise for CCS in Norway, is responsible for coordination of the entire CCS chain. The Government has funded the two above mentioned initial capture projects in Norway, as well as the storage facility.

In addition, the Government has awarded ten new exploration licenses for CO₂ storage; nine in the North Sea and one in the Barents Sea.

In 2024, two studies on measures for carbon capture and carbon dioxide removal have been conducted. The government is considering temporary measures to reduce barriers and market failures in the value chain for CO₂ management.

International support and activities

In order for CCS to play an effective role in climate change mitigation, international cooperation on developing and commercialising new technology is essential. Norway collaborates with relevant countries on both a bilateral and multilateral basis, and various regional and international fora. Examples of such fora are the North Sea Basin Task Force, The Clean Energy Ministerial, The Mission Innovation and The Carbon Management Challenge. Norway furthermore provides funding for CCS projects abroad in cooperation with other countries and through existing programmes and institutions (see chapter 4.4).

2.5.5 Energy and transformation industries

CO₂ taxes and emission pricing through participation in the EU emissions trading system (ETS) raise the price of energy use that results in greenhouse gas emissions and encourage low-emission energy production.

The EU ETS also influences Norwegian electricity prices because Norway trades electricity with the rest of Europe. One of the effects of the EU ETS is to raise the cost of fossil electricity production in Europe, thus pushing up electricity prices. This has an effect on electricity prices in Norway as well, even though production is based on hydropower.

PaM energy No. 1 Electricity tax

A tax on consumption of electricity was introduced in 1951. At present, an excise duty is levied on electricity supplied in Norway regardless of whether the power is generated domestically or imported. Households, agriculture, service industries and the public sector are subjected to the ordinary rate. Electricity used in chemical reduction and in electrolytic, metallurgical and mineralogical processes, greenhouses and rail transport, as well as households and public services in the action zone in the county of Troms and Finnmark, is exempted from the electricity tax. Electricity used in other manufacturing industries, mining and quarrying, commercial shipping and district heating is subject to a reduced rate.

PaM energy No. 2 Electricity Certificate Act

1st January 2012 Norway and Sweden established a common market for electricity certificates. The goal of the two countries was to develop new electricity production based on renewable energy sources amounting to 28.4 TWh by the end of 2020. Sweden will finance 15.2 TWh and Norway 13.2 TWh. In May 2019 Norway and Sweden achieved the goal of 28.4 TWh. Sweden has established goal of an additional 18 TWh in 2030, which will be financed by Sweden. The new goal of 46.4 TWh was achieved in March 2021. The end date for the certificate scheme is 31st December 2035. In both Norway and Sweden renewable energy plants with an operating date after 31st December 2021 is not eligible for electricity certificates. The electricity certificate market is a constructed market in the sense that the demand for certificates arises from a statutory obligation for specified electricity users to purchase them. Sales of electricity certificates give power producers a supplementary income

in addition to that derived from sales of electricity. For more information about the electricity certificate scheme, see the Norwegian Water Resources and Energy Directorate's annual report for 2023 (in Norwegian only).

PaM energy No. 3

Energy requirements in the building code

The national building code (Byggteknisk forskrift – TEK17) is the main legal instrument for improving energy efficiency in new buildings and buildings subject to major rebuilds. The building code regulates total net energy need for space heating, cooling and hot water lower (kWh per m² of heated floor area per year) for 13 different building categories. The building code further specify that installation of fossil fuel heating installations are not permitted, and that larger buildings (more than 1000 m² heated usable floor space) must have flexible heating solutions.

PaM energy No. 4

Ban on the use of mineral oil for heating

In June 2018, the government adopted a regulation banning the use of mineral oil (fossil oil) for heating of buildings from 2020. The ban covers the use of mineral oil for heating in residential buildings, public buildings and commercial buildings. From 2022, the ban was extended to also cover temporary use of mineral oil for heating and drying on construction sites. The use of mineral oil for heating of agricultural buildings and hospital buildings with 24-hour continuous patient care are exempt from the ban until January 1, 2025. The purpose of the ban is to reduce greenhouse gas emissions from heating of buildings.

PaM energy No. 5

Bionova

Bionova was established in 2022 to contribute to climate measures in agriculture and ensure the transition to a more circular bioeconomy based on biological resources from land and sea. Bionova works to increase resource efficiency and circularity in the bio-based industries' value chains by strengthening and coordinating efforts towards energy transition, GHG emission reductions and increased soil carbon sequestration and storage in biobased enterprises, including agriculture, forestry and aquaculture. Bionova includes the «Value added scheme for renewable energy and technology development», a continuation of the «Renewable Scheme», which aims to encourage farmers, forest owners and biobased enterprises to adopt low-emission technologies and to produce, use and supply bioenergy.

2.5.6 Transport

The transport sector accounts for about 1/3 of Norwegian greenhouse gas emissions, and around 2/3 of the ESR emissions. There are several measures in place that affect greenhouse gas emissions from the transport sector. The tax policy is central, and the CO₂ tax, which is a cross-sectoral measure, is of great importance in the transport sector. In addition, the vehicle tax policy contributes to shifting vehicle demand towards low and zero emission vehicles. Norway also has a quota obliga-

tion for biofuels for road traffic. In addition, there are several other measures, such as Enova's grant schemes and requirements in public procurement processes.

Box 2.3 The Planning and Building Act and transport

The Planning and Building Act (PaM cross-sectoral No. 5) constitutes the legal framework for decisions on spatial planning and development patterns. The act establishes the legal basis for decisions that facilitate mobility development, including provision for private cars, buses, walking, and cycling. Central government planning guidelines for land use and transport emphasises that development patterns and transport system must be coordinated to achieve efficient solutions, so that the need for transport can be limited and climate- and environmentally-friendly modes of transport can be facilitated. The guidelines are currently under revision.

Norway has been particularly successful in the aforementioned shift from fossil fuel to zero emission vehicles (ZEVs). Over the past decades, Norway has implemented several measures to increase the ZEV share of car sales and in the total vehicle park. Norway introduced exemption for ZEVs from VAT-payment at purchase, and a registration tax structured progressively based on emissions (with lower taxes for lower emissions and a negative tax for the lowest levels). Both of these measures strongly incentivize the purchase of low-emission cars. In addition to purchasing incentives, Norway has over time implemented several measures in the usage of cars as well. Exemption from payments in tolling stations and on ferries, free parking and access to bus lanes have been some of the most important measures. Norway have also used our state agency Enova to help the transition by offering support schemes for purchasing ZEVs and home chargers. There have been several support schemes both for individuals and businesses.

The measures have been successful. ZEVs make up more than 90 per cent of new passenger car sales in the last couple of months. In 2023 they amounted to more than 80 per cent of new sales. In terms of the total fleet, ZEVs now amount to about ¼ of the passenger car fleet. Our estimates tell us that with adopted policies, the ZEV share of new sales will make up 100 per cent of new passenger car sales in 2027. This means that as new cars replace old ones, the entire fleet will eventually be ZEV.

Box 2.4 The National Transport Plan

The National Transport Plan is submitted to the Storting (the Norwegian Parliament) as a white paper every four years. The white paper sets forth the Government's national transport policy in terms of transport goals, strategies and priorities in a long-term perspective.

The National Transport Plan 2025–2036 (Report to the Storting (white paper) No. 14 (2023–2024)) was submitted to the Storting in March 2024. This is the seventh plan under the current planning system, covering all modes of transport. The plan presents policies and priorities within an economic frame for a twelve-year period and provides perspectives towards 2050 and 2060.

PaM transport No. 1

The CO₂-tax on mineral products (road transport only)

Norway has several overlapping and impactful policies affecting emissions from road transport. The CO₂-tax on mineral products, tax advantages and incentives towards the purchase of low and zero emission cars, a road usage tax levied on fuels and a biofuel sales mandate all affect emissions. Due to the overlap of these measures, the effect of one measure will depend on whether the other measures are present or not. Therefore, the total effect on emissions for all measures with a substantial effect on emissions from road transportation have been reported.

PaM transport No. 2

Road usage tax

The road usage tax on fuel was introduced in 1931. The intention of the tax, besides creating revenue, is to price the external costs of road transport, except emissions of CO₂. CO₂ emissions from road transport are priced by the CO₂ tax on mineral products. The major external costs are congestion, noise, accidents, wear and tear and local emissions. The road usage tax applies to petrol, mineral oil, biodiesel, bioethanol, natural gas and LPG.

PaM transport No. 3

One-off registration tax based on CO₂ emissions

The one-off motor vehicle registration tax was introduced in 1955. The initial intention of the tax was to slow down the import of foreign capital-intensive goods. Now the tax is regarded as a fiscal tax, but it has been used extensively to give economic incentives to choose low and zero emissions vehicles.

CO₂ emissions was introduced in the tax base in 2007. The main reason for including CO₂ emissions in the calculation of the registration tax was to reduce CO₂ emissions from new cars. Since 2007 the registration tax has been shifted to place greater weight on CO₂ emissions. The registration tax on cars now depends on the weight, CO₂, and NO_x emissions of the car. Changes in the motor vehicle registration tax towards a system that rewards vehicles with low CO₂ emissions and penalizes vehicles with high emissions have contributed to reduced emissions from new cars.

From 1990, ZEVs were exempted from the one-off registration tax. An additional weight-component in the one-off registration tax was introduced in 2023, that also applies to electric vehicles.

Since 2011, the share of electric vehicles has increased rapidly, due to the tax advantages for electric vehicles. In 2023, 82 per cent of all new cars were electric.

PaM transport No. 4

Tax advantages for zero emission vehicles

Norway provides very strong tax incentives for zero emission vehicles (ZEVs), through the value added tax, the one-off registration tax and the road usage tax on fuels.

The value added tax is a general tax on the domestic consumption of goods and services which is intended to raise revenues for the central government. The standard rate of value added tax in Norway is 25 per cent and to most goods and services, including vehicles. Since 2001, ZEVs has been zero-rated in the value added tax. This gives a very strong incentive to choose ZEVs, but also a considerable revenue loss, as the share of ZEVs increases. Value added tax on the purchase of ZEVs over NOK 500,000 was introduced in 2023.

From 1990, ZEVs were exempted from the one-off registration tax (PaM transport No. 3). As the one-off-registration tax for an ICE, on average, is more than NOK 300 000, the exemption gives a very strong incentive to choose ZEVs, but also gives a considerable revenue loss, as the share of ZEVs increases. An additional weight-component in the one-off registration tax was introduced in 2023, that also applies to electric vehicles.

Electricity is not encompassed by the road usage tax (PaM transport No. 2). This gives an economic incentive for electric cars.

Tax expenditures are provisions of tax law, regulation, or practice that reduce or postpone revenue for a comparatively narrow population of taxpayers relative to a benchmark tax. In 2024, the estimated tax expenditures related to electric vehicles in Norway are NOK 28 billion.

PaM transport No. 5

CO₂ tax on emissions under the ETS from domestic aviation

Emissions from the use of mineral oil in domestic aviation are subject to the CO₂ tax on mineral products. Norway has, since 2001, imposed a CO₂ tax on civil domestic aviation. Starting from 2012, most of the emissions from domestic aviation are also covered by the EU ETS. The exceptions from the ETS mainly apply to flights under 5,700 kg, certain flights performed in the framework of public service obligations and certain non-commercial flights. Emissions covered by the ETS pay a reduced tax rate of 674 NOK per tonne CO₂ equivalent in 2024, while non-ETS emissions are subject to a tax of 1,176 NOK per tonne CO₂ equivalent. Domestic aviation are subject to taxes in addition to the EU ETS, and the total price on emissions is approximately NOK 1,500 per tonne of CO₂ in 2024.

PaM transport No. 6

Biofuel mandate for road transportation

Norway has a blending mandate for road transport that was introduced in 2009. In 2009 the blending mandate said that economic operators that sold liquid fuel for use in road traffic needed to sell at least 2.5 per cent biofuels as a share of the total yearly amount of fuel sold for road transport. The level on the blending mandate has been increased several times since 2009 and has been 19 per cent since 1 January 2024. In Norway 'advanced biofuels' is defined as 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). This definition of advanced biofuels differs from both the ILUC-directive and the Renewable Energy Directive (Directive (EU) 2018/2001), where only biofuels from feedstock listed in Part A are considered 'advanced'.

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 EU criteria implemented in the Fuel Quality Directive and the Renewable Energy Directive. Norway aims to promote development of the value chain for advanced biofuels. Since January 1st 2014, the use of advanced biofuels in road traffic has double counted towards the quota obligation. In addition, a sub target was introduced on January 1st in 2017, saying that at least 0.75 percentage points of the quota obligation (without double counting) was to be met by the use of advanced biofuels. This sub target has been increased several times and today at least 12.5 volume per cent of the total amount needs to be advanced biofuel. Although the blending mandate for road traffic opens to use 6.5 per cent first generation biofuel, which is characterized by being cheaper and less sustainable, entities that sell liquid fuel normally choose to sell advanced biofuel in addition to the sub target because it counts double when reporting on traded volumes.

In addition to the quota obligation, the CO₂ tax is levied on mineral products. This entails that petrol and diesel are subject to CO₂ tax, whereas bioethanol, biodiesel and hydrogen are not. The volumes of biofuels in petrol and auto diesel have increased over time, and the traded volumes is expected to continue increasing due to higher blending mandates towards 2030.

PaM transport No. 7

Biofuel mandate for shipping

The blending mandate for shipping was introduced 1 October 2023 and is 6 per cent. The blending mandate is only for using liquid advanced biofuels. The same definition of advanced biofuel and sustainability criteria apply as in road transport. The use of biogas as an alternative to natural gas to reduce emissions is not a part of the mandate. The mandate does not apply for foreign shipping.

PaM transport No. 8

Biofuel mandate for other sectors

The blending mandate for other sectors was introduced 1 January 2023 and is 10 per cent and includes for example non-road machinery and agricultural & farming machinery. The blending mandate is only for using liquid advanced biofuels. The

same definition of advanced biofuel and sustainability criteria apply as in road transport. Biogas is excluded from the mandate.

PaM transport No. 9 Biofuel mandate for aviation

On 1 January 2020, a requirement that 0.5 per cent of aviation fuel sold in Norway is advanced biofuels was introduced. The quota obligation applies to all suppliers of aviation fuel and covers all types of aviation fuels for both domestic and international flights. Fuel sold to flights carried out by military aircrafts, however, are exempted from the regulation due to technical requirements in the defence sector. The same definition of advanced biofuel and sustainability criteria apply as in road transport.

PaM transport No. 10 Pilot projects for zero emission construction sites

To speed up the introduction of zero-emission machines and vehicles on construction sites in the transport sector, the government established in 2021 a 6-year support scheme for increased use of zero emission equipment. With financial support from the scheme, the three main public road and railway infrastructure builders have established different pilot projects. The main objectives of the pilot projects are to speed up implementation, gain knowledge and experience, identify risks and potential barriers and support technology development. For 2024, 30 million NOK was granted by Parliament.

PaM transport No. 11 Urban mobility – urban growth agreements

Urban growth agreements are the government's most important instrument for developing attractive urban areas with good mobility, and with less congestion, local air pollution, noise and greenhouse gas emissions. Efficient land-use, measures that reduce private car use and facilitating so that more people can walk, cycle, and use public transport are essential to achieve such development. The aim of the agreements is to stop growth in passenger transport by car – this is referred to as the zero-growth target.

The agreements ensure better coordination between the state and local authorities that are responsible for various measures and instruments, and they are concluded between the government, the municipalities and the county council in urban areas. So far, urban growth agreements are concluded for seven of the largest urban areas. These are Oslo and Akershus, the Bergen urban area, the Trondheim urban area, Nord-Jæren, the Kristiansand region, Nedre Glomma, and the municipality of Tromsø.

PaM transport No. 12 Maximum CO₂ emissions from the coastal service Bergen-Kirkenes

The Ministry of Transport is the competent authority for issuing a licence for the Coastal Route from Bergen to Kirkenes, and for procuring sea transport services on

the route. The current contracts with Hurtigruten Coastal AS and Havila Kystruten AS entered into force in 2021 and expires December 31, 2030.

The contract sets the limit for the maximum allowed CO₂ equivalent emissions (CO₂e) from the vessels serving the Coastal Route. The annual maximum allowed emissions are 162 000 tonnes of CO₂e on average for the whole contract period. All vessels must also be equipped for receiving electric power from shore, which allows operation of the ship without the use of its own machinery when the ship is docked. Electric power from shore will be used in the ports where the infrastructure facilitates it. A maximum of 0.10 per cent sulphur content of the fuel weight used is required. It is also not permitted to use heavy oil as fuel.

In order to meet the environmental requirements of the contract, Havila Kystruten's four newbuilds run on natural gas (LNG) while Hurtigruten's seven vessels run on a blend of marine diesel oil and biofuel.

PaM transport No. 13

Requirements for zero and low-emission technology in tenders for public ferries

In 2016 the CO₂-emissions from national and regional ferry routes in Norway were approximately 540,000 tonnes, and almost all the ferries used conventional fossil fuels. In 2023 ten out of 108 ferry routes were zero-emission and 30 routes were partly zero-emission, either operated by two or more fully electric and marine or liquid gas, or ferries with hybrid solutions. This development is largely a result of requirements for zero and low-emission technology in tenders for public ferries, both on the ferry routes connecting national highways and on the regional road network. The National Public Road Administration (NPRA), the body responsible for the procurement of ferry services on the national highways, estimates that in 2030, more than two-thirds of domestic car ferry routes will be possible to operate with ferries powered by electricity.

Due to high energy demand or lack of access to electricity, there are a few ferry routes that are not suitable for all electric operation. In their analysis, the NPRA expects that ferries powered by hybrid solutions or exclusively on other energy carriers such as biogas, biodiesel, and hydrogen will operate the remaining part of the domestic ferry routes. In 2019, the NPRA signed a development contract, with the result of an electric hybrid fuel cell battery powered car ferry. The ferry was put into operation on March 31 and is powered by equal amounts of hydrogen and electricity as energy carriers, and the final equipping is due in 2022. The objective of the development contract was to make zero emission technology available for ferry routes that would not be suitable for all-electric operation and has led to yet another signed contract with the requirements of two hybrid fuel cell powered car ferries in operation in 2025. These car ferries will be powered by hydrogen in addition to biodiesel as energy carriers.

PaM transport No. 14

Green shipping programme

The government's policy on green shipping has been developed through close cooperation between the authorities and the industry. A good example is the cooperation on the Green Shipping Programme (GSP), a public-private partnership

that aims to advance the Norwegian government's strategy and plans. The GSP perform studies, start pilots, transfer knowledge between theory and practice and facilitate dialogue and collaboration between all stakeholders. The GSP involves the whole maritime supply chain; from shipyards, equipment and system suppliers, design companies, finance institutions, shipowners, certification services, research and development societies, public transport buyers and governmental bodies. The program consists of 118 partners, 105 private companies as well as 13 government observers. The GSP is financed partly by public allocations from the state budget and partly by the members themselves. Since the program was started in 2015, 54 green pilot projects have been initiated, of which 19 have been implemented or are under construction.

PaM transport No. 15

Risk loan scheme for low and zero emission vessels, short sea vessels and fishing fleet

The loan scheme was established in 2020 and is similar to the Innovation Norway's innovation loan scheme (see PaM cross-sectoral No. 8). The aim is to stimulate green fleet renewal and reduced greenhouse emissions. Risk loans can be given to investments in new vessels using low and zero emission technology or for upgrading existing vessels into low or zero emission vessels. The risk loan scheme is state aid under General Block Exemption Regulation (GBER) and supplements other public and private market-based financing and loans.

PaM transport No. 16

High speed passenger ferries scheme

In 2019, the Government introduced a new policy instrument to promote emissions reduction project for high-speed passenger ferries in Norwegian municipalities and counties called «Hurtigbåtprogrammet». The Norwegian Environment Agency is responsible for administering the financial support scheme. The Norwegian Environment Agency assesses and prioritises the application based on given criteria. The objective of the programme is to reduce emissions from the segment and facilitate transition to zero and low emission technology for high speed passenger ferries. Examples of supported projects are feasibility studies for zero emission vessels, development of new technologies such as battery-electric and hydrogen powered vessels, dedicated funding of new tenders that require zero emission technologies and cooperative projects between country councils.

«Hurtigbåtprogrammet» has allocated NOK 270 million to 21 different projects since it was started in 2019. There have been 7 different tenders where municipalities and county councils have competed for funding. There has been substantial interest in the scheme, and it has so far contributed to significant and necessary development of zero emission high-speed ferries.

PaM transport No. 17

Maritime Zero 2050

Maritime Zero 2050 is a research and development (R&D) initiative directed towards development of zero emission solutions for large ships sailing long distances. The

Research Council of Norway is responsible for the call and the funding will go to projects that will achieve new knowledge and develop new technologies and solutions, suitable for vessel segments and sailing distances which do not already have available zero emission solutions. The initiative is important for the ambition to reduce emissions from domestic shipping and fishing vessels by half by 2030 and promote the development of zero- and low emission solutions for all vessel categories.

The Norwegian government has in since the commencement of Maritime Zero 2050 in 2022 to 2024 allocated NOK 112.5 million in total to the programme. The Research Council of Norway has distributed this to the *Collaborative Project to meet Societal and Industry-related Challenges* and the calls for *Innovation Project for the Industrial Sector*. The solutions should also be scalable for industrial use.

In the project portfolio, there are R&D projects related to zero-emission fuels such as liquid hydrogen and nuclear power for commercial ships. There are also R&D projects that will enable zero-emission solutions for large ships sailing over long distances by significantly reducing energy consumption. Furthermore, there is a R&D project that aims to make it possible to document, track, and verify GHG emissions of marine fuels across the entire fuel supply chain, and a project that will develop a new gas analyzer and a sampling system that measures actual emissions of environmental gases on ships, focusing on being able to measure nitrous oxide and carbon dioxide simultaneously.

PaM transport No. 18 Investments in railways

Developing a competitive railway transport system for passengers and freight is of high priority in Norway. Emphasis is placed on improving the passenger rail network around the big cities and improving capacity for freight transport on longer distances. There have been substantial increases in funding for investment in new railways and maintenance of existing railways the last years. The grant to the railway sector has increased the last years, in 2023 the grant was NOK 32 billion. In the National Transport Plan 2025–2036, it is proposed a shift from large investment projects to more maintenance and renewal of existing infrastructure.

One of the main objectives for increased investments in railways is related to the goal «zero traffic growth for passenger cars» (see above) in the nine largest city-areas in Norway. All of these cities are working towards urban growth agreements with national authorities, which obliges them to reduce growth in passenger car transport.

PaM transport No. 19 Grant funding to transport freight by rail

In order to reduce the negative external effects of transport, such as local and global air pollution, climate gases, noise, congestion and accidents, the Norwegian government aims to encourage freight by rail transport. However, rail freight companies in Norway have scarce opportunities to invest and expand due to strong competition from road transport. To improve conditions for rail freight operators, and to facilitate a shift from road to rail, the Norwegian government issued a tem-

porary support scheme which was approved by ESA and adopted by the Parliament in 2019. The scheme was renewed in 2024.

According to Section 6-5 of the Regulation on Railways Operations, the Ministry of Transport has the possibility to introduce, under certain conditions, a support scheme for Railways. The Ministry have delegated this power to the Norwegian Railway Directorate. The Directorate draws up the detailed provisions in guidelines, in accordance with the notification to ESA, and administer the scheme. The scheme is financed through the annual national budget and was granted 101 million NOK in 2024.

Box 2.5 Electrification of Railways

Roughly 80 per cent of all trains driven each year in Norway runs by electricity, while the rest is driven by fossil fuels. In 2022, the total amount of greenhouse gas emissions from rail transport was approximately 58,000 tonnes CO₂-equivalent. Electrification of the rail network is an important measure to reduce emissions, and smaller parts of the rail network are currently being electrified. The Norwegian Railway Directorate presented a concept study in 2023 with recommendations for zero or low-emission solutions for the rest of the non-electrified lines. This will in practice reduce rail emissions in Norway to near zero and compound the emission reducing impacts of the other projects that are prioritized in the National Transport Plan.

PaM transport No. 20

Zero emission requirements for public procurement of vehicles

Zero emission requirements were set for public procurements of passenger cars from 1. January 2022, for vans from 1. January 2023 and for city busses from 1. January 2024. Exemptions can be made in certain cases where amongst other the primary need for the acquisition cannot be met by vehicles, sufficient charging infrastructure is not available or if city busses use biogas. According to the National transport plan 2025–2036, zero emission requirements will also be considered for public procurements of heavy vehicles.

Box 2.6 Other advantages for zero emission vehicles (ZEVs)

In addition to the tax benefits, ZEVs have other benefits, such as access to bus lanes (decided locally), reduced toll fares, a discount on car ferry crossings, and reduced parking fees on public parking spots. Norway has more than 20,000 publicly available charging points, and over 5,000 of these are fast charging points. Many publicly available charging points have received funding via the state-owned enterprise Enova. Both these advantages, and the advantages presented in the different PaMs, is continuously under evaluation. We need sufficient ZEV advantages, but not so good that they outcompete public transport. Striking the balance between ZEV advantages and wanting to move transport from cars to public transport is a constant challenge.

2.5.7 Industrial process and product use (IPPU)

This sector covers primarily emissions from the manufacturing industry, including emissions from industrial processes. A number of policies and measures have been implemented over the years. From 2013, emissions of CO₂, PFCs and N₂O from processes in the manufacturing industries are to a large extent covered by the EU Emissions Trading Scheme (EU ETS). Prior to the EU ETS, a number of agreements concerning the reduction of greenhouse gas emissions have been concluded between the industry and the Norwegian Government. HFCs are regulated through a tax and reimbursement scheme together with F-gas regulation and the Kigali Amendment.

PaM industry No. 1

CO₂ compensation scheme

Norway established a CO₂ compensation scheme for the manufacturing industry in 2013. As Norway is part of the integrated Nordic electricity market with cables linking our system to the European continent, increased electricity prices in Europe, due to the EU Emissions Trading System (EU ETS), result in increased electricity prices in Norway. The result is a competitive disadvantage for the electricity intensive manufacturing industry in Norway compared to manufacturers in countries outside of Europe without the same stringent climate policies. The purpose of the CO₂ compensation scheme is to prevent carbon leakage from Europe as it intends to partly counteract this disadvantage.

The compensation scheme is based on the EFTA Surveillance Authority's (ESA) Guidelines on certain State aid measures in the context of the system for greenhouse gas emission allowance trading post-2021. The scheme includes all sectors listed in the ESA Guidelines, among others aluminium, ferro alloys, chemicals and pulp and paper.

The Norwegian government has proposed amendments in the scheme, including a new requirement in relation to 40 per cent of the aid: the beneficiaries shall use at least 40 per cent of aid received, in the period 2024-2030, on climate mitigation measures or energy efficiency measures in Norway. This requirement will support the manufacturing industry's measures in reducing emissions and increasing their

energy efficiency, and thus supports and strengthens the objective to reduce the risk of carbon leakage, as well as contributing to a green transition.

PaM industry No. 2

Use of bio carbon in the production of cement and ferroalloys

In the production of cement and ferroalloys, the sectors have voluntarily replaced some of the coal consumption with bio carbon. In the production of ferroalloys, the share of bio carbon of the total amount of reducing agents increased from 2 per cent in 2000 to 21 per cent in 2022.

PaM industry No. 3

N₂O reduction, production of nitric acid

In 2022, the N₂O emissions from the production of nitric acid equalled about 52 ktonnes CO₂ equivalents. The N₂O emissions from the production of nitric acid decreased by 97 per cent from 1990 to 2022. This is partly explained by the fact that one of the production lines was restructured in 1991, but mainly because more and more of the production from 2006 and onwards has been equipped with a new technology – N₂O decomposition by extension of the reactor chamber. As a result of the new technology, the implied emission factor (IEF) for nitric acid production decreased from 5.0 kg N₂O per tonne nitric acid in 1990 to 0.1 kg N₂O tonne of nitric acid in 2022.

PaM industry No. 4

Agreement with the aluminium industry

In 1997, the major aluminium producers signed an agreement with the Ministry of Climate and Environment to reduce emissions of greenhouse gases (CO₂ and PFCs) per tonne of aluminium produced by 50 per cent in 2000 and 55 per cent in 2005, compared with 1990 levels. The agreement was followed by a new agreement with the industry for the years 2005–2007. In 2005 the CO₂ equivalent emissions of PFCs per tonne of aluminium produced were 85 per cent lower than in 1990 and 84 per cent lower in 2007. The emissions was from 2013 covered by the EU emission trading scheme. The emission intensity has continued to decrease and the PFC emissions were about 97 per cent lower in 2022 than in 1990.

PaM industry No. 5

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

Norway has implemented the EU Regulations on certain fluorinated greenhouse gases (No. 842/2006 in 2010, revised by No. 517/2014) in 2018. The regulation sets up measures to prevent emissions of F-gases from existing equipment by requiring leakage checks, proper servicing and recovery of the gases at the end of the equipment's life. It also bans the use of F-gases in many new types of equipment and products where less harmful alternatives are widely available. On 7 February 2024, EU adopted a revised F-gas regulation, introducing additional prohibitions on the use of F-gases in a wider range of equipment and products, as well as expanding measures to prevent emissions. Norway is currently working on implementing this revised F-gas regulation in our national legislation.

Norway is exempted from the EU HFC phase-down scheme of the EU f-gas regulation. 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. In the national legislation, Norway has implemented a stricter phase-down scheme than its obligations under the Montreal Protocol.

Norway has implemented the EU Directive 2006/40/EC which gradually bans the use of HFCs with high GWP in air-condition systems in passenger cars and light commercial vehicles.

PaM industry No. 6

Tax and reimbursement scheme on HFC and PFC

To curb the expected growth in HFC emissions due to the phase-out of ozone-depleting substances, a tax on import and production of HFCs was introduced in 2003 (the tax also includes PFCs, but the use of these gases is insignificant). In 2004, this tax was supplemented with a refund scheme, which prescribes a similar refund when gas is destroyed. The tax was initially NOK 180 per GWP-tonnes. In 2024 the tax is NOK 1,176 per tonne CO₂-equivalents, after relatively large increases since 2014. Emissions of HFC/PFC are taxed at the same level as the standard tax rates for CO₂, measured in NOK per ton CO₂-equivalents. Since the tax is levied on imports of the gases, and not on actual emissions of HFC, the tax is combined with a refund scheme to target emissions of HFC.

The tax and reimbursement schemes have resulted in better maintenance and improved routines for discarding old equipment. It also provides a strong incentive for choosing HFCs with the lowest GWP possible and has resulted in the increased use of natural refrigerants, such as CO₂, ammonia or hydrocarbons and in recent years the use of HFC with very low GWP (HFOs), in new installations. The tax has had very significant effects on new, bigger installations, where low-GWP alternatives are often available, and the tax might represent a significant share of the investment costs. On smaller mass-produced units, such as domestic heat pumps, the international development as regards legislation (such as the EU F-gas regulation and the Montreal Protocol) and commercialization of new technology is likely the main driving force influencing emissions and choice of refrigerant.

PaM industry No. 7

Tax on SF₆

The tax on SF₆ was introduced in 2023. The tax covers the import and production of SF₆, as well as SF₆ included in products. The purpose of the tax is to price emissions of SF₆ into the atmosphere. SF₆ is primarily used as an insulating medium in electrical installations, etc., either during the first filling or refilling. Emissions of SF₆ are small and primarily due to unavoidable leaks or accidents. SF₆ is also used in the production of electrical switches. Emissions of SF₆ are taxed at the same level as the standard tax rates for CO₂, i.e. NOK 1,176 per tonne CO₂ equivalent.

2.5.8 Agriculture

Norwegian agriculture is covered by overall Norwegian climate targets and policies as specified in our NDC and our agreements with the EU. The 2024 agricultural agreement (Prop. 105 S (2023–2024)), as adopted per the subsequent recommendation to the parliament June 2024 (Innst. 448 S (2023–2024)), reaffirm that Climate targets are an integral part of agricultural policies. These policies also build on the 2021 White Paper on climate policies (Meld. St. 13 (2020–2021)). The Norwegian Parliament stated that the most important role for agriculture in the context of climate change is to reduce emissions per unit produced, increase the uptake of CO₂ and adapt the production to a changing climate.

Current policies and practices to control GHG emissions in Norwegian agriculture include a combination of regulatory, economic and informatorily measures. CO₂ from the use of fossil fuels in activities related to agriculture meets CO₂ taxation similar to other sectors. A mandatory biofuels turnover for non-road machinery, including agricultural machinery, was introduced in 2023. The general ban on fossil fuels for heating buildings is imposed for agriculture from 2025. Emissions related to transport and energy are accounted for in other sectors. Direct emissions from agriculture are covered neither by the emissions trading system, nor subject to GHG taxation, rather they are covered by other measures as specified below.

Previous reporting of the emission inventory and reports to the UNFCCC have identified key emission sources from Norwegian agriculture. These 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.

Emissions from livestock have been slightly reduced over the last decades. This results from successes with animal breeding, welfare and feeding which have enabled increases in output per animal.

Key measures to reduce N₂O include improving manure management and fertilizer use so that less N-input is needed per unit of product. Such improvements can have various co-benefits, including reduction of run-off to water as well as ammonia emissions. The sector is making efforts to improve the use of fertilizers through improved storage, spreading, timing and dosage of fertilizer – according to crops' needs. Precision agriculture is under development with increasing use of GPS technology in land management. A combination of regulatory and economic instruments support such improved practices and emission reductions. This year a proposal for a revised fertilizer regulation was up for consultation. The proposal contains several measures that will reduce and optimize fertilizer application. The ministries are reviewing the consultation with the aim for a new regulation to come into force early 2025. Restrictions on cultivation of peatland took force in 2020 to mitigate emissions of N₂O and CO₂, as reported under the agricultural sector and the LULUCF sector respectively. Recent reports show a steep decline in such cultivation since these restrictions entered into force.

Emission figures for agriculture have high uncertainty as emissions also depends on precipitation patterns, temperature or soil properties. Various emission sources

have been identified as «key category sources» that have priority for further methodology development. Collaboration between agriculture and climate experts has improved the technical understanding and enables development of measures and instruments to further reduce emissions.

PaM agriculture No. 1 Regional agri-environmental programme

The regional agri-environmental programmes are support schemes directed at environmental challenges in different parts of the country. Each county (region) uses schemes/measures taken from a national «menu», according to the priorities of the regional environmental programme. These involve area-based payments for farming practices to achieve various agri-environmental targets, such as reducing run-off and emissions.

In the 2023 and 2024 agricultural agreements, funds for Regional Agri-environmental Programmes have been upscaled. The lion's share of the additional funds was earmarked to reduce erosion and run-off, while the upscale will also benefit climate goals. Other priority areas include support to environmentally friendly spreading of manure, which is primarily directed to abate ammonia loss, but will also have co-benefits for GHG-emissions. From 2023, measures to advance soil health and soil carbon sequestration have also been eligible for support over regional agri-environmental programmes.

PaM agriculture No. 2 Requirements and support for livestock on pasture

Keeping livestock on pasture may help abate emissions from manure management compared to keeping animal in confinement. Naturally, most livestock in Norway must be kept indoors for part of the year, while there are requirements that cattle, sheep and goats should be free-range for minimum periods in summer, and additional support is paid for those who are kept outdoors longer. Through such practices, emissions from storage and spreading of manure are avoided and replaced by lower emissions from dung and urine deposited on pasture.

PaM agriculture No. 3 Support scheme for Special Environmental Measures in Agriculture

The support scheme for Special Environmental Measures in Agriculture support investments towards environmentally friendly practices. From 2017 this scheme has been expanded to support better storage of manure, to control emissions of CH₄ and N₂O.

PaM agriculture No. 4 Drainage of agricultural soils

The main purpose of the scheme is to increase the quality of cultivated land by financial support for drainage of poorly drained soil, in order to increase productivity and reduce risk for erosion and water pollution. As a side-effect, better drainage may also reduce GHG emissions on mineral soils.

PaM agriculture No. 5

Project Climate Smart Agriculture

A project called Climate Smart Agriculture was established in 2017. The aim of the project is threefold; making a system for data collection and documentation of practical measures, develop a system for on-farm climate decision support, and information and sharing of knowledge. Under the project, training has been provided for extension services in support of climate-smart agriculture, and a «climate calculator» has been developed for on-farm assessment and decision-making support in these areas. Per 2024, about 9,000 out of a total 38,000 farm units in Norway have taken the calculator into use.

PaM agriculture No. 6

Climate and environment programme

The aim of the Climate and environment programme is to contribute to climate and environmental goals within the agricultural policy through research and information measures. The programme is directed towards practical and agronomical knowledge on climate and environmental challenges, that can be quickly disseminated to on-farm implementation. Examples of projects that have been supported by this programme are Climate smart agriculture, Carbon farming and Effects of tillage on run-off of nitrogen and phosphorus.

PaM agriculture No. 7

Delivery of manure for production of biogas

There is a support scheme for delivery of manure to biogas production plants, to compensate for additional costs arising from such delivery and increase the uptake of such treatment.

PaM agriculture No. 8

Restrictions on cultivation of peatlands

Land conversion from peatland to cropland has been extensive historically, and approximately 60,000 ha of croplands (7 per cent of the total cropland area) in Norway are identified as drained organic soils. These soils are a significant source of N₂O and CO₂, as reported under the agricultural sector and LULUCF, respectively. As described under chapter 2.5.9 (PaM LULUCF No. 6) restrictions for the cultivation of peatland took force in 2021. Cultivation of peatland has been reduced from 82 ha in 2021 to 17 ha in 2023. Such restrictions affect the emissions of N₂O alongside the effects for CO₂.

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

Forests absorb CO₂ and store large quantities of carbon. They are also an important source of renewable energy and wooden materials that can be used to replace materials with a larger carbon footprint. Forest biomass is also important as feedstock to bio-energy carbon capture and storage (BECCS) plants and other CDR technologies. Other terrestrial ecosystems and organic soils are also large carbon sinks. 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 in the LULUCF sector. Boreal forests grow slowly, hence the mitigation effects must be considered in a very long timescale.

In addition to the PaMs described in this chapter, the Planning and Building Act (PaM cross-sectoral No. 5) constitutes the legal framework for decisions on land use and land use change.

PaM LULUCF No. 1

Higher seedling densities in existing areas of forest land

Using higher seedling densities for forest regeneration increases the growing stock and CO₂ removals by forest. In 2016, a grant scheme was launched to increase the seedling density used for regeneration after harvesting. This measure forms part of ordinary planting after harvesting, and thus does not involve any afforestation.

PaM LULUCF No. 2

Genetical improvement, plant breeding

In 2016, a grant scheme was launched to support plant breeding. Tree breeding involves using of the genetic variation in forest trees to produce seeds that are more robust and provide higher yields than non-improved seed from ordinary forest stands. High-quality seeds have been produced in seed orchards, making it possible to develop forests where the tree survival rate is high, timber quality is better and volume growth is 10–15 per cent larger. If more effective tree breeding techniques are used, it may be possible to increase the growth in volume by 20 per cent or more. Thus, tree breeding is a way of increasing CO₂ removals by forests. In addition, it is possible to ensure that forest reproductive material is resilient to future climate change.

PaM LULUCF No. 3

Fertilization of forests as a climate mitigation measure

On forest land where growth is inhibited by the availability of nitrogen, using nitrogen fertiliser will increase both diameter and height growth, and increase annual CO₂ removals for the next ten years. A grant scheme for fertilisation of forest as a climate mitigation measure was started in 2016. It is designed to meet recommended environmental criteria and avoid unacceptable effects on biodiversity and the environment otherwise.

PaM LULUCF No. 4

Tending of juvenile stands

Tending of young stands is necessary to select the most adapted tree-species and optimize growth. Correct spacing between the most adapted tree species lead to improved tree stability with straight stems that provide high quality lumber. The need for tending is stipulated to 40,000 ha per year, but the area treated (2022–2023) has been around 26,000 ha per year.

PaM LULUCF No. 5

Regeneration with proper tree-species

The Norwegian Forestry Act requires preparation for regeneration to a certain number of trees per area unit within 3 years after harvesting. A new regulation defines that only tree species with satisfying production of lumber in terms of quality and utilization of the growing potential (potential for removals) can be accounted for.

PaM LULUCF No. 6

Reduced emissions from peatlands and bogs

Peatland bogs and mires are important carbon stocks. There are restrictions against the cultivation of peatland and mires in Norway. The restrictions came into force in 2020. Farmers may apply for exceptions from these restrictions provided that certain conditions are met.

2.5.10 Waste

The main goal of the Norwegian waste policy is that waste is to cause the least possible harm to humans and the environment. The quantity of waste generated is to be considerably lower than the rate of economic growth, whilst rates for the preparing for reuse and recycling should rise. Furthermore, the amount of hazardous waste is to be reduced and hazardous waste is to be dealt with in an appropriate way. The measures to reduce greenhouse gas emissions are to a large extent concurrent with measures to increase recycling and recovery. The most important measures are:

- Regulations under the Pollution Control Act, including the ban on depositing biodegradable waste in landfills and requirements regarding extraction of landfill gas (see below).
- Extended producer responsibility for specific waste fractions.
- The tax on waste incineration (described under 4.3.2)

In general, targets set in EU waste directives, such as EU-targets for preparing for reuse and recycling of municipal waste, also apply for Norway owing to the EEA agreement.

PaM waste No. 1

Requirement to collect landfill gas

The largest emissions in the waste sector derive from landfill gas. In 2022, the methane emissions from landfills amounted to approximately 31,300 tonnes, corresponding to 2 per cent of the total greenhouse gas emissions in Norway. Landfill gas emissions have been reduced by about 52 per cent from 2000 to 2022 and by more than 60 per cent from 1990 to 2022. The reduction is mainly due to the decrease of organic waste in landfills as depositing biological waste has been prohibited.

The Landfill Directive was incorporated into national law by the Norwegian Landfill Regulations of 21 March 2002, and states that all landfills with biodegradable waste must have a system for extracting landfill gas. The gas emissions are monitored by measuring boxes placed on the landfill surface. Also, visual inspection of the landfill surface for obvious leaks should be conducted regularly.

Extraction of landfill gas increased from about 950 tonnes CH₄ in 1990 to about 19,400 tonnes CH₄ in 2010. In 2022, extracted methane from landfills amounted to 3,820 tonnes CH₄. The reduction is primarily due to the prohibition of depositing organic waste. In Norway, in 2022, 18 per cent of the landfill gas production was utilized to generate electricity. 54 per cent is flared, and 27 per cent is used in heat production.

PaM waste No. 2

Ban on depositing biodegradable waste in landfills

In 2002, Norwegian authorities introduced a ban on depositing easily degradable organic waste in landfills. This prohibition was replaced in 2009 by a ban on the depositing of all biodegradable waste in landfills. Since the introduction of these regulatory measures, the annual amount of biodegradable waste deposited in landfills has been reduced by more than 90 per cent in the period between 1990 and 2022. Meanwhile, the amount of all waste generated increased by more than 69 per cent in the same timeframe. Due to the decomposing process, CH₄ production from landfills will continue for several decades after the waste has been disposed of. Nevertheless, the prohibition on depositing biodegradable waste in landfills will reduce CH₄ emissions over time, as the amount of deposited biodegradable waste is reduced.

PaM waste No. 3

Tax on waste incineration

Norway introduced a tax on the final disposal of waste (including both landfills and incineration) on 1 January 1999. The tax for incineration was lifted on 1 October 2010 and for landfills in 2015. The purpose of the tax was to place a price on the environmental costs of emissions from landfills, and thereby provide an incentive to reduce emissions, increase recycling and reduce the quantities of waste. The tax had a specific CO₂-component aimed at reducing emissions of CO₂ from waste incineration. In 2022, a tax on emissions of CO₂ from waste incineration has been reintroduced. In 2024, the rate for non-ETS emissions is NOK 882 per tonne of CO₂ equivalent, which corresponds to 75 per cent of the general level for ESR emissions. ETS emissions from waste incineration are subject to a reduced rate, which corresponds to 15 per cent of the general level for Emission Sharing Regulation (ESR) emissions.

PaM waste No. 4

Other measures in the waste sector

Extended producer responsibility (EPR)

The systems of extended producer responsibility (EPR) are based on requirements regarding waste regulation and to some degree on tax incentives. EPR means that the cost of waste management is included in the price of the product in accordance with the principle that the polluter pays. The scheme gives the producer incentives to reduce this cost by making products that are more durable and easy to reuse and recycle.

EPR is important to ensure that waste is collected and sent to approved treatment and for fulfil national or EEA-wide targets for recycling. Extended producer responsibility schemes have been made for packaging, electric and electronic products, tires, batteries, vehicles and PCB-infected insulation of windows.

Agreement on reduction of food waste

In 2017 the government concluded an agreement on the reduction of edible food waste together with relevant stakeholders representing the entire food value chain. The parties to the agreement have committed to reduce edible food waste by 50 per cent by 2030. The initial results indicate that the levels of edible food waste in Norway were reduced by nearly 10 per cent in the period between 2015 and 2020. This was five percent less than the interim goal of 15 per cent food waste reduction by 2020. In order to reach their food waste reduction goal, the parties to the agreement must therefore accelerate their efforts in the years to come.

Measures to increase waste recycling

The waste regulations regulate a number of waste fractions, and for some fractions set specific targets for recycling, for instance for end-of-life vehicles.

When it comes to EU-targets for preparing for reuse and recycling of municipal waste, a revision made this year of the national waste regulation introduces a new requirement, applicable as of 2025, to sort and separately collect paper and cardboard, glass and metal packaging and textile waste. It is already a requirement to sort and separately collect biowaste (i.e. food, park and garden waste) and plastic waste at source. Furthermore, the regulation requires that all the fractions separated at source are sent to recycling.

There is also a tax on beverage packaging. The tax is reduced by the accepted recycling rate; each percentage of recycling reducing the tax one per cent. The recycling rate is set by the Environment Agency and regulated by the waste regulation.

The pollution control act encourages municipalities to determine differentiated waste fees, as this could contribute to waste reduction and increased recycling. Many municipalities in Norway collect source separated household waste like paper and cardboard waste or biological waste free of charge or to highly reduced fees. The costs are subsidized by the fees for the mixed waste. This gives incentives to the inhabitants of a municipality to separately collect certain fractions of household waste that can be recycled. It has been proposed to change the pollution control act to make it mandatory for municipalities to determine differentiated waste fees.

2.5.11 Planned measures

In this first BTR, planned measures have also been included. The additional PaMs that have an estimated mitigation effect are included in the projections with additional measures (WAM). This includes measures proposed by the government in the Climate status and plan, which have not yet been adopted by the parliament. The effects these PaMs have on the various sectors are reported in CTF table 5 and summarized in Table 2.13 in chapter 2.7.6.

PaM WAM No. 1

Changes in environmental taxes on fuels and GHGs

In 2021, the government announced that the CO₂ tax on emissions under the Effort Sharing Regulation (ESR) will be increased to NOK 2,400 by 2030 (in real 2025 NOK).

The government have proposed to increase the tax on waste incineration towards the same level as the CO₂ tax on emissions under the ESR from 2026. The tax on HFC, PFC SF₆ is planned to follow increases on the CO₂ tax. These are a planned measures which has not yet been adopted by the parliament.

PaM WAM No. 2

Further measures to reduce emissions from building and construction

Requirements in public procurement for emission-free energy use at construction sites

The government is conducting an official study on requirements in public procurement for emission-free energy use at construction sites. The requirement under consideration is that 5–10 per cent of energy consumption must be emission-free by 2026, with an increase to 30–40 per cent by 2030.

Ban on the sale of new construction machinery with combustion engines from 2035

The government announced in 2024 that it will launch an official study on banning the sale of new construction machinery with combustion engines from 2035. Exemptions will be considered.

New ban on the use of fossil gas for heating buildings under construction

A proposal to ban the use of fossil gas for temporary heating and drying of buildings under construction is under consideration. The government plans to implement the ban from 2025.

PaM WAM No. 3

New ban on the use of fossil gas for heating buildings

Ban on the use of fossil gas for heating buildings from 2028

The government is conducting an official study on the expansion of the current ban on the use of mineral oil for heating to also include fossil gas. The study will assess the consequences for safety and self-sufficiency. This is a step towards phasing out all use of fossil fuels for heating buildings. The government aims to extend the oil heating ban to also include fossil gas from 2028.

PaM WAM No. 4 Increased biofuel mandate

The government plans to increase the biofuel mandates. In the «Government's Climate Status and Plan», released in October 2024, a plan for annual increases in biofuel mandates is presented. The following is proposed:

- Gradually increase the biofuel mandates for road traffic to 33 per cent by 2030
- Gradually increase the biofuel mandates for biofuels for other purposes (non-road machinery) to 28 per cent by 2030
- Gradually increase the biofuel mandates for shipping to 18 per cent by 2030
- Aim to increase the biofuel mandates in aviation at the same level as the EU regulation RefuelEU Aviation. However, it is essential to ensure airlines are credited for the use of biofuels in the EU ETS before the mandate is increased. Therefore, from January 1, 2025, the mandate will be kept at the same level.

PaM WAM No. 5 Further measures to reduce emissions from shipping

The Norwegian government has adopted general zero emission requirements for ferries and ferry services. The requirements will be in force for all new contracts in public tenders from January 1st 2025. There are exceptions from the requirement in case of biogas, planned road connections, lack of infrastructure and lack of technological and economic feasibility.

In the 2025 National Budget, the government proposes to increase funding of the high speed passenger ferries scheme («Hurtigbåtprogrammet») with 200 million NOK (see PaM transport No. 16).

The Norwegian government is planning for low and zero emission requirements for vessels in aquaculture within 2025.

The Norwegian government is planning for low emission requirements for vessels in the offshore industry within 2025 and zero emission requirements within 2029.

PaM WAM No. 6 Further measures to reduce emissions from road traffic

In the Government's 2025 Climate Status and Plan (an attachment to the National Budget), the government proposes measures to reduce emissions from road traffic, to meet zero emission targets from the National Transport Plan, including a long-term target that new heavy vehicles should be emission free or use biogas by 2030. The measures include:

- Increased funding for the state agency Enova by NOK 1.7 billion, including 1.2 billion in support of heavy duty transport, both for zero emission vehicles and charging infrastructure. See also PaM cross No. 6.
- Accelerated effort to improve existing and establish new rest and overnight rest areas in order to arrange for charging. The Government has prioritized money to this work in their proposed state budget for 2025.
- Not open up for toll payment for heavy zero-emission vehicles for a period up to 2030.

PaM WAM No. 7

Further measures to reduce emissions from the industry sector

In 2024, the Norwegian government announced the introduction of a ban in 2030 on the use of fossil fuels for stationary indirect heating for energy purposes that results in emissions under the effort sharing regulation. A draft regulation for the ban has been sent for consultation.

PaM WAM No. 8

Further measures to reduce emissions from agriculture

Revised fertilizer regulation

This year a proposal for a revised fertilizer regulation was up for consultation. The proposal contains several measures that will reduce and optimize fertilizer application. The ministries are reviewing the consultation with the aim for a new regulation to come into force early 2025.

MetanHUB

A project called MetanHUB has been established with the aim to clarify whether, under Norwegian conditions, methane production from ruminants can be reduced by using feed additives. The project has been granted support through the agricultural agreement.

Support through the agricultural agreement

Through the agricultural agreement of 2023-2024, the government is providing financial support for fertilizer measures, water environment measures, energy efficiency and biogas, among other things.

PaM WAM No. 9

New food waste legislation

The government aims to propose new food waste legislation in the spring of 2025, with regulations coming into force during 2026. Additionally, the government will initiate a revision of the industry agreement on reducing food waste, based on proposals from the Food Waste Committee.

PaM WAM No. 10

Increased CO₂-tax on emissions under the ETS on the continental shelf

In the budget for 2025 the government proposed to increase the CO₂-tax on the continental shelf so that the total emissions priced, meaning the sum of the tax and the price of allowances under the EU ETS, will reach NOK 2,400 in 2030. In 2024 the tax rate was NOK 790 per tonne CO₂, while the ETS price is estimated to NOK 750, resulting in a total emission price of NOK 1,540 per tonne CO₂.

2.5.12 PaMs no longer in place

There are some PaMs that were reported in the NC8/BR5 that are not reported in this first BTR. The list of such PaMs are shown below.

- The PaM «Aid scheme for short sea shipping» did not produce the desired results and has therefore been abolished.
- The PaM «Base tax on mineral oils etc.» was abolished from 1 January 2023, due to increased energy prices.
- The PaM «Taxes and regulations on emissions from road transportation» was a group-PaM that covered several other PaMs related to road transport». It was decided not to report a group-PaM.
- The PaM «Arrangement to reduce emissions in the processing industry (2004)» had a target for the year 2007 and has been abolished.
- The PaM «Arrangement to reduce emissions in the processing industry (2009)» had a target for the years 2008-2023 and has been abolished.
- The PaM «Green shipping» was a group-PaM that covered several other PaMs related to shipping». It was decided not to report a group-PaM.
- The PaM «Recycling scheme for short sea vessels and offshore vessels» did not produce the desired results has therefore been abolished.
- The PaM «Agreement on SF₆ reduction from use and production of GIS» ended in 2010 and has been abolished.
- The PaM «Afforestation» was a pilot project, and has not been implemented yet.
- The PaM «Measures to reduce damage from root-rot» has been planned but not been implemented yet.
- The PaM «Threshold for tree-stand age by harvesting» has been implemented by the PEFC (Program for the Endorsement of Forest Certification) and need for further regulation will be considered based on more knowledge about rationale reasons for tree-stands to be harvested for they reach maturity.

2.5.13 PaMs that influence GHG emissions from international transport

Norway has for a number of years worked actively through the International Maritime Organisation (IMO) to pursue limitation of greenhouse gas emissions from international shipping. The revised IMO GHG Strategy was adopted at MEPC 80 in July 2023, and sets out an ambition to decarbonise shipping by 2050, including ambitious check-points for 2030 and 2040, as well as an ambition of uptake of 5–10 per cent of zero- or near zero fuels in shipping by 2030. Norway is working actively in the IMO to develop economic and technical measures as amendments to MARPOL Annex VI to reach the levels of ambitions set in the strategy. The aim is to adopt the new regulations in 2025, with entry into force in 2027.

The IMO adopted energy efficiency requirements which entered into force on 1 January 2013. This framework has been expanded further in 2014, and further tightening and expansion of the energy efficiency requirements is adopted with entry into force in April 2022 (EEDI strengthening) and November 2022 (EEXI and CII). The short-term measures are under revision, intended to be completed by 2025. Further, proposals for mid- and long-term measures for reduction of GHG emissions from shipping are under consideration. The IMO data collection system which will collect fuel consumption data entered into force on 1 March 2018. Further the IMO is also

addressing short-lived climate forcers through the ongoing work on Black Carbon emissions from shipping. The existing regulation on emissions on volatile organic compounds also addresses these emissions.

In 2020 the IMO updated the estimate of the global greenhouse gas emissions from international shipping. A comprehensive update of emission estimates will be undertaken as a part of a fifth IMO GHG Study which the MEPC has agreed in principle to initiate, and which is planned to be finalized prior to the 2028 revision of the IMO GHG Strategy.

At the national level, Norway implements all relevant provisions of the IMO to limit or reduce emissions. Development of more energy-efficient technologies for shipping is also enhanced through research and development programmes under the Research Council of Norway, Innovation Norway and Enova. Pilot projects on low- and zero-emission shipping are being developed through the Green Shipping Programme which is a private-public partnership.

In the 2025 budget, it is proposed to introduce a reduced tax rate in the CO₂ tax on mineral products for emissions from international shipping. In 2025 this tax will amount to NOK 1.33 per litre mineral oil (equivalent to NOK 500 per ton CO₂). It must be clarified that the introduction of a tax does not contravene the state aid regulations before the tax can be introduced.

The 41st ICAO Assembly in 2022 adopted a goal of net zero CO₂-emissions in international aviation. The goal shall be reached through technology development, operational improvements, and the use of sustainable aviation fuels. The 41st Assembly reiterated the two global aspirational goals for the international aviation sector of 2 per cent annual fuel efficiency improvement through 2050 and carbon neutral growth from 2020 onwards, as established at the 37th Assembly in 2010. Norway supported the agreement on the global market-based measure (CORSIA) at the 39th Assembly in 2016 and has since 2021 taken part of its voluntary phase. Norway has as an observer seat in the ICAO Committee on Aviation Environmental Protection (CAEP).

The largest emission challenge in air traffic is related to large aircraft and long-distance flights, and Norway therefore welcomes international regulations on international aviation. Norway's comprehensive aviation strategy from 2023 states that Norway shall strive to achieve a higher level of ambition in European and international processes regarding aviation and climate. As a member of the European Civil Aviation Conference (ECAC), Norway participates actively together with 43 other Member States of that organization with a view to limit greenhouse gas emissions from international aviation through ambitious action in ICAO. Norway also takes part in the «International Aviation Climate Ambition Coalition», which was formed in 2021 to push for a higher level of climate ambition in ICAO.

Norway has, since 2001, imposed a CO₂ tax on civil domestic aviation, as one of few countries in the world, as mentioned in chapter 2.5.2 (PaM Cross No. 7). International travel is however exempt from CO₂ tax. Norway also participates in the EU Emission Trading Scheme (EU ETS) which cover emissions from flights within EU. The ETS is further explained in chapter 2.5.2.

In 2016, the Norwegian government introduced an air passenger duty. The air passenger duty is a fiscal tax with a potential environmental impact. The tax applies to commercial transport by air of passengers from Norwegian airports, except for flights from the Norwegian continental shelf and airports on Svalbard, Jan Mayen and Norwegian dependencies. There are two rates, depending on the final destination: a low rate for journeys with a final destination in Europe (in 2024 this duty is NOK 85) and a high rate for journeys to other final destinations (in 2024 this duty is NOK 332).

In April 2024 the state owned airport operator Avinor and CAA Norway entered into a cooperation agreement on establishing Norway as an international testing arena for zero- and low- emission aircraft. The purpose of the agreement is to facilitate accelerated phase-in of zero and low emission aircraft by reducing barriers to testing and demonstration. Avinor provides infrastructure, airspace, and access to energy. While CAA Norway offers regulatory facilitation. This initiative stems from the Government's ambition reiterated in Norway's comprehensive aviation strategy from 2023, and further elaborated in the National Transportation Plan 2025–2036, that the overall climate goal for domestic aviation is to accelerate the transition to zero- and low-emission aviation so that the first commercial zero-emission aircraft are phased in in Norway as soon as technology permits. The Government prioritized NOK 1 billion over a twelve-year period for this purpose, and has in the state budget for 2025 (Prop 1S (2024–2025)) allocated NOK 50 million for the establishment of the test-arena, split between Avinor and CAA Norway.

2.5.14 Black carbon

When developing its climate policy, Norway also addresses drivers of climate change other than reduction of the greenhouse gases. Measures towards certain sources of CO₂ emissions may also have an effect on black carbon (BC) emissions and other short-lived climate forcers. Reducing black carbon can contribute to the slowing down of global warming and in addition have positive health effects. The Intergovernmental Panel on Climate Change (IPCC) adjusted the effect of BC on the global average temperature downward in the latest assessment report. There are however large regional differences. The climate effect is particularly strong in the Arctic where BC contributes to increase the rate of melting of ice and snow when it settles on and darkens these surfaces. The Arctic Council Member States have set a collective, aspirational goal to reduce BC emissions by 25–33 per cent relative to 2013 levels by 2025. The Member States are currently working to update this target.

2.5.15 How PaMs are modifying longer-term trends in GHG emissions and removals

Norway has over the years introduced several policies and measures that have reduced the GHG emissions. There are considerable methodological difficulties in calculating the effect of policies and measures ex post, including establishing a hypothetical baseline and obtaining relevant data. There is also uncertainty related to such estimates. Nevertheless, effects are estimated for a number of policies and measures. According to the estimates, the historical GHG emissions would have been substantially higher than observed, if these policies and measures had

not been implemented. The projected emissions would also be higher without the implementation of these policies and measures.

2.5.16 Assessment of economic and social impacts of response measures

Norway strives to follow a comprehensive approach to climate change mitigation from policy development started around 1990, addressing all sources as well as sinks, in order to minimise adverse effects of climate policies and measures on the economy.

In developing environmental, as well as the economic and energy policy, Norway endeavours to include the polluter pays principle and to have a market-based approach where prices reflect costs, including externalities. As regards emissions of greenhouse gases, costs of externalities are reflected by climate taxes and by participation in the European Emissions Trading Scheme (EU ETS). These instruments place a price on emissions of greenhouse gases. The Norwegian Government contends that the best way to reduce emissions on a global scale, in line with the aims limiting the global average temperature increase to 1.5 °C above pre-industrial levels, would be to establish a global price on emissions. Pursuing a global price on emissions would be an efficient way to ensure cost-effectiveness of mitigation actions between different countries and regions, and secure equal treatment of all emitters and all countries. This will help minimise adverse impacts of mitigation. For more information about climate taxes and the design of the EU ETS, see chapter 2.5.2.

Norway is involved in several international and regional initiatives that contribute to technology development and transfer and enhanced capacity building to developing countries with the aim of contributing to maximize the positive and minimize the negative effects of response measures, including economic diversification and a just transition. One important aspect is to facilitate the shifting of the energy mix away from high emission sources to more renewable energy systems and low-emission sources and diversifying economies. These initiatives are reported here as relevant activities under Article 3.14 of the Kyoto Protocol.

The former government presented a national strategy for green competitiveness in October 2017. The aim of the strategy is to provide more predictable framework conditions for a green transition in Norway, while maintaining economic growth and creating new jobs. An expert commission presented its report with an analysis of Norway's exposure to climate risk in December 2018. The report has a clear recommendation to pursue ambitious and effective climate policies and undertake climate risk analysis to become more robust to effects of climate change.

Carbon capture and storage (CCS) is one of five priority areas for enhanced national climate action. Norway strives to disseminate information and lessons learned from projects in operation in the petroleum sector, new large-scale projects under planning and from research, development and demonstration projects. The information and lessons learned are shared both through international fora, and through bilateral cooperation with developing and developed countries. For further information, see chapter 15.2 of Norway's National Inventory Report for 2022.

The Norwegian Oil for Development (OfD) programme, which was launched in 2005, aims at assisting developing countries, at their request, in their efforts to manage petroleum resources in a way that generates economic growth and promotes the welfare of the whole population in an environmentally sound way. A description of the OfD program can be found at: <https://www.norad.no/en/front/thematic-areas/oil-for-development/>. The programme is currently engaged in 8 countries, mainly in Africa.

The operative goal of the program is «economically, environmentally and socially responsible management of petroleum resources which safeguards the needs of future generations.» OfD takes a holistic approach meaning that management of petroleum resources, revenues, environment and safety are addressed in a coherent manner. OfD assistance is tailor-made to the particular needs of each partner country. It may cover the designing and implementing legal frameworks, mapping of resources, environmental impact assessments, handling of licenses, establishing preparedness to handle accidents and oil spills, health, safety and environmental legislation, petroleum fiscal regimes and petroleum sovereign wealth fund issues as well as initiatives related to transparency, anti-corruption, and climate change.

In 2021 the prior government decided to gradually phase out the OfD and discontinue the programme by 2024. This change was conducted to steer the development assistance in a greener direction with focus on climate change and renewable energy. In accordance with the Norwegian development policy with focus on renewable energy, the OfD programme shall be transformed into an Energy for Development (EfD) programme, which is in the process of being developed.

The policy of the Norwegian government is to integrate development and climate, as these major challenges are highly interlinked. Increased access and transition to renewable energy is the main priority. Renewable energy has been part of Norway's development assistance policy for several years. In addition to extensive support through multilateral and multi-donor funding, several countries, mainly in Sub-Saharan Africa, have received bilateral Norwegian renewable energy funding. The overall objective of Norway's contribution to renewable energy is to contribute to SDG 7 and the Paris Agreement. The intervention in renewable energy is also seen as a contribution to reduce further development of coal power. For further information, see chapter 15.4 of Norway's National Inventory Report for 2022.

Norway has issued Instructions for Official Studies and Reports (Utrekningsinstruksen), laid down by Royal Decree. These instructions deal with consequence assessments, submissions and review procedures in connection with official studies, regulations, propositions and reports to the Storting. The instructions are intended for use by ministries and their subordinate agencies. The instructions form part of the Government's internal provisions and deviation may only be allowed pursuant to a special resolution. The provisions make it mandatory to study and clarify financial, administrative and other significant consequences in advance.

In addition, Norway has a legal framework that deals specifically with environmental impact assessments. The purpose is to promote sustainable development for the benefit of the individual, society and future generations. Transparency, predictability and participation for all interest groups and authorities involved are key aims, and

it is intended that long-term solutions and awareness of effects on society and the environment will be promoted.

For Norway, the principles of just transition are crucial to the implementation of the Paris Agreement. The social dialogue between government, worker's unions and employer's organisations is an important foundation. The government of Norway has emphasized the creation of new, green businesses and workplaces, and at the same time contributing to the greening of existing jobs. In 2022, the Norwegian Council for Just Transition was formed, with an aim to discuss relevant aspects of climate policy that pertains to the workforce. The council is led by the Minister of Climate and Environment with participation from four national worker's unions and four employer's organisations. The council is a platform for discussions around effects of the green transition on the workplace and in the workforce. The council also discusses geographic and gender disparities. An aim for the Norwegian government is that the green transition takes place in a way that does not increase the social differences in the society.

Norway aims to ensure the equal and meaningful participation of civil society, including women and girls, in decision-making processes on climate change, both nationally and internationally. At the international level, Norway has advocated for and made efforts in order to ensure that the equal and meaningful participation and leadership of women in all aspects of the UNFCCC processes are included in relevant decisions under the UNFCCC and the Paris Agreement. Norway also promotes gender balance in all national delegations, including under the UNFCCC. To address the issue of underrepresentation of women in the UNFCCC processes, Norway announced a strengthened commitment on gender and climate change during the negotiation's «Gender Day» at COP 26:

«Norway will work to increase and strengthen the role and impact of women and girls in both international and national climate decision-making. This includes working to increase the proportion of women and girls in the UNFCCC-processes and in national decision-making on climate policies. Norway will report on the results in its Biennial Transparency Report under the Paris Agreement.»

In 2022, the Nordic countries presented a commitment on gender equality and climate change, which was presented during the UN Commission on the Status of Women (CSW66). Through this, we have committed ourselves to promote international cooperation, build alliances and strengthen advocacy on the interconnections between climate action and gender equality. In 2022, Norway also hosted a roundtable on the topic «Gender Equality and Climate Justice», together with the women's organization FOKUS and UN Women. The roundtable included ministers from several Nordic Countries, UN Women, actors from civil society and a number of business leaders. At COP 27, Norway hosted a high-level side event on gender and climate change, together with the African Union and UN Women.

On then national level, Norway has made arrangements for the participation of women's organizations in relation to the preparation of the climate change negotiations. The Ministry of Climate and Environment has also arranged a number of courses for new climate change negotiators, which includes many young women. The courses have also been valuable for more experienced climate change negoti-

ators. Norway is also proud to have had a Norwegian female representative for the role as the SBI Chair under the UNFCCC for the period 2020-2022. She is the fourth woman to ever have this role in history.

Norway will continue the work on gathering knowledge on and promoting the inter-linkages between climate change and gender equality.

2.6 Summary of greenhouse gas emissions and removals

According to the MPGs, each Party that submits a stand-alone national inventory report shall provide a summary of its GHG emissions and removals in a tabular format. According to decision 5/CMA.3, the CTF table 6 should be in accordance with the common reporting table 10.

The ETF progress reporting tool is meant to populate CTF table 6 with inventory data from the ETF inventory reporting tool. However, CTF table 6 in the progress reporting tool has not been specified in accordance with CRT table 10, and hence CTF table 6 can't be generated at the time this BTR was reported. For information contained in the CRT tables, see Norway's submission at the UNFCCC website.²⁴

2.7 Projections of greenhouse gas emissions and removals

2.7.1 Introduction

This chapter presents projections of greenhouse gas emissions and removals in Norway for the years 2025, 2030, 2035 and 2040. The baseline scenario is a «with measures» (WEM) projection, based on policies and measures implemented as of midyear 2024. A «with additional measures» (WAM) projection is also reported, see chapter 2.7.6. Historic emissions and projections both include indirect emissions of CO₂. The previously reported projections were in Norway's 8th National Communication and 5th Biennial Report (NC8/BR5) in 2022.

2.7.2 With existing measures (WEM) projections

Norwegian greenhouse gas emissions in 2022 without LULUCF were 48.9 million tonnes of CO₂ equivalents. Estimates for 2023 that have not yet been reported to the UNFCCC show a significant reduction, to 46.7 million tonnes. Emissions for 2023 are estimated to be 9 per cent lower than in 1990 and 17 per cent below the emissions peak in 2007. This reduction has occurred in parallel with population growth and economic growth. In per capita terms, the emissions reduction is far greater, with a reduction of almost 30 per cent since 1990. Updated emissions projections

²⁴ UNFCCC: First Biennial Transparency Reports

for the period towards 2040 show that the reduction in emissions is expected to continue.

Table 2.8 shows Norway's updated projections under the WEM-scenario for all sectors and gases for the period up to 2040. In 2040, Norwegian emissions without LULUCF are projected to be just under 28 million tonnes of CO₂ equivalents; c.f. table 2.8. This is a reduction of almost 46 per cent from the 1990 level. The LULUCF sector contributed to a net uptake of about 13.7 million tonnes CO₂ in 2022. The net uptake is projected to increase to about 16.6 million tonnes CO₂ in 2025, and then decrease to about 7.8 million tonnes CO₂ in 2040. CTF table 5 identifies the mitigation policies and measures, actions and plans that are included in the WEM projection.

Table 2.8 (CTF table 7) Information on projections of greenhouse gas emissions and removals under a 'with measures' (WEM) scenario

	Most recent year in the Party's national inventory report	Projections of GHG emissions and removals			
	(kt CO ₂ eq)	(kt CO ₂ eq)			
	2022	2025	2030	2035	2040
Sector					
Energy	20770.00 ⁽²⁾	19 562,64	14 849,83	11 520,35	8 931,56
Transport	12 708,57	11 086,04	8 921,39	7 140,43	5 723,17
Industrial processes and product use	9327.40 ⁽¹⁾	8 613,96	8 135,46	7 795,27	7 508,39
Agriculture	4 642,65	4 566,96	4 784,99	4 796,42	4 812,65
Forestry/ LULUCF	-13 746,10	-16 602,32	-13 396,94	-10 901,81	-7 796,90
Waste management/ waste	1 430,87	1 308,05	1 150,37	1 031,09	939,72
<i>Other (specify)</i>					
Gas					
CO ₂ emissions including net CO ₂ from LULUCF	26 605,99	20 410,14	16 635,05	13 839,65	12 761,87

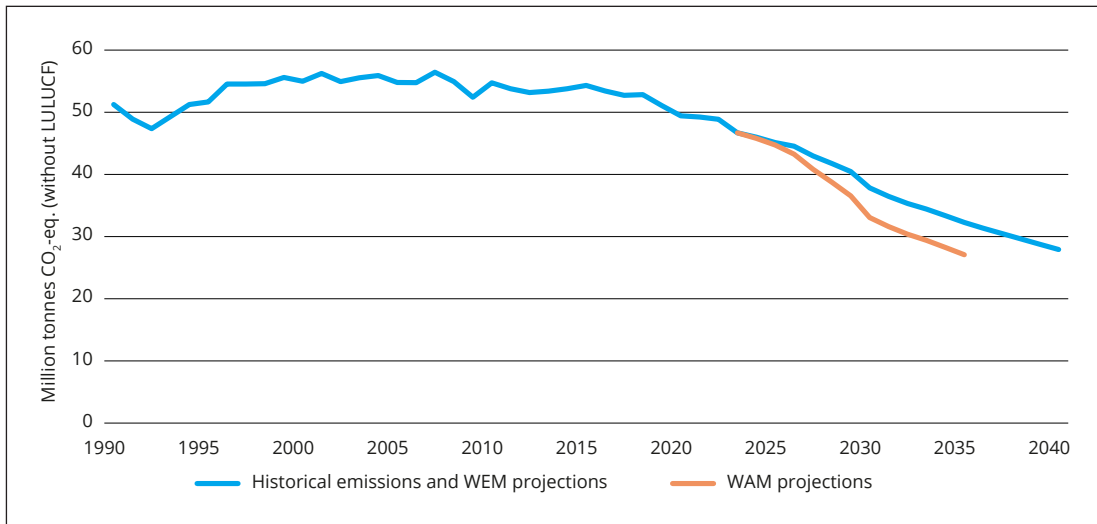
CO ₂ emissions excluding net CO ₂ from LULUCF	40 807,82	37 482,09	30 507,88	25 224,30	21 049,41
CH ₄ emissions including CH ₄ from LULUCF	5 140,56	4 981,31	4 871,30	4 707,70	4 577,17
CH ₄ emissions excluding CH ₄ from LULUCF	4 921,20	4 760,35	4 647,43	4 480,25	4 346,06
N ₂ O emissions including N ₂ O from LULUCF	2 446,96	2 326,37	2 349,25	2 312,42	2 279,49
N ₂ O emissions excluding N ₂ O from LULUCF	2 210,60	2 077,70	2 097,24	2 057,02	2 019,96
HFCs	746,79	648,93	406,19	365,06	331,88
PFCs	122,19	93,9	98,25	102,56	107,4
SF ₆	70,9	74,67	85,05	54,35	60,78
NF ₃					
<i>Other (specify)</i>					
Total with LULUCF	35 133,39	28 535,32	24 445,09	21 381,74	20 118,59
Total without LULUCF	48 879,49	45 137,64	37 842,04	32 283,55	27 915,49

¹ Includes 3.88 kt CO₂ indirect CO₂ emissions as reported in CRT table 6. Indirect CO₂ emissions are included in the projections, but are not specified per sector.

² Includes 120.68 kt CO₂ indirect CO₂ emissions as reported in CRT table 6. Indirect CO₂ emissions are included in the projections, but are not specified per sector.

The WEM projection without LULUCF is illustrated in figure 2.7, together with the historic emissions and a with additional measures (WAM) projection (also without LULUCF). Estimates show that additional measures can lower the emissions in 2030 and 2035 by 4.8 and 5.2 million tonnes CO₂ eq, compared to the WEM projection. Norway does not report a WAM-projection for the year 2040 since the effects of PaMs in the WAM-scenario have not been quantified for the year 2040. For more information about the WAM projection, see chapter 2.7.6.

Figure 2.7 Historic emissions and WEM and WAM projections without LULUCF (million tonnes CO₂ equivalents)



Sources: Ministry of Climate and Environment and Ministry of Finance

Table 2.9 and figure 2.7 show historic emissions and removals and the WEM projection, distributed across sectors from the Norwegian Emission Inventory. Additionally, the table differentiates between EU ETS and ESR emissions, see chapter 2.3 for further details.

Table 2.9 Greenhouse gas emission and sequestration (million tonnes of CO₂ equivalents)

	1990	2005	2022	2030	2035	2040
Greenhouse gas emissions	51.3	54.8	48.9	37.8	32.3	27.9
EU ETS emissions	22.6	27.4	23.6	18.3	15.2	12.9
Oil and gas activities ¹	7.2	12.9	11.5	7.8	5.3	3.6
Mainland manufacturing, incl. mining ²	14.6	13.4	10.7	9.3	8.8	8.3
Other ³	0.7	1.1	1.5	1.2	1.1	1.0
Effort Sharing emissions	28.7	27.4	25.2	19.8	17.3	15.2
Road transport	7.4	9.5	8.7	5.3	3.8	2.7
Shipping, ⁴ fisheries, machinery, etc.	4.6	5.5	6.6	5.6	5.0	4.3
Agriculture	5.0	4.7	4.6	4.8	4.8	4.8
Other ⁵	11.7	7.7	5.3	4.1	3.7	3.4
Negative emissions	0	0	0	-0.2	-0.2	-0.2
+ Net sequestration in forests and other land areas	-11.8	-24.8	-13.7	-13.4	-10.9	-7.8
= Net greenhouse gas emissions	39.5	30.0	35.1	24.4	21.4	20.1
Memo:						
Mainland Norway ⁶	43.0	40.7	36.8	29.6	26.6	24.1

¹ Some of the oil and gas emissions are non-EU ETS emissions. These have been added to «other» Effort Sharing emissions.

² Some of the manufacturing emissions are non-EU ETS emissions. These have been added to «other» Effort Sharing emissions.

³ Includes EU ETS emissions from energy supply and aviation.

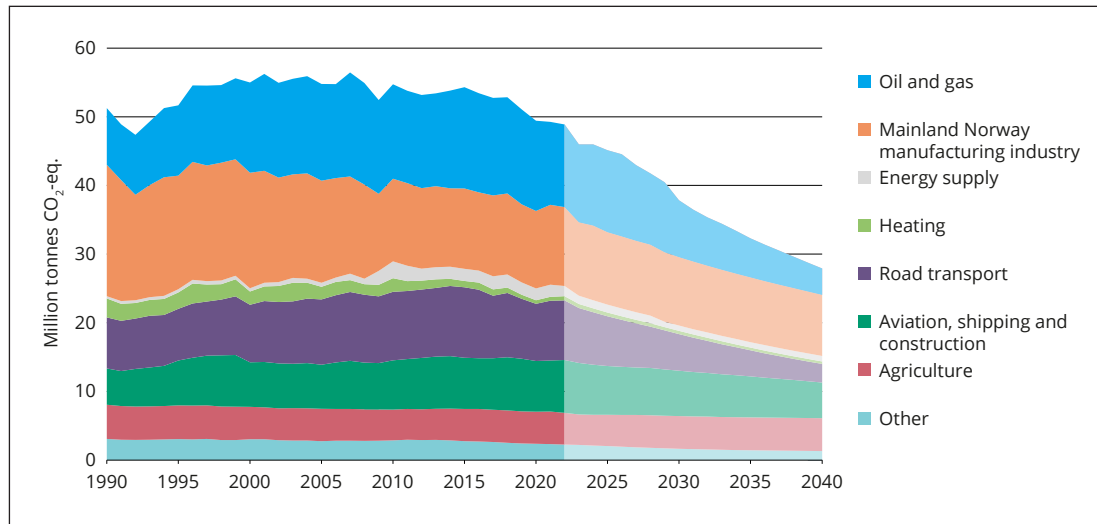
⁴ Includes all domestic shipping emissions, including those that are also EU ETS emissions.

⁵ Includes Effort Sharing emissions from oil and gas activities, mainland manufacturing (incl. mining), energy supply, heating and other emission sources.

⁶ Greenhouse gas emissions, excluding oil and gas activities.

Sources: Statistics Norway, Norwegian Environment Agency, Norwegian Institute of Bioeconomy Research and Ministry of Finance.

Figure 2.8 Greenhouse gas emissions¹ by main sources in the Norwegian emissions inventory (million tonnes of CO₂ equivalents)



¹ Historical emissions up to and including 2022. Projected emissions after 2022 are indicated by transparent colouration.

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

2.7.3 Details for the WEM projections (without LULUCF)

2.7.3.1 Assumptions

The WEM-projection is the Ministry of Finance’s estimate of future greenhouse gas emissions in Norway based on assumptions about underlying trends in the Norwegian and international economy, including economic, technological and demographic aspects. Key assumptions are discussed in Box 2.1. It is assumed that current climate policy will remain unchanged, both in Norway and internationally. This means that proposed changes to policy instruments and measures that have not been fully examined or implemented in regulations or decisions of the Storting, etc., are not included in the projection. This also applies to measures presented in the Government’s proposed fiscal budget for 2025. In the projections, the rates of CO₂ tax and other taxes and public grants are kept unchanged at the 2024 level. The projection therefore does not provide a description of the Government’s objectives or the effects of new climate policies and should not be considered a forecast of the most likely emissions development. Box 2.8 summarises some of the key climate policy changes since the previous projection.

Greenhouse gas emissions developments are uncertain. Emissions are closely linked to economic activity. Norway is a small, open economy, and emissions developments will be heavily influenced by international circumstances. As an example, lower economic growth among trading partners may lead to lower demand for emission-intensive exports, such as metals and fertilisers, thereby reducing Norwegian emissions. Technological development, which for the most part takes place out-

side Norway, is also of major importance to emissions development. However, it is notoriously difficult to predict technological breakthroughs. This uncertainty is illustrated by electric car sale developments in Norway. Value added tax exemption for electric passenger cars was introduced already in 2001, while exemptions from motor vehicle registration tax and road tolls came even earlier. However, electric car sales did not increase significantly until about 2018. By then battery technology had increased the range of electric cars, while the number of models available grew and the take up almost exploded; see figure 2.8. Since the projection is based on the assumption about continuation of current international climate policy, it is generally assumed that the development of new technology will follow historical trends. Major international breakthroughs may therefore lead to a faster reduction in Norwegian emissions.

Chapter 2.7.8 presents an analysis of how sensitive emissions development is to various assumptions about economic growth and technological progress. The 2024 white paper on Long-term Perspectives on the Norwegian Economy also presented alternative Norwegian emissions pathways under various assumptions about international technological development.

Table 2.10 lists the key macroeconomic projections underpinning the Norwegian emission projections. Box 2.7 explains key assumptions of the WEM projections, while box 2.8 lists differences the changes in policy.

Table 2.10 (CTF table 11) Key underlying assumptions and parameters used for projections

Key underlying assumption and parameters ^c	Unit, as applicable	Most recent year in the Party`s national inventory report, or the most recent year for which data are available	Projections of underlying assumption/parameters ^d				
			2022	2025	2030	2035	2040
GDP	billion NOK, Fixed 2023 prices	4 286.00	4 494.00	4 704.00	4 881.00	5 038.00	
GDP of which mainland Norway	billion NOK, Fixed 2023 prices	3 826.00	4 004.00	4 324.00	4 560.00	4 766.00	
GDP of which petroleum activities and ocean transport	billion NOK, Fixed 2023 prices	461.00	495.00	405.00	348.00	302.00	
Consumption	billion NOK, Fixed 2023 prices	2 928.00	3 116.00	3 400.00	3 681.00	3 908.00	
Gross fixed capital formation	billion NOK, Fixed 2023 prices	690.00	706.00	819.00	803.00	790.00	
Gross fixed capital formation of which mainland Norway	billion NOK, Fixed 2023 prices	466.00	435.00	599.00	613.00	610.00	
Gross fixed capital formation of which petroleum activities and ocean transport	billion NOK, Fixed 2023 prices	224.00	272.00	220.00	190.00	180.00	
Population	Thousands	5 425.00	5 600.00	5 750.00	5 880.00	5 994.00	
Number of personsemployed	Thousands	2 822.00	2 875.00	2 911.00	2 917.00	2 913.00	
Oil price	USD per barrel	98.00	78.60	79.30	87.50	96.70	
Gas price	USD per M M Btu	33.10	11.50	7.90	8.40	9.00	

Source: Ministry of Finance

Box 2.7 Key assumptions underpinning the projections¹

The projection is based on the emissions accounts, the reporting guidelines adopted by the parties to the UNFCCC and the national accounts from Statistics Norway. The projection is generated by Statistics Norway's economic model SNOW², whose input data are obtained from the National Account and the GHG inventory. The model is supplemented by other types of analyses in certain areas. The projection relies on detailed emissions data for 2022, which is the last year for which final data are available. For 2023, the projection therefore deviates somewhat from Statistics Norway's provisional 2023 emissions accounts.

The projection is consistent with the macroeconomic pathway outlined in the national budget and the 2024 white paper on Long-term Perspectives on the Norwegian Economy: The emissions projection reflects developments in employment, production, oil and gas prices, public finances and the current account balance. Power production is in line with the provisional 2024 long-term power market analysis from the Norwegian Water Resources and Energy Directorate (NVE). EU ETS emissions allowance prices are projected on the basis of forward prices and interest rate levels. The resulting emissions allowance price estimate increases to about NOK 950 at 2024 prices in 2040. Other international prices are kept unchanged in real terms from the base year.

The projection assumes that current climate and environmental policy will be continued in Norway and internationally. Carbon tax rates, biofuel sales requirements and the level of transfers to Enova are therefore kept unchanged at 2024 levels. The biofuel blend ratio required for fuel sales is 10 per cent for non-road vehicles and 6 per cent for shipping and fisheries. For road transport, the actual biofuel blend ratio is estimated to be 15.5 per cent. This ratio is lower than the sales requirement due to the regulations on double counting of advanced biofuels.

It is assumed that the carbon capture and storage facility at the cement factory in Brevik will be completed in 2025. For the waste incineration plant at Klemetsrud, it is assumed, on an uncertain basis, that the carbon capture and storage facility will be completed in 2029. Completion of the Klemetsrud facility has been deferred by two years compared with the previous projection.

Box 2.7 continued

The projection of emissions from oil and gas activities is based on information from the Norwegian Offshore Directorate. The Norwegian Offshore Directorate estimates are primarily based on operators' own plans and reports, along with onshore facility emission data.³ Petroleum activity-related emissions from maritime support services and helicopter transport are included in other emission sources.

Passenger car emissions are projected using a model developed by the Norwegian Environment Agency. The model generates emissions pathway projections based on assumptions about vehicle kilometre developments, electric car sales and bio-fuel sales requirements.

Based on activity data from the Norwegian Institute of Bioeconomy Research (NIBIO), the Norwegian Environment Agency prepares agricultural emissions projections. A certain degree of efficiency improvement is assumed, thereby gradually reducing emissions per unit produced somewhat over time.

¹ For more details, see Ministry of Finance (2024); «Documentation of assumptions underpinning greenhouse gas emissions projections for the National Budget 2025».

² Rosnes and Yonezawa (2024), The SNOW Model for Norway – SSB, Documents 2024/16, Statistics Norway

³ Under this definition, oil and gas activities include all offshore petroleum installations, as well as the onshore facilities at Kollsnes, Sture, Nyhamna (Ormen Lange field), Hammerfest LNG facility (Snøhvit field), Mongstad (indirect emissions from crude oil terminal) and Kårstø.

Box 2.8 Climate policy changes since the previous report

Projections of environmentally harmful emissions to air were last updated in the National Budget 2023 (and reported in NC8) and were based on the climate policy stance in the late summer of 2022. Since then, climate policy has been tightened. Some important changes are:

- Taxes on emissions covered by the Effort Sharing Regulation have been increased from NOK 766 per tonne of CO₂ in 2022 to NOK 1,176 in 2024. In addition, a carbon tax on nitrous oxide from mineral oil and on SF₆ has been implemented at the general tax level of NOK 1,176. The tax on the combustion of fossil fuel waste has been increased from NOK 192 in 2022 to NOK 882 in 2024.
- Road usage tax rates were reduced in 2023 and 2024. This should be considered in the context of the higher CO₂ tax on mineral products, which would in itself serve to increase fuel prices.
- A new weight component has been introduced in the motor vehicle registration tax for all vehicles. In addition, the rates of the CO₂ component in the motor vehicle registration tax for passenger cars and vans have been increased, and the preferential treatment of plug-in hybrid cars for motor vehicle registration tax purposes has been discontinued.
- From 1 January 2023, the value added tax exemption was abolished for passenger EVs with a value in excess of NOK 500,000.
- From 1 July 2024, value added tax on the financial leasing and rental of passenger cars was restructured to a more neutral stance.
- The biofuel blend ratio required for road transport fuel sales has been increased by almost 2 percentage points. In addition, a 10-per-cent biofuel blend ratio requirement was introduced for non-road transport fuel sales, including construction machinery, from 2023, while a 6-per-cent biofuel blend ratio requirement was introduced for shipping and fisheries fuel sales from Q4 2023.
- The transfers to Enova have been increased by a total of NOK 3.0 billion in 2023 and 2024. The increased transfers are earmarked for emission reduction, technology development and industry restructuring.
- Bionova was established in 2022, and its 2024 grant is about NOK 170 million. Bionova is charged with reducing greenhouse gas emissions in agriculture, forestry and aquaculture.
- As of 2024, public procurement decisions are required to accord a 30-per-cent weighting to environmental considerations. In addition, the regulatory zero-emission requirement in public vehicle procurement has been tightened somewhat by bringing forward the city bus requirement by one year, thereby making it applicable from 2024. It may still be met by using biogas.

The projections in NC8 were based on GWP-100 values from IPCCs fourth assessment report, while GWP-100 values from the IPCCs fifth assessment report are used for the projections in this BTR.

2.7.3.2 *Methods and models*

The method and models used for the projections are described below. In the projections of this report, the SNOW-model has replaced the Excel spreadsheet model used in Norway's NC8, for road transport except passenger cars. For passenger cars, the Excel spreadsheet model remains, c.f. description below. Additionally, the SNOW-model is improved since Norway's NC8. The model has now a more detailed description of the Norwegian tax code; improved specification of free EUA's; introduced biofuel in aviation, fishing, water transport and non-road machinery sectors; and an improved specification of the waste sector.

SNOW

The 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 49 industries (45 private production sectors and 4 government sectors), classified to capture important substitution possibilities with environmental implications. The model includes 24 consumption goods with detailed description. Moreover, detailed description of governmental taxes and transfers such as environmental policy, trade policy, subsidies, tax rates, and real government spending is also included.

Producer behaviour is characterised by perfect competition. The main production factors are material inputs, labour, three types of real capital, five types of energy goods (incl. biomass) and various types of polluting and non-polluting transport services. For most commodities, a certain degree of substitution between production factors is assumed, depending on their relative prices and the exogenous assumptions about factor productivity developments. Labour and capital are perfectly mobile between sectors. In each sector, real capital formation is determined so that expected return on capital equals an exogenously given return on capital.

We model a small, open economy, which considers the world market prices and interest rate as exogenous. Domestic and foreign goods are assumed to be imperfect substitutes (Armington assumption). Together with a given balance of payments, the real exchange rate will be determined consistent with domestic consumption.

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. Various environmental and climate policy instruments are included, e.g., emission quotas, taxes and subsidies.

The intended field of application of the model is climate policy, tax reforms and sustainable public finance. The main input data categories and data sources are National accounts and official statistics on emissions. Outputs of the model are prices and quantities for all goods (monetary values, based on national accounts), GHG emissions, emissions of other pollutants, energy consumption, tax revenues and government spending. Gases covered by the model is domestic emissions of twelve pollutants (six GHG and six air pollutants) disaggregated by source and sector. The base year is 2018 with respect to trends, but the trends are calibrated to start at the emission level in 2020. Adjustments were made for sectors particularly affected by the pandemic. The model can be run to 2100. Population projections are from Statistics Norway. The model structure is top-down with bottom-up features. There are nested CES functions in production and consumption.

Projections of emissions of greenhouse gases other than CO₂ are mainly based on sector- and plant-specific information, assessed by the Norwegian Environment Agency.

SNOW is a general model that simultaneously accounts for behavioural responses to a variety of policy instruments and other drivers. The model's relatively rich variety of policy variables will give synergies between policies and measures (PaMs) when projecting emissions. However, the model only operates with, for example, average marginal tax rates and does not capture the richness of all policy instruments (e.g. differentiation in vehicle registration tax). One of the strengths of using an integrated macroeconomic and emission model like SNOW is that the model provides consistency between long-term economic forecasts and emission projections. The usual caveats of computable general equilibrium top-down approaches apply. One shortcoming of SNOW is its poor specification of new technologies (abatement options) in industries, but this is under development. Another shortcoming is the need for the outputs to be supplemented by the results from more disaggregated models and expert judgment.

Petroleum sector

The projections of emissions from oil and gas production have been prepared by the Norwegian Offshore Directorate (NOD) and are based on reporting from oil companies. Emissions from the petroleum sector in Norway are well documented. The industry's own organisation, the Offshore Norge, has established a national database for reporting all releases from the industry, called EPIM Environment Hub (EEH). All operators on the Norwegian continental shelf report directly in EEH data on emissions to air and discharges to the sea. Oil companies operating on the Norwegian shelf must submit data annually, and forecast their respective operated fields, discoveries, transport and land facilities. The reporting includes corporate financial data, projects, resource volumes and forecasts for production, costs and environmental discharges/emissions. The NOD quality-assures and organises the data reported by the companies. The NOD also prepares its own estimates and clas-

sifies the resources based on its own assumptions. Based on the information from the companies, the NOD updates the resource accounts for the Norwegian shelf and prepares forecasts for production, costs and emissions.

Emissions of CO₂ derive mainly from offshore generation of electricity, gas pipeline compressors, and from flaring for safety reasons. In addition, mobile facilities linked to a permanent facility in production generate some emissions.

In the projection, it is assumed that emissions depend on the infrastructure installed, instead of volume extracted. This modelling choice is because offshore power demand remains almost constant throughout the lifespan of the installation. As such, offshore CO₂ emissions are but sparsely correlated with extraction volume.

Passenger cars

Emissions of CH₄, N₂O, CO₂ from passenger cars are projected in a 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) v5.1 using activity data for 1990–2022). Emissions are projected using time series estimates for the following parameters: population growth, kilometers driven per person for different vehicle classes, emission factors, biofuel blending, and a factor that adjusts for the discrepancy between fuel sales and bottom-up estimates of fuel consumption.

Projection data:

- Activity, population – Statistics Norway
- Activity, kilometers driven per person for different vehicle classes – expert estimates based on historical trends and background data in the National Transport Plan
- Emission factors: trend by vehicle class (or by technology for light duty vehicles) – expert estimates • Biofuels: adopted quota obligations
- Adjustment for the discrepancy between fuel sales and bottom-up estimates of fuel consumption – expert estimates

Agriculture sector

The Ministry of Agriculture and Food is responsible for the agriculture projections and order emission projections from the Norwegian Environment Agency (NEA), and projections for agricultural activity data from Norwegian Institute of Bioeconomy Research (NIBIO). Some basis requirements are given by Ministry of Finance, for example which population forecast the agriculture emission forecast should be based on. The Environment Agency specifies the activity data variables needed in Excel sheets including the historical figures for the same variables. The variables are discussed and include other experts when needed.

The emission projections are estimated with a forecasting tool including the complete agriculture sector and the tool is based on the same set of models and emission factors as are used for the historical emission inventory. This ensures that methodological changes in the inventory also are reflected in the projections. Descriptions of the methods and emission factors used in the emission inventory are given annually in chapter five of the Norwegian National Inventory Document (NID) and Annex 5b to the NID.

Projections for the agricultural activities from NIBIO are input to the forecasting tool. The projection of CH₄, N₂O and NH₃ emissions from agriculture are based on projected development in animal stock. Animal numbers, which is dependent of expected population development from Statistics Norway, historical trend in production and consumption, assumptions in development in diets in the population and the growth and performance per animal.

For dairy cow is expected development in milk yield, nitrogen content in manure and excretion of organic material (VS) forecasted. Use of concentrate as part of total amount of feed, concentrate in kilograms TS per day and animal and the fat content in the concentrate, and the pasture time is also included in the forecast estimations for cows.

For young cattle are slaughter weight and slaughter age forecasted in the enteric methane estimations.

Total nitrogen need is projected, and how expected change in animal manure substitutes for synthetic fertiliser used. The development in tonnes for different crops harvested is also forecasted.

Development in area organic soils cultivated are based on historical trends in the LULUCF inventory. Some dependencies between different emission sources and variables are reflected in the forecasting-tool projections. Population forecast affects animal number forecast, crop production, mineral fertilizer use and use of liming in the emission projections. Also other dependencies between emission sources are included in the forecasting tool, as for example amount of nitrogen in mineral fertiliser and manure respectively, crop production trend also influences emissions from several emission sources in the inventory.

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 12 per cent of produced methane is recovered. This equal to the actual recovery in 2022. Descriptions of the model for calculating CH₄ from landfills are given annually in chapter 7 of the Norwegian NID.

Emissions of some sources under industrial process and product use (IPPU)

The Norwegian Environment Agency projects N₂O emissions from nitric acid production and from the production of mineral fertilizers. This is based on the detailed information used for the GHG inventory. The projections of N₂O emissions from nitric acid are based on information about the effect of a N₂O reducing technology as of 2023. It is assumed an efficiency rate of 0.2 per cent per annum from 2024, and the production level is assumed to be constant at 2023-level. The emissions

from the production of mineral fertilizers derive from the use of phosphate. The projections of are based on the implied emission factor (N₂O emissions per unit production) for 2023, and the production level is assumed to be constant at 2023-level.

The Norwegian Environment Agency also estimates the emissions of sulphur hexafluoride (SF₆) and hydrofluorocarbons (HFCs) based on models used for the GHG inventory. The assessment is based on how taxes and current regulations effect the respective emissions.

2.7.3.3 Projections

Projections of emissions to air were last presented in 2022, in the National Budget 2023. A modified version of this projection was presented in the National Budget 2024 due to revision of the emissions accounts in 2023. In 2023, Statistics Norway updated the emissions accounts to encompass new parameters for mapping emissions from metric tonnes to tonnes of CO₂ equivalents. These so-called GWP (Global Warming Potential) values are in line with the reporting guidelines under the UNFCCC. The update increased estimated greenhouse gas emissions by between 0 and 0.6 per cent annually between 1990 and 2022.

The reduction in Norwegian greenhouse gas emissions is expected to continue. The projections estimate that emissions will on average decline by about 3 per cent annually until 2040 (see Figure 2.7 and Tables 2.8 and 2.9). In 2030 and 2040, emissions are projected to become 23 per cent and 43 per cent lower than in 2022, respectively. This development is primarily due to existing policy instruments making it attractive to improve and adopt more environmentally friendly technology and undertake other energy and emissions efficiency measures. On the other hand, the emissions reduction is dampened by expected economic growth and population growth. Emissions reduction towards 2040 is fairly equally divided between EU ETS emissions and Effort Sharing Regulation (ESR) emissions, with both decreasing by about 10 million tonnes of CO₂ equivalents; see table 2.9.

Table 2.8 shows emissions specified by type of greenhouse gas. CO₂ emissions increased from 1990 until 2015. As fossil fuel consumption has declined, partly because of increased electrification, CO₂ emissions have declined. This trend is expected to continue, and the projection estimates that CO₂ emissions will be almost halved by 2040, compared with 1990. Emissions of greenhouse gases other than CO₂ have halved since 1990. These emissions are also expected to decline further, and emissions are projected to be almost 60 per cent lower in 2040 than in 1990.

Energy emissions are projected to decrease by 57 per cent between 2022 and 2040. The closure of the thermal power plant at Mongstad in 2023 is contributing somewhat to the reduction. Moreover, it is assumed, on an uncertain basis, that the carbon capture and storage facility at Klemetsrud will be completed in 2029. Some of the emissions captured at Brevik and Klemetsrud are from the incineration of biological material and are therefore «negative emissions». In 2030 and 2040, the negative emissions are projected to constitute 0.2 million tonnes of CO₂; see table 2.9.

Most energy related emissions in Norway origin from oil and gas extraction, as 98 percent of electric power production in Norway is hydropower and wind tur-

bine power.²⁵ Oil and gas extraction accounts for the largest emissions reduction towards 2040, measured in equivalent tonnes. Emissions from oil and gas extraction are projected to decline by about two thirds compared with 2022. For comparison volume oil and gas extracted is projected to decrease by 35 per cent over the same period, as shown in table 2.9. The projections are subject to considerable uncertainty, and this uncertainty increases over time. The uncertainty relates, in particular, to future activity levels, infrastructure lifespans, future energy solutions and other potential emission-reducing measures; see Prop. 1 S (2024–2025) for the Ministry of Energy.²⁶

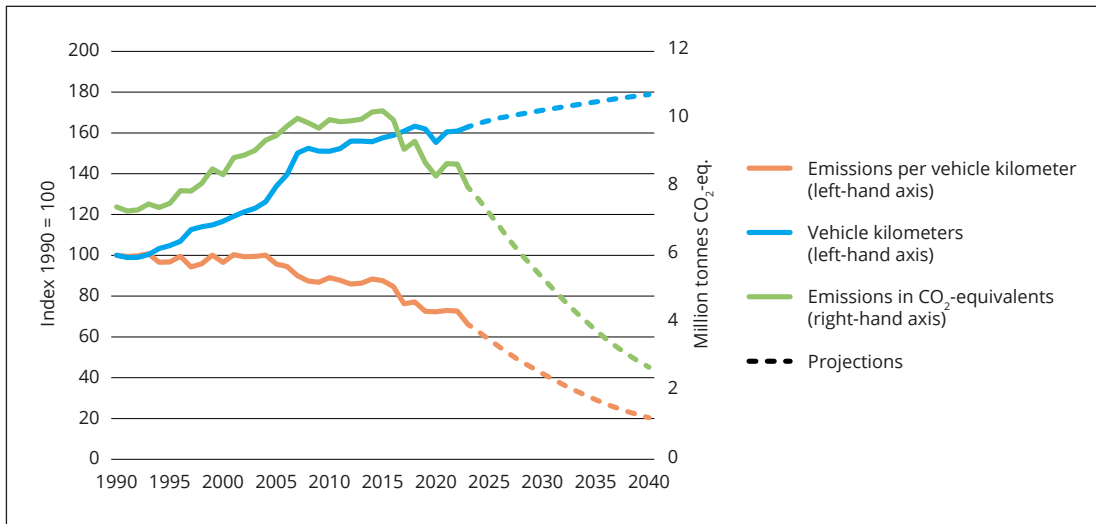
Almost 97 per cent of emissions from oil and gas extraction in 2022 were CO₂ emissions. The remainder of the emissions constitute just under 0.4 million tonnes of CO₂ equivalents. These emissions are mainly methane from necessary cold ventilation, turbine operation and flaring, as well as emissions in connection with loading and storage. Methane emissions are expected to decline as production is gradually scaled back.

Emissions from transport are projected to decrease by 55 per cent between 2022 and 2040. The reduction in road transport emissions is expected to decline by about two thirds by 2040, compared with 2022. The emissions reduction comes despite an expected increase in vehicle kilometres in line with population growth; see figure 2.9. The reduction in emissions from road transport is mainly due to the continued replacement of cars with internal combustion engines by cars with electric vehicles (EVs). So far this year, about 85 per cent of new passenger cars sold have been electric; see figure 2.10. This share is projected to keep rising, but the time when 100 per cent of new passenger cars will be electric has been deferred somewhat from the previous projection.

²⁵ [NVE: Kraftproduksjon](#) (in Norwegian only)

²⁶ [Regjeringen: Prop. 1 S \(2024–2025\)](#) (in Norwegian only)

Figure 2.9 Road transport emissions¹. Left-hand axis: index 1990=100. Right-hand axis: million tonnes of CO₂ equivalents

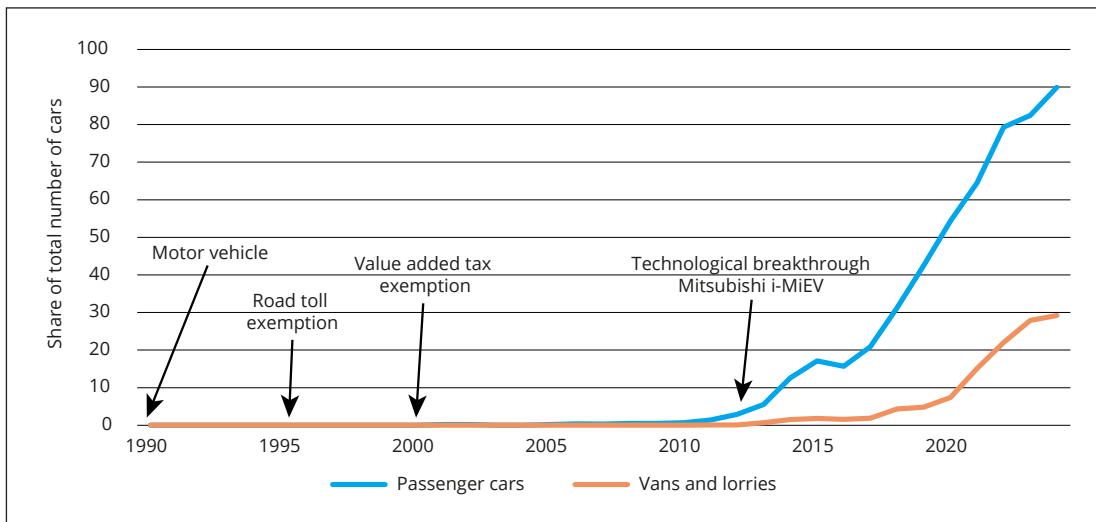


¹ Includes vans and lorries.

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

The share of new vans and lorries with electric propulsion in new car sales has also started to increase, but the uptake is lagging some years behind passenger cars; see figure 2.10. So far in 2024, almost 30 per cent of new vans sold and just over 10 per cent of new lorries sold have been electric. This share is expected to continue to increase in the coming years, thereby helping to reduce road transport emissions.

Figure 2.10 Share of new vehicles with electric propulsion (per cent)



Sources: Norwegian Road Federation and Ministry of Finance

In non-road transport, emissions from construction machinery are projected to decline, as replacement of internal combustion engines for electric propulsion is expected to continue. Aviation emissions are projected to decline somewhat. Less travel after the pandemic and more emission-efficient aircrafts explains the reduction. In shipping and fisheries, further development of emission-reducing technologies, such as seagoing vessels that can use hydrogen, contributes to decreased emissions. Lower demand for supply services for the oil and gas operations contributes to dampened shipping activity. On the other hand, emergence of offshore wind turbine power may increase the demand for supply services. From 2024, some of the domestic shipping emissions are covered by the EU ETS, while at the same time being part of the ESR. In table 2.9, these are classified as ESR emissions in their entirety.

Emissions from mainland industry²⁷ are projected to decline by about 20 per cent by 2040, compared with 2022. Increases in activity is expected to be offset by more efficient and less emission-intensive inputs, thus resulting in emissions decreasing gradually. Part of the emissions reduction by 2040 is due to the assumption that the carbon capture and storage project at Brevik will come to fruition; see Box 2.7. In addition, emissions from the refining of crude oil are projected to decline as demand for petrol and diesel for transport falls.

Agricultural production is projected to increase in line with population growth, thereby maintaining the self-sufficiency rate of agricultural foods. The emissions effect of increased production is offset by the expectation of somewhat lower emissions per unit produced. In total, emissions are projected to remain fairly stable towards 2040. Agriculture accounts for the majority of methane and nitrous oxide emissions; 57 per cent and 77 per cent, respectively, in 2022. These emissions are largely the result of feed digestion in ruminants and fertilisation.

While agricultural methane and nitrous oxide emissions are projected to remain fairly stable, total emissions of both methane and nitrous oxide are expected to decline. The reduction in methane emissions is explained by the ban on solid waste disposal, while the nitrous oxide emissions reduction is assumed to primarily come from further improvements in fertiliser production catalysts.

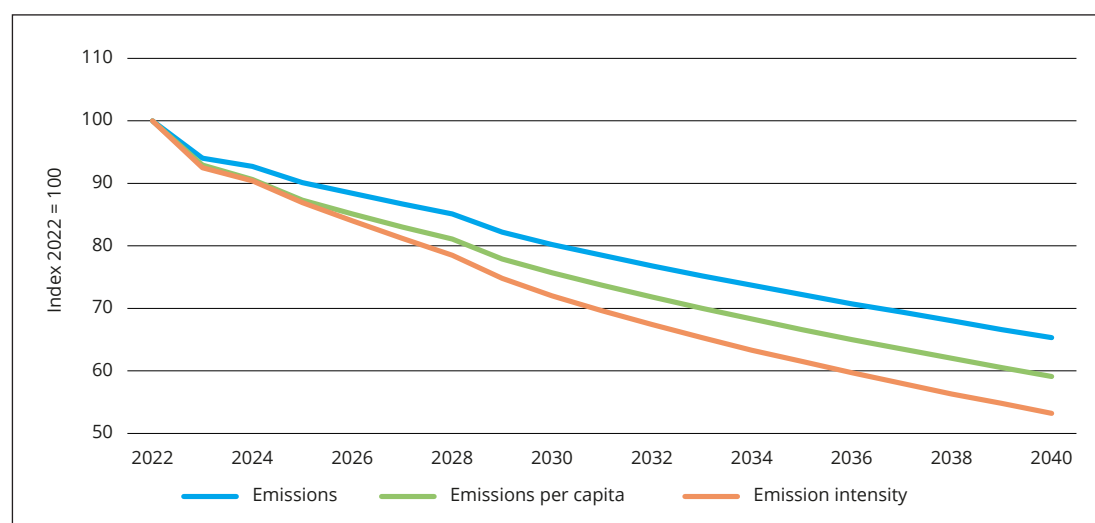
F-gas emissions that cause global warming are expected to decline further towards 2040. These are emissions from perfluorocarbons (PFCs), SF₆ and HFCs, which came to a total of 0.9 million tonnes of CO₂ equivalents in 2022. The introduction of the revised EU F-Gas Regulation, which caps emissions, is projected to more or less halve HFC emissions towards 2040. PFC and SF₆ emissions are expected to remain fairly stable.

Figure 2.11 illustrates that per capita emissions are expected to decline more rapidly than total emissions. The distance between the emissions curve (blue curve) and the per capita emissions curve (red curve) represents the isolated emissions effect of population growth. In 2040, population growth is projected to increase emissions by approximately 6 per cent of the 2022 emissions level, when consid-

²⁷ Mainland industry is industry except offshore oil and gas extraction. The aggregate «Energy excl. transport» encompasses the latter.

ered in isolation. This effect is somewhat larger than in the previous projection due to Statistics Norway's upward revision of future population growth. The figure also illustrates that emissions per unit produced (grey curve) are expected to decline more rapidly than per capita emissions, due to technology and production efficiency improvements.

Figure 2.11 Projected greenhouse gas emissions in mainland Norway (index 2022=100)



Source: Statistics Norway and Ministry of Finance

2.7.4 Details for the WEM projections for LULUCF

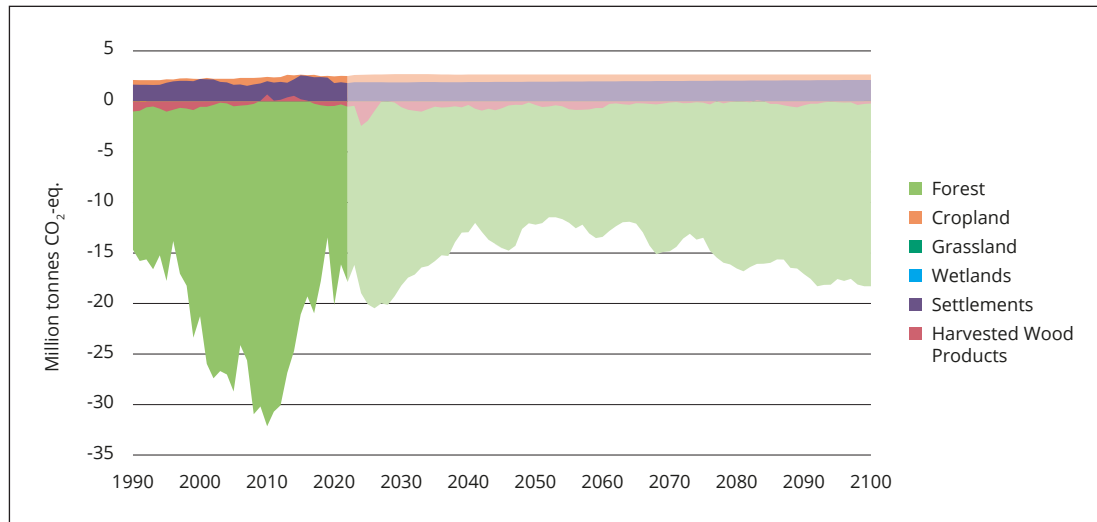
2.7.4.1 Details for LULUCF

Net removals in the Land use, land-use change, and forestry (LULUCF) sector have increased since 1990. The increase is mainly due to large-scale afforestation and active forest management after the Second World War, reaching a peak in 2009 (Figure 2.12). Since the NC8/BR5, annual removals in the LULUCF sector have been significantly reduced. This is due to reduced growth, increased harvest, increased mortality, reduced forest area, as well as methodological changes. Projections show that removals are expected to decrease towards 2050. The reasons for this are a combination of an increasing proportion of older forests that are no longer in their most productive phase, increased harvesting due to more mature timber becoming available in the future, and lower investments in silviculture in recent decades. After 2050, removals are expected to stabilize and then increase towards 2100, see Table 2.11.

Table 2.11 Net removals (million tonnes CO₂ equivalents) in the LULUCF sector (historic and projections)

	2025	2030	2035	2040	2050	2075	2100
LULUCF	- 16.6	- 13.4	- 10.9	- 7.8	- 7.0	- 7.9	- 12.7

Figure 2.12 Historical emissions (1990–2022) and projections (2023–2100) for LULUCF



Source: Norwegian Institute of Bioeconomy Research

The projections are based on data and methodology from Norway's national greenhouse gas inventory in 2022. The projections (dotted line) show the expected development in the sector where only the effect of already implemented measures is included.

2.7.4.2 *SiTree model*

The projections for the LULUCF-sector²⁸ are based on data from the Norwegian Forest Inventory covering 1990–2022 and according to methods described in NIR2024. SiTree simulates growth, mortality, and ingrowth in all the NFI plots for managed forest land. SiTree is a single tree growth simulator and is a publicly available R package²⁹, and functions for growth, mortality, ingrowth and regeneration, and management are user-defined. 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. Final felling and thinning intensities were estimated based on the observed intensities in the reference period (2009–2022). Thinning and harvest intensities in the reference period define the per cent of the area that should be managed at each period. Within each stratum and maturity group, plots are ranked according to the probability of harvest.

The emission projection from land other than forest lands uses the reference period 2009 to 2022 to estimate the change to and from the different land classes until 2100.

²⁸ NIBIO: [Framskrivninger for arealbrukssektoren \(LULUCF\) under FNs klimakonvensjon og EUs klimarammeverk](#) (in Norwegian only)

²⁹ CRAN: [Package SiTree](#)

2.7.5 Main differences in WEM from previously reported WEM

Norway's previously reported projections were in the NC8/BR5. Table 2.12 compares the WEM projection in this BTR with the WEM projection reported in the NC8. Except for LULUCF and energy, there are but minor differences. These projections are, however, not directly comparable. The projections in NC8 were based on GWP-100 values from IPCCs fourth assessment report, while GWP-100 values from the IPCCs fifth assessment report are used for the projections in this BTR. There have also been methodological changes in the inventory, especially for the LULUCF sector. In the LULUCF sector, reduced growth, increased harvest, and increased mortality as well as methodological changes, have significant revised projected emissions compared to the previous report.

Projected energy emissions in 2035 are 14 per cent lower than previously reported. This reduction is largely caused by lower projected emission from oil and gas extraction. The reduction in projected energy emissions is slightly dampened by the GWP value revision. Projected transport emissions are 6 per cent higher than previously reported. This increase is mostly due to the GWP value revision.

Table 2.12 Changes in GHG projections compared with NC8 by sector (ktonnes CO₂ eq)

Sector	2025	2030	2035	2040 ¹
Energy excl. transport	-215	-1087	-1918	NA
Transport	458	330	405	NA
Industry/industrial processes	-135	-334	-371	NA
Agriculture	-32	74	80	NA
Forestry/LULUCF	-726	3143	2703	NA
Waste management/waste	303	285	273	NA
Total with LULUCF	-348	2412	1173	NA
Total without LULUCF	379	-731	-1530	NA

¹ Comparisons for 2040 are not relevant since the NC8/BR5 projections ended in 2035.

Sources: Statistics Norway, Norwegian Environment Agency, Norwegian Institute of Bioeconomy Research and Ministry of Finance

2.7.6 With additional measures (WAM) projection

Chapter 2.5.11 describes planned measures proposed by the government in the Climate status and plan, which have not yet been adopted by the parliament. These additional PaMs are included in the WAM-projection.

Table 2.13 Effect of PaMs included in the WAM-projection (kilotonnes CO₂ equivalents)

	2025	2030	2035	2040
Energy excl. transport	61	459	430	NE
Transport	274	3854	4306	NE
Industrial processes and product use	0	0	0	NE
Agriculture	50	220	220	NE
LULUCF	0	0	0	NE
Waste	0	240	240	NE
Total	385	4773	5195	NE

Source: Ministry of Finance and Ministry of Climate and Environment

The planned PaMs are expected to primarily reduce emissions of CO₂, but there are also some emission reductions for CH₄, N₂O and HFCs, see Table 2.14 (CTF table 8) for details. The effects of the planned PaMs take into consideration the effects of existing PaMs in the WEM scenario and are adjusted to avoid overlapping effects. Norway does not report a WAM-projection for the year 2040 since the effects of PaMs in the WAM-scenario have not been quantified for the year 2040.

Table 2.14 (CTF table 8). Information on projections of greenhouse gas emissions and removals under a 'with additional measures' (WAM) scenario.

	Most recent year in the Party's national inventory report	Projections of GHG emissions and removals			
	(kt CO ₂ eq)	(kt CO ₂ eq)			
	2022	2025	2030	2035	2040
Sector					
Energy	20 770,00	19 501,99	14 390,59	11 090,53	NE ¹
Transport	12 708,57	10 811,99	5 067,19	2 834,83	NE
Industrial processes and product use	9 327,40	8 613,96	8 135,46	7 795,27	NE
Agriculture	4 642,65	4 516,96	4 564,99	4 576,42	NE
Forestry/LULUCF	-13 746,10	-16 602,32	-13 396,94	-10 901,81	NE
Waste management/waste	1 430,87	1 308,05	910,37	791,09	NE
<i>Other (specify)</i>					
Gas					
CO ₂ emissions including net CO ₂ from LULUCF	26 605,99	20 119,24	12 477,14	9 270,56	NE
CO ₂ emissions excluding net CO ₂ from LULUCF	40 807,82	37 191,19	26 349,98	20 655,21	NE
CH ₄ emissions including CH ₄ from LULUCF	5 140,56	4 939,70	4 413,31	4 240,78	NE
CH ₄ emissions excluding CH ₄ from LULUCF	4 921,20	4 718,74	4 189,43	4 013,33	NE
N ₂ O emissions including N ₂ O from LULUCF	2 446,96	2 274,19	2 194,14	2 154,26	NE
N ₂ O emissions excluding N ₂ O from LULUCF	2 210,60	2 025,52	1 942,12	1 898,87	NE
HFCs	746,79	648,93	403,77	363,81	NE
PFCs	122,19	93,9	98,25	102,56	NE
SF ₆	70,9	74,67	85,05	54,35	NE
NF ₃	NO	NO	NO	NO	NE
<i>Other (specify)</i>					
Total with LULUCF	35 133,39	28 150,63	19 671,66	16 186,33	NE
Total without LULUCF	48 879,49	44 752,94	33 068,61	27 088,13	NE

¹ Norway does not report a WAM-projection for the year 2040 since the effects of PaMs in the WAM-scenario have not been quantified for the year 2040.

2.7.7 Without measures (WOM) projection

A WOM-scenario without effects of policies and measures adopted since 1990 was illustrated in Norway's NC8. This was possible since estimated effects of PaMs reported for the years 2020, 2025, 2030 and 2035 were combined with reported effects for 1995, 2000, 2005, 2010 and 2015 from the 7th National Communication. In this BTR1, Norway reports estimated effects for some PaMs only for the years 2020 and 2030. There are therefore no longer consistent numbers/estimates available to report or illustrate a WOM-scenario from 1990.

2.7.8 Sensitivity analysis

Emission projections are uncertain. In addition to future climate policy tightening, the projections are sensitive to, inter alia, economic growth and technological development assumptions. Figures 2.13 and 2.14 illustrate this by four alternative emissions pathways.

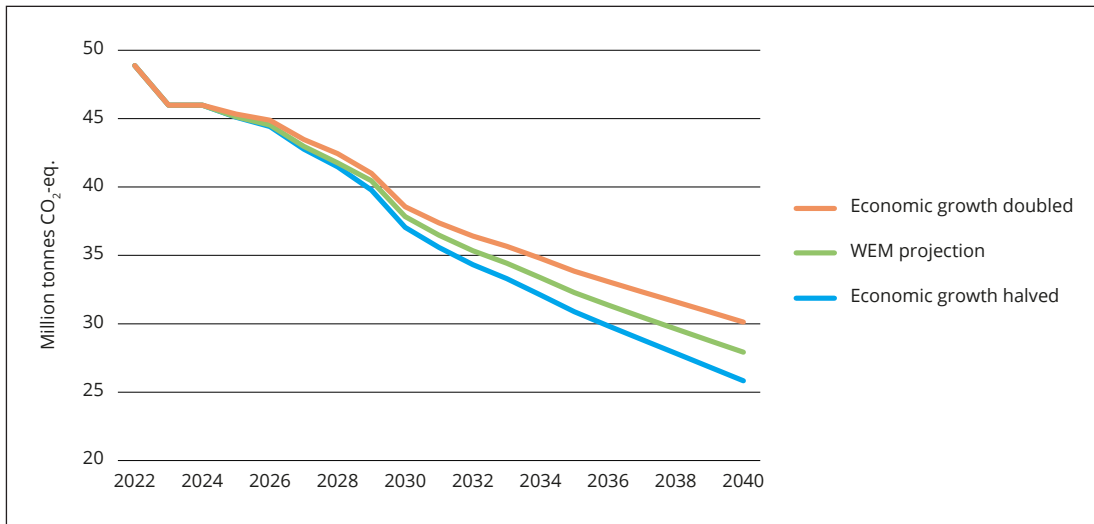
Figure 2.13 indicates how sensitive emissions development is to other economic activity assumptions. In the projection, average annual mainland GDP growth is 1 per cent between 2024 and 2040. If mainland GDP growth is halved from 2025, to an average of 0.5 per cent, the calculations shown in Figure 2.13 show that emissions may be 2.1 million tonnes of CO₂ equivalents lower in 2040 than in the projection (blue curve). The grey curve shows a pathway in which annual GDP growth doubles to 2 per cent from 2025 onwards. In this scenario, emissions are 2.2 million tonnes higher than in the projection.

Figure 2.14 illustrates the emissions effect of alternative assumptions about future technological developments. In the grey curve pathway, technological development is assumed to accelerate, with an annual improvement of 1 per cent over and above the projection, i.e. an improvement of about 16 per cent in 2040. In this scenario, emissions are projected to decline by a further 1.2 million tonnes of CO₂ equivalents in 2040, on top of the projection. Conversely, weaker technological progress may increase emissions. The blue curve shows a pathway in which annual technological development is 1 per cent lower than in the projection, corresponding to a reduction in technological progress of about 16 per cent. In this scenario, emissions increase by 1.3 million tonnes of CO₂ equivalents in 2040, compared with the projection.

The 2024 white paper on Long-term Perspectives on the Norwegian Economy³⁰ also presented an emissions pathway for Norway with significantly accelerated technology development as a result of countries following up on their targets and ambitions so as to attain the Paris Agreement temperature goal; see a summary of the analysis in Box 2.7.

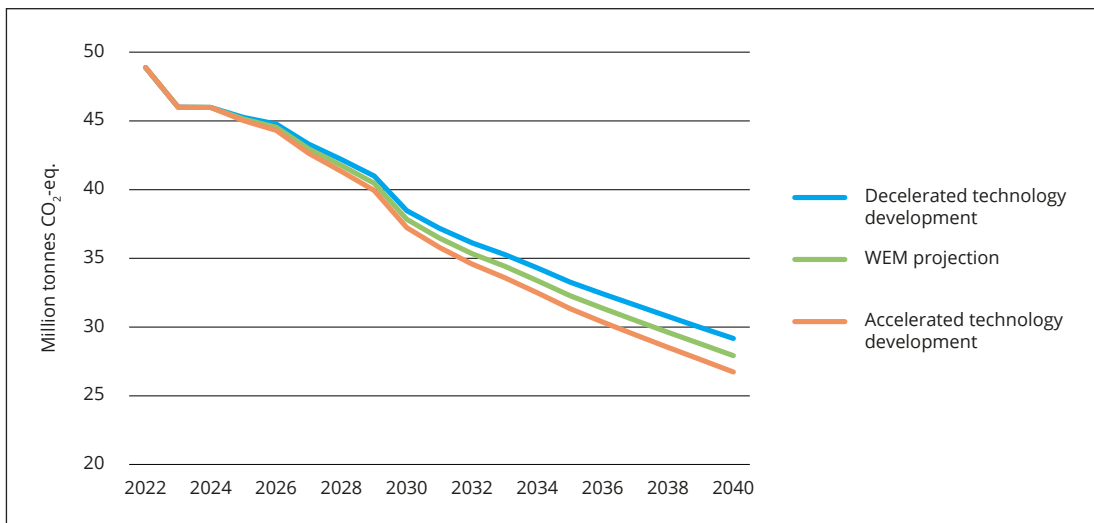
³⁰ Meld. St. 31 (2023–2024) – regjeringen.no (in Norwegian only)

Figure 2.13 Alternative emissions pathways for economic growth (million tonnes of CO₂ equivalents)



Sources: Ministry of Finance and Statistics Norway

Figure 2.14 Alternative emissions pathways for technology development (million tonnes of CO₂ equivalents)



Sources: Ministry of Finance and Statistics Norway

2.6.9 Projections of long-range air pollutants

Emissions of long-range air pollutants are regulated under the Gothenburg Protocol. These are nitrogen oxides (NO_x), sulphur dioxide (SO₂), ammonia (NH₃), non-methane volatile organic compounds (NMVOC) and particulate matter (PM_{2,5}). Such pollutants are spread across national borders via the atmosphere and contribute to, inter alia, acidification, eutrophication, harmful particle concentrations and ground-level ozone formation. Upon revisions of the Gothenburg Protocol in 2012, the parties undertook new emission commitments that apply from 2020.

Emissions of long-range air pollutants are shown in table 2.15. NO_x emissions declined by 32 per cent from 1990 to 2022, and emissions have been lower than the Gothenburg commitment since its introduction in 2020. The reduction is primarily caused by lower road transport emissions due to stricter exhaust emission requirements. In recent years, an increasing share of electric cars has also contributed. There has also been a reduction in emissions from shipping and fisheries. Emissions from oil and gas activities have increased by 48 per cent since 1990, but have declined steadily since 2014. NO_x emissions are projected to decline further, and to more than halve by 2040. This decline is partly attributable to expected vehicle emission reduction as internal combustion engines are phased out. In addition, shipping emissions are expected to decrease significantly as a result of the transition to low- and zero-emission technologies. NO_x emissions are thus well below the Gothenburg commitment to cut emissions by 23 per cent from 2005 levels.

Sulphur dioxide (SO₂) emissions have declined by 71 per cent between 1990 and 2022. Emissions are projected to continue to decline somewhat towards 2040. These emissions are also well below the Gothenburg commitment of a 10-per-cent SO₂ emissions reduction from 2005 levels.

Non-methane volatile organic compound (NMVOC) emissions were 55 per cent lower in 2022 than in 1990. Lower emissions from the loading and storage of crude oil on the Norwegian continental shelf are the main contributing factor. In addition, NMVOC emissions from road transport have been declining for a long time, partly as a result of changes in vehicle fleet composition. Norway met its Gothenburg commitment for NMVOCs in 2020 and 2022. In 2021, however, emissions were 2 per cent higher than permitted under the Gothenburg Protocol. This was due to increased disinfectant use during the pandemic. From 2022, NMVOC emissions are projected to decline further and remain well below the commitment of a 40-per-cent reduction from the 2005 emission level.

Ammonia (NH₃) emissions come primarily from livestock manure handling. This causes agriculture to account for 95 per cent of emissions. The Gothenburg commitment requires an 8-per-cent reduction in ammonia emissions from the 2005 level. As Norway has struggled to comply with this emission commitment, ammonia emissions reduction efforts have been prioritised in the general agricultural sector agreement in recent years. Emissions have declined somewhat in recent years due to changes in the vehicle fleet and agricultural efforts, but not by enough to ensure compliance with the commitment. Provisional figures for 2023 show that the commitment was met that year.

Emissions are projected to increase somewhat, and thus show a risk of non-compliance in the years to come.

Particulate matter (PM_{2.5}) emissions have declined by 38 per cent from 1990 to 2022. When the Gothenburg Protocol was revised in 2012, Norway committed to a 30-per-cent particle emissions reduction in 2020 compared with the 2005 level. This was complied with in 2020. However, increased wood burning as a result of high electricity prices meant that emissions were higher than the commitment in 2021 and 2022. These emissions are expected to decrease in the years to come. The 2023 emissions accounts are expected to again show compliance with the Gothenburg commitment.

Table 2.15 Emissions of long-range air pollutants (1,000 tonnes)

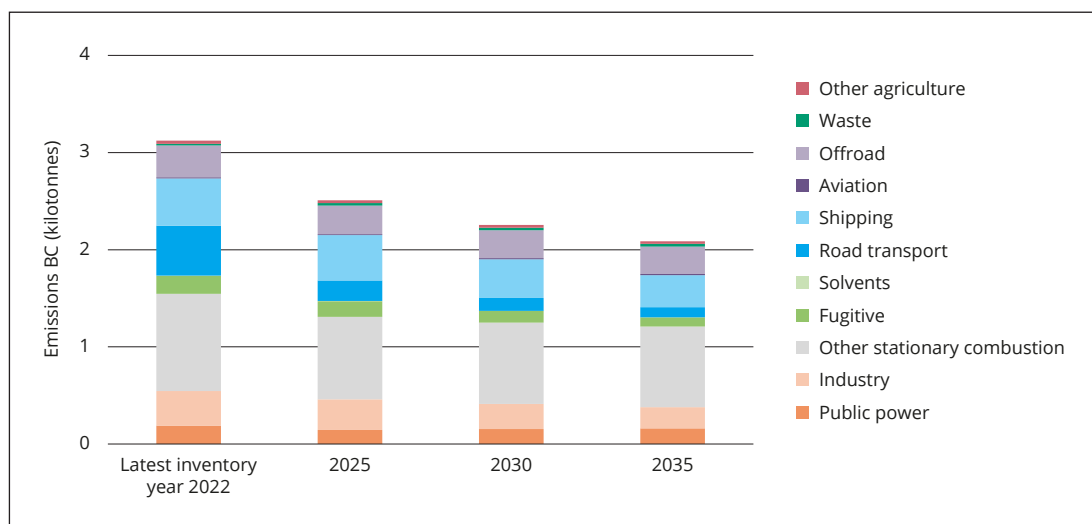
	1990	2005	2022	2030	2035	2040	Gothenburg Protocol
Nitrogen oxides (NO _x)	198.2	210.4	135.6	91.2	73.0	58.9	160.9
Sulphur dioxide (SO ₂)	49.5	23.0	14.4	12.2	11.6	11.0	20.7
Non-methane volatile organic compounds (NMVOC)	319.6	243.9	144.0	129.5	122.2	119.1	149.6
Ammonia (NH ₃)	31.2	31.6	29.5	30.3	30.2	30.2	28.0
Particulate matter (PM _{2.5})	43.9	39.1	27.2	24.2	23.3	22.5	26.0

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

2.7.9 Projections of black carbon

Chapter 1.3 of this BTR briefly describes the historic emissions of black carbon in Norway. According to the projections reported to the UNECE in 2023, the emissions of black carbon are expected to reduce further towards 2035 (Figure 2.15).

Figure 2.15 Historical emissions of black carbon in Norway 2022, and projections for 2025, 2030 and 2035



Source: Norway's reporting to the UNECE

3 Information related to climate change impacts and adaptation



Norway reported on climate change impacts and adaptation in 2022 in its 8th National Communication (NC8). In 2023 the Norwegian government presented a white paper to the parliament on climate change adaptation: «*A changing climate – united for a climate-resilient society*» (Meld. St. 26, 2022–2023).³¹ The white paper outlines Norway's efforts and measures to prepare and adapt nature and society to climate change, aiming to create a climate-resilient society. This chapter is largely based on that report.

In addition to national targets, international goals and commitments guide climate change adaptation in Norway. The 2015 Paris Agreement set a global goal of adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal. The *UAE Framework for Global Climate Resilience* from 2023 supports the implementation of the global goal and sets targets for 2030. The status of many of these targets in Norway is reflected in this chapter.

3.1 National circumstances, institutional arrangements and legal frameworks

3.1.1 National circumstances relevant to adaptation actions

Norway has experienced an increasing frequency of heavy rain causing flood and landslides. This has raised the awareness in the population of the increasing challenges caused by climate change.

Norway is a sub-Arctic country with a long and convoluted coastline combined with a long mountain chain facing a relatively warm ocean surface to the south, west and north. This results in large geographical variations in the present climatic conditions as well as in the projections of future climate change. These variations are found both from coastal to inland and mountainous regions, for ocean and land areas from the southwest to the north and – even more so – from the Norwegian mainland to the Arctic islands (Svalbard and Jan Mayen). Chapter 2.1 of this BTR provides more information on the national circumstances.

According to the green paper NOU 2010: 10 *Adapting to a changing climate*, Norway is in a good position to adapt to climate change. A report from 2018 finds that the Norwegian society's capacity to adapt has been strengthened since 2010, through changes in laws and regulations, a great increase in production of knowledge, guidance, coordination and, to some extent, resources.³² The report underlines that national authorities' work on adaptation has increased significantly since 2010, but the efforts are varying across different sectors. The Norwegian Environment Agency put forward the report *Barriers to Climate Adaptation on the Local and Regional Level*

³¹ [Regjeringen: Meld. St. 26 \(2022–2023\)](#)

³² [Vestlandsforskning & Cicero: Oppdatering av kunnskap om konsekvenser av klimaendringer i Norge](#) (in Norwegian only)

in 2022, which reflects some challenges at the local and regional levels for carrying out successful climate adaptation work, cf. chapter 3.2.3.³³

In 2022, the Office of the Auditor General of Norway presented the results of its study on the authorities' work on climate change adaptation of infrastructure and buildings.³⁴ The study shows that the authorities lack sufficient knowledge about the vulnerability of existing buildings and transport infrastructure to future natural hazards. This knowledge gap could hinder the implementation of necessary preventive measures and lead to high societal costs and security risks. Additionally, the study highlighted inadequate coordination among national authorities and a lack of a comprehensive overview of Norway's progress in climate change adaptation.

The implementation of the white paper on climate change adaptation from 2023 is intended to strengthen Norway's adaptive capacity, including the implementation of a new governance system for national adaptation efforts, as well as a national climate impact and vulnerability assessment, cf. chapter 3.4.3.

3.1.2 Institutional arrangements and governance

A fundamental principle in Norway's adaptation policy is that the actor responsible for a task or function affected by climate change is also responsible for climate change adaptation. In consequence, everyone contributes to climate adaptation work: individuals, households, private businesses, and the public sector.

The public authorities have sector responsibility. This means that all ministries, government agencies and local and regional authorities carry a responsibility for climate change adaptation within their field. All ministries are responsible for assessing whether and, if applicable, how the consequences of a changed climate affect their respective sectors, and for implementing actions to reduce vulnerability. The Ministry of Climate and Environment coordinates the ministries' work and is responsible for the Government's overall efforts to prepare and adapt nature and society to a changing climate.

The Norwegian Environment Agency (NEA) supports the Ministry of Climate and Environment in coordinating these efforts. The agency coordinates the inter-agency cooperation on climate change adaptation and gives guidelines and guidance to the county governors in their climate change adaptation work. It has a particular responsibility for disseminating and sharing knowledge and experience, contribute to competence and capacity building and facilitate cooperation between different public administration levels, sectors and other stakeholders in the field.

The County Governor work to ensure that decisions of the Norwegian Parliament and Government are implemented correctly and is an important link between municipalities and central government authorities. The county plays an important role in supporting and guiding the municipalities in their adaptation efforts. It also guides and coordinates municipal planning within the county, in addition to being

³³ [Vestlandsforskning: Barriers to climate adaptation at local and regional level | Western Norway Research Institute](#)

³⁴ [Document 3:6 \(2021–2022\): Riksrevisjonens undersøkelse av myndighetenes arbeid med å tilpasse infrastruktur og bebyggelse til et klima i endring](#) (in Norwegian only)

the regional planning authority. The municipalities are required to consider climate change adaptation and mitigation in their planning activities and exercise of authority.

Chapters 3.4, 3.5 and 3.6 provide more information about the governance system, including the system for assessing impacts, addressing climate change at the sectoral level, decision-making, planning, coordination, adjusting priorities and activities, monitoring and evaluation, and reporting.

3.1.3 Legal and policy frameworks and regulations

In June 2017, the Norwegian Parliament adopted a Climate Change Act, which establishes by law Norway's emission reduction target for 2030 and 2050. According to the act, the government shall submit updated information to the Parliament on how Norway prepares for and adapts to climate change.

Climate change adaptation concerns basic social structures, and a number of laws are therefore relevant, including rules on land use planning, contingency legislation, waterway legislation, legislation regulating various types of infrastructure, natural property legislation etc.

Local and regional planning are essential to meet the challenges related to climate change. The Planning and Building Act provides the framework for planning in Norway. Its foundation is sustainable development. This framework includes tools and requirements for local, regional and national planning. One such tool is the Central Government Planning Guidelines, that defines which areas of national interest to be implemented in local and regional planning. In 2018, the government adopted new planning guidelines (in Nw.: «*Statlige planretningslinjer for klima- og energiplanlegging og klimatilpasning*») to promote climate change adaptation in local and regional planning. An online tool to support the implementation of the guidelines has been developed.

Every 4th year the Ministry of Local Government and Regional Development issues a white paper on national expectations for regional and municipal planning.

The Environmental Impact Assessment framework and various guidelines and policies ensures that vulnerability due to climate change is included in environmental impact assessments.

Pursuant to the Act of 25 June 2010 No. 45 relating to the Municipal Preparedness Duty, Civil Protection Measures and the Norwegian Civil Defence (Civil Protection Act), municipalities have a duty to identify the adverse events that could occur in their municipality, assess the likelihood of these events occurring and assess how they could affect their municipality. The results of this work must also be assessed and compared in a comprehensive risk and vulnerability analysis. Municipalities must draw up contingency plans based on this analysis, have a municipal crisis team and carry out exercises and other skills enhancing measures to ensure they are able to handle adverse events.

Other relevant legislation includes, inter alia:

- the act on Health and Social Preparedness;
- the act relating to food production and food services;
- the act relating to municipal health and care services;
- the act relating to ports and navigable waters;
- the act relating to the control of communicable diseases;
- the Aquaculture Act;
- the Forestry Act;
- the Land Act;
- the Marine Resources Act;
- the Natural Damage Insurance Act;
- the Natural Damage Compensation Act;
- The Natural Damage Act;
- the Nature Diversity Act;
- the Pollution Act;
- the Public Health Act;
- the Railway Act;
- the Road Act;
- the Svalbard Environmental Act; and
- the Water Resources Act.

3.2 Impacts, risks and vulnerabilities

3.2.1 Current and projected climate trends and hazards

In Norway, warming is taking place faster than the global average. The average temperature in mainland Norway is now more than 1.2 degrees Celsius higher than at the beginning of the 20th century.³⁵ The temperature is rising more rapidly on Svalbard than any other place on the planet. In Longyearbyen, the average temperature has increased by more than 4 degrees Celsius since 1991 alone³⁶ and new records are constantly being set.³⁷

The strong warming in the Arctic is linked to the decline of sea ice in the Barents Sea and in the fjords of Svalbard. With less sea ice, the sea becomes more open and darker and absorbs more heat. This, in turn, melts more sea ice. More open and warmer seas will re-radiate heat to the air during large parts of the year, which will further increase warming.³⁸

As global warming increases, so does the likelihood of extreme weather and concurrent weather events. The average annual precipitation in Norway has increased by 18 per cent since 1900, and episodes of heavy precipitation have become more

³⁵ [NCCS \(2017\): Climate in Norway 2100](#)

³⁶ [Scientific Reports: Exceptional warming over the Barents area](#)

³⁷ [Science Advances: Global record-breaking recurrence rates indicate more widespread and intense surface air temperature and precipitation extremes](#)

³⁸ [NCCS \(2019\): Climate on Svalbard 2100 – a knowledge base for climate adaptation](#)

intense and more frequent.³⁹ Higher temperatures also cause more precipitation to fall as rain rather than snow, resulting in among others shorter snow seasons and earlier spring floods. The glaciers also have retreated significantly over the past century.

The trends we are already experiencing, with a warmer and wetter climate, are likely to continue over the next decades.⁴⁰ The average annual temperature in Norway may become more than 4 degrees Celsius higher during the 21st century. The biggest change in temperature will be during winter. The increase will be greater the further north you go, with Svalbard potentially becoming up to 10 degrees Celsius warmer.⁴¹

The average annual precipitation may increase by just under 20 per cent across mainland Norway and by more than 60 per cent in Svalbard during the 21st century.⁴² More precipitation, especially over short periods of time, increases the risk of stormwater and of more frequent and extensive rainwater flooding. Periods of heavy precipitation may result in more landslides and debris floods.

In a warmer climate, winter temperatures in parts of the country will fluctuate more around freezing point.⁴³ This will generally result in more icy conditions and more episodes of snow melting quickly or rain falling on cold ground.

Permafrost⁴⁴ is now thawing at an ever-increasing rate and will continue to do so throughout the 21st century. Ice will also retreat or disappear. Norwegian waters and coastal areas are also becoming warmer and more acidic.⁴⁵ The sea level along the coast of Norway is now rising by just above three millimetres per year.⁴⁶ This is expected to accelerate in future, although land uplift after the last ice age will reduce the effect in some coastal areas.

3.2.2 Observed and potential impacts of climate change

Climate change has consequences for nature and for society at large. An example is that increased rainfall leads to more frequent floods, landslides and stormwater events, which damage buildings and infrastructure, arable land, outdoor areas⁴⁷ and cultural environments. In severe cases, this may also pose a risk to life and health.

³⁹ [NCCS \(2017\): Climate in Norway 2100](#)

⁴⁰ [NCCS \(2017\): Climate in Norway 2100](#)

⁴¹ [NCCS \(2019\): Climate on Svalbard 2100 – a knowledge base for climate adaptation](#)

⁴² [NCCS \(2017\): Climate in Norway 2100](#), [NCCS \(2019\): Climate on Svalbard 2100 – a knowledge base for climate adaptation](#)

⁴³ [Projected changes in days with zero-crossings for Norway](#)

⁴⁴ Deposits and bedrock where the temperature does not exceed 0 degrees Celsius during two consecutive years.

⁴⁵ [Havforskningsinstituttet: Risikoanalyse for de norske havområdene om direkte og indirekte virkninger av klimaendringer på marine økosystemer under ulike utslippsscenarioer](#) (in Norwegian only, summary in English), [Havforskningsinstituttet: Klimapåvirkning på viktige kystvannarter](#) (in Norwegian only)

⁴⁶ [IPCC Climate Change 2021: The Physical Science Basis](#)

⁴⁷ <https://www.miljodirektoratet.no/publikasjoner/2024/april-2024/sea-level-rise-and-extremes-in-norway/>

Other examples are more frequent periods of prolonged drought that pose challenges to agriculture, and heatwaves that are a potential health risk to vulnerable groups. Society is also affected by the ripple effects of climate-related events. For example, roads closed due to flooding can lead to service disruptions and considerable costs for both the public sector and the business sector.

Climate change knows no national borders. An open economy and extensive international trade and cooperation make Norway vulnerable to the effects of climate change in other parts of the world. Climate-related risk interacts closely with other threats and risk factors globally and nationally, complicating the challenges we face. Climate change may, for example, lead to a reduction in global food production, in turn increasing the risk of supply shortages and higher prices for food products that Norway must import.

The effects of climate change on nature are more severe and extensive than previously expected, and loss and degradation of nature exacerbate the effects of climate change. Climate change has been cited as a negative impact factor for almost 10 per cent of the endangered species in Norway and Norwegian marine areas on the 2021 Red List. Various species of fish and other animals in the ocean and along the coast are migrating further north, altering the conditions for other species in the food chain. For species that already live in high mountain areas or in the Arctic, there are few opportunities for such adaptation. The consequences of this could be vast and unpredictable and change entire terrestrial and marine ecosystems.

There is still uncertainty about how the effects of climate change will affect different social groups in Norway. However, we know that the Indigenous Sámi population, along with their traditions and livelihoods, are already experiencing significant negative impacts in the Arctic. These include higher temperatures and precipitation, permafrost thaw, loss of sea and land ice, changes in snow cover, extreme weather events, and northward shifts of species.

For a more comprehensive description of the impacts of climate change, see chapter 6.3 in NC8.

3.2.3 Approaches, methodologies and tools, and associated uncertainties and challenges

The Norwegian Centre for Climate Services (NCCS) – a collaboration between the Norwegian x Institute, The Norwegian Water Resources and Energy Directorate (NVE), NORCE Norwegian Research Centre and the Bjerknes Centre for Climate Research – facilitates and disseminates climate and hydrological observations, projections and products for use in adaptation to climate change, such as county-specific climate profiles. Municipal authorities and other public actors are an important target group for the NCCS, but the knowledge base is also used for researching and studying the effects and consequences of a changed climate.

The NCCS has published the report *Climate in Norway 2100*, to provide an updated scientific basis for climate adaptation in Norway. The report addresses the causes of climate change and variability, the development of the climate in Norway, and projected climate change through the 21st century. The report also describes methods

and uncertainties related to the climate projections.⁴⁸ In 2021, work began on new climate projections for Norway based on the sixth assessment report from the UN Intergovernmental Panel on Climate Change. The new climate projections are being analyzed together with updated historical changes in a new Climate in Norway 2100 report, which is scheduled to be released in the fall of 2025.

The NCCS is developing the national data platform 'Klimakverna' in order to make climate and hydrological projections available and easier to use. A main objective is to better enable the municipalities to take climate change into consideration in their plans and decisions.

All national geospatial information is available from the website *Geonorge*. Still many municipalities find it difficult to get an overview of and access to geospatial information. This is partly due to the complexity of Geonorge and that the municipalities need to access the portals of several directorates to get information about and how to use the data shared through Geonorge. The Government has initiated measures to further develop Geonorge as a sharing platform for geographic data.⁴⁹

Geodata from the Norwegian Public Base of Geospatial Data (DOK) forms an important part of the information basis for municipal and regulatory planning, impact assessments, risk and vulnerability analyses and building applications. DOK is to be used as the basis for planning proposals and building application cases. The Government is constantly working to improve the quality of DOK.

3.3 Adaptation priorities and barriers

3.3.1 Domestic priorities

The national goal and domestic priorities for climate change adaptation are presented in the white paper to the parliament: «A changing climate – united for a climate-resilient society» (Meld. St. 26 (2022–2023)).

Norway has the following national goal for climate change adaptation:

«Society and ecosystems must be prepared for and adapted to climate change».

Norway has the following priority areas in the cross-sectoral climate change adaptation work:

- More knowledge about climate change and climate change adaptation
- Planning as a tool in climate change adaptation
- Nature-based solutions and nature's contribution to climate change adaptation
- Handling stormwater in cities and towns
- Better access to climate and geodata
- Addressing rising sea levels

⁴⁸ [NCCS \(2017\): Climate in Norway 2100](#)

⁴⁹ [Geonorge: Nasjonal delingsplattform for geodata](#)

- Food security in a changing climate
- Safeguard Sami interests and use indigenous peoples' knowledge in climate change adaptation efforts

In addition, Norway priorities climate change adaptation in the following selected areas:

- Nature and the environment
- Floods and landslides
- Buildings, infrastructure and transport
- Agriculture, forestry, fisheries and aquaculture
- Business and industry
- Tourism in a changing climate
- Health
- Foreign, defence and security policy
- Aid and development cooperation

For information on progress towards the priorities, see chapter 3.5.

3.3.2 Barriers to adaptation

For a long time, climate change adaptation work in Norway was primarily focused on the most immediate and visible consequences of climate change, such as natural disaster events and extreme weather events. There has been less focus on areas where the consequences are more indirect and the risk and vulnerability picture is particularly complex, for example due to chains of effects. This picture is changing, and there is increasing awareness and knowledge about the consequences of climate change in other countries and for different societal groups. Additionally, there is growing recognition of the risks that climate change may pose to the economy and welfare in the future. Our understanding of how climate change aggravates threats to international peace and security is also increasing.

Despite these ongoing developments, the knowledge base is still fragmented and there is a significant imbalance in the scope and level of detail between sectors and areas of society. There is for example limited knowledge about the interaction between different risk factors and how the impacts of climate change in one sector may have consequences for others.

In 2021, CICERO, Western Norway Research Institute, and Nordland Research Institute, on behalf of Norwegian Environment Agency, conducted a study on barriers to climate change adaptation at the local and regional levels in Norway. The report showed that in municipalities, barriers to climate change adaptation include lack of political will, insufficient financial and personnel resources, and challenges in translating knowledge between the national and local levels. Especially small municipalities struggle with climate change adaptation.⁵⁰

⁵⁰ [Western Norway Research Institute: Barriers to climate adaptation at local and regional level |](#)

3.4 Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies

3.4.1 Implementation of adaptation actions in accordance with the global goal on adaptation

Since the release of Norway's 8th National Communication in December 2022, Norway has passed several milestones in its work related to climate change adaptation, the most important being the white paper presented by the government to the parliament in June 2023: «*A changing climate – united for a climate-resilient society*» (Meld. St. 26, (2022–2023)). The parliament (Stortinget) adopted the white paper on January 16, 2024.

3.4.2 Adaptation goals, actions, objectives, undertakings, efforts, plans

The white paper presents Norway's national goal and priorities for climate change adaptation, as listed under chapter 3.3. It also contains a total of 70 measures to achieve these priorities across various sectors.

An important objective of the white paper is to establish a better governance system for national adaptation efforts, which will help ensure that climate considerations are routinely assessed and systematically implemented in all sectors, and that a more uniform and coordinated approach is taken to this work. The governance system therefore has a cyclical approach with procedures for developing national climate vulnerability analyses, updating climate change adaptation policy, reporting and regular evaluation of the efforts.

The white paper includes several measures to strengthen knowledge about climate change adaptation, including a system for climate vulnerability analysis every four years and an expert committee to obtain more knowledge about the socio-economic consequences of climate change.

3.4.3 How best available science, gender perspectives and indigenous, traditional and local knowledge are integrated into adaptation

The adaptation strategies and policies are striving to be based on best available science. One of the priority areas in the white paper is to safeguard Sami interests and use indigenous peoples' knowledge in climate change adaptation efforts. See section 3.5.1.8 for more information.

The white paper on climate change adaptation also addresses consequences of climate change for social justice. It states that the government will obtain more knowledge about the potential impacts of climate change and climate change adaptation on social and gender inequality in different sectors in Norway.

3.4.4 Development priorities related to climate change adaptation and impacts

Norway's climate change-related support to developing countries is described in chapter 4.

3.4.5 Plans leading to mitigation co-benefits

Nature-based solutions, as described in section 3.4.7, can contribute to both adaptation and mitigation. Robust and healthy ecosystems can, for example, contribute to temperature regulation and carbon sequestration.

3.4.6 Efforts to integrate climate change into development efforts, plans, policies and programming

The web-based information portal klimatilpasning.no was established in 2008. The portal supports the Norwegian society in preparing for the consequences of climate change. Local level practitioners are the main target group. The website provides tools and information on climate change adaptation from different sectors. An online tool supports municipalities and county municipalities in adhering to the central government planning guidelines on adaptation. The Norwegian Environment Agency develops and maintains the website on behalf of the sectoral authorities.

The Norwegian Environment Agency regularly organises seminars and webinars on adaptation with other stakeholders. Through webinars, the agency reaches local level practitioners across the country, as well as the County Governor, county municipalities, the national authorities, the private sector and research institutions.

A grant scheme to support regional and local authorities in their climate change adaptation work was established in 2015 by the Ministry of Climate and Environment and is administered by the Norwegian Environment Agency. Support is given to projects designed to strengthen the knowledge base on which municipalities build their climate change adaptation measures. Between 2015 and 2022, a total of approximately 45 million Norwegian kroner were distributed among about 140 different projects.

NVE offers advisory, technical and financial support in the planning and construction of structural protection measures. A project archive contributes to sharing knowledge from completed projects that have been supported through the grant scheme. Between 2015 and 2022, NVE distributed a total of approximately 2,8 billion Norwegian kroner towards several structural protection measures against floods and landslides across the country.

3.4.7 Nature-based solutions to climate change adaptation

The white paper on climate change adaptation highlights the importance of nature-based solutions for climate change adaptation. Resilient and healthy ecosystems can provide important ecosystem services such as temperature regulation, flood mitigation, landslide prevention, protection of groundwater, protection of coastal areas from rising sea levels and erosion.

Nature-based solutions for climate change adaptation are increasingly employed. In recent years, many stream reopenings and watercourse measures have been implemented to limit damage from stormwater, flooding, erosion, and other consequences of climate change. Nature-based solutions are however still less used than more technical and 'grey' solutions. The lack of evaluations, effect analyses and long-term monitoring of implemented nature-based actions may be an obstacle to both public and private actors adopting such solutions. More knowledge about how well nature-based solutions work for different purposes is therefore needed to increase the adoption of nature-based solutions in climate change adaptation. Decision-makers and project developers also need better guidance and greater competence about both the benefits and limitations of nature-based solutions for climate change adaptation. The white paper from 2023 therefore states that the government will increase knowledge and develop relevant tools and guidance for the use of nature-based solutions in climate change adaptation. The white paper also states that the government will promote the use of nature-based solutions for flood and landslide protection wherever appropriate. Part of this is solved through joint Nordic cooperation in a four-year program on Nature-based solutions in the Nordic countries, which Norway has initiated.

The planning guidelines to promote climate change adaptation in local and regional planning (in Norwegian: «Statlige planretningslinjer for klima- og energiplanlegging og klimatilpasning»), includes guidelines on how to use nature-based solutions in climate change adaptation.

Nature-based solutions are also an important topic in two white papers from 2024. In a white paper on floods and landslides, the government announced that it will increase knowledge about the effects and costs of nature-based solutions for stormwater, floods, and landslides, consider a management model for forests that protect against natural damage, and consider various options for strengthening the compliance with the rules on buffer zones along watercourses.⁵¹ Nature-based solutions are also highlighted in the white paper from 2024 on biodiversity, where they are part of the global targets 8 and 11 from the Kunming-Montreal biodiversity framework, and the national contributions to these targets.⁵²

3.4.8 Stakeholder involvement

As described under 3.1, the municipal and county authorities have key tasks when it comes to adapting to climate change. They must take climate change into account in areas such as land-use planning, pollution, nature management and civil protection and emergency preparedness. The county governors provide advice and guidance on municipal planning and coordination of the work on civil protection and emergency preparedness. The Governor of Svalbard is the Government's highest representative on Svalbard. One of the Governor's tasks is to assess the impact of climate change, taking into account its consequences for the administration of Svalbard.

The business community and NGOs are important contributors and valuable partners for the authorities in their work on climate change adaptation, nationally,

⁵¹ [Regjeringen: Meld. St. 27 \(2023–2024\)](#) (in Norwegian only)

⁵² [Regjeringen: Meld. St. 35 \(2023–2024\)](#) (in Norwegian only)

regionally and locally. The business sector plays an important role in developing technology and other solutions and making it attractive to invest in climate change adaptation. NGOs contribute, among other things, to ensuring that different groups and stakeholders' interests are safeguarded in the adaptation work, and are an important channel for engaging and mobilising people in the work. They also contribute operationally, including in emergency preparedness and by developing and disseminating knowledge. However, the Norwegian government does not have a systematic overview of these private initiatives.

3.5 Progress on implementation of adaptation

3.5.1 Implementation of the actions identified

The government is in the process of following up the white paper on climate change adaptation. The Ministry of Climate and Environment has the overall responsibility for following up on the report, and the other ministries are following up on the measures in their respective areas.

The following presents the status of the implementation of the priorities listed under section 3.3.

3.5.1.1 *More knowledge about climate change and climate change adaptation*

The Ministry of Climate and Environment has tasked the Norwegian Environment Agency with developing climate vulnerability analysis, see more information under 3.6. It has also appointed an expert committee to obtain more knowledge about the socio-economic consequences of climate change for vulnerable sectors and regions, and identify priority areas where there is good potential to reduce climate-related risk, assessed in relation to the cost of actions. Both the climate vulnerability analysis and the expert committee will be concluded in 2026.

3.5.1.2 *Planning as a tool in climate change adaptation*

Land-use planning provides the framework for using and protecting land and is an important tool for adapting nature and society to a changing climate. As the local planning authority, the municipality is responsible for ensuring that land is managed and developed in a way that makes it resilient and adapted to the climate of the future. The Planning and Building Act and Regulations on technical requirements for construction works (TEK17) are pivotal to land-use plans and building development in the municipalities. The white paper on climate change adaptation states that the government will consider stipulating regulations in the Planning and Building Act, which specify the minimum to be emphasised in the risk and vulnerability analysis when preparing plans for development, including climate considerations and property of significance from a security perspective. The Ministry of Local Government and Regional Development and the Ministry of Justice and Public Security are in the process of developing a legislative proposal.

The white paper also states that the government will review the safety requirements against natural hazards in TEK17. A working group has been established with

members from relevant agencies to examine, among other things, whether the safety requirements in TEK17 are at an appropriate level and how the requirements can better account for future climate changes. These requirements in TEK17 apply mainly to new construction works.

The Ministry of Local Government and Regional Development is also in the process of developing new guidelines for updating land-use plans where there is new knowledge about hazard areas.

3.5.1.3 *Nature-based solutions and nature's contribution to climate change adaptation*

As described in chapter 3.3 the government will provide more knowledge about nature-based solutions. This is followed up through participation in the Nordic Council of Ministers' four-year program (2021–2024) on nature-based solutions. Six projects map the use of nature-based solutions in the Nordic region, collect examples and experiences, and develop guidelines for best practices. Norway, through the Norwegian Environment Agency, leads the program and will utilize and disseminate this knowledge to municipalities and relevant stakeholders.

3.5.1.4 *Better access to climate and geodata*

As mentioned under chapter 3.2.3, The Norwegian Centre for Climate Services (NCCS) is developing the platform 'Klimakverna' to make climate and hydrological projections available. In addition, the Norwegian Mapping Authority is working to improve the quality of the Norwegian Public Base of Geospatial Data (DOK).

3.5.1.5 *Managing urban stormwater*

Increased precipitation leads to more frequent and intense stormwater events and more frequent damage to buildings and infrastructure, arable land and heritage sites. The damage recovery is cumbersome and costly. As a follow-up on the measures proposed in the Storm Water report presented in 2015 (NOU 2015: 16), the Government has made changes in the Planning and Building Act regarding regulation for stormwater. The planning and building authorities in the municipalities have been given legal authority to demand that building owners carry out measures to deal with stormwater, both for new constructions and on properties that have been fully or partially developed. The Government is also considering changes in the Pollution Act and associated regulations, as well as pros and cons of a separate stormwater fee to fund stormwater measures.

3.5.1.6 *Addressing rising sea levels*

As a coastal nation, Norway is particularly vulnerable to sea level rise and storm surges. Natural assets, agricultural land, infrastructure, buildings and the cultural environment along the coast will be among the areas affected.

A long-term perspective is required when planning measures along the coast, and this complex challenge requires a good cooperation between state authorities. The Norwegian Environment Agency has therefore been tasked with considering how the authorities' efforts to address rising sea levels can be improved. In April 2024,

the Norwegian Environment Agency released the report «*Sea Level Rise and Extremes in Norway*» which describes how the sea is expected to rise along the Norwegian coast towards the middle and end of this century and further towards the year 2300.⁵³ Based on this report, The Norwegian Directorate for Civil Protection (DSB) has updated their advice and recommendations on how municipalities should take sea level rise into account in their spatial planning.⁵⁴

3.5.1.7 Food security in a changing climate

Climate change has consequences for food production both in Norway and globally. Major fluctuations in global food production could contribute to conflicts, which may in turn challenge food security, including for parts of the Norwegian population. New geopolitical challenges exacerbate the situation.

Food production must be adapted to prevent damage caused by climate change, but also to take advantage of the opportunities that the changes may entail. Climate change induced variations are given increased emphasis in scientific advice and management. The government is working to continue the three pillars of Norwegian food security: maintaining the production base, continuous production of food and well-functioning trade systems. This is happening through policy development and in following-up on the Soil Conservation Strategy.

3.5.1.8 Safeguard Sami interests and use indigenous peoples' knowledge in climate change adaptation efforts

One of the priority areas in the white paper on climate change adaptation is to safeguard Sami interests and use indigenous peoples' knowledge in climate change adaptation efforts. The Saami Council and the Sámi Parliament have published the report *Climate Change in Sápmi – an overview and a Path Forward*. The report shows that climate change is resulting in complex cascading impacts and challenges for Sápmi, and have major consequences for Sami culture and business activity.⁵⁵ The Government will obtain more knowledge about how climate change affects Sami culture and business activity, traditions, way of life and health.

Through the Constitution, the Norwegian authorities are obliged to ensure that the Sami people can preserve and develop their language, culture and way of life. In addition to statutory consultations, the Government will also involve the Sami Parliament and the Norwegian Reindeer Herders' Association in climate change adaptation work, where relevant. The Government will also include indigenous knowledge/árbediehtu in its climate change adaptation work, including its work on national climate vulnerability analyses.

The working group on climate adaptation in reindeer husbandry was established under the reindeer husbandry agreement, with representatives appointed by the Norwegian Reindeer Herders' Association and the state. According to the mandate, the working group is to assess how traditional knowledge can be incorporated

⁵³ [Sea-Level Rise and Extremes in Norway – miljodirektoratet.no](https://miljodirektoratet.no)

⁵⁴ [Havnivåstigning og høye vannstander | Direktoratet for samfunnssikkerhet og beredskap](#)

⁵⁵ [Climate Change in Sápmi – an overview and a Path Forward](#)

as a basis in climate adaptation efforts. The working group delivered its report in December 2023. The recommendations from the working group are being followed up by the parties to the reindeer husbandry agreement.

3.5.1.9 Nature and cultural environment

The government has recently put forward a white paper on biodiversity Meld. St. 35 (2023–2024) *Bærekraftig bruk og bevaring av natur – Norsk handlingsplan for naturmangfold*. The White paper is the Norwegian National Biodiversity Strategy and Action Plan (NBSAP) and shows how Norway will contribute to the global targets for biodiversity under the Kunming-Montreal Global biodiversity Framework of CBD (Convention on biodiversity). Many of the proposals and national targets will contribute to stabilize or improve the ecological conditions and integrity of the ecosystems, and thereby their resilience to climate change, and their ability to contribute towards mitigation.

Cultural environments are among other things exposed to damage from events such as floods, landslides, heatwaves, droughts, and storm surges due to increased temperatures, higher humidity, and more precipitation. The Directorate for Cultural Heritage follows up on the Directorate's climate strategy for cultural heritage management (2021–2030). This contributes to the government's ambition to help prevent and reduce the loss of and damage to cultural environments as a result of climate change. Important activities include mapping of risks, measures and development of guidance for land use planning and building management.

3.5.1.10 National security, civil protection and emergency preparedness,

Climate change affects civil protection in a number of ways. The increased intensity and frequency of extreme weather increases the risk of serious natural events and can threaten life and health, material assets and critical infrastructure.

Climate change will affect several critical social functions, as well as essential national functions. The government is working on a comprehensive preparedness report that it plans to present to the parliament in the autumn of 2024.

Norway has a new tool to alert the population via mobile phones. With Emergency Alert, Norwegian authorities can send warnings and information directly to the public's mobile phones in acute and serious situations where there is a danger to life and health. The goal of Emergency Alert is to quickly reach the population with important information that can save lives and health in acute and serious incidents, such as events with radioactive releases, severe terrorism, or other accident and disaster situations.

3.5.1.11 Floods and landslides

The Ministry of Energy presented a white paper on floods and landslides in 2024.⁵⁶ The white paper covers all phases of work related to floods and landslides – from prevention, through crisis management during an extreme event, to the phase after an event. Prevention includes both physical measures to reduce risks from natural

⁵⁶ [Sterkare førebygging av flaum og skred – regjeringen.no](https://www.regjeringen.no) (in Norwegian only)

hazards and measures such as mapping, spatial planning, monitoring, and early warning systems. The government will strengthen its efforts in the prevention of risks from floods and landslides, to increase the safety of its citizens.

3.5.1.12 Forest fire

The Ministry of Justice and Public Security recently presented a white paper on fire and rescue service.⁵⁷ The Government will ensure that there is sufficient forest fire preparedness with forest fire helicopters with commander support and effective forest fire surveillance. The Government will promote Nordic, European and international cooperation on handling large forest fires.

3.5.1.13 Buildings, infrastructure and transport

The effects of climate change are causing increased risk on buildings, infrastructure and transport. To ensure safe infrastructure, climate change adaptation must form an integral part of the planning, construction, operation and maintenance of the infrastructure. For example, climate change must be taken into account in the location of roads and railways and when dimensioning culverts, manholes and ditches so that they can cope with increased amounts of water. Furthermore, climate change causes more frequent damage to infrastructure with subsequent repair needs and costs. Climate change may also increase the need to maintain infrastructure that is outdated, undersized or in poor condition.

The Ministry of Transport included consideration for climate change adaptation in the National Transport Plan (NTP) 2025–2036. The plan serves as a tool for coordination, investigation, management and prioritisation, and is normally rolled out every four years. During the planning period in NTP, the Government will base its prioritisation of resources on the following:

- we shall preserve existing transport infrastructure,
- we shall improve transport infrastructure where possible and better utilise the capacity of the existing infrastructure and transport services,
- we shall construct new infrastructure when necessary.

The Government's prioritisation of operation and maintenance is a crucial step toward adapting transport infrastructure to a changing climate.

As mentioned under chapter 3.5.1.2, the government will review the safety requirements against natural hazards in Regulations on technical requirements for construction works. These requirements apply mainly to new construction works.

3.5.1.14 Agriculture, forestry, fisheries and aquaculture

The agricultural sector must be equipped to ensure the necessary production and climate change adaptation, while reducing its environmental impact. The Government is working on climate change adaptation measures and climate-resilient farming methods that can contribute to achieving agricultural policy goals and the national target for climate change adaptation, and safeguard other social interests.

⁵⁷ [Meld. St. 16 \(2023–2024\) – regjeringen.no](#) (in Norwegian only)

The government is also planning to prepare a mandate and appoint a broadly composed working group with members from research, industry and the public administration to review climate change adaptation in agriculture.

More knowledge is needed about the impact of climate change on fisheries and aquaculture, as well as the measures required to address these consequences. The government has taken several initiatives to increase knowledge about the observed and future impacts of climate change on the ocean and marine stocks.

Adaptation measures in forestry pose particular challenges due to the forest's long rotation period. The trees planted today must withstand the climate in 70-100 years, while at the same time being adapted to today's climate. The Government work with several forest management measures that make forests more resilient to climate change and prevent forest damage.

3.5.1.15 Business and industry

By exploiting the market opportunities that emerge in a changing climate, the business sector can contribute to better and more affordable adaptation in other sectors while maintaining or increasing its value creation. The Government is working to achieve good overall framework conditions for value creation, innovation and restructuring that enable companies to implement adaptation measures, change business practice in line with changed conditions and exploit the opportunities that climate change presents.

3.5.1.16 Health

Heatwaves, droughts, forest fires, extreme weather, reduced access to food and clean drinking water and changes in insect-borne diseases are examples of how climate change can impact health and health systems.⁵⁸

In Report No 15 to the Storting (2022–2023) Folkehelsemeldinga – Nasjonal strategi for utjamning av sociale helseforskjellar ('Public Health Report – National Strategy for reducing social inequalities in health' – in Norwegian only)⁵⁹, the Government emphasises the connection between climate change and public health. The Norwegian Public Health Institute has started a work to assess how climate change may affect morbidity and mortality in Norway.

3.5.1.17 Foreign, defence and security policy

In the new long-term plan for the defence sector for the period 2025–2036, cf. the Storting's consideration of Recommendation 426 S (2023–2024) (to Proposition 87 S (2023–2024)), it is emphasized that climate change, technological development, and a more complex threat landscape are changing what is required to defend Norway. The defence sector must therefore adapt to a rapidly evolving world.

⁵⁸ [The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels – The Lancet](#)

⁵⁹ [Meld. St. 15 \(2022–2023\) – regjeringen.no](#) (in Norwegian only)

3.5.1.18 Aid and development cooperation

Norway's climate change-related support to developing countries is described in chapter 4.

3.5.2 Steps taken to formulate, implement, publish and update national and regional frameworks

In the white paper on climate change adaptation, the Government introduced procedures for updating the national climate change adaptation policy every four year, so that its efforts can be adjusted if new knowledge about risk and vulnerability or other relevant considerations so indicate. The Ministry of Climate and Environment will coordinate the work of updating policy. This work will be carried out in collaboration with the sector ministries, which are responsible for addressing climate change in their respective areas.

The Norwegian Directorate for Civil Protection (DSB) has started the development of a digital solution for better preparation of risk and vulnerability analyses (ROS analyses) for spatial planning (Digiros). This will help ensure that climate change considerations are taken into account in the municipalities.

3.5.3 Implementation of adaptation actions identified in current and past adaptation communications

Norway reported its first adaptation communication in 2021 and it reflected the chapter on climate change impact and adaption reported in Norway's 7th National Communication. Norway reported on climate change impact and adaption in its 8th National Communication in 2022. This, together with updated information in this BTR1 provides updated information on the implementation of adaptation actions.

3.5.4 Implementation of adaptation actions identified in the adaptation component of NDCs, as applicable

This is not relevant for Norway.

3.5.5 Coordination activities and changes in regulations, policies and planning

The Ministry of Climate and Environment is responsible for coordinating the work on climate change adaptation within the Government. The responsible parties in the various ministries meet regularly to collaborate and coordinate the work.

The Norwegian Environment Agency coordinates an interagency group on climate change adaptation.

The Ministry of Local Government and Regional Development assigns tasks related to climate change adaptation to the counties, and coordinate these with the other ministries.

Regarding changes in regulations, policies and planning, see chapter 3.1.3 and 3.5.

3.6 Monitoring and evaluation of adaptation actions and processes

This chapter provides information that is considered as appropriate related to monitoring and evaluation.

3.6.1 Domestic systems to monitor and evaluate the implementation of adaptation actions

The Norwegian Climate and Environment Ministry is responsible for the overall reporting of the climate change policy in Norway, including reporting on adaptation progress. The national Climate Change Act commits the government to providing annual reports to the parliament on the status regarding adaptation. The government gives this account of the status of the work on climate change adaptation in the sectors, including reporting on how the plan for national climate change adaptation work is followed up, in the report climate status and plan.

As part of the governance system for climate change adaptation, the Norwegian Environment Agency is responsible for developing national climate change vulnerability analyses, in cooperation with relevant sector authorities and other actors. The analyses should be updated at least every four years, and the first analysis is expected to be completed by the end of 2026.

The climate change vulnerability analysis is intended to provide an overview of current knowledge about the consequences of a changing climate for society. The analysis should include risks that span national borders and areas of society. Interaction between climate-related risk and other social development drivers should also be addressed. In the first instance, national climate change vulnerability analyses should primarily focus on vulnerability at a more overarching level. However, the analysis may also include topics that impact individual sectors in particular and may be used as a starting point for sector-specific and thematically defined analyses.

3.6.2 The effectiveness and sustainability of adaptation actions

The government has appointed an expert committee to obtain more knowledge about the socio-economic consequences of climate change for vulnerable sectors and regions, and identify priority areas where there is good potential to reduce climate-related risk, assessed in relation to the cost of actions, cf. 3.5.1.1. The expert committee will provide information on effectiveness and sustainability of adaptation action. This will be considered reported in future BTR.

3.7 Information related to averting, minimizing and addressing loss and damage associated with climate change impacts

The white paper on floods and landslides addresses averting, minimizing and addressing loss and damage related to flood and landslides. Good monitoring and warning as a preventive measure against flood and landslide damage will become

increasingly important. NVE, in cooperation with, among others, the Norwegian Meteorological Institute and the Norwegian Public Roads Administration, is further developing the national alert service so that natural hazard warnings better match the risks and consequences of events and not just the likelihood of an event occurring.

The Ministry of Justice and Public Security is responsible for the natural disaster insurance scheme. It provides individuals with security if houses, homes, or other insured items are destroyed in natural disasters and is an important part of society's preparedness for natural disasters. Several actors have pointed out that the current incentives pose challenges and that the incentive models for prevention should be improved so that more profitable climate change adaptation actions are implemented. The Ministry of Justice and Public Security has sent a proposal for a new natural disaster insurance law for consultation. The goal is that the new law, together with new regulations on natural disaster insurance, will provide a good and updated regulatory framework.

3.8 Cooperation, good practices, experience and lessons learned

This chapter provides information that is considered as appropriated for cooperation, good practises, experience, and lessons learned.

3.8.1 Efforts to share information, good practices, experience and lessons learned

13 urban municipalities are collaborating through «The front runner»-network, established in 2015 and coordinated by the Norwegian Environment Agency. The network develops knowledge on climate change adaptation at the local level and shares knowledge and competence among the participating cities through joint projects. The network was evaluated in 2019 after the first strategy period. A second strategy period of five years started in 2020.

An improved cross-sectoral cooperation has been established related to natural hazards, including climate change. Naturfareforum (translates to «The Natural Hazards Forum», albeit in Norwegian only) was established in 2016 as a follow-up of the collaboration initiated through the Research and Development (R&D) program «Naturfare, infrastruktur, flom og skred» (translates to «Natural hazards, infrastructures, floods and landslides» and abbreviated NIFS, albeit in Norwegian only). The aim is to improve cooperation between national, regional and local actors in managing natural hazards, including the impact of climate change. Naturfareforum works on identifying gaps and the potential for improvement related to the society's management of risk related to natural hazards, and initiate projects or working groups on cross-sectoral issues. The network is organised with a secretariat consisting of DSB, NVE, the Norwegian Public Roads Administration, and a steering committee where a number of directorates and other national level actors, as well as KS and the Norwegian Environment Agency, are represented.

Naturfareforum acts as the national platform for the global Sendai Framework for Disaster Risk Reduction. As part of the work on the Knowledge Bank, a platform for

collating natural hazard information from all relevant sources, a new Section of the Civil Protection Act came into force on 1 May 2021. The legal provision authorises DSB to process confidential personal data on natural and water damage from insurance companies and make them available to municipalities and other relevant public bodies where this is necessary to prevent and reduce the consequences of undesirable incidents. In addition to the public authorities, organisations in both the private and voluntary sector make important contributions to the climate change adaptation work. The Norwegian Association of Local and Regional Authorities support municipalities and county authorities in their work and carry out various capacity building and support activities related to climate change adaptation, including networks.

3.8.2 Strengthening scientific research and knowledge

3.8.2.1 Strengthening scientific research and knowledge related to climate, including research and systematic observation and early warning systems, to inform climate services and decision-making

Increasing understanding of climate change and providing a foundation for successful climate change adaptation is highlighted in the white paper Meld. St. 4 (2018–2019) *Long-term plan for research and higher education (2019–2028)*.

The Norwegian Climate Service Center has developed climate projections for Norway up to 2100 and county-specific climate profiles for all counties in the country. New data on extreme precipitation was released in March 2022. In 2021, work began on new climate projections for Norway based on the sixth assessment report from the UN's Intergovernmental Panel on Climate Change (IPCC). The new climate projections will be analyzed together with updated historical changes in a new Climate in Norway 2100 report, which is scheduled to be released in the fall of 2025.

3.8.2.2 Strengthening scientific research and knowledge related to vulnerability and adaptation

Several actors provide funding for knowledge development on climate change adaptation in Norway. Key actors are the Research Council of Norway and the EU Framework Programme for Research and Innovation, Horizon Europe. The Research Council invests in research and innovation through different portfolios. One of these portfolios deals specifically with climate and polar research, but research and innovation in the field of climate change are also included in several of the other portfolios. The sectoral principle for research entails that each ministry must have an overview of its research needs in the short and long term, and fund such research, both through the Research Council of Norway and other channels.

Adaptation to climate change is one of five EU missions towards 2030. Under the mission, researchers, civil society actors and citizens will jointly develop and test solutions for transformative adaptation to climate change.

The Ministry of Climate and Environment has tasked the Norwegian Environment Agency with developing climate vulnerability analysis, see more information under 3.6.

4 Information on financial, technology development and transfer and capacity-building support provided and mobilized



4.1 National circumstances and institutional arrangements

Description of the systems and processes used to identify, track and report on support provided and mobilized through public interventions

The monitoring of Norwegian development finance targeting the objectives of the United Nations Framework Convention for Climate Change (UNFCCC) and the Paris Agreement is conducted by The Norwegian Agency for Development Cooperation (Norad).

Norway's methodology for collecting and reporting information on financial support, including underlying assumptions and indicators, is grounded in OECD methodologies.

Reporting of climate finance provided and mobilised through public interventions is based on activities reported in the OECD's Creditor Reporting System (CRS). This includes Official Development Finance (ODF), which consists of Official Development Assistance (ODA), Other Official Flows (OOF), and private finance mobilised by these official development interventions.

The identification, tracking, and reporting of relevant support are methodologically distinct for *earmarked contributions* and *core contributions* to multilateral organisations. The term 'earmarked support' includes all public support provided through bilateral and multilateral channels, excluding core contributions to multilateral organisations.

Tracking climate-specific earmarked contributions

- The OECD DAC's Rio markers for climate change adaptation and mitigation are used to identify earmarked activities from CRS reporting that can be reported as climate finance to the UNFCCC. The Rio markers classify activities as having either 'principal' or 'significant' climate objectives. These markers are qualitative, indicating the extent to which climate objectives are targeted.
- Grant managers are responsible for accurately recording statistical information for their respective agreements, including the correct application of Rio markers. Norad conducts annual quality assurance to ensure that the use of the Rio markers aligns with the criteria in the OECD guidelines for CRS reporting.
- For tracking and reporting climate-specific earmarked contributions, a 40 per cent coefficient is applied to activities with a significant score. As a result, 100 per cent of contributions to activities with a principal objective are included, while 40 per cent of contributions to activities with a significant objective are counted. This aligns with the reporting practices of several other DAC members, who also use the 40 per cent coefficient for significant objectives. The purpose of applying this coefficient is to estimate a more climate-specific amount, although in practice, this simplified calculation may vary above or below 40 per cent for individual activities. In cross-cutting activities, where the objectives are both climate change mitigation and adaptation, at least one must be a primary objective for the contribution to count as 100 per cent; otherwise, it is counted as 40 per cent.

Tracking climate-specific core contributions to multilateral organisations

- For tracking and reporting climate-specific core contributions to multilateral organisations, estimated climate-specific shares from the OECD Secretariat are used. The OECD estimates, known as the imputed multilateral shares, represent the calculated climate-specific shares of donors' core contributions to various multilateral organisations.
- For each organisation for which the OECD has calculated imputed multilateral shares and that receives core contributions from Norway, Norway's climate-specific core support to that organisation has been calculated and reported as climate-specific core contributions.
- The OECD calculates the climate-specific share of multilateral outflows using the Rio markers or climate components reported by the organisation, and only ODA from the multilateral institution's core resources (commitments) are included in the calculation. The OECD's estimates cover most, but not all, multilateral organisations working on climate objectives. For organisations where OECD has not produced estimates, this is either because the climate share is too low or because the organisation's data reporting to the OECD is too incomplete to make such calculations.
- Starting from the 2021 reporting year, the OECD Secretariat provides climate-specific multilateral core support disaggregated by type of support: adaptation, mitigation, and cross-cutting. An update in Norway's reporting from 2021 onwards is therefore to disaggregate Norwegian climate-specific multilateral core support by type of support.

Tracking climate-specific mobilised private finance

- To track and report private climate finance mobilised through public interventions, we use the OECD's standardised framework for measuring mobilised private capital. More generally, this framework is used to report all private capital mobilised by Norwegian development finance in Norway's CRS reporting. The framework provides methodologies for measuring mobilised private capital through various financial mechanisms and for attributing the mobilised amounts to public actors while avoiding double-counting.
- Public earmarked interventions that mobilise private climate finance are identified using the Rio Markers for Climate Change Mitigation and Adaptation. A 40 per cent coefficient is applied to the mobilised private finance to estimate the climate-specific amount, following the same approach as for the corresponding public interventions.

To measure the amounts of public climate finance, the face value of all types of transfers is considered, from grants to private sector instruments, based on actual gross disbursements in the relevant year. Inflows, meaning repayments on loans, equity sales, and revenues from interest and dividends, are not reported as climate finance. Instead, these inflows are described narratively. The amounts for mobilised private climate finance are based on commitments, in contrast to public climate finance, due to the challenges in tracking disbursements of mobilised private finance.

Description of challenges and limitations

Norway does not have an established method for comprehensively tracking activities that promote technology transfer and capacity-building. The OECD CRS reporting system does not enable the systematic tracking of activities related to capacity building and technology development and transfer. The OECD has proposed a voluntary methodology to track such activities. However, when applied on the Norwegian statistics, there were certain challenges with the method. We aim to further assess these methodological challenges.

A challenge with the OECD's imputed multilateral shares is that such shares are not generated for all climate-relevant multilateral organisations receiving core support from Norway. This is primarily due to insufficient reporting by these organisations to the OECD. As a result, this method does not capture the full extent of Norway's core support for climate-related purposes.

Information on experience and good practices in relation to public policy and regulatory frameworks to incentivise further private climate financing and investment

Many of the efforts undertaken by Norway in the field of climate change are directed at undertaking reforms, phasing out fossil fuel subsidies harmful to the environment, strengthening technical and institutional capacity to support private sector and commercial investments, often in cooperation with other donors or through programmes or funds in multilateral development institutions. For example, the Renewable Energy Catalyst Trust Fund (RECTF) is primarily focused on mobilising foreign direct investment into the renewable energy sector. Through the collaboration with the Multilateral Investment Guarantee Agency (MIGA) (political risk insurance), Norway aims to support renewable energy projects, especially in the poorest countries and Sub-Saharan Africa, by mitigating risks associated with investments. It is a key priority for Norway to support the private sector in developing renewable energy projects in Africa through various means, including by providing grants to companies for early-stage project development, guarantee premiums, and first loss guarantee subsidies. Norway's Climate Investment Fund (CIF) became operational in 2022. The fund, which is managed by Norfund, is an important tool in accelerating the global energy transition by investing in renewable energy in developing countries with large emissions from coal and other fossil power production. Renewable energy is also a priority area for investment in Norfund's development portfolio.

Efforts taken to enhance comparability and accuracy of information

Norway carries out quality assurance checks on the information to be reported using the OECD DAC reporting system, including how significant differentials in the reported information from one year to another are accounted for.

The statistics for each agreement, including the Rio markers for climate change adaptation and mitigation, are filled out by the responsible officer that manages the agreement. The Section for Statistics and Analysis in Norad then performs several quality assurance checks on the statistics before it is finalised. First, each newly signed agreement is reviewed based on the quality of the title, description and sta-

tistics. Second, the entire statistics database for the previous year is reviewed in the period January-April. As part of this review, all new agreements marked with one of the Rio markers, as well as agreements that are not marked with the Rio markers but contain relevant search words in the title/description, are sent to the Section for Nature and Climate in Norad for their expert assessment. Changes to the statistical coding can be made as part of both of these checks, and the responsible officer is alerted about the change and has the possibility to object. Last, time series for the Rio markers are reviewed to ensure that significant changes from one year to another are accounted for.

Norway is a member of the OECD DAC. In recent years, the DAC has done substantial work on ensuring consistent and comparable use of the Rio markers, and Norway has played an active part in this work. For one, the DAC has reviewed member countries' use of the Rio markers and updated the definitions of the markers to be in line with the UNFCCC and the Paris Agreement. Moreover, the indicative tables for climate change adaptation and climate change mitigation were recently updated after comprehensive work in both WP-STAT and ENVIRONET to further accurate and comparable use of the markers ([Rio_markers_indicative_tables_2024.xlsx](#)). The DAC has also increased the transparency of member countries' climate reporting through conducting and publishing periodic surveys, on a voluntary basis, on the coefficients applied to Rio marker data when reporting to the UN Conventions.

Information on national circumstances and institutional arrangements for the provision of technology development and transfer and capacity-building support

Information on the most relevant activities has been provided in textual format. The OECD DAC WP-STAT has developed a methodology for tracking activities relevant to capacity-building and technology transfer, which was completed in 2024. However, this methodology does not fully capture the nature of Norwegian support. This is therefore an area Norway will need to examine in greater detail for future reporting.

4.2 Underlying assumptions, definitions and methodologies

The chosen reporting year is 2021 calendar year and 2022 fiscal year. The conversion between domestic currency and United States dollars is 8.5915 in 2021 and 9.6129 for 2022.

Status

Public climate finance is reported in disbursed amounts, while private finance mobilised through public interventions is reported in committed amounts.

Channel

The category 'Bi_Multi' in the OECD CRS reporting framework is used to report the channels of public climate financing: Channel 'bilateral' includes core contributions to NGOs and PPPs and triangular co-operation. Channel 'multi-bilateral' includes

earmarked support to multilaterals. Channel 'multilateral' includes core support to multilateral organisations. Channel 'regional' includes global or regional earmarked support. As described in section 4.1, different methods are used to track and report earmarked climate financing and climate-specific core support to multilateral organisations.

Funding source

The category 'Type of flow' in the OECD CRS reporting framework is used to report the funding source. Public climate finance is classified as Official Development Finance (ODF), which consists of Official Development Assistance (ODA) and Other Official Flows (OOF). Private climate finance mobilised through Official Development Finance (ODF) is reported in the CRS under the column 'Amounts Mobilised from the Private Sector' for the relevant official development intervention.

Financial instrument

The category 'Type of Finance' in the OECD CRS reporting framework is used to report the type of financial instrument. The categories include grants, debt instruments, equities, mezzanine finance instruments, guarantees, and others. In cases where there is no direct mapping from Type of Finance in the CRS framework to Financial Instrument, the Type of Finance from the CRS is used.

Information on instruments and funding sources reported

The 'Type_of_Flow' category in the OECD CRS reporting framework is used to specify the funding source of the climate finance provided, such as Official Development Assistance (ODA) or Other Official Flows (OOF). The 'Type of Finance' category, meanwhile, reports the specific financial instrument used (e.g., grants, loans).

Norway's reporting of climate finance provided and mobilised is based on activities listed in the OECD's Creditor Reporting System (CRS), which includes Official Development Finance (ODF). This includes both ODA and OOF. OOF activities cover private sector instruments (PSI) from Norfund's Development Investment Mandate and the Climate Investment Fund managed by Norfund. Norway applies the institutional approach for ODA-reporting of PSI, whereby capitalisations of Norfund and the Climate Investment Fund are classified as ODA, whereas their outflows are reported as OOF. For the reporting of climate finance provided, climate-specific PSI outflows (OOF) from Norfund as well as the Climate Investment Fund are included, while the annual ODA-reported capitalisations of these funds are excluded to avoid double counting.

In line with the PSI institutional approach, the ODA coefficients for Norfund and the Climate Investment Fund are assessed based on types of additionality specified by the OECD. Both funds qualify as 100 percent ODA for both the reported years.

Amounts reported represent the face value of all types of transfers, from grants to private sector instruments. Flows are reported at their full disbursed amount, rather than as grant equivalents.

The type of support

The OECD DAC's Rio markers for climate change adaptation and mitigation are used to report on the type of support for earmarked climate financing and mobilised private climate finance. The Rio markers classify activities as having either 'principal' or 'significant' climate objectives. Cross-cutting refers to activities that address both adaptation and mitigation as either principal or significant objectives. The estimated climate-specific core support is also divided into adaptation, mitigation, and cross-cutting categories. The disaggregation of these estimates into adaptation, mitigation, and cross-cutting categories is new from the 2021 reporting year and was calculated by the OECD Secretariat. In certain cases, the climate-specific multilateral core support is not allocated between adaptation, cross-cutting, and mitigation, and we then report it as Climate Unspecified.

Sector

Reporting by sector is based on the OECD's sector classification, Purpose codes, in CRS reporting. The OECD's purpose codes are mapped to sectors relevant to BTR reporting. The mapping has been conducted by the OECD Secretariat.

Subsector

Reporting by sector is based on the OECD's sector classification, Purpose codes, in CRS reporting. The OECD's purpose codes are mapped to sectors relevant to BTR reporting. The mapping has been conducted by the OECD Secretariat.

Whether it supported capacity-building and/or technology development and transfer objectives

As stated earlier in the text, in the registration and reporting to the OECD CRS, there is no variable that specifically and comprehensively identifies whether an activity contributes to capacity building and/or technology development and transfer. Since Norway does not have an established method for comprehensively tracking climate-relevant activities that promote technology transfer and capacity-building, information on the most relevant activities has been provided in textual format.

The support as being climate-specific

The reported amounts are estimated climate-specific finance. To estimate climate-specific climate finance, two different methods are used (as described in section 4.1): 1) one for public earmarked climate finance and mobilised private climate finance, calculating a climate-specific share based on the qualitative Rio markers, and 2) another method for public core support to multilateral organisations using imputed multilateral shares.

To estimate the climate-specific share of earmarked contributions marked with the Rio markers for climate change adaptation and mitigation, we apply a 40 per cent coefficient to contributions for activities with only a significant objective. The same 40 per cent coefficient applies to cross-cutting activities with only significant adaptation and mitigation objectives. For activities with either mitigation or adaptation as a principal objective, a 100 per cent coefficient is applied. The same approach applies

for estimating the climate-specific private climate finance mobilised by public interventions.

The OECD Secretariat's estimates of imputed multilateral ODA are used to calculate climate-specific core contributions to multilateral organisations. The OECD estimates, known as the imputed multilateral shares, represent the calculated climate-specific shares of donors' core contributions to various multilateral organisations. For each organisation with calculated imputed multilateral shares that receives core contributions from Norway, Norway's climate-specific core support is calculated and reported as climate-specific multilateral core contributions.

Information on the efforts taken to avoid double counting

Norway's reporting on climate finance provided and mobilised is based on activities reported to the OECD CRS in accordance with their reporting guidelines. The reporting guidance is designed to prevent double-counting from bilateral and multilateral donors.

For Norway's reporting on attributed private climate finance mobilised by Norwegian public interventions, OECD's standardised framework for measuring private mobilisation is used. A core principle in the design of the OECD framework is to avoid double-counting when attributing the mobilised amount back to the official donors (both bilateral and multilateral). The OECD Secretariat has developed reporting requirements and quality assurance measures to prevent double-counting. The OECD methodology requires that only institutions making direct public investments report mobilised private finance, ensuring clear attribution of the mobilised private finance to those actively involved while avoiding double counting.

Norway does not report resources used under Article 6 of the Paris Agreement as climate finance provided and mobilised.

Norway's reporting on the recipient country of Norwegian climate finance is based on the Recipient category from the OECD CRS reporting framework. In cases where there is more than one recipient country within the same geographical region, multiple recipient countries are not listed. Instead, the activity is reported as regional (e.g., Sub-Saharan Africa, regional). If the activity involves recipient countries across different geographical regions, it is reported as Global unspecified, and core support to multilateral organisations is reported as Multilateral.

The definition of public and private finance, in particular where entities or funds are mixed

OECD's definition of the distinction between official and private flows is used to differentiate between the reporting of public climate finance and mobilised private climate finance. Norwegian public climate finance activities are reported as Official Development Finance (ODA or OOF) and, by definition, consist of contributions provided by Norwegian government agencies. In contrast, the private finance mobilised by Norwegian public interventions refers to private funds where more than 50 per cent of the ownership or control is held by private entities.

How private finance was assessed as mobilised through public interventions

For Norway's reporting on attributed private climate finance mobilised by Norwegian public interventions, OECD's standardised framework for measuring private mobilisation is used. The main principle of the OECD methodology for measuring mobilisation is a demonstrated causal link between the official and private investment. The OECD's methodology establishes a causal link by using specific criteria to attribute private finance directly to public financial mechanisms, such as guarantees, syndicated loans, or equity stakes. This approach ensures that only private investment directly attributable to the public intervention is counted, avoiding overestimations. OECD guidelines require instrument-specific documentation, demonstrating that the public intervention led to the private finance commitment, and excludes more indirect mobilisation that do not meet this criterion.

In the OECD methodology, the point of measurement for private finance mobilised by public interventions is the point of commitment by the private sector, where capital is allocated directly due to the influence of the public intervention. This approach is generally consistent across various financial instruments, although some adjustments may be made based on the specific mechanism.

In the OECD methodology, boundaries are crucial to ensure that only private finance directly and causally linked to public intervention is classified as 'mobilised'. These boundaries include the following key aspects: instrument-specific attribution, causal link requirement, exclusion of indirect mobilisation, avoidance of double counting. These boundaries ensure a robust and transparent measurement of private finance mobilised by public interventions, accurately reflecting the scale and impact of these contributions.

How Norway seeks to ensure that support provided and mobilised through public interventions effectively addresses the needs and priorities of developing country

All Norwegian ODA, including climate finance provided to support developing countries, is assessed in terms of responding to needs and priorities of partner countries. According to the guidance for the preparation and approval of Norwegian support, any project or programme should be assessed in terms of its relevance to the priorities and plans of the recipient country and/or partner, or its relevance to the target group. This is aimed at ensuring that resources effectively address the needs of Parties. Furthermore, in assessing risks associated with projects, the risk that the project itself could have unintended negative consequences to climate and the environment is mandatory to document. Climate and the environment are cross-cutting issues in all Norwegian development assistance and must always be taken into consideration when assessing projects.

How Norway seeks to ensure that support provided and mobilised through public interventions is in line with the long-term goals of the Paris Agreement

The current government has a priority to amalgamate climate and development policy and has been working toward achieving this since elected in 2021. In 2022, Norad was mandated in its main allocation letter from the Ministry of Foreign Affairs to ensure that all climate relevant support is managed in line with the

national climate plans of the recipient countries, the goals of the Paris Agreement and long-term low greenhouse gas emission development strategies.

An indication of what new and additional financial resources have been provided, and how it has been determined that such resources are new and additional

The primary goal of Norwegian development cooperation is to combat poverty, save lives, and reduce suffering, in line with humanitarian principles. Recognising the strong ties between climate change and development, Norway emphasises the connections among the Paris Agreement, the Sustainable Development Goals, and the Sendai Framework for Disaster Risk Reduction.

While there is no internationally agreed-upon definition of «new and additional» resources for climate finance, several countries, including Norway, consider climate finance additional when it exceeds the 0.7 per cent GNI target for development aid. Norway's Official Development Assistance (ODA) has consistently surpassed this target for years. The volume of the Norwegian ODA budget has steadily increased as the Norwegian economy has been growing.

In addition to public climate finance (which originates from ODA funding and returns on investments), Norwegian DFIs' mobilise private finance through their climate specific investments. The amount mobilised varies, as can be seen in the tables below.

Aligned with the 2030 Agenda, Norway integrates social, economic, and environmental sustainability into its development efforts, recognising that well-planned actions can yield local and global benefits, including climate resilience. Although climate concerns are integrated into development assistance, this support is not consistently separately accounted for, making it challenging to isolate climate adaptation contributions within development aid.

How the information provided reflects a progression from previous levels in the provision and mobilisation of finance under the Paris Agreement

Chapter 4.3 presents key figures on Norwegian climate finance provided and mobilised in 2021 and 2022, as well as the progression from 2020.

Information on reporting on multilateral finance

The multilateral finance reported are estimated climate-specific inflow contributions to a selection of multilateral organisations, using the OECD imputed multilateral shares methodology.

Climate-specific core contributions to multilateral organisations are reported using the OECD imputed multilateral shares methodology, where the OECD secretariat has published annual imputed climate-specific shares for a selection of multilateral organisations.

Only climate-specific estimates from the OECD Secretariat are used to report multilateral climate finance. Core contributions to organisations without an imputed climate share from the OECD Secretariat are excluded from climate finance reporting.

For example, core contributions to UNDP are not reported as climate finance, as no imputed climate share is published by the OECD Secretariat.

The OECD imputed multilateral shares methodology is applied to attribute the climate-specific share of multilateral organisations' outflows to the core contributions provided by the reporting Party.

A description of the underlying assumptions, definitions and methodologies used to provide information on technology development and transfer and capacity-building support

The basis for reporting on technology development and capacity building relies on the assumptions, definitions, and methodologies for identifying and reporting climate finance activities, as described above. As noted in section 4.1, Norway has not established a comprehensive method for tracking the climate-related activities that promote technology transfer and capacity building. Instead, information on the most relevant activities has been included in textual format.

4.3 Information on financial support provided and mobilized

This section presents a selection of summary tables on Norwegian climate finance provided and mobilised in 2021 and 2022. The data is fully reported in CTF Tables III.1–3.⁶⁰

At COP26 in 2021, Norway committed to doubling its total annual climate finance to NOK 14 billion by 2026, from NOK 7 billion in 2020, and to at least triple its adaptation finance as part of this effort.

Key figures

Table 4.1 and Table 4.2 provide an overview of total climate finance provided and mobilised in 2021 and 2022⁶¹, in NOK million and USD million, respectively, with 2020 figures included for comparison.

Total climate finance provided and mobilised increased from NOK 6,978 million in 2020 to NOK 15,619 million in 2022, more than doubling over this period. Earmarked support, excluding contributions from Norfund and the Climate Investment Fund (CIF), rose from NOK 4,027 million in 2020 to NOK 5,251 million in 2022. Finance from Norfund and CIF also increased substantially, rising from NOK 581 million in 2020 to NOK 1,903 million in 2022. Mobilised private climate finance saw significant growth, expanding from NOK 313 million in 2020 to NOK 6,302 million in 2022. This was mainly due to growth as a result of investments made by CIF.

⁶⁰ [First Biennial Transparency Reports | UNFCCC](#)

⁶¹ Public climate finance is measured as gross amounts extended, meaning that all outflows are included, while inflows from equity sales, dividends, loan repayments, and interest received are excluded. In 2021 and 2022, such inflows totaled NOK 9.8 billion (USD 1.1 billion) and NOK 2.2 billion (USD 229 million), respectively.

Table 4.1 Total provided and mobilised climate finance, by source (gross disbursements, NOK million)

Type of assistance	2020	2021	2022
Earmarked support (excl. Norfund/CIF)	4 027	4 303	5 251
Norfund/CIF	581	1 702	1 903
Multilateral core support (imputed)	2 057	1 609	2 164
Total public climate finance	6 665	7 614	9 318
Mobilised private climate finance	313	571	6 302
Total provided and mobilised climate finance	6 978	8 185	15 619

The trends in climate finance observed in NOK millions are similarly reflected in USD millions, as seen in Table 4.2. Total provided and mobilised climate finance in USD increased from 741 million in 2020 to 1,625 million in 2022. Earmarked support (excluding Norfund/CIF) increased from 428 million in 2020 to 546 million in 2022, while contributions from Norfund and CIF increased from 62 million to 198 million over the same period. Mobilised private climate finance also saw considerable growth, increasing from 33 million in 2020 to 656 million in 2022.

Table 4.2 Total provided and mobilised climate finance, by type of assistance (gross disbursements, USD million)

Type of assistance	2020	2021	2022
Earmarked support (excl. Norfund/CIF)	428	501	546
Norfund/CIF	62	198	198
Multilateral core support (imputed)	218	187	225
Total public climate finance	708	886	969
Mobilised private climate finance	33	66	656
Total provided and mobilised climate finance	741	953	1 625

The majority of Norwegian public climate financing is provided as grants. Financing listed in Tables 4.1 and 4.2 as 'Earmarked support (excl. Norfund/CIF)' and 'Multilateral core support (imputed)' are exclusively grants. Norfund/CIF primarily manages non-grants, which are private sector instruments, consisting mainly of equities and loans.

Type of support

Tables 4.3 and 4.4 (in NOK million and USD million) present an overview of the types of climate finance provided and mobilised in 2021 and 2022, categorised as adaptation, cross-cutting, and mitigation. Cross-cutting activities target both adaptation and mitigation, while the adaptation and mitigation categories are therefore labelled as 'Adaptation only' and 'Mitigation only'.

A large share of the support is directed towards climate change mitigation, with the proportion being particularly high in 2022 due to the significant amount of mobilised private finance. A substantial portion of the adaptation financing is delivered through core contributions to multilateral organisations. In contrast to Figure 1,

2020 is not included as a basis for comparison. This is because the estimates on multilateral core support broken down by type of support has only been available from 2021 onward.

Table 4.3 Total provided and mobilised climate finance, by type of support and type of assistance (gross disbursements, NOK million)

Type of support	Type of assistance	2021	2022
Adaptation only	Earmarked support	685	866
Adaptation only	Multilateral core support (imputed)	768	1 004
Total Adaptation only		1 453	1 870
Cross-cutting	Earmarked support	586	1 211
Cross-cutting	Multilateral core support (imputed)	160	372
Total Cross-cutting		746	1 583
Mitigation only	Earmarked support	4 733	5 078
Mitigation only	Multilateral core support (imputed)	661	767
Mitigation only	Mobilised private climate finance	571	6 302
Total Mitigation only		5 966	12 146
Climate unspecified	Imputed multilateral	20	20
Total provided and mobilised climate finance		8 185	15 619

Table 4.4 Total provided and mobilised climate finance, by type of support and type of assistance (gross disbursements, USD million)

Type of support	Type of assistance	2021	2022
Adaptation only	Earmarked support	80	90

Adaptation only	Multilateral core support (imputed)	89	104
Total Adaptation only		169	195
Cross-cutting	Earmarked support	68	126
Cross-cutting	Multilateral core support (imputed)	19	39
Total Cross-cutting		87	165
Mitigation only	Earmarked support	551	528
Mitigation only	Multilateral core support (imputed)	77	80
Mitigation only	Mobilised private climate finance	66	656
Total Mitigation only		694	1 264
Climate unspecified	Imputed multilateral	2	2
Total provided and mobilised climate finance		953	1 625

Progress towards the climate adaptation commitment

To measure contributions to the commitment to at least triple adaptation finance from 2020 levels by 2026, a specific method is used to track provided and mobilised finance for climate adaptation, including cross-cutting activities. Adaptation-specific core support to multilateral organisations is not included, as there was no adaptation-specific imputed multilateral core support in the baseline year of 2020. Adaptation-specific core support to multilateral organisations comes in addition to the finance provided towards the target to at least triple adaptation finance. Public earmarked support for climate adaptation increased from NOK 1,062 million in 2020 to NOK 1,753 million in 2022, and from USD 113 million to USD 182 million, indicating substantial progress toward the commitment. In the years 2020–2022, there was no mobilised private capital activities for climate adaptation.

Allocation by sectors and regions

Norwegian climate finance is mainly concentrated in three areas: reducing emissions from deforestation and forest degradation, renewable energy, and climate adaptation, including risk reduction.

Table 4.5 and 4.6 present the sectoral and regional allocation of public climate finance provided by type of support for 2021–2022. The scope of public contributions is limited to earmarked support, excluding core contributions to multilateral organisations, as such contributions are not allocated by sector or region.

Adaptation-focused finance is predominantly allocated to agriculture and disaster risk reduction, while mitigation-focused finance primarily targets energy and general environment protection (mainly reducing tropical deforestation). For cross-cutting finance, targeting both climate adaptation and mitigation, the largest allocations are to general environment protection and agriculture.

Table 4.5 Sector allocation of public climate finance provided by type of support in 2021–2022

Sector	Adaptation only	Cross-cutting	Mitigation only	Total
General environment protection ¹	9.7 %	66.0 %	46.9 %	40.9 %
Agriculture	39.4 %	20.0 %	0.6 %	20.0 %
Energy	0.0 %	5.0 %	49.5 %	18.2 %
Cross-cutting	15.9 %	3.1 %	0.1 %	6.4 %
Disaster risk reduction ¹	17.9 %	0.0 %	0.0 %	5.9 %
Government and civil society ¹	3.7 %	1.6 %	1.6 %	2.3 %
Fishing	5.6 %	0.3 %	0.0 %	2.0 %
Other ¹	7.8 %	4.1 %	1.3 %	4.4 %
Total	100 %	100 %	100 %	100 %

¹ OECD DAC sectors that do not directly align with BTR sectors.

Africa is the largest recipient region, receiving more than half of adaptation-focused financing. Together with Africa, Asia and the Americas are key recipients of mitigation-focused financing. For cross-cutting support, Africa and the Americas remain the largest beneficiaries. It is important to note that a significant portion of the financing is not geographically specified in the statistics.

Table 4.6 Regional allocation of public climate finance provided by type of support in 2021–2022

Region	Adaptation only	Cross-cutting	Mitigation only	Total
Africa	52.8 %	31.4 %	35.1 %	39.8 %
Asia	6.0 %	7.3 %	28.1 %	13.8 %
America	2.8 %	17.6 %	9.8 %	10.1 %
The Middle East	0.3 %	0.1 %	0.1 %	0.2 %
Oceania	0.0 %	0.2 %	0.3 %	0.1 %
Europe	0.0 %	0.0 %	0.2 %	0.1 %
Global unspecified	38.1 %	43.4 %	26.5 %	36.0 %
Total	100 %	100 %	100 %	100 %

Governance of public climate finance

Norwegian public climate finance is managed by various entities within the development aid administration. In 2022, 48 per cent was managed by the Norwegian Agency for Development Cooperation (Norad), 23 per cent by the Ministry of Foreign Affairs, 20 per cent by Norfund, including the Climate Investment Fund, and 8 per cent by the Ministry of Climate and Environment. Private finance mobilised from the private sector is generated through the interventions of Norfund and the Climate Investment Fund (CIF).

Norad and the Ministry of Foreign Affairs (MFA) manage core contributions to multilateral organisations, including those dedicated specifically to combating climate change, such as the Green Climate Fund, as well as other organisations that work partly on climate-related initiatives. Additionally, they provide earmarked support in areas like reducing deforestation and forest degradation, renewable energy, oceans, food security, and climate adaptation. Norfund, the Norwegian Investment Fund for developing countries, aims to create jobs, improve lives, and support the transition to net zero. In 2022, the Climate Investment Fund, managed by Norfund, became operational, with a mission to accelerate the global energy transition by investing in renewable energy in developing countries with significant emissions from coal and other fossil fuel-based power production. The Ministry of Climate and Environment oversees Norway's International Climate and Forest Initiative (NICFI).

4.4 Information on support for technology development and transfer provided

In accordance with Article 10 of the Paris Agreement, Norway works to fully realising technology development and transfer in order to improve resilience to climate change and to reduce greenhouse gas emissions. Our work is to implement 10.4 and 10.5. Our work to accelerate, encouraging and enabling innovation has the dual purpose of both developing and implementing innovative technologies domestically, but also to transfer technologies including through sharing lessons learned. We share experiences through multilateral fora and bilaterally. See also chapter 2.5 for description on national efforts to develop climate technologies.

An example is the Norwegian efforts to develop chains for commercial scale carbon capture and storage solutions, see chapter 2.5.4. We share experiences and lessons learned through The Mission Innovation, Clean Energy Ministerial, Carbon Management Challenge to name a few. All these have participation from developing countries. Through the Clean Energy Ministerial CCUS Initiative we also fund participation for representatives from developing countries participation in workshops, seminars and conferences relevant for CCS. We also arrange visits to the Norwegian CCS facilities, lastly in November 2024 a delegation from UNIDO's matchmaking platform (under the Climate Club).

Norway has also prioritised working in the UNFCCC Technology Mechanism and has a member of the Technology Executive Committee.

The transfer of technology and expertise to promote the development, availability, and efficiency of energy is a key component of Official Development Assistance (ODA) and generates significant environmental co-benefits that align with the goals of the Paris Agreement. In addition, Norway supports a wide range of technology transfer initiatives. As described earlier in the report, there is not a precise method for tracking such activities. Hence, it is difficult to identify all the relevant activities supporting technology development and transfer.

Below is an overview of particularly relevant initiatives to support technology development and transfer, see CTF table III.4 for further details.

- **Green Voyage 2050 Programme:** This programme supports developing countries in reducing emissions from the shipping industry through technology cooperation and piloting new technologies.
- **Systematic Observing Financing Facility (SOFF):** Norway supports SOFF, which addresses the gap in weather and climate observations in Least Developed Countries (LDCs) and Small Island Developing States (SIDS). SOFF funds investments in weather observation stations to comply with the Global Basic Observing Network (GBON) standard, improving early warning systems.
- **Global Environment Facility:** Norway contributes to the GEF, which has established a Technology Transfer Program. This programme helps developing countries adopt environmentally sound technologies. This includes:
 - Technology Needs Assessments (TNAs) to help countries identify technology priorities.
 - Pilot projects aimed at accelerating the deployment of innovative technologies.
- **Adaptation Fund:** Norway contributes to the Innovation Facility, that provides grants to vulnerable countries to accelerate innovative adaptation practices and technologies on the ground.
- **Central African Forest Initiative:** In addition to capacity-building efforts, Norway's contributions to CAFI also support technology transfer. For instance:
 - In the Democratic Republic of Congo, CAFI funds the development of the National Forest Monitoring System, while in the Republic of Congo, CAFI facilitates the use of radar imagery for forest monitoring.
 - In Lebanon, rehabilitation in collaboration with FAO of the main canal in Akkar in the north of the country has led to a doubling of the water supply and a fairer distribution of water resources. In 2022, the support contributed to continued cleaning of the canal system, and to monitoring of water quality, better access to clean water, and less waste reaching the sea. Also, the support contributed to reduced use of polluting chemicals in agriculture. The project contributed to over 100 farmers in the Bekaa Valley using 50 per cent less fertilizer and pesticides without this leading to lower yields and food security increased.
 - In Mali, through Norwegian support – the project partners International Institute of Tropical Agriculture (IITA), Institute d'Economie Rurale (IER) and Care contributed to the development of new climate-robust and efficient agricultural technology and seed varieties. Through this, small-scale farmers in Mali and Niger have gained better conditions for securing food supply and income for the family.

4.5 Information on capacity-building support provided

Norway has several sectoral strategies and programmes that include a significant proportion of capacity building support in climate relevant fields. These are described in further detail below. Norway also supports several initiatives that provide capacity building support to developing countries based on local demand. Below are the most important initiatives in this regard, see CTF table III.5 for further details.

1. **Support to the NDC Partnership:** Through the NDC Partnership, Norway provides technical and financial assistance to help developing countries achieve their climate goals, focusing on the integration of climate adaptation and mitigation strategies.
2. **Support to Global Environment Facility:** Norway indirectly supports capacity building through its contributions to the GEF, specifically the Capacity-Building Initiative for Transparency (CBIT), which helps countries improve their systems for tracking greenhouse gas emissions and climate actions.
3. **The Green Climate Fund:** The Green Climate Fund (GCF) has the world's largest capacity building programme and through our support to the GCF, Norway indirectly contributes to programmes that focus on building institutional and technical capacity in developing countries, in particular in least developed countries. Through GCF support has been provided to a programme strengthening the resilience of Tanzania's agriculture sector by facilitating access to agriculture climate adaptation technologies and building institutional capacity to manage climate variability.

Sectoral Strategies:

Norway has several sectoral strategies and programmes. Below is an overview of particularly relevant activities for supporting capacity building.

Norway has established a *Knowledge Bank*, with the purpose of strengthening the competencies and capabilities in public institutions in partner countries through technical cooperation. Several Knowledge Bank programmes are climate relevant, for example *Fish for Development*, *Oceans for Development*, *Agriculture for Development* and *Energy for Development*.

Oceans for Development and *Fish for Development* were established by Norway with the aim to support developing countries in creating sustainable governance of oceans and fisheries resources. These include collaboration between Norwegian institutions and developing countries on fisheries and ocean management, which is critical for climate change mitigation and adaptation. The primary focus is on capacity development of public sector institutions. For more detailed information on involvement or stakeholders and how it promotes the sharing of lessons learned

and best practices, please see the following policy documents: Oceans for Development⁶² and Fish for Development⁶³.

Both programmes integrate anti-corruption, human rights, gender equality and women's rights, climate change and the environment as cross-cutting issues in all projects. Both programmes include several activities to support climate change adaptation and/or mitigation.

Examples of support under these programmes include:

- In 2022, Indonesia and Norway signed an agreement outlining the overall framework for long-term bilateral cooperation on ocean-related matters running to 2028. One component of the collaboration provides technical support to the Government of Indonesia for the development of a robust and high-integrity national blue carbon market. Outcomes of this component include increased and verifiable carbon sequestration in coastal blue carbon habitats and measurable financial and meaningful benefits for coastal communities from blue carbon projects.
- In Colombia, Conservation International works to support decision-makers' knowledge and awareness about the importance of improving the resilience and adaptive capacity of local communities against negative impacts of climate change and support integrated mangrove management and mangrove restoration programs.

«*Climate change, hunger and vulnerability*» is Norway's strategy for climate change adaptation, disaster risk reduction and the fight against hunger, laying the foundation for Norway's efforts to assist vulnerable societies in adapting to climate change. The strategy identifies five priority focus areas: early warning systems and climate services, nature-based solutions, climate resilient food production, infrastructure and innovative development financing mechanisms. It also highlights tools for enhancing climate change adaptation.

The strategy is rooted in the fact that the fundamental aim of climate change adaptation is for countries and societies to develop adaptation solutions and implement action to prevent and reduce vulnerability to the adverse effects of climate change that are already happening and to increase resilience to anticipated future impact. Additionally, to benefit from opportunities associated with climate change. A key focus is to promote the incorporation of climate change adaptation measures in policies, strategies and plans in line with national priorities in developing countries.

The development and improvement of data, statistics, indicators and analysis, in collaboration with relevant partners is a focus of the strategy. The government sets a specific target in the strategy to promote the development and implementation of national climate change adaptation plans and strengthen the knowledge base for action.

⁶² <https://www.norad.no/contentassets/a98988c2c30949ddb12818fbc9a16863/oceans-for-development.pdf>

⁶³ <https://www.norad.no/contentassets/1a48a9623330485089aaf9a22c108e02/fish-for-development-policy-document.pdf>

Examples of projects that support this strategy include:

In 2022, the support of the Sahara Forest Project in Jordan, which aims to provide water and renewable energy in hot, dry areas, helped 73 Jordanian and Syrian students receive training in sustainable agriculture, and contributed to job creation for more women in the agricultural sector. Also, the project contributed to the supply of vegetables to local markets through the use of solar energy and desalinated water. Through advocacy work, the Sahara Forest Project has contributed to attention and renewed the spotlight on climate challenges in the Middle East and sustainable agriculture, including during the Sharm el-Sheikh Climate Change Conference in 2022 in Egypt (COP27).

Support to Disaster Risk Reduction: Norway supports the United Nations Office for Disaster Risk Reduction (UNDRR) and the Global Facility for Disaster Reduction and Recovery (GFDRR). These programmes build capacity in developing countries to integrate disaster risk management into governance systems, helping countries achieve the targets of the Sendai Framework for disaster risk reduction by 2030.

Support to Meteorological Institutes: Norway has contributed to strengthening meteorological services in Bangladesh, Vietnam, Ethiopia, Malawi, and Mozambique through an agreement with the Norwegian Meteorological Institute. This support includes training, workshops, and annual capacity-building initiatives in Oslo, focusing on technological transfer and weather prediction improvement.

«Combining forces against hunger – a policy to improve food self-sufficiency» is Norway's strategy for promoting food security in development policy. The strategy was launched toward the end of 2022 – and includes relevant policy provisions for capacity building. The strategy has a clearly stated objective to support «national plans and strategies for sustainable development, food security and development of agriculture, fisheries and aquaculture, including UN country frameworks, pan-African strategies such as the 2014 Malabo Declaration on Accelerated Agricultural Growth, and national food security or food system strategies and action plans.»

The strategy also includes the launch of the *Agriculture for Development programme*, which strengthens local expertise in partner countries, focusing on food security and sustainable agriculture.

Food Security and Agriculture for Development Programme: The Agriculture for Development (AfD) programme strengthens local expertise in partner countries, focusing on food security and sustainable agriculture. Climate resilience is also integrated into the food security portfolio. Key projects include:

- The Systems of Rice Intensification (SRI) project in Tanzania, which reduced methane emissions by improving rice field management.
- The One Health project in Malawi, which strengthens veterinary services to control zoonotic diseases in the milk value chain.
- Introduction of climate smart agriculture technology and innovation in Sahel and Mali that improves rural livelihood.
- Increased climate resilient food production and productivity by small-scale food producers in Tanzania and Mozambique.
- In Ethiopia, the Norwegian commitment to climate- and forest initiatives was continued with a strengthened focus on increased food security. Norwegian-sup-

ported activities in 2022 engaged local communities in forest conservation and tree planting, as well as introducing sustainable ways of living from the forest. Nearly 400,000 households have received alternative sources of income. In collaboration with the World Bank, large areas of land have been restored and rehabilitated. Another Norwegian-supported programme has contributed to farmers receiving close to 50 per cent larger grain crops, and that over 40,000 women and young people have found work.

Capacity building is an integrated part of *Norway's Climate and Forest Initiative's (NICFI)* efforts to reduce and reverse tropical deforestation. The Initiative contributes to a wide range of capacity-building related activities in a number of thematic areas. This work is closely related to the initiative's efforts on transparency. Firstly, NICFI works on strengthening forest countries' capacity to monitor their respective forests. This is done bilaterally, directly to some countries, but also at a more global level through partners such as the FAO. One key initiative is the satellite data program, which makes satellite images with high spatial and temporal resolution available to the public. Through this, the governments and other actors get access to data, but the program also creates a push for transparency, given its emphasis on publicly available data. Secondly, NICFI contributes to capacity building through engagement in policy design and discussion more broadly. The initiative's dialogue with both governments in tropical forest countries and other actors such as civil society encourages transparency and facilitates capacity building related to policy making broadly. Lastly, NICFI supports capacity building to make sure that relevant actors can benefit from available mechanisms, such as the carbon market. Engaged and competent actors ensures that the carbon market is implemented with high integrity, which again is an important tool for reducing tropical deforestation.

5 Improvements in reporting over time



5.1 Areas of improvement identified by the Party and technical expert review team

One of the guiding principles of the MPGs is the importance of facilitating improved reporting and transparency over time. Norway has followed this principle for many years for its reporting under the Convention. A very important source of identifying areas of improvement has been the technical expert review teams.

This BTR is Norway's first under the Paris Agreement's enhanced transparency system and therefore there has not yet been any technical review. There are therefore no previous areas of improvement identified for the reporting under the Paris Agreement. However, recommendations and encouragements from the reviews under the Convention of National Communications and Biennial Reports have, if relevant, together with improvements identified by Norway, been considered in the preparation of this BTR.

Some examples where we consider that this BTR reflects areas of improvements are:

- For PaMs, more information is included on the methods used to estimate quantitative impacts.
- The BTR addresses to a larger extent information related to costs and non-GHG mitigation benefits of PaMs.
- The BTR provides explanations of why particular PaMs are no longer in place.
- Relevant information for projections on factors and activities for the industrial processes and agriculture sectors. This is in order to provide the reader with a clearer understanding of emission trends.
- A «with additional measures» projections scenario has been reported for the first time.
- More information is provided on projection method and assumptions, and references to detailed technical documentation.
- The reported information on projections includes the main differences in the projections compared with the previous report.
- The reported information on projections includes sensitivity analysis.
- An improvement from the previous reporting is that Chapter 4 provides a more comprehensive overview of provided and mobilised climate finance, such as by type of support, sector, and region.

5.2 How the Party is addressing or intends to address areas of improvement

The Ministry of Environment and Climate co-ordinates the reporting of the BTR and is responsible for considering how the reporting can be improved. Findings from the review process under the enhanced transparency framework will together with the improvements recognized domestically be included in an improvement plan.



The issues will be considered in terms of responsibility, priority and timeframe for implementation. The prioritization will be based on the recommendations from the ERT and available human and financial resources. Future BTRs will include a table with the status of implementation of any recommendations from the ERT.

5.3 Parties' domestic plans and priorities

Norway strives to continuously improve its reporting over time. The improvement plan referred to in chapter 5.2 will also reflect domestic plans and priorities for improved reporting.

Annexes



Annex 1: Common tabular formats for the electronic reporting of:

1.1 Information necessary to track progress in implementing and achieving NDC

The common tabular formats for information necessary to track progress in implementing and achieving NDC have been reported electronically and are available on the UNFCCC website.⁶⁴

1.2 Information on financial, technology development and transfer and capacity-building support provided and mobilized

The common tabular formats for information on financial, technology development and transfer and capacity-building support provided and mobilized have been reported electronically and are available on the UNFCCC website.⁶⁵

⁶⁴ <https://unfccc.int/first-biennial-transparency-reports>

⁶⁵ <https://unfccc.int/first-biennial-transparency-reports>

Annex 2: Information in relation to Norway's participation in cooperative approaches

Norway's intention is to fulfil this target in cooperation with the EU. This will be done within the framework set up by Article 6 of the Paris Agreement. In the event that domestic measures and the cooperation with the EU does not lead to a full realization of the target, Norway may use ITMOs acquired from countries outside the EEA. A program for procurement of ITMOs from countries outside the EEA is established [Norwegian Global Emission Reduction Initiative – regjeringen.no](https://www.regjeringen.no) and an allotment of NOK 8.2 billion has been set up through the state budget and can be drawn upon if the need arises.

Norway will report on its choice of accounting method for cooperative approaches in its forthcoming Initial Report pursuant to the rules under Article 6 in Decision 2/CMA.3 and in future BTRs. The Initial Report will also contain details of the individual cooperative approaches.

EU and Norway need to agree on how to account for the reductions achieved in the common Emissions Trading System (such an agreement was made pursuant to the unit flow under the Kyoto Protocol) and rules pertaining to any flows of ITMOs reflecting flows of units under other pillars of the cooperation. An allotment of NOK 3 billion has been set up through the state budget for acquisitions of units under the ESR and LULUCF pillars.

Norway expects that the net flow of allowances between EU and Norway in the European ETS will be the basis for transfer of ITMOs also under the Paris Agreement, as was the case under the Kyoto Protocol. Further details defining such net flow is to be agreed between the parties. However, Norwegian companies have acquired and used significantly more allowances in the ETS than we expect that Norway will be held responsible for under this cooperative approach, which will then lead to a significant transfer of ITMOs from EU to Norway. Under the Kyoto Protocol such transfer closed most of the gap between the actual Norwegian emissions and the commitment; see the final compilation and accounting reports ([1613334, car2024_NOR.pdf](#)). The remaining gap was closed using units from the Clean Development Mechanism and also some from Joint Implementation.

Annex 3: Methodologies and assumptions used to estimate greenhouse gas impacts of policies and measures

This annex describes to the extent possible, the methodologies and assumptions used to estimate the GHG emission reductions or removals of the actions, policies and measures (PaMs) reported in chapter 2.5 of this Biennial Transparency Report. It also presents other relevant information related to the PaMs.

Norway does not have emissions of NF_3 in its inventory, so this gas is not relevant for estimating the impacts of PaMs. The effects reported in CTF table 5 are aggregated into CO_2 equivalents by using GWP-100 factors from the IPCC's fifth assessment report.

Cross-sectoral

PaM cross-sectoral No. 1: The CO₂-tax on mineral products (excluding road transport and air transport under the ETS)

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The effect is calculated as a scenario analysis using the SNOW-model and the framework for the WEM-projections. The CO₂-tax on mineral products is explicitly modeled in SNOW, so the effect is calculated by running the model using the same assumptions as in the WEM-scenario, but changing the tax rate in the CO₂-tax to 0 for the period 2025–2040, and calculating the yearly difference in emissions from the WEM-scenario. The SNOW-model and assumptions for the WEM-scenario is described in further detail in chapter 2.6.

Changes in methodologies or assumptions for estimating impact since previous report:

In previous reporting the effect was calculated using the static elasticity model KAJA. For this report the SNOW-model has been used instead.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
X	X	X			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	X	

Information on costs:

Taxes on GHG emissions confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small. A tax rate of NOK 1 176 is equivalent to a tax rate of NOK 3.17 per liter of mineral oil. *Information on non-GHG mitigation benefits;*

The combustion of mineral products leads to other emissions causing harmful air pollution. The CO₂-tax contributes to reducing these emissions.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with cross-sectoral PaMs No. 4-10 and transport PaMs No.7-8 and 10-19. The calculated mitigation is acquired by using a macroeconomic model and should appropriately take into account any overlap effects from the mitigation caused by the other PaMs.

PaM cross-sectoral No. 2: EU Emissions Trading System (ETS)

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The effects of the EU ETS on the petroleum sector are considered under the PaM «Climate policies that affect the petroleum sector» and the effects on aviation are considered under the PaM «CO₂ tax on domestic aviation». The effect of expanding the EU ETS to maritime transport has not yet been assessed as it was just recently included.

The remaining scope of the EU ETS is stationary onshore installations. Because emission allowances in the EU ETS can be sold across borders between installations in the scheme, the effect of the scheme on national emissions depends on several factors in addition to the level of ambition of the EU-wide cap. A crucial factor is Norwegian industry's abatement cost relative to the abatement cost in industry located in other countries covered by the scheme, and relative to the carbon price. For this reason, in contrast to the Europe-wide effect, the scheme's effect at the national level is difficult to assess and quantify.

There are no national emission targets for emission trading scheme (ETS) emissions as there are for the emissions under the effort sharing regulation (ESR). Estimates in a study by Statistics Norway⁶⁶ suggest that the ETS in phase II (2008–2012) may have led to emission reductions. Since the results holds in some, but not all robustness tests, the effect in this BTR is reported as not estimated (NE).

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

⁶⁶ Klemetsen, Marit, Rosendahl, Knut Einar and Jakobsen, Anja Lund, 2020. The impacts of the EU ETS on Norwegian plants' environmental and economic performance. Climate Change Economics Vol. 11, No. 1.

Information on costs:

Auctioning of allowances confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The ETS does however require substantial administration and reporting for both the government and the encompassed entities.

Information on non-GHG mitigation benefits:

The PaM's objective is to reduce GHG emissions, but it could also lead to reductions in non-GHG emissions.

Information on how the mitigation action interacts with other:

The PaM is considered to interact with the PaM industry No.1 and PaM cross-sectoral No. 6, see BTR text for further information.

PaM cross-sectoral No. 3: EU Emissions Trading System 2 (ETS2)

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The EU Emissions Trading System 2 (EU ETS2) covers CO₂ emissions from fuel combustion in buildings, road transport and additional sectors. The EU ETS2 is separate from the existing EU ETS. The EU ETS2 will be fully operational in 2027, but regulated entities are required to hold a greenhouse gas emissions permit by 1 January 2025, as well as an approved monitoring plan. The emissions that will be covered by the EU ETS2 is currently to a large degree already covered by taxes (see PaM cross-sectoral No. 1). It is too early to estimate the effect that the EU ETS2 can have on national emissions as it is not yet operational.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There are administrative costs for the Norwegian Environment Agency.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with the PaM cross-sectoral No. 1 and several of the PaMs addressing road traffic. Since the effect of the EU ETS2 has not been estimated, there is no overlap in estimates of effects.

PaM cross-sectoral No. 4: Regulation by the Pollution Control Act

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The effect in terms of emission reductions of the Pollution Control Act is not estimated since GHG emissions are to a large extent covered by other specific policy instruments.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

The Pollution Control Act lays down a general prohibition against pollution. Implementation of Best Available Techniques (BAT) is a key regulatory requirement under the Pollution Control Act § 2, 3rd letter¹. BAT is defined in the Norwegian regulations: Pollution Regulation § 36, appendix II», and is aligned with the definition in the EU Industrial Emissions Directive (IED), Directive 2010/75/EU.

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.

Information on how the mitigation action interacts with other:

The Pollution Control Act applies also to greenhouse gas emissions. Greenhouse gas emissions are however to a large extent covered by other specific policy instruments such as the CO₂ tax and the EU ETS.

PaM cross-sectoral No. 5: The Planning and Building Act

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The effect on emissions reduced through the regulations in the Planning and Building Act is difficult to estimate, as the emission reduction potential includes transport, land use change and buildings from all Norwegian municipalities. In addition, the base line is not defined.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

The legislative purpose of the Act is to ensure sustainable development in the interest of individuals, society and future generations. Among the core planning functions and considerations required in all planning in accordance with the Act, are climate change adaptation, preservation of agricultural soils and safeguarding nature as the foundation for Sami culture, population and human health, and promotion of civil safety, in addition to climate change mitigation. Sustainable land use in accordance with the Act that reduce emissions from land use change will also predominantly benefit biodiversity.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM cross-sectoral No. 6: Enova

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Enova gives financial support to projects with an aim to contribute to Norway's emission reduction commitment and contribute to Norway's transition to a low-emission society. Enova's support is focused on projects in the late stages of technology development and early stages of market development. Qualifying projects may have an immediate and direct climate implication, however the central aim of the «Enova model» is to contribute to a market transition whereby the relevant technologies and solutions diffuse into and compete in the relevant markets. Support for specific technologies is not permanent, it is typically limited in time and resources to what is deemed necessary to achieve the needed transition. The expected long-term effect of Enova is the emissions reductions that follow from these market transitions. These effects could be both national and international.

Enova does not support projects in a policy vacuum. There are a variety of other policy instruments in Norway, which directly or indirectly aim to reduce domestic greenhouse gas emissions, support for R&D, taxes, regulations, and various other instruments. In such a context it is hard to say which instrument contributed to which development or reduction. An effect of the signaled

steep increase in the carbon tax toward 2030 and onwards may be to reduce the need of financial support from Enova to drive early market diffusion. This illustrates the interplay between different instruments.

Although the overarching aim is to drive a longer term market transition, Enova also records direct emission effect from the individual supported projects. These numbers will not include the market transformation effect, nor can they be wholly attributed to Enova because businesses also respond to and incorporate incentives provided by other instruments. The reductions Enova calculates reflect the difference between the supported project and a defined baseline for each project. This difference (effect) may be in the form of a reduction in greenhouse gas emissions due to reduced consumption of fossil fuels, following from e.g. improved efficiency of fossil sources or conversion from fossil to renewable energy. In addition, emission reductions may result from improved industrial processes. It must be noted that the baseline project may represent a new or expanded activity, thus the reported project result could be a reduced increase in emissions, and not necessarily a net decrease in total emission.

Reported numbers on greenhouse gas emissions reductions builds on Enova-supported projects that have been realized in 2017 or later years. The estimate is based on the direct annual effect from each project on emissions over the project's expected lifetime. Other instruments such as the CO₂ tax also play an important role when it comes to the profitability of the project, but the grant from Enova is assumed to be the factor that triggers the project, and the entire direct effect on emissions is in this case credited to Enova.

In the estimates, a project's lifetime is assumed to be equal to the average lifetime of projects in the relevant sector. The assumed average lifetime of projects is based only on those applications in each sector where a full profitability analysis is required, and thereby expected lifetime is stated. For example, the expected lifetime of projects in transport, industry and the energy system is assumed to be 9, 13 and 23 years, respectively.

For the years after 2021 some assumptions need to be made when it comes to emission effects from the various sectors. Based on historic projects, we assume the following yearly effect from new projects: 300 000 tons CO₂ in total, where 180 000 comes from transport projects, 80 000 from ESR within industry, 30 000 from ETS industry and 10 000 from other sectors. As the time goes by and the carbon price rises, it is likely that the carbon price increasingly will trigger projects in the market introduction phase. This will possibly result in Enova increasing the focus on technology development and decreasing the focus on market introduction. Technology developing projects usually contribute to less direct emission results than projects in the market introduction phase. Therefore, it is assumed a 20 per cent reduction in direct emission result for projects supported during the years 2025–2035, compared to the assumed results from 2022–2024.

As mentioned above, the most important effect of Enova is technology development and market change that in the longer run contributes to emission reductions. These effects are difficult to estimate and do not show in these estimates.

The estimated accumulated contribution to direct greenhouse gas emission reductions from Enova's project portfolio is about 0.9 million tonnes of CO₂ equivalents in 2020 and about 2.6 million tonnes in 2030.

As a result of the bottom-up method of calculation and the use of individual baselines there is no direct link between this number and the national environmental accounts. An additional result of the bottom-up method is the partial inclusion of the effects of other policies. It is important also to note that Enova works by reducing the barriers to adoption of energy and climate technologies with an aim to facilitating a lasting market shift towards such technologies. It is not practical to attempt to attribute such wider changes to Enova or any other policy instrument, so it is important to bear this in mind when contemplating the effects of Enova's support.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with the PaMs cross-sectoral No. 1 and 2. The main effect of the interacting measures for Enova is to increase the cost of the baseline (emission intensive) alternative, thus reducing the level of economic support needed to trigger the projects.

PaM cross-sectoral No. 7: Klimasats

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Municipalities must report on the results and effects of the projects as well as their experiences from the implementation. Knowledge and experiences enable the Norwegian Environment Agency to provide more informed policy advice the Ministry of Climate and Environment. The agency also shares project information and experiences to municipalities through a range of channels, such as webinars, podcast, social media, conferences etc. in order to facilitate the start-up of new projects in other municipalities.

An external evaluation⁶⁷ (2019) of the Klimasats scheme has concluded that the funding to a large degree is contributing to the realization of local emission reductions projects that would not have been implemented without financial support. It also found that the scheme stimulates local governments and administrations in identifying new emission reduction projects, it contributes to capacity building and to the dispersion of project ideas and experiences from projects among municipalities.

For many projects, for example when fossil-driven vehicles or machines are replaced by zero emissions technology, it is possible to give a fairly accurate estimate of the emissions reductions effect in tons/CO₂. But for complex projects that involve several actors, run over several years, and are affected by different policy measures, it is very difficult to isolate the effect of Klimasats as a policy measure and also to quantify the emissions reductions effect by a reasonable degree of certainty. In such cases, we rely on indicators of transformation towards a low carbon, sustainable future to do a qualitative estimate of the effects.

The Norwegian Environment Agency has been able to estimate the emissions reduction effect in 785 of 1962 projects. (For 1177 projects, quantification is difficult, due to the nature of the project.) The quantifiable and relevant projects are estimated to having reduced 2020 emissions by 16 kt CO₂ eq., and that it will reduce emissions in 2030 with 53 kt. Estimates are assumed to be conservative. In addition, projects that are not quantifiable still contribute to emissions reductions, development of new methods and solutions for local climate action and sustainable local transformation. More details can be found in a publication (in Norwegian) on the agency's website.⁶⁸

⁶⁸ <https://www.miljodirektoratet.no/publikasjoner/2023/juni-2023/effektvurdering-av-klimasats-stotte-skreddersydd-for-kommunenes-klimaarbeid/>

⁶⁷ Følgevaluering av Klimasats, Menon Economics (M-1553), 2019

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x	x	x	x		

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	x

Information on costs:

From 2016 to 2024, the Klimasats funding scheme has partially funded more than 2200 municipal emissions reductions and green transformation projects throughout the country, with a total of 1,8 billion NOK.

Information on non-GHG mitigation benefits:

Many projects contribute to a more long-term transition to a low carbon future through urban planning, capacity building and cross-sectoral cooperation. Many projects are transport-related and will reduce exhaust emissions that

impacts air quality, and/or will reduce the need for transportation. Many projects also stimulate local government to identify new emission reduction projects, contribute to capacity building and to the dispersion of project ideas and experiences from projects among municipalities. Access to project plans and experiences enable the Norwegian Environment Agency to provide more informed policy advice the Ministry of Climate and Environment.

Information on how the mitigation action interacts with other:

This PaM share some of the objectives as PaM cross-sectoral No. 6, but Enova is aimed at the private sector and technology development and commercialization and Klimasats is aimed at the public sector and increased uptake of mature technologies.

PaM cross-sectoral No. 8: The environmental technology scheme – Innovation Norway

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The environmental technology scheme supports projects in the demonstration and piloting phase, and it is difficult to quantify the results. The final product or process may not be taken up by the market until several or many years after the support is granted. In their applications, the companies indicate the expected environmental impact of the pilot and the expected effect if the new solution spreads. However, there is no requirement for the effects to be converted into CO₂ equivalents and climate-specific reporting.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM cross-sectoral No. 9: Nysnø Klimainvesteringer AS (Nysnø)

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

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. Nysnø's effect on national emissions will have to be calculated based on actual and estimated future avoided emissions of the companies invested in by Nysnø (directly or indirectly). Methodology to do this with sufficient precision is under development, but does not exist as of today.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM cross-sectoral No. 10: Climate and environmental requirements for public procurements

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

It is difficult to quantify the effects of requirements in public procurements.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

This requirement also includes environmental considerations.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs

Petroleum

PaM petroleum No. 1: Climate policies that affect the petroleum sector

The CO₂ tax on petroleum activities on the continental shelf

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The effect is calculated by comparing the emission intensity from oil production in Norway and Australia. The underlying assumption is that Australia, having mostly offshore production and a comparable level of overall economic development to Norway, but having a less stringent environmental regulation on its production, serves as a reasonable basis for creating a counterfactual development in Norwegian emissions.

We calculate the counterfactual emission trajectory by using the average emission intensity in Australian production for the years 2018 to 2021 and multiply this intensity with the projected Norwegian petroleum production for the relevant years. The mitigation effect is then given by the difference in emissions in this counterfactual trajectory and the WeM-projections for the petroleum sector as described in chapter 2.6.

Changes in methodologies or assumptions for estimating impact since previous report:

There has not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x	x	x			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x		

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The tax contributes to reducing these emissions.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM petroleum No. 2: Indirect CO₂ emissions from offshore and onshore NMVOC regulation

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The regulation on offshore loading and storage of crude oil has, compared to no regulation, reduced the indirect CO₂ emissions of NMVOC by about 95 kt tonnes CO₂-equivalents in 2023. The estimated effects are based on reported data from the oil fields operators to the Norwegian Environmental Agency. In 2025, 2030, 2035 and 2040 the projected effects are 84, 67, 59 and 54 kt tonnes CO₂-equivalents respectively. The latter estimates are based on the assumption that it is the same relationship between oil production and reported baseline NMVOC emissions from the oil fields operators as in 2023.

To calculate the effect of the NMVOC regulation on land terminals, the emissions are estimated with and without measures per terminal, and later summarised. The emissions in 2025, 2030, 2035 and 2040 without measures have been back-calculated from the projected amount of crude oil loaded and an implied emission factor equal to the latest year ahead of the implementation. The emissions in 2025, 2030, 2035 and 2040 with measures have been calculated with an implied emission factor equal to 2023, which is the most recent year with historical emissions data

from the installation. The effect of the regulations is approximately 55 kt CO₂ equivalents per year since 2017, and the projected effect is also approximately 53 kt CO₂ equivalents per year.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Both investment cost and operating expenses are relatively high for integrated VOC recovery units. The private cost of complying with the current regulation on offshore loading is about NOK 5,000/tonne CO₂ equivalents per year for this measure.

Information on non-GHG mitigation benefits:

The measure reduces emissions of NMVOC. NMVOC may react with NO_x to form ground-level ozone and cause damage to health, vegetation and materials. In addition, many volatile organic compounds have negative effects on health. Benzene and polycyclic aromatic hydrocarbons (PAHs) such as benzo[a]pyrene are carcinogenic.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM cross-sectoral No. 4.

Carbon capture and storage (CCS)

PaM CCS No. 1: Carbon capture and storage (CCS)

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The Norwegian CCS policy will help to develop and demonstrate CO₂ capture and storage technologies with a potential for technology transfer. The full-chain demonstration project in Norway, Longship⁶⁹, should contribute to knowledge sharing and technology development in an international perspective. The Norwegian government's policy includes research, development and demonstration, and international work for the implementation of CCS as an international mitigation measure.

The full-scale project will lead to emission reductions from 2025, if the projects at the cement factory and waste-to-energy plant are realized as planned. It is estimated that the CCS on these plants will reduce the emissions 400 kt tonnes CO₂ annually from 2025 (10 per cent biogenic CO₂), and 750 kt CO₂ annually from 2029 (30 per cent biogenic CO₂). The Northern Lights Storage and the Heidelberg Materials carbon capture

facility are both in the final stages of construction and is expected to start operations early in 2025. The capture project on the waste-to-energy plant in Oslo has not made final investment decision (FID) as of the time of writing. The effect is based on the planned capacity of the capture projects from their front-end engineering and design (FEED) studies.

It is difficult to quantify the emissions reduction that will be realized through the policy beyond this. The Northern Lights storage facility also plan to receive CO₂ from the Ørsted project in Denmark (ca. 430 kt CO₂ annually from 2026, 100 per cent biogenic CO₂), and Yara Sluiskil in the Netherlands (ca. 800 kt CO₂ annually from 2025), both of which are past FID. The Longship project have facilitated these projects as well. As part of the project, the Northern Lights storage has made some investments in preparation for a phase 2, which will expand the capacity to 5000 kt CO₂ per year.

The Longship project have contributed to development and refinement of the regulatory framework for CCS, in areas such as MR, technical standards, safety, and pollution prevention and control. The project has also contributed to the further development of post combustion amin CO₂ capture technology, which can now be considered a mature technology (TRL9).

⁶⁹ Detailed information about the Longship project can be found (in English) here: [CCS Norway – Sharing knowledge from the Norwegian CCS project Longship](https://www.ccsnorway.com) (ccsnorway.com).

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x	x	

Information on costs:

The total project costs for Longship are estimated at NOK 25.1 billion. This includes 10 years of operations.

Information on non-GHG mitigation benefits:

From the cement factory emissions of SO₂ and chlorine are expected to be reduced by 80 per cent, PM₁₀ by 10 per cent, fluoride by 50 per cent, ammonia by 30 per cent.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

Energy and transformation industries

PaM energy No. 1: Electricity tax

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

Electricity in Norway is generated through renewable sources with zero emissions. Thus the tax is not expected to have a substantial effect on emissions.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

There has not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM energy No. 2: Electricity Certificate Act

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The electricity certificate system is a market based support scheme to promote new electricity production based on renewable energy sources. The support scheme is technology neutral, which means that all energy sources defined as renewable energy sources in accordance with Directive 2009/28/EC on the promotion of the use of energy from renewable sources qualifies for the right to certificates. For Norway most of the electricity were already produced from renewable energy sources. The effects on national emissions are indirect, and not possible to calculate.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

The support scheme is market based and is financed by end-consumers. Electricity suppliers are obliged to cover a share of their electricity sales by cancelling elcertificates which are bought from producers. The costs associated with buying and cancelling the elcertificates are paid for by end-consumers. As the system is market based, the costs have varied from year to year. The historical prices on elcertificates and an estimation on the cost per kWh for end-consumers are published yearly and the latest report can be found on the Norwegian Water Resources and Energy Directorate's website.⁷⁰

Information on non-GHG mitigation benefits:

The scheme has brought in 21 TWh of new renewable electricity production in the period from 2012 to 2022. Renewable energy plants with an operating date after 31st of December 2021 is not eligible for elcertificates.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

⁷⁰ <https://www.nve.no/energi/virkemidler/elsertifikater/statistikk-og-publikasjoner/aarsrapporter-for-elsertifikatordningen/aarsrapport-2023/>

PaM energy No. 3: Energy requirements in the building code

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

Nearly all of Norway's electricity production is based on hydro power and wind power, and electricity is the most used energy product in buildings, hence the effect on emissions from the changes in energy use is moderate and will not directly affect greenhouse gas emissions. The building code set minimum standards for energy use. Over time, regulations of energy use and fossil fuel heating installations have become stricter. In 2016, a ban on installation of fossil heating in new buildings and after larger renovation was introduced. The gradual development, and stricter requirements on fossil fuel heating installations have limited the opportunity to use fossil fuel heating in new buildings. The impact on national CO₂ emissions is however limited, because estimations indicate that very few new buildings did install heating solutions for fossil fuels even before the ban. The effect is therefore not estimated.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

Energy requirements for buildings reduce energy use over the lifetime of the building, which reduces the need for energy production and the use of fuelwood. Energy requirements also help reduce peak energy demand, which reduces the need for power grid expansion.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM energy No. 4.

PaM energy No. 4: Ban on the use of mineral oil for heating

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Use of mineral oils for heating of buildings has been regulated through different measures such as CO₂ tax, mineral oil tax, standards in the building code and support schemes from Enova and municipalities. The ban on the use of mineral oils for heating of most buildings from 2020 means that most residential, public, and commercial buildings has phased out emissions from such use.

Total direct emissions from heating of households and businesses have declined by more than 80 per cent since 1990, from 2.7 to 0.5 million CO₂ equivalents. The remaining emissions are mostly from the use of gas and from wood burning. The projection estimates emissions of 0.25 million tonnes of CO₂ equivalents in 2030.

It is difficult to separate the emission effect of different measures, but on the basis of the assumption mentioned above, the effect of the ban on the use of mineral oil for heating of buildings can be estimated to 400 kt CO₂ equivalents in 2020, and 380 kt CO₂ equivalents in 2030. The estimated effect in 2030 includes an additional 80 kt per year from the expansion of the ban to include the use of mineral oil for heating

purposes of buildings under construction or renovation from 2022.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

The ban reduces local air pollution and the risk of oil leaks from oil tanks to the ground.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM energy No. 3.

PaM energy No. 5: Bionova

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Bionova consists of a value added scheme for renewable energy and technology development and a bioeconomy programme. Only the climate effect of the value added scheme for renewable energy and technology development is quantified. The scheme supports production and use of renewable energy on farms. The largest part of the budget is used on bioenergy production from wood or wood pellets. There is no historical data on what type of energy this bioenergy substitutes. Some of the budget is used on biogas plants on farms, but the effect overlaps with the PaM support for delivery of manure to biogas production. The support for changing heating of greenhouses from fossil to renewable energy is the only part of the PaM that can be quantified with the current data available. In 2020 three projects received support for a total of 1,3 GWh and the climate effect was estimated to 300 tons of CO₂ equivalents. In 2023 the number of projects for fossil free heating of greenhouses increased to 12 with a total of 12,5 GWh. If this level of support is continued, the effect in 2030 will be 3000 tons of CO₂ equivalents. For the calculation of climate effect an emission factor of 243 grams of CO₂ per kWh is used assuming that NPG is substituted by wood. The data collection for the scheme is under

improvement and will give the possibility to quantify the effect of substituting fossil fuel with bioenergy in the future.

Changes in methodologies or assumptions for estimating impact since previous report:

The calculations are now based on data for substitution of fossil fuels.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The PaM interacts with the PaM agriculture No. 7.

Transport

PaM transport No. 1: The CO₂-tax on mineral products (road transport only)

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The emissions from road traffic are covered by several strong mitigation policies that have large overlaps and interactions. In order to provide a reasonable estimate the impact of these policies needs to be calculated as a whole, and are reported under this PaM.

Electric vehicles

To analyse the effect on emissions from the different incentives provided for Battery Electric Vehicles (BEVs) we compare the BEV share to a country with few incentives towards the purchase of BEVs. The EV-share in Australia is approximately 1.0 per cent. In total, Norwegian EVs drove approximately 9 948 million kilometers in 2023, or 28 per cent of the distance driven by passenger cars. If the BEV share was 1.0 per cent instead, 9 591 million of those kilometers are assumed to be driven by cars with internal combustion engines (ICE) instead, with an average fuel efficiency of 0.8 and 0.65 liters per ten kilometers for petrol and diesel cars. This results in a counterfactual fuel consumption in road traffic given the absence of any BEV-incentives, which is used as a base-

line for the calculation of the effect of the biofuel blending mandate

Biofuel blending mandate

The estimated emission reduction for 2020 is based on estimated consumption of fossil fuels adjusted for the increased consumption an abolishment of all EV-incentives would entail. The observed share of biofuels in 2023 is used as a point estimate. In the calculation of the mitigation effect, it is assumed that without the mandates the sale of biofuels would be replaced by fossil fuels. It is taken into account that the energy content in biofuel is lower than in fossil fuel, i.e. 1 liter of biofuel replaces less than 1 liter of fossil fuel. This provides a new counterfactual fuel consumption in road traffic given the absence of both EV incentives and the blending mandates, which is used as a baseline for the calculation of the mitigation effect of the CO₂-tax and the road usage tax.

CO₂-tax, road usage tax and the price effect of the biofuel mandate

Taxes on fuels used in road traffic leads to increased prices for consumers. Since biofuels are more expensive than fossil fuels the sales mandate will also lead to an increase in fuel prices. The Norwegian Ministry of Finance has developed a model to analyse the mitigation effects of changes in the taxes on GHGs. The model combines price data, volume data from the tax authorities, and elasticities from economic literature to predict the mitigation effect of each tax for the different sectors and products that the tax covers. The analysis uses the sales volumes of fossil fuels stemming from an abolishment of the biofuel sales mandates and abolishing the incentives

towards purchasing low and zero emission vehicles described above, and the mitigation effect is calculated as the response in sales volume following the decrease in prices that an abolishment of the taxes and the sales mandate would entail.

The total effect on emission

The procedure above provides an estimate of the level of emissions in 2023 given the absence of the included policies and measures. It is estimated that emissions would be increased by 4.7 million to a total of 13.0 million tonnes. Mitigation effects are calculated assuming that without these measures, emissions from Norwegian road transportation would remain stable at this counterfactual level for the entire period 2024-2040, instead of being reduced in accordance with the WeM-projections.

Changes in methodologies or assumptions for estimating impact since previous report:

There has not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Carbon taxes confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small. A tax rate of NOK 1 176 is equivalent to a tax rate of NOK 3.17 per liter of mineral oil.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The tax contributes to reducing these emissions. The tax also contributes to reducing congestion, accidents and other harmful effects from road traffic.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM No. 2-4, 6 and 11. The calculated mitigation includes the mitigation effect of transport PaMs No. 2-4 and 6.

PaM transport No. 2: Road usage tax

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

See description under PaM transport No. 1.

Changes in methodologies or assumptions for estimating impact since previous report:

There has not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The tax contributes to reducing these emissions. The tax also contributes to reducing congestion, accidents and other harmful effects from road traffic.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM 1, 3-4, 6 and 11. The calculated mitigation is included in the mitigation effect of transport PaM 1.

PaM transport No. 3: One-off registration tax based on CO₂-emissions

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

See description under PaM transport No. 1.

Changes in methodologies or assumptions for estimating impact since previous report:

There have not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM 1, 2, 4, 6 and 11. The calculated mitigation is included in the mitigation effect of transport PaM 1.

PaM transport No. 4: Tax advantages for electric vehicles

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

See description under PaM transport No. 1.

Changes in methodologies or assumptions for estimating impact since previous report:

There have not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

In 2024, the estimated tax expenditures related to electric vehicles in Norway are NOK 28 billion.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The tax advantages contributes to reducing these emissions.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM 1-3, 6 and 11. The calculated mitigation is included in the mitigation effect of transport PaM 1.

PaM transport No. 5: CO₂ tax on emissions under the ETS from domestic aviation

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The effect is calculated as a scenario analysis using the SNOW-model and the framework for the WEM-projections. The CO₂-tax on mineral products is explicitly modeled in SNOW, so the effect is calculated by running the model using the same assumptions as in the WEM-scenario, but changing the tax rate in the CO₂-tax to 0 for the period 2025-2040, and calculating the yearly difference in emissions from the WEM-scenario. The SNOW-model and assumptions for the WEM-scenario is described in further detail in chapter 2.6.

Changes in methodologies or assumptions for estimating impact since previous report:

In previous reporting the effect was calculated using the static elasticity model KAJA. For this report the SNOW-model has been used instead.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x		

Information on costs:

Carbon taxes confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small. A tax rate of NOK 674 is equivalent to a tax rate of NOK 1.72 per liter of mineral oil.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The CO₂-tax contributes to reducing these emissions.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM No. 9. The calculated mitigation is acquired by using a macroeconomic model and should appropriately take into account any overlap effects from the mitigation caused by the other PaMs.

PaM transport No. 6: Biofuel mandate for road transportation

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The methodology is described under PaM transport No. 1 X

Changes in methodologies or assumptions for estimating impact since previous report:

There has not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Biofuels from wastes and residues typically have a social-economic cost of approx. 4000-7 000 NOK/tonne CO₂.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM 1, 2, 4, 6 and 11. The calculated mitigation is included in the mitigation effect of transport PaM 1.

PaM transport No. 7: Biofuel mandate for shipping

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The methodology is described under PaM transport nr 1.

Changes in methodologies or assumptions for estimating impact since previous report:

There has not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Biofuels from wastes and residues typically have a social-economic cost of approx. 4000-7 000 NOK/ton CO₂.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM No. 1, 2, 4, 6, 8 and 11. The calculated mitigation is included in the mitigation effect of transport PaM No. 1.

PaM transport No. 8: Biofuel mandate for other sectors

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The methodology is described under PaM transport nr 1.

Changes in methodologies or assumptions for estimating impact since previous report:

There has not been any major change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Biofuels from wastes and residues typically have a social-economic cost of approx. 4000-7 000 NOK/ton CO₂.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with transport PaM No. 1, 2, 4, 6, 8 and 11. The calculated mitigation is included in the mitigation effect of transport PaM No. 1.

PaM transport No. 9: Biofuel mandate for aviation

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The estimated effect for 2020 is based on actual amounts of biofuels for aviation in 2020. The estimated effect for 2030 is based on projected amounts of biofuels for 2030 for aviation.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x		

Information on costs:

Estimated socio-economic cost: 5,000 NOK/tonne CO₂. The measure increases fuel costs for airlines and reduces revenue from the CO₂ tax. The measure could result in an increase in fuel costs in 2030 of 0,4–0,7 NOK per liter, and an increase in ticket prices of 1–3 percent.

Information on non-GHG mitigation benefits:

The PaM can stimulate the implementation of new technology for the production of sustainable aviation fuels (SAF), which can provide learning and cost reductions for subsequent projects.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM transport No. 5.

PaM transport No. 10: Pilot projects for zero emission construction sites

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The first pilots started in 2022. The direct effect from the scheme has not been possible to estimate, but the total emissions from machines and vehicles used in transport infrastructure projects are estimated to be at least 4–5 per cent of the total emissions from the transport sector, 600-700 000 tonnes CO₂ equivalents. Speedier introduction of zero-emission machines and advanced technology development could also benefit other sectors and thereby lead to an even larger reduction in national emissions.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

The investment costs for zero-emission construction machinery are currently significantly higher than for machinery with combustion engines. These costs are reflected in higher prices for the execution of construction sites with zero-emission equipment. Furthermore, there are costs for establishing charging infrastructure at the construction site. The total costs vary significantly between different machinery and construction sites. We see that investment cost for smaller and more mature zero emission technologies are going down, and for some work processes, the costs are no longer significantly higher than operations performed with combustion engines.

Information on non-GHG mitigation benefits:

Zero-emission machinery contribute to reduction of local air pollution and less noise on the construction sites.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM transport No. 11: Urban mobility – urban growth agreements

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

It is difficult to single out the effect of measures in the urban growth agreements and the reward schemes for public transport. For instance, the effect on greenhouse emissions of more cycling and walking depends on this transport being replaced by travels with fossil cars. Nevertheless, in 2019 the Norwegian Public Roads Administration made a simplified analysis of the effect of the zero-growth target. The simplified analysis was made for the National transport plan 2022-2033. It indicates that zero growth in passenger traffic by cars in the nine largest urban areas could reduce emissions by 60 000 tons CO₂ equivalents by 2030, compared to a reference path. The figures are uncertain. The reference path includes population growth, economic growth, and growth in electric car sales. It does not include technology developments such as autonomous vehicles or Intelligent Transport Systems.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions. The estimates are the same as in the previous report.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM transport No. 12: Maximum CO₂-emissions from the coastal services Bergen-Kirkenes

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Based on the annual maximum allowed emissions level in the contract (162 000 t CO₂), it is estimated that the emissions will be reduced by approximately 60 000 t CO₂ in 2030.

Emissions from the coastal route Bergen-Kirkenes has in the current contractual period averaged 142 199 tonnes CO₂ per year, compared to 230 kt CO₂ in 2016. Conversion factors for CO₂ for various energy carriers are provided by the Ministry of Climate and Environment. There is no contract beyond 2030 as of now.

Changes in methodologies or assumptions for estimating impact since previous report:

In the previous report the emission reduction in 2035 was estimated to be similar to 2030. In this report, we make no such assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x	x	

Information on costs:

The emission requirement is costly and varies between the two operators of the route. One of the operators has reported emissions above the maximum allowed level for the first few years of the contract. The operator has however implemented further measures to ensure they will be within the average annual limit at the end of the contract period.

Information on non-GHG mitigation benefits:

Less local air pollution.

Information on how the mitigation action interacts with other:

Vessels currently running in coastal service have just recently been included in the EU emission trading system. However, the effect of expanding the EU ETS to maritime transport has not yet been assessed as it was just recently included. The PaM also interacts with the PaM transport No. 7.

PaM transport No. 13: Requirements for zero and low-emission technology in tenders for public ferries

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The emissions from ferries have decreased by about 100 kt CO₂ from 2015 until 2020 and is estimated to decrease by a further 100 kt CO₂ by 2025. Eventually emission from this segment will be close to zero. This is likely as a result of the requirements for zero and low-emission technology in tenders for ferries on the national and county council highways, on tenders that have been awarded, announced or expected as of today. It's likely that the downward trend will continue. There will be a new national zero emission requirement for all public tender ferries from 2025.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x	x	

Information on costs:

Costs vary significantly between different ferry connections.

Information on non-GHG mitigation benefits:

Reduction of local air pollution and less noise on board.

Information on how the mitigation action interacts with other:

A few vessels currently running on contract with the National Public Roads Administration have just recently been included in the EU emission trading system. However, the effect of expanding the EU ETS to maritime transport has not yet been assessed as it was just recently included. The PaM also interacts with the PaM transport No. 7.

PaM transport No. 14: Green Shipping Programme

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Immediate effects are expected from the pilots that are realized, as well as the projects from the Service Center. The effects are ships in operation with dramatically reduced emissions, and in many cases with zero emissions. The potential in scaling of the successful pilots must not be underestimated, and the technologies that are proven feasible can be realized on a larger scale in 5-10 years. Hence, the emission reduction potential is substantially larger than what is shown in the individual projects within the programme. The effect of the pilots has not been quantified.

The emission reduction potential from the Service Center's projects is approximately 260 kt CO₂/year. Effects are expected from 2028 and for 2030, an increase of projects in the portfolio is assumed. Further increases in effect are expected after 2030.

A primary role for GSP is also to funnel projects into available public and private funding schemes, e.g. from Enova, thus enhancing the impact of these schemes.

Effects in the longer run and outside of GSP are expected, as results from barrier studies, roadmaps, and reduction of business risk after successful demonstration in the pilots. A primary function of the GSP is to identify barriers through work on concrete, actual projects – and to communicate these barriers, as well as possible measures and policies to overcome them, to stakeholders including government entities. One example is the GSP barrier study on electrical ferries that accelerated the implementation of emission requirements from the authorities. The Service Center's focus on the cargo owners stimulates the development of the market for green fuels and environmentally friendly transport services, increasing the demand for, and availability of such.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
X	x	

Information on costs:

Costs vary greatly between different technologies and segments.

Information on non-GHG mitigation benefits:

Reduction of local air pollution and less noise on board.

Information on how the mitigation action interacts with other:

Some of the vessels included in the programme may be included in the EU emission trading system. However, the effect of expanding the EU ETS to maritime transport has not yet been assessed as it was just recently included. The PaM also interacts with the PaM transport No. 7.

PaM transport No. 15: Risk loan scheme for low and zero emission vessels, short sea vessels and fishing fleet

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

Innovation Norway (IN) has issued loans of around 570 million NOK, for investments on a total of 28 ships, including two fishing vessels, since its start in 2020. The emission reductions in the projects supported by the scheme have an estimated emission reduction between 25 percent to 71 percent per tonne mile. The emission reduction effect has not been estimated due to uncertainties of actual emission reductions.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

NOx-emission reductions are estimated to be around 80-90 percent.

Information on how the mitigation action interacts with other:

Vessel supported under the scheme may also be included in the EU emission trading system. However, the effect of expanding the EU ETS to maritime transport has not yet been assessed as it was just recently included. The PaM also interacts with the PaM transport No. 7.

PaM transport No. 16: High speed passenger ferries scheme

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Some projects will directly reduce emissions by implementing zero emission vessels. The estimated effect of this is around 33 kt CO₂ per year from 2025, possibly more in 2030 and 2035 depending on funded projects in upcoming tenders. The emission reduction estimates are based on the county councils own actual emissions data for current vessels in operation. These vessels will be replaced with zero or lower emission vessels. Actual emission reductions will in some tenders depend on what operators will offer, while some set clear minimum emission standards because of support from the scheme.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Costs vary significantly between different routes. Costs may be 20–100 percent higher than conventional fossil fuel-based solutions.

Information on non-GHG mitigation benefits:

Reduction of local emissions and noise.

Information on how the mitigation action interacts with other:

The PaM interacts with the PaM transport No. 7.

PaM transport No. 17: Maritime Zero 2050

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The Maritime Zero 2050 call was first initiated in 2022, and the three research projects given funding the first year started up in 2023 and will last until 2025 (when prototypes will be tested on board vessels etc.). The four research projects given funding in 2023 started in 2023/2024 and will last until 2026/2027. The research projects that will be given funding in 2024 is expected to end in 2028. This means that the first effect on national emissions resulting from these projects the earliest can be seen from 2025 and after.

The funded projects will provide new knowledge and potential new zero-emission solutions for large ships sailing long distances, but it is not given how many ships that will be converted or replaced from conventional fossil fuel ships to zero-emission fuel ships based on this. As the relevant ships are large ships sailing long distances, it should also be noted that some of the emission reductions may be outside of Norway. The emission reduction effect has not been estimated due to lack of data.

However, it is possible to give high-level indications on emission reduction potential per ship that is converted or replaced based on the project results. For an example, looking at the project related to nuclear propulsion of merchant ships, this nuclear solution may replace a conventional LNG carrier typically consuming almost 40,000 metric tons HFO per year, which will result in emission reductions of roughly 120,000 metric tons of CO₂ per ship.

The results from the two hydrogen projects will be essential elements in a combined knowledge base and technology platform that will facilitate the widespread, efficient, sustainable and safe use of liquid hydrogen for merchant ships. Optimizing entire power and propulsion systems will save large amounts of power and energy, and this is a necessary step to enable use of hydrogen and obtain reduction in GHG emissions in the maritime sector.

Other funded projects aim via new methods and technology to accurately document and verify emissions incurred in the entire fuel value chain from raw material sourcing to fuel use, incorporating both Well-To-Tank and Tank-To-Wake emissions. By documenting emissions incurred throughout the fuel value chain, the project results may empower stakeholders with the transparency and trust needed to help the shipping industry to decarbonize. However, it is challenging to estimate the emission reduction effect on such projects.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

Vessel supported under the scheme may also be included in the EU emission trading system. However, the effect of expanding the EU ETS to maritime transport has not yet been assessed as it was just recently included. The PaM also interacts with the PaM transport No. 7.

PaM transport No. 18: Investments in railways

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

As per the Norwegian Railway Directorate, investments in railways in the first six years in the National Transport Plan (2025–2036) is estimated to reduce emissions with approximately 27 kt CO₂ in 2030, 26 kt CO₂ in 2035 and 47 kt CO₂ in 2040. The reduction is mainly caused by the transfer of traffic from road to railway, both passengers and freight. The estimate also includes emissions from railway transport. However, it does not include emissions from operations, maintenance and construction of the infrastructure and land-use changes. The first six years of the plan-period includes different projects for developing the freight and passenger services, but the concrete plan and implementation of these projects will be decided upon in the annual budgets. In addition to the National Transport Plan, it is proposed to begin the electrification of the rail line between Stjørdal and Steinkjer in the National budget for 2025. This electrification project is estimated to reduce yearly rail emissions by 10 000 kt CO₂ when it is completed, with an expected completion late 2025.

Changes in methodologies or assumptions for estimating impact since previous report:

In addition to impacts on emissions from the National Transport Plan, emission reductions from electrification projects on non-electric railway lines that are proposed in the national budget has also been estimated.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

The National Transport Plan (2025–2036) estimates the investments in railways from new projects for developing the freight and passenger services to be a yearly average of 12 billion kroner during 2025-2030, 13 billion kroner during 2031-2036. In total, it is expected to cost 153,08 billion kroner during 2025-2036. Investments in railways from new projects for developing the freight and passenger services in 2025 are proposed to be 11.7 billion NOK.

Information on non-GHG mitigation benefits

Transfer of traffic from road to rail has positive effects besides emission reductions as it also reduces local air pollution that might stem from wear of roads and tires.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM transport No. 19, as electrification will reduce emissions from certain freight relations by rail. As that PaM is difficult to estimate, these benefits have also not been quantified.

PaM transport No. 19: Grant funding to transport freight by rail

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

From 2019 to 2023 freight transport by rail has had no significant growth, but with strong fluctuations on a year-by-year basis. Because of the collapse of the railway bridge at Randklev in august 2023 due to flooding, freight transport by rail lost infrastructure capacity between Oslo and Trondheim, leading to a decrease transport from 2022 to 2023 of about 12 per cent. Until the bridge was fully restored in May 2024 (including follow on effects of lost market shares) the transport further decreased by 20 per cent compared to the corresponding period in 2023. The rail freight companies have in September 2024 reported that the freight volumes are returning to the affected transport relations. Further, the total assigned freight volumes for 2025 are stable from 2024. It has however not yet been time to calculate the effects of the support scheme on national emissions. Increased rail capacity, freight transport demand and restrictive measures for road transport are key drivers for a modal shift from road to rail. The support scheme is thus one of multiple measures that works simultaneously to increase transport freight by rail.

Additionally, the Covid 19 pandemic had an impact for both global and national demand for goods, which increased national freight transport by rail in the second half of 2020. This sudden increase occurred simultaneously as the first payment from the support scheme took place.

To determine the effect of the support scheme on national emissions, more data over time is needed to isolate different explanatory variables. Nevertheless, the support scheme did improve market conditions for rail freight companies, and thus contributed to the growth observed in the last years. New analyses indicate that the grant funding has a significant impact on the economic situation of the rail freight companies and would negatively impact the supply of rail freight and large parts of the current freight transport by rail would plausibly be shifted to road.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	X	

Information on costs:

The grant fund has been allocated 100 MNOK for 2025. Funds are allocated in the national budget, on a year-by-year basis, as such there is no information to report on future costs beyond 2025.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM transport No. 20: Zero emission requirements for public procurement of vehicles

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

There has been made estimates of the emission effect of having all new vehicles in the different vehicle groups become zero emission. These estimates are based on calculations in the two reports «Klimatiltak i Norge mot 2030» of 2023 and «Klimatiltak i Norge – Kunnskapsgrunnlag 2024», both from the Norwegian Environment Agency. These reports both calculate emission reductions of electrification of vans, buses and trucks. The calculations are based on projections in the National Budget for 2023 and 2025, and of estimates of replacement rates and composition of the vehicle fleet. In the reports, effects of the planned measures are calculated as the emission effects exceeding the electrification assumed in the baseline projections.

Extracting the emission effect of introducing these requirements is challenging, as the vehicles bought through public procurements only makes up a share of the new vehicles. For city buses, public procurements make up most of new vehicles, whilst for private cars they make up a significantly smaller share.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

PaM not included in previous report.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Electric city buses are in most cases competitive with fossil fueled ones when looking at total costs, but high investment costs might be a barrier for some, and especially for the smaller bus companies.

Information on non-GHG mitigation benefits:

Reduction of local air pollution and less noise in the bus.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

Industrial processes and product use

PaM industry No. 1: CO₂ compensation scheme

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

Until now, it has not been relevant nor possible to estimate the effect on national emissions since the purpose of the scheme is to prevent carbon leakage. Starting from 2024, it will be a requirement that at least 40 percent of the total aid is used for climate and/or energy efficiency measures in order to receive CO₂ compensation. Applicants must file an action plan that outlines how the funds will be used and what effect the measures will have on emission reductions and energy efficiency. The action plans must be approved by the authorities. Once these action plans are submitted, it will be possible to conduct impact assessments of the scheme.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

Starting from 2024, the scheme will have a payment ceiling of 7 billion NOK, which will be adjusted for inflation annually.

Information on non-GHG mitigation benefits:

The scheme will also contribute to energy efficiency going forward.

Information on how the mitigation action interacts with other:

The PaM is considered to interact with the PaM cross-sectoral No. 2.

PaM industry No. 2: Use of bio carbon in the production of cement and ferroalloys

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Some of the use of coal in the production of cement and ferroalloys has been replaced with bio carbon. The emissions are therefore lower than if fossil carbon was used. The estimated effects on the CO₂ emissions from the production of cement and ferroalloys are based on the plants' reported emissions from the use of biocarbon to the Norwegian Environment Agency. The production in these sectors are expected to be at approximately the same level as today in the GHG projections. The CO₂ effect of the use of biocarbon in 2025, 2030, 2035 and 2040 is set therefore equal to the estimated emissions from bio carbon in 2023 (500 kt CO₂).

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x		

Information on costs:

The measure is implemented by private companies and therefore is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The PaM is considered to interact with the PaM cross-sectoral No. 2.

PaM industry No. 3: N₂O reduction, production and nitric acid

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The estimated effects on national emissions have been estimated by comparing emission intensity (tonne N₂O/tonne nitric acid) with a «business-as-usual» scenario from 1990 with no change in emission intensity since 1990. The effect for 2020 is based on production levels and emissions from the GHG inventory, while 2030 estimates are consistent with the GHG projections. The effects for 2020 is estimated to 2500 kt CO₂ equivalents, while the projected effect in 2030 is estimated to 2400 kt CO₂ equivalents.

Changes in methodologies or assumptions for estimating impact since previous report:

The reported effects in NC8/BR5 were based on GWP-100 values from the IPCCs fourth assessment report.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
		x			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x		

Information on costs:

The measure is implemented by private companies and therefore is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The PaM is considered to interact with the PaM cross-sectoral No. 2. The production of nitric acid was opted-in to the EU ETS in 2008 and this has provided incentives for further emissions reductions.

PaM industry No. 4: Agreement with the aluminium industry

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The emission intensity (tonne PFC in CO₂ eq/tonne aluminium) has decreased substantially. This is a result of the sustained work and the strong attention on reduction of the anode effect frequency and time in all these pot lines and the shift from the Soederberg production technology to prebaked technology. The estimated effects on national emissions have been estimated by comparing the emission intensity with a «business-as-usual» scenario from 1990 with no change in emission intensity since 1990. The effect for 2020 is based on production levels and emissions from the GHG inventory, while 2030 estimates are consistent with the GHG projections. The effects for 2020 and 2030 are both estimated to 5200 kt CO₂ equivalents.

Changes in methodologies or assumptions for estimating impact since previous report:

The reported effects in NC8/BR5 were based on GWP-100 values from the IPCCs fourth assessment report.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
				x	

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x		

Information on costs:

The measure was implemented by private companies and therefore is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The PaM is considered to interact with the PaM cross-sectoral No. 2. The production of aluminium entered the EU ETS in 2013 and this has provided incentives for further emissions reductions.

PaM industry No. 5: F-gas regulation and the Kigali Amendment to the Montreal Protocol

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The Norwegian Environment Agency provided an updated assessment on the effect on HFC emissions of planned measures in 2016, based on the work of a national expert. For 2020, the Norwegian Environment Agency has estimated a reduction in HFC emissions of about 150 kt CO₂-equivalents. Comparing projected emissions with emission levels in 2015 gives an estimated effect of approximately 600 kt in 2030 and 660 kt CO₂-equivalents in 2035. The effect in 2035 includes an effect of 27 thousand tonnes CO₂-equivalents from restrictions on SF₆ in certain products, such as windows. The effect is estimated as likely emissions without the measure.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
			x		x

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

The assessment from 2016 estimated the costs to 500 to 670 kroner/tonne CO₂eq reduced emissions. The costs are related to both investment and operational costs for leakage checks and recovery of used f-gases, as well as related to the transition to HFCs with lower GWP values.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with the PaM industry No. 6. That PaM is an incentive to avoid investments in equipments containing high-GWP-HFC and PFC, as well as reducing leakage from existing equipments, and thereby reducing the amount of HFC and PFC imported to Norway. This contributes to fulfil the commitments under the Kigali amendment and implementing the F-gas regulation. That PaM is also an incentive to avoid emissions of HFC and PFC at end-of-life. This contributes to achieving the requirements in the F-gas regulation concerning safe recovery and destruction of used f-gases.

PaM industry No. 6: Tax and reimbursement scheme on HFC and PFC

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

Norway has no methodology for estimating the impact that provides estimates of a sufficiently high quality.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Previous reporting has included an estimated impact calculated using data from the period 2010-2012. This estimate is now considered to be outdated, and is therefore not used in this report.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

Carbon taxes confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small. The tax rate measured in kilograms of HFC/ PFC varies greatly between the different products depending on its global warming potential value.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with PaM industry No. 5.

PaM industry No. 7: Tax on SF₆

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The effect is calculated as a scenario analysis using the SNOW-model and the framework for the WEM-projections. The tax on waste incineration is explicitly modeled in SNOW, so the effect is calculated by running the model using the same assumptions as in the WEM-scenario, but changing the tax rate to 0 for the period 2025-2040, and calculating the yearly difference in emissions from the WEM-scenario. The SNOW-model and assumptions for the WEM-scenario is described in further detail in chapter 2.6.

Changes in methodologies or assumptions for estimating impact since previous report:

The PaM was introduced in 2023 and has not been previously reported.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
					x

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Carbon taxes confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small. The tax rate is NOK 1 176 per tonnes of CO₂-equivalent which corresponds to NOK 27 636 per kg of SF₆.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with industry PaM No. 5. The calculated mitigation is acquired by using a macroeconomic model and should appropriately take into account any overlap effects from the mitigation caused by the other PaMs.

Agriculture

PaM agriculture No. 1: Regional agri-environmental programme

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Environmentally friendly spreading of manure corresponds to category 1 techniques as identified in the guidance document for the LRTAP-convention (ECE/EB.AIR/120). Such techniques save ammonia emissions and indirectly also N₂O emissions from deposition of ammonia. Such savings may also reduce the need for mineral fertilizers and resulting N₂O emissions from this source, however, the latter effect only arise if farmers reduce the dosage of fertilizer according to improved input efficiency.

In Norwegian reports to the LRTAP-convention, we note that uptake of category 1 techniques has risen over recent years and in 2023 the area with environmentally friendly spreading of manure reached 29 per cent of the agricultural area where manure is spread. The regional agri-environment programme was introduced in 2013 and to estimate the effect of the measure, activity data from 2013 was compared to activity data from 2020. The use of environmentally friendly spreading of manure reduced the emissions with about 6 600 tons of CO₂-equivalents in 2020. In 2030

environmentally friendly spreading of manure will reduce the emissions with 7 000 tons of CO₂-equivalents, given that the level of activity from 2023 is continued.

Estimated effects of measures primarily targeted at abatement of erosion and run-off

Various policies under regional agri-environmental programmes address erosion and run-off from arable cropping systems, with effects also for conservation of nutrients and soils, and thus for abatement of GHG emissions. In the abovementioned scale up of funds for Regional Agri-environmental Programmes in 2022, particular priority has been given to support such abatement. Furthermore, from 2023, farms in specific regions draining to the Oslofjord estuary meet requirements that zones adjacent to water courses shall have plant cover over winter, and 60 percent of the cropland of individual farms shall be equipped with plant cover over winter. Similar policy development in other erosion-prone regions are due in coming years.

Practices to comply with support schemes and/or requirements targeted at arable cropping systems include use of buffer strips, no-autumn tillage, and catch-/cover-crops. There is general agreement that such practices support retention of soil organic matter and nutrients, and in this way sequester carbon and reduce N₂O emissions, while quantifying such effects is more complex. First, we can estimate that uptake of soil conserving practices in arable cropping increase substantially. Uptake currently amount to 1/3 of overall land allocated to arable crops, corresponding

to around 100.000 ha of land. With policies and measures under implementation, we project that in the near future, uptake will increase to 1/2 of arable cropland (around 150.000 ha of land). The area of catch crops increased from 8 000 ha in 2020 to 17 000 ha in 2023.

The effect of these measures is currently not included in the official inventory. The effect of no-autumn tillage has not been estimated due to lack of research. The carbon sequestration of catch crops can however be estimated using factors from the literature.

Assuming a carbon sequestration of 880 kg CO₂ pr ha pr year, an increase in direct N₂O emissions of 16 kg CO₂ equivalents pr ha pr year, a reduction in indirect N₂O from leaching of 70 kg CO₂-equivalents pr ha pr year, and an increase in CO₂ from field operations of 4 kg pr ha pr year, the net mitigation effect from use of cover crops on 8 000 ha correspond to 7 500 tons of CO₂-equivalents for 2020. If the area with catch crops is continued as in 2023, the emission reduction in 2030 will be around 16 000 tons of CO₂ equivalents.

Biochar was included in the scheme in 2023, and if the level of biochar used in this year is continued, the emission reduction in 2030 will be 49 tons of CO₂ equivalents.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
X	X	X			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	X	X

Information on costs:

The cost of environmental spreading of manure is estimated to about 3000 NOK per ton of CO₂ equivalents. Catch crops has a cost of 1000- 1400 NOK per ton of CO₂ equivalent while biochar has an estimated cost of under 500 NOK per ton of CO₂ equivalent.

Information on non-GHG mitigation benefits:

The measure will improve water quality, reduce ammonia emissions and contribute to climate adaptation and biodiversity.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM agriculture No. 2: Requirements and support for livestock on pasture

Effect on national emissions has been estimated:

Yes	No
	X

If no, explanation for why effect has not been estimated:

The 2019 refinement of IPCC guidelines was implemented for emissions from deposition of manure on pasture in 2023. The emission factor is lower than in the 2006 IPCC guidelines and consequently, the emissions will decrease with increased use of pasture. Activity data for pasture is however not updated since 2013, so changes in pasture use will not be reflected in the emissions.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable. **GHGs included in the calculation of impact:**

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

Pastureland use at Norway's northern latitudes can result in non-GHG mitigation benefits due to suppression of vegetation and therefore brighter surface, resulting in increased reflection of solar radiation and increased surface albedo. Especially in Norway's mountainous regions with snow cover for extensive periods each winter, this climate benefit through increased albedo is considered to partially or completely outweigh the climate cost of suppressed vegetation (carbon removals foregone).

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM agriculture No. 3: Support scheme for Special Environmental Measures in Agriculture

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The effect on emissions from better storage of manure depends on several characteristics and is therefore hard to estimate. Investment support is given only to storage constructions that are better than requirements established in overall regulations, e.g. capacity to store manures for longer periods in order to optimise the timing of application, and/or instalment of cover on storage silos in order to prevent excessive emissions.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

Improved storage capacity for manure is estimated to have a cost of about 3000 NOK per ton of CO₂ equivalent.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM agriculture No. 4: Drainage of agricultural soils

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

There is a tendency of higher emissions of N₂O from soils with high humidity. Drainage may therefore reduce such emissions. Additionally, yields on properly drained fields are higher, which lower the emissions pr kg of product. However, the effect also depends on e.g. fertilizer, time of fertilization, humidity of the soil, structure of the soil and pH values. There are currently few studies available that can help quantifying the effect on emissions, and more knowledge is therefore needed.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

The measure will contribute to climate adaptation, increased yields and better working conditions.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM agriculture No. 5: Project Climate Smart Agriculture

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

The effect on emissions has not been estimated since the project should be considered as a support system and enabling condition for other, more specific improvements.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

Information on how the mitigation action interacts with other:

This PaM gives more knowledge about climate and environment and could in this way interact with several other PaMs.

PaM agriculture No. 6: Climate and environment programme

Effect on national emissions has been estimated:

Yes	No
	X

If no, explanation for why effect has not been estimated:

The project is related to development and dissemination of knowledge, while actual effect on emissions can only happen through on-farm implementation. The effect on emissions has therefore not been estimated.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM gives more knowledge about climate and environment that can be relevant for several of the other PaMs.

PaM agriculture No. 7: Delivery of manure for production of biogas

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

The use of manure for biogas production has increased from 77 000 tons in 2020 to 138 000 tons in 2023, which equals about 1,6 per cent of the manure in Norway.

The effect of the support scheme is estimated to about 2 200 t CO₂-equivalents in 2020 and 3 400 tons of CO₂-equivalents in 2030. The emission reduction in 2030 is based on a continuation of the share of manure delivered to biogas production in 2023.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The share of manure delivered to biogas- production in 2020 is compared to activity data from 2014, the year before the support scheme was implemented.

Changes in methodologies or assumptions for estimating impact since previous report:

The effect of the PaM in 2030 is estimated by assuming that the level of manure delivered to biogas production in 2023 is continued until 2030.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
	x				

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

The cost of the measure is estimated to about 1000 NOK per ton CO₂ equivalent.

Information on non-GHG mitigation benefits:

Biogas production from manure could contribute to redistribution of phosphorus from areas with high animal density.

Information on how the mitigation action interacts with other:

Biogas plant on farms receive support from the renewable scheme.

PaM agriculture No. 8: Restrictions on cultivation of peatlands

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Emissions from land conversion from peatland to cropland are reported in the agriculture chapter for N₂O, while the LULUCF chapter covers CO₂ emissions. New cultivation of peatlands was forbidden in Norway in 2020. In 2020, the area of new cultivation of peatland was about the same as in 2019, but in 2021 the restrictions reduced the area of new cultivation and the related emissions of N₂O and CO₂. The area of newly cultivated peatland decreased from 82 ha in 2021 to 17 ha in 2023. Since 2021 is the first year where the regulation was effective the whole year, the area of new cultivated peatland in this year was used when estimating the future effect of the measure.

Since the restrictions were enforced in June 2019, the effect for 2020 is set to 0. The effect is estimated to increase to 4 500 tons CO₂ eq. in 2030, based on the prevention of cultivation of 180 ha per year. It is only the reductions of N₂O from this measure that is reported in the agricultural sector. The largest share of emission reductions is CO₂ which is reported in the LULUCF sector. The effect of the restrictions is increasing over time because the emissions from each hectare of drained peatlands con-

tinue for decades after the drainage has happened.

Changes in methodologies or assumptions for estimating impact since previous report:

Forest on organic soils has been included in the calculations since the last report. This is because the restrictions also apply to these areas.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
		x			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

The cost of the measure is estimated to under 500 NOK per ton of CO₂ equivalents.

Information on non-GHG mitigation benefits:

Intact peatlands and bogs are crucial for biodiversity and other ecosystem services. Conserving these areas will also contribute to climate adaptation through flood mitigation and natural barriers against forest fires.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

Land use, land use change and forestry (LULUCF)

PaM LULUCF No. 1: Higher seedling densities in existing areas of forest land

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Higher seedling densities have very limited effect by 2030. However, it has greater potential in the long term. The total potential is not yet reached. Based on statistics, about 50 per cent of the planted area has been covered by this scheme since it was implemented in 2016.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
		x

Information on costs:

In 2022, forest owners received subsidies totalling 25.2 million NOK on 18,661 hectares. By 2023, the subsidized area slightly decreased to 17,506 hectares, but the subsidy increased to 27.8 million NOK. The contribution from forest owners was 59.3 million NOK in 2022 and 53 million NOK in 2023.

Information on non-GHG mitigation benefits:

The measure contributes to increasing forest production per unit area, providing a basis for increased harvesting and value added for forest owners and the forest industry. It can help meet increased future market demand for forest raw materials and products.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM LULUCF No. 2.

PaM LULUCF No. 2: Genetical improvement, plant breeding

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The potential for CO₂ removal is expected to be limited until 2030, but significantly higher estimates are projected for 2100. The long-term strategy for breeding Norway spruce involves ensuring that 100per cent of planted spruce trees come from improved plant material by 2040. In 2020, a breeding program was launched for pine and birch, and a seed plantation has already been established for black alder. Additionally, other tree species are being considered for similar breeding programs.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
		x

Information on costs:

Since 2016, the annual support has been approximately 15 million NOK, which was given as support to The Norwegian Forest Seed Foundation, which is responsible for forest plant breeding.

Information on non-GHG mitigation benefits:

The measure contributes to increasing forest production per unit area, providing a basis for increased harvesting and value-added for forest owners and the forest industry. It can help meet increased future market demand for raw materials and products from forests.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM LULUCF No. 1 and 5.

PaM LULUCF No. 3: Fertilization of forests as a climate mitigation measure

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

It is estimated that fertilization of 5 000-10 000 hectares of forest is acceptable for biodiversity and the environment. If 5 000-10 000 hectares of forest is fertilized, estimates show additional CO₂ removals of 140 to 270 kt tonnes CO₂ annually. The effect of the measure will gradually increase and peak after approximately 10 years. With a steady area treated yearly the effect can be prolonged over time.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
		x

Information on costs:

In 2022, forest owners received subsidies totaling 0.5 million NOK, and 300 hectares of forest land were fertilized. In 2023, the fertilized area increased to 2120 hectares, and the subsidies increased to 5.8 million NOK. The price per decare for forest owners was 400 NOK in 2022 and 600 NOK in 2023. The total cost for 2023 amounted to 12.7 million NOK, including the cost from the forest owner.

Information on non-GHG mitigation benefits:

The measure contributes to increasing forest production per unit area, providing a basis for increased harvesting and value-added for forest owners and the forest industry. It can help meet increased future market demand for raw materials and products from forests.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM LULUCF No. 4: Tending of juvenile stands

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

By increasing the area treated each year, removals can be enhanced by 2030. However, the short term effect will be minimal. The measure will mostly have long term effects, so the removal potential is much larger toward 2100. Tending as a climate measure was included in 2023 as a new climate measure in Norwegian forestry.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
		x

Information on costs:

The subsidies provided for tending in 2023 were 4.5 million NOK.

Information on non-GHG mitigation benefits:

The measure contributes to increasing forest production per unit area, providing a basis for increased harvesting and value-added for forest owners and the forest industry. It can help meet increased future market demand for raw materials and products from forests.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM LULUCF No. 1 and 5.

PaM LULUCF No. 5: Regeneration with proper tree-species

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Regeneration with proper tree species each year can enhance removals by 2030. However, the effect will be minimal. The measure will mostly have long-run effects, so the removal potential is much larger toward 2100.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
		x

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

The measure contributes to increasing forest production per unit area, providing a basis for increased harvesting and value-added for forest owners and the forest industry. It can help meet increased future market demand for raw materials and products from forests.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM LULUCF No. 1 and 2.

PaM LULUCF No. 6: Reduced emissions from peatlands and bogs

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Emissions from land conversion from peatland to cropland are reported in the agriculture chapter for N₂O (chapter 4.3.10.8), while the LULUCF chapter covers CO₂ emissions. For CO₂ alone, the projected effect can reach a little less than 80 kilo tonnes by 2035, based on the prevention of cultivation of 180 ha per year. The effect of the restrictions is increasing over time because the emissions from each hectare of drained peatlands continue for decades after the drainage has happened.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
		x

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

Intact peatlands and bogs are crucial for biodiversity and other ecosystem services. Conserving these areas will also contribute to climate adaptation through flood mitigation and natural barriers against forest fires.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

Waste

PaM waste No. 1: Requirement to collect landfill gas

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

It has been assumed that all collection of landfill gas occurred due to requirements. Even if the regulation was implemented in 2002, some landfills had been required in their permits to collect gas before. Therefore, effect has been estimated from 1995. It has been assumed that the composition and the quantity of waste to be deposited to landfill will be constant during the period 2020–2040. It has also been assumed that the share of collected methane among potential emissions will be constant during the same period. The mitigation impact has been estimated to 172 kt CO₂ equivalents in 2020, 113 kt CO₂ equivalents in 2025, 90 kt CO₂ equivalents in 2030, 72 kt CO₂ equivalents in 2035 and 59 kt CO₂ in 2040. The downward trend is due to the prohibition regulation which has reduced amounts of organic waste deposited and thus potential emissions.

Changes in methodologies or assumptions for estimating impact since previous report:

The landfills model has been updated with new input data for the historical timeseries which led to small changes in the mitigation impact calculation. The reported effects in NC8/BR5 were based on GWP-100 values from the IPCCs fourth assessment report.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
	x				

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM waste No. 2: Ban on depositing biodegradable waste in landfills

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

To estimate the effect of the ban of depositing biodegradable waste, it has been assumed a constant share of deposited amounts among easy degradable organic waste from 2002 to 2040. A constant share of deposited amounts of waste among other biodegradable waste has been assumed from 2009 to 2040 to estimate the effect of the prohibition of all biodegradable waste.

To calculate total produced amounts of organic and other biodegradable waste, the population growth has been used. Between 2002 and 2009, collected landfill gas amounted to around 26 per cent of national potential methane emissions from landfills. This value has been kept constant during the period 2002-2040 to estimate the mitigation impact of the regulation. This impact has been estimated to 345 kt CO₂ equivalents in 2020, 478 kt CO₂ equivalents in 2025, 592 kt CO₂ equivalents in 2030, 678 kt CO₂ equivalents in 2035 and 745 kt CO₂ equivalents in 2040.

Changes in methodologies or assumptions for estimating impact since previous report:

From the previous report, the landfills model has been updated with new input data for the historical timeseries which led to small changes in the mitigation impact calculation. The reported effects in NC8/BR5 were based on GWP-100 values from the IPCCs fourth assessment report.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
	x				

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM waste No. 3: Tax on waste incineration

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The effect is calculated as a scenario analysis using the SNOW-model and the framework for the WEM-projections. The tax on waste incineration is explicitly modeled in SNOW, so the effect is calculated by running the model using the same assumptions as in the WEM-scenario, but changing the tax rate to 0 for the period 2025-2040, and calculating the yearly difference in emissions from the WEM-scenario. The SNOW-model and assumptions for the WEM-scenario is described in further detail in chapter 2.6.

Changes in methodologies or assumptions for estimating impact since previous report:

In previous reporting the effect was calculated using the static elasticity model KAJA. For this report the SNOW-model has been used instead.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x	x	x			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
x	x	

Information on costs:

Carbon taxes confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small. A tax rate of NOK 882 is equivalent to a tax rate of NOK 485 per ton of waste.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The tax contributes to reducing these emissions. Furthermore the tax contributes to reduce the amount of waste and provides increased incentives to recycle materials.

Information on how the mitigation action interacts with other:

The mitigation from this PaM is considered to interact with PaM waste No. 4. The calculated mitigation is acquired by using a macroeconomic model and should appropriately take into account any overlap effects from the mitigation caused by the other PaMs.

PaM waste No. 4: Other measures in the waste sector

Effect on national emissions has been estimated:

Yes	No
	X

If no, explanation for why effect has not been estimated:

It is difficult to quantify the mitigation effects on greenhouse base emissions of these other measures in the waste sector. Their objectives are primarily to increase waste recycling, this is not necessarily reflected in the GHG inventory that would be used to calculate GHG effects. The effects are therefore reported as not estimated (NE).

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

There has been no change in methodologies or assumptions.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits:

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

Planned measures

PaM WAM No. 1 Changes in environmental taxes on fuels and GHGs

Sector: Cross-sectoral

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The effect is calculated as a scenario analysis using the SNOW-model and the framework for the WEM-projections. The taxes in question are explicitly modeled in SNOW, so the effect is calculated by running the model using the same assumptions as in the WEM-scenario, but increasing the tax rates in the CO₂-tax on mineral products, the tax on HFC and PFC, the tax on SF₆ and the tax on waste incineration to gradually increase to NOK 2 400 in 2030, and calculating the yearly difference in emissions from the WEM-scenario. The mitigation effect also includes the government budget proposal for 2025, where the usage tax is reduced 2025. The SNOW-model and assumptions for the WEM-scenario is described in further detail in chapter 2.6.

The mitigation effect also includes the expansion of the CO₂-tax to fisheries in distant waters. This effect is calculated using the static elasticity model KAJA.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x	x	x	x	x	x

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

Carbon taxes confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small. A tax rate of NOK 2 400 per ton CO₂ is equivalent to a tax rate of NOK 6.37 per liter of mineral oil.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The tax contributes to reducing these emissions. Furthermore the tax increase will contribute to reduce the amount of waste and provides increased incentives to recycle materials.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM WaM No. 2–7. The interaction is not taken into account in the estimated impact for this PaM WAM, but when adding up all planned measures, the sum of emission reductions is adjusted for overlapping effects.

PaM WAM No. 2 Further measures to reduce emissions from building and construction

Sector: Energy

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The estimate of emission reductions from the the requirement in public procurement for emission-free energy use at construction sites is based on the following implementation:

	2025	2026	2027	2028	2029	2030
Share of energy use that is emission free	-	5 %	5 %	10 %	10 %	40 %

Calculations of emission reductions are based on the Norwegian Environmental Agency's report «Klimakrav til bygge- og anleggsplasser i offentlige anskaffelser».⁷¹

The estimate of emission reductions from the ban the use of fossil gas for heating buildings is based on the following implementation:

	2025	2026	2027	2028	2029	2030
Use of fossil gas for heating buildings on construction sites	50 %	100 %	100 %	100 %	100 %	100 %

Calculations are based on the projections in the 2025 National Budget and the implementation above.

⁷¹ [Klimakrav til bygge- og anleggsplasser i offentlige anskaffelser: Utredning del 1 – miljodirektoratet.no](#)

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM WAM No. 1 and 4 and PaM cross-sectoral No. 6. When adding up all planned measures, the sum of emission reductions is adjusted for overlapping effects.

PaM WAM No. 3 New ban on the use of fossil gas for heating buildings

Sector: Energy

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Calculation of emission effects is based on the Norwegian Environment Agency's report Climate Measures in Norway («Klimatiltak i Norge – Kunnskapsgrunnlag 2024).

Changes in methodologies or assumptions for estimating impact since previous report:

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM WAM No. 1. When adding up all planned measures, the sum of emission reductions is adjusted for overlapping effects.

PaM WAM No. 4 Increased biofuel mandate

Sector: Transport

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

The following implementations is proposed and used in estimating the emission effects:

Gradually increase the biofuel mandates for road traffic to 33 percent by 2030

Gradually increase the biofuel mandates for other purposes (non-road machinery) to 28 percent by 2030

Gradually increase the biofuel mandates for maritime transport to 18 percent by 2030

Increase the mandates in aviation to the same level as the EU's RefuelEU Aviation ramp-up plans, but before the requirement is increased, airlines must be credited for the use of biofuel in the EU's quota system. Therefore, from January 1, 2025, the sales requirement will continue at the same level

The emission reductions is calculated from an economic model named «KAJA», which is developed by the Ministry of Finance. KAJA is an elasticity model with detailed data for various taxes.

Changes in methodologies or assumptions for estimating impact since previous report:

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM WAM No. 2, 5 and 6. These measures have overlapping effects. The estimates of emissions reductions have been adjusted to account for this.

Interaction with increased biofuel mandates:

Sector/segment	Estimated overlap (in kt CO ₂ -eqv.)
Vans	30
Trucks	750
Construction machinery	20
Shipping	160

PaM WAM No. 5 Further measures to reduce emission from shipping

Sector: Transport

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Estimated emission reductions of the measures:

	Emission reduction 2025–2030 (kt CO ₂ -equ.)
Zero emission requirement ferries	250
High speed passenger ferries scheme	100
Low- and zero emission requirements for vessels in aquaculture	200
Low- and zero emission requirements for vessels in the offshore industry	400

Estimates of emission effects are based on the Norwegian Environment Agency's report Climate Measures in Norway («Klimatiltak i Norge – Kunnskapsgrunnlag 2024»). Calculations are based on electrification of county ferry connections, electrification and use of ammonia as fuel in the aquaculture industry, use of ammonia on offshore vessels, transition to biogas on offshore vessels, and transition to battery and hydrogen for high speed ferries.

Changes in methodologies or assumptions for estimating impact since previous report:

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM WAM No. 1 and 4. When adding up all planned measures, the sum of emission reductions is adjusted for overlapping effects.

PaM WAM No. 6 Further measures for reduced emissions from road traffic

Sector: Transport

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Several measures have been proposed in order to reduce emissions from road traffic, as described in chapter 2.5. The following development of zero emission vehicles is assumed:

Share of vehicles which have zero emissions

	2025	2026	2027	2028	2029	2030
Vans	55 %	77 %	100 %	100 %	100 %	100 %
City buses	100 %	100 %	100 %	100 %	100 %	100 %
Long distance buses	32 %	39 %	45 %	52 %	59 %	100 %
Trucks for local/regional transport	30 %	50 %	60 %	75 %	90 %	100 %
Trucks for bulk transport	25 %	35 %	50 %	70 %	85 %	100 %
Trucks for long distance transport	10 %	20 %	40 %	60 %	80 %	100 %

Estimates of the emission effect are based on calculations in the Norwegian Environment Agency's report 'Klimatiltak i Norge – Kunnskapsgrunnlag 2024', in which emission reductions of electrification of vans, buses and trucks are calculated. The calculations are based on projections in the National Budget for 2025

and of estimates of replacement rates and composition of the vehicle fleet. Effects of the planned measures are calculated as the the emission effects exceeding the electrification assumed in the baseline projections.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

In the 2025 National Budget, increased funding for the state agency Enova is proposed, by NOK 1.7 billion, including 1.2 billion in support of heavy duty transport, both for zero emission vehicles and charging infrastructure.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM Cross-sectoral No. 6 and PaM WAM No. 1 and 4. For vans and city buses, the emission effects overlap with the effect of the CO₂ tax and the biofuel sales requirement. For trucks and long-distance buses, the emission effects overlap with the effect of the CO₂ tax, the biofuel mandates, and the effect of Enova. When adding up all planned measures, the sum of emission reductions is adjusted for overlapping effects.

PaM WAM No. 7 Further measures to reduce emission from the industry sector

Sector: Industry

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Calculation of the emission effect of the ban on use of fossil fuels for stationary indirect heating for energy purposes is based on the Norwegian Environment Agency's report Climate Measures in Norway («Klimatiltak I Norge – Kunnskapsgrunnlag 2024).

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x					

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered to interact with PaM cross-sectoral No. 6. When adding up all planned measures, the sum of emission reductions is adjusted for overlapping effects.

PaM WAM No. 8 Further measures to reduce emissions from agriculture

Sector: Agriculture

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Estimates of emission reductions from measures in the agriculture sector:

	Emission reduction 2025–2030 (kt CO ₂ -equ.)
Methane inhibitors (MetanHUB)	700
Requirements in the revised fertilizer regulation	200
Support through the agricultural agreement	300

Requirements in the revised fertilizer regulation:

The calculations are based on the amended requirements in the fertilizer regulations, as the requirements were proposed in the regulations that were under consultation⁷². The ministries are now reviewing the consultation responses before the regulations are finalized.

Metan inhibitors (MetanHUB):

In the Government's proposal, it is assumed that methane inhibitors in animal food can result in a 20 percent reduction in enteric methane from dairy cows, heifers, bulls, and suckler cows. It is assumed that 70 percent of dairy cows and heifers will receive additives in their feed from 2027, with a linear increase to 90 percent by 2035. For suckler cows and bulls, a somewhat slower phase-in is assumed, where 60 and 70 percent of the population, respectively, will be fed with methane inhibitors by 2035 (linear increase from 30 and 50 percent in 2027). Due to unresolved questions regarding the method of allocation during grazing, it is assumed that the animals will not receive additives on the days they are grazing.

Support through the agricultural agreement:

The increase in funding includes, among other things, funds for fertilizer measures, water environment measures, energy efficiency, and biogas, as well as work on more feed- and emission-efficient cows.

⁷² [Revidert gjødselregelverk – høring av forslag til ny forskrift om lagring og bruk av gjødsel mv. \(gjødselbrukforskriften\) - regjeringen.no](https://www.regjeringen.no)

Changes in methodologies or assumptions for estimating impact since previous report:

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
	x	x			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM WAM No. 9 New food waste legislation

Sector: Waste

Effect on national emissions has been estimated:

Yes	No
x	

If no, explanation for why effect has not been estimated:

Not applicable.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Calculations of emission reductions from reduced food waste are based on the industry agreement between the state and the food industry to reduce food waste by 50 percent from 2015 to 2030. The Norwegian Environment Agency has calculated an effect of 1.17 million tons of CO₂ equivalents if industry actors achieve the industry agreement's goal of a 50 percent reduction in food waste by 2030, while consumers reach the goal in 2035. The effect calculation assumes that production in Norwegian agriculture is reduced corresponding to changes in demand.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
x	x	x			

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF
	x	

Information on costs:

There is no information to report on costs.

Information on non-GHG mitigation benefits;

There is no information to report on non-GHG mitigation benefits.

Information on how the mitigation action interacts with other:

This PaM is considered not to interact with other PaMs.

PaM WAM No. 10 Increased CO₂-tax on emissions under the ETS on the continental shelf

Sector: Petroleum

Effect on national emissions has been estimated:

Yes	No
	x

If no, explanation for why effect has not been estimated:

Norway has no methodology for estimating the impact that provides estimates of a sufficiently high quality.

If yes, description of methodologies and assumptions used to estimate the GHG emission reductions or removals:

Not applicable.

Changes in methodologies or assumptions for estimating impact since previous report:

Not applicable.

GHGs included in the calculation of impact:

CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆

GHG impacts expected within:

EU ETS	Effort sharing regulation	LULUCF

Information on costs:

Carbon taxes confers costs on the emitters that leads to an equivalent generation of revenue for the government, meaning there is no cost to society, rather a redistribution of revenue. The tax does however require administration and reporting for both the government and the tax subjects. These costs are considered to be small.

Information on non-GHG mitigation benefits;

The combustion of mineral products leads to other emissions causing harmful air pollution. The tax contributes to reducing these emissions.

Information on how the mitigation action interacts with other:

This PaM is not considered to have any substantial interactions with the other reported planned measures.

Published by:
Norwegian Ministry of Climate and Environment

Additional copies may be ordered from:
Norwegian Government Security and Service
Organisation
publikasjoner.dep.no
Telephone: + 47 22 24 00 00
Publications are also available on:
www.government.no
Publication number: T-1595 E

Cover photo: [gettyimages/cookelma](https://www.gettyimages.com/photos/cookelma)
Chapter photo: [gettyimages/andersboman](https://www.gettyimages.com/photos/andersboman)

Print: Norwegian Government Security and Service
Organisation 02/2025 – Impression 50

