



NORWEGIAN MINISTRY OF  
CLIMATE AND ENVIRONMENT

Meld. St. 13 (2014–2015) Report to the Storting (white paper)

# New emission commitment for Norway for 2030 – towards joint fulfilment with the EU





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*Recommendation of 6 February 2015,  
approved in the Council of State the same day.  
(Solberg Government)*

## 1 Norway's contribution to a new global climate agreement

According to the UN Intergovernmental Panel on Climate Change (IPCC), current trends in global greenhouse gas emissions will result in a temperature rise exceeding two degrees Celsius. The world risks very serious and irreversible consequences.

The global nature of climate change calls for the broadest possible cooperation by all countries. The UN Framework Convention on Climate Change (afterwards referred to as the Climate Change Convention or the Convention) is the key tool for achieving international cooperation of this kind. The overall objective of the Convention is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. In practical terms, this has been translated into the target of limiting global warming to below two degrees Celsius above pre-industrial levels. Decisions adopted under the Convention in 2010 made the two-degree target the basis for the international negotiations in the time ahead. If emissions are to be reduced to a level in line with this target, all countries will need to contribute,

and emissions will need to be reduced as cost-effectively as possible.

In 2011, agreement was reached under the Climate Change Convention that negotiations on a new climate agreement are to be concluded by December 2015. The intention is for the agreement to come into effect from 2020 and include all countries. To provide a basis for determining the commitments to be included in the agreement, a decision adopted under the Convention in 2013 invited all countries to submit their intended nationally determined contributions (INDCs) in the new agreement. Countries were asked to submit their INDCs by the first quarter of 2015 if ready and otherwise well in advance of the December 2015 climate change conference in Paris. The submission of INDCs by the end of the first quarter 2015 is part of the negotiation process. By 1 November 2015, the secretariat of the Convention will publish a synthesis report on the INDCs that have been submitted and their aggregate effect. This will provide a very important basis for assessing whether the Paris agreement

will be sufficiently ambitious to limit global warming to below two degrees.

The purpose of the present white paper is to inform the Storting (Norwegian parliament) about Norway's proposed contribution to international mitigation commitments for the period 2021–30. The framework for a new Norwegian emission reduction commitment was described in the 2014 Revised National Budget, which also stated that the Storting will be kept informed in an appropriate way about the process of developing the commitment.

*During the first quarter of 2015, the Government will submit an independent intended nationally determined contribution (INDC) for Norway to the UN Framework Convention on Climate Change, including the following elements:*

- Norway will conditionally undertake a commitment to reduce its emissions by at least 40 % by 2030 compared with the 1990 level.
- Norway will enter into a dialogue on joint fulfilment of its climate commitment together with the EU, with an emission reduction target of at least 40 % in 2030 compared with the 1990 level. In the period up to the Paris conference, Norway will work towards a letter of intent with the EU on joint fulfilment of this commitment.

*An agreement on joint fulfilment with the EU would involve the following:*

- In sectors covered by the EU emissions trading system (EU ETS), Norway would contribute to

emission reductions of 43 % compared with 2005 through its participation in the EU ETS.

- Norway would also contribute to emission reductions in non-ETS sectors by setting a national emission target for these sectors in line with comparable EU countries.
- For non-ETS sectors, flexibility within the EU system will make it possible to achieve some of the cuts through the purchase of EU emission allowances or the implementation of measures in other EU countries. Norway would make use of this flexibility on the same lines as EU member states.

If it is not possible to achieve joint fulfilment with the EU, the target of reducing emissions by at least 40 % compared with 1990 will be Norway's INDC. This target is conditional on the availability of flexible mechanisms under the new climate agreement and on Norway being credited for participation in the EU ETS so that this counts towards fulfilment of the commitment. In this case, the Government will consult the Storting at a later date on the determination of a national target for the non-ETS sector.

This white paper does not present new measures, but describes existing policy instruments and gives a general description of sectors where there is expected to be a potential for emission reductions. The Government will submit proposals on new measures to the Storting at a later date, for example in annual budgets.

## 2 Towards a global climate agreement in Paris

### 2.1 Need to enhance mitigation ambition

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It is essential to enhance mitigation ambition considerably on a global scale between 2020 and 2030. This is also reflected in decisions adopted at the Lima climate conference in 2014. The Government is following up the Fifth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) and the decisions from the climate negotiations by formulating a more ambitious emission reduction commitment for 2030 than its 2020 commitment, see Chapter 3.5. Further reasons why Norway should have a more ambitious target for 2030 than for 2020 are its position as a rich developed country and its leading role in the climate negotiations.

The degree of anthropogenic global warming depends on the cumulative quantity of anthropogenic greenhouse gas emissions. The total quantity of greenhouse gases in the atmosphere depends on the volume of global emissions and on how much CO<sub>2</sub> is stored in marine and terrestrial ecosystems. Greenhouse gases persist in the atmosphere for many years. To estimate what the final global temperature rise will be, a 100-year time horizon must be used, to give time for atmospheric concentrations of greenhouse gases to stabilise. The IPCC published its Fifth Assessment Report in 2013–14. The report concludes that unless emissions are considerably reduced, we risk average global warming of 3.7 to 4.8 °C by 2100 compared with the period 1850–1900. In this case, drought, flooding and other consequences of climate change may have even greater impacts than previously thought. The report also concludes that the risks can be reduced, partly by adapting to inevitable climate change and partly by reducing global emissions and thus moderating climate change.

According to the IPCC, global greenhouse gas emissions rose by 2.2 % per year in the period 2000–10, as compared to 1.3 % between 1970 and 2000. To achieve the two-degree target, global greenhouse gas emissions must be 40–70 % lower in 2050 than in 2010, and must continue to drop

until there are net negative emissions towards the end of this century. To achieve net negative emissions, it will be necessary to remove CO<sub>2</sub> from the atmosphere by producing energy from biomass in combination with carbon capture and storage, and through large-scale afforestation. The IPCC also points out that there are risks associated with longer-term dependence on net negative emissions.

In practice, achieving an emission trajectory in line with the two-degree target will require the vast majority of countries to reduce their emissions from current levels, and the largest emitters will have to reduce or limit their emissions considerably. This will call for large-scale social transformation, regardless of whether countries start from a high level of emissions or are able to find alternatives to a traditional emission-intensive development path. Although most of the increase in atmospheric concentrations of greenhouse gases so far can be ascribed to historical emissions in developed countries, the developing countries and emerging economies such as India and China are now responsible for almost all global growth in emissions. In only a few years' time, more than half of cumulative global emissions will originate from other parts of the world than the developed countries.

A cost-effective approach, which is the basis for analyses from the International Energy Agency and the Organisation for Economic Cooperation and Development (OECD) and for the Stern report, will ensure that the two-degree target is achieved at the lowest possible cost. Achieving the target will require substantial resources even if a cost-effective approach is used. However, a number of analyses, for example from the OECD, show that over time, the costs of failing to achieve the two-degree target will be considerably higher. In addition, there will be a risk of very serious irreversible changes in the global climate. To achieve the two-degree target, efforts to develop and deploy new technology will have to be scaled up. This in turn will make it necessary to put a price on emissions to a much greater extent than is the case across the

### Box 2.1 Emission reductions in different regions up to 2030

The IPCC has analysed how emissions will change from 2010 to 2030 in different regions, based on mitigation scenarios that are cost-effective and consistent with the two-degree target. The table below (adapted from the IPCC Fifth Assessment Report, Working Group III contribution) shows emission reductions up to 2030 relative to 2010 in different regions using what the IPCC calls an idealised implementation scenario.

The analysis is based on the assumptions that there is a uniform global carbon price and deployment of default technology. For the OECD countries, emissions would peak in 2010, and would on average be 32 % lower in 2030 than in 2010 (range 23–40 %). Emissions in Asia

would peak in 2020 and would be roughly the same in 2030 as in 2010 (on average 1 % higher, ranging from 15 % lower to 14 % higher). Emissions in Latin America and economies in transition would peak around 2015 and be 32–35 % lower in 2030 than in 2010.

This analysis of emission reductions by 2030 in scenarios compatible with the two-degree target shows peak emissions in 2010 in OECD countries and in 2015–20 in other regions. In practice, it is not very realistic that emissions will peak by these dates. If emissions continue to rise after 2010–2015–2020, deeper cuts in emissions will be needed in the later part of the period up to 2030 to achieve the same results.

Table 2.1 Regional peak years for emissions and emission reductions by 2030 relative to 2010, based on a range of scenarios compatible with the two-degree target. Negative values indicate higher emissions in 2030 than in 2010. The values are averages across a range of models. Figures in parentheses show the range in values. (Adapted from IPCC Fifth Assessment Report, Working Group III contribution.)

	Stabilisation goal	OECD 1990	Asia	Latin America	Middle East and Africa	Economies in transition
Peak year of emissions	430–530 ppm CO <sub>2</sub> -eq	2010 (2010/2010)	2020 (2015/2030)	2015 (2010/2020)	2020 (2010/2030)	2014 (2010/2015)
2030 emission reductions relative to 2010 (Negative values indicate growth in emissions)	430–530 ppm CO <sub>2</sub> -eq	32 % (23 to 40 %)	-1 % (-15 to 14 %)	35 % (16 to 59 %)	8 % (-7 to 18 %)	32 % (18 to 40 %)

world today. Ensuring that the polluter pays encourages changes in production and consumption patterns and the development and deployment of climate-friendly technology. According to the OECD, support for the development of new technology will have hardly any effect without a clear price signal, because it will not be profitable to make use of the newly developed technology. The yield from investments in low-emission installations, technology, buildings and vehicles is spread over a period of time, and it is essential that emission prices are perceived as credible, both now and in the future.

## 2.2 Towards a new climate agreement

### 2.2.1 International cooperation on climate change and the basis for a new agreement

Countries' contributions to emission reductions will be a vital part of a new international agreement, since it is the sum of these contributions that will determine how far we can limit global warming. Efforts to reduce anthropogenic greenhouse gas emissions have already been in progress for many years. The Kyoto Protocol was the

first binding agreement that included quantitative restrictions on emissions for a number of countries. However, it only covers a small proportion of global emissions and will therefore not be sufficient to achieve emission cuts on the scale required by the two-degree target. The starting point for negotiating the Paris agreement has therefore been that it must include all the world's countries. To ensure broad participation, greater flexibility is needed, and countries are to decide which types of emission targets to submit themselves. This means that the effect of the agreement is more unpredictable.

The legal form of the new climate agreement has not yet been decided, but it has been agreed that the parties will negotiate 'a protocol, another legal instrument or an agreed outcome with legal force under the Convention'. Norway is working towards agreement on a binding international instrument at the UN climate conference in Paris. If agreement is reached on a binding international agreement, the Government will submit a proposition requesting the Storting's consent to ratification of the instrument, as is the normal practice.

Global participation is necessary to ensure that countries that may become large emitters in the future are also covered by the agreement. Small countries need to be part of the agreement too. If there are countries that do not join an agreement and do not implement a similar climate policy, this may result in carbon leakage (meaning that emissions are merely moved between countries).

Moreover, there are wide variations between countries in economic strength, level of technological development, natural conditions and population trends. Rich countries and countries that are major emitters are expected to make substantial commitments under the new agreement. Developing countries are also calling for large-scale support for climate finance from developed countries. Support for the development and implementation of climate action in developing countries is therefore an important topic in the negotiations, but is not described further here. Countries have been invited to consider including information on national adaptation efforts or including an adaptation component in their INDCs. The decision from the Lima conference does not mention climate finance or other assistance to developing countries as part of the INDCs.

Norway currently provides funding for a range of climate-related activities in fields such as clean energy, reducing deforestation in tropical forests, and climate change adaptation in developing coun-

tries (see Box 2.2). These activities contribute to climate change mitigation and adaptation. This type of support and cooperation is a key part of the framework for efforts under the Climate Change Convention, and will be continued in the years ahead. As the negotiations continue in the run-up to the Paris conference, Norway will follow up adaptation and other elements that must be included in the new climate agreement.

Norway has advocated the inclusion of a long-term global objective of approaching net zero emissions by 2050 in the new climate agreement. Net emissions are greenhouse gas emissions after deduction of removals, for example in forests and through carbon capture and storage. This level of ambition for the trend in global emissions would give more concrete substance to the two-degree target. The EU has also advocated the inclusion of a joint global objective for emission reductions in the new climate agreement, based on the IPCC's results. A long-term global objective in line with the two-degree target would give a strong, clear signal to the business sector, investors and others that social transformation to a low-emission society needs to be stepped up. At the Lima climate conference in 2014, a group called Friends of the Future was formed to support the inclusion of a long-term objective in the new climate agreement. Norway, many EU countries and ambitious developing countries are all part of the group.

In Norway's view, the new climate agreement needs a minimum level of common rules to be effective. This will provide a framework that can encourage the necessary intensification of climate action. In addition, a sound international framework is needed to facilitate cooperation between countries, see Box 2.3. The rules adopted under the new climate agreement must also be flexible, since different countries' commitments may vary widely in type and scope. The INDCs submitted during the first quarter of 2015 will provide important signals about the kind of rules countries wish to see in the new agreement and how they should be formulated. The Government considers it important to make use of internationally recognised methodology and approaches that other countries will also be able to utilise. Norway and the EU share views in this area as well.

### **2.2.2 The land sector and climate change**

The land sector, which includes forests and other land categories (cropland, grassland, wetlands, settlements and other lands) is highly significant in the context of climate change. According to the

### **Box 2.2 Norway's international climate initiatives**

#### *Norway's International Climate and Forest Initiative*

The Climate and Forest Initiative is Norway's largest contribution to international climate action. From the start in 2008 and up to the end of 2014, Norway has made payments totalling about NOK 14 billion to projects under the initiative. The Climate and Forest Initiative became part of Norway's climate policy after negotiations on the first cross-party agreement on climate policy, and was launched at the Bali climate conference in 2007. A comprehensive evaluation of the initiative was published in 2014, and concluded that Norway's work in this field has given satisfactory results in a number of areas. Agreement has been secured that efforts to reduce emissions from deforestation and forest degradation in developing countries are to be included in a new global climate regime. Good progress has been made in reducing deforestation in several important forest countries, and the initiative has also resulted in important (sustainable) development benefits. The budget for the Climate and Forest Initiative in 2015 is NOK 3 billion. It has been decided that funding will as a minimum be maintained at the current level until 2020. The initiative, its goals and strategy, and activities that are in progress are further described in the Ministry of Climate and Environment's budget proposal for 2015 (Prop. 1 S (2014–2015)).

#### *The Green Climate Fund*

Norway played a part in establishing the Green Climate Fund, which was formally launched in 2011. By the beginning of 2015, the Fund had received total pledges of USD 10.2 billion, and has thus become established as the key institution for multilateral climate finance. Norway took over as one of the co-chairs of the board in autumn 2014, and shortly afterwards pledged NOK 1.6 billion in funding for the period 2015–18. It has been decided that in allocating its resources, the Fund will aim for a 50:50 balance between mitigation and adaptation over time, and that at least 50 % of the adaptation allocation will go to particularly vulnerable countries. The most important task for the Fund in 2015 will be reach the point where it can start allocating support to specific projects and programmes.

#### *Clean energy, climate change adaptation and other action*

Norway has been supporting clean energy projects in developing countries for many years. In 2015, Nor-

way will allocate approximately NOK 1.1 billion to renewable energy projects in developing countries through bilateral and multilateral channels; some of this is channelled through the international energy and climate initiative Energy+. In addition, Norfund (the Norwegian Investment Fund for Developing Countries) will invest in the order of NOK 0.7 billion in renewable energy projects, thus encouraging the mobilisation of private capital. At the 2014 Lima climate conference, Norway and UNEP (the UN Environment Programme) launched an initiative to measure and report reductions in greenhouse gas emissions resulting from projects and programmes that promote renewable energy and energy efficiency in developing countries. Moreover, Norway will allocate about NOK 1 billion to phasing out subsidies on fossil fuels, reducing emissions of short-lived climate pollutants and climate change adaptation, particularly through work in the following fields: food security and nutrition, weather and climate services, agricultural research, disaster risk reduction and conservation of biodiversity.

#### *Short-lived climate pollutants*

Norway is a partner in the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC), an international organisation focusing particularly on black carbon (soot), methane and hydrofluorocarbons (HFCs). Reducing emissions of these substances can yield a rapid climate response and slow down global warming, thus improving the prospects of achieving the two-degree target. The CCAC's aim is to promote rapid reductions in emissions through a range of initiatives, for example targeting waste management, HFCs in products, methane emissions from oil and gas production and black carbon emissions from heavy freight transport. Since autumn 2014, Norway and Chile have been the co-chairs of the coalition. Norway allocated NOK 27.3 million to the CCAC in 2014. Norway is also working at national level to reduce emissions of these substances, and the Norwegian Environment Agency has published a proposed action plan for reducing emissions of short-lived climate pollutants in Norway. On Norway's initiative, the Arctic Council is seeking to increase knowledge of the effects of emissions of short-lived climate pollutants such as methane and black carbon on temperatures in the Arctic. Norway will continue to play a leading role in promoting closer cooperation between the Arctic countries to reduce emissions of these climate pollutants in the Arctic.

### **Box 2.3 Flexible implementation mechanisms**

Flexible mechanisms make it possible to achieve greater overall emission reductions without using more resources. Three market-based mechanisms have been established under the Kyoto Protocol:

1. International emissions trading
2. Joint implementation (project-based cooperation between countries that have quantitative Kyoto commitments)
3. Clean Development Mechanism (project-based cooperation between countries that have quantitative Kyoto commitments and countries that do not).

Norway is working towards the continuation of the market-based mechanisms established under the Kyoto Protocol in a suitable form after 2020, adapted to the structure and substance of the new agreement.

There is currently a considerable market surplus of certified emission reduction credits (CERs) under the Green Development Mechanism, and there has also been a sharp drop in the level of new project activity. Norway and a few other actors are maintaining some activity in the development of new projects. Norway is also seeking to further develop the market. At the UN climate conference in Durban, it was decided to develop a new market-based mechanism that could cover a larger share of the economy.

When as many countries as possible have undertaken to reduce their emissions under the new climate agreement, the situation in international emissions trading markets may change. Countries that are selling emission allowances at present may prefer to be credited for the low-

est-cost measures themselves. As more and more countries pursue a more ambitious climate policy, the cost differences between them may be reduced. However, emissions trading markets may become further fragmented when emission credits are also generated by mechanisms developed by national authorities, not through the UN system. This will create new challenges relating to how emission credits should be approved and documented under the new climate agreement. At the same time, new regional emissions trading markets are developing in various parts of the world, for example for some US states, in China and in other Asian countries. In the long term, this will open up possibilities for linking together different systems so that carbon prices for a growing proportion of emissions converge.

Although it is uncertain at present what the Paris agreement will include, there is reason to believe that it will continue to provide opportunities for emissions trading/joint implementation. A number of countries have indicated that they wish provision to be made for this, and it is therefore likely that international markets for flexible mechanisms will continue to exist after 2020.

If Norway is to make use of market-based mechanisms outside the UN system in future, it will be necessary to consider further the criteria for participation and the arrangements that must be in place to ensure that international emission credits represent real emission reductions and to avoid double counting of emission reductions by different countries.

IPCC, forest management will play an important part globally in achieving the two-degree target, in both the short and the long term. There are currently no clear international accounting rules for the land sector in the new climate agreement. At global level, it is vital that the system provides incentives to avoid and reduce deforestation. A new regime should facilitate the use of both short-term and long-term mitigation options in forest. At the same time, the natural function of forest as a carbon sink must not become an obstacle to mitigation action in other sectors, thus leading to a general reduction in the ambition level. The

accounting rules must provide incentives for new measures to reduce emissions and increase removals in the land sector. This will also ensure that strong incentives are maintained for reducing emissions in other sectors, and that they can be strengthened.

In the Government's view, forest and other land categories should therefore be included in the new climate agreement, and incentives should be created for making more use of the mitigation potential and resources to be found in forest and other land categories. It will be harder to achieve the two-degree target without making use of miti-

gation options in the land sector, and more difficult to achieve a low-emission development pathway. Norway will advocate the development of a sound common framework of accounting rules for forest and other land categories in the climate agreement after 2020. Norway is also seeking to ensure that the new agreement is based on scientifically sound and verifiable approaches for calculating emissions and removals and changes in carbon stocks in the land sector, which should apply to all countries. The rules should also include good control systems to prevent manipulation of data and carbon leakage.

### **2.3 The EU's commitment for 2030 and its role in international climate efforts**

The EU has a population of more than 500 million and a varied industrial structure and energy production system. The EU emphasises flexibility and a cost-effective approach in efforts to achieve its climate targets, which are also part of a broader, longer-term transition to a low-emission society.

Internationally, the EU, like Norway, is advocating that all countries should take on emission reduction commitments to make it possible to limit global warming to less than two degrees. The EU was a driving force behind the decision at the Durban climate conference in 2011 to negotiate an agreement that includes all countries. Like Norway, the EU is seeking to act as a bridge-builder between ambitious developed and developing countries. In recent years, Norway and the EU have regularly acted as co-hosts for ministerial meetings to ensure progress in the climate negotiations. Norway has in addition been invited to join the Green Growth Group, an informal forum which brings together the EU countries that are advocating an ambitious climate policy. The Government intends to cooperate with this group in selected policy areas.

At the end of October 2014, the EU adopted its climate and energy package for 2030. This includes a domestic 2030 greenhouse gas reduction target of at least 40 % compared to 1990. The target is binding at EU level and is to be achieved within the EU, without any use of international mechanisms. The target will give a cost-effective emission trajectory towards the EU target of reducing emissions by 80–9 % by 2050, as set out in the Roadmap for moving to a competitive low-carbon economy in 2050. Emissions in the EU have dropped considerably since 1990 because cli-

mate policy has been tightened up, coal is being phased out in energy production, unprofitable polluting industrial facilities in Eastern Europe have been closed down, and economic growth has been weak. In 2012, emissions were 19 % lower than in 1990. According to calculations by the European Commission, emissions will decline by 32 % by 2030 compared with 1990 if today's climate policy is continued. The EU's emission target is to be achieved through a 43 % reduction in emissions covered by the EU ETS and a 30 % reduction in emissions from sectors outside the ETS, both relative to 2005 levels. The ETS will continue to be the EU's most important climate policy instrument for achieving its commitment. It covers about 41 % of total EU emissions. The emissions cap in the EU ETS is being progressively tightened, and from 2021, the linear reduction factor is to be increased from 1.74 % to 2.2 % of the calculated emissions in 2010.

The EU's overall target of a 30 % reduction in non-ETS sectors compared with 2005 is to be shared between member states in the form of a national target for each of them, probably in 2016. According to the Commission's calculations, emissions in non-ETS sectors will be reduced by 20 % from the 2005 level by 2030 without the use of any new policy instruments. According to the European Council's conclusions from October 2014, the national targets for emission reductions in non-ETS sectors will vary between 0 % and 40 %; in other words, the target for a country may be set between a minimum of 0 % reduction and a maximum of 40 % reduction relative to its 2005 emission level. No country will have a target that permits a rise in emissions. Targets will be set on the basis of each country's per capita GDP, relatively adjusted to reflect cost-effectiveness in a fair and balanced manner, as set out in the Council conclusions. This was also the main approach used in the effort sharing agreement on the 20 % emission target for 2020. There is an emphasis on cost-effective implementation, and flexibility within the EU will be significantly enhanced compared with the arrangements for achieving the 2020 targets. According to the Council conclusions, there will be more opportunity for one member state to fund measures in non-ETS sectors in other member states than is the case today. There will also be a limited one-off arrangement, to be decided before 2020, allowing countries to purchase ETS allowances and use them to cover emissions in the non-ETS sector in the period after 2020. The EU has not yet decided on its policy for including land use, land use change and forestry in its target of

reducing emissions by at least 40 %. A decision on this will be taken before 2020. For the EU as a whole, removals in land use, land use change and forestry up to 2030 will not be very important, but the situation varies widely from one country to another.

## 2.4 Other countries' approaches and climate targets

All the G20 countries except Argentina and Saudi Arabia have confirmed that they are preparing INDCs for the 2015 agreement, either by the end of the first quarter of 2015 or before the Paris climate conference in December. The G20 accounts for more than 80 % of global greenhouse gas emissions and includes the largest emitters (the US, China, India, the EU, Russia, Japan and Indonesia).

### *The US*

In November 2014, the US and China made a joint announcement of their targets for 2025. The US Administration has set a target of reducing greenhouse gas emissions by 26–28 % below the 2005 level in 2025. This corresponds to a reduction of 15–17 % below the 1990 level when land use, land use change and forestry is excluded. The target is intended to keep the US on the right trajectory to achieve reductions of the order of 80 % by 2050. The target will also double the pace of emission reduction from 1.2 % per year on average in the period 2005–20 to 2.3–2.8 % per year on average between 2020 and 2025. To date, the US has no plans to make any use of international emissions trading to achieve its target, and this would require an amendment to the legislation. The US will probably include emissions and removals in the land sector in its target, but no details are available at present.

### *China*

In November 2009, China announced that it would cut emission intensity (CO<sub>2</sub> emissions per

unit of GDP) by 40–45 % by 2020 compared with the 2005 level. In November 2014, China announced a new target, for CO<sub>2</sub> emissions to peak at the latest in 2030. China also intends to increase the proportion of non-fossil fuels to 20 % by 2030. With current policy instruments, China's emissions are expected to rise slightly after 2030. After the announcement last November, China has provided further information on its targets and announced that coal use will peak in 2020. China is working on plans to limit coal consumption in several provinces and on the introduction of emissions trading systems. There are plans to establish a national emissions trading system in 2016. An environmental protection law was adopted in 2014, and a climate change law is being drafted and according to plan will be adopted in 2015.

### *Latin America*

Several Latin American countries have confirmed that they will submit INDCs in 2015 as a contribution to the Paris agreement: Brazil, Peru, Colombia, Chile, Costa Rica and Mexico. Some of them have introduced new climate policy instruments in recent years, for example climate change legislation in Mexico and a carbon tax in Chile.

### *Africa and Asia*

Indonesia, one of the largest emitters in Africa and Asia (excepting China), has confirmed that it will submit an INDC. Up to 2020, Indonesia has a target of reducing emissions by 26 % from 'business-as-usual' levels. India is also preparing a submission. South Africa is planning to submit an emission target, probably based on its current target of an emissions trajectory that peaks at 34 % below a 'business as usual' trajectory in 2020 and 40 % in 2025. Several other African countries, including some of the poorest countries, have also indicated that they will submit INDCs.

## 3 Norway's level of ambition and submission of its INDC to the UN

### 3.1 Norway's intended nationally determined contribution for 2030

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*During the first quarter of 2015, the Government will submit an independent intended nationally determined contribution (INDC) for Norway to the UN Framework Convention on Climate Change, including the following elements:*

- Norway will conditionally undertake a commitment to reduce its emissions by at least 40 % by 2030 compared with the 1990 level.
- Norway will enter into a dialogue on joint fulfilment of its climate commitment together with the EU, with an emission reduction target of at least 40 % in 2030 compared with the 1990 level. In the period up to the Paris conference, Norway will work towards a letter of intent with the EU on joint fulfilment of this commitment.

*An agreement on joint fulfilment with the EU would involve the following:*

- In sectors covered by the EU emissions trading system (EU ETS), Norway would contribute to emission reductions of 43 % compared with 2005 through its participation in the EU ETS.
- Norway would also contribute to emission reductions in non-ETS sectors by setting a national emission target for these sectors in line with comparable EU countries.
- For non-ETS sectors, flexibility within the EU system will make it possible to achieve some of the cuts through the purchase of EU emission allowances or the implementation of measures in other EU countries. Norway would make use of this flexibility on the same lines as EU member states.

### 3.2 Towards joint fulfilment with the EU

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#### 3.2.1 The substance of joint fulfilment with the EU

In the Government's view, Norway's emission reduction commitment in the new climate agreement should reflect its close association with the EU on climate issues. The EU has adopted a target of reducing domestic greenhouse gas emissions by at least 40 % below the 1990 level by 2030. This will give an emissions trajectory in line with the two-degree target. Norway's target must be at least as ambitious as the EU's. By adopting a target of a reduction of at least 40 %, which will facilitate joint fulfilment of the commitment, Norway can play a part in strengthening the group of countries that are taking the most ambitious and constructive approach to the climate negotiations.

If joint fulfilment is agreed, Norway will take part in joint efforts with the EU to achieve the target of reducing greenhouse gas emissions by at least 40 %. These efforts will be based on the allocation of reductions between the ETS and non-ETS sectors adopted by the EU, in other words emission reductions in the ETS sector of 43 %, and emission reductions of 30 % in the non-ETS sectors, both relative to 2005.

The EU intends to achieve these targets entirely through emission reductions within the EU. If joint fulfilment is agreed, Norway will also be restricted to implementing emission reductions within the EU and Norway, but will be able to make use of the same flexibility as EU member states through participation in the EU ETS and the flexibility the EU intends to provide for cuts in the non-ETS sectors.

About half of all Norway's emissions are included in the EU ETS. With an agreement on joint fulfilment, the harmonisation with the EU ETS that has already taken place would continue for the ETS sectors in Norway. The EU ETS produces real and verifiable emission reductions.

Norway incurs costs by participating in emissions trading, but is at the same time contributing to emission cuts within the system. If Norway fulfils its emission reduction commitment jointly with the EU, Norwegian companies will deliver overall emission reductions of 43 % together with companies in EU member states. The cuts will be made in the sectors and countries where the costs of reducing emissions are lowest. The crucial requirement is to ensure compliance with the emission ceiling at European level.

Norwegian emissions in non-ETS sectors would also be included in an agreement with the EU on joint fulfilment. Norway will set a target for 2030 for its domestic emissions in non-ETS sectors. This is expected to be set on the same basis as the targets for EU member states, and after negotiations with the EU. For Norway, a target for the non-ETS sectors will be conditional on opportunities for flexible implementation in line with those available to EU member states (see the description of the EU commitment for 2030 in Chapter 2.3). The EU is expected to reach a decision on how emission reductions in non-ETS sectors are to be shared between member states (effort sharing) in 2016.

### **3.2.2 Background for a joint solution with the EU**

Both Norway and the EU are giving high priority to climate policy, and consider the implementation of climate policy measures to be part of a long-term transition to a low-emission society. Norway's objective is to be a low-emission society in 2050. The present Government has followed this up by strengthening the national cross-party agreement on climate policy. In its roadmap for 2050, the EU has set out its ambition for the transition to a competitive and cost-effective low-carbon economy in 2050. The EU views investment in green technologies and green employment as a cost-effective strategy for strengthening the economy, creating new jobs and making Europe more competitive. The EU also points out that although taking steps to curb climate change has economic costs, the long-term costs of not acting will be far higher.

Norway thus shares many of the EU's views on the climate-related challenges we are facing. Dealing with global climate and environmental problems will require a process of social transformation so that growth and development take place within safe ecological limits. There must be a transition to products and services that have considerably less negative environmental and climate

impact than those in use today. A 'green shift' will be demanding but possible – but it must be a global shift. Today's globalised economy sets the overall framework for social and industrial development, policy development and the use of public policy instruments. By delivering its commitment jointly with the EU, Norway would be able to draw on a wider range of experience and cooperate more closely on the transition to a low-emission society. Joint solutions and joint markets would make the transition easier. This solution would also link Norway more closely to the EU, which is our most important trade partner.

To reduce global emissions in line with the two-degree target, it is necessary to put a price on emissions. Norway has for a number of years been cooperating closely with the EU on good, effective solutions, including the establishment and development of international markets for emissions trading. This approach has been supported by changing governments, with broad-based support in the Storting. The establishment of the EU ETS made the EU a pioneer in putting market solutions into practice and thus creating long-term economic incentives for a transition to low-emission solutions. With its strict monitoring, reporting and verification requirements, the EU ETS provides an international standard for best practices in emissions trading, combining cost-effectiveness with verifiable cuts in emissions. This is important in the transitional phase we are entering at international level, before all countries have undertaken commitments in a new climate agreement.

By forging closer ties with the EU, Norway will contribute to the wider international cooperation on global climate solutions. The EU ETS is the key tool for achieving the EU's climate target. An emissions trading system is both cost-effective and efficient, since it ensures emission cuts at the lowest possible price. The EU ETS maintains high standards and has strict requirements to ensure that emission allowances represent real emission reductions. Although emissions trading schemes are becoming more widespread, and there are moves to link a number of them together, there is a long way to go before there is a single global carbon price. Given the current uncertainty about developments in international carbon markets, developing closer ties to the EU in international climate policy could help to set a standard for effective ways of cooperating to reduce emissions. This would provide a firmer basis for wider climate cooperation and an example of how regional cooperation can be used to make progress

towards global climate targets. Cooperation could subsequently be expanded to the global level. A joint solution for the EU and Norway would be a positive step in international climate cooperation, making it easier for countries to take part in international emission trading systems and facilitating cost-effective implementation of mitigation commitments between countries.

Norway is a small open economy, which benefits from equal framework conditions internationally. An agreement on joint fulfilment with the EU could open up more opportunities for Norwegian companies that are able to provide innovative solutions for the green shift in the economy that has begun both in the EU and in Norway. The EU's provision for the use of flexible mechanisms internally (see Chapter 2.3) may be instrumental in making carbon prices more uniform within the geographical area to which the joint commitment applies.

### 3.2.3 Developing an agreement with the EU

The Government wishes Norway to enter into a dialogue with the EU, with a view to concluding an agreement on joint fulfilment of a climate commitment with an emission reduction target of at least 40 % in 2030 compared with the 1990 level. It is essential for Norway that any such agreement is not incorporated into the EEA Agreement, but is negotiated as a bilateral agreement between Norway and the EU. Moreover, Norway must not automatically be bound by other targets and legislation in the climate and energy field beyond what follows from the EEA Agreement and the agreement on joint fulfilment with the EU. Since Norway already participates fully in the EU ETS through the EEA Agreement, it is particularly questions relating to emission reductions in non-ETS sectors and to access to flexible implementation that must be resolved. The Government will emphasise the importance of ensuring equitable conditions for Norwegian and EU companies.

In the period up to the Paris conference, Norway will work towards a letter of intent with the EU on joint fulfilment of an emission reduction commitment in accordance with the provisions of the Climate Change Convention. The Convention encourages cooperative efforts to address climate change.

Although it should be possible to sign a letter of intent with the EU on joint fulfilment relatively quickly, it may take some time before an agreement can be finalised. The EU's own time frame for following up the 2030 policy framework for climate and energy must be taken into account, and

a number of decisions will not be made until 2016. Because of this, and to take into account the possibility that negotiations with the EU may not be successful, it is necessary for Norway to submit an independent INDC to the UN Framework Convention on Climate Change by the first quarter of 2015. The Government will keep the Storting informed in an appropriate way about progress in the negotiations with the EU.

### 3.3 Norway's commitment without an agreement with the EU

In the Government's view, an agreement on joint fulfilment with the EU would be the best solution. If an agreement with the EU is not reached, the Government will maintain the ambition of reducing emissions by at least 40 % by 2030 compared with 1990. This target will be conditional on the availability of flexible mechanisms under the new climate agreement and on Norway being credited for participation in the EU ETS, so that this counts towards fulfilment of the commitment. In order to retain the same ambition level, Norway will need to be able to make use of flexible mechanisms at international level, in line with the flexibility EU member states will enjoy in achieving their targets within the EU system. The EU's allocation of emission targets for the non-ETS sectors in member states and how flexible mechanisms can be used will be clarified as the EU continues its work on the climate and energy policy framework. Decisions are expected in the course of 2016. If Norway does not conclude an agreement with the EU, the Government will consult the Storting at a later date on the determination of a national target for the non-ETS sector.

About half of all Norway's emissions will still be included in the EU ETS. By participating in the system, Norway is taking responsibility for managing emissions from ETS sectors. The Government is seeking to ensure that Norway is credited for a reasonable proportion of the emission reductions resulting from its participation in the EU ETS. The European Commission has expressed its understanding of the matter and is prepared to find a solution. The way Norway is meeting its commitment under the Kyoto Protocol provides a model for how this could be done. For the period 2008–12, a solution was found that provided a link between the EU ETS operating at company level and the EU's and Norway's Kyoto commitments at country level. Norway is discussing a solution for the current period (2013–20) with the EU. We

do not expect a common international emission allowance to be established in the new climate agreement, and Norway and the EU must therefore find independent solutions. A system for crediting Norway's participation in the EU ETS must ensure that an emission allowance is credited either to the EU or to Norway and is not counted twice. In addition, we must ensure that all emissions are accounted for; in other words, that the emission allowances in the system cover all emissions in ETS sectors.

If no agreement on joint fulfilment is reached with the EU, Norway will not be able to make use of the flexibility the EU system provides for emission reductions in non-ETS sectors. It is therefore important for Norway that a new climate agreement makes good provision for the use of flexible mechanisms, because the costs of emission reduction measures are currently higher in Norway than in many other countries. See Box 2.3 for a description of flexible implementation mechanisms.

### **3.4 Inclusion of forest and other land categories in Norway's INDC**

*The Government will use the following as a basis for a predictable, long-term approach to the inclusion of emissions and removals from the land sector (forest and other land categories) in a new emission reduction commitment for 2030.*

- The accounting approach chosen for removals and emissions from the land sector will not affect the level of ambition for 2030 when forest is not included.
- The approach taken will ensure that there are incentives for new mitigation action in the land sector.
- When Norway submits its INDC during the first quarter of 2015, the treatment of the land sector will be described on the basis of a model where net removals by the sector can be accounted for, using 1990 as the base year. The INDC will make it clear that Norway has not yet taken a definitive position on the accounting rules for the land sector.
- In the negotiations on the new climate agreement, Norway will work towards a land-based approach to treatment of the land sector and a common framework for all countries.
- Norway will clearly indicate to the UNFCCC its position that it should not be credited or penalised for changes resulting from improvements in the methodology for calculating emissions and removals.

- Norway will keep open the option of using the Kyoto accounting rules for natural disturbances and carbon storage in harvested wood products.

The accounting approach for emissions and removals in the land sector in Norway's commitment under the new climate agreement will need to be clarified. It is not yet clear how the EU will include the land sector in its 2030 target. In its negotiations on an agreement with the EU, Norway will work on the principle that the choice of accounting approach for emissions and removals from the land sector should not affect the level of ambition, and that the accounting rules must ensure that there are incentives for new climate action in the land sector, in line with the two-degree target, see Chapter 2.2.2. At the same time, information must be provided on what this entails for Norway's INDC.

In its submission to the UNFCCC and in communications with the EU, Norway will describe the treatment of the land sector using a model that corrects for the difference between net removals in 1990 and the projected figure for the target year. 1990 is also the base year for other sectors. In 1990, net removals in the land sector totalled 10.4 million tonnes CO<sub>2</sub>-eq, while the projected figure for the target year 2030 is 21.2 million CO<sub>2</sub>-eq. The difference to be accounted for is 11.1 million tonnes CO<sub>2</sub>-eq. To ensure that this approach does not affect the level of ambition, Norway's overall emission reduction commitment must be adjusted by the same amount (i.e. 11.1 million tonnes). New action that could be taken in the land sector in order to achieve Norway's commitment could include reducing deforestation, afforestation, fertilisation, increasing plant density and plant breeding.

An approach of this kind when Norway submits its INDC in the first quarter will provide the necessary clarity about what the INDC includes and demonstrate the principles Norway will follow in working towards a common framework for all countries. Norway has not yet taken a definitive position on how the accounting rules should be formulated.

In order to provide incentives for new action in the land sector and at the same time maintain incentives for action in other sectors, the largest possible proportion of sources of emissions and removals and changes in carbon stocks should be included in the target. Norway will work towards a land-based approach including all emissions and removals from the different land categories – for

est land, cropland, grassland, wetlands, settlements and other lands. This expands coverage beyond what has been included until now under the Kyoto Protocol. A system that includes all land categories would also prevent carbon 'leakage' through increased emissions or reduced removals from other land categories, and avoid a situation where countries make strategic choices about which emission sources or carbon sinks to include in their commitments. A land-based approach also gives a good basis for assessing impacts on biodiversity, because these are often related to land-use changes. Moreover, a land-based approach would provide a useful signal in the climate negotiations, as it would harmonise with possible common approaches under the new climate agreement. This is the generally required approach under the Convention and is used in international efforts to reduce emissions from deforestation and forest degradation (REDD+).

One of the factors that makes it complicated to account for emissions and removals from forest is that there are annual variations in net removals. These arise because of seasonal variations, and even more because of variations in timber harvesting. Part of the resulting uncertainty is dealt with by expressing Norway's emission reduction commitment in the form of an emission budget covering several years, to smooth out annual variations. Uncertainty in the estimates of emissions and removals from forest has been reduced considerably in recent years and is now no higher than for certain other sources. It is important to ensure that countries are not penalised for introducing improved methodology, and that recalculations are made for whole time series for emissions and removals from forest and other land categories. Natural disturbances (fire, storms, etc.) have so far been of little significance for removals in forest in Norway. However, a changing climate will entail a higher risk that extreme weather events and forest fires will have greater consequences. To deal with unforeseen events that may make it difficult to achieve its commitment, Norway should indicate that it will keep open the option of using the Kyoto accounting rules for natural disturbances that were negotiated for the second commitment period under the protocol.

### **3.5 A fair and ambitious contribution**

Norway's climate policy is based on the agreements on climate policy adopted by most of the parties in the Storting in 2008 and 2012. These

cross-party agreements include targets for emission reductions by 2020, including targets for national emission reductions and a long-term goal for Norway's transition to a low-emission society.

One of Norway's targets is to achieve carbon neutrality in 2050. This means that Norway would have to reduce emissions by the equivalent of 100 % of its own emissions by 2050. If an ambitious global climate agreement is achieved under which other developed countries also take on extensive obligations, Norway will undertake to achieve carbon neutrality by 2030 at the latest. These targets have been communicated to the Climate Change Convention and continue to apply.

At the Lima climate conference in 2014, it was decided that each country's intended nationally determined contribution was to represent a progression beyond its current undertaking. Countries were also encouraged to provide information on how they consider their contributions to be fair and ambitious, and how they contribute towards achieving the overall objective of the Convention, to prevent dangerous anthropogenic interference with the climate system.

In the second commitment period under the Kyoto Protocol (2013–20), Norway has undertaken to achieve emission reductions corresponding to a reduction of its domestic emissions to 84 % of the 1990 level. This is in line with Norway's target of reducing global greenhouse gas emissions by the equivalent of 30 % of its own 1990 emissions by 2020. Norway has also undertaken to increase its emission reductions to 40 % by 2020 compared with the 1990 level if this can contribute to agreement on an ambitious global climate regime that includes emission commitments on the part of the major emitters. Norway's new emission reduction commitment represents a progression beyond these undertakings.

The Government considers Norway's contribution to be both fair and ambitious. The starting point was that Norway's contribution must be in line with an emission trajectory consistent with the two-degree target, both up to 2030 and up to 2050. The target of cutting emissions by at least 40 % by 2030 is in line with this. Norway will not be alone in taking this approach. The EU target of reducing emissions by at least 40 % in 2030 compared with 1990 also gives an emission trajectory in line with the two-degree target.

Cutting emissions by 40 % will be a more demanding task for Norway than for the EU. There are several reasons for this.

Norway has been experiencing much stronger population growth than the EU, and population

growth is expected to be higher in Norway in the years ahead as well. Seen in isolation, a growing population will tend to lead to higher emissions in Norway, and make it more difficult to reduce emissions, particularly from the transport sector.

Norway has been applying climate policy instruments effectively for many years. The carbon tax was proposed by the Syse Government as early as 1990 and was introduced the following year. More than 80 % of Norway's emissions are either in the ETS sector or subject to the carbon tax or both. The tax rates are also relatively high.

Norway has made use of stronger policy instruments than the EU average in non-ETS sectors. Vehicle taxes have been actively used for many years with the aim of ensuring that Norway's vehicle stock is as environmentally sound and energy efficient as possible. Norway introduced taxes on waste with an effect on greenhouse gas emissions at a fairly early date. These taxes have now been phased out, but Norway has prohibited landfilling of biologically degradable waste since 2009.

Within the EU, heating of buildings is a substantial source of emissions outside the ETS sector. In Norway, on the other hand, buildings are generally heated using renewable energy. Energy efficiency measures and phasing out the use of fossil energy carriers in buildings are often fairly low-cost measures, but will not result in large emission cuts in Norway. This means that the potential for emission reductions in non-ETS sectors is more limited than in the EU.

Despite the effective application of climate policy instruments, Norway's greenhouse gas emissions have risen by 3.7 % in the period 1990–2013. In the same period, the EU's emissions have been reduced by about 19 %. Norway will therefore have to make considerably greater reductions than the EU relative to current emission levels in order to achieve the target of a 40 % reduction in emissions by 2030 compared with the 1990 level. There are also important differences between Norway and the EU in non-ETS sectors. It is estimated that if the use of policy instruments remains unchanged in the EU, emissions from non-ETS sectors will be reduced by 20 % from 2005 to 2030. For Norway, the corresponding reduction is estimated at only 2 %. Costs are also higher in Norway than in the EU, making it more expensive to carry out emission abatement measures.

Differences between Norway and the EU in industrial structure were one reason why Norway's commitment for the first Kyoto period was a 1 % rise in emissions from 1990, while the EU's

commitment was a reduction of 8 %. A study by Statistics Norway estimates that given a carbon price path in line with the two-degree target, the percentage reduction in emissions in 2030 would be about twice as large in the EU as in Norway.

### **3.6 Submission of Norway's INDC to the UN**

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The Government's dialogue with the EU on joint fulfilment of a climate commitment will not be concluded before the time limit for submitting INDCs to the UN, which is 31 March 2015. The Government therefore proposes that Norway should submit a conditional intended nationally determined contribution with a target of reducing emissions by at least 40 % by 2030 relative to the 1990 level. The submission should also include the information that Norway is negotiating an agreement on joint fulfilment with the EU. It should emphasise that in seeking an agreement on joint fulfilment, Norway intends to maintain its overall level of ambition, and that the information provided may be adjusted in accordance with the final agreement with the EU.

According to the 2014 Revised National Budget, Norway's main methodological approach when developing Norway's commitment will be to use an emission budget expressing Norway's commitment as emissions in millions of tonnes of CO<sub>2</sub> equivalents for the whole period. Commitments under the Kyoto Protocol have been expressed in this way. Converting Norway's level of ambition expressed as a percentage of its emissions to an emission budget in tonnes will facilitate implementation in the most flexible and effective way possible. The EU also intends to draw up an emission budget for the period 2021–30. If an agreement on joint fulfilment with the EU is concluded, Norway's final emission budget must be drawn up in conjunction with this agreement.

In order to evaluate the effect of the new climate agreement, it will be necessary to have sufficient and comparable information on the various countries' INDCs. Decisions adopted under the Climate Change Convention provide some guidance on what information should be provided. INDCs should contribute towards the Convention's overall objective of stabilising greenhouse gas concentrations in the atmosphere. Countries have also been asked to provide sufficient information to facilitate clarity, transparency and understanding of their contributions. At the Lima climate conference in Decem-

ber 2014, it was decided that this may include information that makes it possible to quantify the effect on emissions. Types of information that are mentioned include the reference point or base year, time frames and/or periods for implementation, scope and coverage, and the assumptions and methodological approaches on which the INDC is based.

Norway will follow this guidance when it submits its INDC in the first quarter of 2015, and will include both technical information to ensure that the emission target itself is quantifiable and comparable, and information explaining the emission target.

Norway's submission will include the points below. In areas where further clarification will need to be arrived at through the negotiations with the EU on joint fulfilment, the necessary provisos must be included.

- Information on the greenhouse gases and sources covered, including a statement that all emission sources and removals on Norwegian territory including Svalbard are covered.
- A preliminary description of how emissions and removals and changes in the carbon stocks in forest and other land categories are included

in Norway's INDC (see Chapter 3.4). This will need to be conditional on the outcome of the negotiations with the EU.

- The time frame for the commitment, the base year that is used for the emission reduction level and the period to which the emission target applies.
- Information on the use of IPCC methodology for the emission inventory and for conversion factors for different greenhouse gases so that figures can be compared.
- Other clarifications or conditions, such as conditions relating to emissions trading and the use of flexible mechanisms.

The submission to the Climate Change Convention will include a general proviso that if future developments of the rules make it impossible for Norway to fulfil its commitment as intended, it may be necessary to review the commitment. The submission will also explain the grounds for Norway's INDC, with an account of existing policy instruments, emission trends and the potential for emission reductions, and will contain a general description of current political initiatives for reducing emissions.

## 4 Norwegian climate policy

- The Government will continue to pursue an ambitious national climate policy.
- The Government will take steps to reduce Norway's domestic emissions in the period up to 2030.
- The Government's long-term objective is for Norway to become a low-emission society by 2050.

### 4.1 Emission trends

In 2013, Norway's greenhouse gas emissions totalled 53.9 million CO<sub>2</sub> equivalents (CO<sub>2</sub>-eq). This corresponds to 0.1 % of global emissions when removals in forest and other land categories are excluded. With the exception of 2009, when emissions were lower as a result of the downturn in economic activity, this was the lowest level since 1995. Since 2010, there has been a drop in emissions each year. Nevertheless, emissions in 2013 were 3.7 % above the 1990 level. In 2013, industrial processes accounted for 22.5 % of Norway's emissions. Emissions from industrial processes have been substantially reduced since 1990, partly as a result of the introduction of emission abatement technology. The oil and gas industry accounted for 26 % of Norway's total emissions in 2013. There has been a rise in emissions from the industry, partly because more fields are now producing.

The transport sector accounted for 32 % of Norway's emissions in 2013, or 26 % if fishing activities and non-road mobile machinery are excluded. Emissions from the transport sector rose by 27 % from 1990 to 2007 but have remained stable since then despite rising traffic volumes. This is explained by lower emissions from new vehicles and increasing use of biofuels. The drop in emissions from new vehicles is only partly due to technological advances; other factors involved are restructuring of vehicle taxes to improve their environmental profile, and considerable tax and user benefits for electric vehicles.

Future emission trends will depend on a number of factors including technological developments, population trends, economic developments and the policy instruments used. The emission projections are based on the assumption that there will be general technological advances in all sectors.

Table 4.1 shows projections of Norwegian emissions up to 2030.

### 4.2 Current policy instruments

The Government's policy is based on the updated cross-party agreement on climate policy (published in a recommendation to the Storting, Innst. 390 S (2011–2012)), and the strengthening of this agreement announced in its policy platform. Nor-

Table 4.1 Norway's historical greenhouse gas emissions<sup>1</sup> and emission projections up to 2030 for the ETS and non-ETS sectors. From the 2015 national budget (using updated values for global warming potential (GWP)).

Emissions (million tonnes CO <sub>2</sub> -eq)	1990	2005	2020	2030
ETS sector <sup>2</sup>	23.1	27.4	26.5	24.9
Non-ETS sectors	28.8	28.0	28.1	27.3
Sum	52.0	55.5	54.6	52.3

<sup>1</sup> Does not include land use, land use change and forestry.

<sup>2</sup> Domestic air traffic is partly included in the ETS sector.

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

way's domestic greenhouse gas emissions are to be reduced in the period up to 2030, and the Government's long-term objective is for Norway to become a low-emission society by 2050. During this transition, it is important to make use of new opportunities for industrial development and to build green competitiveness.

The main instruments of Norwegian climate policy are taxes and participation in the EU emissions trading system (ETS), which are cross-sectoral economic instruments. More than 80 % of Norway's emissions are either in the ETS sector or subject to the carbon tax. A carbon tax was proposed by the Syse Government as early as 1990 and was introduced the following year. Policy instruments used in addition to taxation and emissions trading are direct regulation, standards, agreements and grants for emission reduction measures. Norway is among the countries with the highest levels of greenhouse gas emission efficiency, in other words where emissions per unit of GDP are lowest.

Norway's climate policy results in considerable reductions in domestic greenhouse gas emissions. Norway's most recent communication to the UN Climate Change Convention includes estimates of the substantial effect of Norway's actions on the level of emissions. The report estimates was estimated that in 2010, greenhouse gas emissions were about 13–15 million tonnes CO<sub>2</sub>-eq lower than they would have been without any of these actions, and that in 2020, emissions will be 17–20 million tonnes CO<sub>2</sub>-eq lower than they would have been without these actions.

The Government will continue to pursue an ambitious national climate policy that will reduce domestic emissions by 2030 and contribute to achieving the long-term objective that Norway is to be a low-emission society by 2050. Steps to strengthen climate policy instruments are being taken, including the establishment of a green tax commission, the Government's carbon capture and storage (CCS) strategy, which was set out in the Ministry of Petroleum and Energy's budget proposal for 2015 (Prop. 1 S (2014–2015)), a comprehensive review of vehicle taxes and updating of the National Transport Plan.

A good many policy instruments and measures intended to reduce greenhouse gas emissions from the transport sector are already in place, some of them introduced in the 2015 budget. The effects of a number of them may increase over time, because they provide incentives to develop new technologies and to choose low-emission technologies. The system for calcu-

lating purchase tax on vehicles was altered in 2007 to encourage people to choose vehicles with low greenhouse gas emissions. This has been successful: average CO<sub>2</sub> emissions from new passenger cars have been reduced by almost 40 % from 2006 to 2014.

The Government is giving priority to railway operation and maintenance. The 2015 budget will reduce the maintenance backlog in the railway system, which should improve punctuality and reliability and encourage the transfer of goods from road to rail. Services are also being improved by increasing capacity along several stretches of railway and increasing the number of intercity rush-hour departures. This will encourage more people to use the railways.

Aviation is partly included in the ETS sector, and domestic aviation in Norway is also subject to the carbon tax. In the 2015 budget, the carbon tax for domestic aviation in the ETS sector has been increased by almost 85 % in real terms.

The renewable transport fuel obligation for road transport is instrumental in reducing emissions, provided that the biofuels meet satisfactory sustainability criteria. In connection with the 2015 budget, the Storting has decided to increase the obligation from 3.5 % to 5.5 % biofuel from 1 July 2015. At the same time, the Storting asked the Government to put forward a proposal in the 2015 Revised National Budget to exempt biodiesel from the road use duty on fuels and introduce road use duty at half the normal rate for low-level bioethanol blends. The Storting asked the Government to take particular account of the consequences for EEA law and the fiscal, environmental and financial consequences of the changes. The 2015 budget introduced a larger deduction from the purchase tax for rechargeable hybrid vehicles than previously. In connection with the 2015 budget agreement, the Government decided that all future procurement processes for ferries are to include a requirement to use zero-emission technology if this is possible given the maturity of the technology.

The Government presented its national biogas strategy in autumn 2014. This includes the establishment of a pilot plant and research on biogas. NOK 10 million has been allocated to the strategy in the budget. Since the strategy was presented, it has been decided to introduce road use duty on natural gas and LPG, which will improve the profitability of biogas relative to natural gas.

Under the cross-party agreement on climate policy, there is agreement that the use of fossil fuel oils to provide base-load capacity is to be phased

out in all central government buildings by the end of 2018. The Government wishes to strengthen the cross-party agreement, and intends to phase out the use of oil-fired boilers to provide base-load capacity in all properties owned by Statsbygg by the end of 2016. NOK 15 million has been allocated to this work in the 2015 budget.

The state-owned enterprise Enova is responsible for administering important instruments for the transition to a low-emission society in several key emission sectors. The Government has strengthened the cross-party agreement on climate policy by increasing allocations to the Green Fund for Climate, Renewable Energy and Energy Efficiency Measures and thus increasing support for energy and climate technology. The fund's capital is being increased by NOK 9.25 million each year in 2014, 2015 and 2016. Enova's grant scheme for energy efficiency measures in private households has been reorganised and expanded.

Action to increase carbon stocks in and reduce emissions from forest and other land categories as part of a more active forest and land use policy will also play a part in achieving a new Norwegian emission reduction commitment. Increasing the use of bioresources to replace fossil fuels and emission-intensive materials will also make an important contribution to the transition to a low-emission society. In the 2015 budget, NOK 15 million has been allocated to a pilot project for afforestation of new areas.

Some types of mitigation action have positive effects beyond the reduction of greenhouse gas

emissions. Measures such as including reducing the use of fuel oils to heat buildings, steps to increase the proportion of electric vehicles increasing the walking and cycling as a proportion transport also reduce air pollution by cutting emissions of pollutants including sulphur dioxide, particulate matter and nitrogen oxides. This reduces acidification and has a positive impact on health.

### 4.3 Trends in forest in Norway

Based on figures for 2012, which at the time of publication are the most updated emission inventory figures, total net removals from the land sector as a whole were 26.7 million tonnes CO<sub>2</sub>-eq, largely due to the net increment in forest. Emissions from other sectors in 2012 totalled 52.7 million tonnes CO<sub>2</sub>-eq. In other words, net removals from the land sector currently correspond to about 50 % of emissions from other sectors. The main factors affecting the volume of removals are age structure, the level of harvesting and natural losses (for example through fire, insects and storms). Age structure influences the level of removals because trees that are approaching harvesting age absorb more carbon than younger saplings; this effect is not a result of forest policy. The annual increment has shown a rising trend in Norway, while the annual harvest has been relatively stable at a lower level than the increment. The high level of net removals in forest is a result of the low harvest level combined with active

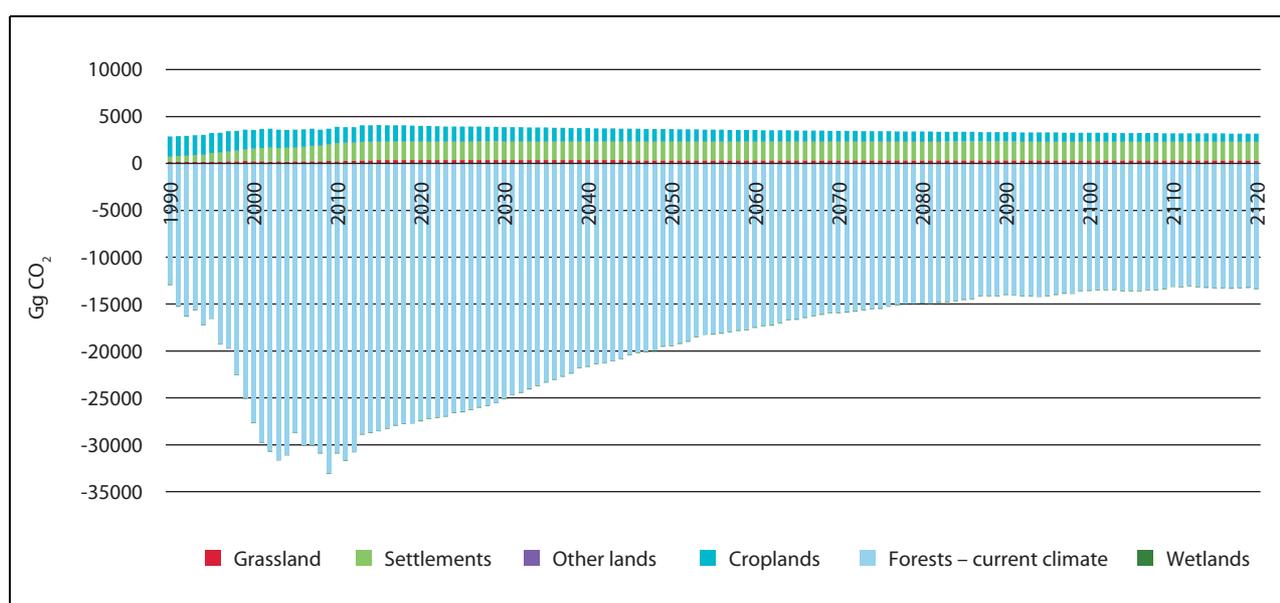


Figure 4.1 Emissions and removals in forest and other land categories in Norway, 1990–2120

Source: Norwegian Forest and Landscape Institute

afforestation since the Second World War. The net increment is expected to decline up to 2100, but will remain positive, thus increasing the carbon stock in forest (see Figure 4.1). The projected decline in net increment is explained by a combination of an increase in harvesting as more forest reaches the right age, a changing age structure, and a low level of investment in forest production in recent years. In the longer term, it will be possible to slow the downward trend by introducing new forest management practices and through targeted mitigation measures in the land sector.

The Government will give more weight to climate policy goals in the management of Norwegian forests. To secure a transition to a low-emission society, both in Norway and in other countries, CO<sub>2</sub> removals in forest and other land categories that are not a result of new action must be additional to and not replace emission reductions in other sectors. New action should be considered, including measures designed to maintain or increase the carbon stock in forest, and measures to allow the replacement of more emission-intensive materials with wood and fossil energy with renewable bioenergy. The Government also intends to take steps to increase the timber harvest.

#### **4.4 Priority areas**

*The priority areas of the Government's climate policy will be as follows:*

- reduction of emissions from the transport sector;
- development of low-emission industrial technology and clean production technology;
- carbon capture and storage;
- strengthening Norway's role as a supplier of renewable energy;
- environmentally sound shipping.

##### **4.4.1 Introduction**

The updated cross-party agreement on climate policy from 2012 states that Norway's climate policy must be designed to give the greatest possible emission reductions relative to the resources used and to give substantial cuts in emissions both in Norway and abroad. The parties agree that general policy instruments are a central element of domestic climate policy. Cross-sectoral economic instruments form the basis for decentralised, cost-effective and well-informed measures to ensure that the polluter pays. The parties agree that fur-

ther regulation should as a general rule be avoided in areas that are already regulated by means of general policy instruments. However, the possibility of using other policy instruments in addition to emissions trading and taxes should be retained in these sectors too. For example, the development of new technology in Norway can help to speed up the shift to more climate friendly technology. The agreement states that the implementation of measures that will be cost effective with a projected rise in the price on emissions of greenhouse gases over the lifetime of the investment, and that will not necessarily be implemented in response to current policy instruments, should be considered in particular. This applies especially to measures that promote technological developments and measures to encourage the population as a whole to speed up the changeover to a low-emission consumption pattern.

Many long-term investments in infrastructure are not made primarily for the purpose of reducing greenhouse gas emissions. Nevertheless, in many ways infrastructure determines the framework for emission trends and what mitigation action can be taken. The IPCC emphasises the importance of avoiding lock-in to carbon-intensive technology or infrastructures in connection with new investments. Deep cuts in emissions will require major changes in investment patterns in the world.

The development of low-emission technology will be of crucial importance for the world's chances of achieving the two-degree target. Although Norway is putting considerable resources into the development of new climate-friendly technology, we are also dependent on technological advances in other countries to achieve substantial cuts in emissions. The costs of a technology drop once some actors have led the way in its use, as a result of wider deployment and learning effects. Economies of scale also come into play. The real challenge in phasing in new technologies is to cross a critical threshold – from a situation where a lack of experience and limited deployment keep prices high, to one where market forces start to drive the deployment of the technology. For climate-friendly technology to be developed and deployed, it must give returns. This is why it is essential to put a price on emissions. At present, only about 10 % of global emissions have a price.

The Government will strengthen the research effort and environmental technology initiatives. The aim is to provide a basis for new industrial development and a forward-looking

business sector. The priority areas of Norwegian climate policy are discussed below. In these areas, Norway can play a part in developing solutions that can be used to reduce emissions both in Norway and in other countries. The Government will submit proposals for new measures, including assessments of their cost and effectiveness, to the Storting at a later date, including in the annual budgets.

#### **4.4.2 Reduction of emissions from the transport sector**

Greenhouse gas emissions from the transport sector can be reduced by shifting to modes of transport with lower emissions, by taking steps to reduce transport needs, and by reducing emissions from specific means of transport. The Government will take steps to encourage more people to meet their everyday transport needs by using public transport, walking and cycling. This means that residential areas and areas where people work need to be developed to ensure efficient land-use and siting of functions, flexible and effective transport solutions, and environmentally sound energy use.

Norway's rolling National Transport Plan includes assessments of how policy instruments can be used to achieve different transport policy goals and play a part in resolving major social issues such as climate change. The guidelines for the transport authorities and Avinor in the analytical and strategic phase of the plan for the next period state that the analyses are, wherever relevant, to describe what will be needed to achieve the target of Norway's transition to a low-emission society by 2050.

The report from this phase of the work is to be submitted in February 2015, and will form part of the basis for developing guidelines for the planning phase for the National Transport Plan. It will be natural for these guidelines to include a request for supplementary analyses of action in the transport sector to reduce greenhouse gas emissions, so that the basis for drawing up the plan is as good as possible.

Achieving large cuts in greenhouse gas emissions from the transport sector will require major technological advances internationally. There is no car manufacturing in Norway, but it is still possible to make a contribution to technological developments, for example by supporting research and development. Norway generally makes effective use of policy instruments, thus providing incentives for a switch from fossil to

renewable energy. A number of policy instruments for reducing greenhouse gas emissions from the transport sector are already in place, and more are being introduced as a result of budget decisions for 2015 and the Government's action plan for public transport. The Ministry of Transport and Communications will continue implementation of the action plan, for example by promoting the provision of park-and-ride facilities at railway and express bus stations.

Vehicle taxes are helping to make Norway's vehicle stock more environmentally and climate friendly, since tax levels are low for zero-emission vehicles, plug-in hybrids and other greener vehicle types than for similar vehicles that use fossil fuel. The Government has announced that it will present a complete review of vehicle taxes in the 2015 Revised National Budget, with a view to making changes that will encourage the use of new technology, make the vehicle stock safer and encourage greener choices.

It is important to continue to encourage people to choose low-emission vehicles. Technological developments are rapid, and Norway must use policy instruments that give people financial incentives for making climate-friendly choices. It is essential to provide a predictable framework for consumers and the business sector. The Storting has pointed out that shifting goods transport from road to sea and rail will have important effects. These effects must be considered in conjunction with the new National Transport Plan and other policy instruments.

Biofuels can make a contribution to reductions in greenhouse gas emissions provided that they meet satisfactory sustainability criteria.

In 2015, the Government will start negotiating urban environment agreements for the nine largest urban areas in Norway. As more people move to the towns, there is a growing need to develop environmentally sound transport infrastructure, but urbanisation also makes it possible to provide more cost-effective public transport. There is now a government investment grant scheme for important public transport projects. In addition, facilities for pedestrians and cyclists need to be considerably improved, and it must also be possible to make use of restrictive measures.

Patterns of development of service functions, homes, workplaces and infrastructure have a strong influence on the options available for meeting transport needs, and thus on local emission levels. Climate change considerations must be given considerable weight in land-use and transport planning, so that development patterns and

**Box 4.1 New guidelines for forward-looking planning**

Norway needs to develop compact towns and urban areas where there are short distances between the different activities people engage in. This will reduce transport needs, provide a better basis for public transport, cycling and walking, and make it easier for people to choose not to use the car. In the years ahead, the population is expected to grow rapidly in and around Norway's largest towns. In Oslo, Bergen, Trondheim and Stavanger, the population is expected to rise by about 30 % by 2030. The population is growing most rapidly in the larger towns and urban areas in other parts of the country too. This is creating a demand for new housing and putting pressure on land and infrastructure, with repercussions for the climate, public health and the environment. It is therefore essential to ensure long-term coordination of urban development patterns and transport systems. In autumn 2014, the Government therefore adopted new central government planning guidelines for coordinated housing, land-use and transport planning. These highlight the need to integrate climate considerations into land-use and transport planning.

transport systems promote the development of compact towns and urban areas, reduce transport needs and promote green forms of transport. When sites for large enterprises, institutions and so on are being chosen, transport options must be considered and given weight. In urban areas and around public transport nodes, there should be a particular emphasis on densification and transformation. It is important to ensure that this is reflected in all the decisions of varying importance that are made about infrastructure, in order to ensure consistency.

**4.4.3 Development of low-emission industrial technology**

Emissions from Norwegian land-based industry have been reduced by the introduction of a range of measures. To reduce emissions further, it will be necessary to develop and deploy new climate-friendly technology. Clean production technology,

technological developments to reduce emissions from cement and fertiliser manufacturing, and technology to reduce process emissions from ferro-alloy and aluminium production will make it possible to bring about emission reductions in Norway and increase production worldwide without a rise in global emissions. Continued research and development and the establishment of pilot plants will be important as a basis for success. Considerable funding is already being made available, for example through Enova's Green Fund for Climate, Renewable Energy and Energy Efficiency Measures.

**4.4.4 Carbon capture and storage**

The importance of carbon capture and storage (CCS) is well documented in reports from the IPCC and the International Energy Agency. According to the IPCC's Fifth Assessment Report, the costs of achieving the two-degree target would rise by 138 % without the use of CCS. The IPCC considers that it will be essential to use CCS to deal with emissions from various industrial sources, such as the manufacture of cement and mineral fertiliser, the chemical industry and electricity production.

The Government's CCS strategy includes a wide range of activities, including research and development, demonstration of technologies for capture, transport and storage of CO<sub>2</sub> and international cooperation. In order for CCS to play an effective role in climate change mitigation, it will be necessary to achieve technological developments, reduce costs and increase the price of greenhouse gas emissions. Projects to demonstrate large-scale capture, transport and storage of CO<sub>2</sub> should be carried out. The first demonstration facilities need to function as suitable reference projects from which as much as possible can be learned and that can promote deployment of the technology. The Government's ambition is the construction of at least one full-scale CCS facility by 2020. Options for full-scale CCS demonstration plants in Norway are being reviewed, and this work will continue. The Government will also consider possibilities for full-scale CCS demonstration projects abroad. The Government is already supporting some projects outside Norway, for example in South Africa and China. The Government's CCS strategy is further discussed in the 2015 budget proposal from the Ministry of Petroleum and Energy.

The policy instruments needed to get CCS projects off the ground must ensure that compa-

nies with the best project ideas are given sufficient incentive to carry them out, without any negative impact on their market position. Research and development work on immature CCS technologies that are of interest to Norwegian companies should be continued and further developed to the pilot stage.

The IPCC's Fifth Assessment Report points out that unless emission cuts of more than 40–70 % are achieved before 2050, CCS based on bio-energy together with other approaches to achieving net negative emissions will be of crucial importance in achieving the two-degree target. The IPCC has also emphasised that there are risks associated with becoming dependent on achieving negative emissions later on, rather than making larger emission cuts at an earlier date. Norway has a limited number of large industrial point sources of emissions, and substantial biomass resources. Norwegian research groups are already collaborating with Norwegian companies on the development of solutions that involve using biofuel in CCS to achieve net negative emissions from industrial plants.

#### **4.4.5 Strengthening Norway's role as a supplier of renewable energy**

A large proportion of greenhouse gas emissions both globally and in Norway is associated with energy production and use. Both energy efficiency measures and the availability of more renewable energy are therefore essential to the transition to a low-emission society. Norway has natural advantages here; it can produce renewable electricity profitably, and in addition, a large proportion of this is flexible production of hydropower. To achieve emission reductions, there must be sufficient renewable energy available to replace fossil energy use. The Nordic electricity market is linked by cables to the rest of Europe, and renewable energy could therefore be used to replace fossil fuels in other parts of Europe, and can make it possible to further develop intermittent renewable energy sources in other countries. The Government has granted licences for the construction of two new electricity interconnectors,

one to Germany and one to the UK. These will make it possible to replace more fossil energy in the rest of Europe with renewable energy from Norway, and will promote green growth in Norway. Further expansion of renewable energy production must also be weighed against the scale of disturbance to the natural environment. It is therefore vital to promote efficient energy use. This can also reduce fossil electricity consumption by permitting more export of renewable electricity to other parts of Europe. Electricity production is included in the EU ETS.

Norway can also play a part in developing new and improved renewable energy technology and advanced biofuels. Avinor has entered into cooperation with the forestry industry on the development of aviation biofuels. Norwegian industry and Norwegian research groups have expertise that can be harnessed to drive technology development.

#### **4.4.6 Environmentally sound shipping**

The Government will pursue a proactive and integrated policy for more climate friendly and environmentally sound maritime transport. The maritime sector is one of Norway's largest industries. Norway plays an active part in negotiating internationally binding climate and environmental rules within the International Maritime Organization (IMO). The Norwegian Maritime Authority plays a key role in this work. Its expertise, innovative potential and environmental technology give the Norwegian maritime industry a competitive edge.

Ships that are under construction now will continue to sail up to about 2050. In other words, the green ships of the future are being built today. Norwegian support schemes and requirements have promoted the development of new technology and encouraged the construction of greener ships for commercial purposes. Norway is already a world leader in gas-powered ships and battery-powered ferries, and Norwegian environmental technology may in future become an important export for the Norwegian maritime industry.

## 5 Economic and administrative consequences

### 5.1 Economic consequences of international climate policy

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A global climate agreement under which major emitters make substantial cuts in their emissions is an essential basis for effective mitigation of climate change. An agreement of this kind will also reduce the costs of loss and damage caused by climate change. For Norway, as a small and open economy, the way climate change influences global political and economic trends is also an important consideration. The longer the delay, the more difficult it will be to achieve the two-degree target. If current emission trends continue, the costs of climate change will exceed the costs of the action needed to achieve the two-degree target. A high and predictable price on emissions of greenhouse gases will create a market for mitigation options and thus promote a shift in production and consumption patterns and the development and deployment of new technology. To bring this about will require a credible global climate policy with a sufficient level of ambition.

Many different estimates have been made of the carbon price required to achieve the two-degree target. Official Norwegian Report NOU 2012:16 (*Cost-Benefit Analysis*) presents an overview of a range of modelling results from 2008–10 for carbon price paths that are consistent with the two-degree target (450 ppm). The mean estimated prices in 2020 and 2030 are EUR 43 and EUR 68 per tonne respectively, while the corresponding figure for 2050 is EUR 235. The modelled price paths vary, particularly further into the future. For 2050, the estimates vary from EUR 101 to EUR 394 per tonne, depending partly on differences in the assumptions made about technological advances. All the price paths show a fairly steep rise in the real price over time. Estimates of carbon price paths are based on the assumption that there is a uniform price for all emissions globally, and the estimates are sensitive to the assumptions on which they are based. The longer it takes before the world is on an emission trajectory in line with the two-degree target, the higher the estimated price on emissions of greenhouse

gases, because the estimated remaining emission budget becomes steadily smaller.

### 5.2 Economic and budgetary costs of Norway's commitment

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The economic and budgetary costs of a given commitment by Norway will depend on a wide range of factors. An international climate agreement with universal participation would be the most effective instrument for mitigation of climate change. Since Norway is a small country, the costs of its own commitment will depend heavily on developments in the rest of the world. On the one hand, the international carbon price will need to rise as the international level of mitigation ambition is enhanced. On the other hand, an ambitious climate agreement and the ensuing high carbon prices will result in rapid development of new, climate-friendly technology.

Norway will undertake a commitment to reduce its emissions by at least 40 % by 2030 compared with the 1990 level regardless of whether or not it delivers its commitment jointly with the EU. Norway will fulfil its commitment through participation in the EU ETS, by reducing emissions in the non-ETS sector and through cooperation on emission reductions in other countries (flexibility). If Norway agrees on joint fulfilment with the EU, the flexibility in the system will be provided by the possibility of implementing emission reductions in EU countries; in the event of an individual commitment, it will be provided by the possibility of implementing emission reductions in countries outside Europe. In either case, Norway's commitment is conditional on flexibility on the same lines as EU member states. Given the current market situation, there is reason to believe that emission reductions within the EU will cost more per tonne than purchasing emission allowances from countries outside Europe, for example credits under the Clean Development Mechanism.

The EU has not yet decided how its commitment for 2030 is to be converted into an emission budget for the whole period, expressed in tonnes.

### **Box 5.1 Assessments of mitigation measures and costs in the non-ETS sector**

The potential for emission reductions and the associated costs can be assessed using several different approaches. One is macroeconomic modelling, which can provide information on the economic costs of using specific policy instruments. Another option is to make a technical analysis of mitigation costs and options. Both these approaches have their strengths and weaknesses.

In 2013, emissions in the non-ETS sector in Norway totalled 28.4 million tonnes CO<sub>2</sub>-eq. The largest emission sources are road transport (10 million tonnes CO<sub>2</sub>-eq), other transport (6 million tonnes CO<sub>2</sub>-eq) and agriculture (5 million tonnes CO<sub>2</sub>-eq).

Analyses of the potential for emission reductions based on macroeconomic modelling generally put a price on greenhouse gas emissions from all sectors. Based on a description of interactions within the economy and assumptions about the technology available, the effects on emissions are calculated. An analysis of this kind carried out by Statistics Norway suggests that there is a fairly modest potential for reducing CO<sub>2</sub> emissions in the non-ETS sector in Norway up to 2030. The analysis is based on 2013 figures from the International Energy Agency. It concludes that if the carbon price path for emissions in Norway is in line with the two-degree target (NOK 550 per tonne in 2030), emissions in the non-ETS sector will be reduced by 4½ million tonnes, provided that the whole world adopts an ambitious policy in line with the two-degree target. If only Norway introduces the policy instruments needed for this, Norway's non-ETS emissions will be reduced by 1½ million tonnes. The model only includes CO<sub>2</sub>, not the other greenhouse gases.

The Norwegian Environment Agency has carried out a technical analysis of the potential for emission reductions, published in the report *Knowledge base for low-carbon transition in Norway*. The report assessed a wide range of mitigation measures, using a 2010 report on measures and instruments for achieving Norway's climate targets by 2020 as a basis (*Climate Cure 2020*). There has been a great deal of technological progress since the report was published. Given developments during the past five years, the Environment Agency considers that there is now a larger potential for emission reductions from some measures, particularly in the transport sector. The report presents the results of an analysis of mitigation potential for all greenhouse gases. The measures assessed were divided into three cost and

three feasibility categories, and three mitigation packages were put together. Most of the measures in mitigation package 1 have an estimated cost of less than NOK 500 per tonne CO<sub>2</sub>-eq and are in the high feasibility category. The package also includes mitigation measures and targets that have already been adopted at political level, but that are not yet included in Norway's reference scenario (for example the goal of using public transport, cycling and walking to meet the growth in the volume of passenger transport in the larger towns). The potential for emission reductions in the non-ETS sector from mitigation package 1 was estimated at 6.7 million tonnes CO<sub>2</sub>-eq in total, of which 5 million tonnes is in the transport sector. This corresponds to a 22 % reduction in emissions from 2005 in the non-ETS sector. Mitigation package 2 also includes measures that have an estimated cost of NOK 500–1500 per tonne CO<sub>2</sub>-eq and are in the medium feasibility category. This package is estimated to give a further 4.5 million tonnes CO<sub>2</sub>-eq of emission reductions. Mitigation package 3 includes almost all the measures that were reviewed, including high-cost measures and measures that are considered to be challenging to implement. Implementing measures will also be conditional on satisfactory sustainability criteria. Including the additional measures in mitigation package 3, which have an estimated cost of more than NOK 1500 per tonne, the total emission reductions are estimated at 12.7 million tonnes. This corresponds to a reduction of about 44 % from 2005 in the non-ETS sector. The costs associated with implementing these measures are uncertain. The emission reductions have been adjusted for overlap between the effects of different measures, but the costs of the transition process and ripple effects of the mitigation measures have not been considered. The analysis does not include an assessment of which policy instruments need to be introduced to trigger the emission reductions. The analysis of measures is based on the projections presented in the white paper *Long-term Perspectives on the Norwegian Economy 2013*.

The analyses discussed above can be useful for illustrating the potential of mitigation measures and their costs, but the estimates are generally uncertain and sensitive to the underlying assumptions, for example about technological developments and international climate policy. Further assessments of the consequences are needed to provide a basis for making decisions about specific measures and policy instruments.

Regardless of the outcome of the negotiations with the EU, Norway's emission budget will be drawn up at a later date, and this adds to the uncertainty about the total costs.

The costs of participation in the EU ETS will not be directly influenced by the size of Norway's commitment. However, there is some uncertainty as to how Norway is to be credited for its participation in the EU ETS if Norway and the EU do not agree on joint fulfilment (see the discussion in Chapter 3.3). This could entail budgetary costs.

The greater the emission reductions Norway makes in the domestic non-ETS sector, the higher the average cost per tonne of fulfilling the emission reduction commitment would be expected to be. The scope and mix of mitigation measures in Norway to fulfil the commitment will be decided at a later date. It can be assumed that achieving the commitment will require further action to reduce emissions in the non-ETS sector in Norway. The costs of emission reductions in Norway are very uncertain, and there is a considerable spread in the potential for emission reductions indicated by the analyses discussed in Box 5.1. The macroanalyses suggest emission reductions of the order of 1½–4½ million tonnes given a carbon price that is consistent with the two-degree target, whereas the mitigation analysis indicates emission reductions totalling 6.7 million tonnes using roughly the same price assumption. The spread of the results of the macroeconomic analyses is partly related to different assumptions about the availability of new climate-friendly technology. Both the macroeconomic analyses and the technical analysis are based on existing technology, but they use different assumptions about future technology price trends and thus about the extent to which new technologies are deployed. By way of comparison, the projections used in the 2015 budget, which are based on continued use of

the same policy instruments as today, show only a marginal decrease in emissions from the non-ETS sector up to 2030. These projections assume that the carbon price of fuel remains at about NOK 300, and also assume that the vehicle stock continues to become more efficient.

The costs incurred through use of flexible mechanisms internationally or through flexible implementation within the EU will be included in the fiscal budget. In the case of domestic measures, the costs imposed will also have distributional effects. The way the costs are split between different actors will depend on the types of policy instruments used. The most cost-effective instrument is pricing of emissions, where those responsible for the emissions are required to pay the costs.

### **5.3 Administrative consequences**

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The proposal will have limited administrative consequences. More information on administrative consequences and costs, including the costs of an agreement with the EU on joint fulfilment of the emission reduction commitment, will be provided in future budgetary processes. If an agreement is concluded that is legally binding for Norway, the consent of the Storting will be requested.

The Ministry of Climate and Environment

r e c o m m e n d s :

that the Recommendation from the Ministry of Climate and Environment concerning a new emission reduction commitment for Norway for 2030 – towards joint fulfilment with the EU, dated 6 February 2015, should be submitted to the Storting.

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