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The German Government's Climate Action Programme 2020

Cabinet decision of 3 December 2014



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2020

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Foreword



Cutting greenhouse gas emissions by at least 40 percent below 1990 levels – that is the ambitious target Germany has committed itself to for 2020. We are already approaching the end of 2014, which means we have just six years left to meet this target. Our National Inventory Report showed that we had achieved a 24.7 percent reduction in 2012 and further cuts will follow as a result of measures we put in place before 2014. However, scientific studies show that our efforts to date will simply not be enough if we want to hit our 2020 target.

Cutting greenhouse gas emissions by at least 40 percent below 1990 levels – that is a huge challenge, but it is not impossible. This Climate Action Programme 2020 puts us on track to making it happen. All of us – all areas of industry and all individuals – have to step up to the plate, and the more determined we are in tackling this challenge, the more easily and quickly we will succeed. Dealing with climate change means facilitating and promoting social and economic change in the best possible way. Germany's Energiewende, or energy transition, is an encouraging example of how that can be done, despite all the challenges its details pose. We intend to continue down this route – with everyone on board, including each individual sector of the economy.

Cutting greenhouse gas emissions by at least 40 percent below 1990 levels – this will enable Germany to hit a key interim target and that is essential if medium and long-term climate change targets are to be met – in Germany, in Europe and worldwide. Germany and the EU have committed themselves to the goal of reducing greenhouse gas emissions by



80 – 95 percent by 2050 – and in doing so are playing their part in the attempts to prevent average global warming from rising more than two degrees above pre-industrial levels. One of the key factors in achieving this is to phase out the use of carbon in energy systems worldwide. We intend to proceed gradually down this path, keeping our goal firmly in our sights.

Cutting greenhouse gas emissions by at least 40 percent below 1990 levels – this will put Germany in an excellent position to continue to work intensively on combating climate change within the EU and at international level. Tackling climate change is a global issue. Germany intends to play a proactive role and send out an unmistakable signal. We want to demonstrate that we do more than just set targets; we want to show that we are successful in achieving them and that success is verifiable. In this way, we hope to be able to encourage other countries to make significant contributions to the new and ambitious global climate agreement which is scheduled to be forged in Paris in December 2015.

Barbara Hendricks

Dr. Barbara Hendricks

Federal Minister for the Environment, Nature Conservation,
Building and Nuclear Safety

1 Introduction



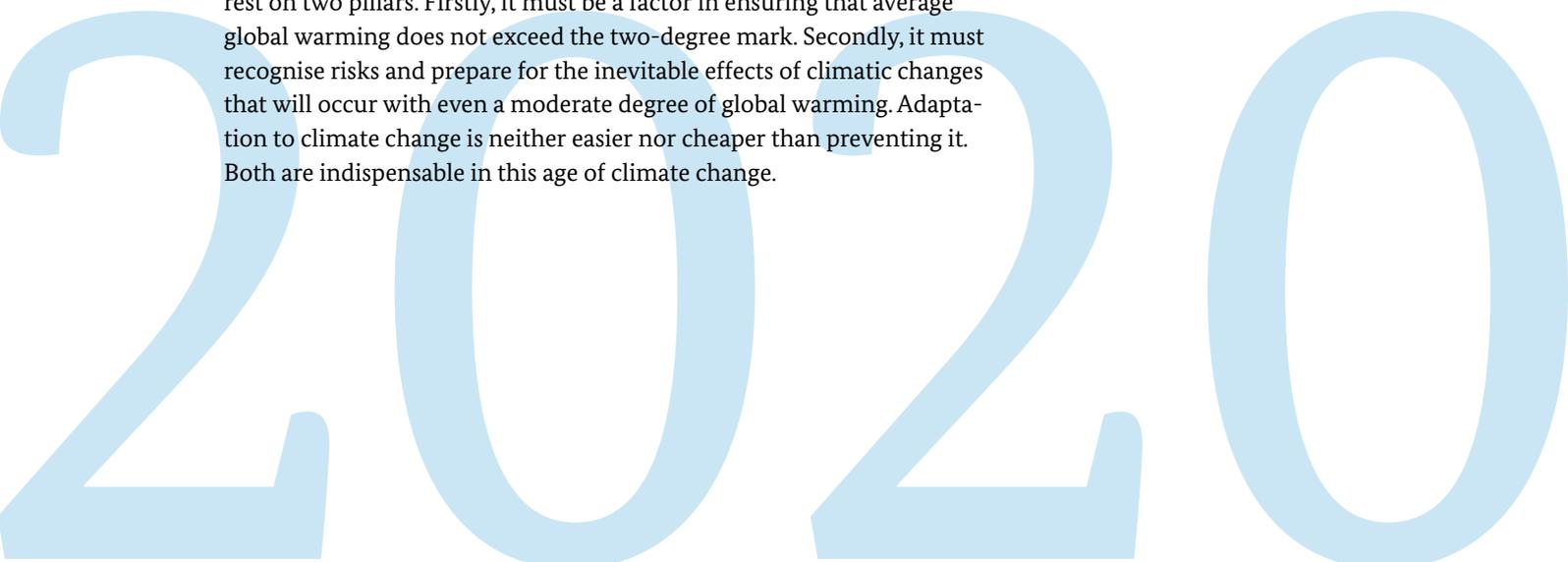
In its 5th Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) once more issues an urgent warning about the consequences of unabated global climate change. It points out that we are likely to see an average global temperature rise of four degrees Celsius or more by the end of the century unless rapid, ambitious and sustainable action to mitigate climate change is taken. This increases the threat of abrupt and irreversible changes to the climate. The consequences are unforeseeable and would have a dramatic impact on people in many parts of the world. The opportunities for people and ecosystems to adapt to climate change will begin to disappear unless rapid and ambitious action is taken. But the IPCC also stresses that it is possible to keep below the two-degree limit – and to do so without paying too high a price in terms of economic growth, provided we take ambitious global action without delay. Above all the risks and costs of unabated climate change would be incomparably higher than taking action. The IPCC stresses that international cooperation is crucial here. That is why climate negotiations at United Nations level are extremely important.

The international climate negotiations are now entering the home stretch: at the invitation of UN Secretary-General Ban Ki-moon, over 100 heads of state and government came to a United Nations special summit in New York, USA in September 2014 to add political momentum to the ongoing international climate negotiations. It is hoped that a new and comprehensive climate agreement will be adopted at the climate change conference to be held towards the end of 2015 in Paris.

The EU is playing its part in international efforts to mitigate climate change: it has committed to increasing the renewables' share in energy consumption to at least 27 percent by 2030. Its new target for energy efficiency stipulates that energy consumption should be lowered by at least 27 percent by 2030.

Ultimately the aim is to cut greenhouse gas emissions within the EU by at least 40 percent compared with 1990 levels by 2030 – an interim target on the way to the 2050 target of reducing greenhouse gas emissions by between 80 and 95 percent below the 1990 baseline. As the highest greenhouse gas emitter in the EU, Germany will make a significant contribution to achieving this target – and will use the opportunities offered by a committed climate policy to promote innovation, competitiveness and sustainable economic development and employment. The IPCC Assessment Report stresses that it is essential that the global energy supply be virtually climate-neutral by the middle of the century if global warming is to be limited to a maximum of two degrees Celsius above pre-industrial levels. Germany can, and must, play a key role internationally and must demonstrate that taking climate action in an industrialised country does work and, in fact, is crucial for any economy that wants to be competitive in the 21st century. That is why it is vital that as a next step we meet our national target of cutting greenhouse gas emissions by 40 percent below 1990 levels by 2020.

The German government subscribes to the guiding principle of sustainable global development, which is based on acting responsibly towards future generations. Accordingly, a responsible climate policy must always rest on two pillars. Firstly, it must be a factor in ensuring that average global warming does not exceed the two-degree mark. Secondly, it must recognise risks and prepare for the inevitable effects of climatic changes that will occur with even a moderate degree of global warming. Adaptation to climate change is neither easier nor cheaper than preventing it. Both are indispensable in this age of climate change.





2 Starting situation and the need for action

Our next interim climate target is to reduce greenhouse gas emissions by at least 40 percent on 1990 levels by 2020. This should create the basis for meeting our subsequent targets for 2030, 2040 and 2050 and the European climate target. This Climate Action Programme 2020 contains additional measures the German government has put in place to achieve the 2020 target. It will also develop a Climate Action Plan 2050 describing further reduction steps to be taken up to the target year of 2050 in the light of the European targets and the outcome of the Paris climate change conference in 2015 and will back it up with actions developed within a broad-based dialogue process.

An important step towards meeting these climate targets is the *Energie-wende*, Germany's energy transition policy, which was launched to support the objectives set out in the Energy Concept in 2010 and reaffirmed in 2011 with the precisely defined details of the nuclear power phase-out. With this the German government set key targets for expanding renewable energy and increasing energy efficiency, the most important of which are listed below (see also 2nd Monitoring Report, April 2014).

Germany has made marked progress in climate change mitigation since the beginning of the 1990s. Examples include its success in decoupling economic growth from greenhouse gas emissions and surpassing the

Table 1: The German government’s key targets in connection with the expansion of renewable energy and increase in energy efficiency

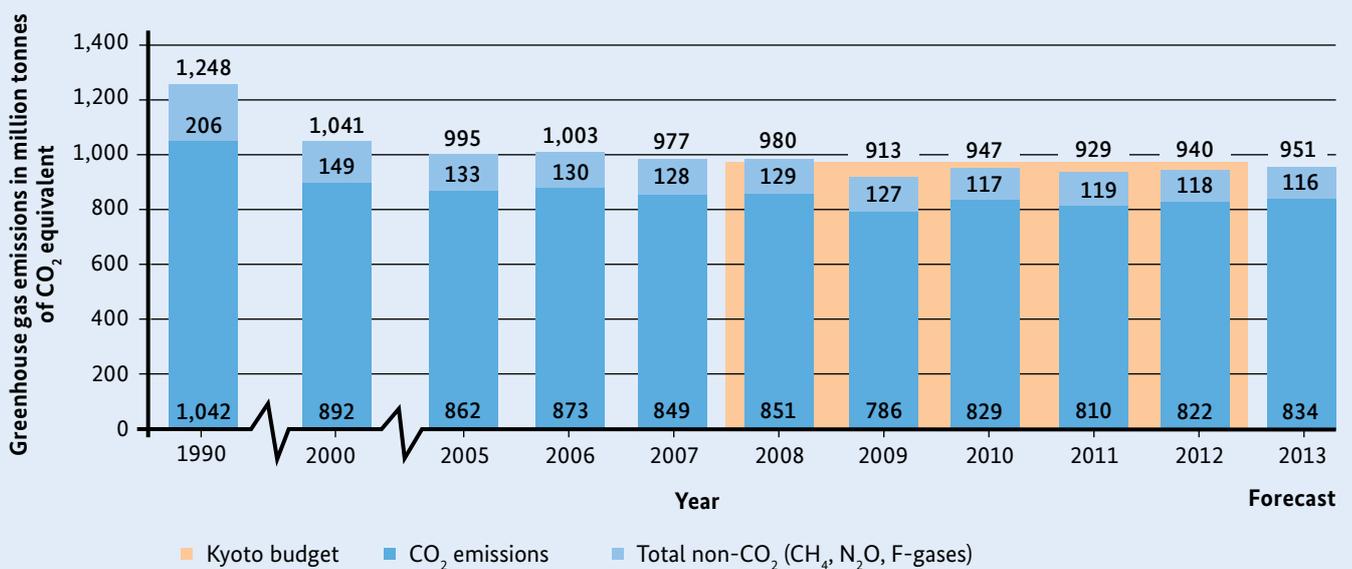
| | Year/period | Target |
|---|-------------|---------------------|
| Share of renewables in gross final energy consumption | 2020 | 18 percent |
| Share of renewables in gross electricity consumption | 2025 | 40 – 45 percent |
| Share of renewables in gross electricity consumption | 2050 | At least 80 percent |
| Primary energy consumption | 2008–2020 | - 20 percent |

Source: Federal Government’s energy concept of 28 September 2010

reduction targets which Germany committed to in the Kyoto Protocol to the United Nations Framework Convention on Climate Change. To achieve the government’s target of reducing greenhouse gas emissions in Germany by at least 40 percent below 1990 levels by 2020, emissions have to be reduced from around 1250 million tonnes (megatonnes) of CO₂ equivalent in 1990 to a maximum of 750 million tonnes of CO₂ equivalent in 2020.

According to the 2014 National Inventory Report, 940 million tonnes of greenhouse gases were emitted in Germany in 2012. That equates to 24.7 percent less than in 1990. However, it is an increase on 2011, when a reduction of 25.6 percent was achieved. According to the forecast by the Federal Environment Agency, greenhouse gas emissions rose again in 2013. It reported that around 951 million tonnes of greenhouse gases were emitted in 2013, which equates to a reduction of only 23.8 percent compared with 1990.

Figure 1: Greenhouse gas emissions in Germany between 1990 and the 2013 forecast in million tonnes of CO₂ equivalent



Source: Emissions situation according to UBA, 25 February 2014

The renewed rise in 2013 was caused by the increased amount of electricity generated from coal and higher heating energy demand than in 2012 due to weather conditions and the consequently greater use of fossil fuels – heating oil and gas. The 7 percent higher electricity export balance of 33 terawatt hours (TWh) in 2013 also contributed to the higher greenhouse gas emissions (territorial principle¹).

Current projections assume that the measures adopted and implemented by 2020 will make it possible to achieve a 33 to 34 percent reduction in greenhouse gases with an uncertainty of +/- 1 percent. That creates a corridor for the mitigation gap of between 5 and 8 percentage points. This estimate is primarily based on assumptions about future macroeconomic trends, trends in energy and carbon dioxide prices (CO₂ prices), the structure and operating life of the power station fleet and demographic trends. Depending on how these factors develop, the reduction requirement may be higher or lower and will be constantly reviewed up to 2020. All sectors and all stakeholders will definitely need to make extra efforts if the 40-percent target is to be achieved. The Climate Action Programme 2020 involves all the relevant sectors and is the first step in this direction.



1 This means that only those greenhouse gas emissions that were caused within the national territory are included.

The first robust estimate of the greenhouse gases emitted in 2014 will not be possible until early 2015. An initial estimate by the Working Group on Energy Balances (AGEB) based on the first nine months of the year indicates that primary energy consumption in Germany may have fallen by about five percent in 2014. Adjusted for the effects of an extremely mild winter, which has the greatest influence on reducing energy consumption, primary energy consumption may be about two percent lower than the adjusted level of the year before. The reasons for this are perceptibly lower electricity consumption and the continuing expansion of renewable energy. This positive trend illustrates that the climate targets can be achieved with the concerted efforts of the government, the private sector and consumers.

Systematic climate change mitigation action which focuses on cost-efficiency, affordability and competitiveness also has considerable benefits for the economy. It reduces the dependency on importing fossil energy sources and therefore increases the security of the energy supply. It supports the development of new technologies, as well as generating added value that predominantly stays in the country, and has to date created around 800,000 jobs in the field of renewable energy and energy efficiency, for example. Systematic climate action can pay off for consumers as a result of lower expenditure on heating, electricity, fuel and hot water, for example.

Nevertheless, a committed climate policy must also take socio-economic challenges into account, such as affordability of energy for consumers and industry and the need for energy-intensive industries to remain competitive.

With regard to the effects of climate change, insurance companies providing cover in Germany for natural hazards are complaining of an increase in the number and intensity of claims as a result of heavy rain, flooding, storms and damage to flora and fauna. Climate change mitigation therefore also means limiting and slowing the increase in damage caused by extreme weather and thus limiting insurance premiums.

Climate change mitigation is a task for which federal and state governments share responsibility and it also has a cultural and social dimension. This means that we have to work even harder to achieve popular support and ensure widespread backing and action in society. Particularly here it is therefore important to create opportunities for the public to get involved and to support people in becoming aware of their scope for action and resources and using them in their own interest. Climate action depends far more than any other policy area on the active involvement of as many people as possible.

3 Potential and areas for action



Fundamentally, there is technical and economic potential for additional reductions in all sectors. The German government's Climate Action Programme 2020 aims to address that potential. However, it does not set any sector-specific targets.

Basically, emissions can be categorised by the “source principle,” i.e. where they are generated, or the “polluter-pays principle”, i.e. according to who or what has caused them (a user or product such as electricity, steel or food). The Climate Action Programme 2020 categorises emissions using the source principle which is commonly used in international greenhouse gas reporting. That means, for instance, that emissions caused by using energy supplied through the public electricity and heat grids for electrical appliances in private households, in small-scale consumption, industry or transport are allocated to the energy sector. Unlike in the National Action Plan on Energy Efficiency (NAPE), measures designed to lower the electricity consumption of private households, for example, are shown in the Action Programme as a reduction contributed by the energy sector.

Conversely, this means that not all measures that affect private households as stakeholders are reported here in the household sector.² Measures in other sectors can incur costs that are passed onto the end consumer and are borne by private households.

Overall, using the source principle produces the following classification by sector:

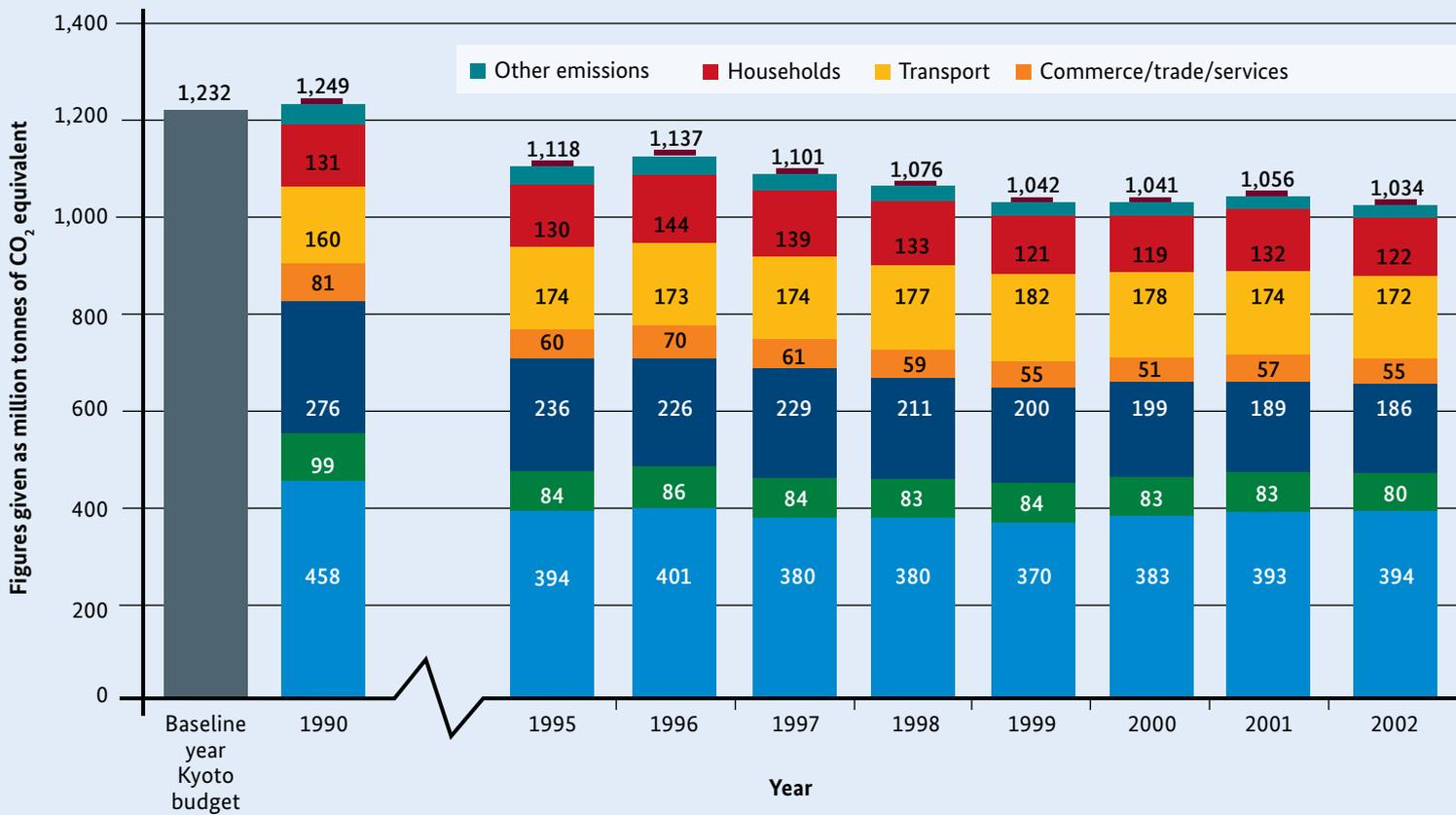
Table 2: Sectors as defined using the source principle

| Name of sector | including emissions from |
|-------------------------|---|
| Energy industry | public electricity and heat supply system, including natural gas compressors |
| Industry | combustion processes and electricity self-generation in the manufacturing industry and emissions from industrial processes |
| Households | combustion processes in private households (primarily fuels for space heating, cooking and hot water) |
| Transport | fuel combustion in road and rail transport, shipping on inland waterways and domestic aviation (not including construction machinery) |
| Commerce/trade/services | combustion processes in commerce/trade/services (primarily fuels for space heating, cooking and hot water) |
| Agriculture | emissions from animal husbandry, fertiliser management and agricultural fuel use |
| Other | waste management (primarily landfill gas), wastewater management |

Source: authors' own presentation

Since 1990, emissions have already been lowered in all sectors, albeit by very varying degrees. Whereas “other emissions” – especially from the waste and wastewater management sector – fell by 67 percent between 1990 and 2012 (cf. Section 3.1.8), emissions in the transport sector fell by only slightly less than six percent (cf. Section 3.1.5). Emissions trends by Land (German state) since 1990 also differed greatly, partly due to their different economic structures and demographic developments (cf. Table 4). For the individual Länder (states) the National Inventory Report only shows energy-related CO₂ emissions, which is why the total in that report differs from the total of all values for greenhouse gases in Germany.

² Only emissions caused by the production of space heating and hot water in residential buildings are recorded in the household sector.

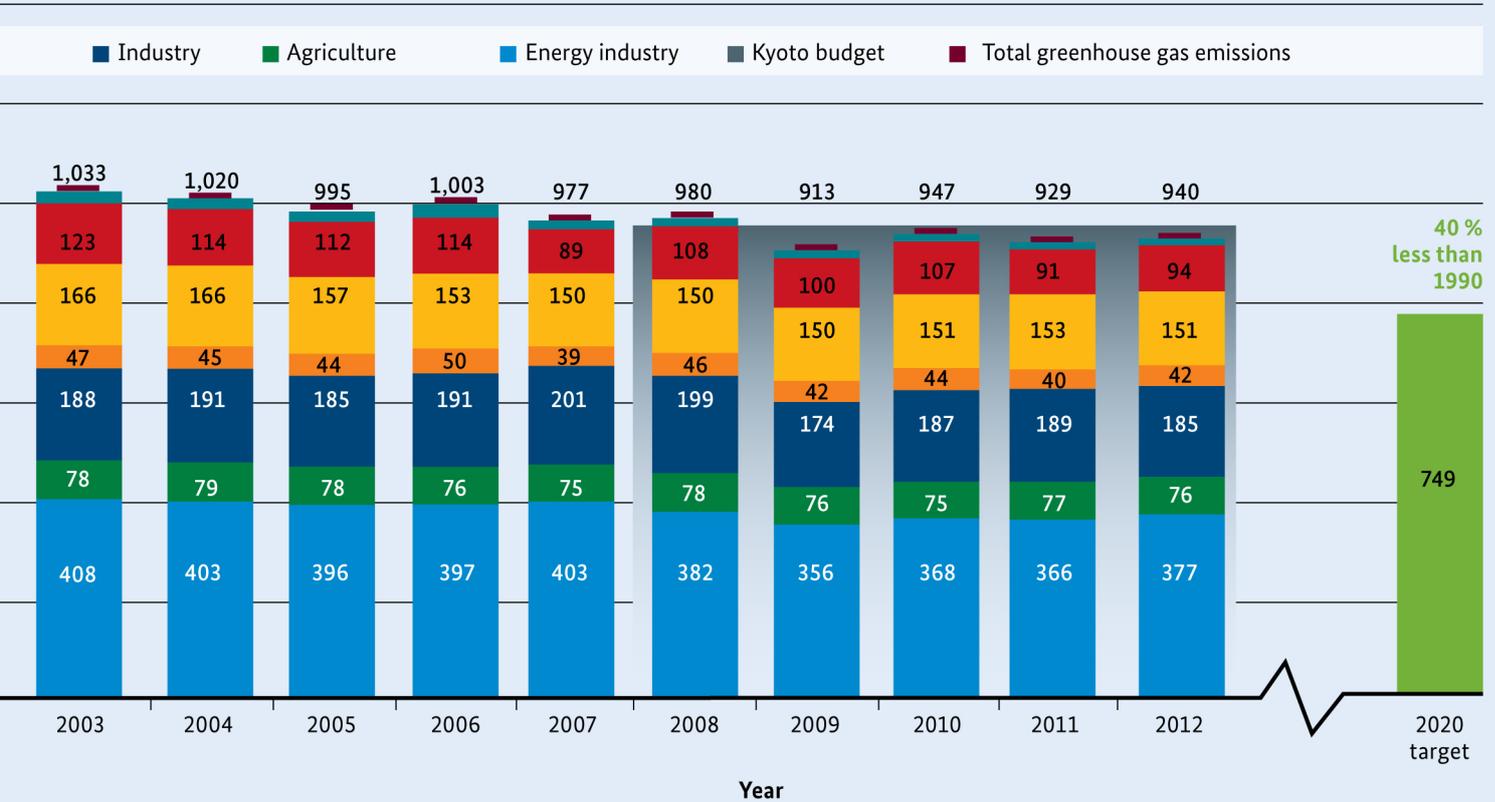
Figure 2: Trends in greenhouse gas emissions in Germany by sector

Source: Federal Environment Agency, 7 January 2014

Table 3: Trends in greenhouse gas emissions in Germany by sector and projections up to 2020

| Sector | Emissions 2012 in million tonnes of CO ₂ equivalent | Change between 1990 and 2012 in percent | "With measures" projection up to 2020 in million tonnes of CO ₂ equivalent | "With measures" projection up to 2020 – reduction as a percentage with compared 1990 |
|-------------------------|--|---|---|--|
| Energy industry | 377 | -17.7 | 306 | -33 |
| Industry | 185 | -33.0 | 183 | -34 |
| Households | 94 | -28.2 | 80 | -39 |
| Transport | 151 | -5.6 | 151 | -6 |
| Commerce/trade/services | 42 | -48.1 | 35 | -57 |
| Agriculture | 76 | -23.2 | 72 | -27 |
| Other | 15 | -67.4 | 10 | -77 |
| Total | 940 | -24.7 | 837 | -33 |

Source: German government's 2013 projection report



The approach of systemically looking for technical and economic potential and areas for action in all sectors proved valuable during the process of drafting the Action Programme. A number of different studies identified potential for additional reductions in all sectors, but especially in the energy sector, industry, in households (residential buildings) and transport. The BMUB also held two dialogue forums to get Länder, local authority associations and social stakeholders involved early on in the search for suggestions for measures in all sectors. The chief purpose of the first dialogue forums in June 2014 was to inform people about the planned Action Programme. The various stakeholders were also asked to submit proposals for measures they believed should be incorporated into the programme. The proposals received were reviewed during the development of the programme to establish that they were complete and plausible and, provided the latter was found to be the case, they were allocated to a particular sector based on the source principle, albeit not always the sector proposed by the individual or organisation submitting it. The proposals received from the above-mentioned groups and government departments were then organised into categories and where possible their effect on reducing greenhouse gas emissions was quantified. As far as possible, all the proposals for measures to be taken were incorporated into the Action Programme.

Table 4: Trends in energy-related CO₂ emissions by Land

| Länder | Energy-related CO ₂ emissions 1990 in million tonnes | Energy-related CO ₂ emissions 2010 in million tonnes | Relative savings 2010 compared with 1990 |
|-------------------------------|---|---|--|
| Baden-Württemberg | 74.4 | 69.3 | 6.9 % |
| Bavaria | 84.5 | 80.0 | 5.3 % |
| Berlin | 26.9 | 19.8 | 26.4 % |
| Brandenburg | 81.9 | 55.5 | 32.2 % |
| Bremen | 13.4 | 13.8 | -3.0 % |
| Hamburg | 12.7 | 11.7 | 7.9 % |
| Hesse | 50.2 | 42.9 | 14.5 % |
| Mecklenburg Western Pomerania | 15.5 | 10.0 | 35.5 % |
| Lower Saxony | 77.1 | 69.0 | 10.5 % |
| Northrhine-Westphalia | 362.7 | 307.3 | 15.3 % |
| Rhineland Palatinate | 27.4 | 27.3 | 0.4 % |
| Saarland | 23.7 | 19.1 | 19.4 % |
| Saxony | 91.5 | 48.7 | 46.8 % |
| Saxony-Anhalt | 50.9 | 27.4 | 46.2 % |
| Schleswig-Holstein | 24.2 | 19.0 | 21.5 % |
| Thuringia | 28.1 | 10.7 | 61.9 % |

Source: Germany's 2014 National Inventory Report

The purpose of the second series of dialogue forums in the second half of September 2014 was to provide the Länder, local authority associations and social stakeholders with information on how work within the federal government was progressing. They were also requested to submit information by the end of September on climate activities they had decided to take or had begun to implement since November 2012. They are described in Section 5.

3.1 Analysis by sector

The starting situation, potential and areas for action for the individual sectors are described below.

3.1.1 Energy industry

The **energy industry** is the sector with the highest greenhouse gas emissions and the greatest technical and economic potential for reduction. Around forty percent of all greenhouse gas emissions in 2012 were produced by the **energy industry**. That figure includes all the emissions produced by burning fossil fuels in power stations to supply electricity and heat to the public grids and from combustion facilities involved in transporting gas (natural gas compressors³). It also comprises emissions arising from electricity consumption in private households and by the transport sector, industry (except self-generated electricity) and commerce/trade/services.

From 1990 to 2012, greenhouse gas emissions in the energy industry fell by around 18 percent – from 458 million tonnes to 377 million tonnes of CO₂ equivalent – mainly thanks to numerous activities in the field of climate and energy policy.

According to the German government's 2013 projection report, we can assume that, as a result of measures that are already in place and will continue to be effective, emissions in the energy sector will fall to around 306 million tonnes of CO₂ equivalent by 2020. Furthermore, the model calculations that the forecast is based on do not take into account the effects of the latest amendment to the Renewable Energy Sources Act (EEG).

The key climate measures in this sector are emissions trading, expansion of renewable energy and combined heat and power on the supply side and all the measures that have been put in place to reduce the demand for electricity, heat and cooling from power stations in the public supply system (increasing energy efficiency).

The key areas for action in this sector are:

- ambitious reform of the emissions trading system at EU level, well before 2020;
- continuous expansion of renewable energy up to 2025 and 2050, which is compatible with nature conservation and is in line with the expansion path defined in the Renewable Energy Sources Act;
- continued development of combined heat and power;
- measures to reduce electricity consumption, including setting ambitious goals in the National Action Plan on Energy Efficiency (NAPE);
- continued development of the conventional power station fleet.

3 However, since they account for less than 0.4 percent of the sector's emissions, they are mentioned here only for the sake of completeness.

3.1.2 Industry

At 185 million tonnes of CO₂ equivalent in 2012, **industry** was responsible for just less than 20 percent of Germany's total greenhouse gas emissions. Included in that figure are emissions from industrial combustion processes and from electricity self-generation in the manufacturing industry and emissions from commercial and industrial processes (production and product use, including of fluorinated greenhouse gases, also known as F-gases). Emissions caused by electricity from external suppliers and measures relating to them are included in the energy category.



Industry has already made progress in reducing emissions in the past. For example, greenhouse gas emissions in the sector have fallen by 91 million tonnes of CO₂ equivalent, or 33 percent, since 1990. Since 2002, this level has not changed at all, apart from some fluctuations associated with the economic cycle.

Taking into account measures put in place up the end of 2012, the German government's projection report anticipates that emissions from industry will fall only slightly to 183 million tonnes of CO₂ equivalent. However, there is currently still considerable technical and economic potential for reduction. The most important climate change mitigation measures in the sector to date are emissions trading, incentives to invest in higher energy productivity, increased use of renewable energy and regulations for reducing fluorinated greenhouse gases (F-gases). Here too – as in the energy sector – setting ambitious goals in the National Action Plan on Energy Efficiency, strengthening the emissions trading scheme and the stringent implementation of the EU Energy Efficiency Directive (EED) will play a key role.

3.1.3 Commerce/trade/services

The commerce/trade/services sector (also known as the small-scale consumption sector) contributed five percent to total emissions in 2012. From 1990 to 2012, greenhouse gas emissions in the commerce/trade/services sector already decreased by around 48 percent. The German government's projection report assumes that, based on the measures already in place, a further drop in emissions can be expected, and here too there is still considerable technical and economic potential for reduction. Direct emissions – and therefore the potential for further reductions in this sector – are produced primarily in the **non-residential buildings sector**. Emissions from the generation of electricity and district heating, on the other hand, are accounted for in the energy sector. Significant emission reductions have thus far been achieved primarily by imposing energy efficiency standards on buildings, processes and products. The introduction of additional measures will make it possible to achieve further reductions by 2020. There is also additional potential for saving electricity and for using renewable energy, which would make a contribution to the desired reduction of emissions in the energy sector.

3.1.4 Households

In the **household** sector too, direct emissions (i.e. not counting electricity and district heating) are caused almost exclusively by the production of space heating and hot water in **residential buildings**. The sector accounted for 10 percent of total emissions in 2012. The most important instruments include the Energy Conservation Act (Energieeinsparungsgesetz), the Energy Saving Ordinance (Energieeinsparverordnung), the Heating Costs Ordinance (Heizkostenverordnung), the Renewable Energies Heat Act (Erneuerbare-Energien-Wärme-Gesetz), the Small-Scale Combustion Plant Ordinance (Kleinf Feuerungsanlagenverordnung), taxation of fuels used for heating purposes, and grant programmes such as the low-carbon building refurbishment programme and the market incentive programme to promote the use of renewable energy in the heat market.

From 1990 to 2012, direct emissions in the household sector fell by around 28 percent. Putting additional measures in place could achieve further reductions by 2020, for example by specifically funding building refurbishment schemes that have a high standard of energy saving, continuing to increase the use of renewable energy and incorporating these aspects into rental and taxation law to ensure social acceptability. It is essential that the aims of the Alliance for Affordable Housing and Building (Bündnis für bezahlbares Wohnen und Bauen) be taken into account and synergies harnessed. In the medium and long term there is future potential in the household sector and also in the public utilities sector, for example through greywater treatment with heat recovery. Implementing “neighbourhood concepts” as part of energy-efficient redevelopment programmes can also identify and tap additional potential for reduction. Furthermore, there is also scope in the household sector, and in the commerce/trade/services sector, for electricity saving measures, which would support emissions reduction in the energy industry.

Any building-related measures cited and described in Section 4 below apply to both residential buildings (household sector) and non-residential buildings (commerce/trade/services sector and industry sector).

3.1.5 Transport

At almost 165 million tonnes of CO₂ equivalent, domestic **transport** accounted for 13 percent of greenhouse gas emissions in the 1990 baseline year (not counting agricultural transport). The main factors influencing greenhouse gas emissions in this sector are traffic volume, energy consumption and fuels used. Between 1990 and 1999, transport emissions rose, reaching a record high of 182 million tonnes of CO₂ equivalent and an 18 percent share in greenhouse gas emissions.

After a phase of declining transport emissions that began in 2000, they began to rise once more in 2010. Provisional calculations indicate that transport emissions increased slightly in 2013 to 156.3 million tonnes of



CO₂ equivalent. Greenhouse gas emissions from international aviation and maritime shipping are not part of the national target and continual growth is forecast for both.

The German government's projection report states that emissions in the transport sector (not accounting emissions from international transport) will rise to around 150 million tonnes of CO₂ equivalent by 2020. These figures will be updated when the 2015 projection report is drafted and will also be based on the 2030 transport integration forecast.

The use of newer, more efficient technologies in the transport sector and modal shifts offer significant potentials. The key climate measures to date are emission standards that new cars and light commercial vehicles have to meet under EU regulations, fuel taxation, decarbonisation strategy in the fuel sector, motor vehicle tax and the HGV toll. The systematic introduction of electric vehicles in passenger transport is a highly significant factor in medium and long-term climate targets and is on a par with electricity from renewable energy sources. In addition to that, the development of alternative fuels is also significant, especially with regard to meeting long-term climate targets. Other key areas for action are further development of the HGV toll, and expanding and strengthening public transport, rail freight transport and cycle and pedestrian transport.

3.1.6 Agriculture

In this sector, methane and nitrous oxide emissions from **agriculture** and carbon dioxide emissions from agricultural fuel use are recorded.

In 2012, German agriculture was responsible for emitting 76 million tonnes of CO₂ equivalent. That is around 8 percent of total greenhouse gas emissions for that year. From 1990 to 2012, greenhouse gas emissions in the agriculture sector fell by around 23 percent from 99 million tonnes to 76 million tonnes of CO₂ equivalent.



The German government's projection report indicates that, based on measures in place, emissions in this sector will fall to 72 million tonnes of CO₂ equivalent by 2020.

The reductions achieved thus far in the agriculture sector are primarily due to the environmental standards included in the EU Common Agricultural Policy, better fertiliser management and a greater link between livestock density and land use. Other reduction options include, for example, expanding organic farming and improving nitrogen use efficiency.

3.1.7 Land use, land use change and forestry

Emissions from agricultural land (caused by ploughing up grassland, for example) and emissions and carbon storage in forestry have to date not been included in assessments of whether climate targets have been met. In the medium term, the potential for additional climate action in this sector will be explored. The **forestry and timber** sector offers potential for reduction due to the carbon sink function of forests, especially wet woodlands or forests that are species-rich and highly structured, and also due to the capacity of trees to store carbon in their wood.

3.1.8 Other emissions

This category primarily records methane and nitrous oxide emissions from closed cycle and waste management and the water sector. 75 percent of emissions in this sector come from waste landfills, 18 percent from wastewater treatment and 7 percent from composting and bio-mechanical waste treatment. Above-average reductions have been achieved in the past in this **other emissions** category, especially in **closed cycle and waste management** – primarily as a result of making it illegal to landfill organic degradable municipal waste and stepping up recycling rates. As a result, emissions in this sector fell by 67 percent, from 43 million tonnes of CO₂ equivalent in 1990 to 14 million tonnes of CO₂ equivalent in 2012. That means that this sector accounted for only 1.5 percent of total emissions in 2012. Projections indicate that, based on measures in place so far, a further decline in emissions to 10 million tonnes of CO₂ equivalent can be expected by 2020. This figure could be even higher if further measures relating to landfills were introduced.

In the medium term, further improvements in energy efficiency, self-generation of electricity and heat from renewable sources (sewage gas, for example) offer potential for reducing emissions in the **wastewater treatment sector**. In the medium and long term, further potential could be tapped by greywater treatment systems that combine heat recovery. The latter is also relevant to the households sector.

Furthermore, measures designed to improve resource efficiency also offer potential for reduction. Based on the source principle used in greenhouse gas reporting, these reductions are accounted for in industry and the energy sector.

4 Key policy measures



4.1 Overview

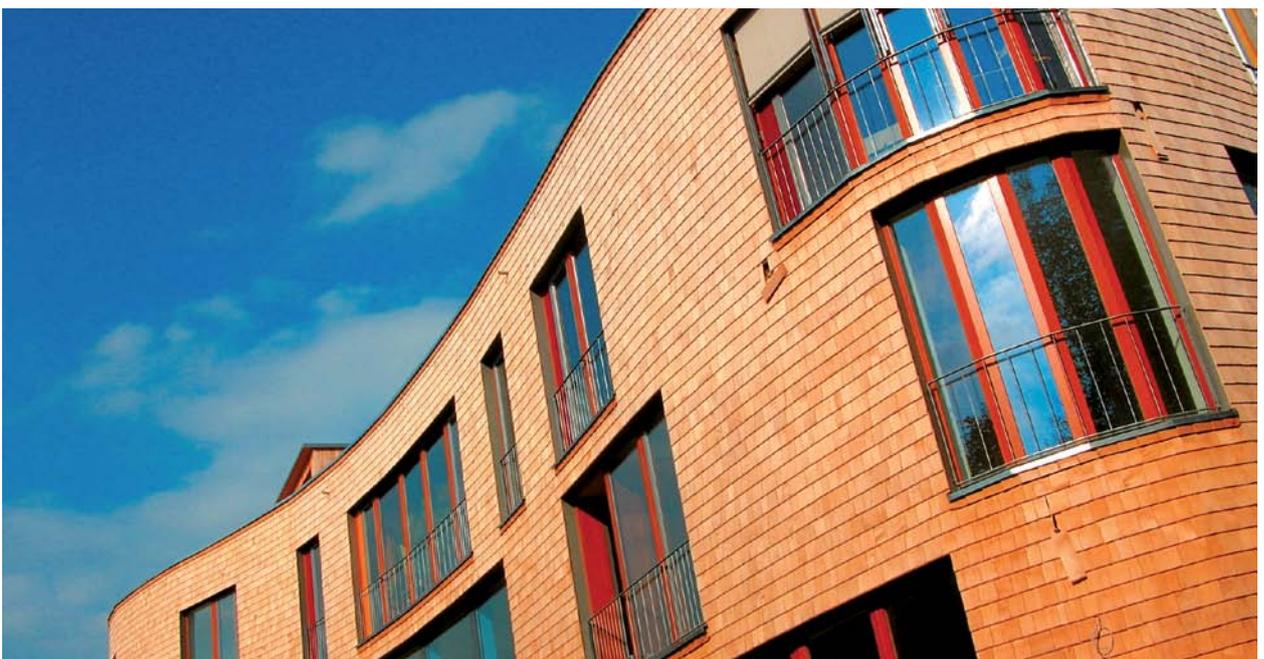
With this Climate Action Programme 2020, the German government is introducing the steps necessary to achieve its 2020 climate target. The Climate Action Programme 2020 builds on existing strategies and decisions, adding to them where necessary.

To ensure it meets its target of reducing greenhouse gas emissions by at least 40 percent, the German government will discuss what form the measures set out in this Action Programme should take, as part of the process of implementing it, and will also identify further possible action. This will include engaging in a dialogue with civil society. To this end, the government will set up a national climate action alliance with the BMUB as lead agency (see Section 6.2).

Measures set out in the Action Programme that impact on the federal budget – either in terms of expenditure or income – have to fit into the federal government's overall budget strategy. That means that any measures that are not funded from the package of measures already announced that is concerned with investing for the future, especially in public infrastructure and energy efficiency, have to be paid for by measures in the same policy area.

The Action Programme is made up of the following components:

- emissions trading, European and international climate policy
- climate change mitigation in electricity generation, including by continuing to upgrade the conventional power station fleet and expanding the use of renewables
- the National Action Plan on Energy Efficiency (NAPE) with the following key areas:
 - energy efficiency in the buildings sector
 - energy-saving as a business opportunity and way of generating returns, and
 - individual responsibility for energy efficiency
- climate-friendly building and housing strategy
- climate action measures in the transport sector
- action to reduce non-energy-related emissions in the following sectors:
 - industry
 - waste management
 - agriculture
- government's role in demonstrating best practice
- research and development
- consultation, awareness raising and initiatives at all levels on climate action



In total, the key policy measures instigated by the Action Programme produce the following contributions to reducing greenhouse gas emissions. Here and in the rest of this document they are stated as the contribution of the individual measures to closing the mitigation gap, i.e. as an additional reduction contribution over and above the current projection for 2020.

Table 5: Contributions to key policy measures designed to meet the 40 percent target

| Key policy measures | Contribution to greenhouse gas emission reduction (million tonnes of CO ₂ equivalent) |
|---|--|
| National Action Plan on Energy Efficiency (NAPE) (not including measures in the transport sector) | Approx. 25 – 30 million tonnes (including energy efficiency in buildings) |
| Climate-friendly building and housing strategy (contains NAPE measures specific to buildings – see Section 4.5.2) ⁴ | In total approx. 5.7 – 10 million tonnes (1.5 – 4.7 million tonnes of which are in addition to NAPE) |
| Measures in the transport sector | Approx. 7 – 10 million tonnes |
| Reduction in non-energy-related emissions in: → industry, the commerce/trade/services sector and waste management → agriculture | 3 – 7.7 million tonnes 3.6 million tonnes |
| Reform of the emissions trading scheme | Dependent on decisions at EU level on structure |
| Further measures, especially in the electricity sector | 22 million tonnes |
| Total: | 62 – 78 million tonnes |

Source: authors' own presentation

In estimating the reduction effect in the sectors, possible overlaps between the effects of different measures were taken into account in order to avoid double counting.

4.2 Emissions trading and European and international climate policy

Germany's climate policy is embedded in European and international agreements and legal obligations. Germany has always been a reliable partner in international and European climate policy. The success of climate policy depends crucially on driving forward reductions in greenhouse gas emissions in European and international cooperation as well as in domestic policy. Furthermore, there are several reasons why Germany has a significant interest in its new energy transition policy being embedded in European and international policy. They include its central location in Europe,

⁴ Note: the NAPE also contains further measures that may bring about additional reductions in the buildings sector.

which makes an integration of the energy markets, for example, particularly advantageous, its high dependency on imported energy, and its close economic and political relations with its neighbours and with other countries in all sectors in which greenhouse gas emissions are produced.

Furthermore, Germany benefits from its pioneering role in climate change mitigation. The technical, cultural and social innovations it entails create added value especially for small and medium-sized companies. German industry can also thrive by developing new technical solutions and implementing them with precision.

4.2.1 International cooperation

As early as 1992, the international community set itself the goal of stabilising the concentration of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. It was enshrined in the United Nations Framework Convention on Climate Change (UNFCCC). The first Conference of the Parties to the Convention, held in Berlin in 1995, paved the way for the Kyoto Protocol to be adopted at the UN climate summit in the Japanese city of Kyoto in 1997. This was the first time that the industrialised countries at least made legally binding commitments to limit and reduce their greenhouse gas emissions. At the 2012 climate summit in Doha, after several rounds of negotiations over the years, the Parties agreed to extend the Kyoto Protocol until 2020. However, since the Kyoto Protocol does not cover all global emissions, there are plans to conclude a new international agreement for the post-2020 period, which will oblige all countries – i.e. industrialised and developing countries and emerging economies alike – to make an appropriate contribution to international climate change action. The agreement is scheduled to be adopted at the UN climate change conference in Paris at the end of 2015 and should help to keep the rise in global temperature to a maximum of two degrees Celsius above pre-industrial levels.

All countries have been requested to prepare their contributions for the Paris agreement by the first quarter of 2015 and to make them available internationally. They will then be formalised in Paris.

The climate summit in Lima in December 2014 is an important interim step on the way to Paris. In Lima the international community intends to reach agreement on coherent text elements for the 2015 Paris agreement, so that a concrete negotiating text can be tabled in May 2015. It also seeks to agree in Lima on what explanatory information the countries should submit with their intended contributions to the new agreement. Without comparable information that is standardised as far as possible, it will not be possible to analyse the reduction proposals and assess to what extent the countries are making progress in a way that is on track to achieve the two-degree target.

Mitigating climate change is a global task. Consequently, Germany provides technical and financial support to developing countries and emerging economies embarking on low-emission and therefore climate-friendly development paths.

4.2.2 Cooperation within the EU

The European Union established climate change action as one of its key policy areas at an early date. To this end, it set goals designed to guarantee a transition to an energy-efficient and low-carbon economy. In 2009, EU heads of state and government agreed the long-term goal of reducing greenhouse gas emissions by 80 – 95 percent compared with 1990 levels by 2050. According to the Intergovernmental Panel on Climate Change (IPCC), it is now crucial that the industrialised countries achieve this reduction if the most serious, and above all irreversible, effects of global climate change are to be averted. The EU has agreed the first interim steps to be taken up to 2020 in order to achieve these goals.

The European Council agreed European climate and energy targets for the first time in March 2007. The 2020 climate and energy package contains three targets to be met by 2020:

1. The EU commits to reducing its greenhouse gas emissions by at least 20 percent on 1990 levels by 2020. A binding individual climate target was set for each EU Member State for those sectors that are not part of the emissions trading scheme. Germany's reduction target, for example, for these sectors is 14 percent below 2005 levels.
2. The share of renewable energy in the EU's total energy consumption is to rise to 20 percent by 2020. Here, too, the EU Member States received individual national targets. Germany's target is to increase its renewables share to 18 percent.
3. The goal is for the EU's energy consumption to be 20 percent lower than forecasts for 2020 as a result of higher energy efficiency. This target is not legally binding, but merely an indicative guide value.



At the European Council on 23/24 October 2014 in Brussels, the EU heads of state and government set out a framework for future climate and energy policy up to 2030, as a follow-on from the 2020 targets. The core element of the Council's conclusions is a binding target to reduce greenhouse gas emissions exclusively through measures within the EU by at least 40 percent below 1990 levels. For those sectors that are not covered by the emissions trading scheme, the EU climate target will then be differentiated across the Member States, with the highest target being a 40 percent reduction and the lowest 0 percent compared with 2005. The individual targets will be set nearer the time.

It was agreed that EU-wide the share of renewables in total consumption should rise to at least 27 percent by 2030. This target will be binding on the EU, but unlike with the 2020 framework, there will not be any European legislation breaking it down into different legally binding targets for the individual Member States. Instead the Member States will themselves designate the contributions they believe are appropriate to achieve the common target. The European Commission will table a proposal for how to implement this in detail in a follow-up process. Furthermore, the 2030

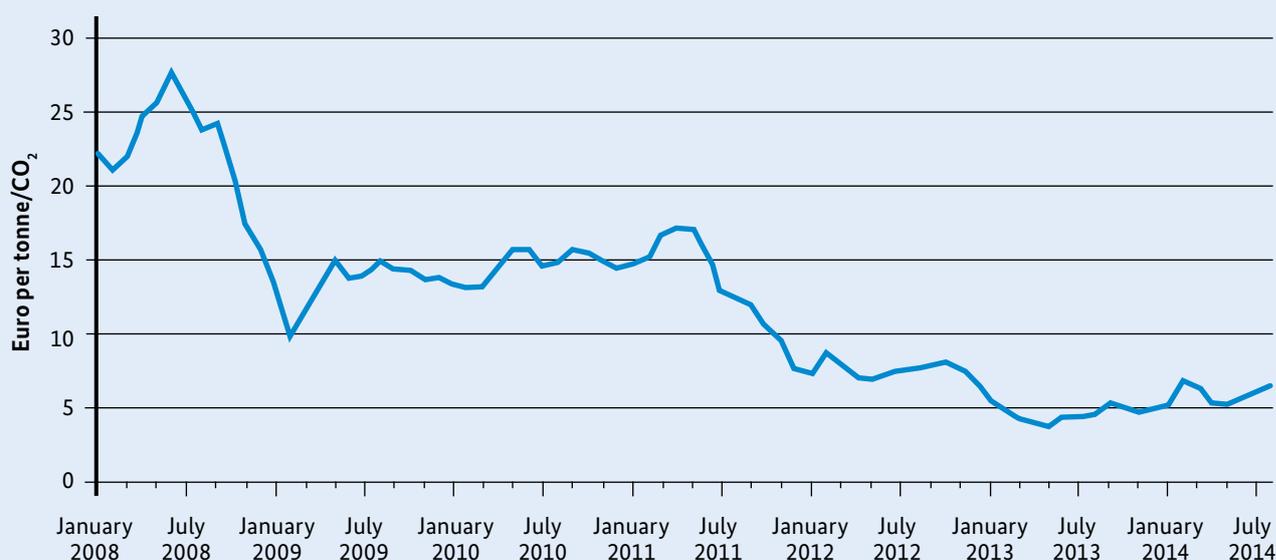
energy efficiency target, which is a key component, is scheduled to be raised to at least 27 percent primary energy saving in 2030 compared with a reference prognosis. The exact level of the target will be reviewed once more in 2020 and, if appropriate, may be raised to 30 percent.

It will only be possible to implement the decision taken by the heads of state and government on the 2030 European climate and energy package with the ambitious targets mentioned above if Germany, as the highest emitter within the European Union, achieves its contributions to climate change mitigation, renewable energy and energy efficiency.

4.2.3 Emissions trading

The EU emissions trading system (EU-ETS) covers the majority of emissions from the energy sector (over 90 percent) and industry (over 60 percent) and is the key European climate policy instrument. However, the EU's 2020 target to cut greenhouse gas emissions to 20 percent below 1990 levels, with the plan being to achieve half of that through the EU emissions trading scheme, is less ambitious than Germany's climate target for 2020. It was not possible to achieve agreement at EU level to raise the EU climate target for 2020 to 30 percent. Furthermore, considerable surpluses of tradable allowances have accumulated, primarily as a result of the economic crisis that began in 2008 and the very generous approach permitting the use of emission allowances from third-country projects. The current total is over two billion allowances. As a consequence, the price of allowances in the emissions trading system has fallen significantly (see Figure 3).

Figure 3: Trend in the price of emission allowances in the EU-ETS since 2008



Source: European Energy Exchange (the monthly average ICE price for one-year futures is shown)

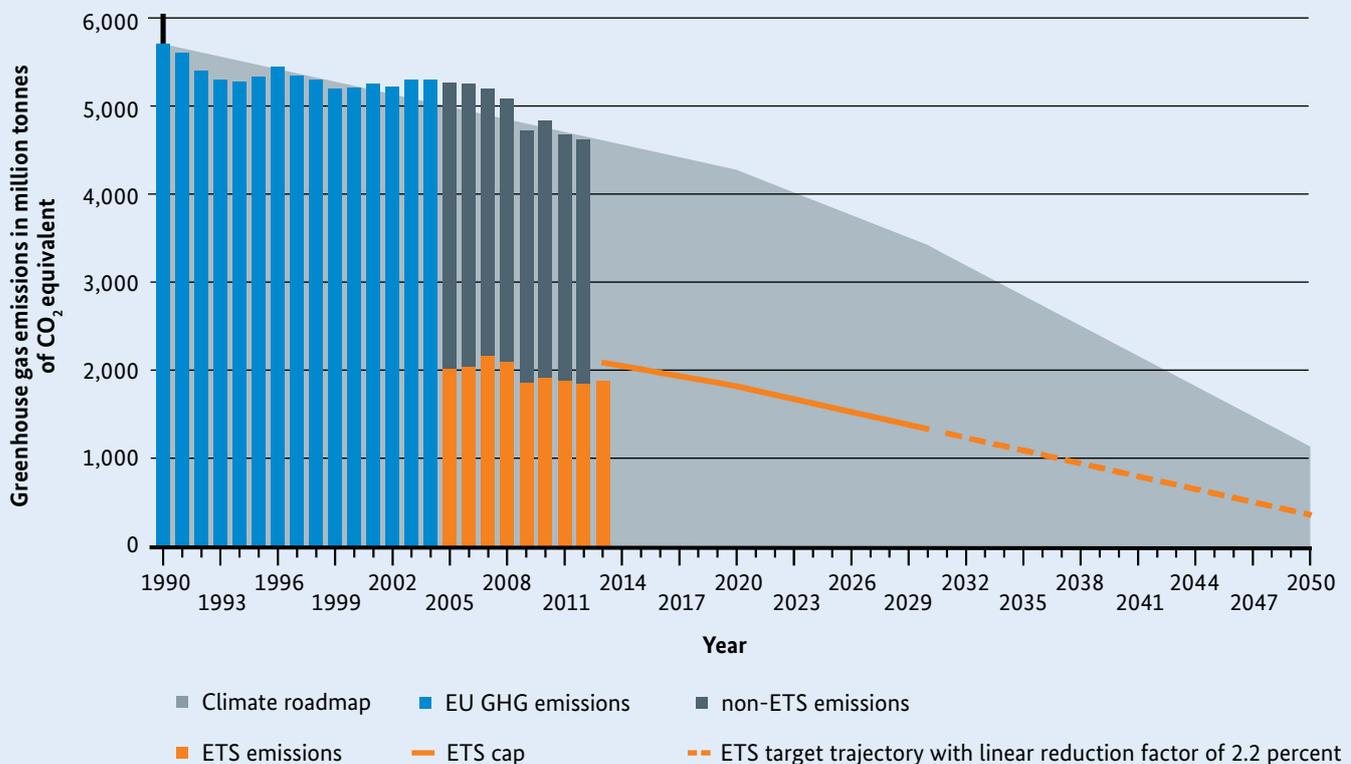
By comparison with the latest emissions estimate (projection report 2013), the current price of allowances in the emissions trading system is significantly lower than is needed to promote active climate change mitigation measures in the energy industry and manufacturing industry.

The first action adopted to stabilise the system was what is known as backloading, whereby the number of allowances auctioned each year from 2014 to 2016 is reduced by a total of 900 million. However, according to the latest decision, these allowances will be put back into the market again up to 2020. That will make the impact of backloading limited and its stabilisation effect short-lived. It is the first step towards the effective reform of the ETS which is needed to ensure the scheme has a key role as a harmonised European climate policy instrument and to create effective incentives to cut emissions.

In October 2014, the EU heads of state and government underlined the emissions trading system's key role after 2020. They also set out its contribution to climate change mitigation by 2030 at European level.

For example, by 2030 greenhouse gas emissions in the sectors covered by the emissions trading scheme will have to be cut by 43 percent from their 2005 level. This will be achieved by raising the annual reduction factor in the ETS from its current 1.74 percent to 2.2 percent from 2021 onwards.

Figure 4: Climate roadmap and EU-ETS targets

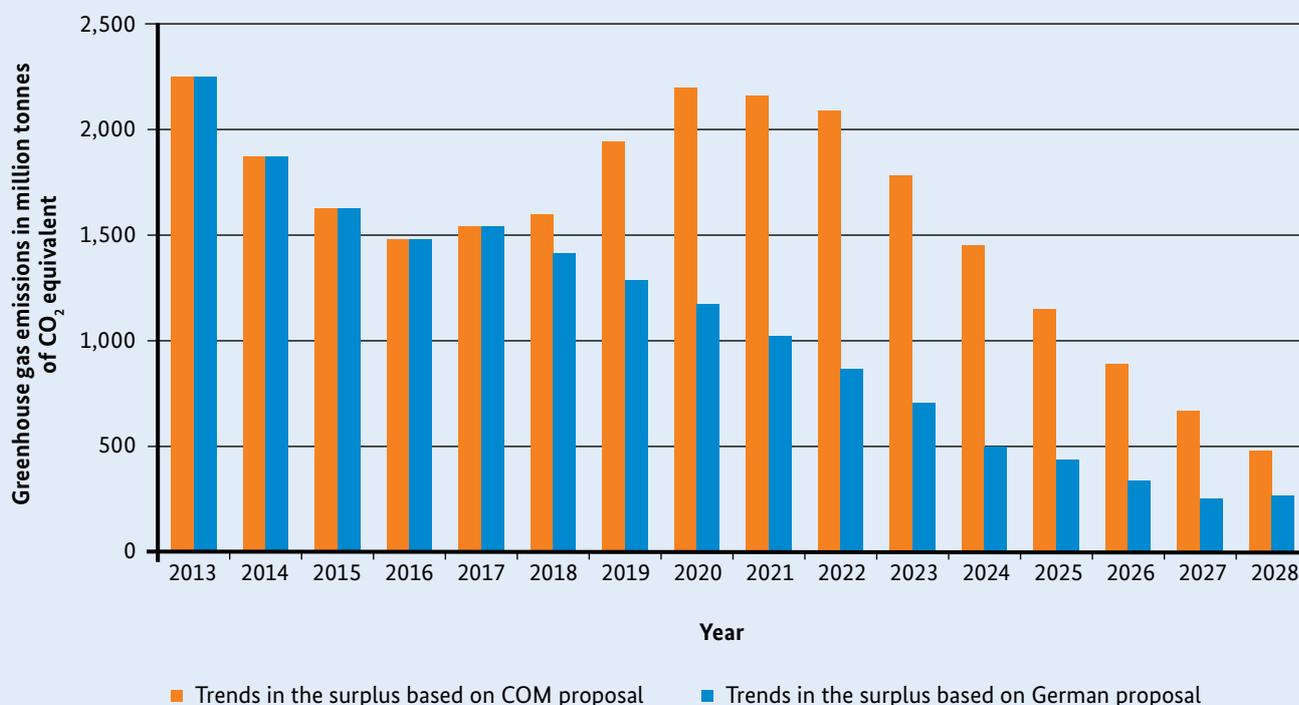


Source: Author's graph based on EEA data viewer and European Council decision

Market Stability Reserve as part of the reform of the emissions trading system

The Council has also expressed its support for a reform of the ETS by introducing a Market Stability Reserve. The aim of the reform is to reduce surpluses on a permanent basis and make the ETS more flexible in future and more able to respond to high fluctuations in demand and therefore in prices. Absorbing the most serious fluctuations in prices for emissions allowances will make the price signal more robust and consolidate the instrument's position again as an effective market instrument that allows industry to plan effectively. However, the reform must be carried out far sooner than planned to create the right incentives in time. The German government is therefore advocating for the Market Stability Reserve to start sooner, i.e. in 2017, and for the withheld volume of allowances (900 million) to be directly transferred into this reserve as part of the backloading process. However, it was not possible to get this included into the Council's conclusions and it must now with urgency be fed into the process of negotiating the legislative proposal that has already begun so that the legislative process can be brought to a swift conclusion. Many Member States have already expressed their support for Germany's proposals.

Figure 5: Trends in the surplus in the EU-ETS showing the MSR as proposed by the Commission and by Germany



Source: Authors' own depiction based on the Commission's view of emission trends (impact assessment on the Market Stability Reserve)

If these reform measures are fully implemented, the surpluses accrued in the ETS would be reduced more quickly so that the conditions on which the 2013 projection was based could be restored. However, according to current forecasts, a steeper price rise is not anticipated until 2025, so that the reform's contribution to a cost-effective achievement of European and national climate targets has a long-term character and also prevents the mitigation gap from becoming wider in 2020 than the findings of the 2013 projection show. It can also be expected that the market participants will anticipate the effects of the reform and the ambitious reduction path from 2020 onwards and may start to make reductions in advance. However, for this to happen it is essential that a decision be taken quickly (if possible in the first half of 2015).

The specific contribution made by the emissions trading scheme is thus very dependent on what shape the reform takes at European level and how quickly it is carried out. Because of the possibility of trading emissions allowances beyond borders between EU Member States, predictions about trends in greenhouse gas emissions in the sectors covered by the emissions trading scheme in any given Member State are fraught with uncertainty.

Greenhouse gas reduction

The contribution to cutting greenhouse gas emissions cannot currently be quantified. It depends on exactly how it is organised at EU level

Timetable

From 2017

4.3 Climate change mitigation in electricity generation

To achieve the desired emission reductions in the energy sector, the following aspects of electricity generation must be addressed, in addition to the reform of the emissions trading scheme:

- expansion of renewable energy,
- modernisation of the fossil power station fleet and
- development of combined heat and power generation.

Measures to reduce the electricity demand and load-dependent use of thermal storage systems also help to reduce emissions caused by electricity generation at European level (see NAPE described in Section 4.4).

Reductions in emissions from installations in Germany that are covered by the emissions trading scheme could reduce the demand for emissions allowances and possibly lead to additional emissions in other EU countries unless these surpluses are absorbed by a market stability reserve scheme. A market stability mechanism in the EU-ETS that works quickly

and effectively is an essential flanking measure to deal with surplus allowances so that interactions of different policy instruments in the energy sector can be absorbed and synergies created.

Any additional emissions produced by the expansion of electric mobility (one million electric vehicles in 2020) must also be taken into account.



4.3.1 Renewable energy

The use of renewable energy already makes a huge contribution to preventing greenhouse gas emissions. The 2014 amendment to the Renewable Energy Sources Act facilitates planning and control of the expansion of renewable energy. For example, it stipulates that the share of renewables in the electricity supply should be between 40 and 45 percent by 2025, rising to between 55 and 60 percent by 2035. One of the ways planned to enable this approach to be continued is to use a competitive tendering system to determine the level of support for renewable energy. This is an instrument that also facilitates quantity control and can therefore ensure adherence to the target corridors set. The German government is assuming that the new regulations in the Renewable Energy Sources Act will promote the continued expansion of renewable energy and that by 2020 the amount of electricity generated will be of roughly the same order as anticipated in the 2013 projection report.

To ensure the successful integration of renewable energy, the German government will reorganise the energy system. That includes appropriately upgrading the electricity grids.

Greenhouse gas reduction

The foreseeable trend roughly matches the projection; reduction contribution over and above that cannot be quantified

Timetable

Not applicable

4.3.2 Other measures, especially in the electricity sector

To meet the 2020 national climate target, it is essential that all sectors achieve an additional reduction contribution. A further 22 million tonnes will be achieved if the electricity sector and the European emission trading system are prioritised. The Federal Minister for Economic Affairs and Energy will table a regulatory proposal in 2015.

| | |
|---------------------------------|---|
| Greenhouse gas reduction | 22 million tonnes of CO ₂ equivalent |
|---------------------------------|---|

| | |
|------------------|------|
| Timetable | 2015 |
|------------------|------|

4.3.3 Combined heat and power

Fuel and CO₂ emissions savings can be achieved by combined generation of heat and power (CHP). The Federal Ministry for Economic Affairs and Energy is currently reviewing a study published in October 2014, which analyses the potential and benefits of CHP and evaluates the Combined Heat and Power Act (KWK-Gesetz), and is reviewing the opinions submitted on the study. On completion of its review it will publish an interim report, as required under Section 12 of the Combined Heat and Power Act.

The complexities of the current debate on the electricity market make it necessary to continue the CHP discussion and decision-making process in early 2015 in the light of fundamental decisions on the electricity market. Implementation of the Amendment to the Combined Heat And Power Act can then begin immediately after that and will not have to wait for the package of legislation on the electricity market to be introduced.

| | |
|---------------------------------|--------------------------------|
| Greenhouse gas reduction | Cannot currently be quantified |
|---------------------------------|--------------------------------|

| | |
|------------------|------|
| Timetable | 2015 |
|------------------|------|



4.3.4 LED lead market initiative

Lighting currently accounts for 16 percent of total electricity consumption in Germany (according to the Working Group on Energy Balances, 2013). A local authority guideline has in recent years promoted a change-over in street lighting and interior lighting to low-energy light-emitting diodes (LEDs).

Currently, lack of information and personnel shortages mean that many local authorities are not adequately exploiting efficiency potential in their outdoor lighting. Added to this is the fact that the initial investment is higher for LEDs than for conventional lighting.

To address this problem, a project to support the LED lead market initiative will work closely with local authorities and industry associations to canvass support for making greater use of new LED technology.

Greenhouse gas reduction 0.01 million tonnes of CO₂ equivalent

Timetable From 2015 onwards

4.4 National Action Plan on Energy Efficiency

In addition to reducing the CO₂ intensity of the electricity supply system (part of which involves increasing generation efficiency), lowering energy consumption (consumption efficiency) is also of key significance. For that reason, the German government's National Action Plan on Energy Efficiency (NAPE) sets out an efficiency strategy for the 18th legislative period. The measures set out in NAPE concentrate on the following areas:

- energy efficiency in buildings (see also Section 4.5);
- energy saving as a business opportunity and way of generating returns on investment;
- individual responsibility for energy efficiency.

Overall, the measures designed to increase energy efficiency – excluding those in the transport sector – are expected to bring about a total reduction in greenhouse gas emissions by 2020 of 25 – 30 million tonnes of CO₂ equivalent more than the projected figure. In this way, NAPE makes a significant contribution (namely 25 – 30 million tonnes of CO₂ equivalent) to meeting the government's climate targets.

NAPE's cross-cutting areas that are concerned with energy saving as a way of generating returns on investment and with individual responsibility for energy efficiency include a number of immediate actions designed to bring about rapid increases in energy efficiency, along with many other longer-term measures to save energy by 2020.

NAPE's immediate actions (cross-cutting, excluding buildings, which are described in Section 4.5):

- introduction of a competitive tendering system for energy efficiency (greenhouse gas reduction: 1.5 – 3.1 million tonnes of CO₂ equivalent);
- promoting energy performance contracting – indemnity bonds provided by guarantee banks for energy performance contract funding/ funding programme for energy savings performance contracting (greenhouse gas reduction: 0.3 – 0.5 million tonnes of CO₂ equivalent);
- enhancing KfW's energy efficiency programme (greenhouse gas reduction: 2.0 million tonnes of CO₂ equivalent);
- enhancing the use of waste heat;
- pilot programme for energy-saving meters;
- energy efficiency networks initiative (greenhouse gas reduction: 5.0 million tonnes of CO₂ equivalent);



- advice on local authority energy efficiency networks;
- promoting energy efficiency managers to harness potential e.g. in business and industrial parks
- sector-specific efficiency campaigns;
- EU energy efficiency labelling and ecodesign;
- national top runner initiative (greenhouse gas reduction: 5.1 million tonnes of CO₂ equivalent);
- mandatory energy audit requirement for non-SMEs (greenhouse gas reduction: 3.4 million tonnes of CO₂ equivalent);
- taking forward the initiative to support SMEs in implementing Germany's energy transition and its climate change mitigation policy ("Mittelstandsinitiative Energiewende und Klimaschutz");
- taking forward the programme to provide energy advice to SMEs;
- national efficiency label for old heating systems (greenhouse gas reduction: 0.7 million tonnes of CO₂ equivalent);
- programme to promote energy efficiency in the wastewater treatment sector;
- energy advice for agricultural businesses;
- reinstating the government programme to promote energy efficiency in agriculture and horticulture.

NAPE also contains more general measures (similarly excluding buildings, see Section 4.5):

- improving the conditions for energy efficiency services;
- new financing concepts;
- strengthening research to improve energy efficiency;
- advice: consolidation and quality assurance;
- developing key performance indicators and benchmarks in the commercial sector and for households;
- energy efficiency in information and communications technology.

4.5 Climate-friendly building and housing strategy

The German government will only be able to meet its climate targets if its policies on environment- and climate-friendly building, the development of energy-efficient neighbourhoods and cities and energy efficiency in buildings are dovetailed. This will enable climate-friendly building and housing to make an additional contribution to emissions reduction and to become a mainstay of the government's climate change policy.

If the goal of achieving a virtually climate-neutral building stock by 2050 is to be met, it is crucial that the right course be set today. At the same time, no other sector has such a direct effect on people's daily lives as the buildings in which they live, work and spend their free time.

The German government is going to develop an energy efficiency strategy in the buildings sector in 2015, with the Federal Ministry for Economic Affairs and Energy as lead agency (see Section 4.5.2).

It will also develop a climate-friendly building and housing strategy, with the BMUB as lead agency, which will combine the issues addressed in the energy efficiency strategy in the buildings sector with more general measures related to climate change mitigation.

As part of the climate-friendly building and housing strategy, more general issues related to housing, urban development, development of rural areas and the challenges posed by demographic change, for example, will also be addressed in collaboration with the Alliance for Affordable Housing and Building (Bündnis für bezahlbares Wohnen und Bauen). The German government is well aware that it will not be able to implement its climate-friendly building policy unless housing remains affordable for lower and middle income groups. With this in mind, cultural and social aspects – such as specific issues relating to villages, towns and cities or neighbourhoods and their infrastructure as units that have their own characteristics and challenges – are incorporated into the climate-friendly building and housing policies.

The climate-friendly building and housing strategy described here makes a significant contribution to meeting the 2020 climate target – taking overlaps into account – with a total reduction of about 5.7 – 10 million tonnes of CO₂ equivalent. Of that, 1.5 – 4.7 million tonnes of CO₂ equivalent are over and above the reductions in the buildings sector already included in NAPE.

4.5.1 Long-term goal: climate-neutral building stock

The climate-friendly building and housing strategy creates a reliable long-term framework for individuals, villages, towns and cities, and neighbourhoods, and thus contributes to the goal of achieving a virtually climate-neutral building stock by 2050. The social and economic effects – especially the affordability of new and existing buildings and housing in

particular and compliance with standards for housing for the elderly – are taken into account in all considerations. Environmental criteria (e.g. the sustainability of building materials) and avoidable health risks (e.g. from pollutants in indoor air) are also taken into account. It is important that the measures are adopted voluntarily and are economically feasible.

The German government will continually review its cross-cutting strategy to ensure it stays on course towards its long-term goal of achieving a virtually climate-neutral building stock by 2050. It will also develop other measures that are not linked to any particular technology and that will gradually help the building stock to move towards the long-term climate target.



The climate-friendly building and housing strategy also needs a reliable database. The government will therefore improve measures for collecting and analysing building data, which will make it possible in the medium term to carry out an assessment of the climate impact of the building stock that is as comprehensive as possible and is differentiated by building category. An initial survey based on available data will be regularly revised and enlarged over the next few years.

4.5.2 Energy efficiency in the buildings sector

The section of the National Action Plan on Energy Efficiency on energy efficiency in the buildings sector describes parameters for immediate measures to quickly increase efficiency (NAPE, cf. Section 4.4).

NAPE's immediate measures in the buildings sector cover:

- quality assurance and optimisation/development of existing energy advisory schemes (greenhouse gas reduction: 0.2 million tonnes of CO₂ equivalent);
- tax incentives for energy-efficient refurbishment (greenhouse gas reduction: 2.1 million tonnes of CO₂ equivalent);
- continuing, refining and providing additional funding for the low-carbon refurbishment programme up to 2018 (greenhouse gas reduction: 0.7 million tonnes of CO₂ equivalent);
- heating check-ups.



NAPE also mentions the following work processes associated with the key points of the energy efficiency strategy in the buildings sector:

- energy advice for local authorities;
- energy saving legislation;
- tenancy law;
- individual refurbishment timetables for residential and non-residential buildings;
- development of the Market Incentive Programme for Renewable Energies (MAP);
- setting new technical standards more quickly, including developing system components for building technology and fixed services;
- energy research: research network on energy in buildings and neighbourhoods.

The energy efficiency strategy in the buildings sector:

- paves the way for an assessment of the energy performance of the building stock that is as comprehensive as possible and is differentiated by building group;
- cites measures that focus on meeting the long-term goal of achieving a virtually climate-neutral building stock by 2050, which is part of the German government's energy concept;
- outlines measures that are not associated with any particular technology, which could help to achieve the energy targets in the buildings sector;
- works towards gradually raising the energy performance of the building stock to the level needed to meet the long-term climate target;
- is regularly reviewed as part of the Energy of the Future monitoring process.

4.5.3 Training initiative in building efficiency

Training on all aspects of energy-efficient building and refurbishment is of key importance to achieving the climate targets that have been set for the buildings sector. The “heat transition” cannot succeed without well trained designers and tradespeople. At the same time, cooperation among the different trades involved in energy-efficient building refurbishment still needs to be developed.

A project entitled “BUILD UP Skills – QUALITRAIN” supports vocational training and continuing professional development for people working in the construction industry and the establishment of a national qualifications platform financed by EU funds.

As part of the European Social Fund, the BMUB is also setting up a programme to promote cross-trade qualifications in energy-efficient building refurbishment. It focuses on informal, out-of-school and practical courses for trainees and trainers.

Greenhouse gas reduction

Comes under flanking measures

Timetable

“BUILD UP Skills – QUALITRAIN”: 2013 – 2016
Part of the ESF programme: 2015 – 2021

4.5.4 Climate-friendly housing for low-income households

Homes that have a high energy performance standard usually have higher rents but lower heating costs than those with poorer energy performance. However, the maximum rent allowances for people receiving income-support benefits are primarily based on rent that does not include heating costs. This means that homes where energy-efficient refurbishment has been carried out cannot usually be rented by people receiving income support benefits – despite the fact that the heating costs are lower. This regulation means in practice that in the medium term there is likely to be a higher concentration of benefit recipients in non-refurbished housing. In order to enable as many people as possible to live in climate-friendly homes, the German government is conducting an open-ended review procedure to add a climate component to housing benefit (once the ongoing housing benefit reform has been concluded), which would involve differentiating the maximum amounts payable based on the energy performance of the building being rented. That could enable more people receiving housing benefit to live in homes that have undergone energy-efficient refurbishment. Furthermore, as part of the proposed simplification of books II and XII (SGB II and SGB XII) of Germany's social code that regulates social welfare benefits, the possibility of amending them to allow local authorities to decide on the appropriate level of payments for accommodation and heating in an inclusive concept is being considered. If accepted, it would mean that heating and rental expenditure are seen as a single cost or benefits are based on rent that is inclusive of heating.

Greenhouse gas reduction

0.4 million tonnes of CO₂ equivalent

Timetable

Up to 2017

4.5.5 Rents map

Differences in energy performance are not always reflected in the market. A BMUB research project has shown that energy performance of buildings is currently included in only about half of rents maps in the country. For that reason, the regulations on local reference rents should be reviewed to consider the possibility of taking greater account of the standard of energy-related fittings and energy performance in rents maps.

Greenhouse gas reduction

Flanking measure

4.5.6 Energy efficiency measures and climate action in local authorities

Neighbourhood-based approaches play an important role in broadening the energy basis in the buildings sector to include more renewables and in small-scale approaches to improving the energy-efficient refurbishment of the building stock. Many energy-efficient projects can only work if all the stakeholders – in particular local authorities, housing companies and private households – take concerted action. This is the basis of KfW's energy efficient urban rehabilitation programme. On the one hand, it gives grants for the development of integrated rehabilitation strategies and, on the other hand, assumes a percentage of the costs for rehabilitation managers ("troubleshooters"). In addition to this, low-interest loans support investment in energy-efficient local authority energy supply systems. The German government will increase funding for the programme, improve its terms and conditions and the way it is linked to and coordinated with other grant programmes and create better options for accessing funding from more than one scheme. For example, the aim is that climate-neutral neighbourhoods should be developed and implemented as examples of best practice. At the same time, the possibility of integrating and providing better support for energy-plus buildings and innovative systems for energy generation in neighbourhoods should be reviewed in consultation with model projects on building and energy research (Zukunft Bau and EnEff:Stadt).



With the guideline on promoting climate action projects in social, cultural and public organisations (local authority guideline), which is part of its National Climate Initiative (NKI), the BMUB supports local authority climate action projects, such as developing and implementing climate change mitigation policies at local authority level, jobs in climate action management and investment measures. Since the launch of the National Climate Initiative, with its comprehensive range of options for providing funding and strategic support for climate action at local authority level, over 6,000 projects in around 3,000 local authorities have been launched. There will be a new application window within the local authority guideline for the 2015 – 2017 period. Another application window is also planned for 2017 – 2019. The German government will increase funding for the local authority guideline as part of the additional funding planned for the National Climate Initiative.

Greenhouse gas reduction

Energy efficient urban rehabilitation programme:
0.6 – 1.2 million tonnes of CO₂ equivalent
Climate change mitigation in local authorities:
0.3 – 2 million tonnes of CO₂ equivalent

Agreement on implementation (timetable)

With immediate effect

4.5.7 Climate-friendly heat generation

Climate-friendly building and housing means, firstly, keeping the energy consumption of buildings and neighbourhoods as low as possible. Secondly, the energy needed for space heating and hot water must be generated in a way that is as efficient and low-carbon as possible. By using the waste heat from the electricity generation process, combined heat and power (CHP) plants have great potential for avoiding greenhouse gases. In view of the growing heat efficiency of buildings, the use of fuel cells with a high electricity to heat ratio is becoming an increasingly attractive option. To drive forward climate-friendly heat generation, the German government will therefore amend the existing guidelines on micro-CHP units, which is part of the National Climate Initiative, refine them in harmony with its combined heat and power strategy and expand them to take account of the electricity market, e.g. by introducing a funding criterion for particularly electricity efficient systems (fuel cells).

Another important task is to eliminate existing obstacles, for housing companies that generate electricity from renewables or in combined heat and power plants, for example. If they fulfil certain criteria, housing associations are currently exempt from business and corporation tax. Other types of property development companies can apply for relief on business tax. However, any tax relief can be lost if they operate photovoltaic systems or combined heat and power plants. This problem has proved to be an obstacle, especially for use of CHP. The authorities have



already demonstrated possible solutions to the problem in the form of the decision issued by Düsseldorf regional tax office of 09.09.2013 (G 1425–2013/0015). However, if it is seen that obstacles continue to exist in practice, every attempt should be made to ensure that housing associations and companies do not lose their tax relief if they generate electricity from renewables or CHP.

Greenhouse gas reduction

Micro-CHP: 0.2 million tonnes of CO₂ equivalent
Tax obstacles: 0.23 million tonnes of CO₂ equivalent

Timetable

By the end of 2015

4.5.8 Competition for ideas: making climate-friendly building an attractive option

Attempts to harness the vast potential for reducing greenhouse gases by making energy savings in the building stock are still making only halting progress. One way of improving this is to make energy-efficient refurbishment a “lifestyle product”. To that end, a competition for innovative ideas will be held, in which representatives of different disciplines (advertising, psychology, construction, etc.) will seek new communications approaches to make climate-friendly and energy-saving building an attractive option.

Greenhouse gas reduction

Comes under flanking measures

4.5.9 Further measures

In addition to the measures listed in Section 4.5, the following activities also contribute to implementing the climate-friendly building and housing strategy:

- drawing up energy-efficient refurbishment timetables for the public sector (Section 4.11.4);
- implementing sustainability assessment systems not only at federal but also at Land and local authority level (Section 4.11.5);
- strengthening applied research in the urban development and buildings sector (Section 4.12.4).

4.6 Climate change mitigation in the transport sector

The measures adopted in connection with this Action Programme will make it possible to achieve a significant reduction in greenhouse gas emissions by 2020: taking the overlap effects of the different measures into account and removing them from the calculations, the total contribution to closing the mitigation gap by 2020 is roughly 7 – 10 million tonnes of CO₂ equivalent.

With the measures in the transport sector, the German government is also aiming to achieve the following targets for the transport sector, which it set in its Energy Concept:

- save around 10 percent of final energy consumption in transport by 2020 and around 40 percent by 2050 (baseline year 2005), and
- significantly increase electric vehicles' market share to one million by 2020 and six million by 2030.

The mobility and fuel strategy adopted by the federal cabinet in June 2013 will continue to be an important instrument for implementing the Energiewende, or energy transition policy, in the transport sector as defined in the national sustainability strategy. It gives an overview of the technologies used and of the energy and fuel options associated with the different modes of transport.

The EU's Clean Power for Transport Directive obliges Member States to establish fuelling and charging infrastructure for alternative fuels. National strategy plans have to be developed by the end of 2016.

4.6.1 Making freight transport climate-friendly

A package of measures has been put together to make freight transport more efficient and climate-friendly. The efficient reorganisation of road freight transport, expansion of rail freight transport and strengthening the role of waterways as a mode of transport complement and influence each other. Improved linking up of the different modes of transport also helps to make freight transport environmentally sound. To achieve this, a study will be conducted to develop recommendations for action, which identify how regulatory, infrastructure and fiscal incentives can be used to better integrate the different modes of transport. Local economies will also be supported.

In **road freight transport**, the **HGV toll** – which involves a mileage-based charge for use of motorways and trunk roads – creates an incentive to shift freight onto the railways and to make sure that vehicles are used to their full capacity and, by incorporating emission classes and in future also external costs, it encourages the use of HGVs with lower specific emissions of air pollutants. In the same way, it also encourages gradual replacement of the fleet and the use of modern, low-consumption technologies, which also lowers CO₂ emissions. The toll will initially be extended



to apply to all vehicles with a maximum laden weight of 7.5 tonnes or more, to an additional 1,100 kilometres of trunk road and from 2018 to all trunk roads. A separate toll category will be created for Euro VI vehicles. From the beginning of 2015, the external costs of air pollution caused by heavy HGVs will be included in the toll rates on a pro-rata basis – taking into account the caps set out in the EU Eurovignette Directive (on charging heavy goods vehicles for the use of infrastructure).

Greenhouse gas reduction 0.3 – 0.7 million tonnes of CO₂ equivalent

Timetable

3rd Act Amending the Federal Trunk Road Toll Act (Bundesfernstraßenmautgesetz) (not yet in force): Another 1,100 km of fourlane trunk roads from 1 July 15
HGVs of 7.5 tonnes or more from 1 October 15
Revision of the EU Eurovignette Directive (including raising or removing caps on external costs)

To accelerate the market penetration of measures designed to increase the efficiency of commercial vehicles, the German government aims to **introduce staggered HGV toll charges based on the vehicles' energy consumption in a way that will be revenue neutral**. It will work towards creating the conditions needed to do this.

Greenhouse gas reduction 1.5 – 2.3 million tonnes of CO₂ equivalent

Timetable

Revision of the EU Eurovignette Directive (CO₂ emissions as the basis for a scale of toll charges, new system) by 2017
EU: conclude the process of developing a methodology for determining CO₂ emissions. Revision of the EU Weights and Dimensions Directive (permitting HGVs with better aerodynamics)

Furthermore, the **market launch of energy-efficient commercial vehicles** that use hybrid technology, for example, will be supported by a fixed-term incentive scheme starting in 2016.

Greenhouse gas reduction 1.0 – 1.5 million tonnes of CO₂ equivalent

Timetable

Incentive scheme for purchases of hybrid HGVs starting in 2016

Rail freight transport will be significantly strengthened because shifting freight transport onto the railways will achieve a further reduction in greenhouse gas emissions. For that reason, there will be much higher investment in upgrading rail infrastructure. Funding for combined transport will be kept at a high level and possibilities of making it easier to access funds that can be justified in the budget will be considered. A more conducive environment for rail freight will also be created by:

- Tackling bottlenecks in the infrastructure for rail freight transport, especially for the Rhine rail corridor and North Sea docks/hinterland connections and smaller-scale infrastructure measures (electrification, new sidings, optimisation of nodes).
- The prioritisation strategy set out in the 2015 Federal Transport Infrastructure Plan specifically states that eliminating bottlenecks in the rail network must be a priority and it also takes that into account in the allocation of funding to the different modes of transport. This will make the railways even more competitive.

Greenhouse gas reduction

The measure has a combined effect with road freight transport measures (1.5 – 1.8 million tonnes of CO₂ equivalent)

Timetable

Gradual but significant increase in budget funds for rail transport for 2016, 2017 and 2018

As a flanking measure, **inland waterway transport** will be strengthened. This will be done by creating incentives to shift freight transport to inland waterways, taking nature conservation aspects into account. Carefully targeted infrastructure measures will be put in place and investment in the canal network will be made. Additional funding will be provided for infrastructure measures to improve the quantitative and qualitative performance of shipping/waterway transport, in line with the priorities set in the 2015 Federal Transport Infrastructure Plan.

Wherever possible, shoreside electricity will be supplied from renewable sources. The electricity consumption tax rate will continue to be lower for shoreside electricity. The government will support the expansion of the liquefied natural gas (LNG) infrastructure as far as its sphere of influence allows. It will also support retrofitting inland vessels with LNG drives and fitting them as standard on new vessels. The greenhouse gas balance will be considered as a whole, taking methane slip into account. The funding guideline for lower emission engines in inland shipping will be revised with the aim of creating further incentives to invest in reduction measures. Funding for combined transport will remain at a high level and possibilities of making it easier to access funds that can be justified in the budget will be considered.



| | |
|---------------------------------|--|
| Greenhouse gas reduction | The effect of the measure in isolation has not been quantified because it complements measures regarding road and rail freight transport |
| Timetable | Revision of the 2015 incentive scheme for engines. Provision of additional funds for waterways for 2016 to 2018 |

Local economies will be strengthened and delivery traffic organised on a more environment-friendly basis, e.g. by creating transport clusters in densely populated areas and making greater use of freight bicycles. To this end, local authorities will join forces to develop commercial areas. Freight transport centres with combined transport facilities contribute to this. Links will be made to ongoing processes to market products locally. The German government will use the possibilities at its disposal to support these processes e.g. by offering advisory services.

| | |
|---------------------------------|--|
| Greenhouse gas reduction | 0.5 – 1.1 million tonnes of CO ₂ equivalent |
| Timetable | Preliminary studies by the German government from 2015 onwards |

4.6.2 Making passenger transport climate-friendly

A raft of measures will be put in place to make passenger transport more environment- and climate-friendly. They will focus on strengthening local **public transport** and long-distance passenger transport and on strengthening cycle and pedestrian transport. Mobility management systems will also be promoted. In the area of public transport, the federal government provides financial support to the Länder and local authorities in the form of regionalisation funds, through legislation on unbundling (Entflechtungsgesetz) and under the provisions of legislation regulating federal government support for local transport funding (Gemeindeverkehrsfinanzierungsgesetz) and in this way contributes to more environmentally sound mobility. Ensuring that local public transport infrastructure is needs oriented is one of the key duties of the Länder and local authorities. As set out in the coalition agreement, this is the subject of ongoing negotiations on the reorganisation of financial relations between the federal government and the Länder. As part of an overall compromise, reliable follow-on financing should be secured without delay for the above mentioned legislation on federal government support for funding for local transport infrastructure. Promotion of alternative drives systems in local public transport will continue in line with ongoing grant programmes, including those that are funded by the National Climate Initiative.

Federal funds for **long-distance public transport** will be significantly increased. In particular, rail transport will be expanded (see also rail freight transport: funds for rail infrastructure will be increased each year from 2016 to 2018).

The German government supports the nationwide introduction of e-tickets and an improved passenger information system to make public transport more attractive.

Greenhouse gas reduction

0.7 – 1.0 million tonnes of CO₂ equivalent

Timetable

Ongoing discussions on the reorganisation of financial relations between the federal government and the Länder.
Gradual but significant increase in funds for rail transport infrastructure in the three years from 2016 to 2018



Cycle and pedestrian transport have significant potential for reducing CO₂ emissions, especially over short and medium distances. The latter is being supported particularly through developments in electric bikes and pedelecs. Cycle paths are being expanded on trunk roads and federal waterways (upgrading towpaths). Specifically, grant programmes for cycle and pedestrian transport will be set up, allocation of federal funds to build cycle paths will be designed to effectively increase cycle traffic, and new financing instruments will be developed. Intermodal transport options will be promoted and environment-friendly modes of transport will be strengthened (including giving them preferential treatment when dividing up road space). To increase traffic safety, local authorities are to be given greater powers to decide what speed limits they wish to introduce.

Greenhouse gas reduction

0.5 – 0.8 million tonnes of CO₂ equivalent

Timetable

Term of the 2020 National Cycle Paths Plan
Adapt the Highway Code (Strassenverkehrsordnung) accordingly

Greenhouse gas emissions can be efficiently prevented by **promoting corporate mobility management**, which can achieve greater use of local public transport and increase occupancy rates of cars in commuter traffic. An incentive scheme for mobility management is being developed, including setting up a separate incentive programme with funding guidelines.

Greenhouse gas reduction

Comprehensive quantification is not currently possible. Within the programme on efficient mobility entitled “effizient mobil,” average savings of 250 tonnes of CO₂ per year and company were achieved.

Timetable

Funding guidelines to be developed from 2015

Fuel-saving driving techniques will be encouraged by issuing vouchers for fuel-saving training courses to people purchasing a new car. Another idea would be to offer lower insurance premiums to drivers who had completed a fuel-saving training course, to introduce dashboard displays showing consumption and when to change gear or speed governors for HGVs (cf. also Section 4.6.1). The German government will hold talks with the motor and insurance industry on these ideas.

Greenhouse gas reduction

0.4 – 0.8 million tonnes of CO₂ equivalent (for cars and HGVs)

Timetable

Talks to start in 2015

Legislation will be introduced to promote **car sharing** in towns and cities. A separate act will be created to give preferential treatment to car sharing. The Highway Code can also be amended to include preferential arrangements. This new legislation will include dependent powers to issue statutory instruments to create separate car sharing bays and the possibility of making vehicles used for car sharing exempt from parking charges. It will also contain regulations about defining and identifying car sharing vehicles.

Greenhouse gas reduction

Not quantifiable

Timetable

2015



4.6.3 Increased use of electric drives in vehicles

Increasing electrification of vehicle drives in passenger and freight transport is of key importance in reducing CO₂ emissions in the transport sector in the medium and long term. Since the reduction effect depends on the market penetration of electric vehicles, the German government will create conditions that are conducive to their rapid market launch and to meeting its target of one million electric vehicles by 2020. This will achieve a CO₂ reduction of 0.7 million tonnes over and above that described in the projection report, which assumes a fleet of 600,000 electric vehicles in 2020. One of the main options under consideration is a special depreciation allowance for commercial electric vehicles, which would be jointly financed by the federal government and the Länder. As part of its efforts to advance its mobility and fuel strategy and implement the Clean Power for Transport Directive, the government will promote the establishment of an appropriate number of charging stations. During this legislative period, it will also carry out a field trial on electric drives in heavy commercial vehicles as a continuation of the BMUB's ongoing ENUBA project. In 2015, the federal government will also launch a procurement campaign in consultation with the Länder, which contains information about electric mobility and is also intended to increase the share of electric vehicles in the federal and Land governments' vehicle fleets. The government's 2011 electric mobility programme already set the target that 10 percent of vehicles purchased or leased by federal government departments should meet emission standards of less than 50 grams of CO₂ per kilometre.

Greenhouse gas reduction 0.7 million tonnes of CO₂ equivalent (by meeting the target of one million vehicles in 2020) – significantly more after 2020. The reduction does not take additional emissions in the electricity sector into account.

Timetable Review the possibility of a special depreciation allowance and of possible further measures: from 2015

4.6.4 Cross-cutting measures in the transport sector

The aim is to create incentives for climate-friendly mobility in the federal public administration. This would have a positive spillover effect because not only federal and Land government agencies but also private sector and non-profit institutions would follow the example set. Incentives for increased use of public transport and bicycles are feasible options.

Greenhouse gas reduction Depending on what measures are implemented, 0.15 – 0.3 million tonnes of CO₂ equivalent

Timetable Up to 2017

Natural gas and liquefied petroleum gas are eligible for tax concessions until 2018. The coalition agreement and the government's mobility and fuel strategy contain provisions for these tax concessions to be extended beyond this period.

Greenhouse gas reduction 0.25 million tonnes of CO₂ equivalent

Timetable 2016/2017

4.6.5 Climate change mitigation measures in air transport

The **Single European Sky** initiative sets and controls performance targets for its key parameters. They include environmental efficiency, which involves flight routes from the departure to destination airport being as direct as possible.

Greenhouse gas reduction Not quantifiable

Timetable Ongoing process

4.6.6 Supporting climate change mitigation in international maritime transport

Climate change mitigation measures in international maritime transport cannot be counted towards national reduction targets. The Action Programme lists them nevertheless because they play an important role in global climate action. One of the primary goals is to implement as agreed the Monitoring, Reporting, Verification Directive (MRV) in maritime transport at EU level and then carry out MRV at International Maritime Organization (IMO) level. Measures to reduce CO₂ emissions from international maritime transport will be introduced at IMO level if possible. Fuel initiatives designed to cut greenhouse gas emissions will also be supported, as will the expansion of onshore LNG infrastructure and LNG use by ships based on the best available technology to ensure methane slip is minimised.

Greenhouse gas reduction

Up to 0.6 million tonnes of CO₂ equivalent

Outlook

Ambitious attempts to reduce emissions in the transport sector will continue **post-2020**. A central element of this will be to take them forward at EU level. In its conclusions of 23/24 October 2014, the European Council asked the Commission to continue to review instruments and measures for a comprehensive and technology-neutral strategy for the post-2020 period. At the same time, the German government will promote the development, testing and market launch of the technologies needed to achieve the ambitious limit and target values.

In the international context, it is crucial that global market-based climate change mitigation measures be implemented in 2016, and efficiency targets for aviation be agreed and enter into force by 2020 at the latest.

In line with the resolutions taken at the 2016 session of the International Civil Aviation Organization's Assembly (ICAO), the question of whether the regulations on aviation in the European emissions trading system should be updated will be considered.

In freight transport it will also be important to create the conditions needed to achieve significant reductions in emissions beyond 2020. The necessary infrastructure measures have to be put in place and firmly established in planning processes. In particular, there will be increased expansion of the rail network as a flanking measure, which will also strengthen rail freight transport.

Similar steps also have to be taken to promote public transport, taking care to ensure that any support measures are linked to requirements to improve climate change mitigation and environmental protection activities that are effective, binding and also practical and economically feasible. In this context, it is important to create a good enabling environment to promote a steady long-term increase in non-motorised transport.

Finally, each alternative fuel should be scrutinised to establish whether it brings about a reduction in emissions that is sustainable and permanent when all the processing phases are taken into account.

4.7 Reducing non-energy-related emissions in industry, commerce, trade and services

Measures to reduce energy-related emissions by making energy savings in industry are described in the National Action Plan on Energy Efficiency (NAPE). Emissions from large-scale industrial installations are also addressed through the emissions trading scheme. Below is a description of complementary measures to reduce non-energy-related emissions.

Measures in the agriculture sector outlined in Sections 4.9.1 and 4.9.2 also contribute to greenhouse gas reductions that are recorded in the industry sector. The amendment to the Fertiliser Application Ordinance (Düngeverordnung), under which fertiliser production will be scaled back, will also bring about a reduction in greenhouse gas emissions from industry by up to 2.5 million tonnes of CO₂ equivalent in 2020 and a measure to increase the percentage of organically farmed land will bring about a reduction in greenhouse gas emissions of up to 0.25 million tonnes of CO₂ equivalent in 2020.

Overall, the measures outlined here and in Section 4.9 will achieve a reduction in non-energy-related emissions in industry of between 2.5 and 5.2 million tonnes of CO₂ equivalent.

4.7.1 Increasing waste avoidance, recycling, and reuse

Waste avoidance, recycling and reuse are key strategies in resource conservation, which in turn helps to reduce greenhouse gas emissions. Furthermore, interference with the environment involving the extraction and processing of mineral resources are indirectly reduced. Aims in this field are to:

- implement the 2013 waste avoidance programme, review indicators and set qualitative targets and measures to promote reuse of electrical and electronic appliances and bulky waste;



- further develop the Packaging Ordinance (Verpackungsverordnung) so as to create fully fledged primary legislation on recyclables, which would include introducing a recyclables bin;
- amend the Commercial Wastes Ordinance (Gewerbeabfallverordnung) to include more stringent separate collection obligations, a requirement to pre-treat municipal waste and standards for sorting facilities;
- introduce measures to facilitate multiple use, lifetime optimisation and reuse and shared use of products; support for community initiatives in this field.

Greenhouse gas reduction

1.85 million tonnes of CO₂ equivalent

Timetable

Review and implementation of measures adopted in the 2013 German waste avoidance programme, drafting legislation on recyclables from late 2014; other measures from 2015 onwards

4.7.2 Reducing F-gas emissions

Other gases besides CO₂ contribute significantly to global climate change. Continuing to reduce emissions of fluorinated greenhouse gases (F-gases) is therefore an important part of the Action Programme. To achieve this, the following measures will be launched:

- implementation of the EU F-gas regulation (no. 517/2014);
- diversified preparatory and flanking measures to implement the F-gas regulation effectively and ahead of the deadline, including activities such as increasing technical advisory services, training and continuing professional development and promoting greater use of non-halogenated refrigerants (such as CO₂ or hydrocarbons) in vehicle air-conditioning systems, transport and stationary refrigeration and air conditioning units;
- continuation of the National Climate Initiative's (NKI) incentive programme to promote efficient refrigeration and air conditioning units in companies, along with regular adaptation. Consideration of increasing funding, the introduction of an advisory component and extension of the programme to mobile applications.

Greenhouse gas reduction

0.6 million tonnes of CO₂ equivalent

Timetable

Gradual implementation of all the measures mentioned starting in 2015



4.7.3 Increasing resource efficiency

Resource-efficient production technologies and practices can make a significant contribution to avoiding environmental pollution and CO₂ emissions. Companies have been able to acquire valuable experience in this field through the “resource efficiency network”. Research and development activities help to develop resource-efficient technologies and practices. The following measures will be launched to achieve this:

- incentives and existing activities designed to create resource efficiency networks will be consolidated and expanded. Independently of that, each network can decide for itself in the context of the energy efficiency networks initiative (cf. NAPE) whether material flows and the environmental impacts associated with them should also be considered;
- provision of information for companies to enhance the diffusion of resource-efficient technologies and practices;
- consolidation of existing research programmes working on resource efficiency and reviewing possible expansion and provision of additional funding.

Greenhouse gas reduction Cannot currently be quantified

Timetable Ongoing from 2015

4.8 Waste and recycling management and other emissions

75 percent of emissions in this sector are accounted for by landfills. Despite the huge decline in emissions in this field, further potential could still be harnessed by 2020.

Other waste management measures to reduce greenhouse gas emissions are to some extent recorded in other source categories: for example, the use of secondary raw materials from recycling processes, which produces lower greenhouse gas emissions than when primary raw materials are used, is recorded in the industry processes category.

The measures described here will produce a reduction in emissions in the waste management sector of 0.5 – 2.5 million tonnes of CO₂ equivalent.

4.8.1 Aeration of landfills to reduce methane emissions

Using in-situ aerobic stabilisation (landfill aeration), biologically degradable waste undergoes microbial oxidation. Instead of being converted into methane, which is what happens during anaerobic degradation, the biogenic carbon in the waste is converted under aerobic conditions into carbon dioxide (which in this case is greenhouse-neutral because the carbon is biogenic in origin) and the landfill's potential to form methane is correspondingly reduced. The aeration should last for between one and five years, depending on conditions in the landfill. Assuming the measure is successfully implemented, a landfill's potential to form methane would be reduced by about 90 percent.

The existing support available under the National Climate Initiative's local authority guideline will be extended to more landfills and to larger ones. In all, between 200 and 300 of the 400 household waste landfills are suitable for stabilisation. A project has been set up to provide information and motivate stakeholders concerned.

Greenhouse gas reduction

0.5 – 2.5 million tonnes of CO₂ equivalent

Timetable

Stabilisation will start on 25 – 30 landfills a year between 2015 and 2018

4.9 Agriculture

Based on the measures described here, a total reduction in non-energy-related emissions in the agriculture sector of around 3.6 tonnes of CO₂ equivalent can be achieved (taking overlap between the measures into account), which would at the same time contribute to the target stated in the government's sustainability strategy of reducing the nitrogen surplus on agricultural land and in livestock housing, passing through air, soil and water, to 80 kg N/ha.



4.9.1 Amendment to the Fertiliser Application Ordinance

The use of nitrogen fertilisers in agriculture causes direct N₂O emissions from the fertilised soil and indirect N₂O emissions as a result of reactive nitrogen compounds (mainly ammonia) leaching to non-agricultural land. In addition to this, emissions are produced during the manufacture and transport of mineral nitrogen fertilisers. Improving nitrogen use efficiency and reducing nitrogen surpluses when applying fertilisers helps to reduce emissions. Improving and using low-emission application methods for farm manure and mixing farm manure with high nitrogen levels immediately into the soil on untilled arable land reduces ammonia losses and thus lowers indirect nitrous oxide emissions.

The main features of the amendment to the Fertiliser Application Ordinance will include:

- the introduction of a fertiliser requirement calculation that is mandatory, standardised throughout Germany and must be documented;
- extension of the periods in autumn and winter during which applying fertiliser is prohibited;
- gradual increase in storage capacity for farm manure;
- improving application techniques and imposing requirements to use low-emission application techniques for liquid farm manure;
- making requirements on nutrient comparison more precise, reducing the control value of the nitrogen balance and extending measures imposed if control values are exceeded.

Greenhouse gas reduction

3.3 million tonnes of CO₂ equivalent
 Additionally, up to 2.5 million tonnes of CO₂ equivalent in industry as a result of lower fertiliser production

Timetable

Can be achieved in the short to medium term as a result of the amendment to the Fertiliser Application Ordinance; likely to enter into force in 2015

4.9.2 Increasing the percentage of organically farmed land

The German government's national sustainability strategy states that 20 percent of agricultural land should be organically farmed in future. In 2013, the percentage was 6.4 percent. The main reason that organic farming causes few greenhouse gas emissions is the fact that it does not use mineral fertilisers. Furthermore, additional greenhouse gas reductions are achieved because organic farming does not use plant protection products made from synthetic chemicals and buys in little additional animal feed.

- The focus is on the details of how to promote organic farming at Land level within the strategic plan of the Federal Government/Länder Joint Task for the Improvement of Agricultural Structures and Coastal Protection. The federal government's programme to promote organic farming and other forms of sustainable agriculture will be continued.

Greenhouse gas reduction

0.3 million tonnes of CO₂ equivalent if the percentage of organically farmed land is increased by two percent. An additional reduction of up to 0.25 million tonnes of CO₂ equivalent in industry as a result of reduced fertiliser production.

Timetable

From 2015

4.10 Land use, land use change and forestry

CO₂ emissions from agricultural land and CO₂ sinks have thus far not been included in the analysis of progress towards national and European climate targets. There is, however, considerable potential for greenhouse gas reductions in this sector. Using peat land for arable and grassland farming alone causes emissions of 37 million tonnes of CO₂ equivalent, which equates to about four percent of Germany's total greenhouse gas emissions. It is anticipated that emissions in this sector will be comprehensively included in climate targets at both international and European level after 2020 and that the Parties will have to put measures in place to address them.

**4.10.1 Conserving permanent grassland**

When permanent grassland is ploughed up, soil organic matter is lost along with the carbon held in it, which is released as CO₂. Furthermore, the increased mineralisation of the soil organic matter causes nitrogen to be released, which when converted can cause nitrous oxide emissions. Ploughing up permanent grassland releases far greater quantities of CO₂ more rapidly than newly created grassland can sequester. The federal government will work with the Länder to conserve permanent grassland by implementing the decisions taken under the Common Agricultural Policy and by making it a priority when it comes to the details of agro-environmental and climate change measures at Land level.

Greenhouse gas reduction

1 – 2 million tonnes of CO₂ equivalent

Timetable

From 2015

4.10.2 Peat land conservation

Greenhouse gas emissions from drained peat land can be reduced by increasing the water level. Almost complete rewetting of peat lands makes it possible to reinstate their carbon storage function. This also has significant positive effects on the water balance and biodiversity.

The aim is for the federal government and Länder to agree a target with the involvement of the agricultural ministry based on a position paper of November 2012 by the Federal Government/Länder Working Group on Nature Conservation, Landscape Management and Recreation (LANA).

Greenhouse gas reduction

1.5 – 3.4 million tonnes of CO₂ equivalent

Timetable

From 2015

4.11 The government's role in demonstrating best practice

In addition to the contributions by the individual sectors, cross-sectoral measures are also needed to help achieve climate targets. Seen in isolation, it is not always possible to quantify the impact of these measures on greenhouse gas emissions.

4.11.1 Public procurement: strengthening the competence centre for sustainable procurement and the alliance for sustainable procurement

In setting standards for purchasing energy-efficient products and services, procurement law already makes a contribution to climate change mitigation. The federal government, Länder and local authorities have been working together in an alliance for sustainable procurement since 2010. In addition to mainstreaming sustainability in procurement law, it is also important that the possibilities for purchasing sustainable products and services available in the procurement practice of the federal government, Länder and local authorities become better known and that advisory services be expanded. There are plans to expand the competence centre's existing advisory services and intensify cooperation with other relevant institutions.

Greenhouse gas reduction

0.2 – 0.3 million tonnes of CO₂ equivalent

Timetable

Work has already begun

4.11.2 German government's "sustainability" action programme

The German government's "sustainability" action programme, which dates back to 2010, aims to make the federal public administration more sustainable. Alongside sustainable procurement, the programme also includes measures relating to buildings, energy supply, environmental management, sustainability, event management and mobility. Climate-relevant aspects are at present an integral part of the different sections of the sustainability programme. The programme is currently being updated with the aim of stepping up climate change mitigation measures.



Greenhouse gas reduction

Not possible to assess

Timetable

An evaluation is being carried out; the programme is scheduled for revision in early 2015

4.11.3 Climate-damaging subsidies

The German government's subsidy policy follows guidelines stipulating that environmental aspects be taken into account both when introducing new subsidies and reviewing existing ones. By ruling out the possibility of disincentives arising from climate-damaging subsidies, it is possible to harness reduction potential and at the same time create financial flexibility. This has been repeatedly stressed at international level: the Kyoto Protocol explicitly requires that subsidies that impede the reduction of greenhouse gases be abolished. Within the G20 resolutions in Pittsburgh in September 2009, the heads of government committed to "rationalise and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption".

One of the aspects the planned review of existing subsidies will look at is their environmental sustainability. This includes a review of whether they have a climate-damaging effect. At the same time, initiatives at EU and international level to abolish climate-damaging subsidies are being supported.

Greenhouse gas reduction

Not possible to assess

Timetable

Summer 2015: presentation of the 25th report on subsidies

4.11.4 Drawing up energy-efficient refurbishment timetables for the public sector

Making public buildings energy-efficient is important for reasons other than the direct effect of cutting greenhouse gases. It also enables the public sector to demonstrate best practice, which in turn supports the dissemination and public acceptance of rehabilitation measures, especially in non-residential buildings. The German government will therefore:

- draw up an energy-efficient refurbishment timetable for public buildings, demonstrating best practice in improving the energy performance of the federal government's properties;
- support the Länder, local authorities and other public bodies, including as part of its energy efficiency strategy in the buildings sector (cf. NAPE), in drawing up similar energy-efficient refurbishment timetables for their properties.

Greenhouse gas reduction

0.1 – 1.7 million tonnes of CO₂ equivalent

Timetable

With immediate effect

4.11.5 Implementation of sustainability assessment systems at Länder, local authority and federal government level

The federal government's Assessment System for Sustainable Building (BNB) can be used to carry out a comprehensive analysis of a building throughout its entire life cycle, which may also include climate-relevant indicators. Implementation of this sustainability assessment will also be strengthened at Land and local authority level.

There are also plans to support advisory services and research when the Assessment System for Sustainable Building's Use and Operation module is adopted by building operators working on behalf of public sector bodies and when corresponding monitoring procedures are developed. Furthermore, there are plans to develop the Assessment System for the housing industry and private building owners.

Greenhouse gas reduction

Included in flanking measures

Timetable

With immediate effect

4.12 Research and development

Science has played a major role in climate change becoming recognised as a problem and in identifying its causes. Research and development are also key drivers in finding solutions to the problem. It has been creating the conditions needed to lower greenhouse gas emissions in the different sectors since 1990. For example, the efficiency of technical appliances has increased enormously, methods of promoting renewable energy have been developed and Germany has been able to establish itself as a world leader in climate change mitigation.

In its research and development funding, the German government focuses on technologies, strategies and processes that strengthen its competitive edge and at the same time promote sustainability. Cross-ministerial collaboration, international cooperation and consultation and coordination among stakeholders play a key role. Major issues that are relevant to climate change mitigation research include social and economic aspects, energy, global change, resources and sustainability and the Earth system.

Two main areas for action on climate change are transition research and energy research. Transition research is concerned with technical and social innovations that promote the development of climate-friendly alternatives to existing technology, including production technologies, and advance their spread. Energy research focuses on research, development and demonstration of new technologies along the entire energy chain from generation and transformation through to transport, storage and use of energy. Renewable energy and energy efficiency are the key areas. Both aim to make the energy transition possible and to create scope for action by facilitating adaptation to a new energy policy environment. Research on the social conditions needed for the energy transition to succeed is also an important element. The building and urban design sectors play an outstanding role in this context. Further research and development is crucial to achieving the goal of making the entire German economy climate-neutral. Research asks questions, the answers to which enable us to act responsibly towards the future. It also provides appropriate advice and support to policymakers and society in their current endeavours to make decisions about climate change mitigation.



4.12.1 Research for the energy transition

In view of the complexity of the energy transition, the Energiewende, it is essential that the various individual solutions for a future energy system be harmonised; an integrative view of technical feasibility, economic implementation, environmental impact, the energy policy environment and social aspects is crucial. The German government's 6th energy research programme is being developed and implemented in a trans-disciplinary approach.

Greenhouse gas reduction

Comes under flanking measures

Timetable

Ongoing

4.12.2 Research into preventing climate change

Climate change is one of the greatest global challenges. The aim of the international community is to limit the average rise in global temperature to a maximum of 2°C. To achieve this climate target and implement effective measures to adapt to climate change, research into preventing climate change pursues the following three goals: 1) carry out excellent research to urgently close gaps in knowledge on climate change, 2) build competence in using knowledge about the climate that will be effective in practice, and 3) develop innovation dynamics for sustainable growth.

Greenhouse gas reduction

Comes under flanking measures

Timetable

From 2015

4.12.3 Socio-environmental research

The findings of scientific research alone are not sufficient to develop strategies for action to address climate change. How people perceive climate change, what consequences it has for their lives and whether and how they are prepared to actually put appropriate strategies into practice depends to a great degree on their social and cultural environment. Socio-environmental research therefore looks at how understanding of the social causes and impact of climate change can be increased, how the design of climate change mitigation and adaptation measures can be supported and how all sections of the population can be included and social acceptance fostered.

Greenhouse gas reduction Comes under flanking measures

Timetable From 2015

4.12.4 Strengthening applied research in the urban design and buildings sector

As part of the building research programme, small and medium-sized companies are supported in developing and optimising innovative products and technologies. The research focuses on strategies and concepts for sustainable building. The Zukunft Bau research initiative will be developed and will receive additional funding. Special priorities are developing “efficiency houses plus” (buildings that produce more energy than they use), including linking them into neighbourhoods and the larger urban context and consistently producing sustainable buildings.

Urban design projects concerned with sustainably developing existing industrial areas also have enormous potential for energy saving and climate change action, as illustrated by a BMUB/BBSR study. Pilot projects on sustainable development of existing industrial parks are being carried out as part of a research programme on experimental housing and urban design (ExWoSt). They focus on energy, environmental and climate-related aspects of architectural and spatial developments in predominantly commercial urban areas. The research also aims to identify developments and planning approaches in the fields of energy saving and climate change mitigation.

Within its research network on energy in buildings and neighbourhoods, the German government is creating the conditions needed to coordinate programmes on energy, building and urban design research to avoid duplication, make use of synergies and accelerate the transfer of outcomes into practice (see NAPE).



Greenhouse gas reduction Comes under flanking measures

Timetable From 2016

4.13 Advice, public education and independent initiatives to step up climate action

With its National Climate Initiative (NKI), the BMUB instigates and funds projects and programmes that make a contribution to reducing greenhouse gas emissions. They cover a broad spectrum of climate change mitigation activities, ranging from development of long-term strategies through to providing practical assistance and investment support measures. It takes a broad-based approach, working with target groups such as local authorities, industry, consumers and the education sector.

Under the National Climate Initiative, specific measures are funded in line with funding programmes (funding programme for municipalities, social and cultural institutions, incentive programme for mini-CHP plants, incentive programme for measures on commercial cooling systems, funding programme for hybrid and plug-in hybrid buses in public local transport – see Section 4.5.6, 4.5.7, 4.6.2, 4.7.2, 4.8.1) and information about funding for innovative individual climate change mitigation projects is made available (see also Sections 4.13.2 and 4.13.3). The National Climate Initiative was launched in 2008. Around 421 million euros were invested in over 19,000 projects between 2008 and 2013.

Both the Climate Action Programme 2020 and the National Action Plan on Energy Efficiency include cross-sectoral and sector-specific policies and measures that overlap with other activities or are difficult to quantify for other reasons. Nevertheless, these measures also contribute to reducing greenhouse gases by 2020. An example of a measure that has interfaces with other initiatives is the European Regional Development Fund (ERDF) (see Section 5), which reserves 20 percent (2.4 billion euros) for activities to combat climate change and the remaining 80 percent for infrastructure measures that also contribute to climate change mitigation. This measure is included in the Climate Action Programme

2020 and, without being adjusted for overlaps, is thought to have the potential to achieve an additional reduction of 4.35 million tonnes of CO₂ equivalent by 2020. Activities that are also difficult to quantify exactly include all the information and advisory measures and the training and continuing professional development activities, which are also part of both the Climate Action Programme 2020 and the National Action Plan on Energy Efficiency. These kinds of initiatives contribute to optimised strategies being developed and implemented in private households, commerce/trade/services, industry and the transport sector. These measures are an indispensable factor in developing and implementing optimised solutions for individual cases. If this package of measures is taken as a whole and its reduction contributions are assessed conservatively, an additional reduction potential of between three and four million tonnes of CO₂ equivalent can be achieved by 2020.



4.13.1 Climate change mitigation in business – the National Climate Initiative and Environmental Innovation Programme

Through the National Climate Initiative, the Climate Action Programme promotes additional measures to remove obstacles to the private sector becoming more involved in combating climate change, while at the same time strengthening and making greater use of innovation potential in German business. They include:

- a dialogue process entitled “Business takes action on climate change” (Wirtschaft macht Klimaschutz): the BMUB will launch a new dialogue process on climate action with the private sector to help it speed up the implementation of concrete measures to reduce greenhouse gases;
- a pilot project and funding programme offering a “climate protection check-up” for micro and small enterprises. It directly addresses climate change mitigation measures for micro enterprises and is tailored to selected industries. The companies are actively contacted and receive comprehensive, all-round advice and support during the implementation phase. Advice and specifically targeted economic incentives are funded. The aim is to unlock the economic potential of investing in climate change mitigation for each company. Depending on the trade or the particular company, this could involve specific measures to increase the efficiency of technical systems (e.g. lighting, drives, compressed air, heat, refrigeration, air conditioning) or measures to reduce materials and water requirements and waste;
- in conjunction with the Federal Ministry for Economic Affairs and Energy and our partners in the private sector, we will ensure that our initiative to support small and medium-sized enterprises in taking practical action towards implementing Germany’s energy transition and climate change mitigation policies (Mittelstandsinitiative Energiewende und Klimaschutz) is continued beyond 2015.

Furthermore, in a process of ongoing development of priority funding areas and climate change mitigation concepts, the National Climate Initiative will continue to review and investigate measures that are designed to eliminate obstacles to unlocking greenhouse gas reduction potentials and at the same time lead to increased exploitation of the innovation potential of Germany’s private sector.

The BMUB’s **Environmental Innovation Programme (Umweltinnovationsprogramm)** supports the initial commercial implementation of innovative, more environmentally friendly processes or combinations of processes and the manufacture and use of environmentally sound products. The support takes the form of either an investment grant or interest rate subsidies to make loans cheaper. Priority is given to funding applications for projects by small and medium-sized enterprises. Research and development are not eligible for funding under this programme. For reasons of competition law, only users of an innovative technology can receive funding, not developers.

As part of the BMUB's Environmental Innovation Programme, we will give consideration to an initiative to use industrial waste heat during the course of the 18th legislative period. The aim is to support the implementation in practice of innovative concepts for using waste heat and to fund the first-time use of new technologies and therefore support their possible market entry.

Greenhouse gas reduction

0.75 million tonnes of CO₂ equivalent as a result of the climate protection check-up project/programme; the remaining measures have a flanking effect

Timetable

All measures mentioned to be implemented gradually starting in 2015

4.13.2 Consumer action on climate change (prioritising electricity saving)

Well over a quarter of Germany's total electricity consumption is accounted for by its 40 million private households. It costs them in excess of 30 billion euros.

Appliances that are efficient and therefore save electricity are often more expensive than appliances with a lower efficiency rating. However, purchasing a highly efficient appliance can be worthwhile since the electricity consumption over its lifetime is significantly lower. This poses a particular challenge to low-income households. Apart from the fact that they do not have the necessary knowledge about highly energy efficient technology, they often do not have the capital needed to make that purchasing choice. They therefore need special support.

Electricity savings check

The BMUB is currently funding the Electricity Savings Check PLUS pilot project. It consists of offering household advice for low-income households, providing simple energy-saving articles including installation at no cost and, if certain conditions are met, awarding a grant towards the purchase of a highly energy-efficient refrigerator, which will be available until the end of 2015. The agencies involved are the Bundesverband der Energie- und Klimaschutzagenturen Deutschlands e.V. (eaD) and the Deutscher Caritas Verband (DCV).

Consideration will be given to the question of how to continue the scheme providing situation-specific advice and financial support for low-income households to purchase energy-saving, resource-efficient technology (large household appliances) on a needs basis. The plan is to involve the same kinds of agency as to date, i.e. social welfare organisations, charities, and energy and climate protection agencies.

Before the measure is implemented the following aspects must be taken into consideration:

- the legal implications of support for low-income households must be considered (whether the grant would affect payment levels for recipients of unemployment benefit);
- it needs to be established whether implementation should/must be based on a funding guideline;
- appropriate funding may need to be made available or the volume of existing funds increased.

Electricity saving campaign

In addition to funding projects through its National Climate Initiative, the government also runs an electricity saving campaign, which aims to motivate as many private households as possible to make use of their energy saving potential and save electricity. This enables private households to lower their energy costs in the long term but the climate also benefits from the energy savings and Germany's dependence on imported energy decreases. The electricity saving campaign is implemented by many partners from different sectors of society who support the government with their specialist knowledge.

Greenhouse gas reduction

0.04 million tonnes of CO₂ equivalent as a result of support for low-income households; the electricity saving campaign has a flanking effect

Timetable

From 2015

4.13.3 Climate change action in schools and educational establishments

The BMUB's education department runs the Climate Action Programme in Schools and Educational Establishments, which was launched in 2008. It is an umbrella programme for a diverse range of educational projects that are funded under the National Climate Initiative. Funding for educational projects is awarded through a competition for ideas for individual and innovative projects on climate change action. These projects are primarily directed at schools (teachers, students and caretakers), but also at non-school stakeholders.

The programme pursues two aims: firstly, to provide information on climate change and raise awareness about the need to take action and, secondly, to inspire and implement specific activities designed to make CO₂ savings. This takes place through practice-based projects, action days and campaigns and is backed up by educational resources for the classroom, interactive learning opportunities and competitions.





5 Activities undertaken by Länder, local authorities and social stakeholders

The BMUB is planning to hold a conference in the first half of 2015 to give an overview of the content and process by which this Action Programme was developed, along with conclusions that have been drawn about the involvement of society in drafting the Climate Action Plan 2050 (cf. Section 7.2).

5.1 Climate change activities already started and adopted by the Länder and local authority associations

In early September 2014, the Länder and local authority associations were asked to submit to the BMUB an overview of the climate change activities they had started or adopted since November 2012. The descriptions submitted by the 16 Länder and the Deutscher Städte- und Gemeindebund (German Local Authorities Confederation) will be published by the BMUB (www.bmub.bund.de/aktionsprogramm-klimaschutz). The Deutscher Städtetag (Association of German Cities) and Deutscher Landkreistag (Association of German Counties) also support compliance with Germany's climate targets and the implementation of the energy transition.

EU structural and investment funds, especially ERDF programmes, make an important contribution to climate change action in Germany's Länder. In the 2014 – 2020 funding period, the Länder will spend about 2.9 billion euros a year from EU structural and investment funds on climate change

mitigation, especially on efforts to cut CO₂ emissions in all sectors of the economy.

Throughout Germany, at least 20 percent of funding – in absolute figures about 2.4 billion euros – from the European Regional Development Fund (ERDF) is used to support the goal of reducing greenhouse gases. The focus here is on sustainable production of energy from renewable sources, energy efficiency and use of renewable energy both in businesses and public infrastructure, public buildings and residential buildings, sustainable urban mobility and energy research (including pilot and demonstration projects). The ERDF programmes aim to reduce annual greenhouse gas emissions by 4.25 million tonnes of CO₂ equivalent by 2023.

5.2 Climate change activities already started and adopted by social stakeholders

At the beginning of September 2014, the organisations involved in drawing up the Action Programme were requested to provide information about climate change activities they had begun and adopted since November 2012. Thirty-three associations/institutions submitted information on 84 activities with a defined stakeholder, details about the objective, duration and date on which the activity was adopted. A list was made which has been published by the BMUB (www.bmub.bund.de/aktionsprogramm-klimaschutz). Thirty-seven of these activities are directed at private households, 19 are designed to cut greenhouse gases in industry, commerce/trade/services, 10 are concerned with the transport sector and eight with the energy industry. In addition to that, there are 10 cross-cutting activities. The associations' measure sheets are available on the Internet.

5.3 Social innovation and climate change action

Discussions on climate change mitigation often concentrate on technical innovations. However, the diverse initiatives and projects that are known as social and cultural innovations also play an important role. They take various forms: participatory local governance, cooperatives, transition towns, intercultural gardens, cooperative schemes to add value locally or to integrate users into product development. Climate-relevant examples include car sharing, renewable energy municipalities, multi-generation housing, repair cafés and community gardens.

Social innovations illustrate civil society's ideas for new and creative ways of tackling the complex problems associated with climate change activities and thus making a substantial contribution to sustainable development. Funding and making use of social innovations creates scope for an active and effective civil society to develop (empowerment).

The German government will take account of this approach, for example in the planned broad-based dialogue process to draw up the first Climate Action Plan based on the outcome of the 2015 Paris climate change conference.

6 Reporting, monitoring and implementation support for climate change action



6.1 Existing reporting obligations for climate change action

Progress towards reducing greenhouse gas emissions can only be assessed on the basis of comprehensive and continual reporting. National systems for reporting greenhouse gases are also required under international agreements such as the United Nations Framework Convention on Climate Change. They form the basis for setting reduction commitments and also make it possible to produce a robust comparison of the efforts being made by the Parties to the Convention. In addition to information about greenhouse gas emissions, details of climate change activities, climate targets and strategies, adaptation measures, education and research and financial and technical cooperation are becoming increasingly important in international reporting. The key reports at international and European level are:

- the National Inventory Report (NIR) on greenhouse gas emissions, submitted in January each year;
- the projection report on probable trends in emissions over the next 20 years (submitted every other year in March);
- the National Communication to the United Nations Framework Convention on Climate Change, which requires comprehensive reporting

on national circumstances, greenhouse gas emissions, climate change policies and measures, projections, adaptation, research and financial and technical cooperation (submitted every four years in January); and

- the Biennial Report, which is submitted every two years to update the main information in the National Communication.

These reporting obligations have been constantly developed over the last 20 years – both at European and international level – and are also gaining increasing importance for developing countries and emerging economies. The scientific and methodological basis for greenhouse gas reporting is also constantly updated on the basis of recommendations by the Intergovernmental Panel on Climate Change (IPCC). This ensures that calculations of greenhouse gas emissions are always based on the latest scientific knowledge.

6.2 Monitoring implementation of the Climate Action Programme

The German government will monitor implementation of the Climate Action Programme in an ongoing process up to 2020. To that end, the BMUB will produce an annual climate action report.

The climate action report will contain information on the latest emissions trends in the various areas for action, progress of implementation and a forecast of the reduction effects that can be expected by 2020. The results from the government's projection report will be incorporated in an appropriate form.

The BMUB's annual climate action report will in turn be incorporated in an appropriate form into the annual monitoring reports on the Energie-wende or energy transition, published by the Federal Ministry for Economic Affairs and Energy (including a triennial progress report).

The German government will consider whether and how institutional capacity for the continuous reporting and review process needs to be strengthened to ensure international and European reporting obligations can be met. That includes primarily producing emissions reports (such as the National Inventory Reports on Germany's greenhouse gas emissions) and projections to estimate the effect of implemented and proposed measures (known as projection reports). This will require a review of the national legal framework relating to the collection and use of data needed for the reports.

Furthermore, the government will also set up a national climate action alliance, comprising representatives from all groups of society with the BMUB as lead agency. The aim of the action alliance is to support implementation of measures adopted, make it easier to activate potential that is currently rated as "not quantifiable" and identify further options for action.

7 Climate Action Plan with a long-term vision



7.1 Parameters and timetable for drawing up the Climate Action Plan 2050

In 2016, the German government will adopt its national Climate Action Plan 2050. It will set out the interim targets already adopted for the post-2020 period, which are essential to meeting the long-term climate target, describe the next specific reduction steps in view of the European targets and the outcome of the Paris climate change conference in 2015 and support them with measures developed in a broad-based dialogue process.

The Climate Action Plan will then be updated at regular intervals. The purpose of this regular updating process – in addition to the annual climate action reports – is that the measures adopted be regularly reviewed to establish whether they are effective (success monitoring) so that they can, if necessary, be modified or redesigned. In this way, it should be possible to ensure that Germany is and remains on track to consistently meet its climate targets.

7.2 Dialogue on the Climate Action Plan

The success of climate change action depends to a great degree on whether the individual measures secure popular support and how many people actively participate. In the light of this, the coalition parties agreed to support the Climate Action Plan 2050 with measures developed in a broad-based dialogue process. In addition to participation in developing the plan, it is also crucial that the public participates in its implementation and review.

The German government therefore plans to set up a dialogue and participation process with the Länder and local authorities, and with the private sector, stakeholder organisations (churches, associations and trade unions) and civil society.

To this end, the BMUB will organise a conference in the first half of 2015, at which, following a review of how the current Action Programme was developed, it will present the participation concept. Unlike with the Action Programme there are plans to involve not only the Länder, local authority confederations and associations, but also to invite direct public participation for the first time.

7.3 Resolution to draw up the Climate Action Plan 2050

The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) will be tasked with drawing up the national Climate Action Plan 2050 and coordinating it with the different ministries so that it can be adopted in 2016 by the federal cabinet.





2020

Abbreviations

| | |
|-----------------------|--|
| BBSR | Federal Institute for Research on Building, Urban Affairs and Spatial Development |
| BMBF | Federal Ministry of Education and Research |
| BMUB | Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety |
| BMWi | Federal Ministry for Economic Affairs and Energy |
| BNB | Assessment System for Sustainable Building |
| CHP | Combined heat and power |
| CO₂ | Carbon dioxide |
| COM | European Commission |
| D | Germany |
| ETS | Emissions trading system |
| F-gases | Fluorinated greenhouse gases |
| GHG | Greenhouse gas |
| HGV | Heavy goods vehicle |
| ICAO | International Civil Aviation Organization |
| IMO | International Maritime Organization |
| IPCC | Intergovernmental Panel on Climate Change |
| KfW | Kreditanstalt für den Wiederaufbau, development bank |
| Kg | Kilogram |
| LNG | Liquefied natural gas |
| MAP | Market Incentive Programme |
| MRV | Monitoring, reporting, verification |
| MSR | Market Stability Reserve |
| N₂O | Nitrous oxide |
| NAPE | National Action Plan on Energy Efficiency |
| NIR | National Inventory Report to the UNFCCC |
| NKI | National Climate Initiative |
| t | Tonnes |
| SMEs | Small and medium-sized enterprises |
| TWh | Terawatt hours |
| UNFCCC | United Nations Framework Convention on Climate Change |



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