Federal Ministry
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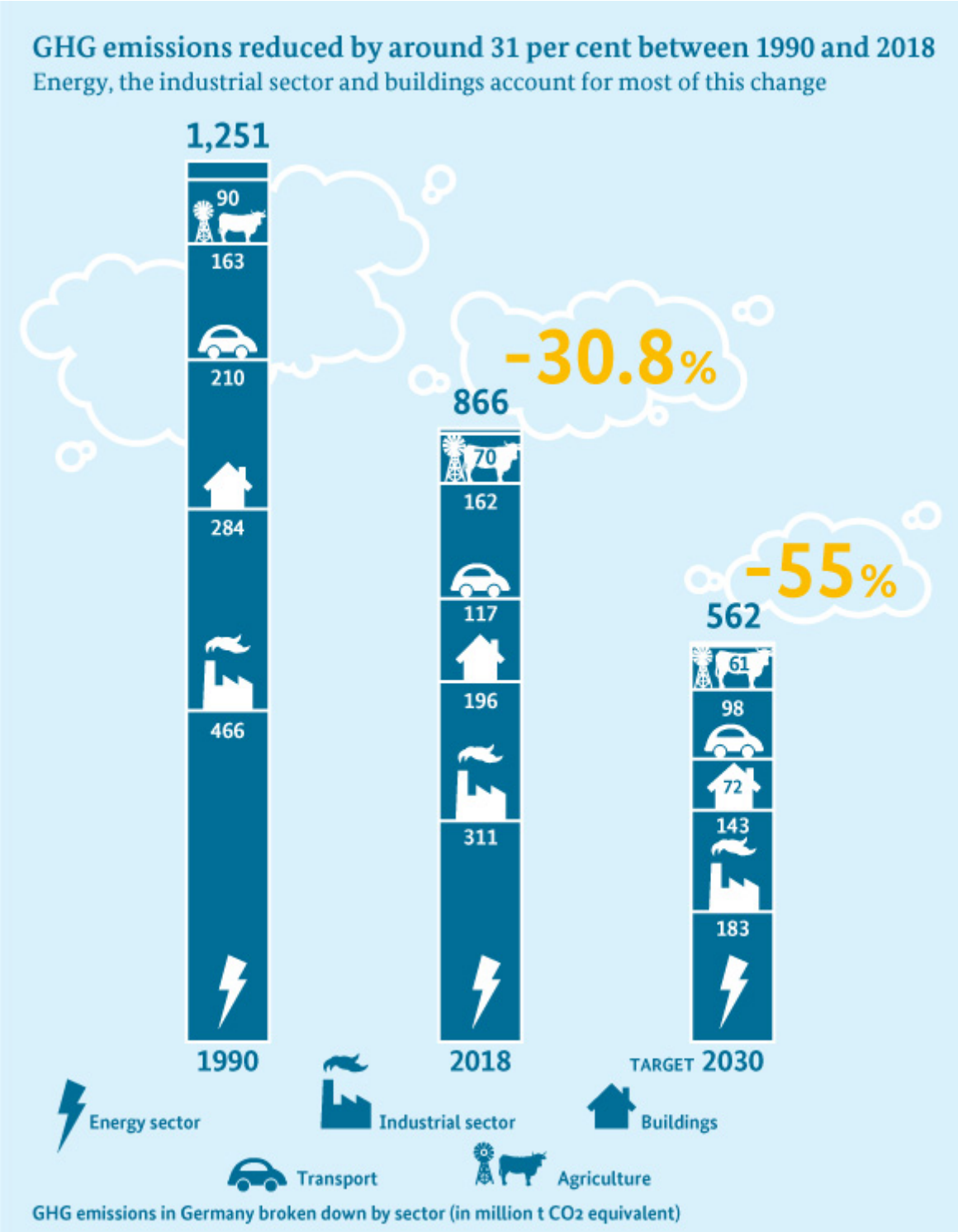
Keeping track of the progress of the energy transition

In 2017, one in three kilowatt-hours of electricity was generated from renewable energy. In 2018, the trend towards renewable energy continued, bringing the share of renewables in total electricity consumption to almost 38 per cent. However, as shown by the second progress report on the energy transition, a lot of work remains to be

Three sectors contributing to the fall in GHG emissions

Initial estimates suggest that greenhouse gas emissions continued to fall in Germany in 2018. According to these estimates, GHG emissions decreased by 31% compared with 1990 levels. Which sector has contributed how much to this result? And what are Germany and the EU aiming to do to further reduce emissions in the future?



According to preliminary figures released by the Federal Environment Agency, Germany cut its annual greenhouse gas emissions by 31 per cent between 1990 and 2018. The largest share of this is due to considerable reductions in GHG emissions in the buildings sector (minus 44 per cent), the energy sector (minus 33 per cent), and the industrial sector (minus 31 per cent). In contrast to this, GHG emission reductions in agriculture and especially the transport sector remained below expectations, at minus 22 and minus 1 per cent respectively. In total, 866 million tonnes of CO_2 equivalent were released in Germany in 2018. That is 385 million tonnes less than in 1990. The CO_2 equivalent (CO_2-

eq) is a measure used to compare the emissions of the seven different greenhouse gases (of which CO_2 is one) based upon their global warming potential.

Buildings, energy and the industrial sector

The energy sector accounts for most of the total reductions of 385 million tonnes, with GHG emissions in this sector falling by 155 million tonnes between 1990 and 2018. That is around 40 per cent of Germany's total reductions. Emissions in the buildings sector and industry fell by 93 million (around 24 per cent less) and 88 million (around 23 per cent less) respectively. When looking at these figures, one has to consider the fact that Germany's total GHG emissions in 1990 included the emissions from the former GDR's carbon-intensive power plants and factories.

Germany seeks to become almost carbon neutral by 2050

As set out in the Energy Concept of 2010, the Federal Government seeks to reduce emissions by at least 55 per cent by 2030 compared with 1990 levels (by at least 70 per cent by 2040 and by at least 80 to 95 per cent by 2050). In order for this to be achieved, Germany needs to reduce its annual emissions by another 304 million tonnes of carbon dioxide equivalents.

The Federal Government plans to decide before the end of 2019 what action it will take to meet the reduction target for 2030. The responsible ministers from five ministries, the chancellor and the finance minister meet regularly in the cabinet committee on climate change mitigation – which has been set up especially for this purpose – to discuss the progress achieved and the measures to be taken. The first meetings were held in April and May of this year.

EU greenhouse gas emissions fall by 22 per cent compared with 1990 levels

The measures identified by the committee will be included in the final version of Germany's National Energy and Climate Plan (NECP), that the Federal Government and all other European Member States need to submit to the European Commission by the end of the year. The European Commission uses the NECPs to assess whether the measures taken by each Member States are sufficient to meet the climate targets at union level.

These include plans to reduce greenhouse gas emissions by 40 per cent by 2030 compared with 1990 levels, and by 80 to 95 per cent by 2050. Taken together, the European Member States reduced their combined emissions by around 22 per cent between 1990 and 2017. The European Statistical Office (Eurostat) has already published some preliminary figures on carbon emissions from fossil fuel combustion for 2018. These suggest that the EU reduced its carbon emissions by another 2.5 per cent over the previous year.

FURTHER INFORMATION

[→ Press release by the Federal Environment Agency on the 2018 short-term forecast on GHG emissions
[→ Press release by Eurostat on carbon reductions in the EU in 2018
[→ Climate Action Plan 2050 (Download, 1.9 MB)

The sunny side of the energy transition

Germany is a global leader in technology for the energy transition. In order to make the energy transition a success, transitioning to renewable heat generation is key. Here, solar thermal energy plays a crucial role and Germany has been conducting cutting-edge research in this area for more than 25 years.

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Solar thermal installations have been used since the 1970s, mostly for heating water, and latterly also for heating homes. It was also in the mid-1970s that the first solar homes were built. The first home able to generate as much energy as it consumed – a sensation at the time – was completed in Freiburg in 1992.

The first research funding programmes launched to promote solar thermal energy included ‘Solar thermal energy 2000’ (from 1994 to 2003) and "Solar thermal 2000 plus" (from 2004 to 2008). Today, these programmes are being continued under the Federal Government’s 7th Energy Research Programme entitled "Innovation for the Energy Transition". The two initial programmes helped create and test the technology needed for developing large solar thermal installations and long-term heat storage. The findings of this research served as the basis for developing both the technology and the market.

A pioneer in international solar thermal energy research

Right from the beginning, Germany played a key role in international solar thermal energy research. The International Energy Agency for example established a number of research cooperation projects that placed a strong focus on technology. One of these is the Solar Heating and Cooling Programme (SHC), which was launched in 1977. Today, experts from 20 countries are using this project to work together on a wide range of subjects – from photovoltaic-thermal collectors and process heat all the way to solar heat networks.

The European standard for solar thermal installations – which was published in 2000 – was drafted with considerable help from German experts on solar energy. The European certification mark for solar thermal products – the Solar Keymark – which was developed as part of this process can be found today on around 1,500 different products on the European market; persons buying solar collectors are only eligible for funding under the Market Incentive Programme (MAP) if they buy a product bearing this certification mark. A unified and global certification is currently being worked on, once again with the help of German experts.

The energy transition: impossible without solar thermal energy

Dr Frank Heidrich, who heads the Directorate on Heat and Efficiency in Buildings at the Federal Ministry for Economic Affairs and Energy, is convinced that the energy transition cannot succeed without the contribution of solar thermal energy. This May, he joined with experts on solar thermal energy to discuss key issues of solar thermal research at a German conference on solar thermal energy and innovative heating systems. The participants of the conference agreed that research in the field of low temperature solar thermal energy – including storage and collector technology, systems technology and new fields of application – was at a high level all across Germany.

The solar thermal energy market has seen continuous growth since the beginning of the 1990s. However, it has been faced with strong competition from other solar technologies for some years. The Solar Heat Worldwide report – which was launched 15 years ago – provides an annual and detailed update on the development of the global market. At the end of 2018, around 686 million square metres (480 GW) of collector surface area was installed. Germany ranks fourth behind China, the US and Turkey in terms of installed collector surface area and installed solar thermal capacity. This means that more than 20 million square metres of solar collector surface was installed in Germany at the end of 2018, which corresponds to 14.4 GW of installed solar thermal capacity.

Germany – the global leader on solar thermal technology

Since the beginning of solar thermal research, Germany has been and continues to be the global leader in the development of solar thermal technology. Whilst this is not equally reflected by the current market growth rates, however, there are several studies that suggest that solar thermal energy has the potential to cover a fourth of the total demand for low-temperature heat.

Experts in solar thermal energy believe that solar thermal energy could be used particularly in the areas of solar process heat, heat networks and solar building design – from building passive houses all the way to passive districts and solutions that integrate solar thermal energy into a building's facade. In this context, dovetailing the electricity and heat markets will play a crucial role – for example in order to convert surplus electricity from renewable sources to thermal energy so it can be stored. As part of the Heat Network 4.0 pilot project, research funding and market incentives are being combined.

The funds earmarked for research funding for solar thermal energy have continuously increased over the last 25 years. In addition, the Market Incentive Programme (MAP) was used to provide around 1.46 billion in investment grants for around 1.2 million solar installations between 2000 and 2017.

FURTHER INFORMATION

- Information about energy research
- Conference on solar thermal energy (only in German)
- The Federal Government's 7th Energy Research Programme (Download, 3 MB)
- Website on research on buildings and districts under the 7th Energy Research Programme

What exactly is the plan approval procedure?

Gimme five! What happens in the fifth and final step in transmission grid planning, and who has a say in it? Read on to find out more.

Grid expansion planning involves five different steps. In the final step, the plan approval decision (building approval) is made, setting out all the important details for the new line, such as the exact route it will take.

The procedural steps in grid expansion planning – from the initial idea to the finished power line – can be counted on one hand. What sounds like child's play is, in practice, a complex procedure in which members of the public can have a say at any time.

In the planning process for expanding the grid, the first step is to forecast how the grid will need to look in ten or fifteen years by developing "scenario frameworks" to predict the future. The aim is to be able to ensure a reliable supply of electricity whilst carbon emissions decline and the share of renewable energy rises. The scenario frameworks form the basis for the creation of a Network Development Plan(step 2). This Plan documents the areas where the four operators of the large transmission grid (50Hertz, Amprion, TenneT and TransnetBW) see a need for conversion, expansion and modernisation measures to ensure that the electricity supply will remain secure in the future. The

Bundesnetzagentur (Federal Network Agency) examines this assessment made by the transmission system operators.

Three steps to determine requirements, two steps for the approval

After the Network Development Plan is complete, the Federal Requirements Plan (step 3) sets out the starting and finishing points of the lines needed, but contains no specific information about the transmission route. This is not defined until the plan approval phase (step 5). Prior to this, however, is Federal Sectoral Planning (step 4), in which a route corridor is defined for the line is to run across. This corridor must be environmentally compatible and designed in line with the physical space available.

Growing anticipation as planning for the Bertikow-Pasewalk grid expansion project nears completion

The Bertikow-Pasewalk grid expansion project entered the plan approval procedure at the start of June 2019. With this fifth and final step now reached, anticipation surrounding construction is rising. In 2023, the new 32-kilometre-long line will go into operation along the existing route and connect the substations at Bertikow (Brandenburg) and Pasewalk (Mecklenburg-Western Pomerania). The line is needed as the output of renewable energy plants in Uckermark and Western Pomerania is set to increase significantly in the coming years. This means that the transmission capacity of the existing 220-kilovolt lines from the 1950s will no longer be sufficient to transport the wind power generated on land and at sea and power from conventional sources.

The plan approval procedure

So what happens in the fifth and final step before the grid expansion project? Let’s take the Bertikow-Pasewalk – project number 11 – as an example. The transmission grid operator involved in the project, 50Hertz, sends off its application for plan approval to the Bundesnetzagentur, in which it proposes to build the planned 380-kilovolt overhead line largely along the A 20 motorway. Applications always include alternative routes, an assessment of the effects on humans and nature, and detailed technology planning on how high the electricity masts should be and what they could look like. The Bundesnetzagentur publishes the application online. Its contents can then be discussed by all interested parties, in particular with members of the public, at a public "application conference". Those attending might, for example, provide specific information regarding parts of the proposed route.

Decisions made only following public participation

Based on the key points raised at the application conference, an "investigation framework" is developed. This contains requirements for the construction company to obtain further information as to where it might need to revise and/or supplement its proposal. These might be expert reports on protected animal species whose habitats are located within the planned route, or studies on other activities proposed. Once the proposal has been revised, it is re-published and discussed once again by all stakeholders so that nothing important is forgotten. Following this, the Bundesnetzagentur examines and decides what will ultimately be built, setting this out in the plan approval decision – a kind of building permit for the new power line.

FURTHER INFORMATION

[→ Grids and grid expansion
[→ Bertikow-Pasewalk grid expansion project (only in German)
[→ Plan appoval – information provided by the Bundesnetzagentur

Quote of the week

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"Beyond climate goals, governments are prioritising renewables as a driver of low-carbon economic growth in recognition of the numerous employment opportunities created by the transition to renewables."

Director-General of IRENA Francesco La Camera during his presentation of the study entitled 'Renewable Energy and Jobs – Annual Review 2019'.

What the press say

Today in our press review: figures on the number of jobs created in renewable energy.

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sonnenseite.com, 13 June 2019: "11 million people employed in renewable energy worldwide in 2018"

Sonnenseite.com looks at how ever more countries make use of the social and economic benefits created by the energy transition.

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