

Climate Agenda 2020: Restructuring Industrial Society

Historical decisions by the European Union

On 9 March 2007, under the aegis of the German Chancellor, the heads of state and government took a historical decision on future climate policy. This decision demonstrates that energy policy and climate protection are being seriously integrated and it combines ambitious climate targets with far-reaching measures:

- By 2020 greenhouse gas emissions from the EU are to be cut back to 30% below the figure for 1990, as long as other industrial nations pledge to comparable reductions and the more advanced developing countries undertake a contribution concomitant with their responsibilities and specific capabilities. As a second step, the industrial nations should work together towards a joint target for 2050 of reducing emissions by 60 to 80% compared with 1990. The aim is that by 2050 global emissions should be down to half the 1990 level.
- In anticipation of international negotiations, the European Union already pledges to reduce its emissions at least 20% by 2020.
- The principal way to achieve these targets will be to increase energy efficiency 20% by 2020 compared with the business-as-usual scenario and to triple the share of renewable energies in primary energy consumption to 20% by 2020. This includes 10% of fuel consumption to be derived from biomass.

Implementing these decisions will call for a quantum leap in the development of industrial societies. The objective is no less than a fundamental restructuring of industrial society to ensure that appropriate goods and services can be provided in 2050 for a world population that has grown from 6.5 billion to over 9 billion, while at the same time reducing emissions by 50%. The business-as-usual trend points in a different direction: the reference scenario established by the International Energy Agency assumes that emissions will rise by another 50% by 2030.

Restructuring industrial society is feasible – by means of an ambitious increase in energy efficiency and a massive expansion of renewable energies. Proactive research and development, rapid market penetration for efficient new products, innovative production processes and new transport strategies are the response to this challenge. At the same time, industrial society will advance to a new level of development.

The status quo

According to initial estimates, emissions of greenhouse gas in Germany in 2006 were about 1,007 million t CO_{2e} or about 18% lower than in base year 1990. This has been a notable achievement to date for German climate protection policies. However, it is also true that the bulk of this fall in emissions was accomplished in eastern Germany in the period 1990-1999 – due partly to substantial gains in energy efficiency in power plants in that region, but partly to the collapse of whole sections of East German industry. Since then progress has been slow, and in 2006 emissions actually rose 0.7% compared with 2005.

Germany's climate protection targets for 2020

The decisions adopted by the European Council go beyond the Kyoto Protocol on Climate Protection and its commitment period 2008-2012. If the EU intends to reduce greenhouse gases by 30%, Germany will have to contribute more. This has already been reflected in the coalition agreement signed by the SPD and CDU/CSU when they entered government. In addition, in a resolution adopted in November 2006, the German Bundestag has drawn attention to the findings of the Study Commission "Protecting the Earth's Atmosphere". This concluded that by 2020 Germany should cut its emissions of greenhouse gases by 40% compared with base year 1990. Until now we have been talking about a 21% reduction over 20 years; but this means a further 19% reduction within just 8 years.

This year the federal German government will be launching a package of measures as part of its new climate protection programme with the aim of implementing the decisions taken by the European Union. To achieve a 40% reduction in greenhouse gases by 2020, 270 million t CO_{2e} less must be emitted than in 2006.

The generation and use of energy are the keys to successful climate protection. Energy-related CO₂ emissions account for 80% of Germany's greenhouse gases. In 2005 they amounted to 795 million tonnes. Considerable reductions must be achieved, and they can. It will mean doubling energy productivity by 2020 compared with 1990 and a huge ramp-up for renewable energies. Based on the reports of European and German experts, the proportion of renewables in Germany's primary energy consumption will need to triple from 5.3% today to 16% by 2020, also enabling the EU to meet its target of tripling the share from today's 6.5% to 20% by 2020.

Key elements of the climate protection programme

Initial findings from studies carried out on behalf of the German government show that emissions can be reduced 40% by 2020. Eight policies can serve to achieve this reduction of 270 million t CO_{2e}:

1. Renewing the power plant park:
→ minus 30 million tonnes/year CO₂

The energy sector accounts for 40% of overall greenhouse gas emissions in Germany. Since 1999 emissions in this sector have increased by over 30 million t. That is why renewing the power plant park is pivotal. Many power plants are reaching the end of their service life and need to be replaced by new installations. A combination of new power plants, savings in the consumption of electricity and an increase in the use of renewable energy sources will both cut greenhouse gas emissions from power plants and substitute the capacity of the nuclear power plants which will leave the grid in the wake of their planned phase-out.

Emission reductions in power plants will be accomplished thanks to the greater efficiency of new coal-fired power plants and the advent of installations fired by natural gas. The crucial instrument in this is emissions trading. With its national allocation plan for 2008-2012 the German government has already adopted clear reduction targets: the volume of emissions from power plants is to be reduced by 57 million tonnes.

The EU emissions trading scheme will continue after 2012 and the emissions allowances allocated within this framework will steadily fall in volume. From 2013 allocations will have to be undertaken at EU level to ensure fair competition in emissions trading across the territory, and a high percentage of these emissions allowances will need to be auctioned.

It is not the task of the German government to determine the energy mix in 2020 via command mechanisms. This is a task, rather, for the market players, in response to future prices for coal, gas and CO₂ and availability of feedstocks at planned power plant sites. It is also clear, however, that after 2012 coal-fired power plants with a relatively high CO₂ intensity will probably only be built if:

- CO₂ is captured and stored (CCS technology)
- the requisite emission allowances have been procured in the emissions trading market, and
- climate protection projects are carried out abroad in return for emissions allowances.

2. Doubling the share of CHP:
→ minus 20 million tonnes/year CO₂

The modernisation and expansion of combined heat and power offers huge potential for greater energy efficiency and more climate protection. The pledge by German industry to expand combined heat and power that was made in the context of the CHP Agreement will fall a long way short of its target. But the aim must remain to make more efficient use of energy and to draw on cogeneration to produce power while at the same time using waste heat for heating purposes. This means that the current 10% of electricity generation accounted for by CHP must be at least doubled by 2020.

- To this end the CHP Act will be amended to create commercial incentives for modernising existing CHP installations and building new ones.
- The efficient expansion of district and distance heating networks must be stepped up.

3. Increasing the share of renewable energies to over 27% of electricity generation:

→ minus 55 million tonnes/year CO₂

The proportion of electricity generation accounted for by renewable energies has doubled in very few years – to 11.8% in 2006. This is equal to the electricity production of a utility like EnBW. According to the major 2007 study on the expansion of renewable energies, renewable sources could be producing about 156 terawatt-hours of power in 2020. This is 27% of power generation. The main features will be the continued expansion of wind farming (especially offshore with repowering on land) and the use of biomass in power plants.

The Renewable Energy Sources Act (EEG) is the most effective instrument in the promotion of renewable energies. The basic principle – a guarantee that power fed into the grid will be remunerated at a fixed price – has been proven to be better value for money and to produce more effective results than any other instrument in Europe. The Act will be amended in 2008 to ensure that the substantial spread of renewable energies will continue.

4. Promoting energy efficiency in power consumption:

→ minus 40 million tonnes/year CO₂

Carbon dioxide emissions can be cut by 40 million tonnes/year by reducing the consumption of electricity by 11%. This means considerably enhancing the efficiency of equipment, improving engine performance in industry and substantially reducing the amount of power used for standby modes.

Initial measures to achieve this include:

- Swift introduction of ambitious equipment performance requirements under the EU Ecodesign Directive based on the top runner principle (the product with best energy efficiency in the category sets the standard which all other products in the same segment must meet within a predefined period).
- A Climate and Efficiency Initiative: The Energy Efficiency Action Plan to be discussed at the next energy summit includes an Energy Efficiency Fund intended to help small and medium-sized businesses carry out measures to enhance efficiency.
- The German Bundestag has asked the German government to submit a proposal by July this year for introducing binding energy management. This would mean that in future companies will only be permitted to pay a lower rate of energy tax if they apply energy management procedures and identify their energy-saving potential on this basis.
- Greater weight to be given to energy efficiency and consumption criteria in public procurement, which is a major purchaser of goods. This will enable the federal government in Germany to set a good example.

5. Reducing heat consumption by modernising buildings and adopting efficient heating systems and production processes:
→ minus 41 million tonnes/year CO2

Heating costs and CO2 emissions can be more than halved on average by optimising the energy performance of buildings and using state-of-the-art heating technology. Crucial importance is attached, therefore, to modernising buildings (doubling the pace of modernisation), more efficient heating systems and tougher thermal standards for newbuild. The key instruments here are:

- doubling the energy-related rate of modernisation for buildings. Funds for the CO2 programme for building redevelopment for the period 2006 -2009 have already been topped up to €1.4 billion (four times as high as in 2005!).
- an amendment to the Energy Saving Ordinance in 2007/2008 aimed at reducing energy consumption values for newbuild, initially by 30% from 2009. The second stage will be to tighten standards again by a similar order of magnitude.

6. Generating heat from renewable energy sources:
→ minus 14 million tonnes/year CO2

Great potential can be harnessed by promoting renewable energies for heating purposes. It is here that renewable energies have the greatest ground to make up. This is a value-for-money approach to cutting CO2 emissions while at the same time reducing the consumption of oil and gas. The government's aim is to at least double the share of renewables (biomass, solar thermal, geothermal) in the production of heat from the current level of 6% by 2020. This will cut CO2 emissions from households, light industry, trade and services and also manufacturing by about 14 million tonnes.

Two conditions are vital to achieving this aim and we hope to create these by means of a Heat Act to be adopted before the end of 2007:

- legal underpinning and a huge boost to financial resources as part of a programme of market incentives to place funding on a permanent basis and enhance planning security;
- obligation to use renewable energy sources for newbuild and thorough modernisation of old building stock.

7. More efficiency and renewable energy in the transport sector:
→ minus 30 million tonnes/year CO2

About a quarter of energy consumption occurs in the transport sector, with air travel showing the fastest growth rates.

Technical measures (such as engines requiring less fuel, less powerful engines, light construction) and more fuel-conscious driving would enable gains of up to 40% in specific CO2 emissions from cars by the year 2020. Besides, traffic – and especially major segments of freight traffic – should in future be transferred from the roads to rail and waterways.

The following measures will pave the way initially:

- **CO2 limits for cars:** the European Commission has submitted a proposal for capping average greenhouse gas emissions from cars at 120 g/km by 2012. The German government has actively driven European debate about implementing these ideas. We want all classes of car to contribute to climate protection in line with their potential. Ultimately drivers should be helped when making their purchase decisions by a simple, robust indication of consumption levels. The German government will draw up proposals for this.
- **CO2-oriented vehicle tax:** Taxation classes for vehicles should not in future depend on the size of the vehicle but on the amount of pollution it produces. In 2007 the German government will sit down together with the federal states in Germany to draft legislation for revising the present taxation system so that tax on all new road vehicles will depend on their CO2 consumption.
- **Biofuels:** The EU has agreed that by 2020 renewable energies should account for at least 10% of fuel consumption in Europe. The Biofuel Quota Act adopted by Germany in 2006 already envisaged an increase in the share of biofuels in this country to 8% of consumption by 2015. Studies on behalf of the German government indicate that a proportion of 17% can be achieved by 2020. Second-generation biofuels such as biogas and BTL (biomass to liquid) will play a decisive role in this process.
- **Increase the efficiency of freight transport:** One fundamental problem climate policy confronts is the forecast growth in freight transport. Wide-ranging measures to improve efficiency here are crucial. Before the end of 2007 the German government will adopt a master plan on freight transport and logistics in which this efficiency strategy will play a key role. Above all, logistic processes must be further optimised (e.g. by avoiding empty runs) and bottlenecks at multimodal interfaces must be eliminated. This will encourage the best possible utilisation of infrastructure capacity.
- **Strengthen the competitiveness of rail:** Rail has a much cleaner climate balance than cars, trucks and planes. A person travelling from Berlin to Munich produces 33kg CO2 when taking the train but three times as much in a car. The impact on the climate of taking a plane is nearly five times as high. In the light of this, the German government will examine how rail can be made more competitive in the interests of climate protection.
- **Air travel:** Emissions from domestic and international air travel are growing faster than in any other sector. There is an urgent need to respond. The German government will, therefore, support the competition-neutral inclusion of air travel in European emissions trading.

8. Non-energy-related measures: → minus 40 million tonnes/year

Apart from reducing emissions in the focal area of energy-related CO₂, reductions in other greenhouse gas emissions are also required. Reductions in N₂O (laughing gas), CH₄ (methane) and F-gases are especially effective as these exert a major impact on the climate.

The German government has already adopted a number of measures to this end and will continue to pursue them. They include:

- further reduction in methane emissions due to the ban on depositing untreated or inadequately treated waste,
- methane reduction in decommissioned mines,
- improvements in agricultural methods,
- improvements in industrial processes.

Research

Apart from the eight measures outlined above, there is a need for research and development in the field of new innovative technologies. Innovation in all walks of life and the development and application of new technologies are the key to mobilising the potential for reducing greenhouse gases while at the same time seizing the economic opportunities that arise in the process. Germany has lost substantial ground in energy research. Whereas Japan currently spends over 30 US\$ per head on this, Germany spends only 6.20 US\$. The German government will therefore continue to boost funding for energy research across the board and expects industry to display a similar commitment.

Role of nuclear power

This package of measures assumes the phase-out of nuclear power stations as agreed in the nuclear consensus. In other words, no changes are to be made to the law as it currently stands. This was endorsed by the Coalition Agreement.

Besides, regardless of the divergence of opinion that exists within the German government as to the role of nuclear power, energy efficiency and renewable energies are the keys to energy security and climate protection. More than 90% of what needs to be done in order to resolve the problem lies beyond the debate about continued use of nuclear power, as this accounts for just 6.5% of global primary energy consumption.

Financing

Implementing this programme is good for industry, the environment and employment – because jobs will be created in sectors with a future. The German Environment Ministry estimates the additional costs to the German budget of kick-starting the necessary investments in climate protection up to the year 2010 at about € 3 billion. These need to be measured against the costs of pressing ahead with unbridled climate change. The German Institute of Economic Research (DIW 2005) values the damage that Germany would incur from unbridled climate change at € 137 billion in the period up to 2050. The federal government will therefore adopt a decision about the resources required for investment in climate protection during budget consultations in 2008.

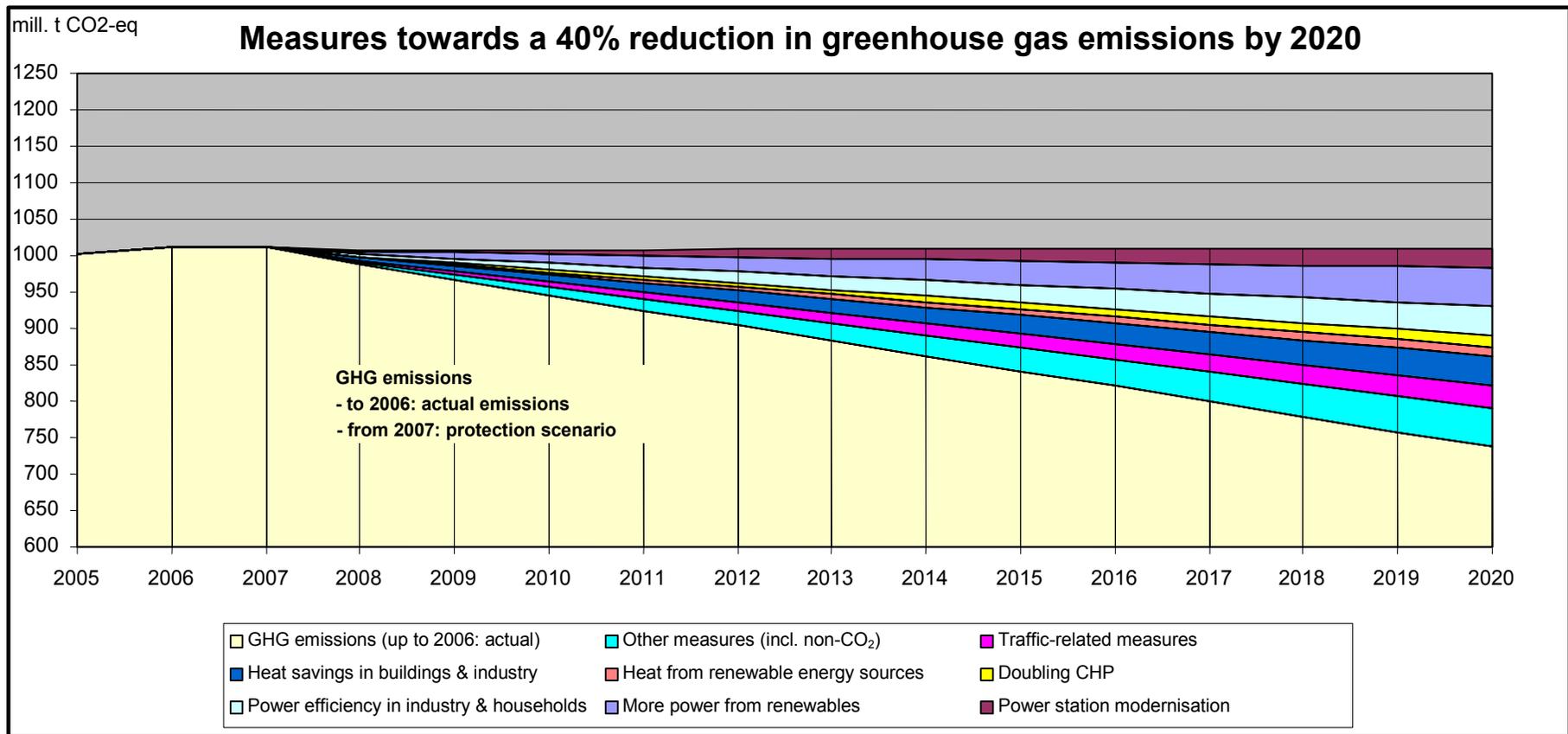
Individual responsibility

Combating climate change and the concomitant restructuring of industrial society can only succeed if the German government as a whole, but also the *Länder* and local authorities, as well as industrial and societal players assume their share of responsibility.

But ordinary men and women can contribute substantially through their own behaviour to protecting the climate. Saving energy is simple and it pays off. Opening windows wide for short periods is the low-energy way to air a home. Unplugging the TV at night avoids wasting power on stand-by. Power consumption can be reduced considerably by taking energy efficiency into account when purchasing a fridge, computer or light bulb.

International policies

Germany will continue to play a pioneering role in climate protection. The aim of the German government is to establish an international follow-up agreement to the Kyoto Protocol by the year 2009. The Kyoto Protocol is currently scheduled to expire at the end of 2012. A decisive factor here will be the assumption of appropriate contributions to protecting the climate in the period up to 2020 by the United States of America and the other industrial nations, but also the newly industrialising countries such as China and India. As the poorest developing countries stand to be hit hardest by the consequences of climate change, particular support will be required here to enable them to adapt. The German government is examining innovative financing instruments of the kind already applied by France and the United Kingdom. The revenue could be used for climate protection measures in developing countries.



Status quo: Greenhouse gas emissions: 1990: 1,228 mill. t CO_{2e} 2006: approx. 1,007 mill. t Target 2020 (-40% over 1990): 737 mill. t

Possible measures to reduce greenhouse gas emissions by 270 million t compared with end of 2006 by the year 2020:

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| 1. 11% fall in electricity consumption due to major energy efficiency gains in the power sector: | 40 million t |
| 2. Renewal of power plant park with more efficient power plants : | 30 million t |
| 3. Power from renewable energy increased to over 27%: | 55 million t |
| 4. Use of efficient cogeneration doubled to 25%: | 20 million t |
| 5. Fall in energy consumption due to modernised buildings, efficient heating and improved production: | 41 million t |
| 6. Heating generated from renewable energy increased to 14%: | 14 million t |
| 7. Greater transport efficiency and use of biofuels increased to 17%: | 30 million t |
| 8. Reduction in emissions of methane, nitrous oxide and F-gas: | 40 million t |