European Energy and Climate Policy Requires Ambitious Targets for 2030

by Claudia Kemfert, Christian von Hirschhausen, and Casimir Lorenz

In January 2014, the European Commission proposed a framework for its climate and energy policy up to 2030 which includes targets for reducing greenhouse gases and increasing the use of renewable energy sources, but no specific goals for improving energy efficiency. By 2030, greenhouse gas emissions should be 40 percent lower than in 1990. Another element of the proposal is the introduction of a market stability reserve for the EU Emissions Trading System, the impact of which would be too little, too late, however. With regard to renewable energy use, the Commission has proposed a target of a 27-percent share of gross final energy consumption throughout Europe. This appears unambitious bearing in mind developments to date. In addition, there is no mandatory division of these targets among the individual member states. The Commission's calculations are based on implausible technological and economic assumptions in the power sector. Nuclear power costs are underestimated, and it is assumed there will be a breakthrough in carbon capture technologies that seems unlikely from today's perspective. In contrast, cost assumptions in the renewable energy field remain too high and outdated.

In light of previous experience, specific goals for 2030 are required on three levels: greenhouse gas emissions reductions, renewable energy, and energy efficiency. According to the Commission's Impact Assessment, energy system costs would hardly increase even with more ambitious objectives. In addition, creating an appropriate framework would result in positive developments in investment, exports, and employment. The German government should continue its commitment to an ambitious European policy to reduce greenhouse gas emissions, to increase the use of renewable energy, and to enhance energy efficiency.

European energy and climate policy is currently regulated by a legislative package adopted in 2009. The 2020 climate and energy package consists of three key targets to be achieved by 2020: a reduction of at least 20 percent in greenhouse gas (GHG) emissions from 1990 levels, a 20-percent cut in primary energy consumption compared to a reference development, and an increase in the renewable energy share to 20 percent of gross final energy consumption.[1]

In January 2014, the European Commission proposed a framework for its climate and energy policy in the period from 2020 to 2030. A key component was the Commission's Communication to the European Parliament: A policy framework for climate and energy in the period from 2020 to 2030 (White Paper).[2] This document is based, inter alia, on a Green Paper adopted in March 2013 and subject to public consultation[3] and also a comprehensive Impact Assessment[4] which outlined the findings of energy and macroeconomic modeling. As part of the Communication, additional documents were submitted including a proposal for introducing a market stability reserve (MSR) to reform the EU Emissions Trading System (EU ETS) (see box).[5]

1 J. Diekmann, "Erneuerbare Energien in Europa: Ambitionierte Ziele jetzt konsequent verfolgen," Wochenbericht des DIW Berlin, no. 45 (2009): 784-792.

2 European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A policy framework for climate and energy in the period from 2020 to 2030, COM(2014)15 final (Brussels: January 22, 2014).

3 European Commission, Green Paper: A 2030 framework for climate and energy policies, COM(2013) 169 final (Brussels: March 27, 2013).

4 European Commission, Commission Staff Working Document: Impact Assessment, SWD(2014) 15 final (Brussels: January 22, 2014).

5 European Commission, "2030 climate and energy goals for a competitive, secure and low-carbon EU economy," press release IP/14/54, Brussels, January 22, 2014.

Box

European Commission Climate and Energy Policy Proposals until 2030

European climate and energy policy is regulated by the 2020 climate and energy package until 2020. The package includes specific targets for a reduction in GHG emissions, improvements in energy efficiency, and the use of renewable energy sources ("20-20-20" targets). Long-term development is marked out in the Roadmap for moving to a low-carbon economy in 2050 (Energy Roadmap),[1] according to which EU GHG emissions should be reduced by 80 to 95 percent by 2050 against 1990 levels.

The Commission's recently proposed policy framework for climate and energy in the period from 2020 to 2030 bridges the 2020 Package and the 2050 Roadmap. As its centerpiece, the framework envisages a Europe-wide GHG emissions reduction target of 40 percent by 2030 compared to 1990 as well as an EU-wide renewable energy target of at least 27 percent of final energy consumption. The European Commission has also submitted the following documents:

- Communication: A policy framework for climate and energy in the period from 2020 to 2030,[2]
- Accompanying Impact Assessment,[3]
- Communication[4] and comprehensive report[5] on energy prices and costs in Europe,
- Report on energy economy developments in Europe,[6]
- Guidelines for member states on public intervention in electricity markets,[7]
- Proposal for the introduction of a market stability reserve for the European Emissions Trading System.[8]

1 European Commission, Communication: Roadmap for moving to a low-carbon economy in 2050, COM(2011)112 final (Brussels: March 8, 2011).

2 European Commission, Communication: A policy framework for climate and energy in the period from 2020 to 2030, COM(2014)15 final (Brussels: January 22, 2014).

3 European Commission, Commission Staff Working Document: Impact Assessment, SWD(2014) 15 final (Brussels: January 22, 2014).

4 European Commission, Communication: Energy prices and costs in Europe, COM(2014) 21 final (Brussels: January 22, 2014).

5 European Commission, Commission Staff Working Document: Energy prices and costs report, SWD(2014) 0020 (Brussels: January 22, 2014).

6 European Commission, „Energy Economic Developments in Europe," European Economy, no. 1 (2014).

7 European Commission, Communication: Delivering the internal electricity market and making the most of public intervention, COM(2013)7243 final (Brussels: November 5, 2013).

8 European Commission, Proposal for a decision of the European parliament and of the council concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC, COM(2014) 20/2 (Brussels, 2014).

European Commission Proposes 2030 Framework for Climate and Energy Policies

The Commission's most recent Communication differs significantly from the 2020 climate and energy package which sets out specific climate, renewable energy, and energy efficiency targets. The 2030 framework proposes a 40-percent reduction in GHG emissions from 1990 levels. Further, the requirements had to be tailored both to sectors that were covered by the EU ETS and sectors that were not. As has been the practice to date, the target for the sectors not included in the EU ETS is to be distributed among the member states. The aim for renewable energy use is to produce a 27-percent share of gross final energy consumption across Europe. The Commission considers this to be consistent with achieving a 40-percent emissions reduction target. From the point of view of renewables, however, no specific objectives are stipulated for the individual EU member states and, consequently, they cannot be made directly responsible for meeting this particular target. Neither does the Commission propose a specific goal with regard to increasing energy efficiency, instead referring to an ongoing review of energy efficiency directives, the findings of which must first become available before a target can be set.

One possible explanation for the inconsistent targets in the 2030 framework compared to the 2020 package could be the UN Conference of the Parties on Climate Change (taking place in Paris at the end of 2015) placing the Commission under pressure to set GHG emissions targets quickly; there is unlikely to be quite such a sense of urgency among the different member states to set renewable energy and energy efficiency targets, however.

The European Commission remains committed to its long-term target of reducing GHG emissions by between 80 and 95 percent by 2050 against 1990 levels. However, the question remains as to whether the current proposals are enough to ensure the 2050 targets are met.[6]

Commission's Proposal Based on Scenarios and Impact Assessment

The Commission's current proposals refer to a reference scenario that was published at the end of 2013 and an Impact Assessment of the resulting policy scenarios. Alongside key energy indicators, the Impact Assessment also evaluates the development of macroeconomic variables. The basis of the proposal is the reference scenario "EU Energy, Transport and GHG Emissions Trends to 2050".[7] The scenario builds on statistical data from 2010 and assumes a continuation of current economic trends and future demographic developments. Further, policy proposals that had been agreed or already implemented by spring 2012 were also taken into consideration. The reference scenario establishes that by 2030 there will be a 32.4-percent reduction in GHG emissions compared to 1990 levels, a 24.4-percent share of final energy consumption generated by renewable energy sources, and also energy savings of 21 percent compared to the 2007 reference development forecast (see table). It should be noted, however, that, according to the reference scenario, the reduction in GHG emissions to be achieved by 2050 is only 44 percent. A reduction of emissions between 80 and 95 percent by 2050 compared to 1990 would require further measures by 2030.

The policy scenarios that build on the reference development include a range of targets for GHG emissions (–35 percent to –45 percent) and renewable energy (no target, 30 or 35 percent).[8] None of the scenarios assume separate targets for increasing energy efficiency. Two groups of scenarios are set out: in the first group, enabling conditions such as sectoral measures for improving efficiency or a particularly comprehensive network expansion are required in order for the targets to be met. The second scenario group does not include such enabling conditions. It is interesting to note that none of the scenarios without enabling conditions meet the EU's long-term target of an 80- to 95-percent reduction in GHG emissions by 2050.

The findings of the Impact Assessment do not point to any clear conclusions with regard to the advantages of following particular policies. Energy system costs, for example, are very similar in all scenarios: average annual energy system costs are 34 billion euros (1.6 percent) higher in the most ambitious scenario than in the reference scenario. Annual investment is 93 billion euros higher than in the reference scenario (816 billion euros) and furthermore 27-billion-euro can be saved over the reference scenario due to reduced fuel imports.

Ambitious targets in the fields of climate change, renewable energy, and energy efficiency may result in a positive net impact on the overall economy, for example, due to increased investment activity or decreased imports of fossil fuels from abroad.[9] Depending on the model used and the assumed use of CO_2 revenue, the EC's Impact Assessment shows either slightly positive or negative net impact on GDP and employment. The most ambitious scenario results in the most significant growth in income and employment (45-percent emissions reduction, 35-percent share of renewable energy sources, and increased efficiency measures). According to this scenario, compared to the reference development, a positive employment effect of 1.25 million people can be expected throughout Europe by 2030.

Most Ambitious Scenarios Not Favored by European Commission

The Commission's model analyses illustrate that the scenarios with particularly ambitious targets for emissions reductions and the expansion of renewable energy would probably be only slightly more expensive and possibly even bring macroeconomic advantages. Bearing this in mind, the Commission's proposal to link a 40-percent GHG emissions target with a renewable energy target of just 27 percent is difficult to comprehend. Further, more ambitious 2030 objectives improve the chances of the 2050 climate target being met. Particularly the renewable energy target of 27 percent which, although described as "binding'' is only formulated at EU level, appears to be unambitious and the Commission is yet to set any target at all for energy efficiency. These circumstances certainly do not instill confidence in a secure and sustainable energy supply up to 2050.

6 In a recent Wochenbericht, DIW Berlin outlined a number of reasons for a proactive energy and climate policy and indicated that Europe was not the only country in the world to have implemented an ambitious energy and climate policy to date. K. Neuhoff et al., "Energie- und Klimapolitik: Europa ist nicht allein," DIW Wochenbericht, no. 6 (2014): 91–108.

7 European Commission, EU Energy, Transport and GHG Emissions Trends to 2050. Reference Scenario 2013 (2013).

8 European Commission, Impact Assessment.

9 J. Blazejczak, D. Edler, and W.-P. Schill, "Improved Energy Efficiency: Vital for Energy Transition and Stimulus for Economic Growth," DIW Economic Bulletin, no. 4 (2014).

Table

Overview of Impact Assessment Scenarios

	Under reference conditions				With enabling conditions			
Scenario name[1]	Reference scenario	THG35 / energy efficiency	THG37	THG40	THG40	THG40 / energy efficiency	THG40 / energy efficiency / RES30	THG45 / energy efficiency / RES35
	2030 targets in percent							
Greenhouse gases[2]	–	–35	–37	–40	–40	–40	–40	–45
Renewable energy[3]	–	–	–	–	–	–	30	35
	Model findings for 2030, in percent							
Greenhouse gases [2]	–32.4	–35.4	–37	–40.4	–40.6	–40.3	–40.7	–45.1
Renewable energy [3]	24.4	25.5	24.7	25.5	26.5	26.4	30.3	35.4
Energy efficiency[4]	–21.0	–24.4	–22.9	–24.4	–25.1	–29.3	–30.1	–33.7
	Impact on energy system (index 2010 = 100)							
Net energy imports	96	90	94	92	89	83	81	78
Energy intensity[5]	67	64	66	65	64	60	60	57
	Economic and social impact							
System costs in reference scenario and changes compared with this scenario in billion euros per annum[6]	2,067	–3	+6	+7	+2	+22	+22	+34
Investment in reference scenario and changes compared with this scenario in billion euros per annum[6, 7]	816	+17	+19	+30	+38	+59	+63	+93
Net imports of fossil fuels in the reference scenario and changes compared with this scenario in billion euros per annum[6]	461	–10	–2	–4	–9	–20	–22	–27
Average price of electricity in reference scenario and changes compared with this scenario in euros per MWh[8]	176	–2	+1	+6	+3	–1	+2	+20
Emissions trade price in euros per ton of CO_2	35	27	35	53	40	22	11	14

1 "Energy efficiency" in the scenario name refers to the existence of policy measures to increase energy efficiency.
2 Compared to 1990.
3 Share of gross final energy consumption.
4 Compared to a 2030 forecast.
5 Primary energy/GDP.
6 Annual averages 2011–2030.
7 Excluding transport infrastructure.
8 Prices in end customer segment constant from 2010. In the reference scenario, the relevant value in 2010 was 134 euros/MWh.
Sources: European Commission, Impact Assessment; see also European Commission, Executive Summary of the Impact Assessment. Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions A policy framework for climate and energy in the period from 2020 up to 2030, SWD (2014) 16 final, Brussels, January 22, 2014.

Greenhouse gas emissions vary considerably across the scenarios; system costs on the other hand barely differ.

Mitigating Climate Change with Nuclear Energy and Coal-Fired Power Plants with Carbon Capture?

The results of the Commission's scenario calculations depend largely on assumptions made with regard to the availability and future costs of different power generation technologies which, in part, are based on implausible cost estimates and scenario prerequisites: for example, both the reference scenario and the Impact Assessment use over-optimistic estimates for nuclear power and carbon capture that contradict the economic and technological trends of the last decade. Consequently, in all scenarios with no targets for the use of renewable energy sources, the share of power generation contributed by nuclear energy is over 20 percent by 2030, although it has proven to be the most expensive technology available and is also plagued by insurance problems and the unresolved issue of final disposal.[10] The Impact Assessment also assumes a high share of coal power due to an

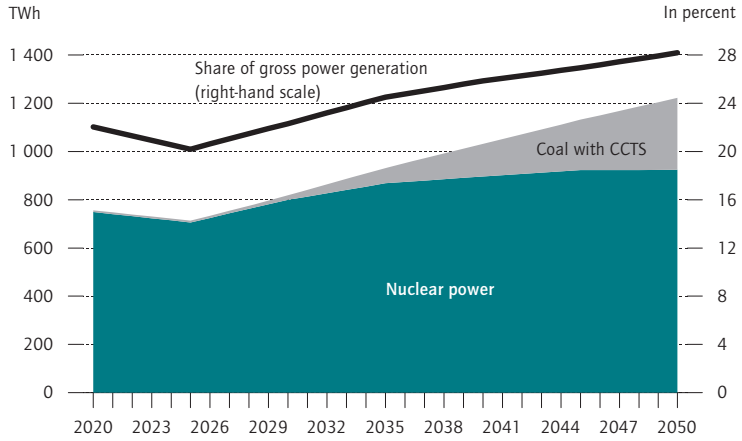
10 C. v. Hirschhausen, C. Kemfert, F. Kunz, and R. Mendelevitch, "European Electricity Generation Post-2020: Renewable Energy Not To Be Underestimated," DIW Economic Bulletin, no. 9 (2013); and also A. Schröder, F. Kunz, J. Meiss, R. Mendelevitch, and C. v. Hirschhausen, "Current and Prospective Costs of Electricity Generation until 2050," DIW Berlin Data Documentation, no. 68 (2013).

increase in the availability of carbon capture over time (CCTS, carbon capture, transport, and storage); there will be a significant rise in the CCTS share after 2030. However, the assessment ignores the fact that (globally) every attempt to demonstrate and expand this technology to date has failed and the required CO_2 pipeline infrastructure has since been sidelined by the European Commission.[11] Further, the Impact Assessment also underestimates the expected cost degression of renewable energy sources.

Already the predecessor documents of the aforementioned Communication, the Energy Roadmap 2050 and the 2013 Green Paper,[12] draw on assumptions based on a boom in nuclear energy and the rapid implementation of CCTS technology.[13] The cost degression of renewable energy, on the other hand, uses very conservative estimates; consequently, the costs for photovoltaics, for example, have already reached approximately the level forecast by these EU studies for 2050. Despite some minor adjustments to the cost estimates, the Commission's optimistic forecasts for 2020 to 2030 regarding the costs and availability of nuclear and coal-fired power plants (with CCTS) currently remain fundamentally unchanged. Although the capital costs for nuclear power and CCTS were increased slightly,[14] this change has had little impact on the model findings, since the costs are still underestimated. This means that, according to the Commission's scenarios, the reduction targets will be met primarily as a result of the continued high level of nuclear power (97 gigawatts in 2025 and 125 gigawatts in 2050) and also, to a more limited extent, through fossil fuel power plants with carbon capture: the plan is to build a large number of new nuclear power stations and also several fossil fuel-fired power stations with carbon capture technology by 2030, although, taking all relevant factors into consideration, neither of these technologies is either cost-effective or even safe.

Figure 1

Annual Electricity Generation from Nuclear Power and Coal-Fired Plants with CCTS in the EC's Reference Scenario



Sources: European Commission, Reference Scenario; calculations by DIW Berlin.

Gross power production from nuclear and coal-fired power plants with CCTS will increase to 28 percent by 2050.

CO_2 Emissions Considerably Higher in Sample Calculation Without Nuclear Power and CCTS

Due to the underlying optimistic assumptions, the Commission's scenarios expect nuclear energy and CCTS to account for a substantial share of the reduction in emissions in the long term. According to the reference scenario, between 2020 and 2050, around 20 to 28 percent of power generation in Europe will be supplied by nuclear energy and coal-fired power plants with CCTS (see Figure 1). Using a sample calculation in which the energy produced by nuclear power stations and coal-fired plants with CCTS is replaced by energy from gas and coal-fired plants without CCTS from 2020, the result shows a cumulative increase in the energy sector's CO_2 emissions from 2020 to 2050 of 17.8 billion tons against the reference scenario.[15] This equates to 25 percent of the EU's entire emissions budget between 2008 and 2050 (69.5 billion tons).

11 European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Long term infrastructure vision for Europe and beyond, 711 final (Brussels: October 14, 2013).

12 European Commission, Commission Staff Working Paper: Energy Roadmap 2050 Impact Assessment, SEC (2011) 1565 final (Brussels: December 15, 2011); and also European Commission, Green Paper.

13 Hirschhausen et al., "European Electricity Generation."

14 Nuclear power (for 2030) from 3,859 euros/kW to 4,212 euros/kW; CCTS from 2,315 euros/kW to 3,370 euros/kW). See European Commission, EU Energy, Transport and GHG Emissions Trends to 2050. Reference Scenario 2013 (2013); and also European Commission, Energy Roadmap 2050 Impact Assessment.

15 The sample calculation assumes that, from 2020, the substituted electricity will be produced by coal-fired (40 percent), gas and steam power plants (40 percent), and open gas turbines (20 percent).

Achievement of Long-Term Climate Targets Under Threat

The European Commission's reference scenario assumes that current policy measures alone will reduce emissions by 24 percent by 2020 and 32 percent by 2030 compared to 1990 levels. However, given the dubious assumptions the scenario is based on, there is a real danger that the EU will face major difficulties in achieving its 2030 emissions target and completely miss the 2050 target of reducing GHG emissions by 80 to 95 percent. Although the 2020 objective of a 20-percent reduction will be met due to the economic crisis, the EU's energy, transport, and heating sectors all lack instruments for achieving the 2050 targets. Given the energy sector's durable capital stock and the danger of a carbon lock-in, the question arises as to why a large share of the energy sector's reduction has to be deferred to 2030-2050 in order to meet the long-term emissions reduction target of 80 to 95 percent.

Between 1990 and 2011, GHG emissions in the current EU-28 countries dropped by 18 percent compared to 1990 (see Figure 2). The lion's share of the reduction occurred during the crisis years between 1990 and 1993 (the transformation crisis in former East Germany and Central and Eastern Europe) and 2008 and 2012 (financial and economic crisis), whereas GHG emissions levels remained largely unchanged between 1993 (5.2 billion tons) and 2007 (5.1 billion tons).[16]

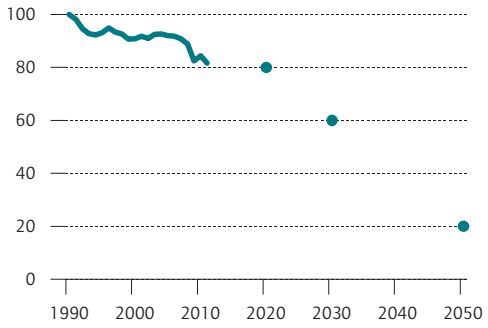
Achieving emissions reductions in the sectors covered by the EU ETS is more cost effective than in those not part of the scheme, such as transport or households. This makes it relatively easy for the emissions trading sector to meet the current emissions reduction target of 1.74 percent per year, with a large number of surplus permits still remaining in circulation (around two billion tons).

According to the European Commission, the emissions reduction target of 40 percent compared to 1990 levels should be met solely by implementing internal EU measures. This figure does not take into account GHG emissions produced abroad however. Along with a 43-percent reduction in industries covered by the EU ETS, achieving the target is also contingent on a 30-percent reduction in other sectors (against 2005 levels). A particularly problematic area is effort sharing among the member states of the EU with regard to sectors not covered by the EU ETS. Currently, this is based, inter alia, on per capita GDP to reduce impact on the poorer countries.

Figure 2

EU-28 Greenhouse Gas Emissions and Targets for 2020, 2030, and 2050

Index 1990 = 100



Emissions in carbon dioxide equivalents; excluding land use, land-use changes, and forestry.
Sources: Eurostat; calculations by DIW Berlin.

The reduction in emissions between 1993 and 2007 was minimal.

In view of these distribution issues, protracted negotiations can be expected in the future.

Emissions Trading System Reform Proposal: Impact Too Late and Too Slow

The EU ETS itself will also have to undergo far-reaching structural reforms at least if it is to maintain its position as an international role model. Carbon emissions trading was first introduced in the EU at the beginning of the last decade because the EU-wide carbon tax project did not meet with majority support. The hope was that the system would facilitate an effective and efficient reduction in emissions. Following a pilot phase (2005 to 2007) and trading period with broadly free allocation among the member states (2008 to 2012), the system is now in its third trading period (running until 2020) which involves auctioning a significant share of emissions allowances throughout Europe and harmonizing the rules for free allocation.

If, in terms of promoting investment, the EU ETS has, for the most part, only had a moderate impact since it was introduced in 2005, this impact has been almost completely lost as a result of the economic crisis and the large number of credits from outside the EU. Figure 3 shows the price development of carbon certificates on

16 Since 2011, emissions have been on the increase in Germany as well as a number of other countries.

the spot market from 2005 to the present day.[17] Apart from its high level of volatility, the collapse of the carbon price as a result of the 2008 economic crisis is also particularly striking: due to the slump in demand for certificates that was not accompanied by a corresponding adjustment of supply, in summer 2008, the price plummeted; it was only the trading participants' speculation and hedging strategies that prevented the price from hitting zero euros per ton of CO_2.[18] Since then, the accumulated surplus of unused permits has hit around two billion tons. Many market observers as well as the European Commission itself assume that a significant surplus will remain for some years, probably until 2030 (see Figure 4).[19] The Commission anticipates that there will be a slight reduction in the surplus in the near future due to delayed auctioning of allowances, known as backloading. Between 2020 and the end of the observation period, the reduction of the surplus is expected to be marginal, which means that carbon prices are likely to remain low in the long term.

Although the decision to backload endorsed in February 2014 saw 900 million tons of allowances withdrawn from the market, these permits will be released back into the market by 2019, which means that any price effects will only be temporary. Yet the most recent Commission document makes no mention of the structural reforms that have been discussed in this context, such as a reduction of the surplus in the third trading period. Instead, the document proposes a "market stability reserve" with the aim of increasing or reducing the supply of carbon credits from 2021, depending on the state of the market. The plan is to announce the level of surplus certificates on May 15 each year:[20] if the cumulative surplus exceeds 833 million permits, up to 12 percent of the surplus certificates to be auctioned in that particular year (i.e., at least 100 million) will be transferred to the reserve. Conversely, if the number of permits in circulation dips below 400 million, the Commission will release 100 million permits from the reserve back into the market the following year. The remaining long-term surplus should correspond to the hedging demand of the power sector. It is assumed that this occurs because power producers have generally always sold their power production up to three years in advance and issue it with certificates at the point of sale. However, since the market stability reserve is not due to come into effect until 2021 and will only result in a gradual reduction of the surplus thereafter due to the 12-percent adjustment, the mechanism should be more effective.

Figure 3

Development of Certificate Prices in EU Emissions Trading System (Spot Market)

In euros per ton of CO_2

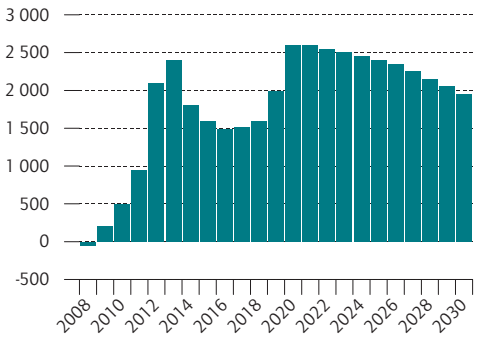
Source: European Energy Exchange.

For most of 2013, the carbon price was under five euros per ton.

Figure 4

Expected Surplus Permits in EU Emissions Trading System

In million emissions allowances



Historical values up to 2012; forecasts from 2013.
Source: European Commission, Questions and answers on stability reserve.

Continued high surpluses are anticipated for the coming years.

17 In 2007 in particular, term prices were significantly higher.

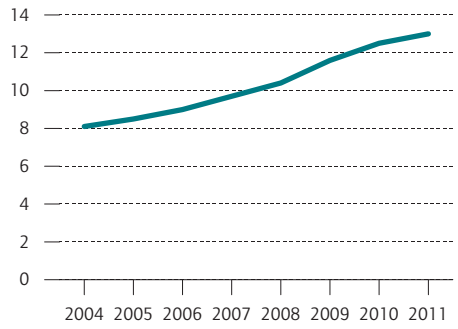
18 K. Neuhoff and A. Schopp, "Europäischer Emissionshandel: Durch Backloading Zeit für Strukturreform gewinnen," Wochenbericht des DIW, no. 11 (2013): 3–11.

19 European Commission, Questions and answers on the proposed market stability reserve for the EU emissions trading system, MEMO/14/39 (Brussels: 2014).

20 Permits issued + credits from abroad – verified emissions – permits in the market stability reserve = permits in circulation. Based on this calculation, permits have accumulated since 2008, i.e., since the beginning of the second trading period.

Figure 5

Renewable Energy Share of Gross Final Energy Consumption in EU-28 Countries
In percent



Source: Eurostat.

The share of renewable energy sources has increased significantly since 2004.

Figure 6

Primary Energy Consumption in EU-28 Countries and Projections to 2020
In million tons of oil equivalent

Sources: Eurostat; European Commission, Proposal for a Council Directive adapting Directive 2012/27/EU on energy efficiency by reason of accession of Croatia, Brussels, COM(2013) 113 final; calculations by DIW Berlin.

A substantial reduction in primary energy consumption is needed to meet the 2020 target.

More Ambitious Renewable Energy Targets Required

Compared with nuclear power and power generation using fossil fuel-fired plants with CCTS, renewables provide a cost-effective and reliable source of carbon-free energy. They also contribute to securing supply and conserving resources. Unlike the Commission's proposal to protect the climate using nuclear power and coal-fired plants with CCTS, renewable energy sources are currently already available and constitute a viable alternative for meeting climate targets with no inherent technological risks.[21] In view of the high external costs of nuclear power and fossil fuels, renewable energy sources are indispensable for sustainable development.

The aim is to increase the share of gross final energy consumption contributed by renewable energy to 20 percent by 2020. In 2011, this figure was only 13 percent (see Figure 5). According to the reference scenario, if no further measures are implemented, a 24-percent share will be reached by 2030. In light of this, the 2030 target of 27 percent proposed by the European Commission could be considered rather low.

The Commission's proposal of an EU-wide binding target is still extremely vague; it is particularly unclear how the target should be met: there is no sharing of the objective across the member states, no coherent approach to implementation, and no sanctions for non-compliance. Although the Commission states in its Communication that there will be a new governance system based on national energy plans to ensure the target is achieved, this governance structure with its iterative voting process between the Commission and the member states still remains unclear.[22] In this respect, there is no evidence of the framework having a binding effect.

Improved Energy Efficiency of Major Importance

Energy efficiency is defined as the ratio of output of goods or services to input of energy.[23] Improvements in energy efficiency are indicated by a rise in energy productivity (economic output per unit of energy used) or a fall in energy intensity (energy use per unit of economic output).[24] Improvements in energy efficiency make

21 Hirschhausen et al., "European Electricity Generation."

22 A new governance system has been proposed, based on national plans, with the aim of facilitating a competitive, secure, and sustainable energy supply. Improvements are needed with regards to competitiveness, transparency, security of investment, and EU-wide coordination. These plans are to be implemented in an iterative process between the Commission and the member states to facilitate compliance with legal requirements and provide long-term prospects. European Commission, 2030 climate and energy goals.

23 Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EG and 2010/30/EU and repealing Directives 2004/8/EG and 2006/32/EG.

24 J. Diekmann, W. Eichhammer, A. Neubert, R. Hellwig, B. Schlomann, and H.-J. Ziesing, "Energie-Effizienz-Indikatoren: Statistische Grundlagen,

it easier to meet relative targets pertaining to a higher share of overall consumption contributed by renewables.

In 2008, the Commission agreed a reduction of primary energy consumption of 20 percent by 2020 compared to the reference development.[25] The plan is to meet this target primarily through efficiency improvements in the building, services, transport, and energy sectors and also through increased use of cogeneration.

An Energy Efficiency Directive entered into force at the end of 2012.[26] The Directive specifies that, in 2020, the EU-28's primary energy consumption should not exceed 1,483 million tons of oil equivalent (Mtoe) (see Figure 6) and final energy should be no more than 1,086 Mtoe. Member states are obliged to implement this Directive in national legislation by June 2014 and submit National Energy Efficiency Action Plans (NEEAPs) describing measures implemented to meet these targets.

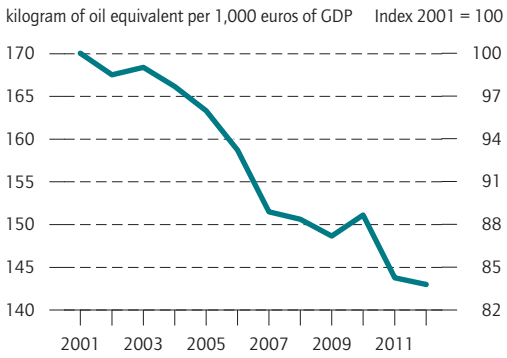
Increased Efforts Required to Meet Current Energy Efficiency Targets

The progress made in the field of energy efficiency to date is noteworthy but does not go far enough (see Figure 7) and varies across the member states (see Figure 8): in Italy, France, and Spain, relative improvements since 2001 are below the EU average whereas Germany and the UK recorded above-average improvements. Poland exhibits comparatively high energy intensity but this has seen a significant decline since 2001.

If the EU does not increase its efforts, it will fail to meet the target of a 20-percent reduction in primary energy consumption by 2020 compared to the reference development (see Figure 6). According to a 2013 trend projection, unless the Energy Efficiency Directive is successfully implemented, a maximum reduction of only 10 percent would be achieved. Currently, with the implementation of the Directive, the Commission anticipates a saving of just 17 percent by 2020.[27] Energy savings achieved to date are not only a result of energy efficiency measures but partly also due to the economic crisis. Primary energy consumption in 2012 was at around the same level as in 1990. The Commission's Impact Assessment indicates that reaching a 40-percent GHG re-

Figure 7

Development of Energy Intensity in EU-28 Countries

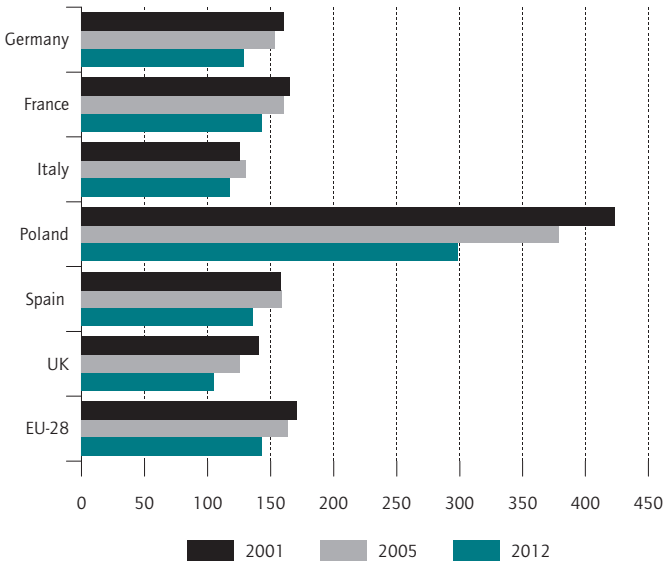


GDP at 2005 prices.
Source: Eurostat.

Energy intensity has declined.

Figure 8

Development of Energy Intensity in Selected Countries
In kilograms of oil equivalent per 1,000 euros of GDP



At 2005 prices.
Source: Eurostat.

Improvements vary significantly between individual member states.

theoretische Fundierung und Orientierungsbasis für die politische Praxis," Umwelt und Ökonomie, vol. 32 (Physica-Verlag: 1998).

25 European Commission, Energy efficiency: delivering the 20% target, COM(2008) 772 (Brussels: November 13, 2008).

26 Directive 2012/27/EU of 25 October 2012 on energy efficiency.

27 European Commission, Impact Assessment.

duction target by 2030 would still require considerable improvements in energy efficiency.

The Commission's proposal does not include any specific target for energy efficiency improvements by 2030 and states only that the role of energy efficiency will be examined more closely after the Energy Efficiency Directive has been reviewed during the course of this year. The Commission will only consider whether the Directive should be changed or not once this review has taken place.[28]

In the run up to 2030, efforts to enable energy efficiency to make a major contribution to a sustainable energy system must be redoubled in the run up to 2030. Presently, however, we need to wait for the initial results of the evaluation in summer 2014 before setting new targets.

Conclusion and Economic Policy Implications

In essence, the European Commission's proposed 2030 climate and energy policy framework is composed of a 40-percent GHG reduction target compared to 1990. It also proposes an EU-wide target for the use of renewable energy of 27-percent of gross final energy consumption by 2030. The framework does not, however, include a specific energy efficiency target. With these proposals which can only be considered moderately ambitious, the European Commission is running the risk of jeopardizing its long-term climate targets.

The quantitative Impact Assessment that forms the basis of the Commission's Communication provides no explanation for this restraint: neither total system costs nor energy prices really vary between the scenarios. Further, more ambitious greenhouse and renewable energy targets could result in positive investment, foreign trade, and employment developments if suitable framework conditions were created. This is an opportunity that such cautious proposals fail to take advantage of.

For the power sector, the Impact Assessment depicts an outlook which is risky from a technology policy point of view and questionable from an economic perspective, i.e., climate targets can only be met by, inter alia, increasing the number of nuclear power stations and coal-fired plants with carbon capture. Therefore, despite updated cost estimates, the European Commission's scenario calculations are based on implausible technological and economic assumptions. For instance, the Commission's estimated nuclear power costs are relatively low, contradicting the actual capital costs of recently built plants and fail to take into account the considerable risks posed by accidents and final disposal. The Impact Assessment also assumes a breakthrough in carbon capture, transport, and storage technologies in the long term. The model calculations for renewable energy, on the other hand, continue to be derived from outdated and excessively high cost assumptions.

On the basis of past experience with the 2020 Climate and Energy Package, ambitious targets will also be necessary for 2030 and beyond on three levels: greenhouse gas reduction, renewable energy, and energy efficiency. GHG emissions should be reduced by at least 40 percent by 2030 and, according to the Commission's analyses, it would also be possible to increase reductions at reasonable costs. Urgent reforms to carbon trading are required to ensure a strong carbon price that will foster low-carbon investment as soon as possible. The impact of the Commission's recent proposal to implement a market stability reserve would be too little, too late, however.

The target of a 27-percent share of renewable energy by 2030 is too low and lacks a binding division between the member states. The proposed implementation (governance process) remains unclear.

The Commission has yet to set a specific 2030 target for improvements in energy efficiency. However, also in future, a significant increase will be essential, which, in the first instance, will require the successful implementation of the Energy Efficiency Directive with its specific 2020 targets. Thereafter, increased efforts would be necessary in the run up to 2030.

In its coalition agreement, the German government confirmed the key elements of the national climate, renewable energy, and energy efficiency targets required for the energy transition. The government should therefore also commit to ambitious policies on a reduction in GHG emissions, greater use of renewable energy sources, and improvements in energy efficiency at European level.

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