Assessment of climate change policies in the context of the European Semester

Country Report: Germany

Ecologic Institute

Authors team: Lena Donat, Eike Dreblow, Matthias Duwe, Tim Wawer, Elizabeth Zelljadt, Andrew Ayres

eclareon

Author: Robert Schachtschneider

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Ecologic Institute

Ecologic Institute, Berlin:

Pfalzburger Strasse 43/44
10717 Berlin
Germany

www.ecologic.eu

Contact:

Eike Dreblow,
Fellow Climate and Energy

Tel. +49 (30) 86880-165
Fax +49 (30) 86880-100
eike.dreblow(at)ecologic.eu

eclareon

eclareon GmbH

Giesebrechtstraße 20
10629 Berlin
Germany

www.eclareon.eu

Contact:

Robert Schachtschneider
Consultant, Policy Department

Tel. +49 (30) 88 66 74 000
Fax +49 (30) 88 66 74 010
rs(at)eclareon.com

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The report provides an overview of current emission trends and progress towards targets as well as policy developments that took place over the period May 2012 to January 2013.

The content of the report represents the state of knowledge in February 2013, specific updates were made adding the latest official greenhouse gas emission data by the European Environment Agency (EEA).

Please feel free to provide any comments or suggestions to the authors through the contacts listed above.

Short summary

- ***Background:*** *Germany's climate and energy policy is ambitious and addresses relevant emission sources while emphasizing green growth.*
- ***GHG target:*** *Non-ETS emissions were in 2011 below of the 2013 target and according to the latest national projections Germany is expected to miss its 2020 target if no additional measures are taken.*
- ***Policy development:*** *Measures have been taken in all sectors in 2012. However, increased action is necessary regarding energy efficiency and grid integration of renewable energy. Adjustments to the feed-in tariff scheme are currently being discussed.*

1 Background on climate and energy policies

Although Germany is among the international leaders in climate policy, it remains the largest GHG emitter in the EU. Germany has committed to ambitious emission reduction targets that go well beyond the targets set by the EU. The Integrated Energy and Climate Programme of 2007 and 2008 stipulated a 40% emission reduction target by 2020, compared to 1990 levels. Taking into account Germany's economic recovery and the decision for the nuclear phase-out, a 2008 study cautioned that the measures included in the programme may not suffice to reach the target (OECD 2012). These 29 measures focus primarily on energy efficiency and the promotion of renewable energies, but they also include action on transport and research and development (GLOBE 2012).

In 2010, the government published the Energy Concept, which provided a long-term strategy for German energy policy and sets a path for a reduction of GHG emissions by 80% until 2050 (BMU and BMWi 2010). Its principal objective is to ensure the provision of environmentally friendly, reliable, and affordable energy supply while turning Germany into one of the greenest economies in the world. Nuclear energy was stipulated as a bridging technology. However, as a reaction to the Fukushima disaster, the government decided to phase-out nuclear energy by 2022 and updated the Energy Concept accordingly to reflect the accelerated shift to renewable energy ("Energiewende"). More specifically, the strategy aims at increasing the share of renewable energies in electricity generation to 35% in 2020, and reducing demand for primary energy by 50% until 2050 ([1]). Furthermore, the government is promoting the expansion of the electricity network and the use of electric vehicles (Bundesregierung 2011). Several legislative acts have been agreed on in 2011 to implement this strategy. In December 2012, the government presented the first annual monitoring report on the progress of the Energy Concept. Accordingly, increased action is required regarding energy efficiency and expansion of the electricity grid (BMU/BMWi 2012).

[1] The Energy Concept also sets emission reduction targets for 2030 (55%), 2040 (70%), and 2050 (80% to 95%). Renewable energies shall provide share of total electricity use of 50% in 2030, 65% in 2040, and 80% in 2050, and a share of total energy use of 30% in 2030, 45% in 2040, and 60% in 2050.

The National Climate Initiative and an Adaptation Action Plan are among the instruments for implementing Germany's climate policy. The Energy and Climate Fund was established in 2010 and provides a financing framework for measures related to climate protection. It receives funding from the auctioning of emission certificates.

According to OECD, Germany is a leader in green technologies and one of the largest producers of environmental goods and services by successfully "turning environmental challenges in to a source of growth" (OECD 2012). The German *Energiewende* explicitly stimulates the greening of the economy by supporting renewable energy, energy efficiency, and resource efficiency. According to a 2008 study commissioned by the Federal Ministry of Environment (BMU), 1.8 million people work in the environmental sector, making up 4.5% of total employment. The study predicts that the sector will provide 500,000 additional jobs by 2020 and possibly even 800,000 by 2030 (Jochem et al. 2008). In order to speed-up the transition to a green economy, the BMU and the Federal Ministry of Education and Research (BMBF) launched a joint initiative in September 2012, which started with a conference that brought together 450 representatives of science, business, politics, and society (BMBF & BMU 2012).

2 GHG projections

Background information

Germany is the biggest emitter of GHG emissions in the EU. In 2011, Germany emitted 917 Mt CO_2eq (UNFCCC inventory 2011), which was 26% less than in 1990. Almost 40% of these emissions stems from energy supply. However, emissions in that sector have been reduced significantly by almost 20% between 1990 and 2010, reflecting the increased use of renewable energies and natural gas. Emissions from energy use decreased by more than 30% since 1990, mainly as a result of energy efficiency measures and improved insulation of buildings in Eastern Germany. Germany is also one of the few Member States in the EU where emissions from transport have not increased since 1990; rather, transport emissions have decreased by 6% due to higher fuel prices, road tolls, the eco tax, and the increased use of biofuels. Emissions from industrial processes decreased by 23% and emissions from agriculture decreased by 18%, due to decreasing production levels and shrinking numbers of livestock (EEA 2012c, UNFCCC 2012).

Progress on GHG target

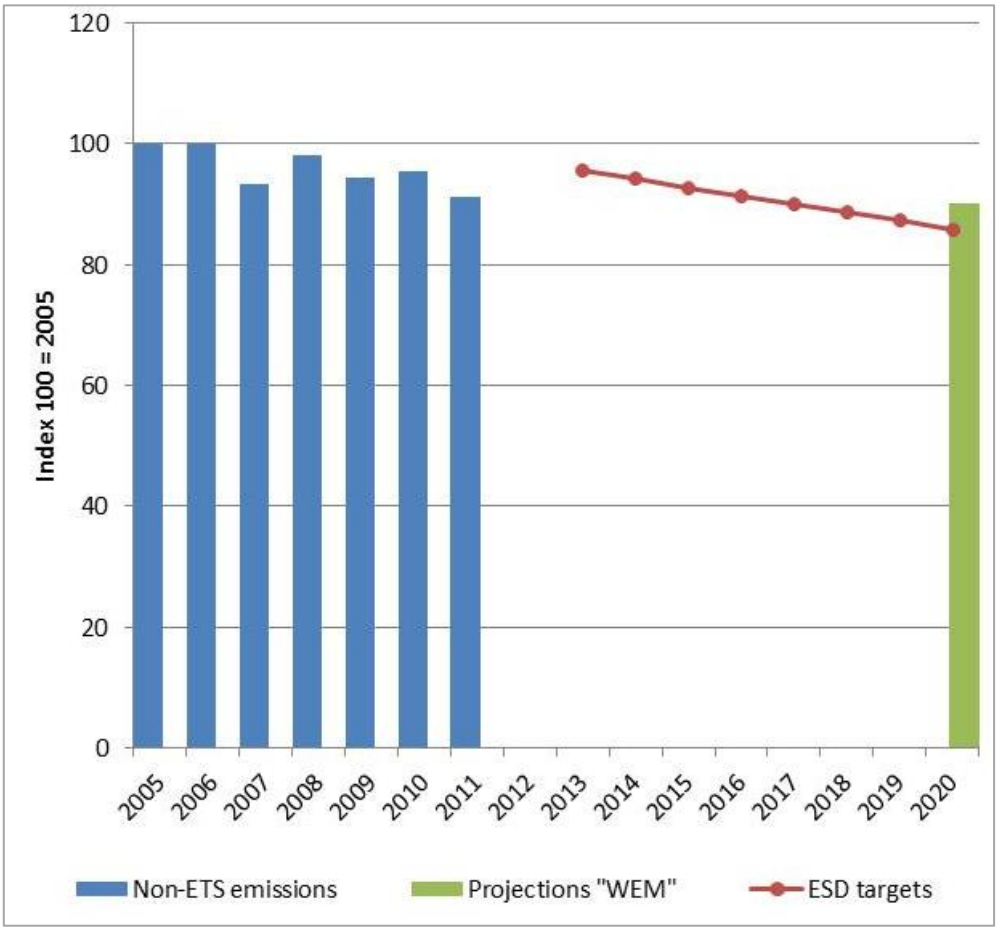
There are two sets of targets to evaluate: 1) the Kyoto Protocol targets for the period 2008-12 (which has just ended) and 2) the 2020 targets for emissions not covered by the EU ETS.

Under the Kyoto-Protocol the emission reduction target for Germany for the period 2008-2012 has been set to minus 21 % based on 1990 for CO_2, CH_4 and N_2O and on 1995 for F-gases. An evaluation of the latest complete set of greenhouse gas data (for the year 2011) shows that Germany's emissions have decreased on average by 26% from the Kyoto base year to 2011 (EEA 2013a). Therefore, Germany is on track to meeting its Kyoto target through domestic emissions reductions directly.

By 2020, Germany needs to reduce its emissions not covered by the EU ETS by 14% compared to 2005, according to the Effort Sharing Decision (ESD) ([2]). The latest data suggest that Germany is currently not on track to meet this target. However, according to the 2011 inventory data, emissions in 2011 were 5% below the Annual Emissions Allocation (COM 2013) for the year 2013. Up to 2020, national projections show that Germany will only meet its 2020 ESD target if additional measures are implemented: Germany is expected to reduce its non-ETS by 10% compared to 2005 in scenarios with existing measures and by 14% with additional measures ([3]) (EEA 2013b).

Figure 1 shows Germany's non-ETS emissions until 2011, targets under the ESD for the period 2013-2020 and the projections with existing measures for 2020.

Figure 1: Non-ETS emission trends and projections compared to the ESD targets



Source: EEA. Projections are based on 15/04/2013 draft GHG inventory submissions under the UNFCCC and MS projections submitted

[2] Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.

[3] Calculations are based on domestic emissions only, without accounting for possible use of flexibility options. The 2020 targets and 2005 non-ETS emissions are all consistent with 2013-2020 ETS scope, i.e. they take into account the extension of the ETS scope in 2013 and the unilateral inclusion of installation in 2008-2012.

Table 1: GHG emission developments, ESD-targets, and projections (in Mt CO_2eq)

					ESD target*		2020 Projections**	
	1990	2005	2010	2011	2013	2020	WEM	WAM
Total	1,250.3	997.9	943.5	916.5				
Non-ETS emissions		509.7	486.6	464.4	487.1	417.2	437.8	416.3
(% from 2005)				-9%	-4%	-14%	-10%	-14%
Energy supply	13.8	16.4	14.2	14.0				
(% share of total)	1%	2%	2%	2%				
Energy use (w/o transport)	385.3	267.8	266.5	238.0				
(% share of total)	31%	27%	28%	26%				
Transport	164.7	161.8	155.0	157.2				
(% share of total)	13%	16%	16%	17%				
Industrial processes	94.2	78.8	68.7	69.3				
(% share of total)	8%	8%	7%	8%				
Agriculture	88.0	71.4	68.4	70.4				
(% share of total)	7%	7%	7%	8%				

Source: UNFCCC inventories 2011; EEA (2013b); COM (2013), Calculations provided by the EEA and own calculations.

** The ESD target for 2013 and for 2020 refer to different scopes of the ETS: The 2013 target is compared with 2011 data and is therefore consistent with the scope of the ETS from 2008-2012; the 2020 target is compared to 2020 projections and is therefore consistent with the scope of the ETS from 2013-2020. Non-ETS emissions in 2005 for the scope of the ETS from 2013-2020 amounted to 485.1 Mt CO_2eq.*

*** 2013 projections with existing measures (WEM) or with additional measures (WAM).*

Legend for colour coding: green = target is being (over)achieved); orange = not on track to meet the target

Total greenhouse gas emissions (GHG) and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international aviation and international maritime transport.

National projections of GHG emissions up to 2020, summarised by the EEA, need to be prepared by the Member States in accordance with the EU Monitoring Mechanism ([4]) every two years, and the latest submission was in 2013. Projections need to be prepared reflecting a scenario that estimates emissions reductions in line with policies and measures that have already been implemented (with existing measures, WEM), and an additional scenario that reflects developments with measures and policies that are in the planning phase (with additional measures, WAM) may also be submitted.

In the following two tables, these measures - as outlined by Germany as basis for their projections as of April 2011 ([5]) - have been summarised with a focus on national measures and those EU instruments expected to reduce emissions the most ([6]). An update on the status of the policies and measures is included in order to assess the validity of the scenarios.

[4] Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol.

[5] The respective policies and measures were not available at the time of the preparation of this country report. Thus, policies and measures as outlined in April 2011 are given here.

[6] The implementation of the EU-ETS has not been included. Other EU Directives have only been considered if they have been outlined in the projections as one of the main instruments to reduce GHG emissions.

Table 2: Existing and additional measures as stated in the 2011 GHG projections

Existing Measures (only important national measures; w/o EU legislation)		Status of policy in January 2013
Energy	Renewable Energy Act: Guaranteed feed-in tariffs and grid access	Still in place; PV tariffs recently amended (see below)
	Market penetration programme (Solar, Biomass, Heat pumps): Incentives for building owners and investors	Still in place; funding was increased in 2012 (see below)
	Renewable Energies Heat Act: Building code which sets minimum standards for new buildings	Still in place, last amended in 2011
	Environment Tax 99-03: Tax on electricity, mineral oil, natural gas consumption	Still in place; "mineral oil tax" was renamed "energy tax"
Energy Efficiency	KfW CO_2 incentive programme: Incentives for investors for energetic rehabilitation of buildings	Still in place
	KfW CO_2 incentive programme - new buildings: Incentives for investors for energetic rehabilitation of buildings	Still in place
	Energy Efficiency Ordinance: Building code which sets minimum standards for buildings	2009 building code still in place until new code is published
	Heating costs ordinance: Building code which sets minimum standards for buildings	Still in place; last amended in 2009
	CHP Act: Bonus payments for feed-in of electricity from modernized CHP plants and new small CHP plants	Still in place; last amended in 2012 (see below)
	Special fund for energy efficiency in SMEs: coupling of financial incentives for energy audits with low interest loans for investments in energy efficiency. Addressed to small and medium sized enterprises	Still in place
Transport	Redistribution of Highway toll for heavy duty vehicles: Highway toll revision to account for CO_2 emissions	Toll was last revised in 2009; HDVs are categorized according to four emission classes
	Mandatory biofuel quotas	In place since 2007
	Mandatory efficiency standards for new cars	Implemented (EU Regulation)
	Introduction of CO_2 based car taxation	Implemented since July 2009
Other non-ETS sectors	Reduction of CH4 and N2O emissions in the waste sector through legal requirements like Technical Instruction on municipal waste (TASI) e.g. regulate the management of waste	Still in place

Source: Reporting of MS in accordance with Decision No 280/2004/EC about their GHG emission projections up to 2020, April 2011

Additional Measures: Still to be implemented (only important national measures; w/o EU legislation)		Status of policy in January 2013
Energy	Promotion of hard coal extraction expires, end of black coal extraction in 2018	Was already decided in 2007
Energy Efficiency	Energy efficiency ordinance 2009: Building code with 30% more ambitious standards	New code published in February 2013 but needs to pass legislative chambers
	Renewable energies Heat act (large appliances)	From 2012 onwards the market incentive programme supports large

		solar thermal appliances with 50% of investment costs; large heat pumps receive support even in new buildings
	Force the use of district heating	The 2008 Renewable Energies Heat Act allows municipalities to use climate change as a justification for forcing the use of district heating.
	Tax abatement (Reduce value added tax) for investments in energetic rehabilitation of buildings	Government proposal did not receive support of *Bundesländer* and was given up in October 2012
	White certificates (Industry sector): Creation of an additional market for energy efficiency measures	Not yet implemented
Transport	VAT for Aviation	Not yet implemented
	Extension of Highway toll for heavy duty vehicles	Since August 2012 toll is extended to four-lane federal highways
	Removal of Tax for electricity used by railways	Not yet implemented
Other non-ETS sectors	Ban of HFCs	Not yet implemented

Source: Reporting of MS in accordance with Decision No 280/2004/EC about their GHG emission projections up to 2020, April 2011

3 Evaluation of National Reform Programme 2012 (NRP)

In April of each year, Member States are required to prepare their National Reform Programmes (NRPs), which outline the country's progress regarding the targets of the EU 2020 Strategy. The NRPs describe the country's national targets under the Strategy and contain a description of how the country intends to meet these targets. For climate change and energy, three headline targets exist: 1) the reduction of GHG emissions, 2) the increase of renewable energy generation, and 3) an increase in energy efficiency ([7]).

In the following table, the main policies and measures as outlined in the NRP of April 2012 ([8]) have been summarised, and their current status (implemented, amended, abolished, or expired) is given, with specifics on latest developments.

[7] There are specific targets for all MS by 2020 for non-ETS GHG emission reductions (see section 2) as well as for the renewable energy share in the energy mix by 2020 (see section 4, renewable energies). Specific energy efficiency targets will be defined (or revised) by the MS until the end of April 2013 in line with the methodology laid out in Article 3 (3) of the Energy Efficiency Directive (Directive 2012/27/EU).

[8] All NRPs are available at: http://ec.europa.eu/europe2020/documents/related-document-type/index_en.htm

Table 3: Main policies and measures as outlined in the NRP, April 2012

Establishment of a Market Transparency Authority for Power and Gas (Markttransparenzstelle für den Großhandel mit Strom und Gas)	
Status as stated in the NRP	authority is to be launched in early 2013
Status as per Jan 2013	In December 2012, the bill on a market transparency authority for power and gas was adopted. The proposal for a separate transparency authority for fuel was published in January
Description of policy or measure	A Market Transparency Authority for Power and Gas was established at the Federal Network Agency to ensure transparent pricing. The bill also transposes EU Regulation 1227/2011 into German law.

Implementation of the Government Programme for Electric Mobility	
Status as stated in the NRP	On 08.05.2011 the cabinet of ministers passed the Government programme for electro mobility
Status as per Jan 2013	Under implementation; several components of the programme have been implemented in 2012
Description of policy or measure	The programme sets out key actions that the government will take until the end of 2013. These include: the increase of funding for R&D by 1 billion euro by 2013; 10 year vehicle tax exemption for cars with less than 50g/km emissions; the establishment of regional showcases and technical lighthouse projects; gradual transition of government fleet to electric cars.

Implementation of the German Resource Efficiency Programme (ProgRess)	
Status as stated in the NRP	Programme was adopted in February 2012
Status as per Jan 2013	No major steps undertaken in 2012
Description of policy or measure	Programme provides a framework for existing measures and activities targeting resource efficiency such as the introduction of environmental management systems or the expansion of closed-loop systems.

Closed Substance Cycle and Waste Management Act (KrWG) (Kreislaufwirtschaftsgesetz	
Status as stated in the NRP	Act adopted in 2011
Status as per Jan 2013	In force since 01.06. 2012
Description of policy or measure	The bill transposes EU Directive 2008/98/EG into German law and updates German waste management law. Inter alia, 65% of residential waste and 70% of construction waste shall be recycled by 2020.

Implementation of new KfW Energy-efficient Urban Redevelopment programme	
Status as stated in the NRP	Approved
Status as per Jan 2013	Under implementation since February 2012
Description of policy or measure	Under the support programme investments in heating and energy-efficient water supply and sanitation systems of urban quarters are supported with low-interest loans.

Energy and Climate Fund will fund electric mobility and many programmes	
Status as stated in the NRP	Will start in 2012d
Status as per Jan 2013	Under implementation but lacks funding
Description of policy or measure	The Fund grants priority to funding of electro mobility projects. The estimated funding could not be raised as the revenues from ETS-Auctions were much lower than expected (The government calculated with 17 €/t). Additionally, the expected revenues from the tax on nuclear fuel ("Brennelementesteuer") are much lower due to the nuclear phase out agreed after the Fukushima disaster.

4 Policy development

This section covers significant developments made in key policy areas between May 2012 and January 2013. It does not attempt to describe every instrument in the given thematic area. The time-frame was chosen based upon the release of the National Reform Programmes (in the section above) in April 2012, which contain the status quo for policy on most topics.

Environmental Taxation

Germany has a high implicit tax rate on energy, with a value of approximately 192 € per tonne of oil equivalent in 2009 (Eurostat 2013). This is the 6th highest value among the EU MS. However, the Germany's economy exhibits relatively low energy intensity and is the 8th least intensive in the EU (Eurostat 2013). Accordingly, German revenues from energy taxes as a percentage of GDP can be placed in the middle of the pack among EU MS: Germany ranked 15th in the EU for revenue from energy taxes (1.8% of GDP) but only 21st in the EU when all environmental taxes are considered (2.2% of GDP) (Eurostat 2012).

The ecologic tax reform of 1999 aimed at encouraging environmentally positive behaviour change, such as the use of renewable energy or the reduction of energy consumption through tax regulation. The reform is summarised as "Ecotax" but contains the reform of different existing taxes, most importantly the mineral oil tax, and the introduction of a tax on electricity use (Bundesumweltamt 2011). The revenues are primarily used for financing pensions thus reducing the tax burden on labour. Further environmental taxes were introduced in 2011 on civil aviation and on nuclear fuel.

The electricity and energy tax was partly reduced for energy-intensive industry until December 2012. The official argument behind this is the fear that otherwise, this industry would suffer disadvantages in international competiveness. Additional tax relief was granted pursuant to a formula taking into account pension contributions. According to a 2012 Greenpeace study, these measures reduced the average electricity tax from 2.05 cent/kWh to only 1.2cent/kWh (Greenpeace 2012). In December 2012, a law was adopted to prolong this top rate tax relief until 2022, amounting to annual tax savings €2.3 billion. These tax advantages are, however, only granted if companies introduce energy management systems by 2015. Furthermore, the government requests the sector as a

whole to improve energy efficiency by 1.3% annually between 2013 and 2015 and by 1.25% in 2016, when these rates will be reviewed ([9]).

According to a paper by FÖS (2013), the relative importance of environmental taxes has been decreasing since 2004, mainly because fuel use decreased and income taxes VAT increased.

Energy Efficiency

As mentioned above, Germany's economy is the 6th least-energy-intensive economy in the EU, and the intensity declined considerably (~9%) from 2005 to 2010. The country's final energy consumption in 2010 had also dropped approximately 4% compared to the average from 2001-2005. This is a result of a slight decrease in the residential and transportation sector (Eurostat 2013).

Germany has committed to ambitious energy saving targets as specified in the 2010 Energy Concept. The building sector still has a high saving potential, although strict regulations and incentive programmes are already under implementation (OECD 2012). The Energy Saving Ordinance (EnEV) ([10]), first introduced in 2002 and last amended in 2009, sets strict minimum requirements for the energy performance of buildings and introduces energy performance certificates. The government published a proposed amendment in February 2013 that still needs to pass the legislative chambers. Accordingly, the primary energy demand of new buildings would need to decrease gradually by 12.5% from 2014 to 2016, and it would be compulsory to include energy performance data in housing advertisements. Furthermore, it creates an obligation to construct new buildings according to the standard for close to zero-energy buildings by 2019 for public buildings and by 2021 for all other buildings (BMVBS 2012a).

The government also offers grants and low-interest loans for energy efficiency refurbishments of new and existing buildings through the CO_2 building modernisation programme. The programme was established in 2006 and is a centrepiece of the government's energy efficiency strategy. Within this framework, several KfW funding schemes exist, including "efficiency house" and "energy efficient construction" for new buildings or "energy efficient refurbishment" for existing buildings. From 2006 to 2012, the programme provided €9.3 billion for the refurbishment or energy-efficient construction of 3 million flats and 1,400 municipal buildings. The funding, which stems from the Energy and Climate Fund, was raised from €936 million to €1.5 billion annually for 2012-2014. Additionally, in 2012, the government announced to provide €2.4 billion between 2013 and 2020. However, this still falls short of providing the annual €3 billion that were originally expected. According to the BMVBS, the programme supports 300,000 jobs annually (BMVBS 2012b).

In July 2012, an amendment to the Combined Heat and Power Act ([11]) came into force. The act aims at modernising and constructing combined heat and power plans with the

[9] Gesetz zur Änderung des Energiesteuer- und des Stromsteuergesetzes sowie zur Änderung des Luftverkehrsteuergesetzes Gesetz vom 05.12.2012,Bundesgesetzblatt Teil I 2012 Nr. 57 11.12.2012 S. 2436

[10] Energieeinsparverordnung as amended on 29 April 2009, Bundesgesetzplatt Teil I 2009 Nr. 23, p. 954)

[11] Gesetz zur Änderung des Kraft-Wärme-Kopplungsgesetzes (KWKGÄndG) of 12 July 2012, BGBl. I S. 1494 (Nr. 33); in force starting from 19 July 2012.

target to provide a 25% share of total electricity production by 2020. The amendment raises the premiums for new and modernised CHP plants to 1.8 to 5.41 cent/kWh. This was mainly an adjustment to compensate the fact that CHP producers are now required to buy certificates within the ETS.

The rental housing sector requires special attention in Germany, since around half of the flats in Germany are not owner-occupied (Statistisches Bundesamt (2012). However, the current legal framework does not provide enough incentives for energy performance improvements in this sector. In order to distribute the costs more evenly between landlords and tenants, the tenancy law was changed in December 2012 now allowing landlords to undertake refurbishment measures without compensating the tenant in the first three months. The tenancy law already allows landlords to pass refurbishment costs to the tenants at 11% of annual investment costs. The legislative amendment aims to incentivize energy-focused refurbishment, but this caused resistance in parliament due to rising renting costs (Bundestag 2012).

Renewable Energy

Renewable energy use as a portion of final consumption has been especially increasing in Germany. However, at 11% of total consumption in 2010, the country is only half way to reaching its target of 18% by 2020. The share of renewably-generated electricity in final electricity consumption also increased from 10% to 17% from 2005 to 2010 (Eurostat, 2013). This trend continued in the following years so it is safe to assume that over 20% of the electricity is produced using renewable sources.

The principle instrument for the promotion of renewable electricity is the Renewable Energy Sources Act (EEG) that guarantees fixed feed-in tariffs for renewable energy and sets the target to increase the share of renewable energy in electricity production to 35% by 2020. The EEG was last amended in June 2012, retrospectively applying from April 2012. With the aim to prevent over-subsidization, feed-in tariffs for PV installations have been reduced to 13.5 to 19.5 cent/kWh. These tariffs will decrease by 1% per month up to a maximum decrease of 29% and the government will stop to support new installations once a national capacity under the support scheme of 52 GW has been achieved.

The costs for the support scheme are distributed to the consumer via the EEG levy. The levy caused fierce debates in October 2012 when it was announced that consumers would be required to pay 5.3 instead of 3.7 cent/kWh in addition to the electricity price in 2013 (Tagesschau 2012). The government is currently considering freezing the levy at 2013 levels (Focus 2013). However, as federal elections are scheduled for the 22nd of September 2013, it seems unlikely that an amendment to the EEG will be agreed on during 2013. Since the 2012 amendment, companies that are consuming more than 1 GWh (formerly 10 GWh) are to a great extent exempted from the levy. This also applies to companies for which electricity costs account for more than 14% (formerly 15%) of the gross value added.

With regard to the promotion of renewable heat, the principal instrument is the 2008 Renewable Energies Heat Act (EEWärmeG), last amended in 2011 that obliges owners of any new buildings and of public buildings undergoing major renovations to cover part of the heating or cooling with renewable energies. The overall objective is to increase the share of renewable energy in heating to 14% in 2020. The sector already provides employment for 76,000 people (BMU 2012a).

In the framework of the Market Penetration Programme (Marktanreizprogramm, MAP), KfW provides low-interest loans and grant support for installations using heat from renewable energy in residential buildings. The BAFA provides investment support for these installations in small public and commercial buildings. According to a 2012 study, the MAP had a very positive impact on the expansion of heat networks and led to CO_2 emission reductions of 1.9 million tonnes between 2009 and 2011 (BMU 2012a). In 2012, the government increased the MAP support, especially for solar thermal power, bio mass installations, and heat pumps.

Other Energy Generation

After lengthy discussions, the two legislative chambers agreed on a CCS Act ([12]) implementing the EU Directive 2009/31 in August 2012. Accordingly, CCS is allowed on a test basis, but projects may not exceed 1.3 million tonnes of CO_2. In total, a maximum of 4 million tonnes of CO_2 may be stored in Germany.

German domestic fossil fuel production, such as lignite and hard coal production, is still heavily-supported by subsidies (BMU 2012b). However, in 2007, the government decided to phase-out support for hard coal production by 2016.

Energy Networks

The *Energiewende* will require a significant expansion of the electricity transmission and distribution networks by 2030. A study commissioned by the German Energy Agency and published in December 2012 estimated that investment for the low voltage distribution grid of up to €42.5 billion will be required by 2030 to integrate renewable energy generators into the network.

In addition, the discussion in the recent years has focussed on the high voltage transmission grid. The German government has taken several measures to speed up the expansion of the electricity network in the last years. The 2009 Power Grid Expansion Act (EnLAG) defined 24 priority grid expansion projects that are necessary to secure energy supply in the future. It also opened the possibility to the grid operators to get a refund for the extra costs for underground high voltage AC cables through the grid operating fees. However, the implementation of most projects is delayed, inter alia because approval procedures are delayed when planned lines cross several *Bundesländer*. By 2012, only 214km of the planned 1834km lines have been built and none of the pilot underground cables has been put into operation (Bundesnetzagentur 2012). Pursuant to the Grid Expansion Acceleration Act (NABEG) that came into force in 2011, an additional federal planning procedure is being carried out. The first national grid development plan was completed in November 2012 by the Federal Network Agency (Bundesnetzagentur) and the four German grid operators, identifying 2,800 km of additional lines and 2,900 km of lines that need to be upgraded. Based on this document, the government published a proposal for a Federal Plan (Bundesbedarfsplan) in December 2012 which is expected to be discussed in Parliament in early 2013 (BMWi 2012).

[12] Gesetz zur Demonstration und Anwendung von Technologien zur Abscheidung, zum Transport und zur dauerhaften Speicherung von Kohlendioxid, Gesetz vom 17.08.2012 - Bundesgesetzblatt Teil I 2012 Nr. 38 23.08.2012 S. 1726

In order to stimulate expansion of grids connecting offshore wind plants, the Energy Industry Act (EnWG) was amended in November 2012, requesting grid operators to develop a binding offshore grid development plan every year. Moreover, the amendment provides for a liability regulation for network operators. Accordingly, grid operators can be held liable by plant operators for damage resulting from delayed grid connections. In the case of delays, the liability of the responsible grid operator is limited to a maximum of €17.5 million and up to €1 bn in the case of severe delays. Remaining costs can be passed on to the consumers through a levy.

Transport

As can be seen in Table 1, the amount of GHG emissions originating in the German transport sector dropped from 2005 to 2011, but their proportion among Germany's total emissions has increased, indicating that these emissions are especially important to address moving forward. Revenues generated by transport taxes (excluding fuels) in Germany as a percentage of GDP are slightly above the EU average; Germany ranks 16th among EU MS in this regard (Eurostat, 2012). On the other hand, newly registered vehicles in Germany in 2011 emit on average 145.6 gCO_2/km driven - 5% more than the EU average (EEA 2012e).

The 2010 Energy Concept foresees emission reductions in the transport sector of 10% by 2020 and 40% by 2050 compared to 2005. A 2012 study estimates that a 37% reduction could already be achieved by 2030 (Öko Institut 2012). The government is currently working on a new mobility and fuel strategy which is expected to be published in spring 2013. Currently, the main policy instruments targeting emissions from transport are a highway toll for heavy duty vehicles, mandatory biofuel quotas, and car taxation based on CO_2 emissions. Furthermore, Germany is promoting electro-mobility through various schemes.

As of August 2012, the HGV toll scheme, which formerly only applied to motorways, has been extended to federal highways with four or more lanes (Federal Trunk Road Ordinance, BSTRMautErhebV) ([13]). The government expects additional revenues of €100 million a year from the inclusion of around 1,100 additional km in the toll system. The additional revenues are to be invested in road modernisation (Zeit 2012). The ordinance is based on the new 2011 Federal Trunk Road Toll Act (Bundesfernstraßenmautgesetz (BFStrMG) ([14]), which replaces the Motorway Toll Act for HGVs and the Mauthöhe-verordnung (MautHV) that were restricted to federal motorways.

Since 2009, the annual circulation tax for passenger cars is based on CO_2 emissions and cylinder capacity. Formally, cars emitting less than 120g/km were exempted from the CO_2-related part of the tax; since 2013 this tax free margin was decreased to 110g CO_2/km and will be further reduced to 90g CO_2 /km in 2014. Trucks, coaches and buses pay a circulation tax according to weight and exhaust emission group, and trailers are charged according to weight.

[13] "Verordnung zur Anordnung des Beginns der Mauterhebung auf Abschnitten von Bundesstraßen vom 2. Juli 2012 (BAnz. 2012, AT 04.07.2012 V1)"

[14] Bundesfernstraßenmautgesetz vom 12. Juli 2011 (BGBl. I S. 1378), das durch Artikel 2 Absatz 121 des Gesetzes vom 22. Dezember 2011 (BGBl. I S. 3044) geändert worden ist

Regarding electro-mobility, the government published a Government Programme for Electric Mobility in 2011. The programme aims at having 1 million electric cars in use by 2020 and to turn Germany into a leader in electro-mobility. It sets out key actions that the government will take until the end of 2013 to create an enabling framework. This includes: the increase of funding for R&D by 1 billion euro by 2013; the gradual transition of government fleet to electric cars; 10 year vehicle tax exemption for cars with less than 50g/km emissions; and the establishment of regional showcases and technical lighthouse projects. In April 2012, the government chose four regions that will receive €180 million over a period of three years under the "showcases electric mobility" programme (BMVBS 2012c). In December 2012, an act was passed that extended the exemption from the vehicle circulation tax ([15]) from five to ten years and included all types of electric vehicles. The National Innovation Programme for Hydrogen and Fuel Cell Technology provides support amounting to €1.4 billion until 2016.

Adaptation

In 2008, the federal government published the national climate adaptation strategy and succeeded in formulating an action plan in 2011, which stipulated the main cornerstones of German climate change adaptation strategy in four areas: "information dissemination, federal framework, activities under federal competence, and international responsibility." Currently, the Federal Environment Agency is developing indicators for the strategy.

5 Policy progress on past CSRs

As part of the European Semester, Country Specific Recommendations (CSRs) for each MS are provided by the EU Commission in June of each year for consideration and endorsement by the European Council). The recommendations are designed to address the major challenges facing each country in relation to the targets outlined in the EU 2020 Strategy. In the following table, those CSRs that are relevant for climate change and energy that were adopted in 2012 are listed, and their progress towards their implementation is assessed.

Existing Country Specific Recommendations	Progress
Shift taxation away from labour to consumption and property	Exemptions from ecotaxes for industry was extended in return for energy saving measures
Encourage energy efficiency by providing incentives for reducing energy costs and shifting consumption towards energy-efficient products, including vehicles, buildings, and heating systems	Funding for energy refurbishment was increased. Proposal for tightened Energy Efficiency Ordinance was published. Tax exemption for electric vehicles was extended. Tax exemptions for energy-intensive industry were made conditional on implementation of energy management systems. Premiums for CHP plants were increased.

[15] Gesetz zur Änderung des Versicherungsteuergesetzes und des Kraftfahrzeugsteuergesetzes (Verkehrsteueränderungsgesetz - VerkehrStÄndG). Gesetz vom 05.12.2012 - Bundesgesetzblatt Teil I 2012 Nr. 57 11.12.2012 S. 2431

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