

# The German Federal Ministry for Economic Affairs and Energy White Paper on the Electricity Market and the New Climate Policy Instrument

## Summary Evaluation

The "electricity market" White Paper published by the German Federal Ministry for Economic Affairs and Energy (BMWi) puts forward practical proposals for implementing key projects in the Federal Government's short-term plan for achieving the energy transition.

The "electricity market" White Paper contains proposals for

1. Policy decisions for a future-proof electricity market design
2. Support for combined heat and power generation
3. The requirement for developing the electricity distribution network
4. The introduction of a CO<sub>2</sub> reduction contribution in the power sector

In general the WWF and Germanwatch view the BMWi's proposed measures as a good basis for the forthcoming debate. If carried through, these measures could form the cornerstone of a credible climate policy. However, the following remarks are limited to the analysis and evaluation of the new climate policy instrument for securing an adequate CO<sub>2</sub> reduction contribution by the power sector. Only a short appraisal is given of the other three proposals.

1. The WWF and Germanwatch do not share the BMWi's views on the future development of the **electricity market design**. As part of the consultation on the green paper on the design of the power market, WWF has made detailed comments on the situation and has already made its own contribution to the discussion on the development of a selective capacity market.<sup>1 2</sup> In the new programme package the BMWi has still to provide an answer to the key question of whether the planned incremental development of the regulatory framework can still guarantee the same high level of security of supply in the future. There is serious doubt as to whether the required investments in flexibility and generation capacity will be encouraged by the statutory fixing of a free price formation including peak load prices. The uncertainty in the prognosis of these peak load prices remains. This means uncertainty for investors and produces other much-discussed adverse effects (e.g. boom-and-bust cycles).

<sup>1</sup> WWF (2015): "Stellungnahme zum Diskussionpapier (Grünbuch) des BMWi 'Ein Strommarkt für die Energiewende'", available online at: [http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF-Stellungnahme\\_zum\\_Gruenbuch\\_des\\_BMWi.pdf](http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF-Stellungnahme_zum_Gruenbuch_des_BMWi.pdf)

<sup>2</sup> Öko-Institut (2012): "Fokussierte Kapazitätsmärkte. Ein neues Marktdesign für den Übergang zu einem neuen Energiesystem", study for environmental foundation WWF Germany, online at: <http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Fokussierte-Kapazitaetsmaerkte.pdf>

2. **Combined heat and power generation (CHP)** is an important "bridging technology" for the successful implementation of the energy transition; the reform of the existing support scheme is overdue. In view of the mostly difficult market situation for cogeneration plants and the increasing share of renewable energy in the generation mix, the adjustment of the CHP expansion target to the thermal energy generation proposed in the White Paper is the right step. At the same time it remains to be seen whether this kind of adjustment to the reference basis might also require an adjustment or stimulation of the target quota (upwards if necessary). Focussing on support for the more efficient gas-operated existing CHP plants and reducing support for highly profitable CHP plants is sensible and logical with the prospect of a marked decrease in operational hours in CHP plants. The WWF and Germanwatch particularly welcome the planned increase in subsidies for heating networks and storage as the right step towards focussing stronger on heating.
  
3. The energy transition cannot succeed without the environmentally compatible **expansion of the transmission grids** which guarantee the reliable transport of renewable generation to the load centres in the south of Germany. The current discussion on the expansion of the power grid is characterised by a very regional perspective, especially in southern Germany, something which runs contrary to some of the aims of the energy transition. This makes the clear commitment in the White Paper to expanding the transmission network and the importance of the three direct current connections between north and south Germany all the more welcome. Expansion of the German - and also the European - power grids is currently lagging behind the targets. It is important to restore an all-party consensus on the expansion of the grid as soon as possible and to continue to aim for a transparent and participative process of community dialogue, particularly with those affected on the ground, so that a high level of acceptance for the energy transition can be maintained.
  
4. The **proposal for developing an additional CO<sub>2</sub> reduction contribution in the energy sector** is of particular importance. The German Federal Government's stated climate policy goal is to reduce greenhouse gas emissions by 40% by 2020 compared to 1990. This can only be achieved if the greenhouse gas emissions from the power plant sector are also significantly reduced by 2020.

To achieve this reduction in power sector emissions by 2020, a significant reduction in lignite power generation especially from old power plants cannot be avoided. There are three main reasons for this:

1. 49 per cent of CO<sub>2</sub> emissions in the power plant sector come from lignite power plants.
2. Lignite has contributed almost nothing to the reduction in emissions by the power sector to date. Instead its share in total emissions rose in comparison with 2000. Emission reductions largely stem from coal and gas power plants.
3. Under the new instrument the power plants which would have to reduce emissions are written off and there is no interference in ownership rights.

If the proposed instrument were to be systematically implemented, this would modernise the energy industry, guarantee security of supply, and the effects on the electricity price would be limited. The instrument is compatible with the EU ETS and does not induce carbon leakage. Instead it complements the reduction of surplus emission certificates. In order to make sure that the instrument is designed effectively, it must specify a clearly defined assessment basis for the age of the plant. Further, it must guarantee that the emissions cannot be transferred between individual generating units. In order to deliver the necessary emissions reductions in the power sector by 2020, it must be ensured that emissions reductions are monitored transparently. In order to ensure the steering effect of the instrument the planned 18-20€ per tonne CO<sub>2</sub> should mark the absolute minimum of the climate contribution. Accordingly it must be ensured that the instrument can be tightened if necessary and the level of the free emissions allowance adjusted if required.

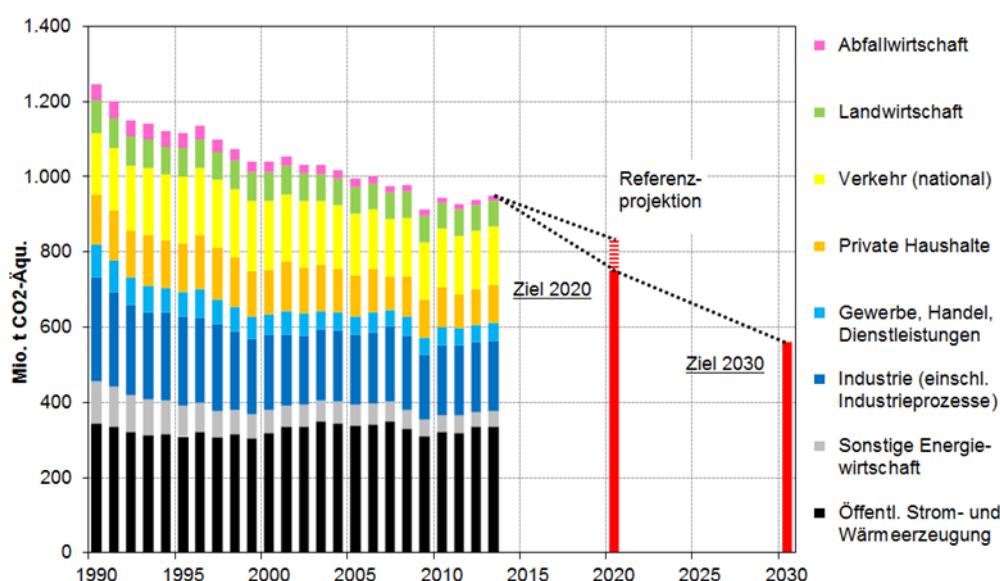
The WWF and Germanwatch view the proposed instrument in its basic form as central to achieving the stated climate policy goals with only a modest effect on the power generation sector.

# Status quo

## Emissions and climate policy targets in Germany

With the presentation of the climate action plan in December 2014, the German Government confirmed the central importance of climate policy in its agenda. This reinforced the climate and energy policy decisions contained in the 2010/11 energy strategy, according to which Germany wants to reduce its greenhouse gas (GHG) emissions by 40% compared to the 1990 base year in order to make an adequate contribution to complying with the 2 degrees limit.

Figure 1: Historical and future GHG emissions and reduction targets in Germany (UBA, AG Energiebilanzen, Öko-Institut)



Mio. t. CO <sub>2</sub> -Aequ	Million t CO <sub>2</sub> eq
Abfallwirtschaft	Waste management
Landwirtschaft	Agriculture
Verkehr (national)	Transport (national)
Private Haushalte	Private households
Gewerbe, Handel, Dienstleistungen	Commerce, trade, services
Industrie (einschl. Industrieprozesse)	Industry (incl. industrial processes)
Sonstige Energiewirtschaft	Other energy industry
Öffentl. Strom- und Wärmeerzeugung	Public-sector heat and power generation
Referenzprojektion	Projection
Ziel	Target

The latest projection report by the German Government gives a reduction of GHG emissions for 2014 of 27.3% compared to 1990 (from 1,248.1 million t CO<sub>2eq</sub> to 907.4 million t CO<sub>2eq</sub>). In order to reach the 40% target, Germany can still emit 750 million t CO<sub>2eq</sub> in 2020. This would be a reduction in emissions of 158.5 million t CO<sub>2eq</sub> or about 13 per cent points compared to 2014.

The German Government predicts that, based on the energy and climate policy measures introduced to date, a reduction in emissions of 32.7% will be achieved by 2020 compared to the base year of 1990<sup>3</sup> (cf. also reference projection in Fig. 1). Thus, according to these calculations, there is a need for a further reduction of 91.7 million t CO<sub>2eq</sub> (see red hatching in Fig. 1) in order to reach the -40% climate policy target. This is equal to around 7 per cent points.

<sup>3</sup> Projection report by the German Federal Government 2015, available online at: [http://cdr.eionet.europa.eu/de/eu/mmr/art04-13-14\\_lcds\\_pams\\_projections/envvqlq8w/](http://cdr.eionet.europa.eu/de/eu/mmr/art04-13-14_lcds_pams_projections/envvqlq8w/)

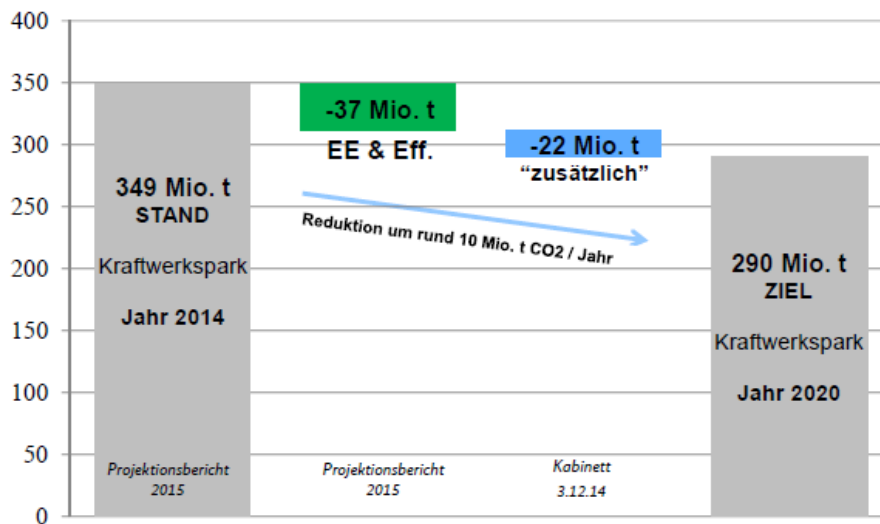
# The power sector CO<sub>2</sub> reduction contribution

## German power sector emissions

The development of emission reductions by means of a new national climate policy instrument is imperative because the power plant sector emissions and those from energy-intensive industries are subject to EU emissions trading and amount to around 52% (in 2011) of German GHG emissions. However, EU emissions trading has not worked well for years. In order to produce a steering effect, the emissions trading certificate price must be at least 35 €/t CO<sub>2</sub> instead of the current 7 €/t CO<sub>2</sub>. A far-reaching structural reform of the EU ETS is required in order to remove the causes of this lack of steering effect. The WWF has put forward appropriate proposals for this.<sup>4</sup> There are currently no regulations within the EU ETS which could conceivably lead to the necessary reduction in emissions by 2020. This is the main reason why we say that (coal) power plants - which are particularly damaging to the environment - are experiencing an economic boom at present, and not only in Germany. It is therefore essential to introduce a national climate policy instrument which, along with the EU ETS, will help to reduce greenhouse gas emission by at least another 22 million t CO<sub>2</sub> so that the 40% climate target can be met by 2020.<sup>5 6</sup>

In 2014 the power sector produced 349 million t CO<sub>2</sub> and is therefore responsible for 38.5% of all emissions in Germany. The BMWi proposal now aims to reduce annual power sector emissions from 349 million t CO<sub>2</sub> per year in 2014 to a maximum of 290 million t per year by 2020. This should enable the climate policy target to be met. It is assumed that a reduction amounting to 37 million t CO<sub>2</sub> can be expected from the energy and climate policy measures already introduced (EE expansion and energy efficiency). The remaining balance of at least 22 million t CO<sub>2</sub> should be produced in the power sector by the new climate policy instrument. (see Fig. 2)

Figure 2: The CO<sub>2</sub> emissions reduction gap in the German power plant fleet (annual emissions and reduction contributions in million t CO<sub>2</sub>) (BMWi)



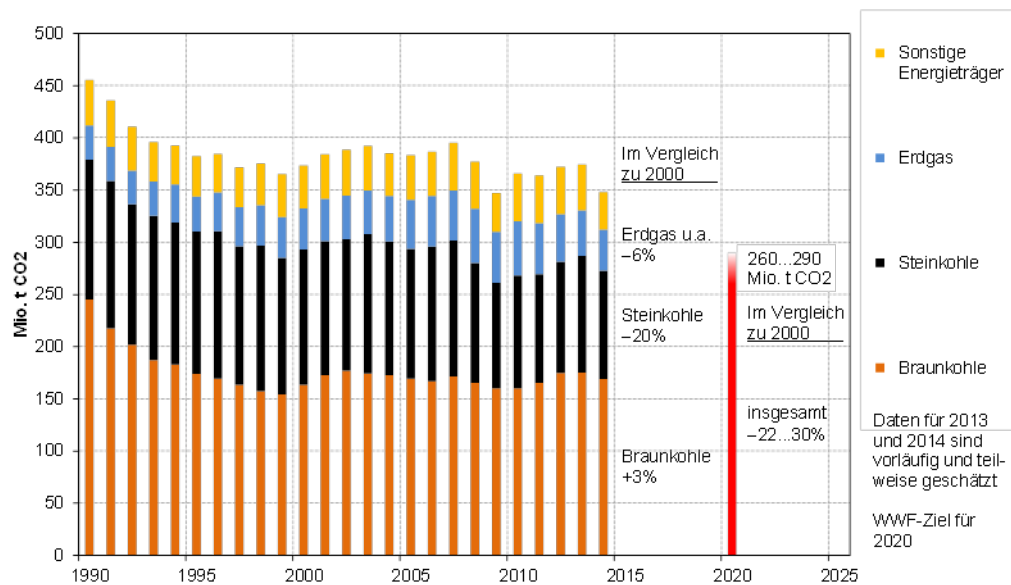
<sup>4</sup> Cf. WWF (2014): "Letzte Chance für den Emissionshandel – Strukturelle Krise und Chance für Reform", available online at: <http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF-Positionspapier-Letzte-Chance-fuer-den-Emissionshandel.pdf>

<sup>5</sup> Cf. WWF (2014): "Den europäischen Emissionshandel flankieren – Chancen und Grenzen unilateraler CO<sub>2</sub>-Mindestpreise", available online at: [http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF-Studie\\_Den\\_europaeischen\\_Emissionshandel\\_flankieren.pdf](http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF-Studie_Den_europaeischen_Emissionshandel_flankieren.pdf)

<sup>6</sup> Cf. WWF & Germanwatch (2014): "Klima oder Kohle? – Reduktion des Kohlestroms zur Erreichung des deutschen Klimaschutzziels bis 2020", available online at: <http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Germanwatch-WWF-Klima-oder-Kohle.pdf>

349 Mio. t	349 million t
STAND	CURRENT
Kraftwerkspark	Power plant fleet
Jahr 2014	2014
Projektionsbericht 2015	Projection report 2015
EE & Eff.	EE & Eff.
“zusätzlich”	“additional”
ZIEL	TARGET
Reduktion um rund 10 Mio. t CO <sub>2</sub> / Jahr	Reduction of around 10 million t CO <sub>2</sub> / year
Kabinett 3.12.14	German Government 2.13.14

Figure 3: The contribution of fossil energy sources to reducing emissions to date (Öko-Institut)



Mio. t. CO <sub>2</sub>	Million t CO <sub>2</sub> eq
Im Vergleich zu 2000	In comparison to 2000
Erdgas u.a.	Gas and others
Steinkohle	Hard coal
Braunkohle	Lignite
Insgesamt	In total
Daten für 2013 und 2014 sind vorläufig und teilweise geschätzt	Date for 2014 and 2014 preliminary and partly based on estimates
WWF-Ziel für 2020	WWF target for 2020

### Lignite-based emissions increased by 3% against 2000 levels

The WWF and Germanwatch demand annual power sector emissions to be limited to a maximum of 290 million t in 2020. Up to now contributions to effective emissions reductions in the power plant sector since 2000 have varied widely according to the type of fuel. Gas and hard coal contributed 6% and 20% respectively to the emissions reductions in the power plant sector in comparison to 2000. It must be noted however that the share of gas in the national generation mix slightly increased from 8.5% in 2000 to 9.5% in 2014.<sup>7</sup> Emissions reduction in hard-coal based power generation mainly result from a significant decrease in the share of generation from 24.7% in 2000 to 17.8% in 2014 (“hard coal crunch”) and increased energy efficiency. In contrast however, emissions from lignite based power generation did not decrease in comparison to 2000, but rather increased by 3% (see Fig. 3)

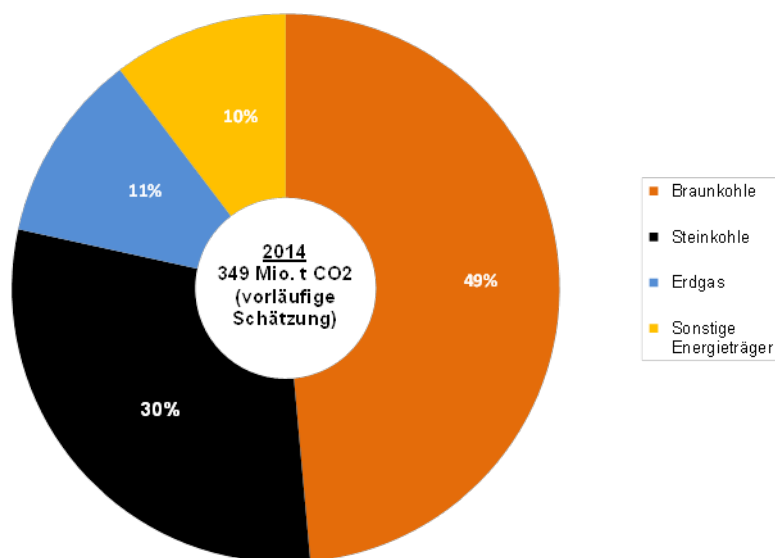
With 25.4% the high share of lignite in Germany’s generation mix remains nearly unchanged in comparison to 2000 (25.7%). Lignite power plants are highly emissions intensive. Specific emis-

<sup>7</sup> Cf. AG Energiebilanzen (2015): „Bruttostromerzeugung in Deutschland ab 1990 nach Energieträgern“, available online at: [http://www.ag-energiebilanzen.de/index.php?article\\_id=29&fileName=20150227\\_brd\\_stromerzeugung1990-2014.pdf](http://www.ag-energiebilanzen.de/index.php?article_id=29&fileName=20150227_brd_stromerzeugung1990-2014.pdf)

sions from lignite power plants are on average 20% higher compared to hard coal power plants.<sup>8</sup> With a share of 49% lignite based power generation produces almost half of Germany's power plant sector emissions (see Fig. 4).

According to the polluter-pays-principle lignite power plants as the oldest and most emission-intensive power plants should be held accountable and contribute most to emissions reductions efforts. Further, a reduction in must run capacities by reducing lignite-based generation would free up much needed power transmissions capacities for the integration of renewable energies. This would then add to making the system more flexible and increase system security, thereby reducing the risk for grid congestion and expensive redispatching.

Figure 4: CO<sub>2</sub> power plant sector emissions in 2014 (Öko-Institut)



Mio. t. CO <sub>2</sub>	Million t CO <sub>2</sub>
Vorläufige Schätzung	Preliminary estimate
Braunkohle	Lignite
Steinkohle	Hard coal
Erdgas	Gas
Sonstige Energieträger	Other fuels

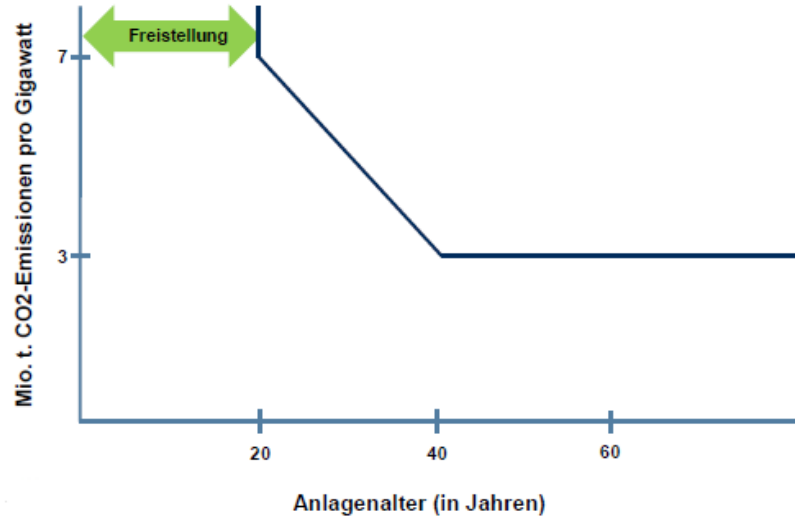
### How the instrument for a power sector "climate contribution" works

The instrument provides for a "climate contribution" for particularly old and emission-intensive power plants as soon as these exceed a specified free emissions allowance. The plan is that power plants will be given an annual free emissions allowance per power plant block of 7 million t CO<sub>2</sub> per installed GW capacity after the age of 20. This free allowance drops linearly by 3 million t CO<sub>2</sub> per GW per year up to a plant age of 40 years, after which the plant remains at this level. Plants are exempt from paying the climate contribution up to a plant age of 20 years as are a total of approx. 90% of fossil energy generation facilities in Germany which do not have to reimburse the proposed free allowance (see Fig. 5). This means that the burden falls on the 10% of German power generation which takes place in the oldest and most emission-intensive power plants. CO<sub>2</sub> emissions below the free allowance limit continue to be subject only to the regulation in the EU ETS. From 2017, plant operators will be obliged to pay a climate contribution for every tonne of CO<sub>2</sub> which exceeds the free allowance limit. This climate contribution is set to increase to € 18-20 by 2020 (phase-in). The plant operators will be liable to reimburse the climate contribution by means of EU ETS certificates. These certificates will then be retired. Currently with a certificate price of €

<sup>8</sup> Cf. Öko-Institut (2014): „Co<sub>2</sub>-Emissionen aus der Kohleverstromung in Deutschland“, available online at: <http://www.oeko.de/oekodoc/1995/2014-015-de.pdf>

6-7/t CO<sub>2</sub>, in other words for every tonne of CO<sub>2</sub> above the free allowance, up to 3 certificates have to be bought and then retired.

Figure 5: Graphic representation of the free allowance (BMWi)



Mio. t CO <sub>2</sub> -Emissionen pro Gigawatt	Million t CO <sub>2</sub> emissions per gigawatt
Freistellung	Exemption
Anlagenalter (in Jahren)	Unit age (years)

In the view of WWF and Germanwatch, an effective delivery of the new instrument will depend on

- The specification of a **clearly defined assessment basis for defining the age of the plant**. It is currently unclear whether "basic modernisations which function like a new-build" can be limited to the replacement of the boiler.
- Fixing the planned **18-20€ per tonne of CO<sub>2</sub> as the absolute minimum of the climate contribution** in order to ensure a steering effect. The climate contribution should thus not be subject to any fixed adjustment upwards. The **climate contribution needs to be able to be tightened** as required in order to produce the desired steering effect. This is all the more important in view of the short deadline to 2020 and the unforeseeable effect of a phase-in of the instrument.
- A **transparent monitoring of emissions reductions during the "phase-in"** in order to tighten the instrument in the short term.
- A guarantee that the **free contributions cannot be transferred** between individual power plant blocks.

### Without a reduction of coal power the 2020 climate policy target will not be reached

Electricity generation from coal and lignite is responsible for about a third of all German greenhouse gas emissions. The 2020 climate policy target can only be achieved with a significant reduction in coal-based generation in Germany.

The proposed instrument in the White Paper for a national "climate contribution" is an imperative step towards a credible climate and energy policy. We welcome the instrument as an effective and efficient solution to gradually make the oldest and most emission-intensive power plants more accountable for increased climate protection in accordance with the polluter-pays principle. On the one hand the instrument thus exerts climate-friendly leverage to effectively limit emissions, particularly of old and less efficient coal power plants and, on the other, supplements the existing regulatory framework of the EU ETS. Maintaining the status quo would lead to an export surplus of around 51 TWh of power by 2020.<sup>9</sup> The planned introduction of the climate policy instrument

<sup>9</sup> Cf. Projektionsbericht der Bundesregierung 2015 (p. 83), available online at: [http://cdr.eionet.europa.eu/de/eu/mmr/art04-13-14\\_lcds\\_pams\\_projections/envvqlq8w/](http://cdr.eionet.europa.eu/de/eu/mmr/art04-13-14_lcds_pams_projections/envvqlq8w/)

would limit the net power export in 2020 to an estimated 35 TWh. In 2014 Germany exported 35.4 TWh (net), an all-time record. Assuming the instrument is implemented as planned, it could therefore make an important contribution to limiting electricity generation especially from the climate damaging lignite power plants. This is a clear and important message against the planned expansion of opencast lignite mines in the Rhineland and Lusatia.

The White Paper and the 2015 projection report it is based on limit annual power plant sector emissions to a maximum of 290 million t CO<sub>2</sub> in 2020. WWF and Germanwatch view these 290 million tonnes of CO<sub>2</sub> per year as the absolute maximum from the power plant sector in 2020. Should it turn out that the emissions reduction gap is larger and further reductions in emissions are required to reach the 40% target by 2020, it must be ensured that the instrument for the national climate policy contribution from fossil power generation can be adequately tightened and the emissions reduction gap closed.

### Shaping structural change in a socially responsible manner

The gradual reduction in coal power in Germany proposed by the instrument in order to achieve a national climate policy focusses on emission reductions from the oldest and most polluting power plants. Approx. 90% of power plants are exempted from the planned regulation. It is simply not true to claim that the introduction of this instrument amounts to a withdrawal from coal power in Germany.

The structural change towards a low-carbon economy based renewable energies can only succeed on the basis of a broad consensus amongst all of society. The WWF and Germanwatch therefore call upon all stakeholders involved to engage in an honest and constructive debate on the jobs in the power plants and coal industry affected by the structural change.

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