ADVANCED SUSTAINABLE SYSTEMS
www.advsustainsys.com

Germany and Climate Protection: From Model Pupil to Laggard—Why Coal Phasing Out Makes Economic and Ecological Sense

Claudia Kemfert

Germany has gone from being a pioneer to a laggard when it comes to climate protection. The proportion of Germany's most polluting energy source, lignite, is higher than ever before. Renewable energies are being thwarted. There is no sustainable transport policy that focuses on traffic avoidance, relocation, and electrification as well as environmental, climate, and health protection—not even after the diesel scandal. The climate protection targets that are set are missed. A clever energy transition is different. Germany will only be able to regain its credibility as a climate protection world champion if the phase-out of coal is initiated today and completed in a decade, a sustainable transition in transport is initiated and the entire energy system is converted to renewable energies. This creates enormous economic opportunities for a long overdue modernization of the German economy.

1. The German Energy System Transformation: A Role Model?

The world is changing. In many countries the end of the fossil age is more or less noticeable. The battle for oil is once again in full swing. The climate treaty of Paris in 2015 marked the beginning of the end of the fossil age. Economic solutions are being sought in a wide variety of ways for the entry into the age of renewable energies. Some are already further in the process, while others are just about to turn the corner.

However, the German energy transition (Energiewende) has not set the course for a rapid progress toward the probably now utopian but still important two-degree target. Germany, formerly climate protection pioneer country will not achieve the climate targets it has set itself of a 40% reduction by 2020. There can be no question of a structured phase-out of coal. Because of loud lobby protests, people do not even dare simple but effective measures such as a coal tax. Germany, the otherwise so innovative car country, has surprisingly little success in the paradise discipline of sustainable mobility. On the contrary: the Volkswagen exhaust scandal is damaging the reputation of German environmental policy worldwide. More than ever, the Federal Government is called upon to implement climate protection measures against all conflicting economic interests.

Thanks to past investments from Germany, rising demand, and the economies of scale associated with this, the costs of renewable energies have fallen massively worldwide. Globally, more investments are being made in renewable energies than in fossil energies—and this despite still high subsidies for fossil energies! However, this is no longer the case in Germany! China is catching up massively, investing more in renewable energies and also wants to become world market leader in the field of electromobility. It is high time Germany did not miss the boat!

2. Germany Should Not Lose Its Credibility In Climate Protection and Sustainable Transport Transition!

The new Federal Government must place energy system transformation and climate protection as a central element on the political agenda. The latest reports by climate scientists have once again impressively shown that climate protection must take place quickly and that we no longer have time. If mankind wants to stop the global warming effects, it must reduce emissions as quickly as possible. After all, global emissions are rising again, not falling. So, it is time to change course. Over 80% of coal resources and over 60% of oil and gas resources must remain in the ground if emissions are to fall by 80–95% by the middle of the century. This means that almost all investments made now and in the near future should not be made in fossil or nuclear energy, but in renewable energies and eco-energy. In addition to renewable energies, we need more efforts to save energy and more climate-friendly drive technologies in the transport sector.

Germany has gone from being a pioneer to a laggard when it comes to climate protection. The climate protection policy of the last two legislative periods has been a poor one. Emissions are not falling sufficiently; in recent years they have even risen. The proportion of Germany's most environmentally harmful energy source, lignite, is higher than ever before. Renewable

Prof. C. Kemfert
Deutsches Institut für Wirtschaftsforschung
Mohrenstrasse 58, 10117 Berlin, Germany
E-mail: sekretariat-evu@diw.de
The ORCID identification number(s) for the author(s) of this article can be found under https://doi.org/10.1002/adsu.201800155.

DOI: 10.1002/adsu.201800155

energies are being thwarted. There is no sustainable transport policy that focuses on traffic avoidance, relocation, and electrification as well as environmental, climate, and health protection—not even after the diesel scandal. The climate protection targets we have set ourselves are missed. Clever energy system transformation is different. But it would have to be the other way round: cap coal and nuclear energy, push renewable energies.

3. Coal Phase-Out Must be Initiated Today

Coal-fired power plants account for almost 40% of electricity production and around 80% of CO_2 emissions (**Figure 1**) in the German electricity sector. In order to meet the targets set out in the German government's 2016 climate protection plan, which provides for a 60–62% reduction in CO_2 emissions for the energy industry by 2030 compared with 2014, a significant reduction in coal-fired power generation by 2030 must make a decisive contribution and set the central course for the complete phase-out of coal by 2030 (**Figure 2**).

A phase-out of coal-fired power generation is not only necessary in terms of climate policy but also makes sense in terms of energy economics and is technically and economically feasible, as a wealth of studies show.[1–3] The benefits of phasing out coal far outweigh the costs—not least because it stimulates strong investment and innovation. A coal phase-out in Germany will stimulate necessary investments in demand management, storage, power-to-X applications, and efficiency technologies, technologies that are not only needed in Germany but also open up great opportunities on export markets. A reduction in coal-fired power generation can also lead in some places to a significant easing of the grid situation.

An exit from coal-fired power generation in Germany, however, will only become a model capable of multiplication for other countries if it can be made socially acceptable. Currently, around 18 500 people are employed directly in lignite-fired power plants and opencast mines; a further 4000–8000 people are employed in hard coal-fired power plants. A large part of the decline in employment in the coal sector could be offset by regular retirement.[4–6] But even if the exit can be implemented in such a way that it has hardly any negative impact on the current generation of workers, active support must be given to structural change, especially for future generations. Not only investments in new sustainable jobs but also the improvement of soft location factors is necessary to create attractive living conditions and to offer people promising prospects in the former coal regions. Despite different framework conditions, the three lignite regions of Germany offer equally good opportunities not only to adhere to energy industry traditions (e.g., by establishing themselves as an energy system service and power to X location) but also to gain a foothold in other areas.

We know that the technologies necessary for phasing out coal-fired power generation are available today or have been developed to such an extent that they can be used in good time. The costs for wind and solar power today are about the same as or even lower than those for new fossil-fuel power plants. The availability of energy storage facilities also does not represent a bottleneck for coal phasing out. Simulation calculations show that up to 80% of renewable energies in the electricity mix are flexible options, such as sector coupling, electricity-guided cogeneration, heat storage, and demand-side management,

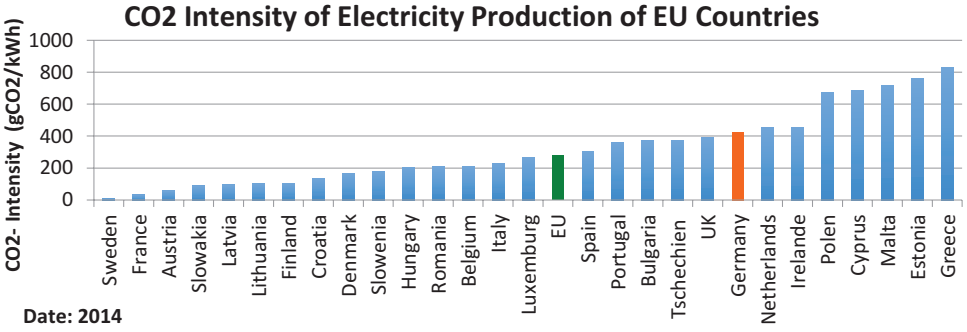

Figure 1. The CO_2 emission intensity ($gCO_2\ kWh^{-1}$) is calculated as the ratio of CO_2 emissions from public electricity production (as share of CO_2 emissions from public electricity and heat production related to electricity production) and gross electricity production.

Claudia Kemfert has been Professor of Energy Economics and Sustainability at the private University, Hertie School of Governance, in Berlin since 2009 and Head of the department Energy, Transportation, Environment at the German Institute of Economic Research (DIW Berlin) since April 2004. In 2016 Claudia Kemfert was appointed by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety as a member of the German Advisory Council on the Environment.

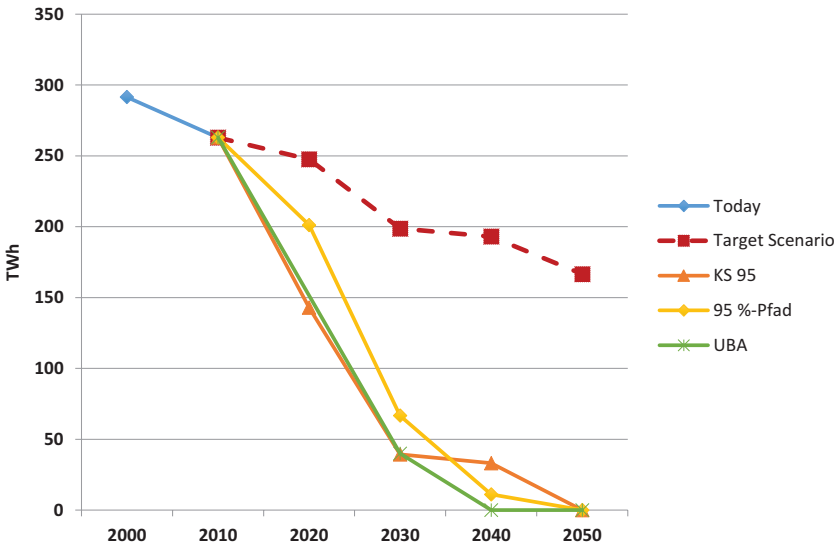

Figure 2. Electricity production by coal. Where we are and where to go. Climate protection scenarios showing the today situation and conceivable coal phasing-out assumptions. The target scenario is the projection of the current postulation. 95 means a 95% reduction of CO_2 emissions, KS stands for climate protection scenario and UBA means Umweltbundesamt.[2]

which are sufficient to meet the requirements of system integration and are also more cost-effective than seasonal electricity storage systems.

The controllability of the transformation process is highest for all actors when coal-fired power plants are shut down in a fixed order.[2] This creates the necessary lead time for regional structural development. In the case of price-based instruments such as the minimum CO_2 price, but also in the case of decommissioning with generous transfer possibilities between power plants, however, it is more difficult to estimate the concrete effects on site. This would limit the possibilities of preparing this purposefully with appropriate time in advance but on the other hand would increase flexibility in implementation.

4. Outlook

The phasing out of coal is therefore necessary in terms of climate policy, makes sense from the point of view of the energy industry, and is technically and economically feasible. Against this background, it is now a matter of political will to shape the future in order to make concrete use of the opportunities associated with an orderly coal phase-out.

Climate protection creates jobs, Germany is the world market leader as a provider of climate protection technologies, over two million people work in this sector. Investments in climate-friendly future markets create investments and added value and generate jobs. Economy and ecology are two sides of the same coin.

Big steps toward climate protection are needed everywhere. The industrialized countries must accelerate and channel investment in climate protection. Renewable energies bring added value and prosperity and avoid resource and climate conflicts and wars. Renewable energies thus also create participation and can strengthen democracy. Climate protection and the energy transition are the best peace project we currently have—for all countries in the world.

Conflict of Interest

The authors declare no conflict of interest.

Keywords

climate protection, coal phase-out, energy transition, renewable energies

Received: November 26, 2018
Published online:

[1] DIW Berlin, IZES, IwH, and Öko-Institut. Climate protection and coal phase-out: policy strategies and measures up to 2030 and beyond. Study Commissioned by the Federal Environment Agency. Unpublished data. German Institute for Economic Research, Institute for Future Energy and Material Flow Systems, Leibniz Institute for Economic Research Halle, Öko-Institut, Berlin **2018**.
[2] DIW, Wuppertal Institute, Ecologic. Kohlereader: The end of the energy use of coal in Germany, an overview of interrelationships, challenges and options for solutions, Wuppertal, Berlin **2018**.
[3] SRU, German Advisory Council on the Environment, Berlin **2017**, https://www.umweltrat.de/SharedDocs/Downloads/DE/04_Appraisals/2016_2020/2017_10_Appraisals_Coal_exit.pdf?__blob=publicationFile&v=16 (accessed: November 2018).
[4] Öko-Institut, Study Commissioned by Agora Energiewende and the European Climate Foundation, Berlin **2017**, https://www.agora-energiewende.de/fileadmin/Projekte/2017/Deutsche_Braunkohlen-wirtschaft/Agora_Die-deutsche-Braunkohlenwirtschaft_wEB.pdf (accessed: November 2018).
[5] RWI. Development of current comparative structural data for the German lignite regions. Project Report for the Federal Ministry of Economy and Energy. Project Number: I C 4-25/17, Leibnitz Institute for Economic Research, Essen **2017**.
[6] DIW Berlin, DIW Politikberatung Kompakt 84 German Institute for Economic Research, Berlin **2014**, https://www.diw.de/documents/publikationen/73/diw_01.c.471589.de/diwkom-pakt_2014-084.pdf (accessed: November 2018).