

THE UNFINISHED REFORM
AN ASSESSMENT OF THE ENERGY
TRANSFORMATION IN GERMANY DURING
THE RULE OF THE GRAND COALITION 2013–2017

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INTRODUCTION

In its time in power, which is shortly to end, the CDU/CSU-SPD coalition introduced key legislative changes enabling a further transformation of the energy sector (referred to as 'Energiewende'), which provide for a total restructuring of the German energy system by 2050. The term Energiewende (energy transformation) became popular in Germany in 2011, when, in response to social protests following the disaster in the Fukushima nuclear plant in Japan, the government announced a plan to accelerate the decommissioning of nuclear plants and began to use this term to popularise an energy strategy whose main aim was to develop renewable sources of energy¹. The long-term goals of Energiewende include reducing greenhouse gas emissions by 80–95% by 2050 and increasing the share of renewable energy sources in the consumption of primary energy to 60% (from the present 13%). In the future, green electricity is set to replace not only the electricity produced in conventional power plants, but also natural gas used for heating and oil used in transport. However, it should be remembered that the roots of the Energiewende concept reach back to the 1970s and to the protests against the development of the nuclear energy sector in Germany. The German state has offered comprehensive support for the development of renewable sources of energy since the end of the 1990s. The energy transformation strategy enjoys considerable support from society; moreover, all political parties support it and their programme differences solely concern the pace of introducing this strategy and not the goal itself. Energiewende has become an element of German identity and an important component of a positive image for Germany. Thereby, the strategy is of major importance for German politics.

Despite the fact that Energiewende is a major priority for the government, the implementation of this strategy is encountering various problems, as well as resistance from the traditional energy lobby. It is also frequently confronted by politicians' fears of introducing overly radical changes. The electricity market is where the spread of renewable energy sources is the most rapid. In the previous government term, the main goal was to reduce the costs of subsidising renewable sources of energy in electricity generation. It seems that the reforms have brought the expected result and the government has managed to stop the spiral of increasing costs of support for renewable energy sources (RES). Due

¹ For more see A. Kwiatkowska-Drożdż (ed.), *Germany's energy transformation: difficult beginnings*, *OSW Report*, December 2012, <https://www.osw.waw.pl/en/publikacje/osw-report/2012-12-06/germanys-energy-transformation-difficult-beginnings>

to a favourable pace of investment, the decommissioning of nuclear plants is proceeding according to plan and it is almost certain that all nuclear plants in Germany will have been shut down by the end of 2022. However, it is still not known how and when Germany will be shutting down the most emission-generating brown coal-fired power plants. The greatest challenge is posed by the reduction of greenhouse gas emissions because, due to an increase in electricity generation in brown coal-fired power plants and an increase in the use of fuels in the transport sector, the level of greenhouse gas emissions is almost equal to that recorded in 2011. Moreover, Germany is developing its electric car sector at a slower pace than expected. In 2017, Chancellor Angela Merkel admitted that the previously announced goal involving one million electric cars by 2020 is unrealistic.

THESES

- The German government is presenting the national strategy for energy transformation as a success. This strategy is also being promoted abroad. In its official communications, the government is drawing attention to a number of positive aspects that energy transformation brings to the country as a whole, when it comes to both security and environmental protection. It is emphasised that, for Germany, renewable energy sources (RES) mean greater security of energy supplies and economic security, in that they guarantee low and stable energy prices in the future. A narrative involving Germany maintaining its technological lead in the field of green energy-generating technologies is also present. At the same time, the government admits that there are certain sector-specific problems surrounding the transformation, such as high electricity prices and stagnation in the reduction of greenhouse gas emissions. Nevertheless, these challenges have no impact on the stance Germany expresses in European and international forums or on the positive narrative regarding energy transformation itself.
- Maintaining energy costs that would be acceptable for the economy will continue to pose a major challenge for the new government. Continued increases in the price of electricity would mainly affect small and medium companies, most of which are not entitled to discounts when buying electricity, unlike companies from the energy-intensive industrial sector. A major hike in electricity prices would also constitute a problem for low income households, and in the long run would entail an increase in the price of most utilities and consumer goods. In 2014 and 2016, the Ministry for Economic Affairs pushed through two amendments to the law concerning renewable sources of energy, which dramatically reduced the amount of subsidies offered to RES, and consequently slowed down the rise in electricity prices paid by consumers. Whereas in 2012 the average cost of subsidy for RES was 18.2 cents/kWh, in 2016 it dropped to 16.6 cents/kWh, and the forecast for 2017 is 16 cents/kWh. The most significant drop was recorded for solar energy: from 35 cents/kWh in 2012 to 29.2 cents/kWh in 2016. Despite this drop, the cost of subsidising RES remains high – in 2016 producers of green energy received subsidies worth 29 billion euros that came from obligatory fees to support RES. The reform of the system for subsidising RES has resulted in a marked change in the market. Investments in photovoltaic power dropped from an average of 7 GW annually in 2010–2012 to 1.5 GW in 2015–2016. The negative impact of this change was that companies were going bankrupt and the number of jobs in the solar

energy sector was diminished. In 2010–2015 alone, the number of individuals employed in the solar energy sector dropped by 71% from 107 800 to 31 600.

- For years, the permanent challenges for Germany’s energy and climate policy have been the extension of transmission networks and the reduction of greenhouse gas emissions. So far, the extension of electricity networks has been progressing at a slower pace than originally planned. From the 1800 km of power lines foreseen in the law, to date only 650 km have been constructed and building permits have been issued for another 850 km. The construction of any of the three key energy highways (direct current high voltage lines) linking the north with the south of the country has not yet started. These highways are intended to transmit electricity from offshore wind farms, to replace a major portion of what is being produced by nuclear plants.
- The future of Germany’s coal energy sector is still unknown. The present CDU/CSU-SPD coalition government has not taken any stance on the schedule of decommissioning coal-fired plants, which is of key importance for Germany if it wishes to meet the goals of greenhouse gas emission reduction. Similarly, no meeting of coal industry representatives with the government has taken place under the announced ‘round table’ regarding coal phase-out. Germany’s biggest problem is brown coal – in 2016 23.1% of electricity was generated from it. In 2000–2015, electricity generation from brown coal dropped by a mere 2%, whereas it increased by 6% compared to 2010. In 2015, brown coal-fired power plants generated over 50% of CO₂ emissions recorded in the German energy sector (around 20% of Germany’s total CO₂ emissions). The closing down of brown coal mines and brown coal-fired plants will trigger protests by trade unions and reluctance on the part of those federal states in which these mines are located (90% of Germany’s production comes from North Rhine-Westphalia and Brandenburg). However, nationwide, around 80% of society support the plan to eliminate coal burning in power plants by 2030.
- The new government will have to tackle the issue of changes within the automotive market. Germany’s emissions from transport have barely declined since 1990, and diesel cars, which were expected to help reduce emissions, have in recent years fallen into disfavour with Germans. German companies had tried to implement a strategy of introducing so-called ‘clean diesel’ cars on the market. However, it failed due to various disclosed

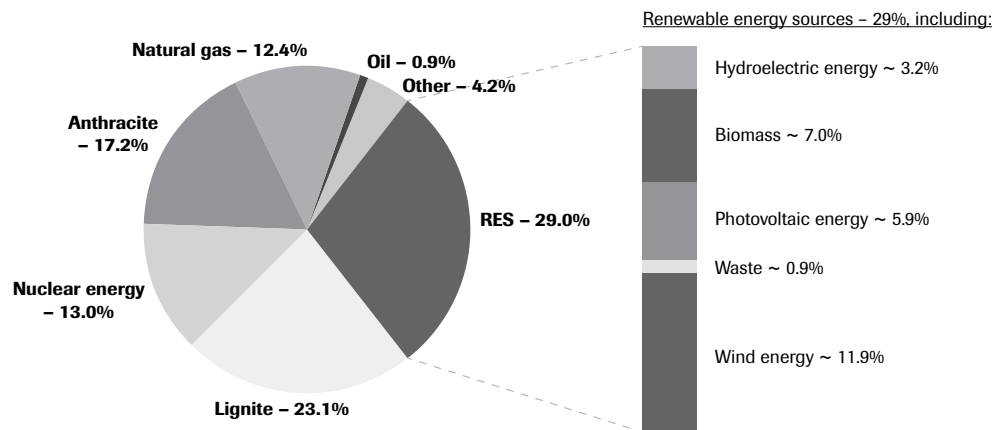
cases of cheating in emission tests. Following this scandal, automotive companies lost their credibility both in Germany and abroad. At the same time, the German automotive industry is lobbying against the so-called energy transformation in transport (German: *Verkehrswende*). The powerful influence of this sector results from the fact that it employs around one million individuals and is of key importance for the state of the German economy. As a consequence, Germany's greenhouse gas emissions in the transport sector have continued to rise over recent years and the German automotive sector is rather unlikely to deliver low- and zero-emission cars to the market.

- As far as continued energy sector reforms are concerned, there are two conflicting opinions. The main challenges which the sceptics (representatives of the German industry) cite are the need to reduce costs and also to implement energy and climate policy goals as cheaply as possible. Energy transformation enthusiasts (the environmental protection and new technologies lobby) on the other hand, are looking for new ways to finance the development of RES without the need to increase the electricity price paid by recipients. Electoral programmes devised by political parties contain two contrasting concepts: the Green Party wants to increase the share of RES in electricity generation to 100% by 2030 and to introduce a plan for decommissioning conventional power plants. The liberal party (FDP), for its part, wants to cut RES subsidies completely and to foster competition among all electricity generation sources. Germany's biggest political parties, CDU/CSU and SPD as well as Die Linke, do not propose any significant changes to the present energy policy and instead they support the plan to achieve the formerly adopted goals using presently available policy instruments.

I. THE EXPANSION OF RENEWABLE SOURCES OF ENERGY

The development of renewable sources of energy in the electricity generation sector has been the biggest success of Energiewende to date. In 2000–2016, the production of electricity from renewable sources recorded a five-fold increase from 36 TWh to 192 TWh². The largest increase has occurred since 2011, when the decision to decommission nuclear plants was announced and the government popularised the idea of Energiewende, or the transformation of the energy sector based on renewable energy sources (RES). This development was possible only due to the policy of support for RES development. The most important instrument was the *feed-in-tariff*, which guarantees that producers may sell ‘green electricity’ at a price that is several times higher than the wholesale electricity price. The difference between the wholesale price and the guaranteed price would be covered by recipients as the so-called RES fee. Due to a relatively large internal market, an attractive system of subsidies (including a guaranteed price for the supply of electricity for 20 years), and political support for the development of RES, Germany has become the world’s biggest producer and exporter of RES technologies, and since around 2010 even the largest market in terms of the volume of investments. In 2016, 29% of electricity was generated from RES. Thereby, green energy has become a major source of power for the electricity and energy network, next to coal-fired, gas-fired and nuclear plants (nuclear plants are due to be decommissioned by the end of 2022).

Chart 1. Electricity generation in 2016 (in TWh)



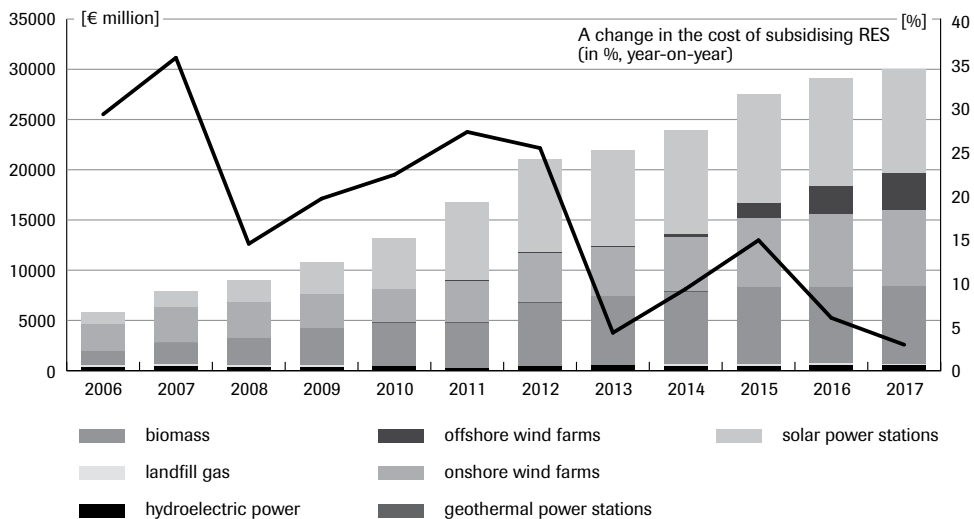
Source: Federal Ministry for Economic Affairs and Energy, <https://www.bmwi.de/Redaktion/DE/Dossier/erneuerbare-energien.html>

² Erneuerbare Energien in Deutschland Daten zur Entwicklung im Jahr 2016, Federal Office for the Environment, March 2017, https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/erneuerbare_energien_in_deutschland_daten_zur_entwicklung_im_jahr_2016.pdf

The biggest problem faced by the energy transformation is the increase in the price of electricity paid by individual consumers. High energy prices are less burdensome for industrial consumers because they are entitled to discounts or have their own power generation equipment.

Around 2009 it became clear that the existing system of subsidising RES may lead to anomalies in the energy market: in a country with frequently cloudy skies, the most expensive solar power stations with several times more capacity were installed instead of cheaper wind farms, and an unprecedented oversupply of electricity began to appear on the energy market. This caused a drop in wholesale electricity prices and subsequently resulted in traditional energy generating companies recording financial losses. At the same time, consumers continued to pay more for electricity: in 2008–2012 the annual cost of subsidising RES increased more than twofold: from around 9 billion euros to around 21 billion euros annually. In 2015, the cost of subsidies rose to 27.5 billion euros, in 2016 it is expected to reach around 29.2 billion euros annually, and in 2017 – to 30 billion euros³. The share of the so-called RES fee in electricity bills for individual recipients rose from around 5% in 2008 to around 20% in 2015. In recent years, the increase in the cost of subsidies has eased, yet it has not been halted.

Chart 2. The cost of subsidising RES in 2016–2017 (in millions euros)



Source: http://www.erneuerbare-energien.de/EE/Navigation/DE/Recht-Politik/Das_EEG/DatenFakten/daten-und-fakten.html

³ A publication by the Federal Ministry for Economic Affairs and Energy entitled “EEG in Zahlen: Vergütungen, Differenzkosten und EEG-Umlage 2000 bis 2017”, Berlin 2016.

The rising costs of subsidising RES automatically translate into higher electricity bills. In 2016, an average household using 4000 kWh (kilowatt-hours) of energy paid around 1097 euros annually for electricity, including a so-called RES fee of around 219 euros (6.35 cents/kWh). For comparison, in 2006 the bill was 771 euros⁴, including an RES fee of around 35 euros (0.88 cents/kWh). Numerous politicians and experts have argued that the acceptable upper limit of costs of subsidising RES paid by consumers has already been breached many times⁵. In the previous government term there was a halt in the increase of the price of electricity paid by individual recipients. In 2016, the average electricity price paid by households (gross price) was lower than in 2013⁶ (see Appendix). The respite in the electricity price surge was possible due to a drop in the wholesale price of electricity. This, in turn, happened because even though the costs of subsidising RES continue to rise, this has occurred at a much slower pace. This has been down to the reform of the system for subsidising RES. First, the feed-in-tariffs for the production of electricity, specified in the law (the 2012 and 2014 amended RES laws) were gradually reduced, then open tenders for the production of electricity from RES were introduced (the 2016 amended RES law). The reforms bore fruit – in 2011–2014, the so-called RES fee rose by 76% (from 3.53 cents/kWh to 6.24 cents/kWh), whereas after the law was amended, in 2014–2017, the RES fee rose by 11% (to 6.88 cents/kWh). Due to a drop in the cost of RES technology, electricity consumers paid less in ‘green electricity’ subsidies: while in 2012 the average cost of subsidy for RES was 18.2 cents/kWh, in 2016 it stood at 16.6 cents/kWh, and the forecast for 2017 is 16 cents/kWh. The most striking drop in the cost of subsidy involved solar power: it fell from 35 cents/kWh in 2012 to 29.2 cents/kWh in 2016⁷. The latest tender results suggest that the support for RES will soon be eliminated completely. In the April 2017 tender, a bid was approved to build a 900 MW offshore wind farm that will

⁴ Tarife.de, Deutsche arbeiten jährlich 65 Stunden für Strom, 27 April 2017, http://www.tarife.de/nachrichten/deutsche-arbeiten-jaehrlich-65-stunden-fuer-strom_208628.html

⁵ The acceptable upper limit of RES subsidy fees paid by German recipients was mentioned by politicians and lobbyists several times, for example in 2010, 2014 and 2016. Source: Michael Fuchs (a CDU deputy), Bundestag, 12 May 2014 https://www.bundestag.de/dokumente/textarchiv/2014/interview_fuchs/276564; Holger Schwannecke, secretary general of the German Crafts Association, 14 October 2016, <https://www.zdh.de/index.php?id=29925>; Die Schmerzgrenze ist erreicht, *Handelsblatt*, 2 July 2010, <http://www.handelsblatt.com/politik/deutschland/solarfoerderung-die-schmerzgrenze-ist-erreicht/3479404.html>

⁶ In 2016, the average electricity price paid by households was 28.69 cents/kWh. Source: Erneuerbare Energien und das EEG: Zahlen, Fakten, Grafiken (2016), BDEW, Berlin, 18 February 2016, p. 56.

⁷ A publication by the Federal Ministry for Economic Affairs and Energy entitled “EEG in Zahlen: Vergütungen, Differenzkosten und EEG-Umlage 2000 bis 2017”, Berlin 2016.

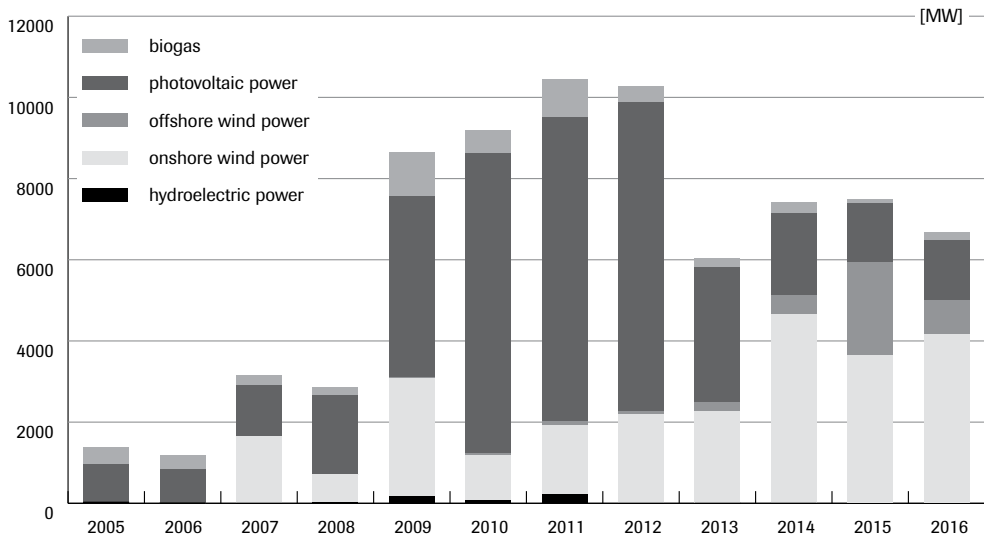
require no subsidies and will rely solely on market prices⁸. This set a precedent in Germany and formed part of a trend towards a drop in the cost of energy generation from RES.

The CDU/CSU-SPD coalition has also tackled the issues regarding investment in new renewable power stations. In 2012, an annual limit for installing new photovoltaic (solar) plants was introduced. In 2014, it was expanded to include other types of RES as well. As a consequence, Germany's energy sector has become more stable and predictable. On the other hand, this administrative limit has had a negative impact on the financial standing of companies operating in the photovoltaic sector, with several of them becoming insolvent⁹. At present, the photovoltaic market is stagnating. In 2016, photovoltaic plants with 1.5 GW power were installed, in 2015 – 1.5 GW, in 2014 – 1.9 GW, whereas in the peak years of 2010–2012 over 7 GW were installed annually. At present, newly installed photovoltaic capacity is lower than the limit specified in the law, i.e. 2.5 GW per year. Critics of the government argue that this means that Germany is not implementing the provisions of the energy transformation quickly enough. On the other hand, it was precisely this drop in the number of newly installed expensive photovoltaic plants combined with an increase in the number of newly installed cheaper wind farms that made it possible to make savings in the RES subsidy system.

⁸ R. Bajczuk, Niemcy: Pierwsza farma wiatrowa bez dotacji, *Analizy OSW*, 26 April 2017, <https://www.osw.waw.pl/pl/publikacje/analizy/2017-04-26/niemcy-pierwsza-farma-wiatrowa-bez-dotacji>

⁹ A. Kwiatkowska-Drożdż, K. Mazur, The expensive energy revolution in Germany. The implementation of the Energiewende is behind schedule, *OSW Commentary*, 10 May 2012, <https://www.osw.waw.pl/en/publikacje/osw-commentary/2012-05-10/expensive-energy-revolution-germany-implementation-energiewende>

Chart 3. Annual increase in installed RES power in 2005–2015 (in MW)



Source: Federal Ministry for Economic Affairs and Energy

The most recent legal amendment adopted by the Bundestag in August 2016 was inspired by the need to reduce the so-called RES fee. It also implemented European Commission guidelines on state aid for renewable energy-related purposes¹⁰. The law has changed the philosophy of how the state subsidises RES: producers of ‘green electricity’ will continue to receive a guaranteed rate for the production of electricity, but the amount of the guaranteed price will be set each time in a tender. The purpose of this change to the law is to create the conditions for fostering the implementation of a subsequent stage of energy transformation, with the objective of increasing the share of electricity production from RES from 30% in 2015 to 40–45% in 2025¹¹. Moreover, the reform provides for the inclusion of energy generation from renewable sources in the energy market – until now, electricity was being generated from RES with no consideration for the actual demand. Both the parliamentary opposition and the German RES lobby voted against this amendment, as they rightly feared that if it does not specify the prices for the supply of electricity, the sector will be less attractive for new investors.

¹⁰ R. Bajczuk, Niemcy: reforma rynku energii, *Analizy OSW*, 13 July 2016, <https://www.osw.waw.pl/pl/publikacje/analizy/2016-07-13/niemcy-reforma-rynku-energii>

¹¹ Press releases by the Ministry for Economic Affairs and Energy, <https://www.bmwi.de/Redaktion/DE/Artikel/Energie/eeg-2017-start-in-die-naechste-phase-der-energiewende.html>

II. THE DEBATE ON THE FUTURE OF ENERGIEWENDE

In Germany, the development of RES and the energy transformation strategy are the subject of a major dispute in political, academic and economic circles. There is a general agreement as to the general thrust of energy policy, i.e. the promotion of renewable energy sources and emissions reduction. However, the dispute concerns the pace and the sources for funding of new investments. The debate revolves around two conflicting approaches: on one side, representatives of business circles (chambers of commerce and industry, think tanks and foundations associated with big enterprises) and bodies responsible for the state's financial stability (the Antitrust Committee, the Federal Audit Office) criticise the excessively high costs of Energiewende¹². Their adversaries in the debate, non-governmental organisations dealing with environmental protection, as well as companies from the new technology sector, support a rapid pace of investment in renewable energy sources. This division largely results from the divergent interests of various consumers of energy. While the relatively affluent German society means that households and the service sector can afford high electricity bills, the industrial sector, which produces goods for the global market and competes with producers from all over the world, cannot afford to pay for electricity much more than what its competitors pay. According to Eurostat data, the average price of electricity paid by industrial users in Germany is only slightly lower than the EU average price and is higher than the price of electricity applicable in neighbouring states: the Czech Republic and Poland, as well as France, the Netherlands, Austria and the Nordic countries¹³. When it comes to retail prices, German consumers pay Europe's second highest energy bills, after Danish consumers.

Think tanks associated with the industrial sector, including the Cologne-based Economy Institute (IW Köln) and the organisation called Initiative Neue Soziale Marktwirtschaft (Initiative New Social Market Economy), propose implementing a reform of the RES subsidy system and reducing the system's costs¹⁴,

¹² According to the Federal Audit Office (a counterpart of the Polish Supreme Audit Office), the government has to control the expenses associated with energy transformation and pay greater attention to possible strategy funding options and to the consequences for the security of energy supplies and the operation of the electricity and energy system. Source: A. Mihm, Bundesrechnungshof kritisiert undurchsichtige Energiewende, *Frankfurter Allgemeine Zeitung*, 12 January 2017.

¹³ Eurostat, <http://ec.europa.eu/eurostat/web/energy/data/database>

¹⁴ E. Chrischilles, H. Bardt, Fünf Jahre nach Fukushima Eine Zwischenbilanz der Energiewende, Cologne 2016; INSM press release, 10 October 2016, EEG & Co. treiben Ener-

so as to provide breathing space for the economy. This group of lobbyists supports a technologically neutral subsidy system that would be cheaper than the present system (in which specific technologies do not compete with each other). According to IW Köln, even after the amendment of the August 2016 RES law, which reduces the level of subsidies offered, the costs of financing RES will continue to rise¹⁵ – by 2025 the annual cost of subsidising RES will rise by around 3.3–6.9 billion euros annually, which means that consumers will pay an additional 24.8 to 32.9 billion euros annually. For an average household, the annual sum of fees for RES will then rise from 222 euros annually to around 416 euros in 2025. According to INSM, the costs of energy transformation will rise by 2025 as well and the total amount of subsidies for RES calculated from 2000 onwards will be 520 billion euros¹⁶.

Proponents of the fast-track implementation of the German energy strategy, for example representatives of the Institute for the German Economy in Berlin, and also the green technologies lobby (for instance, the Federal Association of Renewable Energy Generation), argue that what should be corrected is not so much the very philosophy of subsidising the development of RES as the efficiency of the present system. The proposed reforms of the present system focus on solutions to reduce the costs of the RES subsidy system and on seeking new sources of funding. For example, they provide for reducing electricity bills, so that the development of RES would burden consumers to a lesser extent. In the proposal submitted by the Federal Association for New Energy Industry (German: Bundesverband Neue Energiewirtschaft)¹⁷, the development of RES is not financed from an additional levy included in electricity bills, as is the case at present, but through an additional charge imposed on all conventional energy sources, including petrol and diesel fuel. In this way, the share of the so-called RES fee in the electricity bill is to be reduced from the present level of over 20% to 6–8%. The main goal of this reform would be to enable the so-called integration of other energy sectors (German: Sektorkopplung), by making it possible to use electricity as a source of primary energy to generate fuels (for example

giewendekosten auf 520 Milliarden Euro, <http://www.insm.de/insm/Presse/Pressemeldungen/Pressemeldung-Studie-EEG.html>

¹⁵ E. Chrischilles, IW-Pressemitteilung Nr. 64, 5 October 2016.

¹⁶ INSM press release, 10 October 2016, EEG & Co. treiben Energiewendekosten auf 520 Milliarden Euro, <http://www.insm.de/insm/Presse/Pressemeldungen/Pressemeldung-Studie-EEG.html>

¹⁷ BNE press release, 10 October 2016, Änderung der EEG-Umlagebasis bringt Sektorkopplung voran, <http://www.bne-online.de/de/content/bne-studie-%C3%A4nderung-der-eeg-umlagebasis-bringt-sektorkopplung-voran>

hydrogen and methane) for the transportation and heat generation sectors. This, in turn, is expected to result in an acceleration of energy transformation in the heat generation industry and in transportation. The Federal Association of Renewable Energy proposes reducing the cost of energy by abolishing excise tax on electricity and cancelling discounts offered to industrial recipients. A new tax on CO₂ emissions would be the source of additional budget revenues¹⁸.

Another method of reducing the cost of RES development involves a special purpose fund taking a loan which electricity consumers will repay in the future. This proposal was put forward by politicians from the ruling coalition. Ministers of the economy of Bavaria, Ilse Aigner (CSU), and North Rhine-Westphalia, Garrelt Duin (SPD), propose setting the upper limit of the RES fee at 6.5 cents/kWh. Additional costs from subsidising RES would be covered by a loan whose repayment would start post-2028, i.e. when the 20-year period of guaranteed subsidy for a major portion of RES expires. In addition, Duin proposes setting a 50% limit of the share of levies and fees in the price of electricity, in order to halt the electricity price increase – at present, levies and other fees account for around 55% of electricity price, and the remaining 45% are fees for energy transmission and distribution. Moreover, he argues that the excise tax on electricity should be abolished and the RES fee reduced¹⁹.

¹⁸ BBE press release, 7 October 2016, BEE legt Vorschläge zur Senkung der EEG-Umlage vor, <https://www.bee-ev.de/home/presse/mitteilungen/detailansicht/bee-legt-vorschlaege-zur-senkung-der-eeg-umlage-vor/>

¹⁹ Ökostrom-Umlage steigt auf Rekordniveau von 6,88 Cent, *Die Zeit*, 14 October 2016, <http://www.zeit.de/news/2016-10/14/energie-netzbetreiber-geben-hoehe-der-oekostrom-umlage-bekannt-14053402>

III. WHAT WILL THE NEW GOVERNMENT DO?

Due to the parliamentary elections scheduled for September 2017, the government is not disclosing its plans regarding further energy market reforms should the cost of RES development continue to rise. So far, the post-2011 increase in energy prices paid by consumers has not been a political issue, because the public reacted positively to any news regarding the development of RES and the decommissioning of nuclear plants. In addition, the relatively frequent (for German standards) amendments to the RES law have been used by the government as an argument to show that it is tackling the current problems in energy policy. At present, the government officially admits that the problem of high energy prices paid by the service sector and the industrial sector is of major importance. In March 2017, the Federal Ministry for Economic Affairs and Energy admitted that the cost of electricity should be reduced and invited both consumers and producers of energy to take part in a debate over this issue²⁰. It should be emphasised that back in January 2017 the then minister for economic affairs, Sigmar Gabriel, summed up his three-year term in office and referred to it as a success in implementing *Energiewende*²¹.

If the most recent amendment of the RES law adopted in July 2016 fails to bring about a drop in the cost of energy, then another reform of the subsidy system will surely be implemented after the September elections to the Bundestag. Many different scenarios for a reform of the RES subsidy system are feasible, including complete cessation of the guaranteed pricing scheme for the production of electricity from RES. According to the *FAZ* daily, this proposed energy policy reform was put forward by Christian Democrat politicians specialising in economic affairs in their internal debate over the party manifesto²². This change in the energy policy would very likely slow down the development of RES in the electrical energy sector. However, should a left-wing coalition be formed, with the intent of increasing the share of green energy in the energy mix as quickly as possible (the Greens propose that 100% of electricity and heat should be generated from RES by 2035), it would have a political mandate to do so. At present, the relatively affluent German society supports the

²⁰ K. Stratmann, System am Ende, *Handelsblatt*, 10–12 March 2017, p. 10.

²¹ S. Gabriel, *Energiewende als Teil eines epochalen Wandels*, <https://www.bundesregierung.de/Content/DE/Namensbeitrag/2017/01/2017-01-24-gabriel-handelsblatt-journal.html>

²² CDU debattiert Ausstieg aus Ökostrom-Hilfe, *FAZ*, 19 January 2017, <http://www.faz.net/aktuell/wirtschaft/energiepolitik/energie-wende-cdu-debattiert-ausstieg-aus-oekostrom-hilfe-14690006.html>

fastest possible development of RES, regardless of the high costs which, when calculated according to purchasing power parity (not in absolute numbers), are merely average by European standards²³. However, this unstinting support for energy transformation may change. The point is not the social consequences of high energy prices – in Germany, energy poverty is not a major problem and Energiewende has done nothing to change this²⁴. A shift in social mood may result from a change in how society perceives and assesses the energy transformation policy itself. In opinion polls conducted in May 2017, regarding the implementation of Energiewende, 63% of the respondents assessed the transformation costs as excessively high²⁵. Numerous experts interpret this result as a sign of the beginning of a decline in social approval for this strategy.

An analysis of documents and party manifestos regarding energy transformation suggests that in upcoming years the main subjects of the debate will include the end of coal burning (Kohleausstieg) and energy transformation in transport (Verkehrswende). From the government's point of view, announcing new strategies for specific sectors may be a good method of diverting society's attention from other problematic issues. To date, the heat generation and transport sectors have not been reformed, mainly due to resistance by the lobbies of heating equipment producers and car manufacturers, although this direction of change would be in line with the energy transformation strategy promoted since 2011. If in the future, due to an increase in electricity costs that would be unacceptable for the economy, the government had to reduce the pace of investment in RES, it would be able to divert voters' attention from this fact by announcing further transformations. Agriculture is one example of an area in which the government could announce an ecological transformation. In the autumn of 2016, during the debate over the Climate protection strategy by 2050²⁶, the

²³ See the surveys by TNS Emnid commissioned by the Agency for Renewable Energy Sources, <https://www.unendlich-viel-energie.de/repraesentative-umfrage-weiterhin-ruecken-wind-fuer-erneuerbare-energien>

²⁴ The share of energy expenses in spending on consumer goods was as follows: 1998 – 4.7%, 2003 – 5.5%, 2008 – 6.2%, 2013 – 6.4%. In 2015, the share of electricity expenses was 18%, of fuel expenses – 39%, of heating expenses – 33%, and process heating (cooking) expenses – 10%. Source: an inquiry submitted by a parliamentary deputy on 1 March 2017, <http://dip21.bundestag.de/dip21/btd/18/113/1811351.pdf>

²⁵ M. Fabricius, Hausbesitzer und Mieter sind die neue Hoffnung der Energiewende, *Die Welt*, 18.05.2017, <https://www.welt.de/finanzen/immobilien/article164680479/Hausbesitzer-und-Mieter-sind-die-neue-Hoffnung-der-Energiewende.html>

²⁶ Germany's climate protection strategy by 2050 (German: Klimaschutzplan 2050), http://www.bmub.bund.de/themen/klima-energie/klimaschutz/klima-klimaschutz-download/artikel/klimaschutzplan-2050/?tx_ttnews%5BbackPid%5D=3915

Environment Ministry promoted the idea of the ecological transformation of agriculture (Agrarwende), which would involve reducing the use of fertilisers and promoting reduced consumption of meat and milk and a hike in the VAT rate on these products.

Aside from costs, another important problem Germany faces in the context of RES development is the extension of the transmission network. So far, this process has been slow and recorded multiple delays. Out of 1800 km of transmission lines included in the law on expanding the energy grid, 650 km has actually been constructed and building permits have been issued for another 850 km. The construction of any of the three key energy highways (direct current high voltage lines) linking the north with the south of the country has not yet started. They are intended to transmit electricity from offshore wind farms, thereby replacing a major portion of energy produced by nuclear plants that are set to be decommissioned by 2022²⁷.

Germany will have to tackle the problem of emissions reduction – regardless of the costs of developing zero-emission energy sources standing at billions of euros, the emissions across Germany are not being significantly reduced. In 2009–2016, the emissions remained largely the same and stood at around 906 million tonnes of CO₂ equivalent²⁸. A minor drop in the emissions from the electricity and energy sector was counterbalanced by increased consumption of natural gas in the heat generation sector and increased use of oil in the transport sector. The main reason behind the stagnation of German greenhouse gas emissions is the situation in the transport sector (both road transport and aviation), where the emissions have not dropped since 1990. Another reason is that a relatively large amount of electricity is being generated in coal-fired plants²⁹. Another problem which the new government will have to tackle involves the German automotive industry, which has not yet managed to adjust to the requirements of Germany’s climate policy. It also has a major impact

²⁷ R. Bajczuk, Germany: time is running out for the development of the electricity and the energy network, *OSW Analyses*, 5 October 2016, <https://www.osw.waw.pl/en/publikacje/analyses/2016-10-05/germany-time-running-out-development-electricity-and-energy-network>

²⁸ C. Wörten, K. Gebauer, Kurzanalyse der nationalen Treibhausgasemissionen für das Jahr 2016, Berlin 2017, http://www.arepoconsult.com/fileadmin/user_upload/pdf/THG-Kurzstudie_2016.pdf

²⁹ Federal Office for the Environment, Emissionsquellen, <https://www.umweltbundesamt.de/themen/klima-energie/klimaschutz-energiepolitik-in-deutschland/treibhausgas-emissionen/emissionsquellen#textpart-1>

on Germany's energy and climate policy. Should the present climate protection policy be maintained, in the upcoming years the government will have to reduce emissions from transport. This, in turn, will likely have a negative impact on the financial results recorded by the German automotive industry that employs around 800 000 individuals. According to experts, the German automotive sector is not only lagging behind the world's latest industry-specific innovations, but also it is lobbying in favour of maintaining traditional technological solutions within the automotive market³⁰.

For the new German government, energy transformation will continue to pose a major challenge. Back in the early 2010s, Germany was a leader in the sector of renewable energy sources and low emission technologies. However, at present, other countries – China in particular and also the United Kingdom and France – are equal competitors in the fight for leadership of the international climate policy. For German companies, they represent a genuine threat across an increasing number of markets.

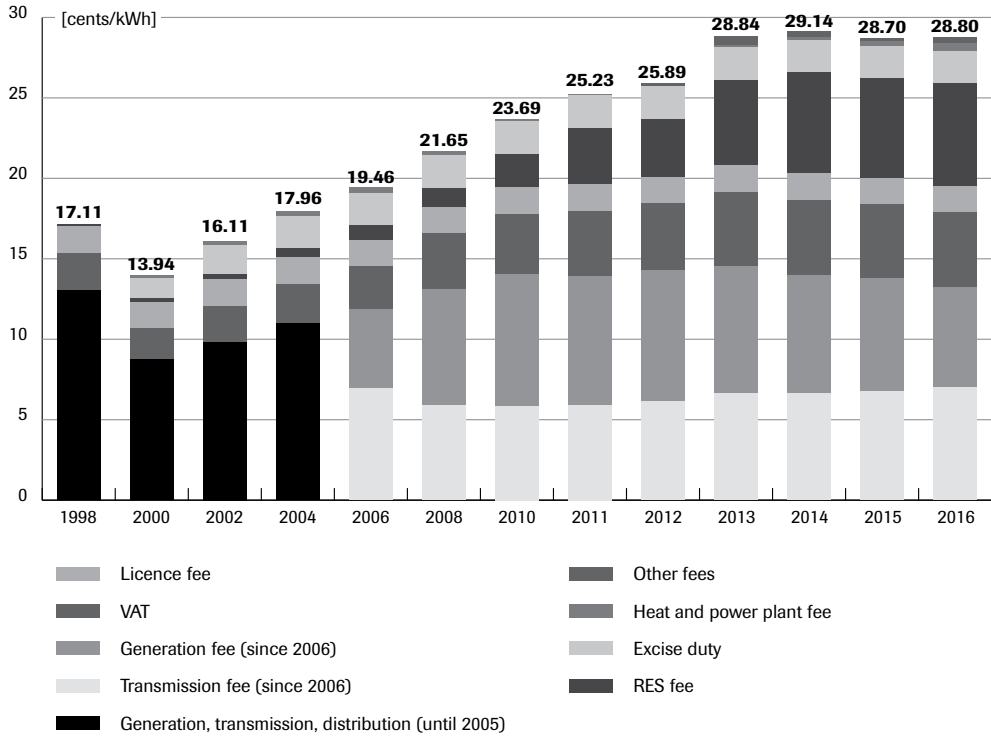
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³⁰ J. Hilgenberg, M. Müller-Görnert, Versprochen – Gebrochen Wie die deutsche Autoindustrie den Klimaschutz ignoriert, Berlin 2015, https://www.vcd.org/fileadmin/user_upload/Redaktion/Publikationsdatenbank/Auto_Umwelt/Analyse_Modellentwicklung_deutsche_Autoindustrie_2015.pdf

See also R. Bajczuk, The diesel scandal in the German car industry, *OSW Analyses*, 9 August 2017, <https://www.osw.waw.pl/en/publikacje/analyses/2017-08-09/diesel-scandal-german-car-industry>

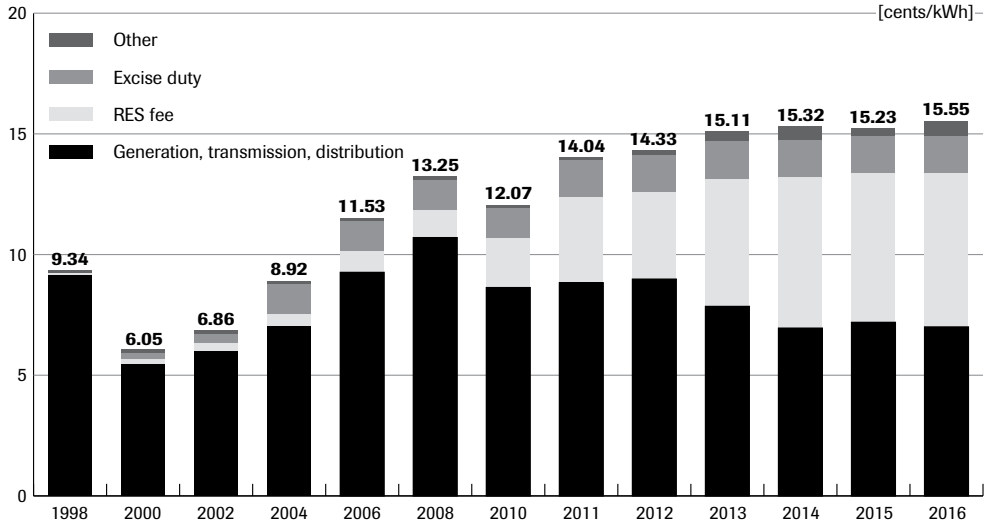
APPENDIX

Chart 1. Electricity prices paid by individual recipients in 1998–2016 (in cents per kWh)



Source: Erneuerbare Energien und das EEG: Zahlen, Fakten, Grafiken (2016), BDEW, Berlin, 18. Februar 2016, p. 56

Chart 2. Electricity prices paid by industrial recipients in 1998–2016 (in cents per kWh)



Source: Erneuerbare Energien und das EEG: Zahlen, Fakten, Grafiken (2016), BDEW, Berlin, 18. Februar 2016, p. 58