Explaining the Persistence of Coal in the German Electricity Sector

1. Introduction

Just a few years ago Germany was considered as being at the forefront in its attempt to switch the national energy system to renewable energy use. Under pressure from a public critical of nuclear energy, the conservative government shut down eight out of seventeen nuclear power stations, directly after the Fukushima nuclear disaster, in 2011. The remaining reactors will be decommissioned by 2022. However, the energy transition lost some of its previous momentum. This is especially true regarding climate protection. According to the German government’s plan (BMWi/BMU 2010), greenhouse gas (GHG) emissions have to be reduced by 80-95 percent, in respect of 1990 values, by 2050. The focus of current discussions is the interim target for 2020: a reduction of GHG by 40 percent (ibid: 5). The expert commission responsible for monitoring this process, the "Energy of the Future" Commission (Commission „Energie der Zukunft“) predicts that this interim target will "probably be missed" (Commission „Energie der Zukunft“, 14 December 2016. Translation: MN). After a decline in emissions in the early 90s, there were almost no further reductions (Fig. 1). Moreover, the decline was not achieved due to a success of climate policy, rather, it was an incidental effect caused by the downfall of East Germany’s outdated industry and the "dirty" lignite power plants that were removed from operation in the same context.

One important factor that can explain the emissions remaining at a high level is the persistence of coal in the electricity sector. Although coal only contributes 40 percent of the German electricity supply, it is responsible for 80 percent of CO₂ emissions generated in all electricity production (oekom 2017: 14). This applies in particular to the combustion of lignite, which alone produces almost one-fifth of all German GHG emissions (Matthes 2017: 27). This share has been constant since 1993 (ibid.). Thus, whereas the nuclear phase-out is to progress continuously, it seems as if climate protection is not within the scope of the energy transition.
At the very least, a controlled discontinuation of coal use going beyond the mere shutdown of a few old lignite power stations would seem unavoidable (Agora Energiewende 2015: 15f.) if the climate protection targets for 2030 (55%) and 2040 (70%) (BMWi/BMU 2010) are to be met. Apparently, massive obstacles jeopardize these targets. The initial challenge is to identify these obstacles, and the second is to have them become the object of a broad and fact-based public debate. This paper addresses these issues, via the following steps:

First, one must specify the way in which the persistence of coal use should be discussed. Then, different views will be summarized as to why the dominance of coal causes problems, not only for climate protection, but for other policy fields as well. This will be followed by a short discussion of the main arguments against an accelerated coal phase-out. The main result is that these arguments are insufficient or are based on particularist viewpoints. Therefore, if the coal sector remains nevertheless, there must be good reasons. Within the framework of an explorative policy field analysis, the paper searches for these reasons in Chapter 4. Who or what has guaranteed the persistence of coal, and how?

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1 In 2060 there will probably be no coal power plants in operation: due to economic or climate-related political reasons, to new sustainable technologies and step-by-step improvements of existing technologies, like wind- and solar power, as well as to storage technologies. An “accelerated coal phase-out”, in this context, means that the last coal power plant in Germany will shut down in 2040 or earlier (see below).
2. Persistence of German Coal – Specification of the Scope

If one only looks at the levels of lignite and hard coal used for combustion during the last 20 years, one will note a high degree of constancy (Agora Energiewende 2015: 30). As a consequence, CO₂ emissions within the electricity sector diminished only 16 percent between 1990 and 2014 (ibid.).

In contrast, from the perspective of the temporal development of the employee numbers, the situation is quite different (Fig. 2). Whereas in 1957 there were about 750,000 people working in coal mining (West Germany and East Germany, hard and brown coal), today there are only 21,000 employees (Wehnert 2017: 34). However, a study commissioned by the trade union federation, ver.di, provides different results with regard to the highly political issue of jobs in the coal sector: 15,000 people working in the German coal power stations and a "similar range" in the German lignite mining sites (enervis 2016: 41. Translation: MN).

Figure 2 Employees in the German lignite and hard coal sector 1960 - 2014

Source: Agora Energiewende, 2016: 18

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2 Compared to the total GHG emissions (minus 26 percent), the electricity production displays a significantly slower degree of reduction (Agora Energiewende 2016: 30).
Due to the cessation of subsidies for hard coal, most of the mines have been closed. In 2011 the federal government decided to abandon the review clause (option to review the phase-out decision) and thus committed itself to stop the production of hard coal by 2018 (Bundesregierung 2011). Already today, most of the hard coal needed in Germany is imported. In July 2017, there were only two mines left in operation (Wikipedia 2017). Thus, the decline of employee numbers in the coal sector and the phase-out of hard coal production contrasts with the fact that the coal-based production of has remained nearly at the same level as in the early 90s (Fig. 3).

**Figure 3**  The persistence of coal in the German electricity sector

![Graph showing the persistence of coal in the German electricity sector from 1990 to 2016](image)

Source: Wehnert/Best/Andreeva 2017: 6

3. **The Coal Phase-Out is Necessary and Should be Implemented ASAP!**

It may be unusual to include an explicitly normative position, like this title, in an academic paper. But in this context, establishing a position has analytical importance. The greater the number of arguments for an early and orderly coal phase-out is, the greater seems the need to explain the persistence of coal. To this end, in Section 3.1 some of these arguments are summarised. Section 3.2 discusses the extent to which popular arguments against a coal
phase-out are not sufficient, or are partly incorrect. The reference is a moderate\(^3\) phase-out scenario that was planned in 2016 by the environmentally-oriented think tank, Agora Energiewende. According to this scenario, the last coal power station would shut down no later than 2040 (Agora Energiewende 2016).

3.1 Arguments for an accelerated coal phase-out

**Climate Policy.** Coal has considerable potential for GHG emission savings. In 2016, 307 million tons of CO\(_2\) were emitted by the coal sector, which is equal to a third of Germany’s GHG emissions (Fig. 1).

**Environment Policy.** Coal power is a problem not only because of GHG emissions, but also because of other types of emissions. About half of Germany’s emissions of mercury, a quarter of the sulphur dioxide and ten percent of nitrogen oxide emissions are produced by lignite use in energy production (Matthes 2017: 27 f.). According to Oliver Krischer of the Green Party, “no brown coal power station would be able to keep its permit to remain connected to the grid” if the limits for mercury emissions that apply in the USA were to be applied in Germany (cited: Zeit-Online, 3 January 2016. Translation: MN). A study launched by Greenpeace concluded that coal power use in Germany led to about 3,100 cases of early death every year due to the emission of poisons like mercury, lead, arsenic, cadmium and sulphur oxide (Greenpeace 2013b).

**Coal power stations as an obstacle for energy transition.**

From an economic-technical point of view, there is a systemic contradiction between coal power stations and volatile renewable energies (especially wind and solar power). The economic efficiency of lignite power plants depends on a high load factor (ideally, they should always run under a full load). However, for reasons to do with climate policy, it would be best to reduce the load, which would have negative effects on the plants’ efficiency. Moreover, the load of brown coal power plants cannot be reduced below 50 percent of the maximum (Meyer/Kreifels/Burger 2013: 15). Otherwise, they would have to be turned off completely, which is very expensive and implies an economic loss for the operator. As a result, the surplus coal power is exported at low prices to neighbouring countries (ibid: 6). From the perspective of an optimal implementation of the energy transition, flexible and low-emission gas power stations would be the ideal supplement to energy production by wind and solar installations (ibid: 18).

\(^3\) In their programme for the federal elections in 2017, the Green Party demanded that the coal phase-out should be implemented almost completely by 2030 (Bündnis 90/Die Grünen 2017: 39).
3.2 Insufficient arguments to justify the continuity of coal power use

Security of supply. The debate over the security of supply is multifarious and cannot be presented here in an adequate way. The scenario for an accelerated coal phase-out (Agora Energiewende 2016), described above, includes an explanation of how the supply can be guaranteed. During the coal phase-out, and as a consequence of it, complementary energy generation sources, e.g., gas power plants with a total capacity of about 20 GW, would have to be built (Agora Energiewende 2016: 49).

Economic benefits of coal. Coal power was never cheap, as a matter of fact. The prices never reflected the real costs. Rather, a large share of the costs associated with harmful environmental and health effects were externalised, as were costs incurred due to negative effects on the climate. In addition, coal power (and the nuclear power sector) received great subsidies amounting to several billions of euros (Küchler/Wronski/Haas 2015: 5ff.). If these costs (externalisations and subsidies) were taken into consideration, an energy system based on natural gas and renewable energies would be shown to be more favourable from an economic perspective, already today (Fig. 4). Moreover, Fig. 4 shows that the externalisation of direct state subsidies only contributes to the distortion of prices to a limited extent.

The core message is that coal and nuclear power stations may remain in the energy market, because the owners are only liable for a small share of the damages caused. The extent to which the real costs of conventional power are to be included in the energy prices is always an issue for public debate. But the proponents of an accelerated coal phase-out may also refer to something like “economic rationality”. This is because the renewable energy technologies have been gradually improved. In 2004, operators of small photovoltaic systems received 54 cents for each kWh that was fed into the grid. Today the tariff for a comparable installation is around twelve cents. EnBW, a German energy corporation, recently won the contract for a large offshore wind park that is scheduled to start operating in the middle of the next decade. For the first time, such a project is supposed to be refinanced completely without public subsidies (EnBW, April 13, 2017). The support for offshore wind power was criticised for the large subsidies the first projects had received.4 Perhaps this criticism will out of place in the near future.

4 For example, Holger Krawinkel, energy expert for the association for consumer protection: “After the solar boom, consumers are now threatened by the next cost increase wave, with offshore wind.” (cited: welt.de, August 27, 2012. Translation: MN).
Loss of jobs due to coal phase-out

Persistence is an issue related to the production of electric energy. If the developments of the past decades are considered, persistence is clearly not an issue of employment in the coal sector (see above). Nevertheless, this topic is very important for certain lignite-mining regions. From a perspective of the national economy, it is important to emphasize that the disappearance of jobs in the coal sector may lead to an accelerated creation of employment in other areas, like renewable energies and natural gas. According to a study commissioned by ver.di, a socially acceptable coal phase-out by 2040 would cost around 13.4 billion euros, corresponding to 384 million euros each year. Distributed to all electricity customers (analogously to the German Renewable Energy Act), the prices for electricity would rise by 0.11 cent/kWh (Enervis 2016: 41).\footnote{Without exceptions for energy-intensive industries, the price would only rise by 0.07 cents/kWh (ibid.).}

In summary, the use of coal for energy production is highly problematic from the perspective of climate and environment policy. Moreover, it is a large obstacle for the energy transition. Neither the preservation of jobs, nor the claimed defence of supply security, nor the alleged economic unviability of the alternatives are legitimate reasons against a commitment to the withdrawal from coal use.
4. How the Persistence of Coal is Created

Against the background described above, it cannot be assumed that a prompt and binding agreement for the discontinuation of coal use for power cannot be reached easily in Germany. Below, my thesis is discussed that proposes that this persistence mainly is the result of a powerful coalition’s work. This coal coalition is a heterogeneous group of actors who follow their own interests, which are served by a prolonged operation of the coal power plants. Who are the members of this coalition, and what are the actors’ specific interests?\(^6\)

First, the power plant operators and lignite mining sites are part of this coalition (especially RWE and EPH). The capital-intensive coal infrastructures were made for long-term operation. To avoid sunk costs, these plant operators oppose a coal phase-out. The German Brown Coal Industry Association (DEBRIV) refused “national climate activism” and all proposals for a construction ban of new coal power plants (DEBRIV 2016).

The energy-intensive industries (e.g., steel and chemical plants), are also part of the coalition. They are represented by their organisation, "The energy intensive industries in Germany” (EID), which defends their interests. In particular, the EID aims to keep electricity prices low. It sees this target as being endangered, if a transition to renewable energies were to advance and destroy the coal power stations’ economic viability (EID 2017). Both of the large political parties in Germany, CDU (conservatives) and SPD (social democrats) belong to the coal coalition. The abandonment of nuclear power was framed as a justification to delay the discontinuation of coal power use, among others, by the former minister of economics, Sigmar Gabriel (SPD), who made a paradigmatic statement: "We cannot phase out nuclear and coal at the same time" (cited: Freitag.de, July 13, 2016. Translation: MN). By 2014, Gabriel had already given the following reasons to explain why he would not support an exit from coal power: price stability, security of supply and maintaining jobs (welt.de, 11 November 2014). Thus, he articulated the main topics of the debate to justify the persistence of coal.

The dena (deutsche Energieagentur) plays an important role within the coal coalition. Dena is a semi-public organisation that sees itself as a non-partisan actor, but is in fact tightly connected to the established energy sector. Therefore, it has been criticised by those who are in favour of a much more rapid energy transition than that seen today (e.g. klimaretter.info, 10 February 2010). In a move that fits in well with this scenario, the head of dena, Stephan Kohler, took a leading position at the RWE energy corporation temporarily, in 2009 (taz.de, 24 February 2009). Gerd Rosenkranz from the Deutsche Umwelthilfe (DUH) called this a "consistent step" (cited. Ibid. Translation: MN). On several occasions, Stephan Kohler directed statements critical of the energy transition at the general public. For him, coal power plants

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\(^6\) The actors and their interests cannot be examined completely here.
were energy supply guarantors in the face of the nuclear phase-out. In this respect, he pointed out the danger of an "electricity gap" that may emerge from the nuclear power stations’ being removed from operation (cited: welt.de, 28 December 2009. Translated: MN): "The danger of an electricity gap is growing." By 2020, he stated, "the situation will worsen so much that we will have a shortage of about 11,7000 megawatts – the capacity of 15 power stations."  

The debate over employment is another discourse, especially in the lignite regions, but it has an impact on the entire coal sector. A study by RWE (RWE 2010: 67) indicated that the lignite sector in the Rhine area (mining and operation of power plants) was the source of 41,816 jobs in the whole country. With each job in the Rhine area "another 2.11 jobs in up- and downstream sectors” would be created (ibid.). A total of 13,438 people (ibid.: VIII) were directly employed in the lignite sector by RWE-Power. These workplaces are paid relatively well and they are well organised by labour unions.

**Figure 5**    Protest banner of a labour union in the Rhine lignite-mining area (March 2017)

"We defend ourselves! Against the social blackout of our regions." (Translation: MN)

In particular, from the viewpoint of regional labour unions, defending the interests of the lignite workers is consistent behaviour. The organised and established working class in core industries has traditionally supported the Social Democratic Party (SPD). This explains the SPD’s sympathy for the coal sector to a great extent, especially the SPD of North-Rhine-

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7 Kohler’s statement at that time has to be seen in the context of the debate over the decision, in 2002, to phase out of nuclear power, made by a former government. In September 2009, CDU (conservatives) and FDP (liberals) formed the new government, and they announced a withdrawal from the nuclear phase-out.
Westphalia (where the largest mining sites are located).\textsuperscript{8} Scientific expertise is an important aspect of the battle over the energy system's future. This battle involves not only the number of jobs that depend on the lignite sector, but also the number of new jobs that would be created in the renewable energy sector. A study commissioned 2015 by the Federal Ministry of Economics showed that, by 2030, about 100,000 new jobs would be created if the renewable sector were to continue to expand. Results like these do not fit the dominant framework, which emphasises the argument that coal is necessary to maintain jobs. It was unclear when the study would be published at first (Neue Energie, April 15, 2015).\textsuperscript{9} Fig. 6 supplies an overview of the members of the German Coal Coalition.\textsuperscript{10}

\textbf{Figure 6}  The German Coal Coalition and its activities to defend the coal power sector

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\textsuperscript{8} In the state of Brandenburg, where there are also large lignite mining sites, similar networks between the SPD and the coal sector can be observed.

\textsuperscript{9} The study was published later on. But the "politically" relevant data, "100,000 new jobs by 2030" appeared neither in the introduction, nor in the concluding section. In fact, the number is included in the text: On the bottom of page 171, just below table 6-2 (DIW/DLR/GWS/Prognos/ZSW, 2015).

\textsuperscript{10} In contrast to the large labour union, IG BCE (mining, chemistry and energy), the federal level of ver.di switched their position in 2016 (enervis 2016) to the support of an socially acceptable coal phase-out by 2040 (and left the coal coalition this way).
Another important area to guarantee the persistence of coal is regulation. First, there is the seemingly trivial fact of the continuous reluctance of SPD and CDU to start the debate about a coal phase-out law with definitive timelines along which power stations would stop production. The regulation of renewable energies is another very important policy field in this context. The operation of coal power stations only makes sense as long as the capacities of renewable energies do not exceed a certain level. The notion that coal power stations will also be necessary in the future, to guarantee the security of supply, would become obsolete, as the residual load\textsuperscript{11} can also be provided by the installation of low-emission gas power plants (see above).

The main law regulating the installation of new capacities of renewable energies is the renewable energies act (EEG). This act came into force in 2000 and secured the advancement of the energy transition for a long time. Starting no later than August 2014, when the EEG was reformed, there was a continuous worsening of the framework for renewable energies (Kemfert 2017: 96). Since 2014, wind and solar power stations were switched off to a greater extent, compared to 2009-2013. Kemfert (ibid.) criticises that the feed-in priority in favour of renewable energies is called into question now. Conversely, this can justify the idea that coal power stations are still "needed". A close action field, the extension of the German electricity transmission grid, should be considered in this context as well. Critics have pointed out that one important reason for this extension is to keep coal power stations in the system (von Hirschhausen 2013; Jarass 2016).

To shed light on this pro-coal regulation, it is important to look at tight coalitions and the networks formed between large industry sectors and the decisive state actors. Repeatedly, such coalitions have undermined democratic decision processes. Examples of this are the saving of "distressed banks" during the financial crises, the behaviour of the Kraftfahrt Bundesamt (Federal Office for Motor Vehicles)\textsuperscript{12} concerning the diesel scandal within the German automobile industry, and the sad situation of agro-industrial factory farming that is tolerated or even supported by the ministries of agriculture.

With respect to national energy supply systems, Peter Hennicke and Michael Müller (2005: 18) spoke of symbiotic connections between state and energy corporations as well as of a convergence of their energy policy targets. In the course of the German energy transition and the debate over nuclear power, the formerly tight nexus loosened somewhat. To what extent these structures still exist, and are hampering any attempts at a coal phase-out, cannot be

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\textsuperscript{11} The residual load is the share of the electricity demand that cannot be delivered by renewable energies.

\textsuperscript{12} As responsible public authority, the Kraftfahrt Bundesamt obviously tolerated the methods of the car industry.
discussed in this context. Traditionally, one expression of this nexus has been an overlap of personnel in both spheres.

Whenever one talks about big money and great influence, lobbyism and corruption are usually not far away. Nevertheless, it is hard to evaluate their scope in particular cases, especially because such activities are usually carried out behind closed doors. Then there is also the case of so-called "revolving doors", a lighter form of corruption. Politicians who, in the eyes of private interests, earned merits during their active time in political office through certain decisions and partiality, may be rewarded with well-paid jobs in the private sector.\textsuperscript{13}

Even though there is little to complain about, from a formal point of view, one can almost assume that democratic decision-making procedures may be strongly compromised here, or that political offices are abused. This applies in particular to the coal sector. In this context, Greenpeace has documented numerous cases (2013a).

**Summary and Conclusions**

The long-term persistence of coal as a core element of the German energy system is the main reason why national climate targets will probably be missed. An accelerated coal phase-out seems to be the correct choice, not only from a climate policy view, but also from the perspective of environment and health protection. Moreover, with the growing role of renewable energies within the energy sector, coal represents increasingly an obstacle to the energy transition. In addition, the main arguments advocating coal use are insufficient: The replacement of coal with renewable energies, natural gas, energy imports from neighbouring countries, and the reduction of overcapacities would be viable within a short period of time. Coal is no longer needed to guarantee the security of supply. In face of the fact that the structural change in the coal regions has left today’s coal sector with only 21,000 employees, the conservation of employment is a strong argument at the regional level. But this can never be reason enough to postpone the coal phase-out.

Nevertheless, the debate over energy economics and the security of supply is complex and it cannot be dealt with exhaustively. Whatever is understood under these terms, it underlies conflicts over the prerogative of interpretation. However, even if environmental and climate aspects were ignored, and one referred only to the established logic of the energy markets, a

\textsuperscript{13} There is the reverse situation as well: Decision makers in energy corporations are moving into political positions. Although money does not seem to play a crucial role here, activities like these reflect the strength of the nexus described above. Examples of this are the former German ministers of economy, Werner Müller (Greenpeace 2013a: 16) and Wolfgang Clement (ibid.: 9): Both worked for RWE and after their interludes as ministers they went back to the energy corporation (ibid.: 9; 16).
slow progress of the European emission trading system, and improvements in renewable energy and saving technologies, may unbalance the coal sector long before 2040 (which seems to be a compromise deadline for a coal phase-out).

The most important reason for the persistence of coal are the activities of the coal coalition. Although the actors in this group are quite heterogeneous (e.g., political parties, energy corporations and labour unions) and have different action orientations, the coalition is strong and powerful. Their main task is to alter legislation in favour of coal power use, or to demand legislative decisions that would support this goal. At the same time, however, the public must approve or even welcome the coal regulation. This is not simple, because the general public is far from being part of the coal coalition. On the contrary, it sympathizes with the transition to renewable energies. Therefore, advocates of coal are, so to speak, "forced" to defend their specific interests by introducing one-sided arguments and half-truths in a subtle enough way to the public so that it is unable to decode the corresponding statements to a great extent. In fact, the coal coalition seems to be able to make the persistence of coal look like something that is implemented in favour of the majority. In this sense it would look like different interests are safeguarded in this context: national and regional interests, and also the interests of corporations and their workers. This impression is reinforced by the heterogeneous character of the coalition, and the guarantors of these interests are none other than the energy corporations: At the national level, they ostensibly defend the energy system's economics and the security of supply, and in the lignite regions they guarantee the ongoing existence of (relatively) well-paid jobs. This corporatism may help explain the great acceptance of lignite to a large extent. Furthermore, it is certainly true that coal mining belongs to the collective memory at the local level. However, the reference to a widespread industrial romanticism that wishes the return of old times is not enough to explain the local anchoring of coal.
Sources


