

Economic disadvantage for Greenpeace Energy due to the regulations on the German lignite phase-out

Short analysis by Energy Brainpool

Current situation (June 2021)

Greenpeace Energy (GPE) has concluded long-term power purchase agreements (PPAs) with renewable energy systems (primarily wind and solar energy), with a volume of just under 100 megawatts (MW). Under these long-term PPAs, GPE has an obligation to purchase all the electricity produced by the plants in question for a period of usually three to five years at a fixed price ("pay as produced"). The majority of this price-fixed supply volume was already contracted in 2018 and 2019 - i.e. long before the Bundestag resolution on the coal phase-out or the political agreements on specific compensation amounts for lignite-fired power plant operators. In addition, GPE continuously evaluates investment decisions for the purchase or construction of solar parks in Germany that no longer receive a compensation by the EEG subsidy scheme. In total, GPE will cover about a quarter of its total electricity sales through long-term price-fixed supply contracts. As a broad-based green electricity supplier, GPE is also active in the innovative business fields of sector coupling. For example, GPE is directly involved in electrolyzers with a cumulative nominal output of 2.5 MW. Due to the high CO₂ emission factor of German grid electricity, the electrolyzers are primarily supplied with surplus electricity from simultaneously producing wind and solar plants in the same distribution grid, in order to produce green electrolysis hydrogen. This means that the electrolyzers are at the same time run in a grid-supporting mode of operation; in addition, some of them are already prequalified for the provision of control energy. Furthermore, in addition to classic green electricity, GPE offers its household customers separate electricity tariffs for heat pumps and e-vehicles as well as an innovative gas supply tariff "proWindgas", whose "wind gas" (hydrogen) share is procured from both the company's own electrolyzers and other electrolyzers amounting to around 9 MW.

With these investments and product offerings in the area of sector coupling, GPE, as an energy supply company, is making an important contribution not only to making the electricity system

more flexible and to the market integration of renewable energies, but also to reducing emissions in the electricity market-coupled sectors of transport and heating. As a pioneer in this early phase of the market ramp-up of sector coupling, especially of electrolysers, GPE shoulders the sales risk of these products to a particular extent in view of the higher supply costs compared to conventional utility products. The success of these product offerings depends to a large extent on their emission reduction potential and the perception of GPE's end customers in this regard.

In addition, green PPAs with Renewable Energy Systems (RES), such as those concluded by GPE, are a business contribution to achieving renewable energy targets. Since electricity generation from renewable energies is the cheapest form of electricity production today, such green PPAs are politically desired instruments. This is because they economically secure the expansion or continued operation of renewable energies without the plants having to take advantage of subsidies. Energy utilities such as GPE, which conclude green PPAs with RES, thus relieve the general public, but also have to shoulder higher risks than energy utilities that procure their electricity sales via standardised exchange products. The risk is that wholesale prices develop more weakly than assumed during the multi-year contract period. While competitors then procure their electricity at the low exchange price level, GPE must honour the fixed prices from the long-term supply contracts and would suffer corresponding economic losses. In return, GPE has the opportunity to profit from rising electricity prices due to the fixed prices.

These contributions to the energy transition in the form of entrepreneurial risk assumption are commercially justifiable, provided that future market developments are carefully assessed. However, this is only possible if market forces can operate and align themselves with the necessary climate protection without being distorted by unpredictable political interventions.

With a view to the necessary, rapid transformation of our energy system towards climate neutrality, GPE has concluded the contracts for the purchase of renewable electricity volumes as well as the investments in sector coupling plants on the justified assumption that the pending coal phase-out will

- a) increase the price of electricity,
- b) decrease the CO₂ intensity of the German electricity mix, and
- c) could increase the demand for low-CO₂ flexibility technologies in the control energy market.

The closure of mainly older lignite-fired power plants was foreseeable due to structurally too high CO₂ emissions and the lack of economic viability of continued operation, exacerbated by rising costs of CO₂ certificates. However, the phase-out of lignite is now being delayed by the design of the Coal Exit Act and the public-law contract on the reduction and termination of lignite-fired power generation (thereafter called “lignite contract”). This leads to electricity prices in Germany and its neighbouring countries falling below the level that would have resulted from a market price development without compensation payments. In addition, the CO₂ intensity of the German electricity mix remains at a high level for a longer period of time and decarbonisation in the control energy market is delayed. Hence, the agreements on the lignite phase-out devalue supply contracts for electricity from renewable energies as well as investments in sector coupling technologies and products.

However, in the liberalised European electricity market, GPE as an energy supply company must be able to rely on the fact that, when making investments and forecasting future market situations, prices are set according to supply and demand in accordance with the rules of the market without the distorting influence of direct and massive energy policy interventions. This also applies to GPE's role as plant operator, as the company invests in RES both itself and through its wholly owned subsidiary Planet energy.

Below, Argument 1 describes the extent to which the agreed compensation for lignite-fired power plant operators are firstly not necessary, secondly too high and thirdly far removed from market reality.

Following Argument 1, we set out in the below Arguments 2 and 3 a-c how GPE, in its role as a green electricity supplier as well as a project developer and operator of RES and sector coupling plants, is disadvantaged by the market-distorting agreements with lignite-fired power plant operators.

Argument 1: The agreement on the reduction and termination of lignite-fired power generation gives energy supply companies with large lignite-fired power plants unreasonable advantages. The high and, due to a lack of transparency, still incomprehensible compensation sums exclusively for certain energy supply companies are far removed from market reality.

Details: Whether the state is obliged to pay compensation for the shutdown of coal-fired power plants at all is controversial. The Scientific Service of the German Bundestag had already come

to the conclusion in October 2018 that compensation payments worth billions to RWE and Co. are not necessary.¹

The amount of the compensation payments for operators of coal-fired power plants that have now been agreed on is not explained in more detail in the public-law contract on the reduction and termination of lignite-fired power generation or in the Coal Exit Act. The last point of reference for understanding the amount of compensation is provided by the explanatory memorandum to the draft Coal Exit Act of 29 January 2020.² It speaks of a "formula-based compensation logic", on the basis of which the agreed payments of 2.6 billion euros for the plants in the Rhenish mining area and 1.75 billion euros for the plants in the Lausitzer mining area would be calculated. The input parameters for the calculation formula defined in the explanatory memorandum at the time are congruent with the structure of the formula that the environmental protection organisation Greenpeace e.V. obtained from the BMWi³, through a request within the framework of the Environmental Information Act. The think tank Ember disclosed this formula in an analysis in May 2021 on behalf of Greenpeace.⁴ From the critical review of the assumptions on individual formula parameters within the framework of this analysis, it emerges that the compensations should be reduced to a required minimum of up to 343 million euros total compensation for all recipients. Calculations by other experts also conclude that the compensation payments are significantly too high.⁵

Another study⁶ commissioned by Greenpeace Energy suggests that a competitive market environment no longer existed for a large proportion of the lignite-fired power plants at the time the contract was concluded, as at the same time power plant utilisation had reduced and the costs for CO₂ certificates had increased: for the evaluation of a total of 15 RWE power plant units examined, Energy Brainpool calculated their expected costs and revenues from electricity

¹ https://rp-online.de/wirtschaft/unternehmen/kohleausstieg-bundestagsjuristen-halten-entschaedigung-fuer-rwe-fuer-unnoetig_aid-37032703

² „Erläuterungen zu § 42 - Ermächtigung der Bundesregierung zum Abschluss eines öffentlich-rechtlichen Vertrags“ in https://www.bmwi.de/Redaktion/DE/Downloads/G/gesetzentwurf-kohleausstiegsgesetz.pdf?__blob=publicationFile&v=8

³ The German Federal Ministry of Economic Affairs and Energy

⁴ https://www.greenpeace.de/sites/www.greenpeace.de/files/ember-assumption_of_german_ministry_of_economics.pdf

⁵ http://p376185.mittwaldserver.info/fileadmin/user_upload/Dateien/Bilder/Content/Presse/%C3%96ko-Institut_2020_-_Einordnung_der_geplanten_Entsch%C3%A4digungszahlungen_f%C3%BCr_deutsche_Braunkohlekraftwerke_final_.pdf

⁶ https://www.reinrevierwende.de/fileadmin/reinrevierwende/documents/GPE_Substitution-RWE-BK-durch-eE_Energy-Brainpool_2018-11-25.pdf

trading. According to this, the expected profit - and thus the market value - of the power plants in 2020 is still around 1.3 billion euros on balance. In the following years, however, the profits of the power plant units on the electricity market will fall continuously, as the operating costs will not only become more expensive, which will be driven mainly by rising CO₂ prices, but also gradually exceed the revenues. Several power plant blocks would therefore already be unprofitable in a few years: as early as 2022, RWE's power plant portfolio would only be worth around €673 million on the market.⁷

In addition to unrealised earnings from power sales, the Federal German Government is of the opinion that, when determining an appropriate compensation, not only lost profits have to be taken into account, but also the additional post-mining costs incurred by the operators due to the premature closure of the power generation plants. According to the "lignite contract", these are also covered by the agreed compensation. The Federal German Government has commissioned an expert report to determine these costs.⁸ However, it remains unclear to what extent the results were included in the compensation calculation. A participation of the Federal Government in the post-mining costs contradicts the "polluter pays principle" of the Federal German Mining Act, according to which the mining operator bears full responsibility for mining damage caused. In this context, it is at least doubtful that the Coal Exit Act constitutes an unreasonable intervention on the part of the Federal Government that would justify a contribution to the post-mining costs. After all, the operators have been sufficiently aware for many years, or at least since the conclusion of the Paris Climate Agreement in 2015, that lignite-based power generation plants must be phased out significantly earlier than at the end of their technical lifetime due to the need for climate protection.⁹ According to § 249 of the German Commercial Code, among other things, it is the entrepreneurial duty of plant operators to form appropriate provisions for such "uncertain liabilities" at an early stage.

Overall, it is not apparent why and in what amount damage has been caused, and whether the compensation corresponds to actual costs at all, or whether the payment amount is merely the result of bilateral negotiations between the Federal German Government and respective energy

⁷ <https://www.reinrevierwende.de/aktuelles/artikel/marktwerte-von-rwe-meilern-deutlich-geringer-als-geforderte-entschaedigungssummen-1.html>

⁸ https://www.bet-energie.de/fileadmin/redaktion/PDF/Studien_und_Gutachten/Gutachten_Folgekosten/Gutachten_Folgekosten_Braunkohleausstieg_Abschlussbericht.pdf

⁹ Im Referenzszenario „ohne Kohleausstiegsgesetz“ des oben zitierten Gutachtens wird dieser Zeitpunkt auf das Jahr 2051 geschätzt.

companies. In any case, the funds give utilities such as RWE an unreasonable advantage over competitors and lead to numerous distortions in the electricity market that are listed below.

Argument 2: The decommissioning premiums for lignite-fired power plants provided by the Federal German Government particularly favour the recipients of these premiums if they invest in capital-intensive renewable energy systems. This distorts competition among RES project developers in both domestic and international markets.

Project planning and construction of RES is very capital intensive and competition for the limited number of projects is fierce. Even an operator of an unprofitable coal-fired power plant can participate in RES tender systems and gain competitive advantages in such auctions through the decommissioning premium received for its coal-fired power plants. If funds from the premiums are used to reduce the costs of their own renewable energy projects, this increases the chances of the RWE subsidiary RWE Renewables, for instance, to receive subsidies in the tender rounds.

Particularly with regard to RWE, this also applies to the competition from project developers abroad: the RWE Group plans to invest €5 billion in RES by the end of 2022, of which €4 billion is to flow into foreign projects.¹⁰ This plan includes, for example, the already completed purchase of the Nordex Group's RES project portfolio with 2.7 GW in France, Spain, Sweden and Poland for around 400 million euros. Thus, financial resources from the German Federal Government threaten to be used to give German corporations an advantage in competition with local companies abroad.

Argument 3: The inappropriate compensation sums and the agreed regulations on the decommissioning dates lead to affected power plants being kept in operation for longer. This delays the rapid, market-driven dismantling of unprofitable overcapacities. From Greenpeace Energy's point of view, this is not only a serious systemic flaw in the construction of a coal exit law, which should actually enable the quickest possible transition away from fossil fuels and the achievement of the goals of the Climate Protection Act, but also disadvantages climate-neutral renewable energies and the market ramp-up of other future technologies that are needed to achieve climate neutrality.

¹⁰ <https://www.eid-aktuell.de/nachrichten/unternehmen-verbaende/detail/news/rwe-laesst-deutschland-bei-investitionen-links-liegen.html>

Pursuant to Section 22 (2), the “lignite contract” provides for two main options for decommissioning lignite-fired power plants even before the decommissioning dates specified in the contract. On the one hand, the option of voluntary decommissioning on the part of the operators is retained if, for example, the economic framework conditions deteriorate due to increased CO₂ prices in the EU ETS. However, the incentive for a market-based lignite phase-out, which is primarily driven by CO₂ costs, can be significantly torpedoed by the inappropriate compensation sums, as their payment was agreed to be independent of the further development of the plants’ economic viability. By having recourse to the compensation money, the power plant operators are given the opportunity to keep their plants in operation for longer and to better bridge periods of particularly limited economic viability, e.g. due to an unfavourable development of the coal-gas price spread.

Furthermore, the agreement provides that only lignite plants with an agreed decommissioning date after 2030 can be decommissioned up to three years earlier than planned (“early decommissioning”), on the basis of decisions by the Federal Republic of Germany. Such a decision must be taken by the Federal Republic at least five years before the new decommissioning date. This means that a complete lignite phase-out can only be brought forward by regulatory means to 2035 at the earliest.

All in all, the contract causes a considerable delay in the lignite phase-out, which would take place much earlier, driven by the market and without the payment of inappropriate compensation sums. This delay has a negative impact on free competition in the electricity market in several dimensions, which are described in more detail below.

Argument 3a: If affected power plants are kept in operation longer due to the inappropriate compensation sums and the agreed regulations on decommissioning dates, this impairs climate-neutral renewable energies by reducing the revenues for electricity from these plants.

The delay of the lignite phase-out has an electricity price-reducing effect that directly reduces the potential revenues for renewable electricity. This is mainly due to two influences:

1. First, the electricity supply increases, which leads to lower electricity prices according to the merit order mechanism. The merit order determines the order in which the power plants are used to meet the respective electricity demand. If a lignite-fired power plant is not shut down, it displaces more expensive power plants from the dispatch because it is allowed to produce electricity itself. The power plant that sets the price (the last power

plant in the merit order that is still subject to procurement) is relevant for all market players, because the uniform price procedure, which is used in this context in the day-ahead electricity market, determines a uniform sales price per hour for all electricity producers. The economic viability of power plants with low short-term marginal costs, such as RES, is therefore highly dependent on price-setting power plants with higher marginal costs. Therefore, the equivalent value of the feed-in profiles, for which GPE has entered into a price fixing agreement, decreases. This system is shown in Figure 1. In the example shown, the lignite-fired power plants that continue to produce in the upper part of the figure reduce the price increase by 6 EUR/MWh. This would have resulted if unprofitable old lignite-fired power plants had been forced out of the market because their operating costs were too high.

2. In times of low electricity demand and high feed-in of renewable energies, the must-run share of electricity generation is particularly relevant for the revenue situation of renewable energies. The must-run share of electricity generation is that share of the generation capacity of a steerable power plant, which, for technical reasons or for reasons of other contractual obligations (heat supply, supply of system services), is also offered on the electricity market at prices that are below the actual marginal costs. An electricity market with a high must-run share in generation, regularly leads to low prices when demand is low or the supply of renewable energies is high. Older lignite-fired power plants in particular have a high must-run share. This reduces the revenues of RES in the case of prolonged operation, as it depresses electricity prices and sometimes causes them to fall into the negative when they provide a high feed-in capacity.

As an operator or PPA contract partner of subsidy-free RES, GPE is directly affected by these market effects. Furthermore, due to the interconnectedness of the German electricity market with neighbouring countries, this price-reducing effect also compromises the revenues of RES operators in other European countries, albeit to a lesser extent, whenever less electricity is exported to Germany due to lower German electricity prices.

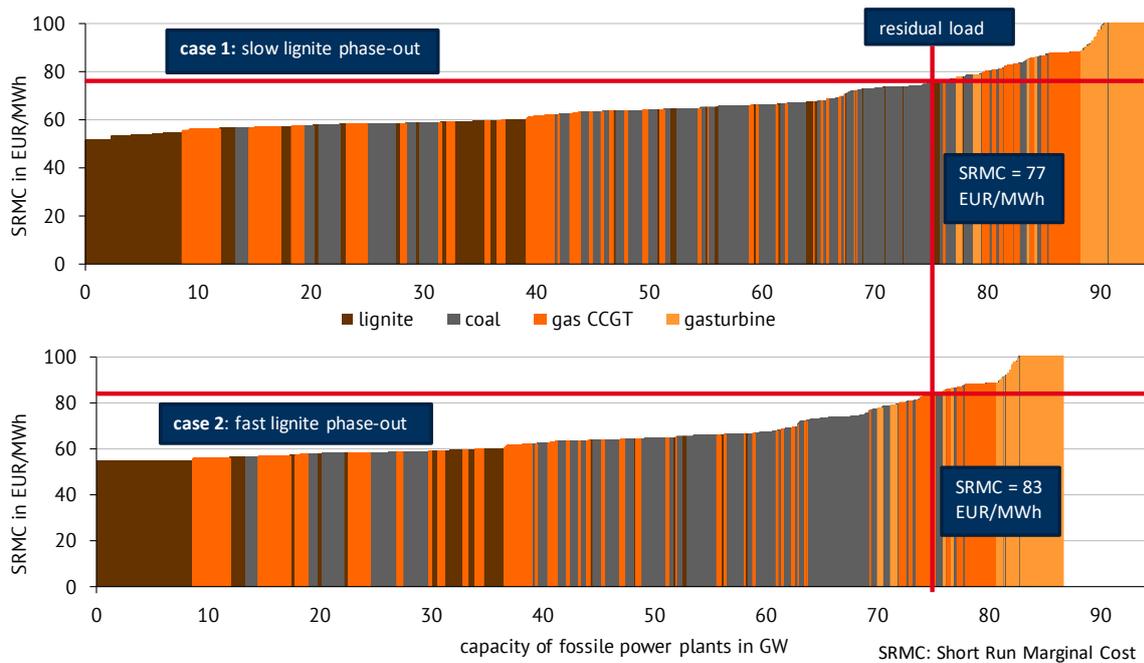


Figure 1: Merit-Order of fossil power plants in Germany including (case 1) and excluding (case 2) old lignite power-plants with high short run marginal cost [source: Energy Brainpool, commodity-prices: gas 22 EUR/MWh, coal 8 EUR/MWh, lignite 3 EUR/MWh, EUA 52 EUR/t_CO₂]

Argument 3b: If affected power plants are kept in operation longer due to the inappropriate compensation sums and the agreed regulations on the decommissioning dates, this hinders the market ramp-up of low-carbon flexibility technologies in the German and European control energy market.

In addition to the wholesale market, the control energy market is another market segment in which GPE and other energy supply companies are disadvantaged by the regulations on the lignite phase-out. In this market, the players must first pre-qualify in order to be allowed to participate in regular auctions for the provision of control power and control energy. Both RWE Supply & Trading GmbH and Lausitz Energie Kraftwerke AG (LEAG) are pre-qualified for all three product types of the control energy market (primary control reserve (FCR), secondary control reserve (aFRR), minute reserve (mFRR)).¹¹ The lignite capacities that are prequalified for the three product types and their share of the total prequalified (PQ) capacity are listed in „Table 1“. Due to the high market concentration among lignite-fired power plant operators, it can be concluded that the companies named are highly likely to be prequalified with their

¹¹ <https://www.regelleistung.net/ext/download/anbieterliste> (Stand: 01.04.2021)

lignite plants on the control energy market. In this context, the prequalified lignite capacity significantly exceeds the respective average demand in 2021 for FCR and mFRR.

Table 1: Prequalified lignite capacity in the German control energy market ^{12,13}

	FCR	POS. aFFR	NEG. aFFR	POS. mFFR	NEG. mFFR
Prequalified lignite capacity	0.62 GW	1.23 GW	1.23 GW	4.54 GW	4.54 GW
Lignite share of total prequalified capacity	9%	5%	5%	12,4%	12,6%
Average demand 2021 (approx.)	0.56 GW	2.3 GW	2.2 GW	1.2 GW	0.6 GW

It is true that the control energy market has been characterised by a technological diversification of control energy providers in recent years, and new low-carbon flexibility options, such as battery storage, have successfully prequalified. However, insofar as these low-carbon system services are offered by subsidy-free new plants, these plants are dependent on refinancing their investment costs via corresponding market mechanisms, such as the control energy market. It is precisely this refinancing option that has not been available in recent years due to the low revenues on the control energy market. One of the reasons may likely be the marketing strategy of already depreciated, steerable old plants such as lignite-fired power plants, which are not directly dependent on the revenues from the control energy market and participate in the tenders with particularly low bids. Due to the delayed lignite phase-out, such windfall profits will persist longer than necessary. This hinders necessary investments in low-carbon flexibility technologies of the future, such as battery storage or electrolyzers. To a lesser extent, this circumstance also affects European countries neighbouring Germany, as secondary control reserve is tendered jointly with Austria, whereas primary control reserve is tendered jointly in six European countries (Germany, France, the Netherlands, Belgium, Austria, Switzerland).

¹² https://www.regelleistung.net/ext/download/pq_capacity (Stand: 01.09.2020)

¹³ <https://www.regelleistung.net> (Stand: Mai 2021)

Argument 3c: If affected power plants are kept in operation for longer due to the inappropriate compensation sums and the agreed regulations on the decommissioning dates, this hinders the market ramp-up of green sector coupling technologies, as the CO₂ cost advantage compared to existing technologies is lower with a more CO₂-intensive electricity mix.

If lignite-fired power plants, being the most CO₂-intensive electricity generators, are kept in operation for longer, this will have a significant impact on the CO₂ emission factor of the German grid electricity mix. A recently published analysis by Energy Brainpool on alternative coal phase-out paths compatible with the updated German Climate Protection Act of May 2021 illustrates this. Accordingly, within a given reference scenario, an early lignite phase-out shifted from 2038 to 2029 alone would result in a reduction of expected annual emissions in 2030 from 160 to 118 million tonnes of CO₂ equivalents (-26.3 percent).¹⁴

However, for the market ramp-up of green electrification and sector coupling technologies, such as e-vehicles, electrolysers, heat pumps or power-to-heat plants, the CO₂ intensity of the electricity supply plays a central role, since these technologies are to gradually replace the more CO₂-intensive, existing technologies in the transport, industry and building sectors. Since the electricity sector is currently the easiest to decarbonise, it will become the driver for emission reductions in other sectors of the economy. However, the replacement of established existing technologies in those sectors is often associated with higher costs than a continuation of the previous technology path. In order to nevertheless steer investment decisions in the direction of lower-carbon technologies, CO₂ emissions trading systems have been introduced both at national (the German “nEHS” for the transport and buildings sectors) and at EU level (EU ETS for the electricity and industrial sectors). Pricing CO₂ intends to reflect the real climate impact costs of more CO₂-intensive existing technologies and make new, low-carbon options competitive when comparing investment and operating costs. However, this mechanism is partially undermined by a delayed lignite phase-out, as the CO₂ cost advantage and thus the emission reduction potential of these future technologies is significantly lower.

It is important to note that, especially in the private sector, investment decisions are often based on personal perceptions of technological alternatives in addition to economic aspects. Of the technologies mentioned, it is above all e-vehicles and heat pumps that are increasingly

¹⁴ https://blog.energybrainpool.com/wp-content/uploads/2021/05/2021-05-19_Pressemitteilung_Energy-Brainpool_Klimaschutzgesetz-Kohleausstieg.pdf

being used in the private sector. If the CO₂ intensity of the electricity mix is artificially kept at a higher level for an extended period of time by lignite compensation payments, this impairs the public perception of the long-term added value of these technologies for a climate-neutral energy system and, in a sense, doubly hinders their market take-up in the private sector.

As an operator of electrolysers and as a green electricity supplier with a climate-conscious household customer portfolio, GPE is directly affected by this impediment of a market ramp-up.

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