EMBER

Analysis of German lignite compensation

Uncovering the German government's calculations

Ember has obtained the formula for Germany's lignite compensation payments from Greenpeace, through an information request they made to Germany's Ministry of Economics (BMWi).

This is the first time that it has been possible to show how the German government calculated the proposed compensation payments of €4.35 billion for utilities RWE and LEAG. Greenpeace asked us to unpack the formula (see Annex) to assess the fairness of the assumptions and calculate alternative compensation scenarios.

Our assessment of the formula is that it contains three key assumptions that lead to a systematic overvaluation of the compensation payments.

Any three of the assumptions, when considered individually, would approximately halve the compensation amount. If combined together, they would reduce the compensation from €4.4 billion to just €343 million.

Offenlegung der Berechnungen der deutschen Regierung

Ember hat die Formel für die deutschen Braunkohle-Entschädigungszahlungen analysiert, die Greenpeace durch eine Anfrage nach dem Umweltinformationsgesetz an das deutsche Wirtschaftsministerium (BMWi) erhalten hat.

Damit ist es zum ersten Mal möglich zu zeigen, wie die Bundesregierung die vorgeschlagenen Entschädigungszahlungen von 4,35 Milliarden Euro für die Energieversorger RWE und LEAG berechnet hat. Greenpeace hat uns gebeten, die Formel zu entschlüsseln (siehe Anhang), um die Fairness der Annahmen zu bewerten und alternative Entschädigungsszenarien zu berechnen.

Unsere Einschätzung der Formel ist, dass sie drei Schlüsselannahmen enthält, die zu einer systematischen Überbewertung der Entschädigungszahlungen führen.

Jede der drei Annahmen für sich betrachtet, würde den Ausgleichsbetrag ungefähr halbieren. Zusammengenommen würden sie die Entschädigung von 4,4 Milliarden Euro auf nur 343 Millionen Euro reduzieren.

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Published May 2021

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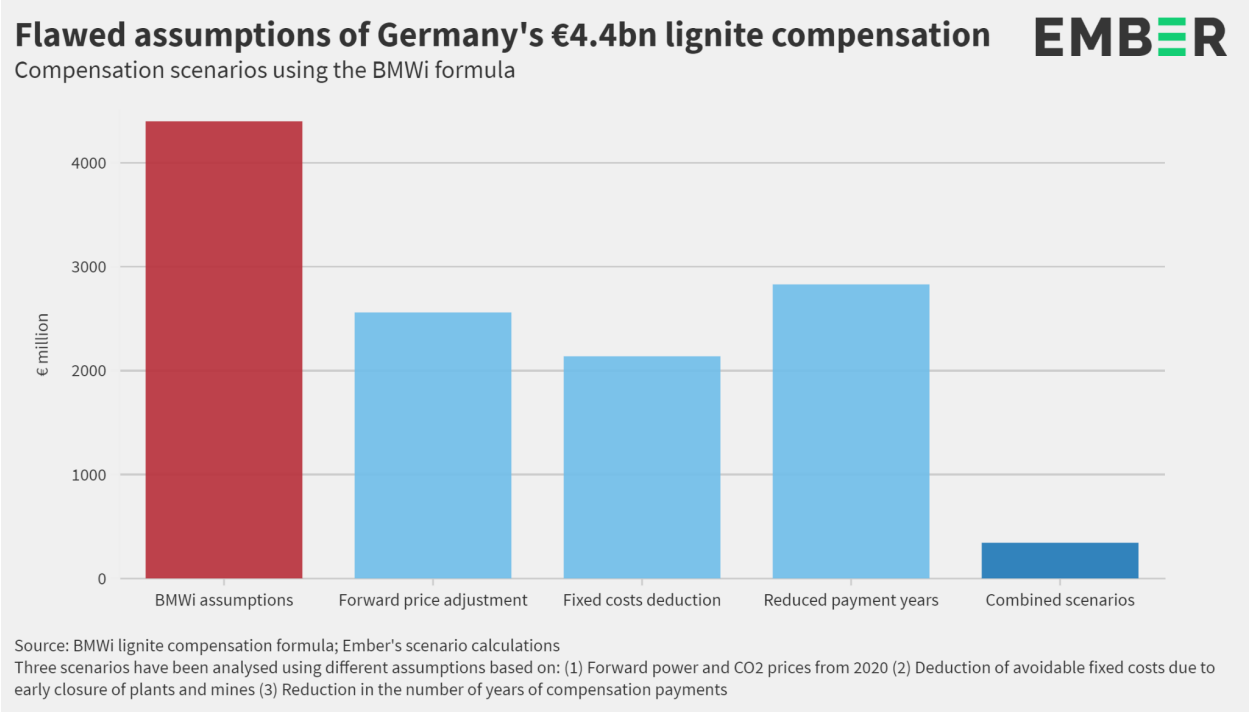
Summary

A summary of the BMWi assumptions that we see as problematic:

1. **Applying arbitrary power and CO2 prices.** The BMWi calculation takes average forward power and CO2 prices from Jan-17 to Dec-19, but forward power prices have been in near-constant decline while CO2 prices have been rising. We feel using forward prices from Jan-20 to Dec-20 is fair, as this more closely corresponds to expected utility hedging strategies for 2021-2023. The resulting compensation payments would be almost halved to €2.6 billion instead of €4.4 billion. Since 2020, power plant profit margins have fallen even further. Using forward prices as of 5th May 2021, the compensation payments would be a mere €143 million.

2. **Assuming no fixed costs can be saved through early closure.** A proportion of future fixed costs are avoided when a plant and mine are closed. We feel Oeko Institut's assumption of partial fixed costs savings is fair. That would halve compensation to €2.1 billion instead of €4.4 billion.

3. **Assuming 4 to 5 years of compensation.** The Oeko Institut proposes that the period of compensation for bringing forward power plant shutdowns should be three years. Once again, we feel this is a fair assumption. This would lead to a reduction in compensation payments of 36% to €2.8 billion instead of €4.4 billion



The compensation payments were agreed behind closed doors and the assumptions appear biased in favour of the utilities. We hope this analysis can provide further evidence to the EU Commission that, as they themselves suspect, the current fixed payments overcompensate Germany's lignite units for closing early.

Zusammenfassung

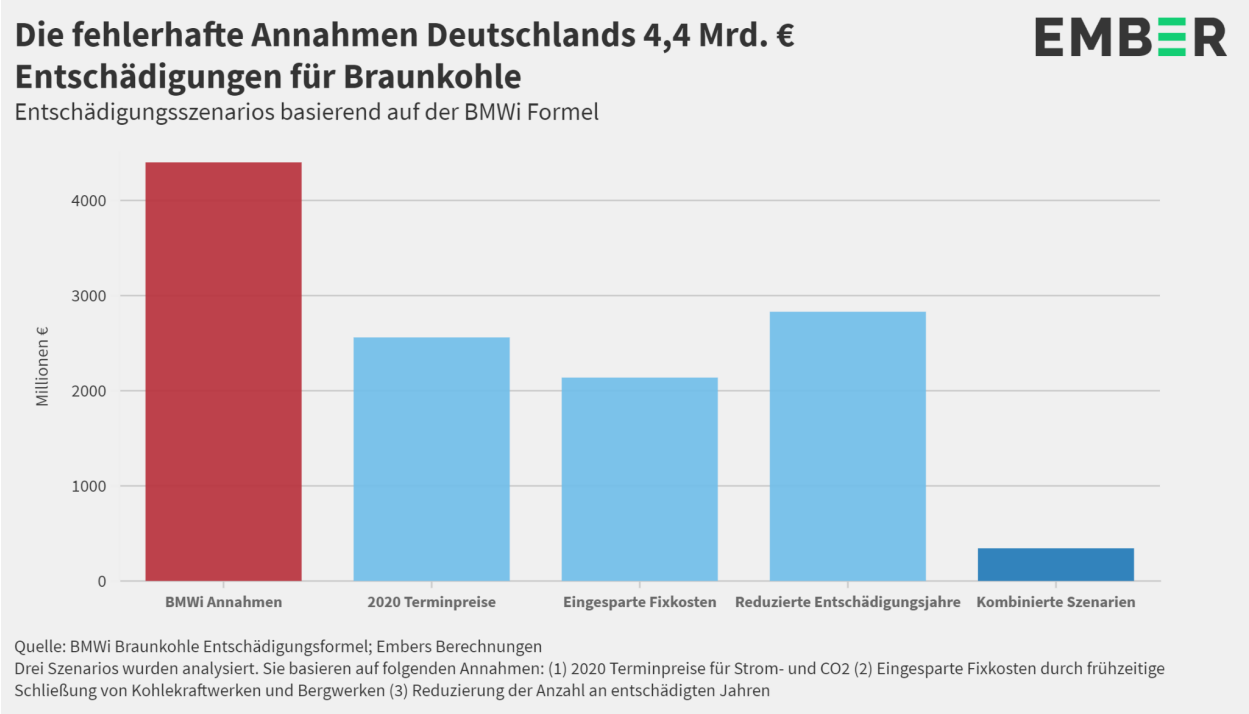
Zusammenfassung der Annahmen des BMWi, die wir als problematisch erachten:

1. Anwendung willkürlicher Strom- und CO2-Preise. Die BMWi-Berechnung basiert auf den durchschnittlichen Forward-Strom- und CO2-Preisen von Januar 2017 bis Dezember 2019, aber die Forward-Strompreise sind nahezu kontinuierlich gefallen, während die CO2-Preise gestiegen sind. Wir halten die Verwendung von Terminpreisen von Januar 2020 bis Dezember 2020 für fair, da dies eher den erwarteten Absicherungsstrategien der Versorger für 2021-2023 entspricht. Die daraus resultierenden Ausgleichszahlungen würden sich mit 2,6 Mrd. € anstelle von 4,4 Mrd. € fast halbieren. Seit 2020 sind die Gewinnmargen der Kraftwerke noch weiter gesunken. Bei Verwendung von Terminpreisen zum 5. Mai 2021 würden die Ausgleichszahlungen lediglich 143 Mio. € betragen.

2. Die Annahme, dass durch die vorzeitige Stilllegung keine Fixkosten eingespart werden können. Ein Teil der zukünftigen Fixkosten wird vermieden, wenn ein Werk und eine Mine geschlossen werden. Wir halten die Annahme des Öko-Instituts, dass ein Teil der Fixkosten

eingespart wird, für fair. Damit würde sich die Entschädigung von 4,4 Mrd. € auf 2,1 Mrd. € halbieren.

3. Annahme von 4 bis 5 Jahren Kompensation. Das Öko-Institut schlägt vor, dass der Ausgleichszeitraum für vorgezogene Kraftwerksabschaltungen drei Jahre betragen soll. Auch dies halten wir für eine faire Annahme. Dies würde zu einer Reduzierung der Ausgleichszahlungen um 36% auf 2,8 Mrd. € statt 4,4 Mrd. € führen



Die Ausgleichszahlungen wurden hinter verschlossenen Türen vereinbart und die Annahmen scheinen zugunsten der Energieversorger verzerrt zu sein. Wir hoffen, dass diese Analyse der EU-Kommission weitere Beweise dafür liefern kann, dass, wie sie selbst vermuten, die derzeitigen festen Zahlungen die deutschen Braunkohleblöcke für die vorzeitige Stilllegung überkompensieren.

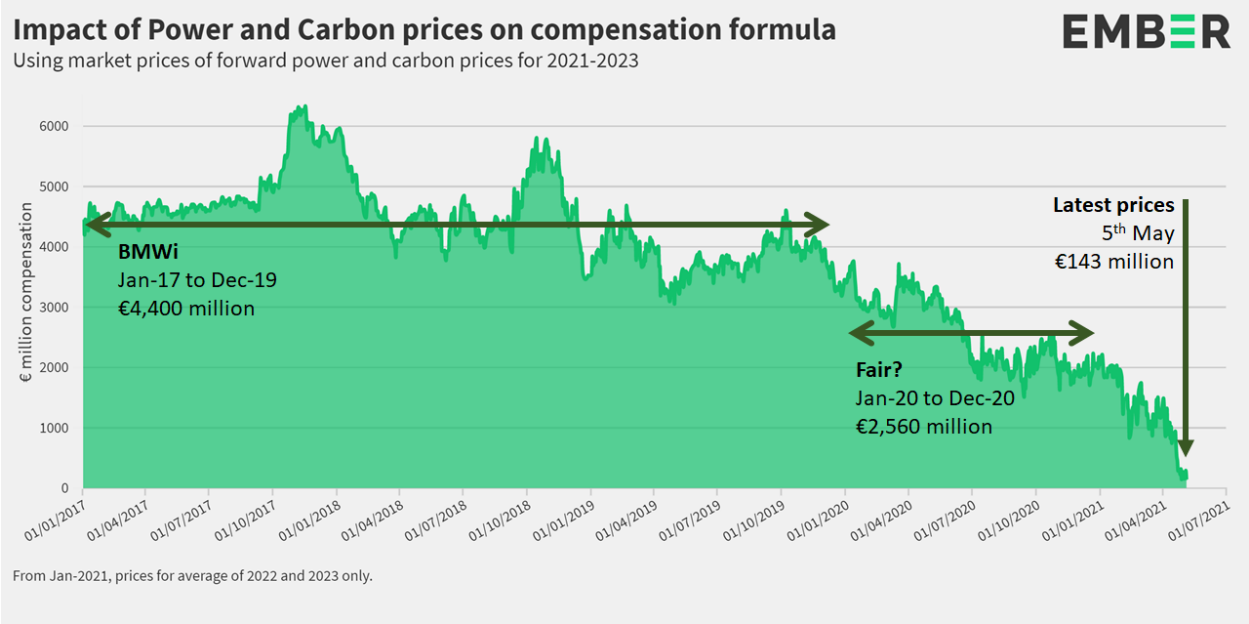
Analysis in more detail

We have analysed each of the assumptions in the BMWi's formula to recreate its compensation payment calculations. The relevant inputs for each questioned assumption have then been applied to the formula to produce scenario compensation calculations. All workings are available to view here. The Annex breaks down the formula to explain the various components.

We have taken insights from Oeko Institiut's 'Assessment of the planned compensation payments for decommissioning German lignite power plants in the context of current developments' to inform our findings.

The first assumption that we question is the power and carbon prices that have been applied. The BMWi used average forward German power (2021-2023) and CO2 (December 2021-2023) prices from the period Jan-2017 to Dec-2019 to determine foregone profits. However, forward projected profitability for lignite power plants has been consistently falling over time.

The chart below tracks this decline. If last year's average power and CO2 forward prices were applied instead, the compensation would be a little over half of the BMWi proposal: €2.56 billion compared to €4.4 billion. However, CO2 prices have significantly increased in 2021. If we take the latest forward prices from 5th May 2021 - as EU-ETS carbon prices hit €50/tonne - the compensation payments would equate to only €143 million.



It is apparent that the German government is using generous historic power and carbon prices to overcompensate utilities, making exactly the same "mistake" as it did for the first wave of

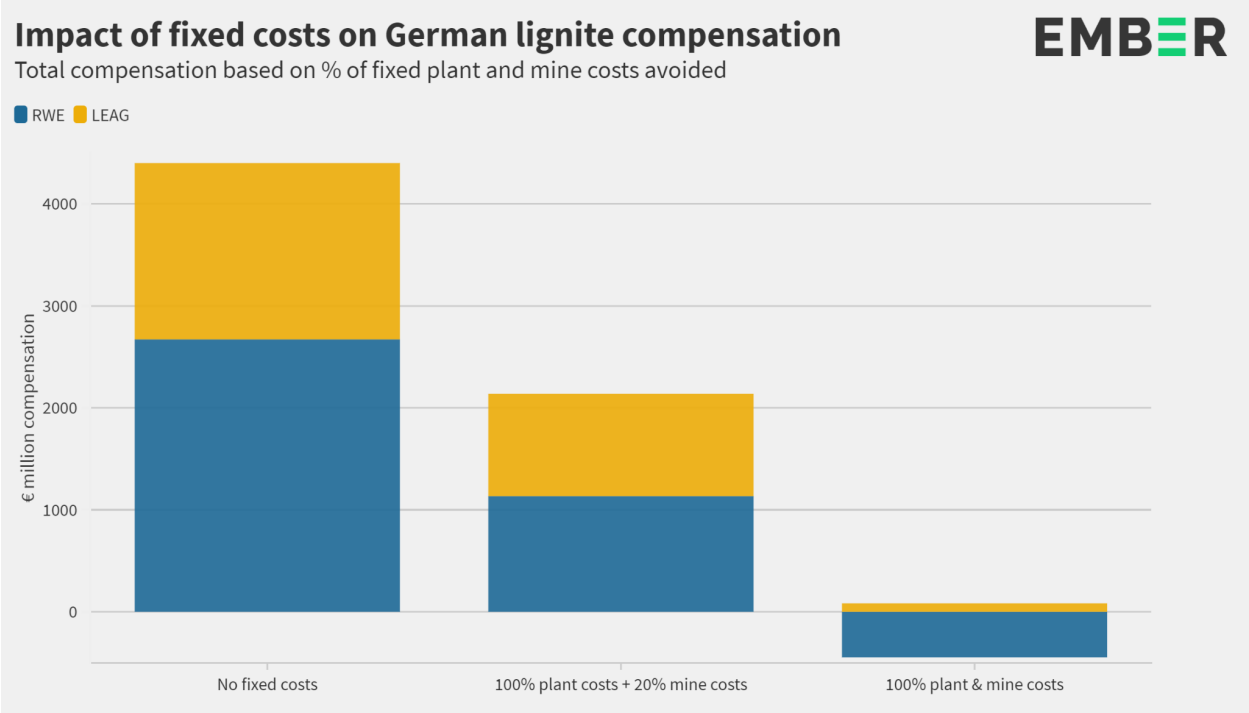
lignite reserve payments “Sicherheitsbereitschaft”, which used high power prices in 2012-2014, even though the agreement was finalised in 2016 when prices were substantially lower.

The utilities would never have realised the high power prices in 2017 and 2018 using forward hedging. That normally takes place 2-3 years in advance, meaning that 2023 would be hedged in 2020 and 2021, not in 2017 and 2018. For that reason, we find average forward prices in 2020 a fair assumption. And this would lead to the compensation amount almost halving.

Oeko Institut has proposed assessing profitability based on ex-post pricing outcomes. This would mean the realised power and CO2 prices from the period around the shutdown date would be applied to any compensation calculation.

The second assumption that we question relates to fixed costs. BMWi assumed no fixed costs are saved by closing early. A proportion of fixed costs can undoubtedly be saved at the power plant, and also some at the mine. The answer is not “none”. It is clear that this BMWi assumption overstates the compensation payment.

Oeko Institut assumed that all plant fixed costs and around 20% of the mine fixed costs could be saved, reflecting avoidable personnel costs. This would more than halve the compensation payment to €2.14 billion. We also calculated that if it is assumed that full fixed costs are saved, then the RWE lignite assets would be loss-making and, therefore, require no compensation and the LEAG lignite assets would be close to zero.



What are the fixed costs of a lignite power plant?
The assumptions from Agora Energiewende's "Die deutsche Braunkohlenwirtschaft" - tables 7-2 and 7-4 are as follows:

- **Plant fixed costs**: 60€/kW/year for old units, 40€/kW/year for new units.
- **Mine fixed costs:** 94€/kW/year for old units, 78€/kW/year for new units.

These are purely fixed costs, so they exclude all debt and depreciation costs related to building the lignite units in the first place.

What is the argument that fixed costs can be saved?

- **At the power plant:** wages would be saved, maintenance contractors' fees would be saved, replacement equipment would be saved, network connection would be saved. Even four-year outage costs would be saved due to the years of advanced notice given under the government agreement. It is hard to see that many costs would not be saved.
- **At the mine**: the majority of mine costs, by comparison, are front-loaded and cannot necessarily be saved. Costs including buying the land, preparing the land for excavation and sealing the sides are not avoided in the short term. However, because it was clear a government agreement was forthcoming years ago, there is potentially a decade of notice. Therefore, the costs associated with the land acquisition and excavation that has been happening at Hambach, for example, should never have been incurred. Many other costs are even more avoidable, for example maintenance to the excavator machines or staff costs to run them.

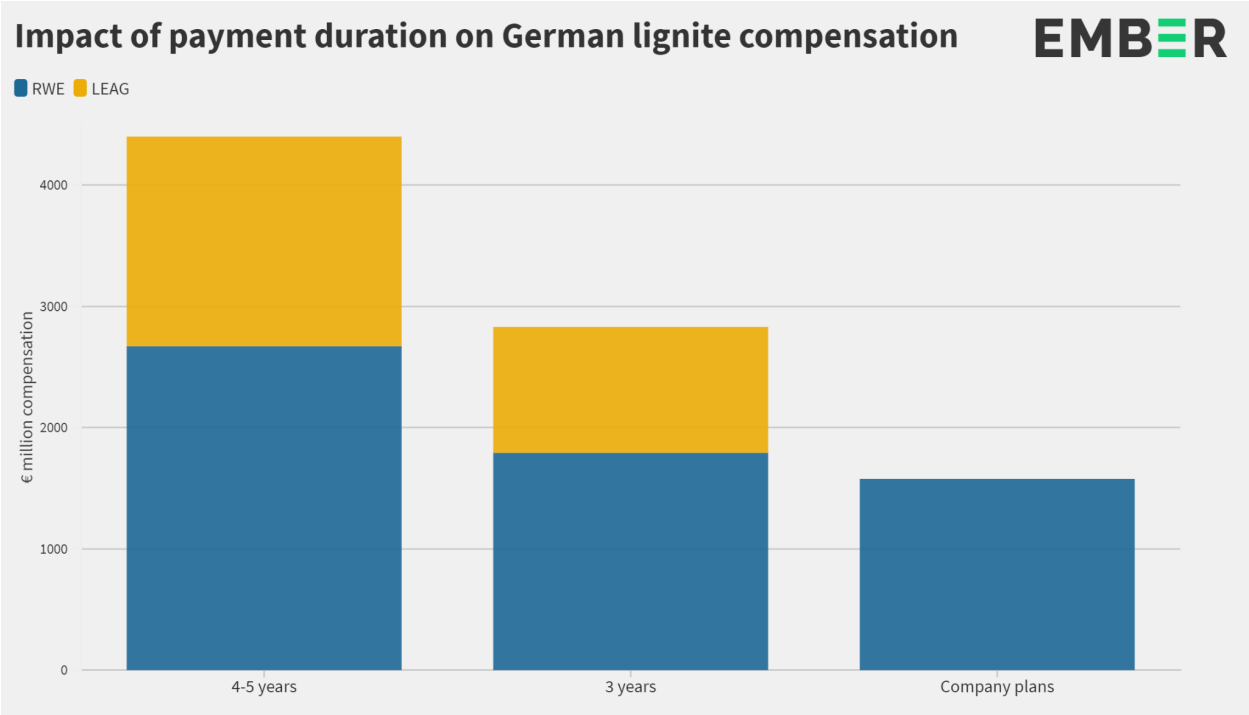
Therefore, we agree that the Oeko Institut's assumption of all plant fixed costs and 20% of mine fixed costs feels fairer. This would halve the compensation payment.

The third assumption that we question is the duration of the payments. BMWi assumed payments would be made to cover lost profitably for four or five years depending on the closure date of the plant. No justification for this assumption has been provided.

Oeko Institut argues that payments should be limited to **three years.** This would cut the compensation payments by 35% from €4.35 million to €2.83 million.

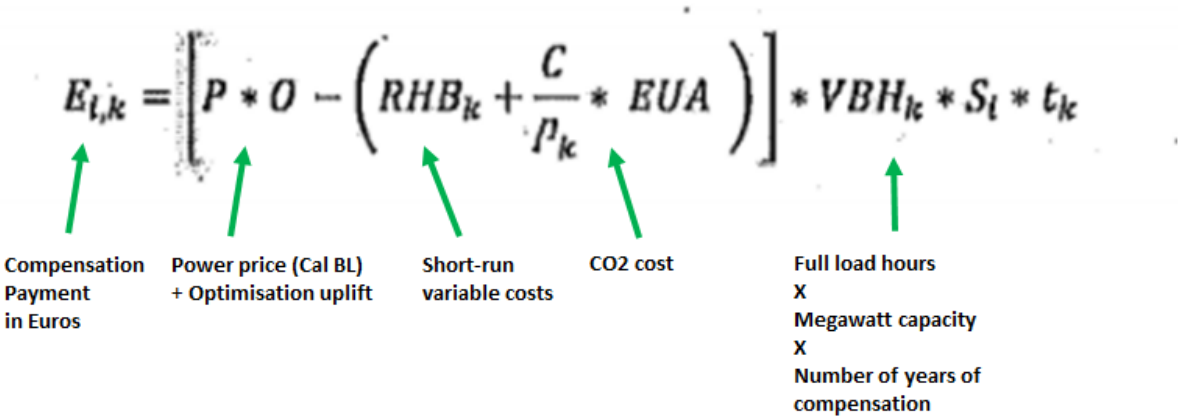
However, even three years could be construed as generous because many of the plants were expected to close in accordance with "company plans" earlier than the dates agreed with the German government. For LEAG, that could mean zero compensation. A memo from Oeko Institut called "Analysis of power plant closure plans for Germany's Lusatian mining district" identifies that, prior to the sale to LEAG, Vattenfall's business plan detailed its intention to close the lignite units earlier than the dates agreed with the state government. And RWE's Inden mine,

which supplies Weisweiller, was also forecast to close earlier, reducing RWE's compensation claim.



Annex: An analysis of the compensation formula

On the face of it, the formula obtained from BMWi is similar in structure to how we calculated "gross profit" for Germany's lignite plants in Ember's paper back in July 2019.



Power price

- **€41.01/MWh**. This was calculated by BMWi as the average forward trading price for Calendar Baseload 2021+2022+2023 from Jan-2017 to Dec-2019.

Optimisation uplift

- **7.5%**. This was calculated by BMWi as the "actual uplift" from Jan-2017 to Dec-2019. It is the difference between the achieved day-ahead price and the average annual day-ahead price, based on the actual hourly generation profile.

Short-run variable costs.

These are similar to the costs from Agora Energiewende's "Die deutsche Braunkohlenwirtschaft" report on table 7-3.

- Fuel costs
  - Older units: €4.29/MWh versus €4.30/MWh in Agora's report
  - Newer units: €4.05/MWh versus €4.60/MWh in Agora's report
- Other short-run costs ("raw materials and supplies"):
  - Older: €3/MWh versus €2/MWh in Agora's report
  - Newer: €3/MWh versus €2/MWh in Agora's report

CO2 cost

- **CO2 price of €16.62**. This was calculated by BMWi as the average forward trading price for the EUA December contract for 2021+2022+2023 from Jan-2017 to Dec-2019.
- **CO2 intensity**. These are similar to the intensity rates from Agora Energiewende's "Die deutsche Braunkohlenwirtschaft" report on table A3-7.
  - Older units: 1.171tCO2/MWh versus 1.118 to 1.315 in Agora's report

- Newer units: 1.108tCO2/MWh versus Agora 0.976 to 1.315 in Agora's report

Full load hours

- **6316/6658**. This was calculated by BMWi as the average annual number of full-load hours older and newer lignite units ran respectively over the period Jan-2017 to Dec-2019.

Number of years of compensation

- **4 or 5**. Four years would be paid to older units and five years would be paid to newer units. No explanation is provided for why these are assumed.

We analysed each of the assumptions to understand the formula and recreate the compensation payment totals.

We found an almost exact match between our results and those of the German government when we populated the formula ourselves. We calculated compensation payments of €2.67 billion for RWE's Rheinish area and €1.73 billion for LEAG's Lusatian mining area, compared to €2.6 billion and €1.75 billion from the German phase-out law (*see section 44, Gesetz zur Reduzierung und zur Beendigung der Kohleverstromung und zur Änderung weiterer Gesetze (Kohleausstiegsgesetz) 8. August 2020, veröffentlicht Bundesgesetzblatt Jahrgang 2020 Teil I Nr. 37*).

Please see this Googlesheet for our calculations.

About Ember

Ember is an energy and climate think tank that is focused on accelerating the global transition to fossil-free electricity.