

New EU emission limits for capacity mechanisms

Favorable for German gas-fired power plants?

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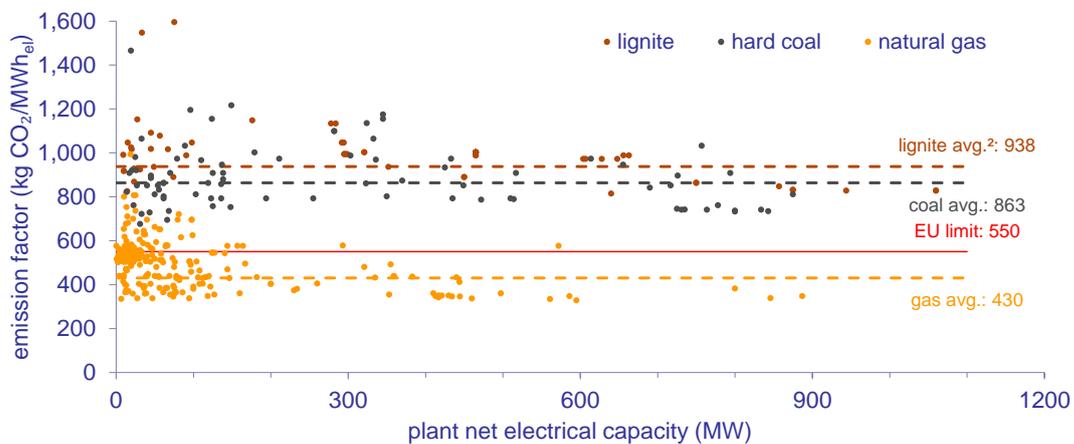
On 18 December 2018, the EU parliament and the EU member states provisionally agreed on new electricity market rules. Among others, the new regulation specifies that power plants may only participate in capacity mechanisms if they emit less than 550 kg/MWh (kilograms of CO₂ per megawatt-hour of electricity). This applies to all plants constructed after the entry into force of the proposed regulation. For pre-existing power plants, the emissions limit will be applied five years later.

Although the details of the proposed new market rules are not available yet, Team Consult has performed a short analysis of the German power plant market in order to determine how plants might be affected by this new regulation. This article provides a brief summary of our findings.

Lignite-fired and coal-fired do not fulfill the EU criteria for capacity mechanisms

Due to the high specific emissions of lignite and coal, none of the German lignite- and coal-fired power plants are capable of fulfilling the EU emission limit of 550 kg/MWh (Figure 1). Our analysis shows that even the most efficient lignite-fired power plant has an emission factor of 814 kg/MWh, whilst the most efficient coal-fired power plant emits 676 kg/MWh.

Figure 1: Emission factor of German power plants¹ (kg CO₂/MWh_{el})



¹ operational and backup/system-relevant plants (§§ 13b, 13g EnWG), net electrical capacity ≥ 10 MW

² capacity-weighted average emission factor
Source: TEAM CONSULT Merit Order Model

Most gas-fired power plants would be eligible for capacity mechanisms

By contrast, most gas-fired power plants comply with the EU limit. According to our calculations, the average¹ emission factor of these plants is 430 kg/MWh and thus below the threshold of 550 kg/MWh. In total, there are currently 249 large² gas-fired power plants in Germany which are either operational or in backup mode. These plants have a total net capacity of 23.9 GW. 85% of this capacity (20.6 GW), or 185 plants, would be eligible for capacity mechanisms under the new EU regime. However, it is noteworthy that the emission factor of many plants with a capacity between 10 and 100 MW is slightly above the EU threshold (see Figure 1).

Backup plants: Only gas-fired plants would be eligible for capacity mechanisms

Above analysis includes plants that are participating in the electricity market (continuously or seasonal) as well as plants which are used for backup and security of supply purposes:

- Lignite-fired power plants in standby mode for backup purposes³ (currently 2.0 GW), the so-called "Sicherheitsbereitschaft"; and
- Coal-, gas- and oil-fired power plants that are considered system-relevant and are only operated at the request of the transmission system operators (TSOs) to ensure security of supply⁴ (currently 6.9 GW).

None of the lignite-, coal- and oil-fired power plants in these two categories would be eligible for a capacity mechanism under the new EU regime⁵. By contrast, about half (5 out of 12) of the gas-fired power plants currently used to ensure the security of supply do fulfill the EU emission limits for capacity mechanisms (Figure 2). The total capacity of these plants is 2.2 GW, or 32% of the total system-relevant capacity.

¹ capacity-weighted

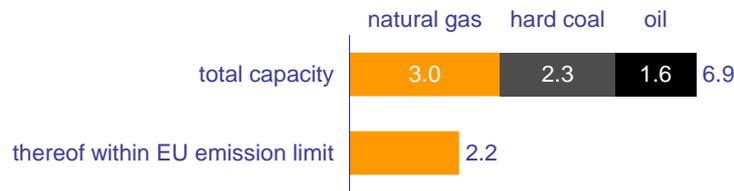
² net electrical capacity of 10 MW or more

³ according to § 13g EnWG

⁴ according to § 13b EnWG

⁵ Lignite-fired power plants in "Sicherheitsbereitschaft" are not affected by the new EU regulation in any case, because they will shut down at latest by the end of 2023, i.e. before the law applies to existing power plants.

Figure 2: System-relevant* capacity in Germany (GW)



* system-relevant power plants barred from decommissioning by law (§ 13b EnWG)

Source: TEAM CONSULT Merit Order Model

Conclusion

Under the new EU regulations, German lignite- and coal-fired plants will not be able to participate in capacity mechanisms. In light of the much-debated German coal phase-out, this puts further risk on the value of such assets. Operators might have to consider alternative ways to preserve their value, such as a biomass retrofit. Although challenging at best and unfeasible at worst, this path has been successfully adopted in Denmark, for example.

The outlook is more favorable for gas-fired power plants in Germany, which have seen a phase of economic struggle in recent years. In particular, modern and highly-efficient plants will be eligible to be used in future capacity markets. However, medium-sized plants often slightly exceed the EU limit. Operators of such plants might have to improve the plant efficiency if they intend to participate in capacity mechanisms after the year 2025.

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National and international stakeholders in the power and gas sector are among our clients, including noteworthy energy groups, public utilities, industrial clients and power plant operators, European gas and LNG producers, as well as gas importers and suppliers.



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