

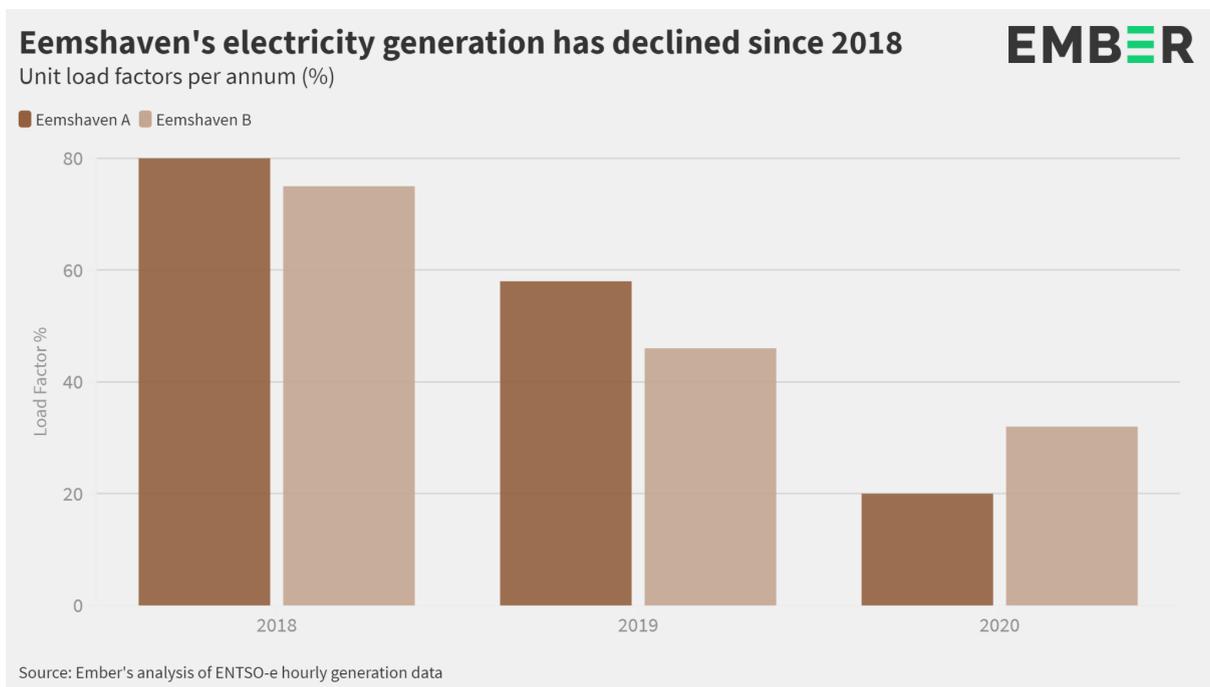
RWE Eemshaven Analysis

Historic production and profitability

RWE's Eemshaven A & B had an average load factor of 26% in 2020 and 52% in 2019. This is a significant decline (almost two-thirds) since 2018 when the load factor was 78%.

Eemshaven A load factor 2018 = 80%; 2019 = 58%; 2020 = 20%

Eemshaven B load factor 2018 = 75%; 2019 = 46%; 2020 = 32%



Neither Eemshaven A or B generated in June and July 2020. RWE's Eemshaven B did not generate in August 2019, probably due to the biomass conversion.

Revenue has been calculated using ENTSO-e hourly power generation for Eemshaven A & B and EEX Dutch day ahead power prices.

Gross profit = Revenue - [coal costs + CO2 costs + VOM]

VOM = variable operating and maintenance costs = €2 / MWh

Plant efficiency rate = 46%

Carbon intensity = 0.33333

Net profit/losses = Gross profit - FOM

FOM = Fixed Operating and Maintenance costs = €30 / kW / year

For more detailed information on the calculation methodology, please refer to [Annex I](#)

Eemshaven A achieved a net profit in 2019. The majority of this occurred in January and February. The Clean Dark Spread (CDS) was €19 and €11 in January and February 2019 respectively. This has only exceeded €11 once since then, in January 2021 (€12), due to extremely cold weather conditions resulting in power prices of €53.62. The CDS for February 2021 was positive at €4.60/MWh but CO2 prices of €45/tonne would have sent it negative based on the API2 coal and Dutch power prices.

Historic clean dark spread for Eemshaven

Clean Dark Spread based on unit efficiency rate of 46%

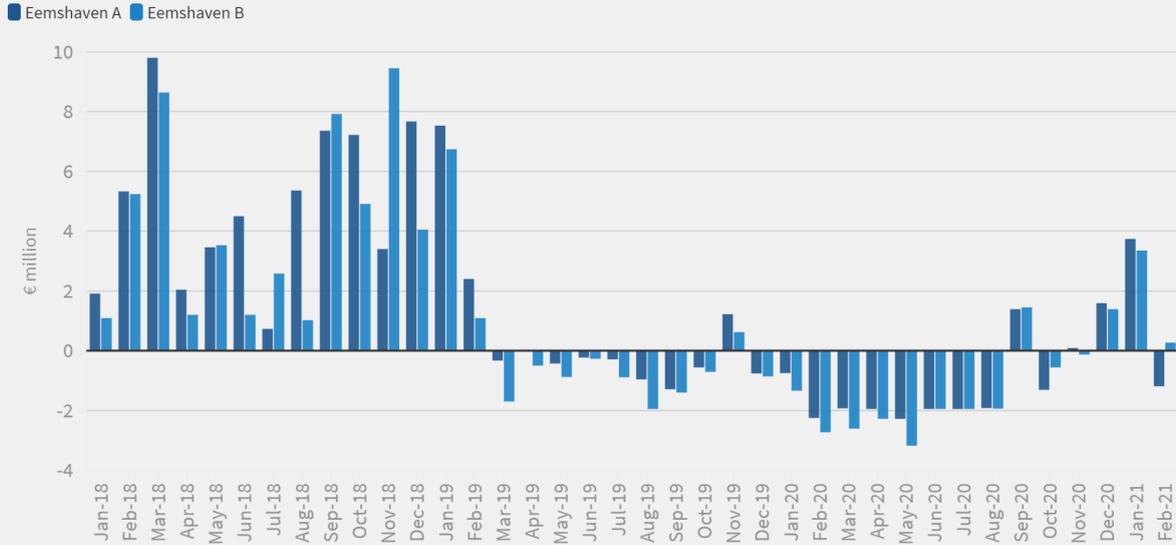


Source: API2 monthly coal prices; EEX Dutch power day ahead prices; ECX EUA front month prices

The total net profit for units A & B 2019 was €5.6 million, 95% less than the net profit in 2018. In 2020, the net losses were almost €30 million. Net profits were only achieved in September and December in 2020.

Eemshaven historic net profit/loss

Net profit/loss by unit (€ million)



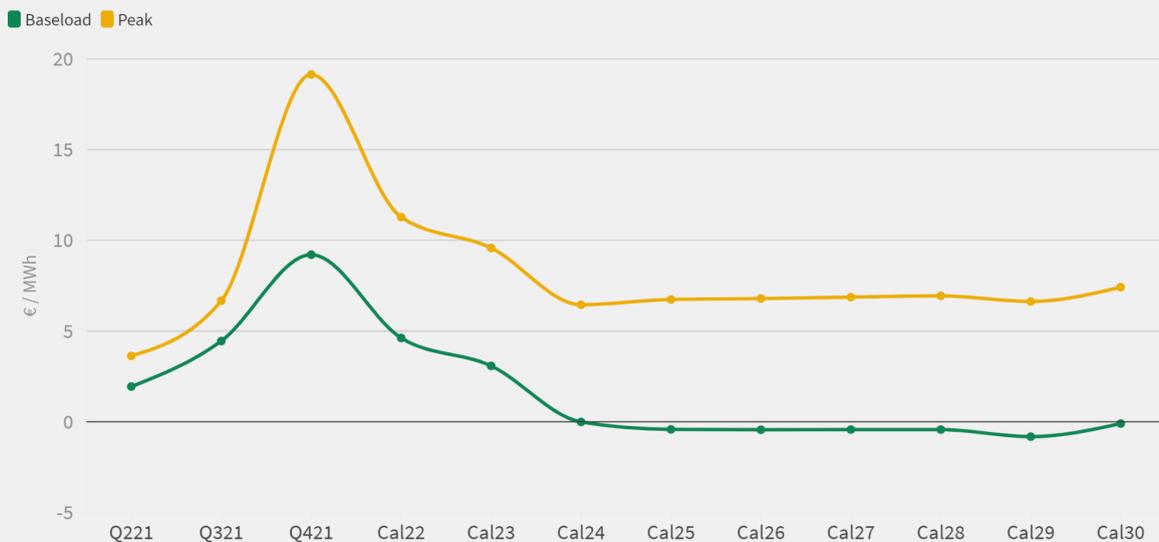
Net profit calculation = Gross profit - Fixed Operating & Maintenance costs

Future profitability

The current Q321 dispatch cost of a hard coal unit with an efficiency rate of 46% is around €49.10 This is calculated using a Dec21 carbon price of €41.85 and a Q321 coal price of €60.20/tonne. This is before any fuel transport costs or non-fuel operating costs are taken into consideration. With Dutch power prices at €53.53/MWh baseload, this equates to a clean dark spread of €4.43/MWh

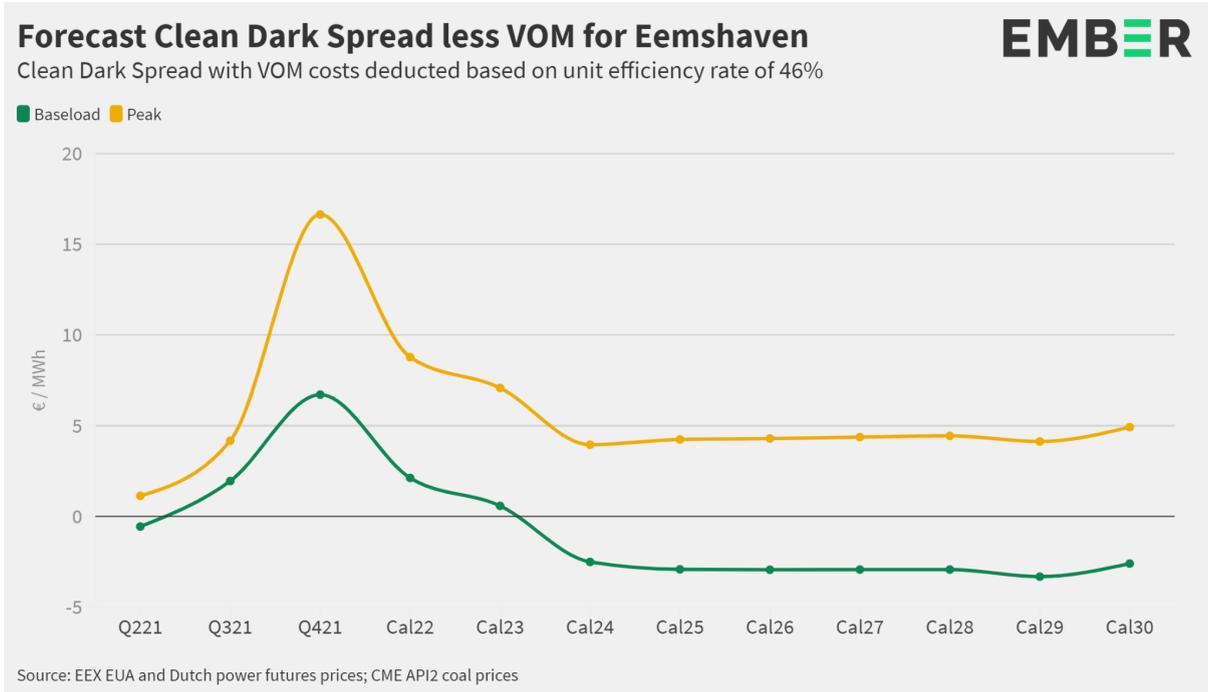
Forecast Clean Dark Spread for Eemshaven

Clean Dark Spread based on unit efficiency rate of 46%



Source: EEX EUA and Dutch power futures prices; CME API2 coal prices

Non-fuel Variable Operating and Maintenance (VOM) and coal transport costs have been estimated at €2.5/MWh.



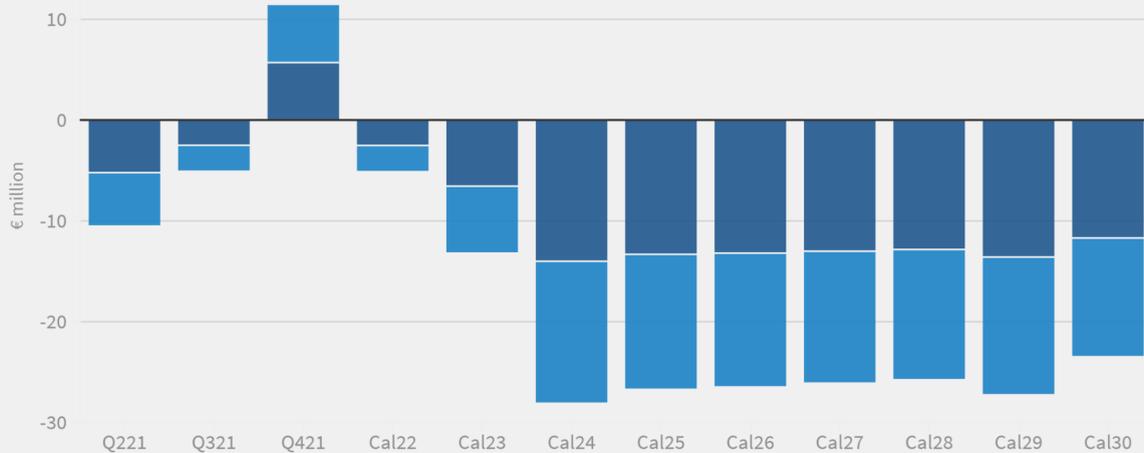
Gross profit calculations have been carried out with assumptions that the units only generate when the CDS less non-fuel variable costs and coal transportation costs (€2.50/MWh) is positive. With the current coal, carbon and power curves, this results in Eemshaven only running during peak hours beyond calendar year 2023.

For the net profit/loss calculations, Fixed Operating & Maintenance costs of €30/kW/year have been deducted from the gross profits. These are fixed regardless of the number of hours run or volume of power generated. Based on these assumptions, the Eemshaven plant will be accruing consistent net losses from 2022. Total net losses from now until the end of 2030 equate to over €200 million.

Eemshaven forecast net losses of over €200 million by 2030

Net losses in € million

■ Eemshaven A ■ Eemshaven B



Net profit calculation = Gross profit - Fixed Operating & Maintenance costs

Biomass subsidies

Biomass subsidy calculations have not been incorporated into the above analysis.

RWE receives subsidies for co-firing Eemshaven with biomass. The subsidies compensate utilities for a proportion of their generation and associated costs (fuel, CO₂, operating and maintenance, and capital costs) if these costs are above the EEX Dutch baseload electricity price (APX).

Eemshaven power station was converted to co-firing with coal and biomass in October 2019 and currently receives subsidies for producing up to 15% of its annual electricity generation from biomass. RWE's 2020 annual report states that Amer 9 generated 2.6 TWh of electricity using biomass, whilst generation from biomass was 0.7 TWh for Eemshaven. That equates to Eemshaven accounting for 26% of the total biomass generation. The annual report also says that RWE received €86 million from the Netherlands government in biomass subsidies. If Eemshaven received 26% of this amount, this is €22.5 million in subsidies for Eemshaven for 2020. It is recognised that, if correct, this would compensate for the majority of calculated €29 million net losses for Eemshaven that year.

The future profitability analysis calculates net losses of around €27 million per annum from 2024 onwards, therefore, even if annual subsidies of €25 million are considered, Eemshaven would still be unprofitable. Furthermore, the Netherlands government intends to end all biomass subsidies in 2027. Consequently, even if the current subsidies are enabling Eemshaven power station to survive economically, this will not be the case from 2027 onwards and it will be exposed to the full market conditions.

Further information on biomass subsidies can be found in this [report](#).

Annex I

Additional information/caveats:

- *Generation data = ENTSO-e hourly generation in MWh by unit*
- *Historic power prices = EEX Dutch power day ahead prices*
- *Future power prices = EEX Dutch power futures*
- *Coal price = CME API2 monthly prices*
- *Historic CO2 prices = ECX EUA front month*
- *Forward CO2 prices = EEX EUA futures price (December contract)*
- *Profitability calculations exclude any profit or loss due to forward hedges. Utilities sell electricity and buy carbon permits in advance, so our methodology using day-ahead prices does not include the profit or loss of these forward hedge transactions.*

Pricing information

Dutch power prices from EEX to Cal-25 then formula used for extrapolation

CO2 prices out to Dec-30 from EEX

API2 prices out to Cal-25 then formula used for extrapolation

Calculations and assumptions:

- *Load factor = generation (MWh) / installed capacity (MW)*
- *Hourly revenue (€/MWh) = Hourly generation from ENTSO-e (MWh) x EPEX hourly prices (€)*
- *Gross profitability (€/MWh) = Hourly revenue - ((CO2 cost + Coal cost + Coal transportation cost + VOM) * hourly generation)*
- *Gross profitability (€/MW) = Gross profitability (€/MWh) / Installed capacity (MW)*
- *Net profitability (€/MW) = Gross profitability - Fixed Operating & Maintenance (FOM) costs (€/MW)*
- *Fixed operating costs (FOM) = €30,000 / MW / year*
- *Annual FOM per unit (€) = FOM (€/MW) x installed capacity (MW)*
- *Variable operating costs (VOM) are averaged at €2/MWh for all units*
- *Coal transportation is averaged at €0.5 / MWh for all units*
- *CO2 cost = CO2 price (€/MWh) / unit efficiency rate*
- *Coal cost = Coal price (€ / MWh / unit efficiency rate)*
- *Unit efficiency rates: 46% for Eemshaven and Maasvlakte 3. 45% for Onyx Power Maasvlakte*
- *Conversion of coal price in tonnes to MWh = Coal price (€/tonne) / 6.97633*
- *Conversion of CO2 price in tonnes to MWh = CO2 price (€/tonne) * 0.33333*
- *Capital costs are excluded from all calculations*