

Summary of Biofuelwatch's oral submission for the Drax Bioenergy with Carbon Capture and Storage Project Issue Specific Hearing 1

Biofuelwatch interested party reference number: 20032287

Issue Specific Hearing 1

Many of the issues and details we had planned to raise in the Issue Specific Hearing were raised via the exchanges between the Applicant and the Examiner during the hearing with no need for us to repeat things in that forum. However, we provide a written summary of those points here for the record.

GHG emissions

- Due to the energy penalty, installing carbon capture and storage at Drax power station will significantly reduce electricity output. Based on Drax's own figures, this will remove 371 MW net electrical capacity from the National Grid.
- Biomass electricity is classified as renewable and low carbon by the UK government. Biofuelwatch strongly disagrees with this, however, we are focussing here on whether the proposal is in line with government energy and planning policies.
- While the amount of wood burned by Drax would remain unchanged, this project would leave a 371 MW gap in UK electricity generation. There is a realistic prospect that the loss of 371 MW capacity in what is classed as renewable electricity generation will be compensated for by increased fossil fuel burning.
- This would contradict the UK's climate change obligations and also the requirements under the Climate Change Act to reduce carbon emissions.
- Non-biogenic emissions: supply chain emissions will not be 'neutralised' by the proposed carbon capture process and due to the energy penalty (or reduction in energy output due to the adding of CCS) the carbon footprint for supply chain emissions increases per MWh

Energy Penalty points

The effect of the proposed scheme on the output capacity of the power station

Significant loss of net electric capacity contrary to government energy policy

- According to Drax's Environmental Statement Volume 3, Appendix 15.2, the carbon capture development will reduce the combined net capacity of the two biomass units to 931 MW, i.e. 465.6 MW per unit.
- According to Drax's website (tinyurl.com/nbvdr4zh), the current biomass capacity is 2.6 GW across four units, i.e. 650 MW per unit.

- This means that the proposed development will reduce the biomass units' net capacity by 28.4%, and overall electric capacity by 369 MW. This reduction is due to the energy required to capture and compress CO₂.

We believe that this reduction in electric capacity is not compatible with:

- *Overarching National Policy Statement on Energy (EN-1), 2011*: As highlighted in paragraph 3.3.10 in particular, *“as part of the UK’s need to diversify and decarbonise electricity generation, the Government is committed to increasing dramatically the amount of renewable generation capacity.”*
- *Draft Overarching National Policy Statement for Energy (EN-1), 2021*: Similar to the current EN-1, this draft policy emphasises the *“need to dramatically increase the volume of energy supplied from low carbon sources and reduce the amount provided by fossil fuels”* (2.3.4).
- Drax’s application, on the other hand, will, if approved, allow for a reduction in renewable generation capacity by 369 MW.
- Evidence that efficiency and net output could be reduced further comes from the world’s only current commercial-scale carbon capture project at a coal unit, Boundary Dam in Canada. There, 30-31% of the unit’s energy is required to capture and compress CO₂ (tinyurl.com/5p7wdpku).

Support for CCS from biomass in the draft EN-1 National Policy Statement is based on ensuring security of supply & Drax’s proposed reduction in electricity does not comply with this policy

- The Draft EN-1 does support carbon capture and storage, including from bioenergy (3.3.34).
- However, this support is qualified in paragraph 3.3.43: *“All the generating technologies mentioned above are urgently needed to meet the Government’s energy objectives by: • providing security of supply (by avoiding concentration risk and not relying on one fuel or generation type)”*.
- In our view, Drax’s proposed significant reduction in biomass electricity is not compatible with this policy.

The effectiveness and reliability of the proposed technology for the capture of CO₂

At the hearing, the ExA asked the applicant if it could provide evidence of the carbon capture rate it claims it will achieve being demonstrated anywhere else in the world. We provided oral evidence regarding the longest-running and world’s only operating commercial carbon capture facility at a coal-fired power plant which is Boundary Dam, run by Sask Power. The figures we provided were that that facility’s carbon capture rate in 2021 was less than 37% of the official target of 90%. That figure was taken from this article: [REDACTED]

We provide more information here in the hope that this will further assist the ExA:

In this more recent article [REDACTED] it states that the world's sole carbon capture project on a large power plant (again Boundary Dam) caught 43 percent fewer metric tons of carbon dioxide in 2021 compared with the year before, according to new data from the Canadian utility company operating the project. This was said to be because a compressor failed.

According to this article [REDACTED], SaskPower has apparently downsized its ambitions for Boundary Dam 3. Instead of capturing 90 percent of the CO₂ it produces, which was the original goal for Boundary Dam 3, the company is now settling for a target of only 65 percent.

This paper [REDACTED] published in November 2018 is less recent but examines Boundary Dam in more depth: Holy Grail of Carbon Capture Continues to Elude Coal Industry, David Schlissel, Director of Resource Planning Analysis Dennis Wamsted, Associate Editor Institute for Energy Economics and Financial Analysis.

To assist the ExA we have copied a particularly relevant section here:

SaskPower, the state-owned utility in Saskatchewan, has spent C\$1.5 billion to retrofit Unit 3 at its Boundary Dam generation station with CCS technology. Of that total, 50%, or roughly C\$750 million, went to CO₂ capture equipment and C\$440 million was spent to upgrade and modernise the ageing plant so that it would be able to run long enough to recover the carbon capture investments. SaskPower spent an additional C\$293 million on related emission controls and efficiency improvements.

In its 2014 annual report, the company touted the project as “the first commercial-scale post-combustion project of its kind at a coal-fired power station” and one that would be able to capture 1 million metric tons of CO₂ annually—roughly 90% of the plant's CO₂ output. Much of the captured CO₂ was to be used in enhanced oil recovery efforts (EOR) at an oil field in southern Saskatchewan. The rest was to be stored underground.

Given its first-of-a-kind status, it is no surprise that little has gone well. The project was over budget and behind schedule when it began operating in October 2014. Its overall CO₂ capture rate during its first year of operation hovered at about 40%, a dismal performance, as David Jobe, SaskPower's director of carbon capture and chemical services, acknowledged in an interview with The Chemical Engineer in May of this year.

“Let's just say that out of the box, the plant didn't work as designed,” Jobe said.

Nor is the plant working now as promised. Boundary Dam has never hit its CO₂ sequestration goal of 1 million metric tons a year, having captured a total of only 2.2 million metric tons in the four years since its carbon capture system came online.

Meanwhile, the utility has had to pay millions of dollars for temporary units that boost the capacity of the system's thermal reclaimer, the unit that purifies the amine solution used to strip CO₂ and sulphur dioxide from the plant's flue gases. The amine solution has been degrading faster than anticipated, overwhelming the plant's installed reclaimer and forcing the utility to bring in mobile units. The fix has worked, but according to a report prepared for

SaskPower, it is “not economically sustainable.”

The amount of CO₂ captured at Boundary Dam is not likely to increase anytime soon either, as the entire plant has been online only approximately 50% of the time from August 2015 to August 2018.

Capturing the CO₂ from Boundary Dam Unit 3 also is very expensive, averaging about C\$60 per metric ton (US\$42 per short ton), doubling the overall cost of producing power at the Plant.

SaskPower said this summer that its costly experience with Unit 3 prompted it to decide against retrofitting two other units at Boundary Dam with carbon capture technology. Instead, the two 1970s-era units will be shuttered, perhaps as early as next year.

Overall GHG emissions

These factors clearly need to be considered together: the energy penalty and likely offset by baseload supply from other generators - in all likelihood coming from fossil gas; supply chain emissions; the likely carbon capture rate; and the question which was raised by others in the hearing of the carbon neutrality of woody biomass due to the carbon payback period being too long for any relevance in meeting our current climate commitments.

For these reasons we do not believe the application complies with either the spirit or the letter of EN-1 and EN-3.