UNDERSTANDING THE COST OF THE DRAX BECCS PLANT TO UK CONSUMERS

EMBER
COAL TO CLEAN ENERGY POLICY

EMBER
COAL TO CLEAN ENERGY POLICY

Authors
Phil MacDonald, Tomos Harrison

Published date
May 2021

Disclaimer
The information in this report is complete and correct to the best of our knowledge, but if you spot an error, please email tomos@ember-climate.org

Document design & layout by Wilf Lytton

Cover image composition by Leonardo Barreto (leocamposbarreto@gmail.com)

Ember estimates the proposed biomass energy and carbon capture and storage plant will require £31 billion in subsidy

Major risk that the plant will not deliver the negative emissions promised

Executive summary

How much will the new BECCS plant cost the UK consumer?

£31.7 billion

Equivalent to almost £500 per person in the UK,[1] directly adding more than £16 a year to each household's energy bill.

- For comparison, the National Audit Office has estimated Hinkley Point C nuclear power station will cost consumers £30bn in total,[2] a project which is described as the world's most expensive power station.[3]
- £31.7 billion is Ember's central estimate (from a range of £23.5 billion - £44.3 billion) for the total cost to the UK energy bill-payer of Drax's proposed BECCS plant (bioenergy with carbon capture and storage), over a 25 year plant lifetime . Total subsidy was calculated using cost estimates from the 2020 study commissioned by the Department of Business, Energy & Industrial Strategy completed by Ricardo.

Will the BECCS plant deliver the negative emissions the UK requires?

- Current regulations are not sufficient to prevent unsustainable and high-risk biomass feedstock from being burnt in UK power stations. For example, feedstocks from primary, high-carbon, highly biodiverse or slow-growing forests.[4]
- Without additional regulation, the government cannot be sure that BECCS will deliver the negative emissions being paid for.

1. £31.7 billion / The 2021 population of the UK 67,530,759 = £470 per person
2. The National Audit Office (2017), 'Hinkley Point C', https://www.nao.org.uk/report/hinkley-point-c/
3. The Guardian (2013) 'Hinkley Point' https://www.theguardian.com/environment/2013/oct/30/hinkley-point-nuclear-power-plant-uk-government-edf-underwrite
4. The Climate Change Committee (2018) Biomass in a low-carbon economy, page 14 https://www.theccc.org.uk/publication/biomass-in-a-low-carbon-economy/

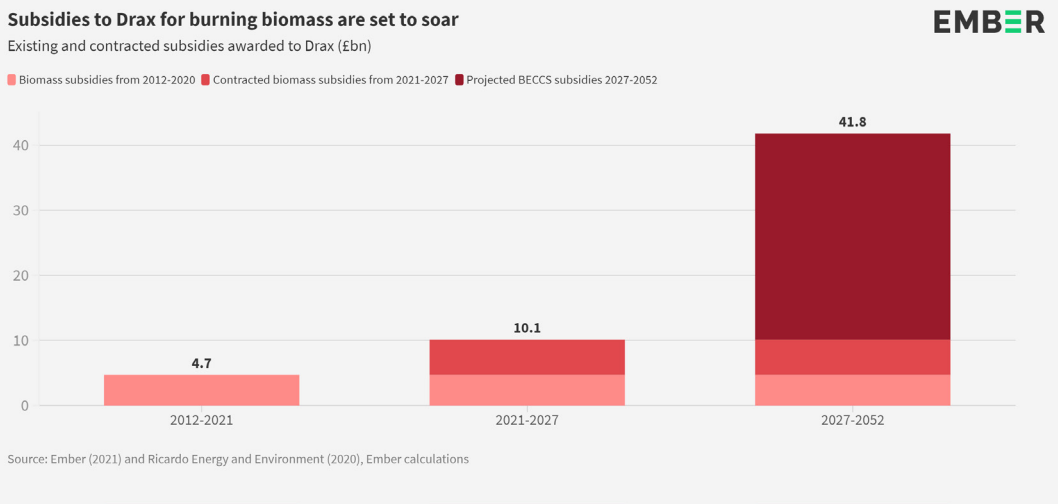
- In the worst-case scenarios outlined in research commissioned by BEIS, burning biomass can produce greater emissions than those from burning coal.[5] A BECCS plant using these feedstocks would be a net emitter, not a net carbon sink.

The UK's largest power station is looking for a new subsidy. In 2027, Drax's £10 billion of subsidies to burn wood for power will come to an end, and with it Drax's means of generating profit. In order to continue operating past 2027, Drax plans to build the world's first bioenergy with carbon capture and storage (BECCS) plant. By capturing the carbon emissions of wood burned for electricity and storing them under the North Sea, Drax intends to generate the negative emissions the UK is reliant upon to reach national climate targets and would seek to be rewarded for this through new public subsidy.

Negative emissions play a key role in the Climate Change Committee's plan to reach net zero, and ahead of COP26 the UK government is keen to make progress towards negative emissions. But the ability of BECCS to deliver negative emissions is dependent on the carbon neutrality of biomass, an assumption that is no longer reasonable within the current regulatory framework. Indeed the European Academies Science Advisory Council (EASAC) now states that using woody biomass for power "*is not effective in mitigating climate change and may even increase the risk of dangerous climate change.*"[6]

In this paper Ember has examined existing estimates of BECCS costs, and used them to calculate the level of public subsidy required to build and operate Drax's new power station. Drax has not revealed the size of the new subsidy it is requesting from the UK government. However, our research, using studies commissioned by BEIS, reveals that a large subsidy will be necessary, similar in size to that of the controversial Hinkley Point C nuclear project. This paper also highlights that, due to the risks of high carbon emissions from burning wood, Drax's new power plant may not be able to deliver negative emissions at the scale or in the timeframe it promises.

5. BEIS (2014) Life cycle impacts of biomass electricity in 2020 https://www.gov.uk/government/publications/life-cycle-impacts-of-biomass-electricity-in-2020 BEIS BEAC model Scenario 14. Electricity from pellets produced from additional wood (compared to counterfactual) from intensively managed pine plantation in South USA. Counterfactual = increasing rotation time from 25 to 35 years.
6. The European Academies Science Advisory Council - EASAC (2021), The Climate Impacts of Woody Biomass, https://easac.eu/media-room/press-releases/details/easac-welcomes-that-the-jrc-report-strengthens-the-case-for-shorter-payback-periods-on-woody-biomass/


Subsidies to Drax for burning biomass are set to soar
Existing and contracted subsidies awarded to Drax (£bn)
EMBER
Biomass subsidies from 2012-2020
Contracted biomass subsidies from 2021-2027
Projected BECCS subsidies 2027-2052
40
30
20
10
0
4.7
10.1
41.8
2012-2021
2021-2027
2027-2052
Source: Ember (2021) and Ricardo Energy and Environment (2020), Ember calculations

Contents

Estimating the public subsidy necessary for Drax's BECCS plant

The subsidy: How a Contract for Difference (CfD) works

As wind and solar power undercut traditional power plant operating models, all new thermal capacity built in recent years has required government subsidy - whether gas, nuclear or biomass power.

There are two routes to securing this subsidy. The first is via the Capacity Market, which has funded new gas capacity, alongside batteries, demand side reduction, and new hydro power. The second is securing a Contract for Difference (CfD), which is now the UK government's main route to support low-carbon power. CfDs have funded technologies including coal-to-biomass conversions (e.g. at Drax), nuclear, dedicated biomass, and new wind projects.

Contracts for difference set a guaranteed rate for the electricity the power plant generates. This 'strike price', if above the wholesale cost of electricity, allows the generator to receive a top-up payment for the duration of the contract. CfDs are commonly awarded at auction, allowing for price discovery (e.g. with offshore wind), but in the case of specific technologies the CfD may be directly negotiated with government (e.g. nuclear).

It seems unlikely that the Drax BECCS plant can participate in an open CfD auction, given the lack of competition amongst large-scale BECCS projects and that it would be the first such project in the world. Instead, like nuclear, it is likely to negotiate a strike price directly with government.

In combination with the costs recouped from the sale of electricity, the CfD would serve to cover the costs of the plant, which include:

a. Capture plant capex
b. Feedstock cost - including costs of global imports
c. Other opex (including operating the capture unit)
d. The transport and storage pipeline and rig for geologic injection (although some of this cost may need to borne by the government, given many others in the industrial cluster may want access to the pipeline)

Drax has proposed a novel hybrid business model consisting of two payments: a power CfD + a carbon payment.[7] The first would pay for the power generated, the second for the negative emissions achieved. In this paper, Ember is estimating the total cost to consumers, and so we are assuming just a power CfD. In the case of the hybrid model proposed by Drax, the carbon payment portion may come from general taxation, rather than from energy bills as with a CfD. This would reduce the amount added to energy bills - but the UK taxpayer would still end up footing the bill for the BECCS plant.

Estimates for the cost of BECCS

Drax has argued that BECCS will provide overall cost savings to UK decarbonisation,[8] as negative emissions allow for residual emissions in 2050 from sectors which are deemed expensive and/or difficult to abate, such as aviation, industry, and heating. This is the "net" in the UK's 2050 net-zero target.

However, Drax have not yet been forthcoming on the costs of the BECCS plant itself.

The table below shows existing estimates for BECCS costs in £ per unit of electricity generated, in research by the energy consultancy Ricardo, commissioned by BEIS published August 2020.[9]

The BEIS / Ricardo study gives a central cost estimate for BECCS of £181/MWh, with a range from £149/MWh-£230/MWh.

The range of costs principally depend on estimates for feedstock costs, the cost of CO_2 capture and transport and storage. Ember uses the central cost estimate for calculating likely subsidy cost.

	£/MWh low	£/MWh (mid)	£/MWh high-range	Technology type
BEIS/Ricardo (2020)	£149	£181	£230	Post combustion amine

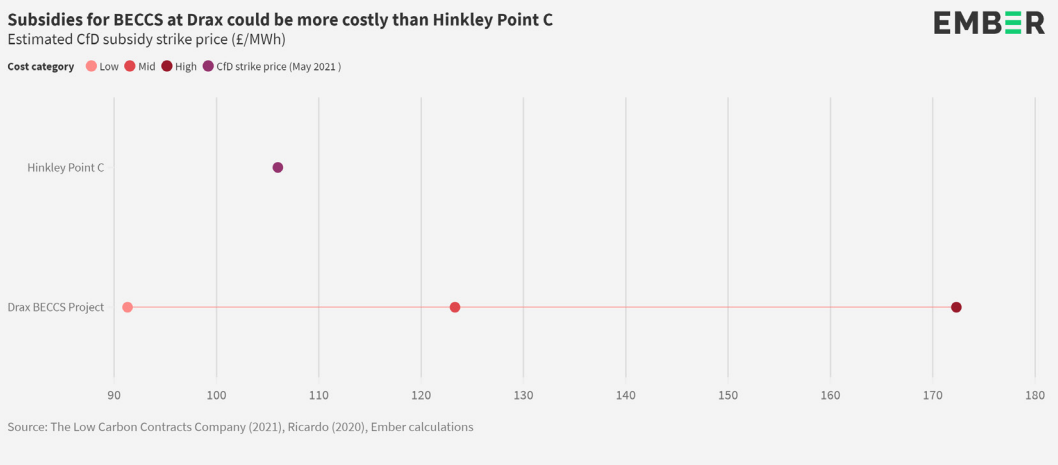
7. Drax Group (2021) 'Business Model Options' https://www.drax.com/energy-policy/supporting-the-deployment-of-bioenergy-carbon-capture-and-storage-beccs-in-the-uk-business-model-options/
8. Drax Group (2021), 'Achieving UK climate goals is £4.5bn cheaper with BECCS at Drax', https://www.drax.com/press_release/achieving-uk-climate-goals-is-4-5bn-cheaper-with-beccs-at-drax/
9. Ricardo Energy and Environment (2020), Analysing the potential of bioenergy with carbon capture in the UK to 2050 Summary for policymakers, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/911268/potential-of-bioenergy-with-carbon-capture.pdf

Estimates for the subsidy cost of Drax BECCS plant

The average of mid-range estimates for the total cost to the consumer of Drax's BECCS plant is £31.7 billion, with costs ranging from £23.5 billion to £44.3 billion.

In research by Wood Group (2018) and Ricardo (2020), a BECCS plant has an assumed lifetime of 25 years. Therefore we've assumed a 25 year CfD contract.

	Subsidy low (£bn)	Subsidy mid (£bn)	Subsidy high (£bn)
BEIS/ Ricardo (2020)	£23,497	£31,731	£44,340



Methodology for estimating BECCS subsidy

1. Ember has taken BECCS cost estimates from the Ricardo Energy & Environment 2020 report on the potential of BECCS in the UK to 2050[10] commissioned by BEIS. The central cost estimate from this report is £181/MWh. For comparison, recent UK offshore wind projects are contracted at £47/MWh,[11] and Hinkley C nuclear power station's contract is £106/MWh.[12]
2. If Drax wins a Contracts for Difference at this level, they will receive a top-up from the wholesale electricity price. BEIS estimates the wholesale price of electricity will average **£58/MWh** over the course of the next decades.[13]
3. In 2020 Drax's 4 biomass units generated **14.1TWh** of electricity (without CCS).
4. The capture plant of a CCS project uses a significant amount of electricity, which Drax estimates will reduce usable capacity by ~25%.[14] Using Drax's estimate, Ember calculates this would leave **10.2TWh** of usable BECCS generation upon which the CfD would be calculated.
5. Ember uses this generation estimate to calculate total CfD subsidy due to Drax.

There are a variety of types of carbon capture, but we use post-combustion plant figures here, as Drax has stated an intention to pilot amine post-combustion carbon capture.[15] The BEIS/Ricardo research shows costs for NOAK plant (nth-of-a-kind), whereas the Drax plant will be FOAK (first-of-a-kind) and there is a likely cost premium for initial demonstrations of a technology.

10. Ricardo Energy and Environment (2020), Analysing the potential of bioenergy with carbon capture in the UK to 2050 Summary for policymakers, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/911268/potential-of-bioenergy-with-carbon-capture.pdf
11. Low Carbon Contracts Company (2021), 'Dogger Bank A P1', https://www.lowcarboncontracts.uk/cfds/dogger-bank-a-p1
12. Low Carbon Contracts Company (2021), 'Hinkley Point C', https://www.lowcarboncontracts.uk/cfds/hinkley-point-c
13. BEIS (2020), Updated energy and emissions projections: 2019, https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2019
14. "When converted to BECCS, Drax units are de-rated from 630 MW to 460 MW" Baringa Partners LLP (2021), Value of Biomass with Carbon Capture and Storage (BECCS) in Power - Summary Report, https://www.drax.com/wp-content/uploads/2021/04/Drax-Baringa-Report-Summary-2021.pdf
15. Drax Group (2020), 'Negative emissions pioneer Drax and leading global carbon capture company – Mitsubishi Heavy Industries Group – announce new BECCS pilot', https://www.drax.com/press_release/negative-emissions-pioneer-drax-and-leading-global-carbon-capture-company-mitsubishi-heavy-industries-group-announce-new-beccs-pilot/

Ricardo (2020) estimates a premium of 25% for the first plant, suggesting the figures Ember have calculated are conservative. Similar BECCS cost estimates are available from research by Wood Group (2018)[16] and the Climate Change Committee (2020),[17] but we haven't used them in this paper as they are not specific to amine post-combustion capture plant.

Key Assumptions

- 25 year subsidies
  - » Ember's assumption of a 25 year contract length is conservative - the plant's lifetime could be between 25 and 40 years if other UK power stations are a guide. Capacity Market contracts for new build gas run for 15 years, as do current wind CfDs. However, much longer contracts are available, and it would be expected that BECCS plants, with a high capex and very high opex, may require a longer contract to turn a profit. Hinkley C's CfD contract is guaranteed for 35 years.
- Drax converts the full four biomass units to BECCS
  - » Drax currently has 2.6GW of biomass capacity: 4 biomass units each with a capacity of 650MW.
  - » Drax's initial planning application lists 2 biomass units for conversion to BECCS, but by 2035 Drax plans to convert all 4 units.[18]
- The BECCS plant runs near to baseload for the duration of the subsidy contract
  - » Barring some significant outages, Drax has run its current biomass units as baseload, and given the value of the BECCS plant would be in the CO_2 produced for negative emissions, it is planned to run baseload.
- Future power price
  - » We use BEIS assumptions in these calculations. Large amounts of cheap wind & solar could drive power prices lower (increasing the size of the CfD subsidy necessary to the BECCS plant).

16. Wood Group Plc. (2018), Assessing the Cost Reduction Potential and Competitiveness of Novel (Next Generation) UK Carbon Capture Technology, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/864688/BEIS_Final_Benchmarks_Report_Rev_4A.pdf
17. Sector Summary: Electricity Generation (2020) The Climate Change Committee https://www.theccc.org.uk/publication/sixth-carbon-budget/
18. Drax Group (2019), Capture For Growth, https://www.drax.com/energy-policy/capture-for-growth-zero-carbon-humber-report/#chapter-1

- Future carbon price
  - The EU ETS carbon price and UK carbon price support have historically driven power price increases, and the UK ETS could continue this trend, although the presence of dispatchable low-carbon generation (Hydrogen / Gas CCS / Long-term energy storage) would begin to decouple this relationship. We use the most recent wholesale power price forecast from BEIS which contains an implicit carbon price.
  - Ricardo (2020) assumes a 90% capture rate, and applies a carbon price to the 10% of emissions not captured.
- Development of CO_2 transport and storage infrastructure
  - Drax will not move forward with the BECCS project without government backed development of the CO_2 pipeline and CO2 injection site in the North Sea, specifically the project proposal from Zero Carbon Humber.

Calculating the additional cost on energy bills

Ember estimates the new BECCS plant, at a total subsidy of £31.7 billion, would add around £16 a year to each UK household's energy bill.

Contracts for Difference (CfD) subsidies are funded by a levy on electricity suppliers, and so directly add to electricity bills, when the strike price agreed is above the wholesale electricity price. In the UK, 36% of electricity is used by residential households, with the remainder being used by business and industry.[19] In 2020, the Office for National Statistics estimates there were 27.8 million households in the UK.[20] By dividing the total subsidy across the 25 year plant lifetime, and then again by the percentage of electricity used by households, Ember is able to estimate that each household would pay an extra £16.44 on their electricity bill each year to fund the Drax BECCS plant. As the CCC points out, household energy bills in total are continuing to fall as a result of more efficient appliances and lower electricity use, and as subsidy-free wind and solar begin to generate, we may see electricity bills fall in total.

19. The Climate Change Committee (2017) Energy Prices and Bills https://www.theccc.org.uk/wp-content/uploads/2017/03/Energy-Prices-and-Bills-Committee-on-Climate-Change-March-2017.pdf
20. The Office for National Statistics (2021) Families and Households in the UK https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/bulletins/familiesandhouseholds/2020

Why is it incorrect to assume biomass is carbon neutral?

BECCS refers to the combination of CCS with a range of different bioenergy technologies, such as biomass or biogas derived from agricultural wastes or dedicated energy crops. However, in the case of Drax's project it will occur through the capturing of emissions released by burning wood derived from forests, whilst generating electricity.

The ability of BECCS to deliver negative emissions is founded on the assumption that burning wood to generate power is a carbon-neutral process across timeframes relevant to meeting climate-goals. It is assumed that if burning wood is carbon neutral then capturing its emissions will result in negative emissions. However, there is a significant and growing body of evidence that burning wood to generate power can cause near-term increases in carbon emissions, undermining climate goals and accelerating climate change.

> *"The use of...biomass for energy cannot be considered to be automatically carbon-neutral under all circumstances, though most policy frameworks treat it as though it is. In reality, carbon dioxide and methane will be emitted from the combustion of woody biomass...and from its supply chain of harvesting, collecting, processing and transport."*
>
> **- Chatham House (2017)**[21]

The carbon neutral status of wood arises from the idea that an equal amount of carbon as is released into the atmosphere through burning wood is reabsorbed through the growth of new wood in the form of forests, resulting in net zero carbon emissions. However, while burning wood instantly releases carbon, regrowth of trees takes time to occur. Depending on the type of wood burned (e.g. small branches or whole trees) carbon can remain in the atmosphere for decades or centuries.[22]

The magnitude of carbon impacts of burning wood, and the timescales over which they occur, can vary greatly.

21. Brack, D., (2017), Woody Biomass for Power and Heat Impacts on the Global Climate, https://www.chathamhouse.org/sites/default/files/publications/research/2017-02-23-woody-biomass-global-climate-brack-final2.pdf
22. Matthews, R. et al., (2014) Review of literature on biogenic carbon and life cycle assessment of forest bioenergy, Forestry Commission, https://ec.europa.eu/energy/sites/ener/files/documents/2014_05_review_of_literature_on_biogenic_carbon_report.pdf

Impacts depend on the type of wood used, the effects on forest carbon sinks of harvesting wood for bioenergy, the emissions involved in drying, pelleting and transporting wood, and comparisons of wood-burning projects against counterfactual situations in which wood is not burned.[23] In theory, burning wood can be considered low-carbon or carbon-neutral only in limited cases: forestry products must be prioritised for higher carbon-saving non-energy uses; and harvesting wood to be burned for power results in improvements in forestry management and increases carbon stocks.

However, given the number of variables across the wood supply chain that must be satisfied in order for wood to achieve carbon neutrality over climate-relevant timeframes and the difficulties in accurately measuring the impact of the bioenergy industry on forests, there is considerable scope for disagreement and debate among different stakeholder groups on the carbon impacts of burning wood for power.

For example, Drax claim that their supplies of wood, which include stemwood (whole trees) deemed too poor quality for use in commercial timber production, satisfy the above criteria. However, a recent report by the Joint Research Centre of the European Commission suggests that the types of wood actually likely to satisfy these variables are limited to fine woody debris such as thin branches that fall from trees as they are harvested.[24]

Although it is very difficult to accurately quantify the carbon impacts of burning wood for power, it is clear that the practice carries significant risks to the climate and cannot be assumed to be carbon-neutral. Indeed as the European Academies Science Advisory Council have stated: "*applying the simplistic concept of carbon neutrality has led to an expensive policy which is increasing atmospheric levels of CO_2 and worsening rather than mitigating climate change for indeterminate periods of time*".[25]

Currently it is assumed that BECCS is able to deliver a known quantity of negative emissions across a clearly defined timeframe. However, given that the ability of BECCS to deliver negative emissions relies on the carbon neutral status of burning biomass, if it cannot be ensured that all biomass burned in a BECCS project can be considered carbon neutral over climate-relevant timeframes, then there can be no certainty over the scale of negative emissions and the timeframe over which they are delivered.

23. Matthews, R. et al., (2018) Carbon impacts of biomass consumed in the EU, Supplementary analysis and interpretation for the European Climate Foundation
24. Camia A. et al., (2021), The use of woody biomass for energy purposes in the EU, Joint Research Centre, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC122719/jrc-forest-bioenergy-study-2021-final_online.pdf
25. Norton, M. et al., (2019) Serious mismatches continue between science and policy in forest bioenergy, https://onlinelibrary.wiley.com/doi/full/10.1111/gcbb.12643

Therefore, the ability of BECCS projects, such as that proposed by Drax, to deliver timely negative emissions at the scale proposed must be called into question and treated with great caution. Accordingly, awarding a multi-billion pound contract to Drax's for a BECCS project that cannot guarantee delivery of negative emissions represents an extremely risky investment of large-scale public funds.

Drax's previous attempt at CCS – The White Rose coal CCS project

Drax's proposed BECCS project is not the company's first foray into CCS technology. The *White Rose Carbon Capture and Storage* project sought to combine 426MW of coal-fired electricity generation with CCS technology and was proposed as a bid for the then government's £1bn CCS commercialisation competition programme. However, before the project could get further than FEED/feasibility studies it was cancelled, following the government's withdrawal of funds over concerns about the excessive costs to taxpayers that the project would incur.

Estimating the scale of BECCS being called for

In recent years, deployment of large-scale BECCS has emerged as one of the most popular tools used by policy-makers when plotting pathways to net-zero. For example, the CCC Sixth Carbon Budget estimates 58Mt of greenhouse gas removals a year in the UK by 2050, with around 20Mt of this accounted for by BECCS in the power sector.[26] If Drax is fully converted they claim they will deliver 16Mt of negative emissions a year, almost meeting the CCC's estimate. National Grid ESO go further than this in their 2020 *Future Energy Scenarios*[27,28], estimating that to reach net-zero, 49-61Mt of annual carbon removals would need to be delivered through BECCS in the power sector by 2050. Achieving these levels of carbon removals would require 51.8-63.7TWh of BECCS annually by 2050; equivalent to four or five Drax power plants.

Given the concerns about the ability of BECCS projects such as that proposed by Drax to deliver negative emissions, outlined above, heavy reliance on BECCS to deliver negative emissions and achieve net-zero constitutes a serious policy risk.

26. The Climate Change Committee (2021), Sixth Carbon Budget, https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf (page 198)
27. National Grid ESO, (2020) Future Energy Scenarios 2020, https://www.nationalgrideso.com/future-energy/future-energy-scenarios/fes-2020-documents
28. Ember (2020), Gambling with Biomass, https://ember-climate.org/commentary/2020/10/28/gambling-with-biomass/

Alternative sources of negative emissions

This paper exists to scrutinise the subsidy implications of Drax's proposed BECCS project and highlight the uncertainty around its ability to deliver negative emissions. This paper does not, however, seek to entirely discount any possible contribution BECCS may be able to make to reducing carbon emissions. Instead, we strongly advise a cautious approach to BECCS and call for better understanding of the climate and economic implications of BECCS before large-scale public investments are made.

As discussed above, BECCS currently plays a pivotal role in a number of decarbonisation plans. However, there is increasing concern that this status is not based on a thorough investigation of BECCS and comparisons against alternatives, but instead on a view of BECCS as 'low-hanging fruit' — based in part on the flawed and risky assumption that burning biomass for energy is carbon neutral.[29]

> *"The danger at the moment is that policymakers are 'sleepwalking towards BECCS' simply because most models incorporate it – or, almost as bad, it may be that they are simply ignoring the need for any meaningful action on [carbon dioxide reduction] as a whole"*
>
> **Chatham House (2020)[30]**

While BECCS may have a role to play in emissions reductions, it should not monopolise attention. Possible alternative sources of negative emissions include: nature-based solutions; direct air carbon capture and storage (DACCS); and methods of more rapid and deep emissions abatement to reduce requirements for negative emissions through further societal action, such as dietary changes or development of the circular economy.

29. Brack, D. and King, R. (2020), Net Zero and Beyond: What Role for Bioenergy with Carbon Capture and Storage?, https://www.chathamhouse.org/sites/default/files/CHHJ7830-BECCS-RP-200127-WEB.pdf
30. Ibid.

The current consumer cost of biomass at Drax - subsidy & carbon tax exemption

Due to the costly nature of the wood pellets burned at its power stations, Drax is unable to generate profit from producing and selling electricity. As a result, Drax is entirely reliant on public subsidy to operate. As we have previously reported[31], in 2020 Drax earned £832m in public subsidy and an additional £258m in carbon-tax breaks. We have calculated that from 2012 until 2027, when its subsidy support runs out, Drax will have collected more than £10 billion in subsidies. This figure is all the more extraordinary considering wind and solar generation, which guarantee real emissions reductions, are now effectively subsidy free, and therefore represents a poor use of public funds.

31. Ember (2021), 'Drax received more than £800m in biomass subsidies last year - with no obvious climate benefit', https://ember-climate.org/commentary/2021/02/25/drax-biomass-subsidies/

Recommendations

The principal message of this briefing is that **the government must proceed cautiously with support for BECCS until the negative emissions it is paying for are guaranteed** - within a timescale relevant to achieving the UK's climate ambitions. Before contracting a commercial-scale plant, more needs to be understood about the true carbon cost of imported forest biomass over timescales compatible with the Paris Agreement - and the very high-carbon scenarios completely ruled out.

1. To facilitate the necessary public debate over BECCS, **Drax should publish estimates for the subsidy requirements for BECCS** - and a full lifecycle assessment of the carbon impact of their biomass feedstocks, with realistic counterfactuals.

2. In the Sixth Carbon Budget, the Climate Change Committee state "the development of BECCS is contingent on sourcing sustainable biomass, given concerns over the associated lifecycle emissions". **It is essential that UK regulations on sustainable biomass are tightened.**

3. With BECCS playing an important role in many climate scenarios, less risky routes for biomass feedstock should be explored - **especially in sourcing domestic energy crops** on degraded land, which are less likely to have a large emissions impact.[32]

4. Carbon accounting isn't just messy when it comes to biomass imports - the UK's carbon budgets also bundle emissions mitigation and negative emissions. **To give clarity on the scale of negative emissions necessary under our 2050 net zero law, residual emissions and negative emissions budgets should be unbundled.**

5. Given BECCS cannot yet be relied upon to provide true net negative emissions, **there's an urgent need to understand other routes to provide negative emissions** - and reconsider the potential for further emissions mitigation to minimise the requirement for net negative emissions.

32. Chatham House (2020) Is BECCS carbon-negative? "*establishing energy crops on marginal lands can result in much faster carbon neutrality and much deeper carbon dioxide removals over time*" https://www.chathamhouse.org/2020/01/net-zero-and-beyond-what-role-bioenergy-carbon-capture-and-storage-0/beccs-carbon-negative


EMBER
COAL TO CLEAN ENERGY POLICY