National Audit Office

REPORT

The government's support for biomass

Department for Energy Security & Net Zero

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Key facts

£22bn

government support to businesses using biomass to generate power and heat – 2002 to 2023, in cash terms

11%

of UK electricity generated from biomass (known as bioenergy) in 2022

6.4%

of UK heat generated from biomass in 2021

3,000 megawatts	combined generating capacity of the two largest biomass power stations – Drax and Lynemouth
£6.5 billion	net amount in cash terms of government and consumer funding received by Drax, the largest recipient of the Renewables Obligation and Contracts for Difference schemes, between 2002 and 2023
£9.3 million	the average amount received by each generator via the Renewables Obligation, excluding the largest recipient Drax, between 2002 and 2023, in cash terms
9.1 million	tonnes of wood pellets imported to the UK for use in energy production in 2021
66%	of biomass used in UK electricity generation, heat and transport in 2022 was from domestic feedstocks

Note

1 Participants in the Renewables Obligation scheme are given Renewables Obligation Certificates for the power they generate. These certificates have a maximum notional value and are traded or sold to energy suppliers. The figures quoted in this report are based on the maximum notional value of the certificates issued.

Summary

1 Biomass, such as plants or food waste, can be used to generate power or heat, or made into biofuel for vehicles or other uses.[1] Since 2002, the government has provided financial support for businesses and households using biomass for power and heat because of its potential to be a low-carbon alternative to fossil fuels. Over that time, the use of biomass in energy production has increased significantly. For example, in 2022, biomass-fuelled power stations accounted for 11% of total UK electricity generation, an increase of around eight percentage points compared with 2010. Much of this power comes from biomass stations at Drax and Lynemouth, which have generating capacities of 2,580 Megawatts (MW) and 420 MW respectively. These large biomass power stations typically burn wood pellets, 9.1 million tonnes of which were imported into the UK in 2021. Unlike some other methods of generating electricity, such as solar and wind, biomass is not intermittent and can be used at critical times to support the electricity grid. The use of biomass to generate heat has increased significantly as well, more than doubling between 2010 and 2021 to account for 6.4% of UK heat generation. In 2022, 66% of biomass used in UK heat, electricity and transport was from domestic sources.

2 The government sees biomass as a low-carbon fuel, provided that it is produced from sustainable sources. For biomass to fulfil this potential though, government must have an assurance system that gives it confidence that the biomass is made up of genuinely sustainable resources. The government sees biomass as having a significant role in decarbonising many sectors of the economy ranging from transportation, power generation, industry and residential emissions. If sustainable biomass is enabled with carbon capture and storage, it could generate negative emissions. This is because biomass absorbs carbon as it grows. If, rather than being released back into the atmosphere when it is burnt to generate heat or power, the carbon is captured and stored it would result in an overall net decrease in atmospheric carbon dioxide. Although no UK biomass generators currently have the capability to capture and store carbon, the government is planning for this in the future. This would give sustainable biomass the potential to offset residual emissions in harder-to-decarbonise sectors, such as aviation. The Climate Change Committee (CCC), government's independent adviser on progress towards its climate ambitions, has said that sustainably harvested biomass can play a significant role in meeting long-term climate targets, provided it is prioritised for the most valuable end-uses.

1 Some biomass feedstocks, such as wood pellets, are burned to produce heat and energy. Other biomass feedstocks, such as biogenic waste used in anaerobic digestion, are used to produce fuels (in this case biomethane) that are burnt. For simplicity, we refer to biomass being burnt throughout the report.

3 The Department for Energy Security & Net Zero (DESNZ) has overall responsibility for government's approach to supporting biomass. In August 2023, DESNZ published its *Biomass Strategy* setting out the significant role it considers biomass can play in achieving net zero by 2050. This included actions for strengthening sustainability criteria covering biomass use; prioritising the use of biomass given its limited supply; and the potential for biomass to be used in conjunction with carbon capture and storage, known as BECCS. The Office of Gas and Electricity Markets (Ofgem) administers the government schemes that provide the majority of financial support for biomass in the heat and power sectors – the Renewables Obligation and the Renewable Heat Incentive.

Scope and purpose of this report

4 This report examines:

- the current role of biomass in generating heat and power, and the responsibilities in government for biomass (Part One);
- the government schemes currently in place to support the deployment of biomass, how much they have cost, and how the government makes sure scheme participants meet sustainability criteria (Part Two); and
- the main features of DESNZ's *Biomass Strategy* (Part Three).

5 The purpose of this report is to support Parliament's understanding of the conditions in which the government considers biomass as a sustainable, low-carbon alternative to fossil fuels. It looks into government's compliance regime for the current support schemes and identifies lessons that it should incorporate into current and future support schemes. The report highlights the main risks DESNZ will need to manage as it takes forward its *Biomass Strategy* and the impact these risks could have on its overall ambition to achieve net zero.

6 This report focuses on government support and oversight of biomass use in the power and heat sectors. Biomass is also used in transport, primarily in the form of biodiesel and bioethanol blended into standard diesel and petrol. These fuels are outside the scope of this report.

Key findings

Government support for biomass as a low-carbon alternative to fossil fuels

7 The government and CCC consider biomass to be low carbon only if generators adhere to certain sustainability criteria. Burning biomass derived from plants and trees releases carbon dioxide into the atmosphere in much the same way as burning fossil fuels. However, provided that the biomass came from a sustainable source, such as a well-managed forest, the carbon can be reabsorbed as it regrows in a relatively short time. This means that the net carbon impact over the whole process (including regrowth) will be much less than burning fossil fuels which cannot be replenished. For schemes where it provides support for biomass generators, the government has set sustainability criteria that focus on the land from which the biomass is sourced and its life cycle greenhouse gas emissions, including from cultivation, harvesting, transportation and processing (paragraphs 1.2 to 1.6 and paragraph 2.8)

8 Between 2002 and 2023, the government provided £22 billion of support in cash terms to businesses using biomass through a combination of consumer- and taxpayer-funded schemes. This includes:

- £14.1 billion consumer-funded support through the Renewables Obligation (RO) scheme, which looks to encourage the generation of electricity from renewable sources. As the largest biomass electricity generator in the scheme by some distance, Drax received £5.1 billion (36%) of this funding. The remaining £9.1 billion went to 973 generators (an average of £9.3 million per generator);
- Consumer-funded support with a net worth of £2 billion to date through Contracts for Difference (CfD). Drax has received net payments of £1.4 billion through these contracts and a second large power station, Lynemouth, has received £0.6 billion. A third large biomass station, MGT Teesside, began generating electricity under a CfD in September 2023. These contracts mean generators receive a fixed price for the electricity they generate, supported by consumer-funded top up payments collected through energy bills; and
- £5.5 billion through the Renewable Heat Incentive (RHI), a taxpayer-funded scheme to encourage homes and businesses to install low-carbon heating systems which can include biomass (paragraphs 1.15 and 2.3 to 2.5, Figures 5 and 6).

Ensuring compliance with sustainability criteria

9 Scheme rules require participants to submit regular information to Ofgem to demonstrate their compliance with sustainability criteria. The assurance arrangements were set in legislation when the government first introduced sustainability criteria in 2015 and aim to balance monitoring compliance with the challenges posed by the long, complex supply chains for biomass. For both the RO and CfD schemes, legislation requires scheme participants, depending on their capacity, to submit monthly information to Ofgem stating that they have complied with land and greenhouse gas emissions criteria. Generators are allowed to use third-party certification schemes, approved by the European Commission or recognised by the UK government, to demonstrate compliance. Generators need to demonstrate that 70% of any woody biomass burnt has met sustainability criteria for land from which the biomass has been sourced. The legislation also requires solid biomass and biogas stations with a generating capacity of one megawatt or more (and all bioliquid stations regardless of capacity) to confirm the accuracy of the sustainability information they submit by commissioning an independent, limited assurance audit report each year. Ofgem told us that it reviews the annual sustainability reports to ensure that they meet the reporting requirements set out in legislation. DESNZ considers these arrangements a proportionate approach to give government sufficient confidence in the credibility of the sustainability criteria for existing schemes (paragraphs 2.6 to 2.14, Figures 7 and 8).

10 Ofgem is currently carrying out an investigation into Drax Power Limited. Drax Power Limited falls under the compliance regime established in legislation. On 31 May 2023, Ofgem announced it was investigating whether Drax Power Limited was in breach of annual profiling reporting requirements relating to the RO scheme and other related matters. The annual profiling requirements mean generators with capacity greater than 50kW must submit information annually on the sustainability characteristics of their biomass used during the previous year such as the forest where it was grown and a description of forestry management practices. Ofgem has stated that the investigation does not imply that it has made any findings about possible non-compliance by Drax Power Limited. It expects to report in 2024 (paragraphs 2.14 to 2.15).

11 The government plans to strengthen its sustainability criteria for future support. DESNZ has reported that stakeholders have mixed views about the current sustainability criteria: in a recent call for evidence, roughly the same proportion of respondents stated that the current criteria were sufficient as stated that they were not. As part of its *Biomass Strategy*, DESNZ committed to develop and then consult on a common sustainability framework which can be applied to new future biomass policies and schemes across a range of applications. This framework will also consider issues such as biodiversity. Our experience from auditing other areas of government shows that to gain the necessary assurance about more stringent rules, DESNZ will need to commit more resources to monitoring and compliance. DESNZ has also committed to considering whether a requirement should be introduced that 100% of woody biomass is sustainable against the land criteria, rather than the current 70% (paragraphs 3.6 and 3.7).

12 The government has not evaluated whether the current arrangements provide adequate assurance that firms are complying with sustainability requirements. Good practice for any arrangements to manage non-compliance is to ensure controls are evaluated to assess how they are performing and to identify new and emerging risks. DESNZ has not reviewed the existing arrangements but accepts that its work to develop a cross-sector sustainability framework would be an opportune moment to review existing arrangements and consider how changes could be implemented in future schemes. It is planning to run a pilot between October 2023 and April 2024 with a range of generators on the Renewables Obligation scheme on increasing the requirements on data reporting by generators on their biomass feedstocks and supply chains. It hopes that this additional information would increase transparency and improve public trust. Ofgem told us that it had carried out its role in line with the assurance measures required by legislation, and that it has not reviewed the effectiveness of the current approach which is established in legislation, though it is happy to share its expertise to support the government in any such review. Ofgem also considers a review of the effectiveness of the current regimes would be a significant undertaking given the scale and complexity of the supply chain. An assessment of the current approach, which relies mainly on information provided by generators, would indicate how effective it has been at ensuring compliance and should help inform the development of a regime to monitor stronger sustainability criteria (paragraphs 2.18 to 2.22).

Risks to implementing the *Biomass Strategy*

13 There is limited biomass available, so departments across government will need to work together to prioritise how it is used. The government expects global demand for biomass to increase in the medium- to long-term as countries employ it in their efforts to reduce carbon emissions. This could create further pressure on supplies as there are competing priorities for land use in the UK which limit the potential to increase domestic biomass production, including reforestation and food supplies. DESNZ has set out four principles for guiding the use of biomass as it is a limited resource. These are: sustainability; air quality; net zero; and contribution to the circular economy and resource efficiency. The government has identified BECCS as a priority intervention in the long term (paragraphs 3.3 to 3.5 and 3.9).

14 Biomass's ability to generate negative emissions relies on the success of government's programme to develop carbon capture utilisation and storage (CCUS). There are no BECCS plants currently operating in the UK. DESNZ has a programme to promote CCUS technology and is negotiating commercial terms with a first wave of eight carbon capture projects. None of these are BECCS plants, although BECCS plants could be successful in later phases of the CCUS programme. On 16 January 2024, the Secretary of State for Energy Security and Net Zero granted development consent for Drax's BECCS project. DESNZ is considering whether to provide transitional support to large scale biomass generation, such as Drax and Lynemouth beyond 2027, when both their CfDs and Drax's support through the RO is due to finish, to enable them to convert to BECCS in the future (paragraphs 3.10 to 3.12)

15 If biomass cannot make the contribution to achieving net zero that government currently expects, DESNZ may need to increase activity in other areas. If DESNZ needs to lower its expectations around the contribution that biomass can make, either because of the supply or compliance challenges outlined above, it may require additional action elsewhere to achieve its net zero target. This could include increasing the capacity of other types of greenhouse gas removals technology, greater behaviour change or innovation. The CCC has said that in scenarios in which residual emissions are highest due to lower overall levels of behaviour change and innovation, achieving net zero is more dependent on technologies that remove carbon dioxide from the atmosphere (paragraph 1.12).

Conclusion

16 The government is relying on biomass, in combination with CCUS, to make a significant contribution to its net zero goals. For biomass to fulfil this role the government needs to be confident that the industry is meeting high standards of sustainability. Its current monitoring arrangements rely on a combination of information provided by generators, third-party certification schemes and limited-assurance audit reports. DESNZ considers this a proportionate approach that provides it sufficient confidence in the credibility of the sustainability criteria for existing schemes. But in our view the lack of an evaluation of how effective these arrangements have been, particularly given the long supply chains involved, means the government cannot demonstrate that its current arrangements are adequate to give it confidence industry is meeting sustainability standards.

17 The government must review the assurance arrangements for these schemes, including ensuring that it has sufficient resources to give it assurance over the billions of pounds involved. It should apply the lessons from its experience to date to make sure it has clarity about the roles, responsibilities and effectiveness of the different organisations that provide assurance around sustainability. Doing so will enable it to understand how its assurance approach will need to adapt to support its plans to strengthen sustainability criteria, and in response to increasing global demand for biomass.

Recommendations

18 In taking forward its *Biomass Strategy*, DESNZ should:

a as part of its commitment to consider whether a requirement that 100% of woody biomass is sustainable against its land criteria, define its risk appetite for non-compliance against this increased threshold and ensure a commensurate assurance approach.

b evaluate whether its current arrangements provide adequate assurance that generators are complying with sustainability criteria on the Renewables Obligation and Contracts for Difference schemes. This should include a detailed review of accreditation schemes such as the Sustainable Biomass Program, an estimate of the current rates of non-compliance, and an assessment of whether all parts of the system of oversight share a coherent view of the level assurance achieved.

c commission and then publish an assessment of the potential environmental impact of transitional support to large scale biomass generation beyond 2027, including clarification of how long it expects these subsidies to continue prior to being replaced by government support for BECCS.

d review annually its expectation of the contribution that BECCS will make to generating negative emissions and prepare in advance alternative options for achieving net zero in the event that BECCS's contribution is lower than currently expected.