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REPORT

The government's support for biomass

Department for Energy Security & Net Zero

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National Audit Office

The government's support for biomass

Department for Energy Security & Net Zero

Report by the Comptroller and Auditor General

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Gareth Davies
Comptroller and Auditor General
National Audit Office

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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.

Part One

An overview of biomass

1.1 This part of the report:

- explains how biomass is used to generate energy;
- highlights the role biomass currently plays in the power and heating sectors;
- sets out the role biomass could play in achieving net zero; and
- sets out responsibilities for biomass policy across government.

The use of biomass to generate energy

1.2 The government defines biomass as "any material of biological origin, including the biodegradable fraction of products, crops, wastes and residues from biological origin". Biomass includes:

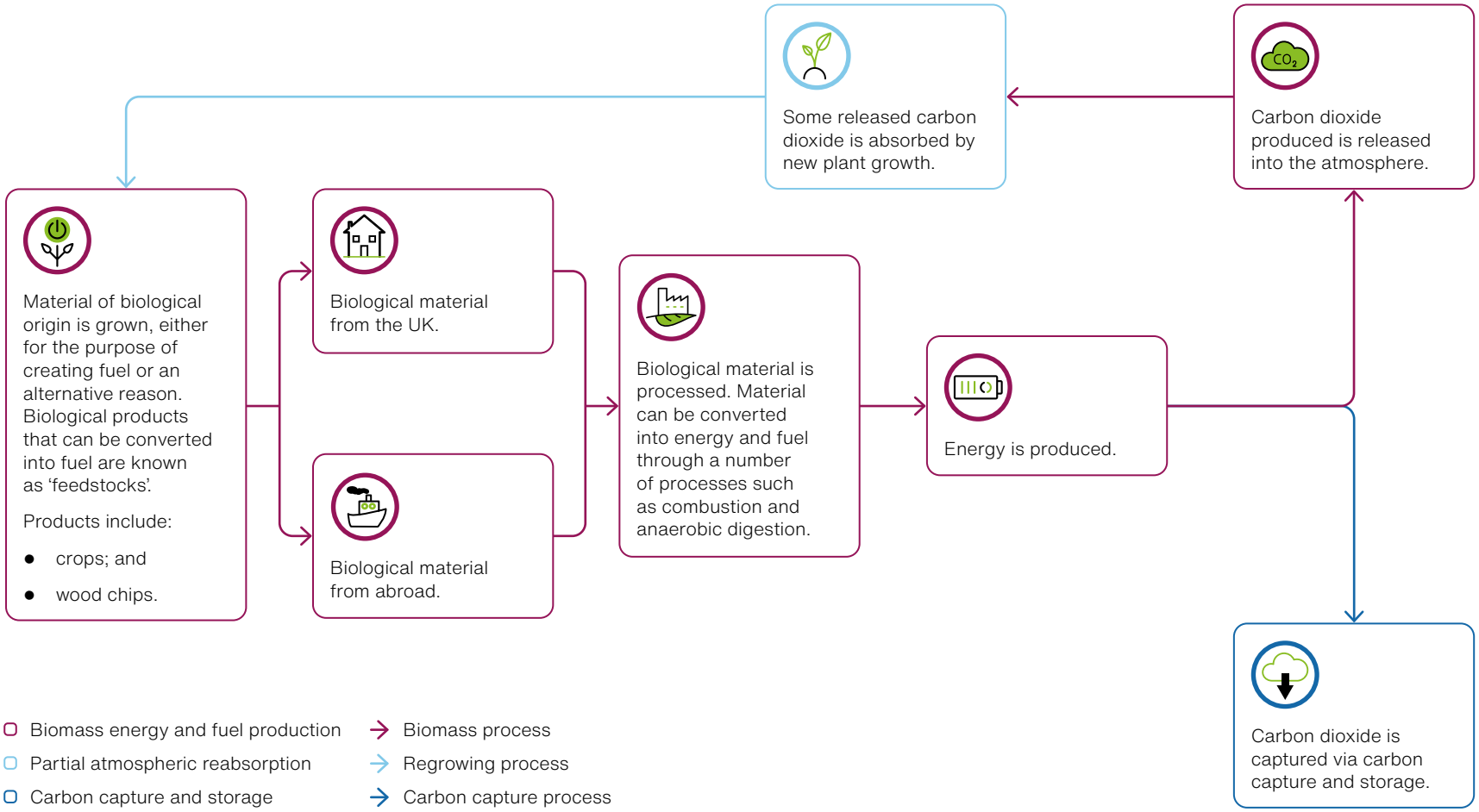
- purpose-grown annual crops such as maize and perennial energy crops such as miscanthus;
- biomass co-products and residues, such as sawdust from timber mills (one of the materials known as woody biomass[2]) and seed husks from sunflower oil production;
- biogenic waste, for example food waste and cattle slurry; and
- gases produced from biological waste, such as biogas from anaerobic digestion and from landfill, which can be upgraded to biomethane.

1.3 Biomass can be used to generate energy for heat or electricity. It can also be used as a transport fuel or grid gas. Burning biomass releases carbon dioxide (and other pollutants) into the atmosphere – such releases are subject to regulation. If the burning of biomass is combined with carbon capture technologies, most of this carbon dioxide will be captured and stored (**Figure 1**).

2 Woody biomass is derived from trees and shrubs.

Figure 1
Converting biomass into power and heat

A number of steps are required to convert feedstocks into power and heat



Notes

1 Combustion is the burning of feedstocks to produce energy and heat.

2 Anaerobic digestion is the process where microorganisms are used to breakdown biomass material without oxygen to produce fuels such as methane.

Source: National Audit Office analysis of Department for Energy Security & Net Zero's documents and publicly available data

1.4 The main biomass fuel used in the UK power sector is woody biomass. Much of this is imported from other countries, primarily in North America, in the form of wood pellets, produced from, for example, offcuts from the forestry industry and from residues, such as sawdust, from timber mills. In 2021 the UK imported 9.1 million tonnes of wood pellets for use in energy production. Around 60% came from the US, 18% from the EU and 16% from Canada.

1.5 The government and the Climate Change Committee (CCC, the government's independent adviser on its climate ambitions) both consider biomass to be a low-carbon alternative to fossil fuels, provided it is produced from sustainable sources. The government recognises that burning woody biomass releases carbon dioxide into the atmosphere. However, if it is sustainably sourced (for instance, from a managed forest) biomass can be regrown in a relatively short time and reabsorb carbon. It considers that the carbon released from biomass has been removed from the atmosphere recently, whereas burning fossil fuels releases carbon that has been stored for millions of years. Much of the biomass used in the UK, including many feedstocks for biomethane generation and wood pellets is derived from waste, co-products or residues. If they were not used as fuel, they would either be burnt (in the case of thinnings) without the energy generated being captured or released directly into the atmosphere (in the case of methane created by decomposing biological waste).[3] Burning these products for power or heat therefore does not create additional carbon emissions.

1.6 Some stakeholders have raised concerns about burning biomass to produce energy and heat because of the risk that feedstocks are being drawn from unsustainable sources and because of its potential impacts on air quality and biodiversity. The government recognises that burning biomass can have an impact on air quality as it can produce a range of pollutants that are harmful to human health (such releases are subject to regulation). It also recognises that there is a risk to biodiversity and soil health from growing crops for biomass feedstocks. In the past, the government has acknowledged that, if it is not sourced in a sustainable manner, burning biomass can have a larger carbon footprint than burning fossil fuels. The government has therefore put in place sustainability criteria for all schemes that support the use of biomass in the UK, requiring biomass users to demonstrate that their feedstocks come from sustainable sources.

3 Thinnings means the removal of some plants, or parts of plants, to make room for the growth of others.

Biomass's role in energy generation

1.7 Biomass plays an important role in the power sector. In 2022 it accounted for 11% of total electricity generation and 26.5% of renewable electricity generation (**Figure 2** on pages 16 and 17). Biomass's role in power generation has increased substantially since 2010 when it accounted for only 3.2% of total UK generation.

1.8 In the power sector, there are two large biomass stations: Drax with a generating capacity of 2580 megawatts (MW) of electricity and Lynemouth with a generating capacity of 420 MW of electricity.[4] A new biomass power station on Teesside with a capacity of 299 MW began generating electricity in September 2023. The remaining power from biomass is generated by smaller stations.

1.9 Biomass and waste have also played an increasing role in the heating of buildings since 2010 as homes and businesses have converted to biomass boilers. Biomass and waste accounted for 2.9% of UK heat generation in 2010 and this more than doubled to 6.4% in 2021 (**Figure 3** on pages 18 and 19).

The role of biomass in achieving net zero

1.10 The government plans for sustainable biomass to play a significant role in reducing UK carbon emissions as it offers a low-carbon alternative to fossil fuels in several sectors of the economy. It published its *Biomass Strategy* (the Strategy) in August 2023, setting its priorities for using biomass in the future.[5] The *Strategy* states that biomass has a wide range of potential uses in addition to heat and power. The Strategy is linked to 10 other strategy documents across a range of sectors, including for decarbonising transport and industry.

1.11 Biomass also has the potential to generate negative emissions, making it an important component of the government's net zero plans. To achieve net zero, any residual greenhouse gas emissions, such as from harder-to-decarbonise sectors like aviation, will likely have to be counterbalanced by activities that remove greenhouse gases from the atmosphere. These include planting trees or using technology, such as direct capture, that remove carbon from the atmosphere. Biomass has the potential to remove carbon dioxide from the atmosphere if it is combined with carbon capture technology – known as bioenergy with carbon capture and storage (BECCS). This would mean most of the carbon dioxide absorbed from the atmosphere during the growing of the feedstock is not released when it is burned for energy.[6]

4 Drax Power Station is made up of four generating units each with a capacity of 645 MW. Units 2, 3 and 4 are fuelled by biomass. Unit 1 was a co-firing unit that burnt both coal and biomass but switched to exclusively using biomass in April 2023.

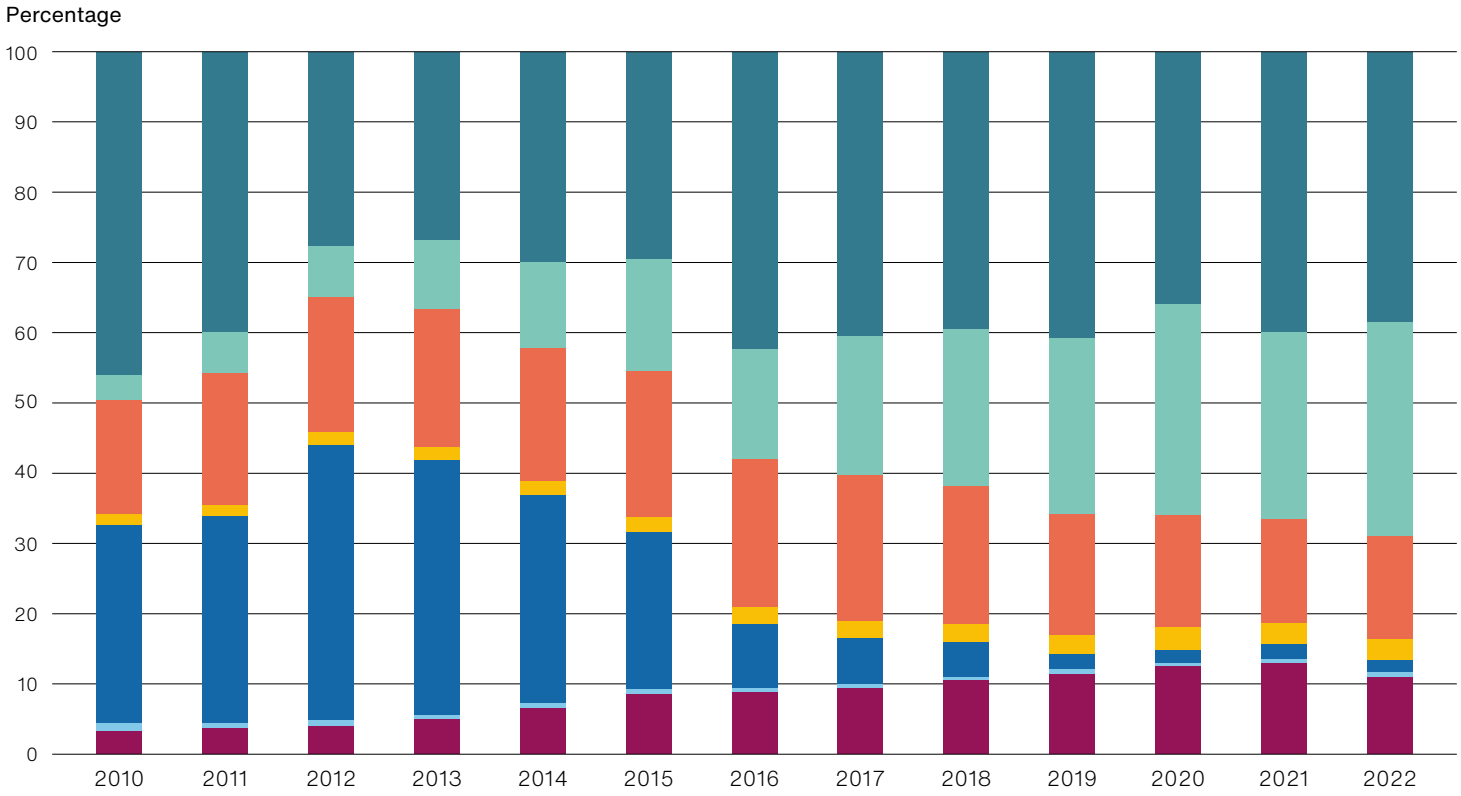
5 Department for Energy Security & Net Zero, *Biomass Strategy*, August 2023. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1178897/biomass-strategy-2023.pdf

6 Bioenergy carbon capture and storage (known as BECCS) – the carbon dioxide removed from the atmosphere and stored in biomass during its growth is captured during combustion and stored permanently rather than being released back into the atmosphere.

Figure 2

UK electricity generation by fuel type, 2010–2022

Electricity generation from bioenergy has increased since 2010



Type of electricity	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bioenergy	3	4	4	5	7	9	9	9	11	11	13	13	11
Oil	1	1	1	1	1	1	1	0	0	1	0	1	1
Coal	28	29	39	36	30	22	9	7	5	2	2	2	2
Other	1	2	2	2	2	2	3	2	3	3	3	3	3
Nuclear	16	19	19	20	19	21	21	21	19	17	16	15	15
Hydro, wind and solar	4	6	7	10	12	16	16	20	22	25	30	27	30
Gas	46	40	28	27	30	29	42	40	39	41	36	40	38

Figure 2 *continued*
UK electricity generation by fuel type, 2010–2022

Notes
1 Bioenergy is energy derived from biomass – material of biological origin including the biodegradable fraction of products, crops, wastes and residues from biological origin.
2 Electricity generated from biomass peaked in 2021 at 13% of total UK energy generation.
3 The 'other' category includes pumped storage (a type of hydroelectric storage) and 'other fuels'.
4 Percentages have been rounded to whole numbers, therefore do not always round to 100%.
5 In 2010 total UK electricity generation was 382.07 terawatt Hours (TWh) of this 12.3 TWh came from bioenergy. In 2022, total UK electricity generation was 325.26 TWh, of this 35.8 TWh came from bioenergy.

Source: National Audit Office analysis of Department for Energy Security & Net Zero data

1.12 Biomass plays a role in the UK achieving net zero carbon emissions by 2050 in all pathways plotted by the CCC. The CCC has developed five scenarios that present the government with information on the choices and uncertainties around the potential route to net zero. The CCC considers that the achievement of the net zero target is dependent on 'engineered solutions' like BECCS, with different levels per scenario depending on how widespread alternative methods such as behaviour change become.

1.13 The Department for Energy Security & Net Zero (DESNZ), which has overall responsibility in government for achieving net zero, has developed three illustrative scenarios for the potential role of biomass in achieving net zero. In all three scenarios, DESNZ considers biomass to be most cost-effectively used in BECCS technologies that provide the highest negative emissions while producing low-carbon energy. The Strategy also sets out the role of biomass in the production of biofuels which might be used in hard-to-decarbonise types of transport, such as aviation.[7] In all three scenarios, DESNZ uses its 'ambitious supply profile', which assumes higher levels of domestic energy crop planting and the continued availability of sustainable feedstock on international markets.

Roles and responsibilities

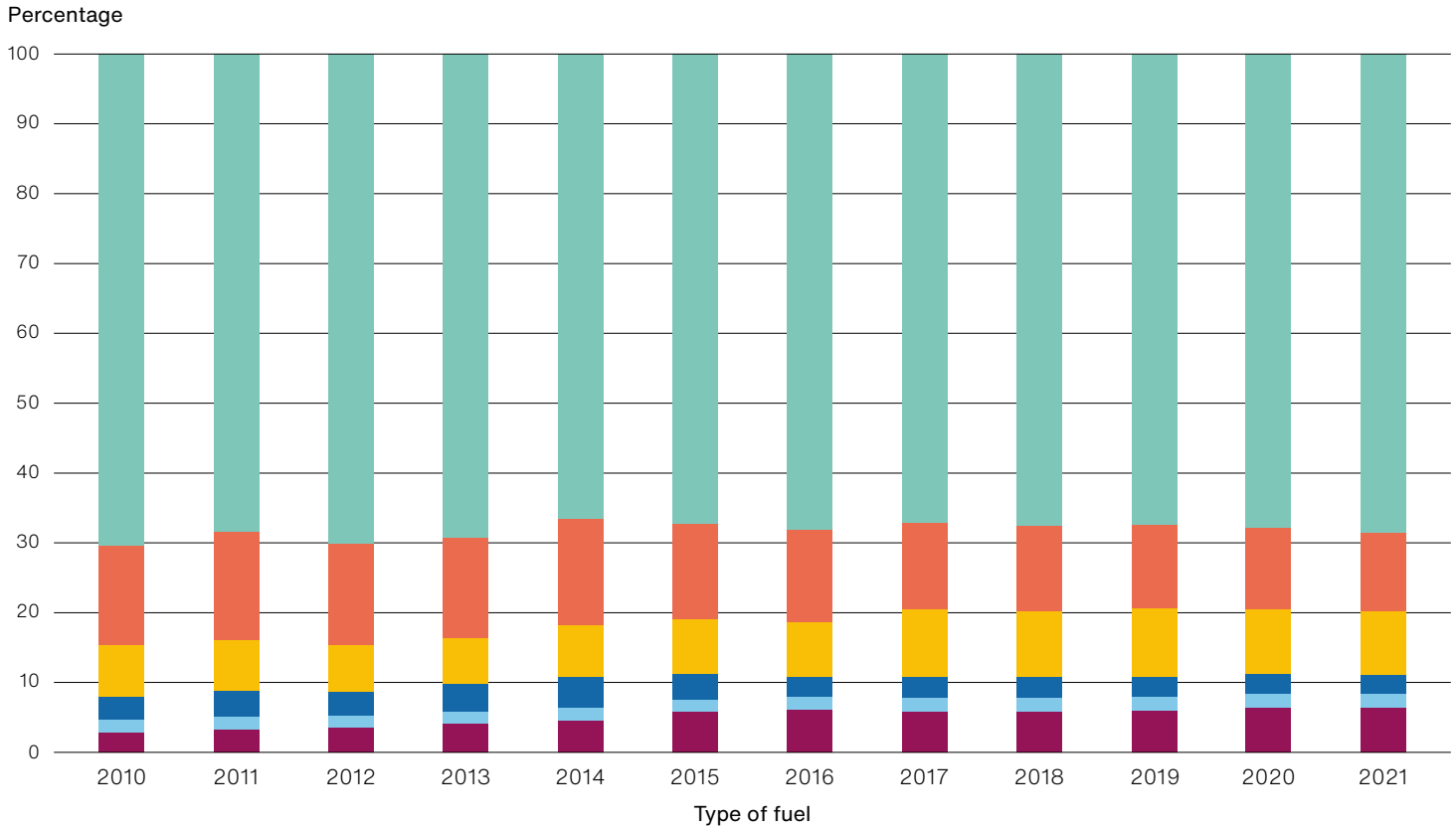
1.14 DESNZ has responsibility for the government's overall approach to biomass, set out its August 2023 *Biomass Strategy*. DESNZ also has lead responsibility for the decarbonisation of power, heat and heavy industry. It is responsible for the main government schemes that have supported biomass to date.

7 Biofuels include biokerosene and biodiesel.

Figure 3

UK heat generation by fuel, 2010–2021

In 2021, bioenergy and waste contributed more than 6 per cent to heat generation in the UK, having doubled from 3% in 2012



Type of fuel	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bioenergy and Waste	3	3	3	4	4	6	6	6	6	6	6	6
Heat sold	2	2	2	2	2	2	2	2	2	2	2	2
Solid fuel	3	4	3	4	4	4	3	3	3	3	3	3
Oil	7	7	7	7	7	8	8	10	10	10	9	9
Electricity	14	16	15	14	15	14	13	12	12	12	12	11
Gas	70	68	70	69	67	67	68	67	68	67	68	69

Figure 3 *continued*
UK heat generation by fuel, 2010–2021

Notes

1 These data show all heat produced in the domestic, services and industrial sectors. This covers the use of heat for space heating, water heating, cooking, process use, and drying.

2 Bioenergy is energy derived from biomass – material of biological origin including the biodegradable fraction of products, crops, wastes and residues from biological origin.

3 Solid fuel refers to various forms of solid material that can be burnt to release energy, providing heat and light through the process of combustion.

4 Heat sold is defined as heat that is produced and sold under the provision of a contract.

5 These data are inclusive of both domestic and commercial heat generation.

Source: National Audit Office analysis of Department for Energy Security & Net Zero data

1.15 In addition to DESNZ, a number of other central government bodies play a role in administering government support schemes that include biomass and in developing and implementing biomass-related policy in specific areas:

- Department for Transport (DfT): Leads on decarbonising all forms of transport in the UK, including road transport, shipping and aviation. Bio-fuels already play a major role in reducing emissions from road transport and DfT administers the Renewable Transport Fuel Obligation. This sets an obligation on fuel suppliers to provide a certain amount of renewable fuel as a proportion of their fossil fuel supply.
- Department for Environment, Food & Rural Affairs (Defra): Is responsible for setting standards and policies relating to land use, farming and forestry in England. Together with its arm's-length bodies, it is responsible for ensuring that domestically produced biomass feedstocks comply with environmental regulations.
- Office of Gas and Electricity Markets (Ofgem): Administers most of the government schemes that provide support for biomass in the power and heating sectors on behalf of DESNZ. This includes registering participants on to schemes, making payments and monitoring compliance with sustainability and other scheme criteria.
- Low Carbon Contracts Company (LCCC): Is the formal counterparty for Contracts for Difference and issues and collects payments to power stations within the scheme. Contracts for Difference provide a guaranteed minimum price to generators for renewable electricity. The two largest biomass power stations, Drax and Lynemouth, received Contracts for Difference which will run until 2027.

1.16 The rest of this report:

- sets out how government has supported biomass to date, including how it has ensured that sustainability criteria have been met (Part Two); and
- describes the risks and opportunities for the government in taking forward its *Biomass Strategy*, and how DESNZ is managing them (Part Three).

Part Two

Current government support for biomass

2.1 This part of the report:

- explains how the government's support for biomass has developed over time and how much this has cost; and
- describes how government has ensured biomass feedstocks were from sustainable sources.

2.2 Biomass has featured in government's plans to reduce greenhouse gas emissions since Parliament passed the Climate Change Act in 2008 (**Figure 4**). It published its first biomass strategy in 2012, and then most recently in 2023. Over the same period, the government has published other strategies, such as the Energy white paper in 2020, which emphasises the role of biomass in meeting its net zero ambitions.

Current government support for biomass in power and heating

2.3 Over time, the government has established a number of schemes that include support for biomass across the power and heat sectors (**Figure 5** on page 22). We estimate that, to date, these schemes have provided £22 billion of support in cash terms to businesses using biomass. Each scheme has a set of sustainability criteria that participants must meet to receive support. Whilst the detail of these differ for each scheme, most concentrate on meeting land and greenhouse gas emissions criteria.

2.4 In total, biomass power generation has received £14.1 billion of funding through the Renewables Obligation (RO) and £2.0 billion through Contracts for Difference (CfD).[8] As the two largest biomass power generators, Drax and Lynemouth have received a substantial amount of the financial support given to biomass in the power sector as a result of the electricity they have generated (**Figure 6** on page 23):

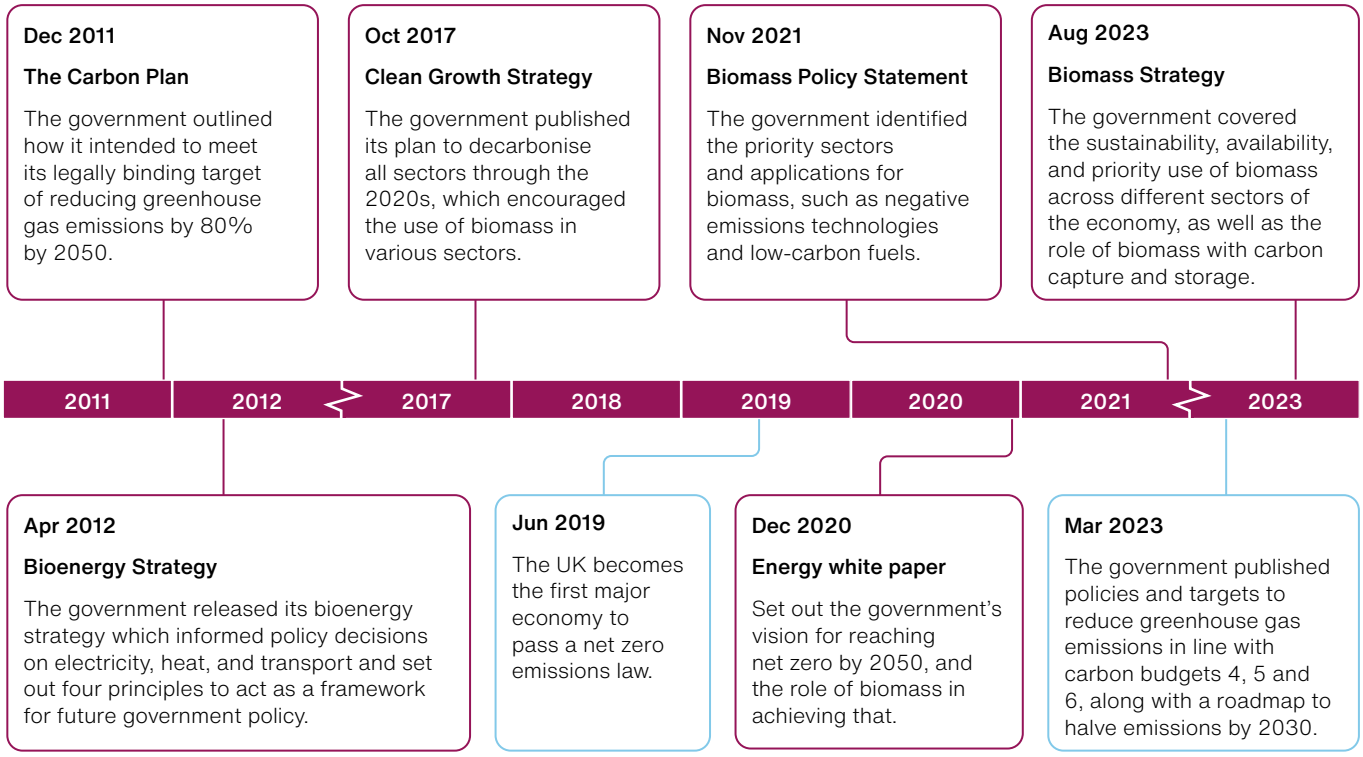
- The largest recipient of financial support for biomass is Drax, the largest biomass electricity generator by some distance. It has received a cumulative total of £6.5 billion (£5.1 billion through the RO since 2003-04 and £1.4 billion through CfDs since 2016).[9]

8 Values are in cash terms and have not been adjusted for inflation.
9 Participants in the Renewables Obligation 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.

Figure 4

The government's strategies for biomass, 2011 to 2023

The government's support for biomass has developed over the last decade



Source: National Audit Office analysis of Department of Energy & Climate Change, Department for Business, Energy & Industrial Strategy, and Department for Energy Security & Net Zero data

- The other 973 biomass generators in the RO scheme have received a total of £9.1 billion of support at an average of £9.3 million each. The bulk of this went to a small number of generators. The 6 largest recipients after Drax have received support worth £1.8 billion (an average of £296 million per station) to date. The remaining 967 biomass generators in the scheme are significantly smaller and have received an average of £7.5 million each.
- Lynemouth, the UK's second biggest biomass power station, now only receives financial support through a CfD. To date, it has received around £579 million since 2018 through this contract. It also received £16 million through the RO between 2004-05 and 2018-19.[10]
- A third large biomass power station with a Contract for Difference – MGT Teesside – became operational during 2023 and has received £3.4 million in CfD payments.

10 Lynemouth received support through the Renewables Obligation as a co-firing station that burnt both biomass and coal. The support it has received since 2018 through a Contract for Difference has been on the basis of it running wholly on biomass.

Figure 5

The UK government's main biomass electricity and heat subsidy schemes

Since 2002, five government schemes have provided £22 billion of financial support to biomass in the power and heat sectors

Scheme	Description	Launch and closure details	Number of projects	Funding	Spend
					(£mn)
Renewables Obligation (RO)	Places an annual obligation on electricity suppliers to provide Ofgem with a specified number of Renewables Obligation Certificates (ROCs). ROCs are issued to accredited operators of renewable stations which generate renewable electricity.	Launched in 2002. Closed to new generating capacity in 2017.	974	Consumer funded	14,149.8 March 2023
Non-Domestic Renewable Heat Incentive (NDRHI)	Open to commercial, industrial, public sector, non-profit and community generators of renewable heat. Participants in the NDRHI receive payments in arrears over a 20-year period based on the heat output in kilowatt hours (kWh) of their system.	Launched in 2011. Closed to new applicants 2021. Payments will be made from the scheme until 2041.	22,368	Taxpayer funded	5,024 June 2023
Domestic Renewable Heat Incentive (DRHI)	Covers single domestic dwellings. The technologies eligible for support under the DRHI were: air source, water source and ground source heat pumps; biomass boilers and biomass pellet stoves with integrated boilers; and solar thermal systems. Those who use the DRHI receive payments in arrears over a 7-year period based on the heat output in kilowatt hours (kWh) of their system.	Launched in 2014 . Closed to new applicants in 2022. Last payments will be made in 2029.	114,759	Taxpayer funded	355.0 June 2023
Contracts for Difference (CFD)	A long-term contract between low carbon electricity generators and the Low Carbon Contracts Company (LCCC), a company opened by the UK Government. CFDs provide low-carbon generators with a set price for the electricity they produce. This is to avoid market volatility.	Launched in 2014. Still ongoing.	3	Consumer funded	1,961 November 2023
Green Gas Support Scheme (GGSS)	The GGSS provide financial incentives for new anaerobic digestion biomethane plants. The scheme is designed to increase the proportion of green gas used in the national gas grid.	Launched in 2021. Currently closes 30 November 2025. The government intends to extend the close date to 31 March 2028.	1	Consumer funded	0.1 March 2023

Notes

1 This does not include the Feed-in-Tariff. This scheme is designed to promote widespread uptake of small-scale renewable and low-carbon electricity generation. The scheme covers technologies including photovoltaic, wind, hydro, and anaerobic digestion.

2 Participants in the Renewables Obligation 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.

3 Spend data have not been shown as a summed total as the table shows a selection of the main biomass schemes and not a complete list.

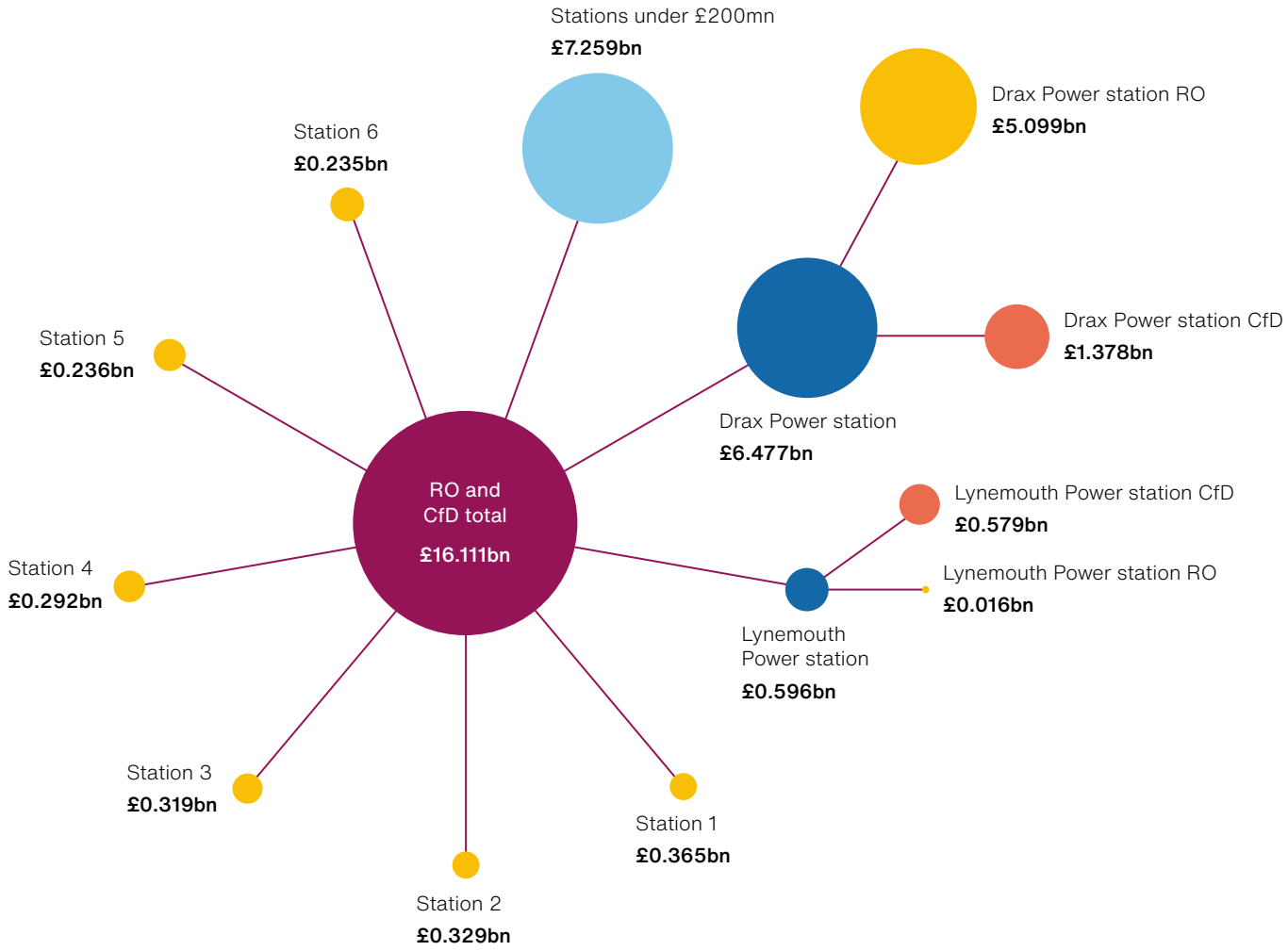
4 Values are in cash terms and have not been adjusted for inflation

Source: National Audit Office analysis of Department for Energy Security & Net Zero and Office of Gas and Electricity Markets data

Figure 6

Recipients' financial support through the Renewables Obligation (RO) scheme, 2002–2023 and Contracts for Difference (CfD), 2016–2023

Drax Power station has received £6.5 billion through the RO scheme and CfD between 2002 and 2023 – around 40% of the total distributed



- Total of Renewables Obligation (RO) and Contracts for Difference (CfD)
- Recipients of the RO receiving less than £200 million each
- Recipients of both the RO and CfD
- Recipients of RO
- Recipients of CfDs

Notes

1 The Renewables Obligation (RO) and Contracts for Difference (CfD) are two different schemes related to the production of renewable electricity. Data for these schemes cover 2002–2023 and 2016–2023 respectively, covering their years of operation.

2 Stations under £200 million is made up of 967 generators.

3 Figure may not sum due to rounding.

4 This figure does not include MGT Teesside, which became operational during 2023 and has received £3.4 million in CfD payments.

5 Values are in cash terms and have not been adjusted for inflation.

Source: National Audit Office analysis of the Department for Energy Security & Net Zero data and Low Carbon Contracts Company data

2.5 By contrast, financial support for biomass in the heating sector through the Non-Domestic RHI has been directed towards a greater number of small generators.[11] To date, it has paid out £5.0 billion to over 20,000 scheme participants that use biomass to generate heat.

Ensuring compliance with sustainability criteria

2.6 Depending on where biomass feedstocks are sourced, there can be a long and complex supply chain (**Figure 7**). It may involve many different parties and processes, both within the UK and abroad. In 2022, around 66% of biomass used in UK electricity generation, heat and transport was from domestic feedstocks with the rest being imported from abroad (from, for example, North America and the European Union, each with their own policies and regulations). These feedstocks are imported in different forms (for example, raw/processed/final form) and have different transportation and processing needs.

2.7 The government is clear that generators must demonstrate compliance with the UK's sustainability criteria. This can be challenging given the length and complexity of the supply chain. Generators must demonstrate that woody biomass sourced from overseas is from sustainably managed forests. The government allows generators to demonstrate compliance with land criteria by using internationally recognised voluntary certification schemes such as the Forest Stewardship Council (FSC) certificate scheme, the Programme for the Endorsement of Forest Certification (PEFC) or the Sustainable Biomass Program. Depending on the certification scheme they use, generators may also need to provide additional information to demonstrate compliance.

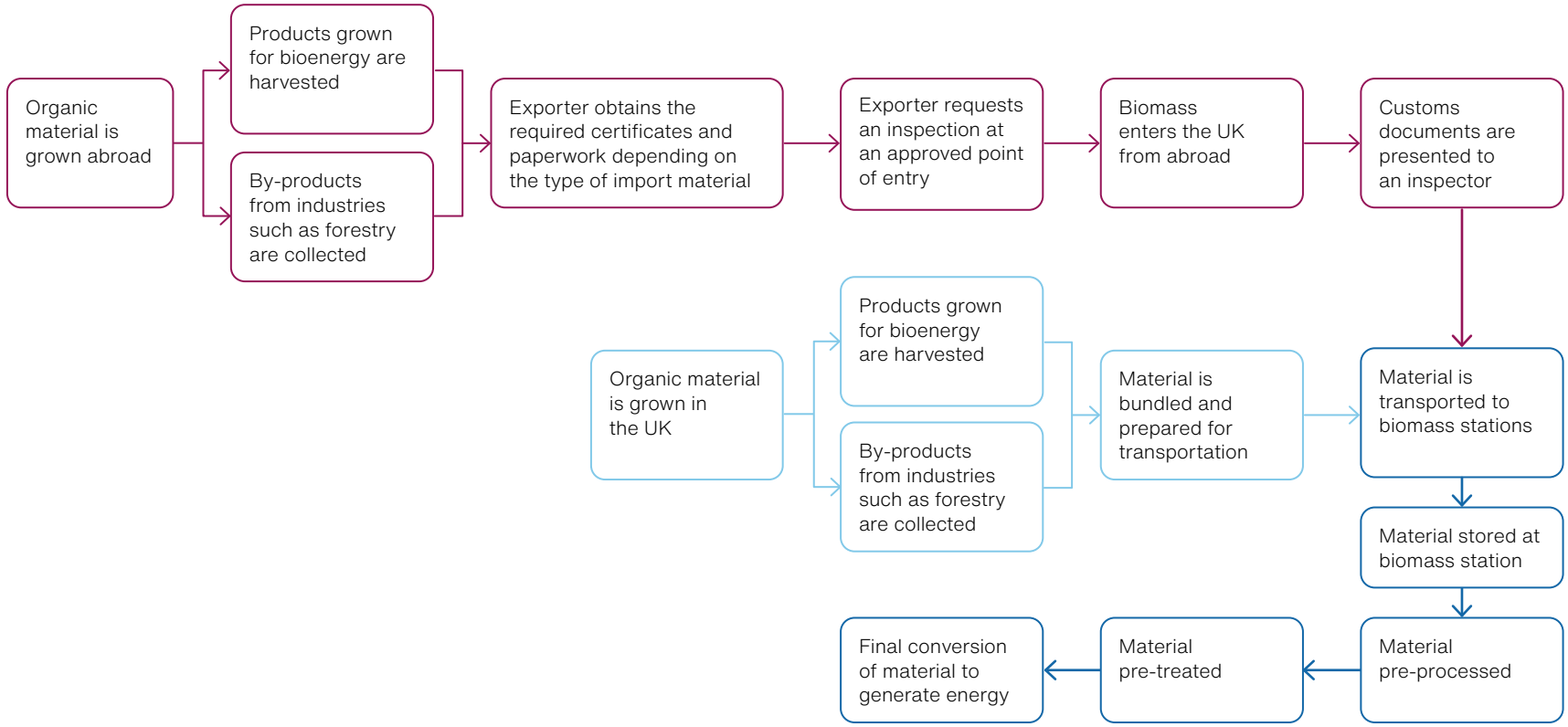
2.8 While the precise requirement for each government scheme varies, the overarching criteria are broadly similar and consist of two parts:

- Land – which focuses on the land from which the biomass is sourced. Specifically this states that all feedstocks should be legally sourced according to the laws in the country of harvest. They also set requirements for sustainable harvesting that account for protection for, for example, biodiversity and soil, water and air quality. They also cover land rights.
- Greenhouse gases – which account for the life cycle greenhouse gas emissions associated with biomass (including production, cultivation, harvesting or collection, transportation and processing) are included in emission calculations.

11 Financial support for the Non-Domestic RHI is provided through direct payments to generators. This is as opposed to the Renewables Obligation which uses a system of selling certificates issued to accredited operators of renewable stations which generate renewable electricity.

Figure 7
The biomass supply chain

The supply chain for biomass is long and fragmented



Notes

1 All operators exporting certain material from abroad must register to trade material and give notification before material arrives.

2 Timber, wood products or bark must be inspected at the border post or an approved inland inspection premise, while plants and plant products can be inspected at the place of destination (so long as it is a commercial location) for some high-priority goods.

3 The section of the flow chart covering 'Biomass imported from abroad' applies to feedstocks that are not in their final form. The process of importing and distributing biofuels, a type of fuel produced from biomass, differs.

Source: National Audit Office summary of publicly available information

Renewables Obligation and Contracts for Difference

2.9 Ofgem administers the RO including making sure scheme participants adhere to sustainability criteria, which are established in legislation. The Low Carbon Contracts Company (LCCC) has appointed Ofgem to provide support and advise on fuelling and sustainability issues related to the CfD scheme. In 2015, the government established the requirement that solid biomass, bioliquid and biogas stations had to meet sustainability criteria to receive support under the RO scheme. These criteria were then applied to CfD.

2.10 For the RO, the government has set out in legislation both the sustainability criteria for using biomass and the approach to assessing compliance with these criteria (similar requirements for CfD are set out in the contracts). The same legislation established Ofgem's role with regard to the RO, including monitoring and enforcing compliance with the scheme's rules. Ofgem's approach, determined by legislation, to understanding a station's compliance with sustainability criteria is based around the station's size (**Figure 8**). This approach also applies to Contracts for Difference, where all three stations with a contract have a capacity greater than 1 MW.

Figure 8

Ofgem's approach to understanding compliance with sustainability criteria for Renewables Obligations and Contracts for Difference

Ofgem's approach, set out in legislation, to assessing a generating station's compliance with sustainability criteria depends on the station's size

Generator size	Monthly sustainability reporting Declaration that land use and greenhouse gas emissions criteria have been met for each consignment of fuel	Annual profiling data Information on the sustainability characteristics of their biomass	Annual sustainability report Prepared by an independent verifier to verify the information submitted on a monthly basis
Less than or equal to 50 Kilowatts (kW)	✗	✗	✗
Greater than 50 kW but less than or equal to 1 megawatt (MW)	✗	✔[3]	✗
Greater than 1 MW	✔	✔	✔

Notes

1 Ofgem's approach to considering sustainability criteria is established in legislation.

2 The approach outlined in the table does not apply to bioliquid stations.

3 Generators with a capacity greater than 50 kilowatts and less than 1 megawatt report whether they have met sustainability criteria as part of their annual profiling submission. This information does not relate to the issuing of Renewables Obligation Certificates for generators of this size.

4 A station with a generating capacity of less than 50 kilowatts is known as microgenerator.

Source: National Audit Office summary of Office for Gas and Electricity Markets' documentation

Monthly sustainability reporting

2.11 Generators that have a capacity equal to or greater than 1 MW are required to provide information to Ofgem monthly on sustainability. For each consignment, the generator needs to confirm whether it met the land criteria and enter a figure for greenhouse gas emissions (some fuel types are exempt from this requirement). Stations using woody biomass must declare that at least 70% of all fuel it used in a month has met the land sustainability criteria to qualify for support. The generator does not need to submit any supporting evidence at this time but must hold evidence to demonstrate compliance as part of the annual sustainability report audit (described below). Compliance with the land criteria can be through the use of a certification scheme, such as the Forest Stewardship Council certificate scheme, the Programme for the Endorsement of Forest certification scheme, or an equivalent like the Sustainable Biomass Program. Alternatively, the station might collect what Ofgem describes as bespoke evidence which demonstrates compliance with the criteria.

Annual sustainability report

2.12 Generators that have a capacity equal to or greater than 1 MW are required to submit an annual sustainability audit report. This report is prepared by an independent auditor, appointed by the generator. It is intended to verify the station's monthly sustainability data. The independent auditor assesses the station's evidence of compliance against sustainability criteria and considers for example:

- whether the station's systems are likely to produce reliable and accurate information on sustainability;
- the robustness of the data on which the relevant sustainability information was produced;
- the station's approach to and frequency of sampling as part of its preparation and checking of sustainability information; and
- whether there are controls to help protect against material misstatements due to fraud or error.

2.13 As required by legislation, the audit is conducted on a 'limited assurance' basis, meaning the auditor looks to collect sufficient evidence to conclude there is no evidence to suggest the sustainability information submitted is incorrect. Ofgem reviews the annual sustainability reports to ensure the report meets the requirements for reporting set out in legislation, which is that they be prepared in accordance with the requirements of a limited assurance engagement. This might result in the generator's Renewables Obligation Certificates being suspended, withheld or revoked if the audit report is not prepared to the required standard or it highlights discrepancies, such as the fuel data in the audit report not matching what the generator submitted in its monthly reporting.

Annual profiling

2.14 Generators that have a capacity greater than 50KW must submit information annually on the sustainability characteristics of their biomass used during the previous year. This includes, for each consignment, information on the material the biomass came from (for example, if it was composed of wood), the form it took, whether it was waste or derived from waste and the country of origin. If the biomass was wood, the generator must also provide, among other things, information on the forest where it was grown and a description of forestry management practices. Ofgem is not required to verify this profiling data; nor is it verified as part of the annual sustainability audit report, though some profiling data may be relevant to the audit. Ofgem sends a summary of the annual profiling data to DESNZ each year. This information is used to monitor the sector and inform future policy, used for statistics and for responding to queries. Ofgem also publishes a summary of this information annually.

2.15 On 31 May 2023, Ofgem announced it was completing an investigation into whether Drax Power Limited was in breach of annual profiling reporting requirements relating to the Renewables Obligation scheme and other related matters. 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.

Renewable Heat Incentive

2.16 The government has established sustainability requirements for participants in both the domestic and non-domestic Renewable Heat Incentive schemes. Ofgem is responsible for monitoring and enforcing compliance with these criteria. In common with the approach taken with the RO and CfD schemes, the sustainability criteria cover land and lifecycle greenhouse gas emissions. Scheme participants are required to report annually (domestic) or quarterly (non-domestic) against these criteria depending on the type of installation or its capacity.

2.17 In 2018, we published a report looking at the government's Renewable Heat Incentive programme.[12] This found that Ofgem could be more effective in how it was aiming to reduce the rates of non-compliance among the scheme participants. For example, it could have done more to pinpoint the root causes of non-compliance and target its activities accordingly. Furthermore, we noted that Ofgem's activities have tended to focus more on the most commonly occurring types of non-compliance, rather than those that have the greatest financial impact. In response to our report, Ofgem introduced an audit strategy which focused on improving the effectiveness of its audit approach.

12 Comptroller and Auditor General, *Low-carbon heating of homes and businesses and the Renewable Heat Incentive*, Session 2017–2019, HC 779, National Audit Office, February 2018.

Evaluating the effectiveness of compliance arrangements across all schemes

2.18 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. Evaluation of controls also enables comparison of controls against each other to assess their cost-effectiveness for tackling non-compliance.[13] We asked both Ofgem and DESNZ what work they had done to evaluate the current arrangements for ensuring sustainability criteria are adhered to.

Ofgem

2.19 Ofgem told us that it had carried out its role in line with the assurance measures required by government policy legislation and that the effectiveness of the scheme's operation is not within its remit. Ofgem has not considered whether its approach to assurance is effective. But it has completed an exercise to consider whether the standards set out in a number of the voluntary certification schemes provide the evidence required to show the government's sustainability criteria have been met. Ofgem told us this exercise was not designed to give assurances how these schemes operate in practice on the ground. Ofgem concluded that only one of the voluntary schemes it reviewed was sufficient to demonstrate compliance with RO sustainability criteria on its own. Generators using the other schemes need to provide additional 'bespoke' evidence to demonstrate compliance (see paragraph 2.11). Ofgem is updating its guidance in the light of this exercise. This exercise follows a similar one Ofgem completed in 2015.

13 Available at: www.nao.org.uk/wp-content/uploads/2021/03/010381-001-Fraud-and-Error-Accessible.pdf, p.18.

2.20 In addition to compliance activity established by legislation, Ofgem completes its own programme of audits:

- **Renewables Obligation**: Ofgem has conducted targeted audits on generators deemed to be higher risk, and, since 2020, statistical audits, which Ofgem selects randomly to estimate levels and types of non-compliance. These audits assess compliance with a range of scheme criteria and do not focus on sustainability criteria, which only apply to generators with a capacity of 1 MW or more. One aspect of the audit covers the station's Fuel Measurement and Sampling procedures, which the station agreed with Ofgem as part of accreditation to provide an accurate way of quantifying fuel usage. The audits also look to determine the quantity, energy content and any contaminants of the fuel, which supports overall monitoring of sustainability. Ofgem is continuing to work on compliance activity following up its statistical audits and is yet to estimate overall rates of non-compliance. But it told us this programme would not provide it with an estimate of non-compliance with sustainability criteria.
- **Renewable Heat Incentive**: Ofgem has been conducting statistical audits on RHI scheme participants since 2015-16 and uses this to report on the rates of non-compliance with scheme rules. In 2022-23, Ofgem estimated that 0.7% of scheme payments had been in error, worth £7.2 million, although this covers all technologies supported by RHI and not just biomass. This continued a trend of falling error rates over recent years.

DESNZ

2.21 DESNZ considers the current arrangements are a proportionate approach to give government sufficient confidence in the credibility of the sustainability criteria for existing schemes. A board, jointly chaired by DESNZ and Ofgem, meets on a quarterly basis to monitor and address key issues and emerging risks around schemes that support renewable electricity including the RO. DESNZ told us sustainability issues have been discussed at certain points, such as when there had been media reports around potential non-compliance, but that it is not discussed routinely by the board.

2.22 DESNZ accepts that its plans to develop a cross-sector sustainability framework (paragraph 3.6) are an opportune moment to review existing arrangements and consider how changes could be implemented in future schemes. DESNZ is considering increasing the requirements on data reporting by generators on their biomass feedstocks and supply chains to enable the collection of more granular data as part of its commitment to develop and strengthen existing sustainability criteria. DESNZ hopes that this additional information would increase transparency and improve public trust. Alongside its exercise to consult on sustainability criteria set out in the *Biomass Strategy*, it is considering running a pilot with some generators in the RO scheme to understand what additional data may be available and to consider any issues linked to additional reporting requirements.

Part Three

Managing risks to successful implementation

3.1 In this part of the report, we

- set out the key features of the government's *Biomass Strategy* (the Strategy) and summarise the key risks government needs to manage to implement the strategy successfully; and
- describe how the Department for Energy Security & Net Zero (DESNZ) is set up to deliver the Strategy.

The government's *Biomass Strategy*

3.2 In August 2023 the government published its *Biomass Strategy*, setting out priorities and key challenges for biomass in the UK up to 2050. The Strategy considers the use of biomass across the whole economy. The Strategy particularly focuses on three key themes:

- The future availability of sustainable biomass feedstocks.
- Sustainability and how to ensure that biomass used in the UK is genuinely low-carbon.
- How to ensure that limited supplies of biomass are directed to the parts of the economy that will most need them.

Key risks for government to manage

Security of supply

3.3 The Strategy makes it clear that the UK will need to use biomass at scale up to and including 2050 to meet its decarbonisation goals. It notes that governance over biomass feedstocks, sourced from outside the UK, is complex. DESNZ states that it is agnostic as to whether biomass feedstocks are imported or produced domestically, noting that both have to satisfy relevant sustainability criteria. The Climate Change Committee (CCC) noted that biomass imports could be phased out by 2050 if UK supplies of forestry and perennial energy crops expanded significantly. Government is running the £36 million Biomass Feedstocks Innovation Programme to address technical barriers to UK biomass production.

3.4 Increasing domestic feedstocks will be challenging as there are a range of other, potentially competing, government priorities for land use in the UK. The government has committed to at least maintain current levels of UK food production and to achieve a degree of reforestation by 2050, both of which will reduce land availability for growing biomass feedstocks. Increasing biomass production could also cause friction with other environmental commitments, such as promoting biodiversity.

3.5 Even if the UK increases its own production of biomass, the government expects that it will need to continue importing biomass to meet demand. DESNZ has announced that it will consult on strengthening sustainability criteria for biomass feedstocks which could make procuring compliant biomass more challenging in the future. DESNZ also expects international demand for feedstocks to increase as more countries transition to biomass, which may drive up prices and restrict the quantity that the UK can procure from overseas.

Compliance with sustainability criteria

3.6 The Strategy includes a commitment for government to review and strengthen the sustainability criteria. A 2021 call for evidence, summarised in the Strategy, produced mixed responses on whether current sustainability criteria for biomass use were appropriate, with an equal number (almost two in five of stakeholders) considering the current criteria were or were not sufficient. DESNZ will launch a consultation on new criteria in 2024. This will include proposals for developing a cross-sectoral framework that can be applied to new future biomass policies and schemes across a range of applications. The present sustainability criteria for the various biomass schemes, which were initially required by EU regulations, were developed with particular supply chains in mind. This has led to inconsistencies between how the carbon and other impacts of biomass feedstocks are measured across different sectors. It has identified a number of actions it may need to consider to deliver this framework. For example, how to encourage best practice and how to consider issues such as biodiversity. The government is also planning to consult on tightening air quality regulations covering small industrial users of biomass to bring them in line with those covering larger users. It also plans to tighten regulations on domestic solid fuel burning.

3.7 Setting stricter sustainability criteria could require DESNZ to make trade-offs. The risks of non-compliance are lower on any government scheme that makes payments to businesses or individuals with few or no rules over eligibility. For example, DESNZ's energy support schemes, which helped households and businesses pay their bills over the winter 2022-23, provided near-universal support. This meant there were fewer opportunities for money to be paid to recipients that did not qualify for support.[14] By adding additional, or strengthening existing, criteria for its support for biomass, DESNZ could introduce more opportunities for non-compliance, either deliberately or through error. It will therefore need to decide what level of non-compliance it is willing to accept and consider the resources required to monitor and enforce compliance at that rate.

Prioritising uses of biomass

3.8 The Strategy sets out how the government expects the UK to use a similar amount of biomass in the period covered by Carbon Budget 6 (2032-37) as it does now.[15] Beyond 2035, government expects biomass to be predominantly used in conjunction with carbon capture (known as BECCS), with unabated biomass restricted to hard-to-decarbonise sectors where BECCS cannot be deployed. It is considering how best to support low-carbon fuels, including biomass, in combined heat and power plants and in the heating sector. It is also considering options for a future policy framework for biomethane following the closure of the Green Gas Support Scheme.

3.9 In the Strategy, DESNZ provides little detail on where it expects biomass to be deployed by 2050 because of the degree of uncertainty over biomass availability and how technology will develop. It does stress that departments should take account of four priority use principles when considering policies related to biomass – sustainability; air quality; net zero; and contribution to the circular economy and resource efficiency – when developing sector specific policies for biomass use. DESNZ developed three scenarios setting out how biomass might be used by 2050. Outside of its use in BECCS, the main uses DESNZ highlighted were, for example, aviation fuels (which are hard to decarbonise through other means) and in heating buildings not on the gas grid that are not suitable for heat pumps.

14 Comptroller and Auditor General, *Energy bills support*, Session 2022-23, HC 1025, National Audit Office, February 2023. Available at: www.nao.org.uk/wp-content/uploads/2023/02/012365-Energy-price-BOOK.pdf

15 A Carbon Budget places a restriction on the total amount of greenhouse gases the UK can emit over a five year period.

Reliance on Carbon Capture and Storage

3.10 The Strategy sets out the government's intention to move away from unabated biomass uses in the power sector and instead only use bioenergy in conjunction with carbon capture and storage where possible. Government has expressed an ambition to fully decarbonise electricity generation in the UK by 2035 and for BECCS to play a longer-term role in offsetting residual emissions from other sectors up to 2050. Alongside the Strategy, DESNZ's Chief Scientific Adviser chaired a 'Task and Finish' group to look at the feasibility of BECCS technology. Its paper, *The ability of BECCS to generate negative emissions* concluded that "whilst there are some challenges the group has not identified any insurmountable scientific barriers to the net removal of CO_2 (carbon dioxide) from the atmosphere and subsequent permanent geological storage via BECCS when carried out in accordance with existing biomass sustainability criteria and via sustainable supply chains".

3.11 BECCS is a new technology that has yet to be proven on a commercial basis in the UK. While there are no BECCS plants currently operating in the UK, the *Biomass Strategy* notes that the technology is operating in other countries in demonstration plants and to scale. DESNZ has a programme to promote CCUS technology in the UK and has made a commitment to have four CCUS clusters up and running by 2030. In March 2023 it announced which projects will be supported in the first two clusters. These are termed Track 1 clusters and are located on Merseyside (the HyNet cluster) and Teesside (the East Coast cluster). It hopes to negotiate and conclude commercial terms with these projects by the end of 2024. No BECCS plant was selected for either Track 1 cluster. Instead, DESNZ hopes that BECCS projects will be supported as a later addition to a Track 1 cluster or in the next two clusters (Track 2).

3.12 The government will soon need to start planning how it will handle the transition from using unabated biomass in the heat and power sectors to plants using carbon capture and storage. Current support schemes, such as the Renewables Obligation (RO) and Contracts for Difference (CfD), will start to close in 2027, but it is not clear when BECCS will be running at scale. In March 2023, the government committed to "work closely with electricity generators currently using biomass to facilitate their transition to power BECCS, subject to value for money, taking account of energy security on the road to net zero". Both Drax and Lynemouth have expressed an interest in converting to BECCS, but the government has yet to decide on what transitional support, if any, it will provide. On 18 January 2024, DESNZ published a consultation to inform its assessment of whether a transitional support arrangement is appropriate and, if it is, how best to design and implement that support mechanism. On 16 January 2024, the Secretary of State for Energy Security and Net Zero granted development consent for Drax's BECCS project.

How DESNZ is set up to deliver its *Biomass Strategy*

3.13 DESNZ has developed what it describes as a high-level implementation plan which summarises the actions and commitments set out in the Strategy. DESNZ plans to use this to track progress against the timescales set out in the Strategy. It is developing the precise mechanisms for reporting on progress.

3.14 The DESNZ team that produced the Strategy has largely relocated from its Renewable Electricity Directorate to its Net Zero Strategy Directorate. This was done to allow for more effective integration of tasks outlined in the Strategy with broader policy on net zero. The Renewable Electricity Directorate, in conjunction with the CCUS Directorate, are considering whether transitional support arrangements may be appropriate to support the transition of large scale biomass generators, such as Drax and Lynemouth, to BECCS when the current arrangements under the Renewables Obligation and Contracts for Difference end in 2027.

3.15 DESNZ is currently considering how best to coordinate work on biomass policy across government. A cross government working group that coordinated departments contributing to the *Biomass Strategy* could potentially be reconvened and there are other bodies in place, such as the Climate Change Integrated Review Implementation Group, that could be used. Since the publication of the Strategy, DESNZ has had to divert resources to addressing legal challenges. It has yet to decide on the most appropriate methods for ensuring that government acts in a coordinated manner in implementing biomass policy.

Appendix One

Our audit approach

Scope

1 We examined government's support for biomass in the heating and energy sectors through six schemes: Contracts for Difference; Feed-In Tariff; Green Gas Support Scheme; Renewable Heat Incentive (Domestic and Non-Domestic); and the Renewables Obligation. We also looked at the role biomass currently plays in energy, heating and government's plans for biomass in decarbonising the UK economy by 2050.

2 This report provides the basis for Parliamentary scrutiny of how the Department for Energy Security & Net Zero (DESNZ) oversees the deployment of biomass in the heat and power sectors and how it ensures that biomass burned in the UK is genuinely low-carbon. We have not concluded on the value for money of the schemes nor on the scientific assumptions underpinning government's support for biomass. This report covers:

- the current role of biomass in the heating and power sectors, and the financial support it receives;
- the compliance work undertaken to ensure that biomass used in the heating and power sectors meets sustainability criteria; and
- government's plans for biomass in achieving net zero by 2050.

Methods

3 In examining these issues, we drew on a variety of evidence sources which we analysed between August and November 2023. We reviewed DESNZ documents on biomass including: strategy documents; risk registers; evaluation papers; and governance arrangements. We also reviewed documents and data from Office for Gas and Electricity Markets (Ofgem) setting out how much is spent supporting biomass and the compliance work it undertook to ensure that sustainability criteria were met.

4 We interviewed officials from DESNZ, the Department for Environment, Food & Rural Affairs, Ofgem, the Climate Change Committee and Low Carbon Contracts Company (LCCC). We also spoke to a range of parties with an interest in biomass including Drax Power Ltd, the Renewable Energy Association, the US Industrial Pellet Association, and a number of people from academia.

5 We used these interviews to understand:

- why the government began these support schemes and how they have evolved over time;
- the roles and responsibilities of DESNZ, Ofgem and LCCC in administering the support schemes;
- the key risks posed by the support schemes and how the government is managing them; and
- the government's future plans for biomass in the heating and power sectors.

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