Biomass Strategy
REA Members Townhall

17th August 2023

Agenda

1) REA Activities on the Biomass Strategy and Coverage

2) Overview of the Biomass Strategy: (Mark)

- High level messages
- Sustainability
- Air Quality
- Biomass Availability
- Priority Use Framework
- Biomass With Carbon Capture and Storage
- Other publications that accompanied the strategy

3) Sector Specific Focus (will take questions after each section)

- Biomass Heat (Poppy Airey)
- Transport Fuels (Paul Thompson)
- Landfill Gas (Paul Thompson)
- AD and Biomethane (Sara Bartle)
- Hydrogen (Sara Bartle)
- Biomass Power (Mark Sommerfeld)
- Waste Policy Interaction (Mark Sommerfeld)

4) Next Steps

REA Activities on the Biomass Strategy and Coverage

@reassociation

PRESS RELEASE: REA welcomes Government support for sustainable biomass and recog...

Priscilla Aroean
To

Reply | Reply All | Forward | ...

Thu 10/08/2023 11:07

Experts re Biomass Strategy.pdf 74 KB

Biomass Key Facts - Aug 2023.pdf 114 KB

REA Press Release

10th August 2023

For immediate release

REA welcomes Government support for sustainable biomass and recognition of its importance in getting to Net Zero

- The Government's new Biomass Strategy underlines the vital role of bioenergy in delivering energy security and Net Zero;
- Chief Scientific Advisor for DESNZ, Professor Paul Monks, highlights that *"Biomass can play a significant role in decarbonising nearly all sectors of the economy.";*
- New policy certainty on biomass will drive investment in the UK, supporting green jobs and innovation in crucial technologies such as BECCS;
- The Government's evidence-driven approach that places sustainability as its "top-priority" will build confidence in the continued use of biomass across the economy;
- Government must now urgently act upon this Strategy, delivering policies that ensure bioenergy is able to play its role in delivering Net Zero.
- We include with this press statement a 'Biomass Key Facts' paper and a list of academic experts on biomass.

Minister Graham Stuart
Department for Energy Security and Net Zero
House of Commons
London SW1A 0AA

11th August 2023

Dear Minister Graham Stuart,

RE: Industry Welcomes the Biomass Strategy

We, the

REA | Energy UK | UK PELLET COUNCIL | Carbon Capture & Storage Association | ade | Coalition for Negative Emissions | wra Wood Recyclers' Association

BIOMASS

Net zero without biomass? Forget it

The Biomass Strategy is a welcome boost for the sector, but the UK can and must go further, writes REA's Nina Skorupska

14 August 2023 • 4 min read

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Updates and information / Perennial energy crops potential highlighted yet again in Biomass Strategy

Perennial energy crops potential highlighted yet again in Biomass Strategy

16 August 2023

Text only view

Combinable crops | Climate change and renewables | Net zero

Dr Jonathan Scurlock
CHIEF ADVISER RENEWABLE ENERGY AND CLIMATE CHANGE

Following the announcement of the government's new Biomass Strategy, hear from Dr Jonathan Scurlock, NFU Chief Adviser for Renewable Energy & Climate Change, as he looks at how we've got to this point and the potential role that British crops could have in domestic biomass production.

Bloomberg

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Green

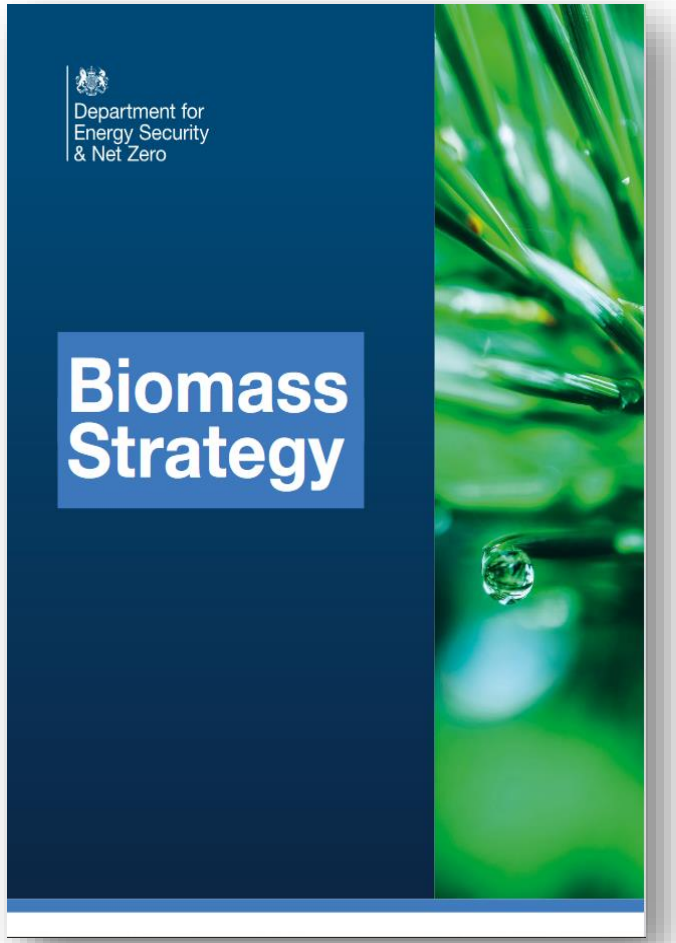
UK to Support New Biomass Under Tougher Sustainability Rules

- Government strategy says biomass has 'extraordinary' potential
- Concerns remain over whether biomass can cut emissions

High Level Messages

"Biomass can play a significant role in decarbonising nearly all sectors of the economy" – Professor Paul Monks

- Positive bill of health for the sector although light on new policy.
- Places sustainability as 'top' priority with commitment to developmnet of a cross sectoral sustainability criteria.
- Recognises strong ongoing roles for both imported and domestically grown biomass.
- Priority use focuses on harder to decarbonise areas. Setting out Short, medium and long-term visions that prioritise abated uses over time.
- BECCS prioritised for longer term. Recognise need for it to be well regulated can deliver negative emissions with positive outcome for people, the environment and climate



Sustainability

Strategy recognises leading sustainability governance arrangements across all support mechanism.

Call for evidence demonstrated variety of opinions across stakeholders:

- *38% viewed the existing sustainability criteria to be sufficient and robust*
- *38% regarded the existing sustainability criteria to be insufficient*
- *24% did not indicate a position*

Themes highlighted in responses:

- Need for standardisation across sectors
- Monitoring and Reporting (inc. trust in voluntary certification schemes)
- Carbon life cycle assessments and carbon accounting
- Domestic Vs Imported Feedstock
- Sustainability outside of carbon
- International consensus

Identifying areas that need strengthening:

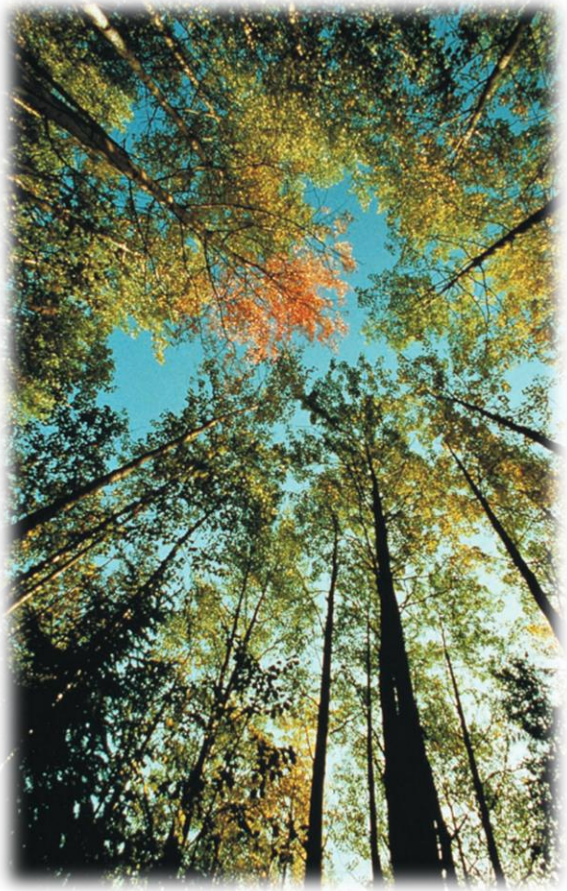
- Need for overarching criteria across the bioeconomy leading to address inconsistencies between sectors
- Understanding reliance on local governance mechanisms
- Need to develop criteria for new and emerging feedstocks and technologies
- Assessing the current evidence base on Indirect Land Use Change (ILUC) metrics, soil carbon accounting, and waste exemptions

Developing a "Cross Sectoral Sustainability Framework"

"A key commitment of the Biomass Strategy is to develop and implement a cross-sectoral common sustainability framework, subject to consultation."

To be consulted on in 2024. Minded to positions and key principles:

- Implementation of a common GHG emission calculation methodology
- Inclusion of indirect land use change (ILUC) in the framework
- Explore practicalities for accounting for soil carbon changes.
- A-minded to position to require biomass users to ensure 100% of woody biomass feedstocks used in their operations are proven sustainable.
- Implement the same definitions for sustainable feedstocks where possible to increase alignment across sectors. They will review these definitions in line with current up-to-date forest management practices and evidence around cascading uses within a circular bioeconomy. Separately, biogenic waste feedstocks can be treated differently in GHG emission calculations and may receive a higher reward.
- Look to include biodiversity and further ecosystem services into the framework.
- Look to include social sustainability issues such as land and labour rights, health and safety and community welfare into the framework.
- A-minded to position to allow for the introduction of new criteria as feedstocks and technologies evolve.



Air Quality

"Improvements could be made, particularly for smaller biomass combustion plants where regulation and permitting is currently less effective at ensuring local air quality is protected and population exposure minimised."

Key areas of concern identified:

- PM 2.5 emissions from combustion in urban areas
- Ammonia and nitrogen emissions from digestate spreading
- Transport

Ongoing Actions

- Government considering the case for tighter emissions standards on Medium Combustion Plant (MCP) and Specified Generators (including biomass plant)
- Closing the regulatory gap between the current Ecodesign and MCP regulations.
- Reducing ammonia emissions from organic manures. These will also relate to the storage and spreading of digestate.
- Government is continuing to take action to improve air quality and deliver cleaner transport through measures set out in the Environmental Improvement Plan.
- Government has launched a funding competition of up to £1 million to help industry develop technologies to abate emissions from solid fuel burning.
- A research study to develop emission factors for domestic solid fuels, including wood and ongoing domestic combustion survey.
- *"Government are not considering a ban on domestic burning in England"*

Biomass Availability

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"Both domestic and imported supply of sustainable biomass are expected to continue to play an important role in supporting biomass use across the economy."

Government have modelled both an ambitions and restricted scenario for biomass availability

The total potential sustainable biomass estimated to be available: 550-750 PJ in 2025, and 500- 1,000 PJ in 2050.

"We have modelled a further scenario by starting at the ambitious level of biomass imports and incrementally reducing the share of global production that the UK is able to access until the model is unable to find a pathway to net zero in 2050. *This occurs at around two-thirds of the level of the ambitious scenario, or around 400 PJ per year of imports of sustainable biomass by 2050."*

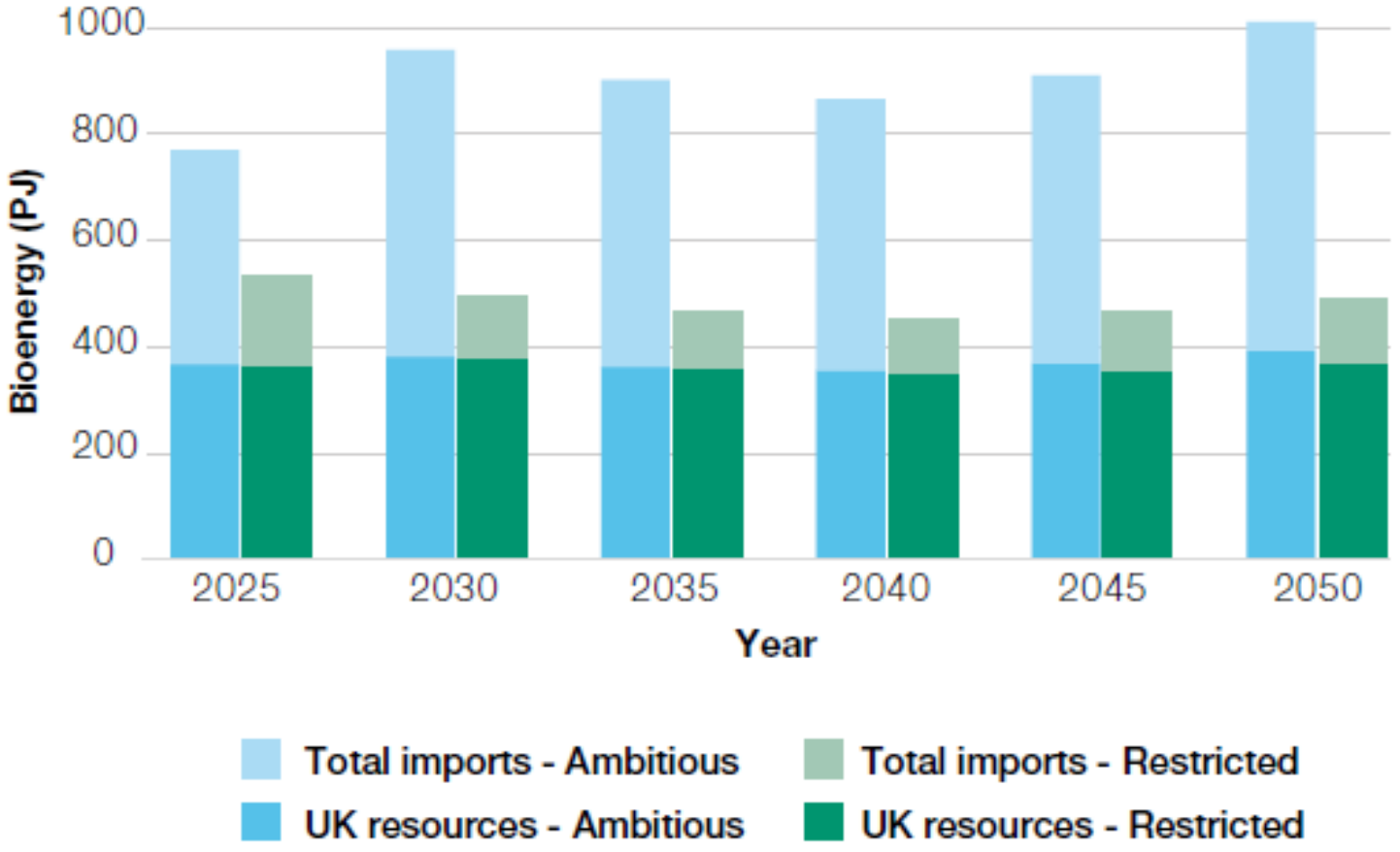


Figure 4.3: Total potential future availability of biomass feedstock to the UK from domestic and imported sources in restricted and ambitious supply scenarios.[67]

[67] The feedstocks (food and feed crops) from which the global first generation (1G) biofuels are made are not quantified in the model as these are assumed to be available to the UK as 'finished fuels', processed overseas and imported to the UK.

Biomass Availability – Domestic Resources

Domestic biomass availability remains consistent between scenarios varying between 270 – 390 PJ by 2050

The Strategy considers each potential avenue for sustainable Biomass including:

- Miscanthus
- Short Rotation coppice – willow
- Interaction with waste policies – including food waste and bans on biodegradable material going to landfill.
- Landfill Gas
- Wastewater
- Energy Crops
- Wood pellet production from existing woodlands and forest
- Hemp

On Miscanthus, short-rotation coppice (SRC), and short-rotation forestry (SRF) strategy sees increase from 2030 onwards, to c.17kha per year in England could be achieved by 2038.

This is however less then Climate Change Committee 23,000ha and actual policy to deliver this will need to wait till the Land Use Framework

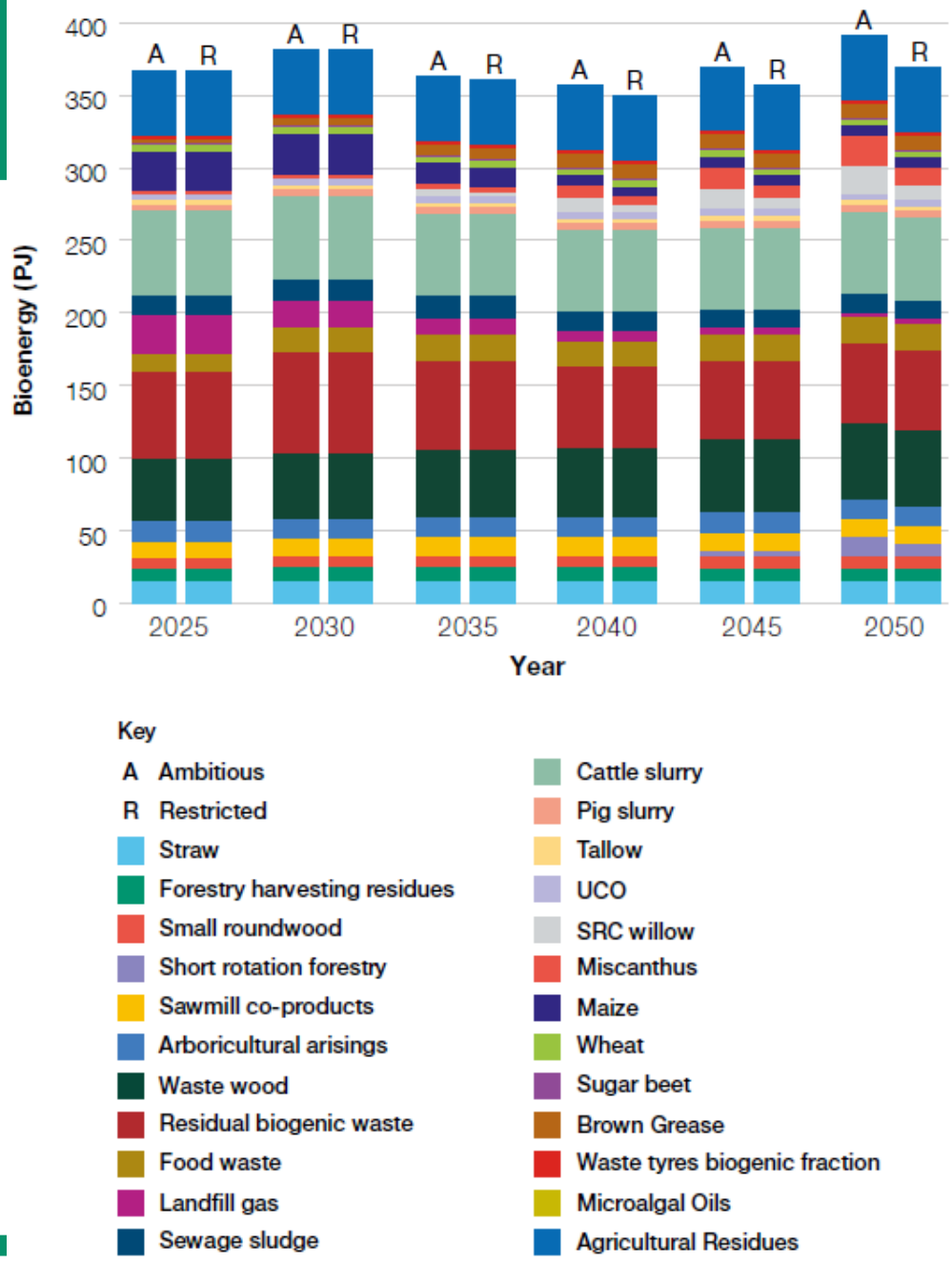


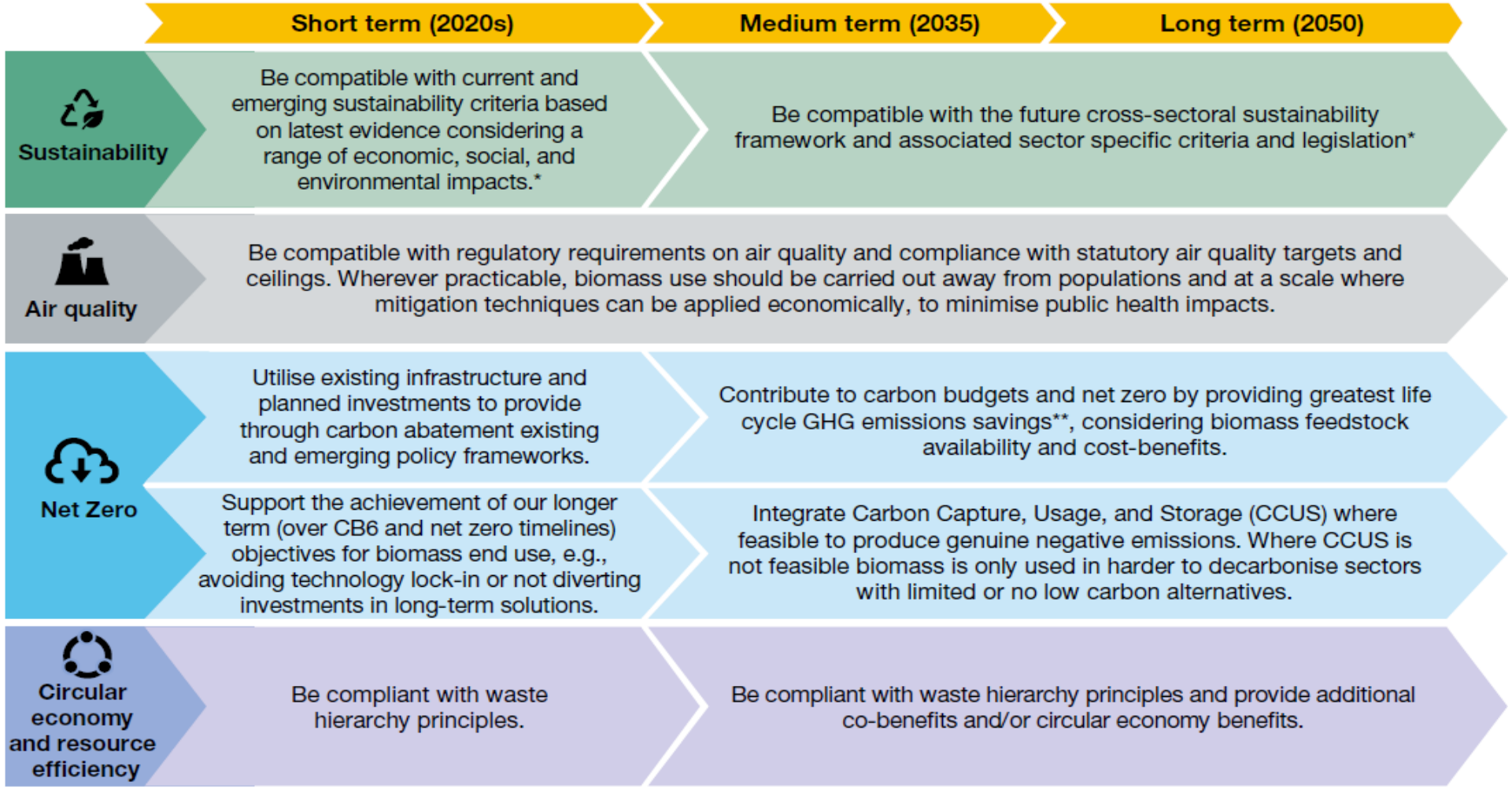
Figure 4.4: Potential future availability of biomass from domestic sources in the restricted and ambitious supply scenarios.

Priority Use Framework

Biomass Use Principles:

- **Sustainability**
- **Air Quality**
- **Net Zero**
- **Circular Economy and resource efficiency**

"Government will be launching a series of sector-specific consultations in 2023 and 2024; these will support the implementation of these guiding principles, as relevant to different sectors in the economy "



*A consultation to support the development of a common sustainability framework for biomass use across the economy is being planned for 2024.
**Compared to GHG emissions of appropriate counterfactual.

Figure 5.1: Guiding principles for prioritising the uses of biomass in the short, medium and long term (updated).

Priority Use Framework – Medium Term View to 2037

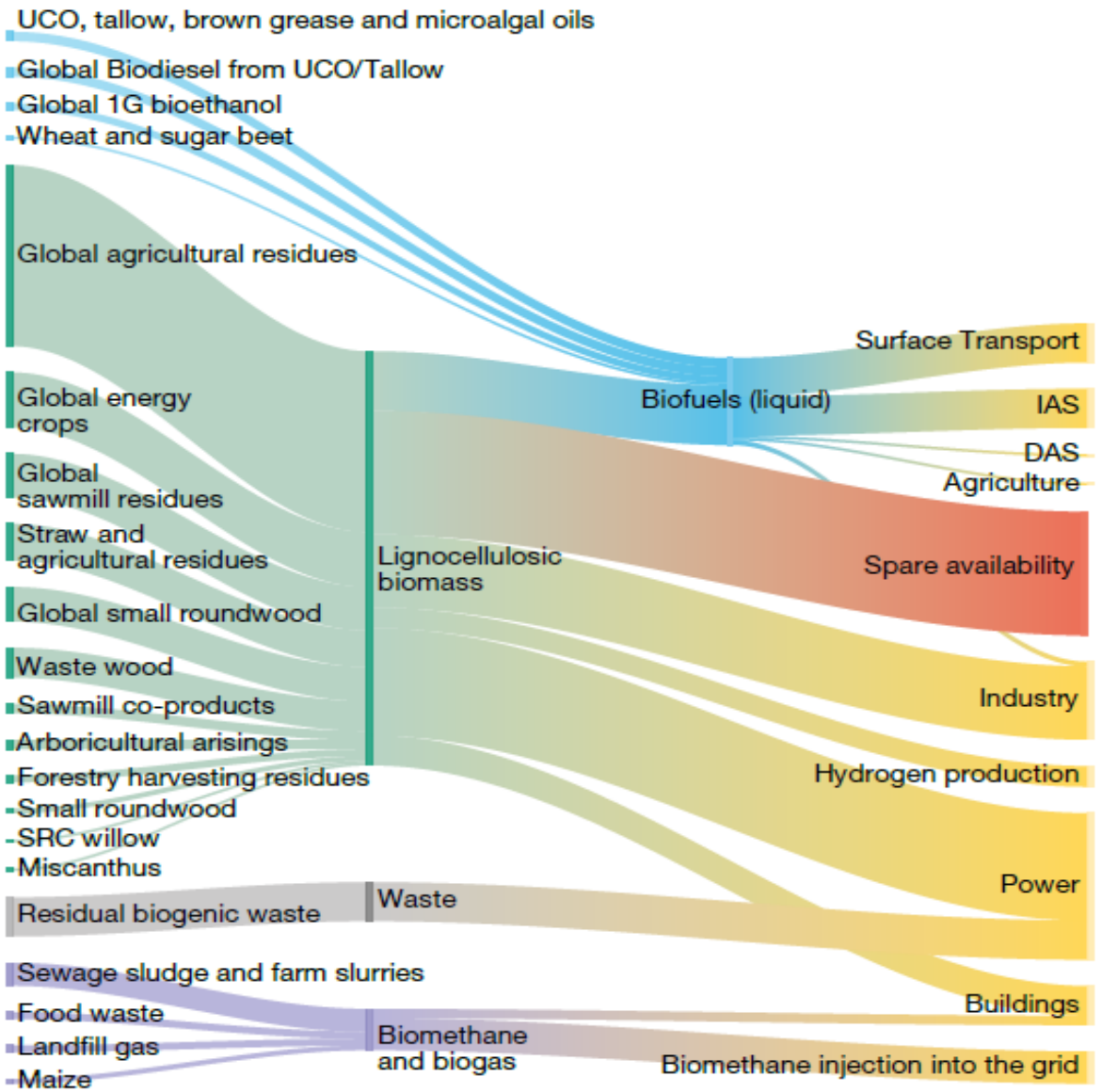


Figure 5.3: Sankey diagram representing biomass feedstocks and end-use sectors in 2035, in an ambitious biomass supply scenario. 'Global' feedstocks imply those which the UK has access to, and the 'Spare availability' node denotes excess availability that the UK would not need to import. Sector demands are averages across the CB6 period. Presented uses for feedstocks are indicative and may vary based on policy development and changes in end-use demand.

The future biomass supply estimates developed using the Ricardo model suggest a total potential biomass availability after policy considerations and ***processing yields between 113TWh and 228TWh of delivered energy.***

As such CB6 demand is estimated to be within the range of overall biomass availability.

Note SAF not included

Long Term View – Towards 2050

Common Themes in Long term view:

- The common theme across the three scenarios is that biomass is most cost-effectively used in BECCS technologies that can achieve the highest negative emissions, whilst producing additional low-carbon energy vectors.

- Role of biomass in the production of biofuels such as biokerosene and biodiesel, particularly where carbon capture and storage (CCS) can be part of the production process. This is expected to mainly go towards transport, particularly SAF, although potential role in heating also recognised.

Table 5.3: Illustrative scenarios and associated assumptions

Illustrative scenario	Assumptions
High Electrification	Transport, heating and industry predominantly electrified. No hydrogen used for power or heating buildings.
High Resource	Greater use of hydrogen including heat and power. Increased ambition in afforestation.
High Innovation	Significant technological advances, including increased carbon capture rates, deployment of direct air carbon capture & initial roll-out of hydrogen-powered aeroplanes.
All scenarios	Meet all Carbon Budgets and Net Zero by 2050 and assume ambitious biomass supply profile.

Bioenergy Carbon Capture and Storage

Table 6.1: BECCS TRL produced in support from the IEA Clean Energy Technology Guide – IEA(2022), ETPClean Energy Technology Guide, IEA, Paris
https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide

Routes to BECCS	Type	Technologies	CO_2 Capture method	CO_2 Transport	TRL Assessment
Fuel-BECCS	Biological	Fermentation	Separation	Pipeline	Mature
Biomethane-BECCS	Biological	Anaerobic digestion	Separation	Pipeline	Early adoption
Hydrogen BECCS	Biological	Anaerobic digestion	Biomethane with steam methane reforming with CO_2 capture*	Pipeline	Early adoption
Power BECCS	Post-Combustion	Combustion	Chemical absorption	Pipeline	Precommercial
Industrial BECCS	Post-Combustion	Combustion	Chemical absorption	Pipeline	Precommercial
SNG or Biomethane -BECCS	Thermochemical	Gasification to SNG	Pre-combustion	Pipeline	Demonstration
Fuel-BECCS	Thermochemical	Gasification to fuel	Pre-combustion	Pipeline	Demonstration
Hydrogen BECCS	Thermochemical	Gasification to fuel	Pre-combustion	Pipeline	Demonstration

Key	
Mature	Above TRL9
Early adoption	Early adoption – solution is commercially available, but needs improvement to stay competitive
Precommercial TRL8-9	Proven to work
Demonstration (TRL 6-7)	Prototype complete, planned operation

[143] https://www.globalccsinstitute.com/wp-content/uploads/2019/03/BECCS-Perspective_FINAL_18-March.pdf
[144] https://co2re.co/FacilityData

"Greenhouse Gas Removal (GGR) technologies are essential to the UK's net zero strategy – balancing residual emissions from hard-to-decarbonise sectors while providing new economic opportunities."

Task and Finish Group Report: The ability for BECCS to generate negative emissions

"While the group recognised there are some challenges, it did not identify any insurmountable scientific barriers to the net removal of CO2 from the atmosphere and subsequent permanent geological storage via BECCS when carried out in accordance with appropriately designed biomass sustainability criteria and via sustainable supply chains."

Principles for Deploying BECCS

The government is actively working on developing clear guidance and principles for GGRs and BECCS.

Principles State:

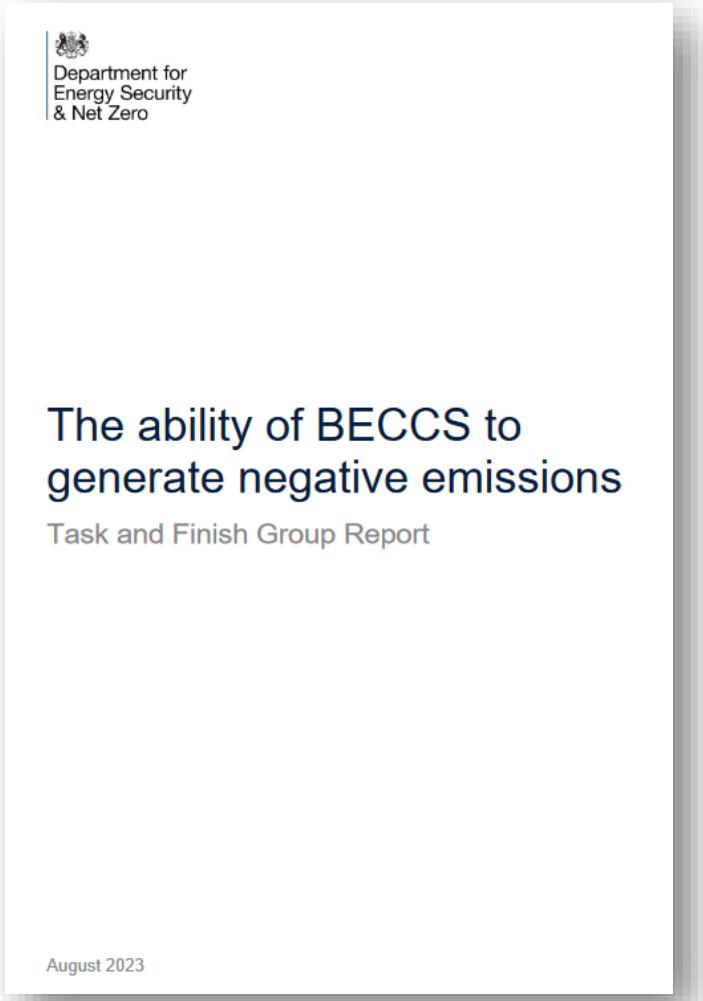
- Government should only support the use of sustainable biomass.
- Support of BECCS should only be for BECCS projects that deliver net-negative emissions.
- BECCS should provide valuable, low carbon co-products alongside a greenhouse gas removal
- BECCS project must achieve long term and safe carbon storage to guarantee atmospheric carbon removal.

The Strategy then goes onto review the various business model work streams that can support BECCS.

Table 6.2: The government's criteria for a robust negative emission.

CO_2 source	CO_2 must be directly captured from the atmosphere or seawater (via biological, chemical or geochemical means).
Net Negativity	End-to-end CO_2 emissions must be lower than the total amount of stored carbon. For some technologies we propose that we would set requirements to limit the level of supply chain emissions, to ensure that GGR technologies achieve a minimum level of net negative emissions.
Permanence	Once captured by a project, carbon must be sequestered in a highly durable store. The assessment of permanence should consider durability and 'risk of reversal' (likelihood of captured carbon being re-emitted into the atmosphere) associated with a carbon store. Utilisation of carbon in short-lived products, such as fuels and plastics, does not constitute a negative emission.

Other Documents

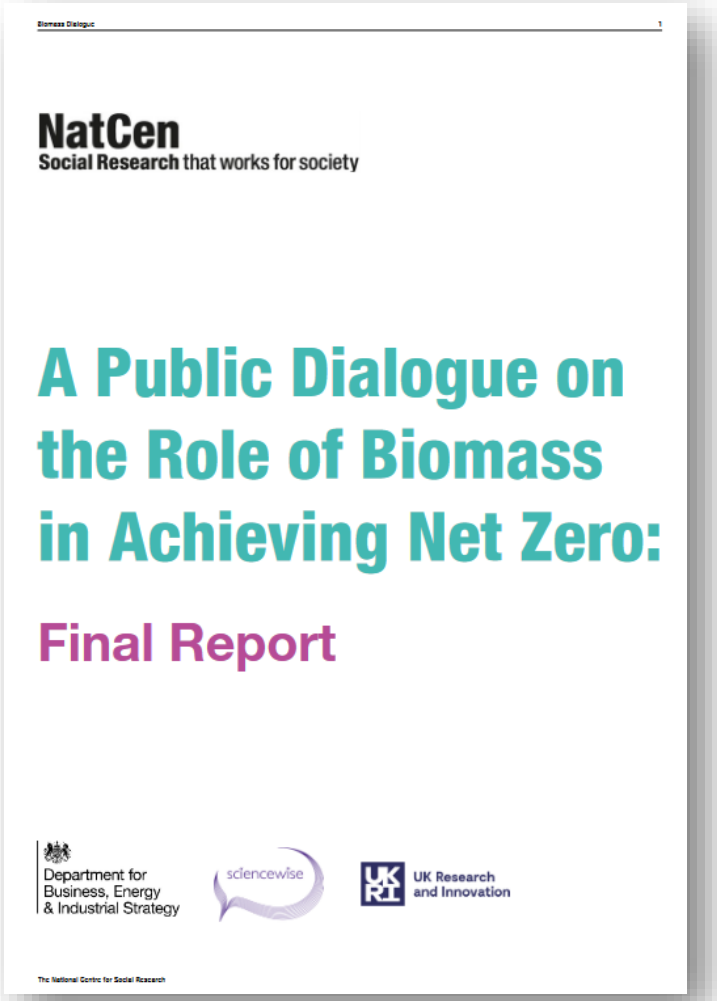


Department for Energy Security & Net Zero

The ability of BECCS to generate negative emissions

Task and Finish Group Report

August 2023



Biomass Dialogue 1

NatCen
Social Research that works for society

A Public Dialogue on the Role of Biomass in Achieving Net Zero:

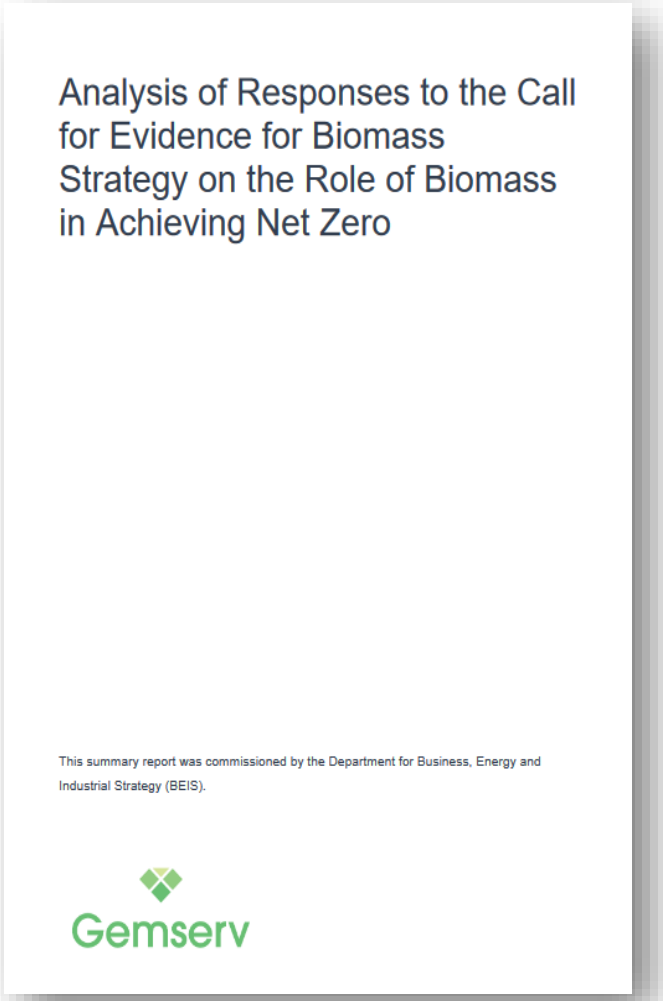
Final Report

Department for Business, Energy & Industrial Strategy

sciencewise

UK Research and Innovation

The National Centre for Social Research



Analysis of Responses to the Call for Evidence for Biomass Strategy on the Role of Biomass in Achieving Net Zero

This summary report was commissioned by the Department for Business, Energy and Industrial Strategy (BEIS).

Gemserv

Sector Specific Analysis

Biomass Heat

- Key statement: *"Biomass will likely have a role in heating in certain properties such as off-gas grid homes that are not readily suitable for heat pumps, and where appropriate mitigations can be set in place to minimise air quality impacts".*
- Clear short and medium term role in government's technology agnostic approach to net zero
- 1.1 million **off-gas-grid properties** - biomass boilers can contribute to the **decarbonisation of 20%** of these
  - Equivalent to 220,000 properties
  - Currently 12,477 biomass boilers installed as of December 2022 under the RHI
- Deployment opportunity in **hard-to-decarbonise sectors of industry**
  - Transition fuel in the short and medium term
  - Manufacturing industry
  - IETF

Biomass Heat

- **Air quality** - emphasis on need for **tighter regulations**
  - Focus on stoves and fireplaces
  - Clear they are ***"not considering a ban on domestic burning in England"***
  - Ongoing workstreams
    - Survey work to track domestic burning
    - Research to develop emission factors for domestic solid fuels
    - Funding competition to abate emissions from solid fuel burning
- **Sustainability**
  - Implementing the **same definitions** for sustainable feedstocks across the biomass sector
  - Requirement that woody biomass users ensure **100% of feedstocks** can be proven sustainable
  - Expects perennial energy crop growth to increase up to **17kha/yr from 2038**
    - Low compared to the 23kha/yr requirement estimated by CCC

Renewable liquid fuels in heating

- Renewable liquid fuels could play a role in decarbonising **off-gas-grid properties**
- Hydrotreated Vegetable Oil (**HVO**); renewable liquid petroleum gas (**BioLPG**); renewable dimethyl ether (**rDME**)
    - Limited modifications needed to existing boilers
    - Not commercially available for home heating
    - High costs compared to other fuels
    - Limited availability of **sustainable feedstocks**
        - High demand from other sectors e.g., transport
- Working with stakeholders to see what role it could play in the future heating mix and the potential to scale up production
- However, questions remain around **supply chains**, and how they'd be best used

Biomethane

"Biomethane will continue to play an important role in optimising the path to net zero and increasing energy security."

- Food waste treatment by Anaerobic Digestion (AD) recognised as `recycling` activity.
- Carbon Budget Delivery Plan (2035)- Feedstocks (food, slurries/manures, sewage, crops) prioritised for AD biomethane production.
- AD currently main source of biomethane but expected increase through biomass gasification/ landfill gas upgrade/ slurry lagoon.
- In 2022, 6.2 TWh biomethane injected into the grid – increase to 8TWh by 2030 and 30-40TWh across scenarios by 2050 (gasification BECCS included).
- By 2050 biomethane could largely be used to deliver peaking power requirements with CCS technology (Green gas battery).
- Barriers to growth (post- GGSS, digestate, CH4 leakage, BECCS deployment)
  - ➢ Commissioning research to create methodology for life cycle assessment.

Hydrogen

- Energy Security Strategy (2022) doubled the UK ambition to 10GW of low carbon hydrogen production capacity by 2030, subject to affordability and value for money.
- By Carbon Budget 6 period (CB6) as set out in the Carbon Budget Delivery Plan (CBDP), biomass will also have a role in hydrogen production through hydrogen BECCS.
- Many biomass pathways will rely on gasification-based routes for BECCS (hydrogen and SAF BECCS), a priority area for innovation.
- Hydrogen BECCS Innovation Programme supports technologies which can produce hydrogen from biogenic feedstocks.
- The NZIP Direct Air Capture (DAC) and GGR Innovation Programme has directed funding to deliver a portfolio of First-of-a-Kind (FOAK) GGR projects, including BECCS and biochar.

Illustrative scenario	Assumptions
High Electrification	Transport, heating and industry predominantly electrified. No hydrogen used for power or heating buildings.
High Resource	Greater use of hydrogen including heat and power. Increased ambition in afforestation.
High Innovation	Significant technological advances, including increased carbon capture rates, deployment of direct air carbon capture & initial roll-out of hydrogen-powered aeroplanes.
All scenarios	Meet all Carbon Budgets and Net Zero by 2050 and assume ambitious biomass supply profile.

Renewable transport fuels

- RTFO delivers ‘around a third’ of the carbon savings in domestic transport required ‘under current budget’
- Ongoing role seen for renewable fuels in light road vehicles, but increasingly focus on modes with limited alternatives such as aviation and maritime
- DfT interested in supporting ‘higher biocontent’ fuels, as ‘heavier vehicles and vessels covering long distances will continue to require liquid and gaseous fuels for some time to come’
- CCS increasingly seen as important in biofuel production processes, especially SAF
- Low Carbon Fuels Strategy still be worked on – DfT hopes to publish by end of 2023

Landfill gas

- 732kT of methane from landfill was captured in 2021, vast majority of which was used to generate electricity – 3.3GWh
- ROCs due to end for most in 2027. Recognition that provide an environmental service as well as renewable electricity and ‘it is a priority’ that feedstocks such as landfill gas are used ‘now and in the future’.
- Specific reference to planned consultation on supporting ‘repowering’ within the Contracts for Difference mechanism
- Noted the possibility of supporting landfill gas injection to the gas grid, although this is currently not eligible under Renewable Heat Incentive or Green Gas Support Scheme

Biomass Power

- No Plans to remove Support from Biomass generating stations that are already supported under a current government scheme.
- However, moving forward it is anticipated that support for new plants will be directed towards priority uses areas. They indicate there will not be support for new unabated biomass sites.
- BECCS has been identified as a priority use of biomass, and plants should consider the various business models.
- This will also align with Decarbonisation Readiness Requirements for all new and substantially refurbished plants, which where consulted on earlier in the year.
- Strategy also recognises merit in repowering existing assets, which is being currently considered through CfD reform proposals.

Waste Policy Interaction

"The availability of different waste and waste-related feedstocks, such as food waste, and residual biogenic waste, is dependent on our domestic waste policies and ambitions.“

Specific reference to expected legislation for separate food waste collections and indentations to ban biodegradable material from landfill.

Circular Economy is also prioritised in the Priority Use Framework and potential Cross Sectoral Sustainability Framework.

“To support a move towards a more circular economy, we will make a further assessment on how best to adopt the cascading use of biomass in the UK as part of the sustainability principle”

Energy from Waste continues to be considered the “better option” for dealing with residual waste while also prompting waste potential use in biofuel production.

Also noted that many biomass pathways that will rely on **gasification**-based routes for BECCS (hydrogen and SAF BECCS) “therefore gasification is a priority area for innovation.”

Next Steps

Large number of upcoming government policies where the Biomass Strategy will have an Impact: REA will be pushing to see that intentions of Biomass Strategy are pushed through:

- Power BECCS Business Model
- GGR Business Model
- Low Carbon Fuels Strategy
- Industrial Energy Transformation Fund
- Green Gas Support Scheme Review
- Low Carbon Hydrogen Strategy/ Standard
- Land Use Framework
- Quality Protocols
- Repowering CfD
- REMA
- Waste Prevention Plan inc. Waste Hierarchy Consultation
- Waste Consistency of Collection Legislation
- SAF Mandate
- RTFO evolution
- Air quality Strategy

Next Steps

Raise any questions and issues with the strategy with Government DES NZ Team.

Establish how REA will respond to Sustainability Consultation

Ensuring further stakeholders understand role of bioenergy in decarbonisation, reiterating strategy positions. Includes MPs and Think Tanks

Ensure Labour understand Strategy Outcome and support its implementation.

Upcoming Events

@reassociation

Chesford Grange, Kenilworth, Warwick, CV8 2LD

https://www.r-e-a.net/events/rea-wood-heat-conference/

Wood Heat 2023 is supported by:

UK PELLET COUNCIL

Speakers Include:

- **Terence McCracken**, Innasol Ltd.
- **Tunde Ojetola**, Department of Energy Security and Net Zero
- **Neil Welsh**, Ofgem
- **Dr Amy O'Mahoney**, Ofgem
- **Matthew Goodwin**, UKPC and European Pellet Council
- **Helen Bently-Fox**, Woodsure
- **Virginia Graham**, RECC
- **Thomas Wilkins**, NFU Energy
- **Prof. Patricia Thornley**, Supergen Bioenergy Hub
- **Andrew Welfle**, BISM
- **Gill Alker**, AMP Clean Energy

Upcoming Events

Environment Agency's Climate Change Adaption Survey Webinar
Sep 21 2023, 11:30 - 12:30

The Environment Agency have recently issued a survey to EPR permit holders in England to review the extent to which EPR operators are aware of and implementing good and best practice related to climate change. This is an information gathering stage and will not impact compliance. There is also a requirement to complete a site-specific risk assessment by April 2024. To help members with this we have arranged a webinar with Spence Seaman, Regulated Industry Climate Change Manager at the EA.

https://www.r-e-a.net/events/environment-agencys-climate-change-adaption-survey/

Upcoming Events

UK Green Gas Day 2023

The 11th edition of the largest industry gathering in the UK focused on green gases including hydrogen

11th October 2023

National Motorcycle Museum
Solihull, B92 0EJ

REA cngservices

Sponsored by:

Cadent Your Gas Network

Clarke Energy Engineer - Install - Maintain

https://www.r-e-a.net/events/uk-green-gas-day/

https://www.r-e-a.net/events/the-hydrogen-futures-conference/

Upcoming Events

Organised By Supergen Bioenergy Hub
10.00 – 16.30
https://www.eventbrite.co.uk/e/supergen-bioenergy-hub-uk-biomass-strategy-event-tickets-691693021447

Thank You

@reassociation

Mark Sommerfeld
Deputy Director of Policy
msommerfeld@r-e-a.net

Poppy Airey
Heat Policy Analyst
pairey@r-e-a.net

Paul Thompson
Head of Renewable Transport Fuels & Landfill Gas
pthompson@r-e-a.net

Frank Gordan
Director of Policy
fgordon@r-e-a.net

Sara Bartle
Green gas and Hydrogen policy lead
sbartle@r-e-a.net