drax

Delivering negative emissions at scale

22 October 2019

Welcome to Drax Power Station

The largest single site renewable generator in the UK

4 of 6

645MW boilers converted from coal to sustainably sourced biomass

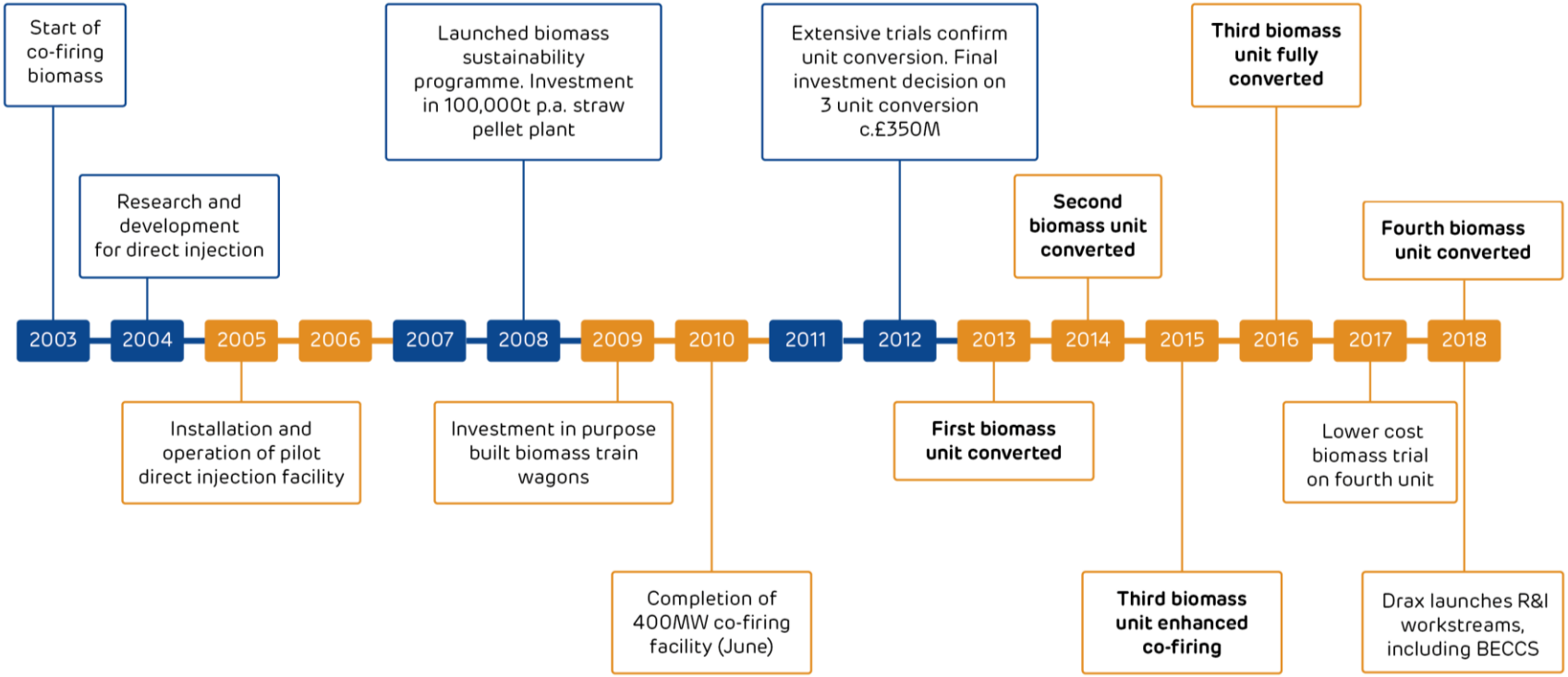
12%

GB's renewable electricity in 2018

17,000+

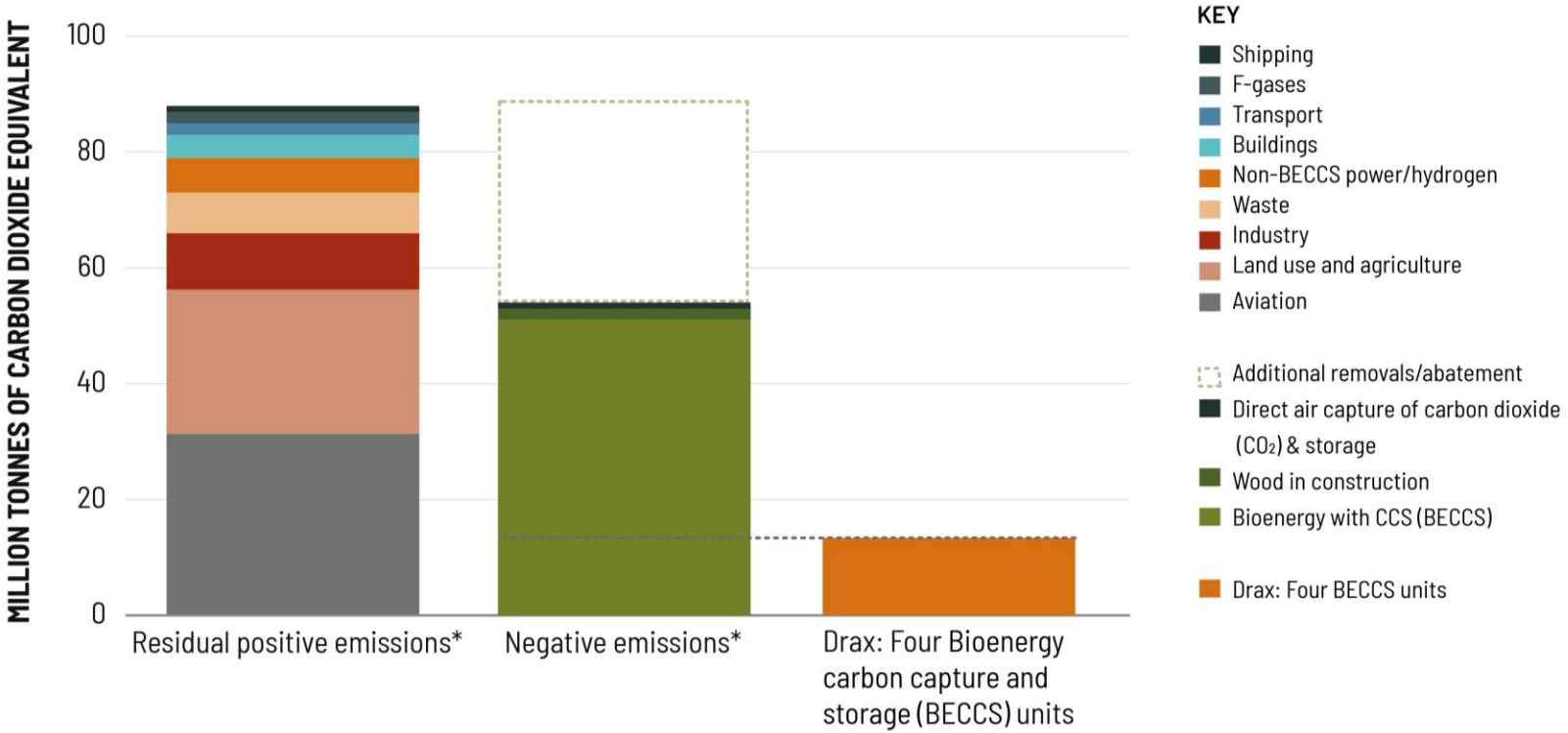
UK jobs directly or indirectly supported by Drax

Our biomass journey



Developing bioenergy with carbon capture and storage (BECCS) at Drax

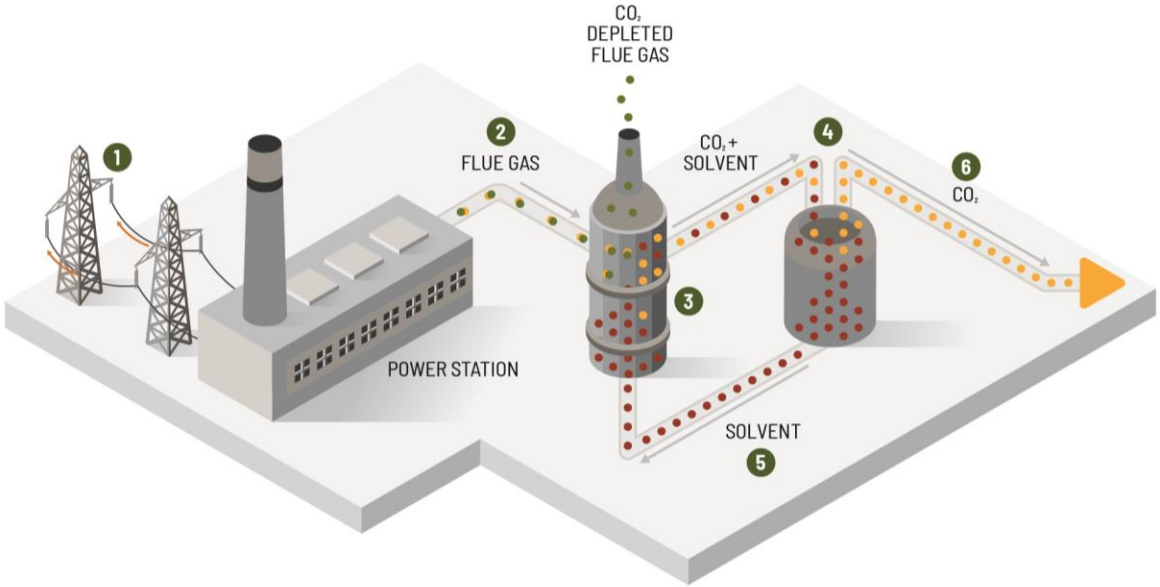
BECCS: Essential to achieving ‘net zero’ in the UK by 2050



***Source:** Committee on Climate Change, ‘Net Zero’ report (2019)

Notes: Sectoral emissions and contributions from negative emissions presented for the Further Ambition scenario. The contribution from 'additional negative emissions abatement' refers to the options to go beyond the Further Ambition scenario and achieve net-zero emissions, which can be done with additional negative emissions and/or further reductions of positive emissions (see Chapter 5).

How BECCS would work at Drax Power Station



KEY

- Flue gasses
- Solvent
- Carbon dioxide (CO_2)

1. Electricity is produced and enters the national grid system
2. Flue gas containing CO_2 leaves the power production process. It is cooled and treated before entering an absorption tower
3. Inside the absorption tower, a chemical reaction takes place which extracts CO_2 from the flue gas. CO_2 depleted flue gas is released to the atmosphere
4. The solvent containing the CO_2 is heated in a re-boiler, which reverses the chemical reaction separating the CO_2 from the solvent
5. The solvent is then re-circulated back into the carbon capture system
6. The now pure stream of CO_2 is transported via pipeline for permanent storage under the southern North Sea

BECCS: Our work to date

- **BECCS pilot commissioned earlier this year**, capturing one tonne CO_2 per day using C-Capture technology – the first 100% biomass CCS pilot in the world.
- **£5m awarded through BEIS CCUS innovation programme** to C-Capture/Drax partnership to test at Tiller in Norway in 2019, scaling up to 100 tonnes per day in Technology Centre Mongstad in 2020/21.
- **Utilisation project announced** with Deep Branch Biotechnology to explore use of biogenic carbon to create protein for fish food.
- **Leveraging historical technical work** undertaken with National Grid on CO_2 transport and storage infrastructure as part of the White Rose CCS project.

Our long-term ambition

- **Mid-2020s** deployment of first BECCS unit at Drax (2.5 Mts CO_2 p.a.)
- **16 Mts CO_2 p.a. of negative emissions** in 2030s
- **Large scale CO_2 Transport & Storage network** for Humber industrial cluster, sized, appraised and developed

UK energy minister Claire Perry MP visiting Drax BECCS pilot – 29 November 2018

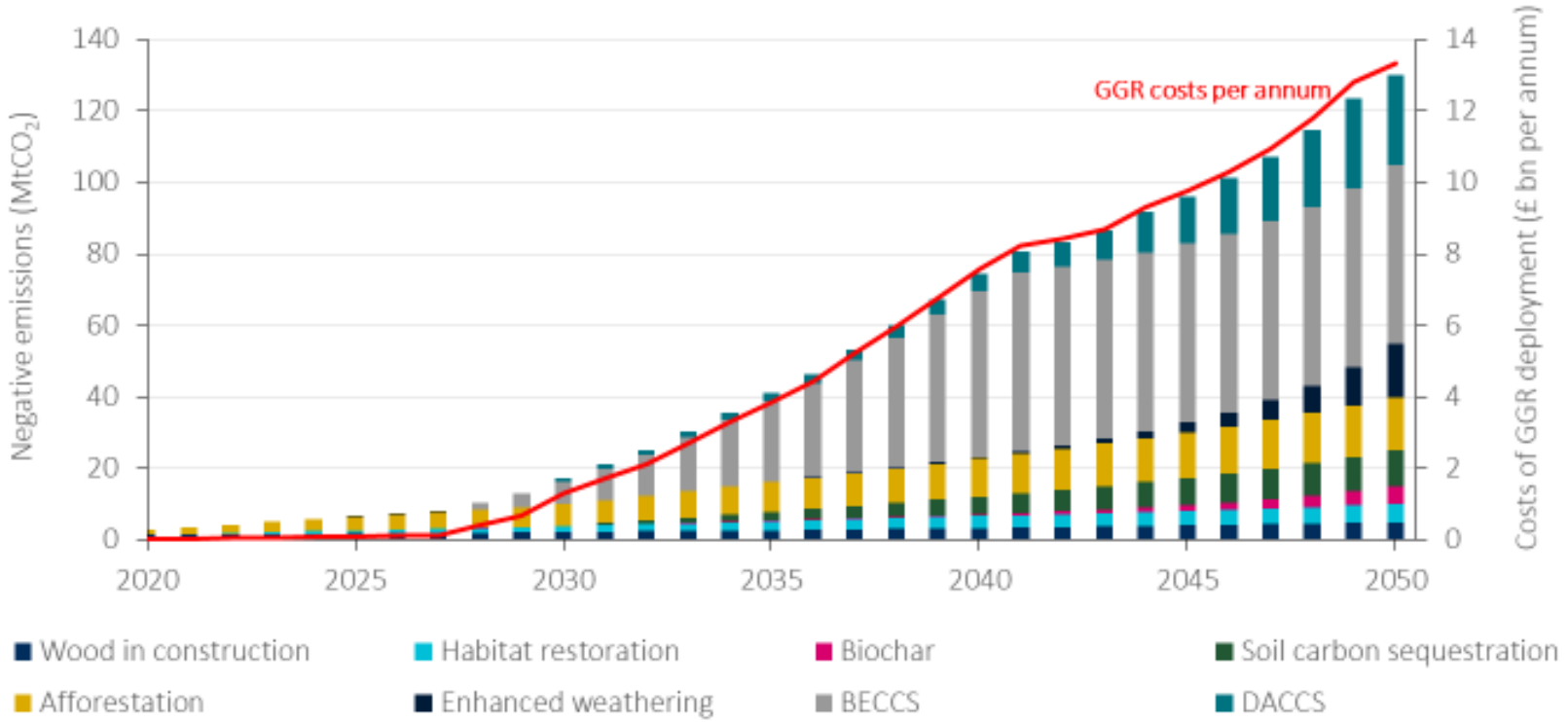
Developing negative emissions policy in the UK

Vivid Economics advice to government, September 2019

Key findings:

- GGR technologies are **absolutely vital** if we are to hit our 2050 Net-Zero target.
- BECCS and DACCS expected to be two GGR options **due to their scalability**.
- **Significant policy support will be required** in order to enable GGR rollout at the scale required.
- Annual costs of GGRs estimated at between **£1-2 billion in 2030** and **£6-30 billion in 2050**.
- A number of near term policies can be deployed quickly for early deployment with **longer term policies developed over the next few years**.

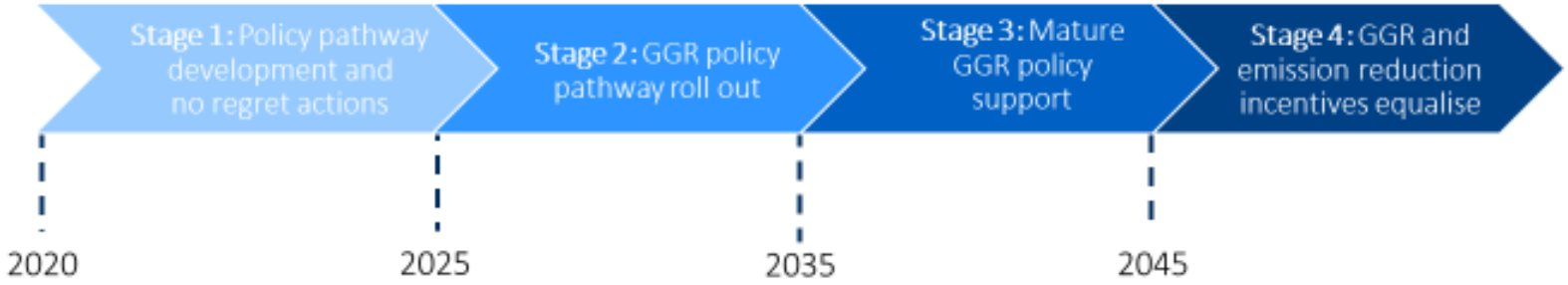
GGR will need to scale up rapidly to reach 2050 climate goals



Note: Costs displayed are the mid-point of upper and lower estimates. Substantial uncertainty surrounds future technology performance.
Source: Vivid Economics, with data from Royal Society (2018)

:vivideconomics

Approximate timeline for GGR policy rollout



Several short term actions to support GGR are available

Direct policies

- Strengthen payment schemes for afforestation and habitat restoration
- Enhance the recognition and demand for Woodland Carbon Units
- Include BECCS and DACCS under existing emissions trading schemes

Enabling policies

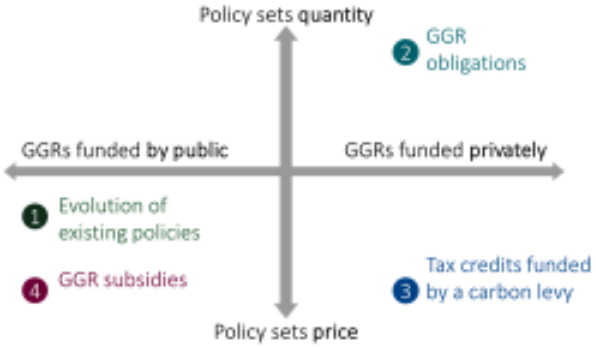
- Pilot project of immature land-based GGRs (aim is to develop suitable accounting standards and mitigate environmental risks)
- Support demonstration projects of BECCS and DACCS
- Coordinate investments in CCS infrastructure
- Provide land managers with skills and information to transition into new land management practices

Integrating policies

- Relax the permanent land use change requirement in afforestation schemes

Regardless of the direct policy to support GGR, several enabling and integrating policies will be required

Various options for direct policy



Suite of policies irrespective of direct policy

Enabling policies

Integrating policies

Thank you

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