

Towards carbon negative power: The role of Bio-Energy with Carbon Capture and Storage (BECCS)

Drax: Our journey to net negative

drax

Who we are:

Global, vertically integrated renewable power company

Operator of Europe's largest decarbonisation project; we've converted 2.5GW from coal to sustainably sourced biomass

The **largest renewable power generator** in the UK (11%), providing power to over 5 million homes and businesses

A **leading producer of wood pellets** from sustainably managed working forests; with operations in Arkansas, Louisiana, Mississippi and Alabama

19,200 jobs supported by our operations and across our supply chain

Carbon Dioxide Removal (CDR) pioneer

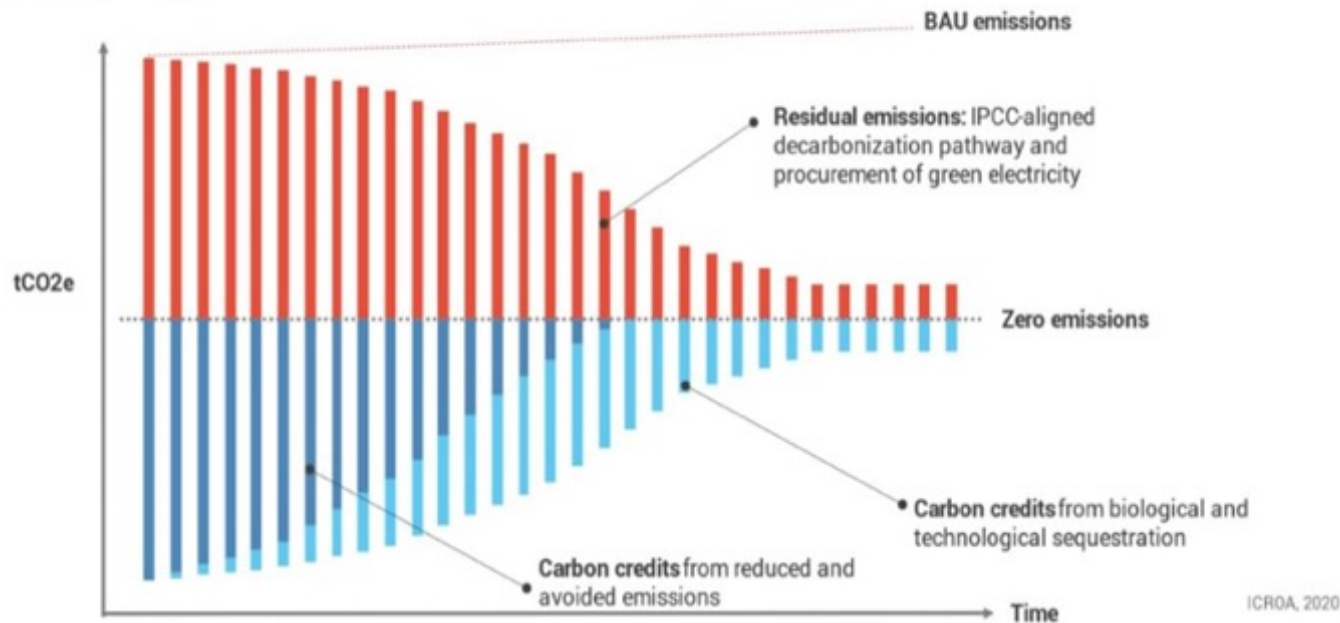


The need for Negative Emissions

Achieving the transition to Net Zero through Carbon Dioxide Removals (CDRs)



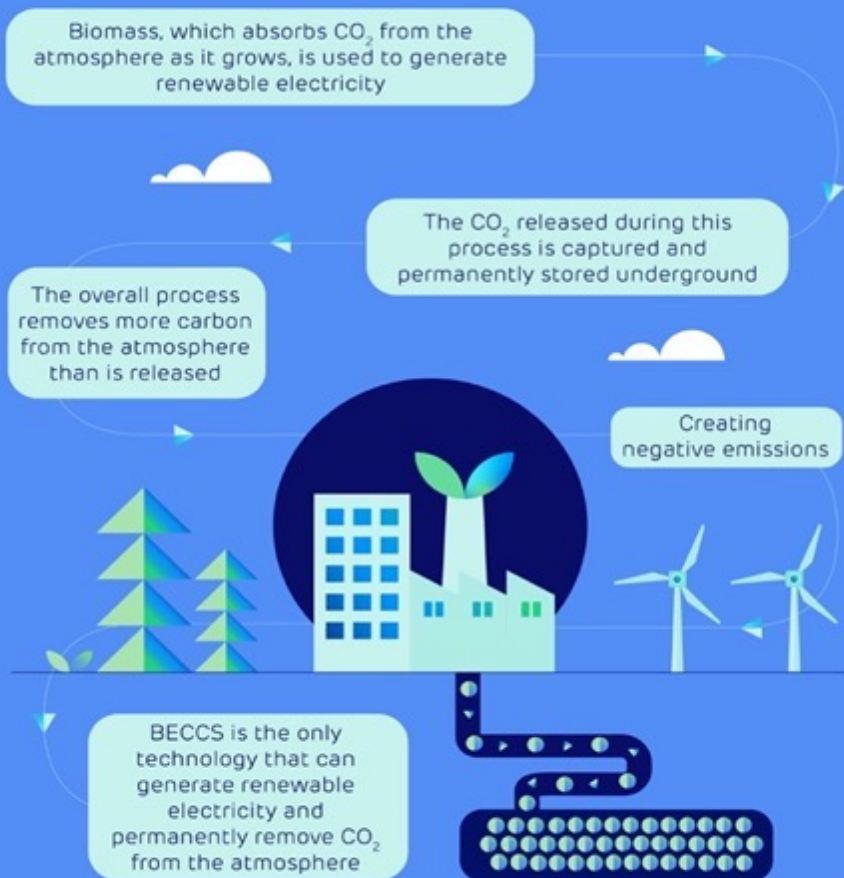
HIGH INTEGRITY CARBON CREDITS CAN ACCELERATE THE TRANSITION TO NET ZERO



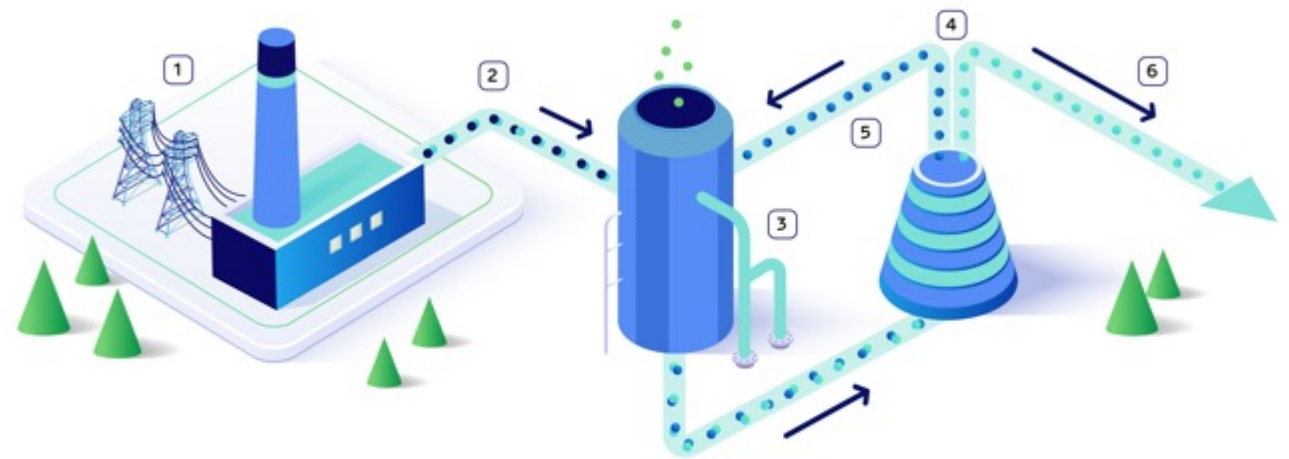
“Carbon Dioxide Removal is necessary to achieve net zero CO₂ and GHG emissions both globally and nationally” - lowering net emissions in the short-term, counterbalancing ‘hard-to-abate’ residual emissions, and enabling net negative emissions in the long-term

- **High integrity Carbon Removals will play a key role in achieving Net Zero**
- **Carbon Removals can accelerate achieving Net Zero while power generation decarbonises**
- **There is also the opportunity to go beyond Net Zero with negative emission solutions**

What is bioenergy carbon capture with storage? (BECCS)



How carbon is captured from an emissions source



KEY

- Flue gasses
- Solvent
- CO₂

- 1 Flue gas containing CO₂ leaves the power production process
- 2 The flue gas is cooled and treated before entering an absorption tower
- 3 Inside the absorption tower, a chemical reaction takes place which extracts CO₂ from the flue gas. CO₂ depleted flue gas is released to the atmosphere
- 4 The solvent containing the CO₂ is heated in a re-boiler, which reverses the chemical reaction separating the CO₂ from the solvent
- 5 The solvent is then re-circulated back into the carbon capture system
- 6 The now pure stream of CO₂ is transported via pipeline for permanent storage under the southern North Sea

Drax BECCS: the world's first negative emissions power station

- **Most advanced CCUS project in the UK:**
 - Pre-FEED work completed, FEED / EPC contractor announced (Worley)
 - Technology / solvent provider selected (Mitsubishi)
 - 2 successful CO2 capture pilots
 - DCO planning process well advanced
- **First unit operational from 2027**, second by 2030
- **c.4mtpa negative emissions** from each unit
- Part of **East Coast Cluster** – selected by BEIS for Track-1
- **10,300 jobs created by Drax BECCS** and c.50,000 by CCUS in the Humber region

Drax BECCS is a mature, deliverable project that is good value for money and will contribute to Government's climate, energy and levelling up objectives.



EAST CO₂ AST CLUSTER

THE HUMBER

YORK ●

drax

Negative emissions

DONCASTER ●

● SHEFFIELD

equinor

Blue hydrogen

LOCATION TBC

BRITISH STEEL

Hydrogen & CCS

H2H SALTEND

equinor E.ON POWER MITSUBISHI POWER

Blue hydrogen production, Hydrogen-blend CCGT, Low carbon chemicals & maritime fuel

KEADBY CC POWER STATION

sse Thermal equinor

CCGT & Carbon Capture

HYDROGEN HUB

uni per

Blue and green hydrogen

VELOCYS

Waste to jet fuel

BEVERLEY ●

HULL ●

● SCUNTHORPE

Saltend Chemicals Park & Saltend Power Station

Immingham/Killingholme

GRIMSBY ●

BRIDLINGTON ●

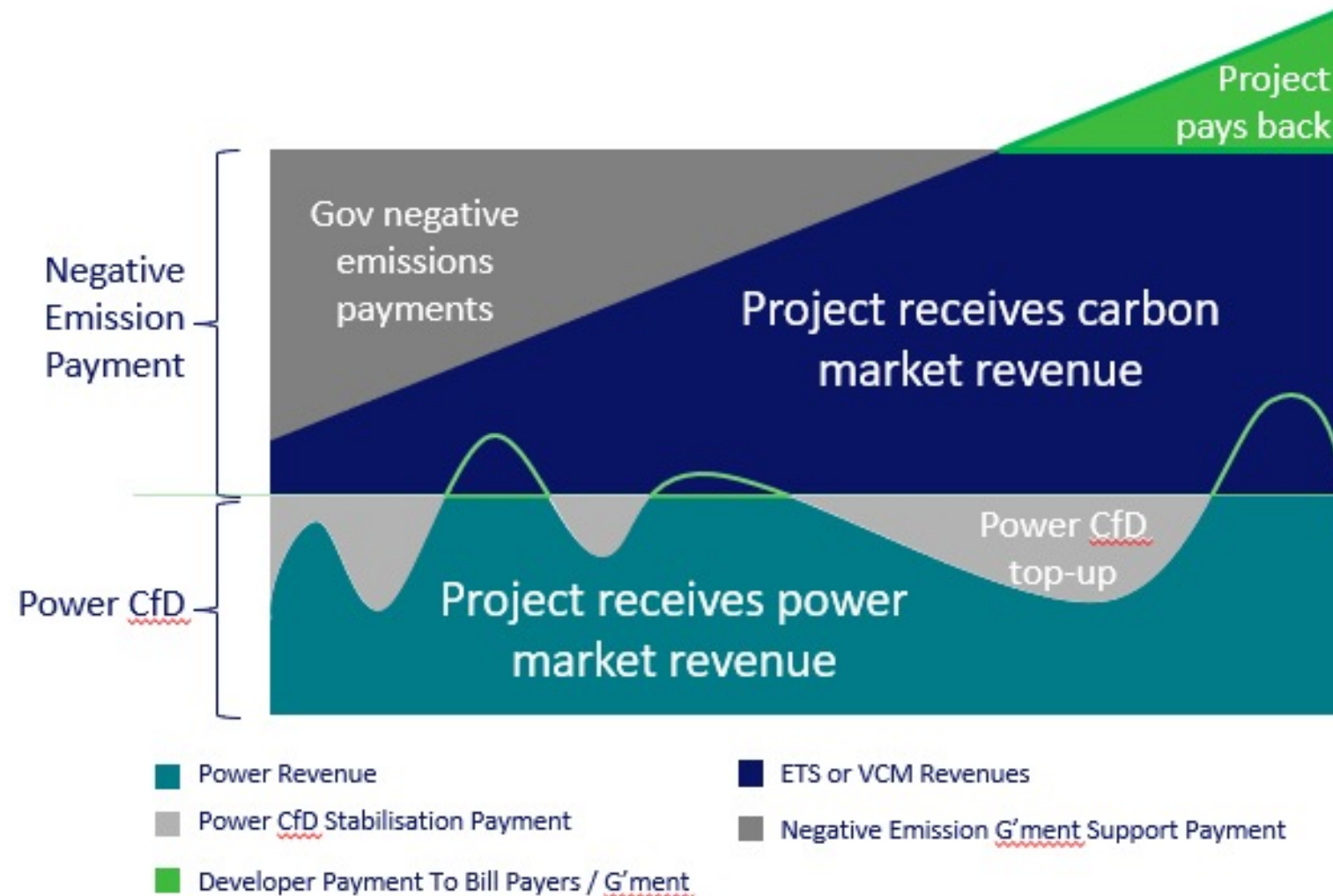
NORTH SEA

EXPORT PIPELINE TO STORE

KEY

- | | | | |
|-----------------------|-------------------|---------------------------------|------------------------------|
| Power generation | Biomass | Hydrogen production | Primary emitters for ECC bid |
| Industry | Energy from waste | Future CO ₂ pipeline | Potential future emitters |
| Biofuels / processing | Shipping | Future hydrogen pipeline | |

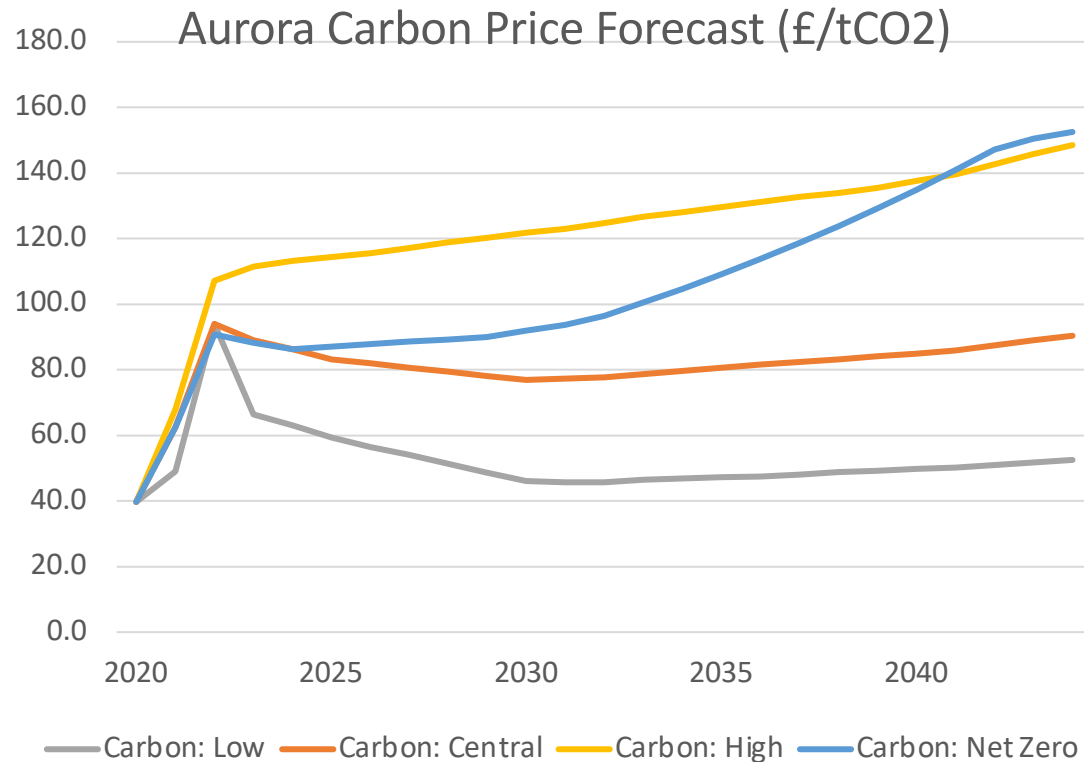
BECCS business model: Negative Emissions CfD



Revenue from the UK Emissions Trading Scheme and / or voluntary carbon market could materially reduce Government support for GGRs

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Including carbon removals in the UK ETS could provide all or most of the carbon revenue required for a FOAK BECCS project



Voluntary carbon market is in its infancy but growing rapidly in both supply and demand

Integrity Council for the Voluntary Carbon Market

The Integrity Council for the Voluntary Carbon Market (IC-VCM) is the new governance body established to set and enforce global standards for the voluntary carbon market. Its purpose is to ensure the voluntary carbon market contributes to the goals of the Paris Agreement by mobilizing finance into projects and programs that reduce or remove greenhouse gas emissions in the atmosphere.

- **Security of supply:** reliable renewable power, complements intermittent renewables, reduces reliance on gas.
- **High integrity carbon removals:** permanent geological storage.
- **Value for money:** reduces cost of achieving net zero by £10-30bn.
- **Levelling up:** UK supply chain potential.

