THE ASSOCIATION FOR RENEWABLE ENERGY & CLEAN TECHNOLOGY

Member Meeting on Greenhouse Gas Removals Business Models Consultation

17th August 2022

Agenda

- In Context: GGR Business Model Consultation
- Technology Scope
- Government Minded-to-Position for a Contract Based Business Model
- Three Proposed Market Contracting Arrangements
- Policy Design Features
- Negative Emission Markets
- Standards – Monitoring, Reporting and Verification
- Technology Applicability

Webinar will be recorded for note taking purposes.

In Context: GGR Business Model Consultation

Following an open call for evidnce last year, the Net Zero Strategy established the Government's intention to develop markets and incentives for engineered GGR technologies.

Net Zero Strategy suggests that at least 5 $MtCO_2$ of engineered removals will be needed annually by 2030, rising to around 23 $MtCO_2$ by 2035

Along with options for contract-based model the GGR consultation also considers:

- Building a Market for Negative Emissions
- Monitoring Reporting and Verification
- Applicability across GGR Technologies

The GGR Business Model is being developed in Parallel to several other Carbon Capture Business Models:

- Industrial Carbon Capture Business Model
- Dispatchable Power Agreement
- Power BECCS Business Model

In addition, worth noting other relevant Government Workstreams

- Low Carbon Hydrogen Business Model Development
- Call for Evidence on UK ETS Development
- Net Zero Innovation Portfolio Projects

Technology Scope

Technology Neutral for engineered removals

Non-exhaustive list of :

- Direct Air Capture and Carbon Storage (DACCS)
- Bioenergy with Carbon Capture and Storages (BECCS)
- Hydrogen BECCS
- SAF BECCS
- Ocean based CO2 Removal
- Carbon negative concrete using zero-carbon lime

Interactions with other support mechanism therefore also being considered (Final Section)

Out of scope:

- Nature Based Solutions (afforestation, soil carbon, habitat restoration)
- Timber in Construction
- Ocean Fertilization
- Carbon Capture and Utilisation (e.g. fuels and beverage)
- Biochar and enhanced Weather – Under review but at this stage *"further work is needed to build an empirical evidence base around the benefits and risks of these methods, particularly in relation to their permanence and impacts on local ecosystems when deployed at scale."*

Q1: Do you agree that the Government should develop a GGR business model to enable a diverse portfolio of GGR technologies to deploy at scale in the next decade?

Q2: To support a portfolio approach to GGR deployment, do you agree that Government policy for incentivising negative emissions should be technology-neutral as far as possible?

Minded-to-Position for a Contract Based Business Model

BEIS Commissioned Research Project on GGR Business Models by Element Energy, E4tech and Cambridge Econometrics.

Tax Credits: Seen as too complex a mechanism for incentivising a range of GGRs and may not benefit all business.

Competition Funding: Not appropriate beyond piolet commercialisation projects

Regulated Asset Base (RAB): GGRs expected to be smaller than typical RAB infrastructure usually considered.

Minded to Position: **Contracted Support**: Provides revenue confidence, and suitably flexible to support a range of technologies

BEIS set out principles for considering policy design:

- Revenue Certainty
- Value for Money
- Deliverability
- Competition
- Market Development
- Technology Neutral
- Reduced Support
- Compatibility
- Reaching GGR Targets

Q3: Do you agree with the Government's principles for policy design?

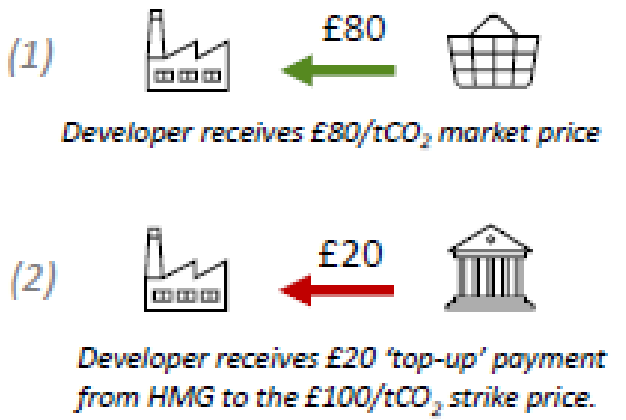
Q4: Do you agree with our overall approach to introduce a contract-based business model for GGRs to provide revenue support for negative emissions?

Three Proposed Market Contracting Arrangements

Negative Emission CfD

Government pays difference between agreed **Strike Price** and **Market Reference Price.**

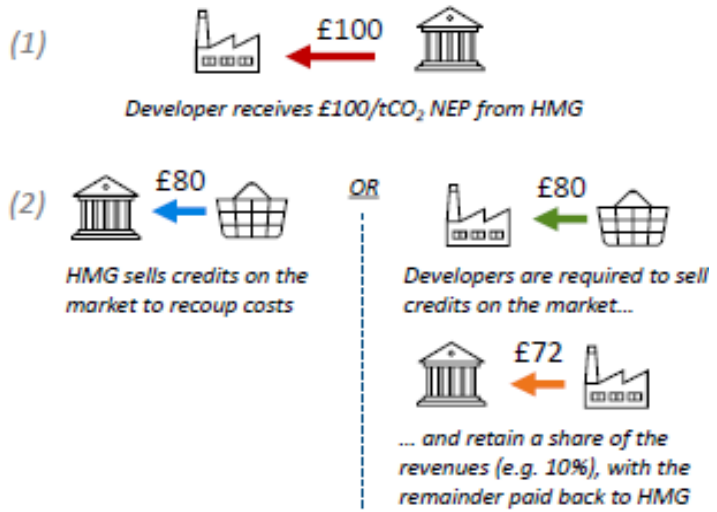
Would require establishment of negative emission market price.



Negative Emission Payment + *Clawback Mechanism*

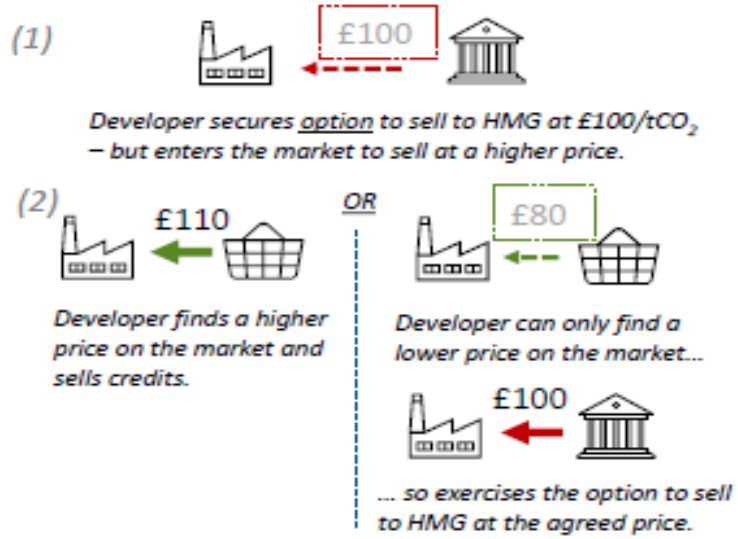
Receive a fixed payment for Negative emission.

Government seeks to recover costs by selling in the market or by requiring developers to sell credits on the market, with the proceeds shared between the developer and HMG.



Negative Emission Guarantee

Developers bid for the option to sell credits to HMG at a guaranteed price. They may exercise the option to sell credits to HMG if they are unable to find a high enough price on the market.



Example Diagrams Produced by BEIS – They are purely illustrative. Final policy Design May Differ.

Policy Design Features

Allocation Process	Current thinking suggests allocation by bilateral negotiations first, followed by competitive bidding.
Setting a Contracted Price and Reference price	How variable are cost requirements going to be between types of project – retrofit Vs newbuild. How is a reference price set for intial projects.
Contract Length	Appropriate to set a length at the start or have contract lengths as part of initial bids, between a Min and Max length set by government.
Review Mechanism	Is it appropriate for contracts to have a review mechanism in case the contact terms prove insufficient or excessively generous?
Capture and Utilisation	GGR Business Model not intended to support CO2 utilisation projects. Payments will be based on *£t/CO2 stored.*
Revenue Cumulation or 'stacking'	Should HMG allow project developers to combine negative emissions support under a GGR business model with existing subsidy schemes for co products?
Capital Support	Should additional CAPEX support be provided for FOAK Projects.
Any Other Design Priorities?	

Questions

Q5: What is your preferred contract scheme of those outlined in the consultation? Please provide arguments to support your view.

Q6: *When might it be feasible to introduce an auction mechanism for GGR contracts, and what criteria should the Government consider when developing its allocation process?*
Q7: How can the Government most effectively reward innovation and cost reduction in early GGR contracts?
Q8: *If the Government pursues a Negative Emissions Contract for Difference, what is the most appropriate basis for setting the reference price for initial contracts? Please provide arguments to support your view.*
Q9: What mechanism could the Government introduce to ensure that project developers achieve the highest possible sales price for negative emissions credits on the market?
Q10*: What do you think is the most appropriate option for setting the length of GGR contracts? Please explain your rationale.*
Q11: *Would it be desirable to include a review mechanism in early GGR contracts? If no, please outline your reasons. If yes, please give your views on how a review mechanism might be designed.*
Q12: Should the Government allow project developers to combine negative emissions support under a GGR business model with other support mechanisms for co-products? Please provide arguments to support your view on whether this could be an effective route to supporting multi-product GGR projects.
Q13: *Do you believe that capital support instruments are necessary to complement GGR business models? If so, please outline your reasons and your preferred type of capex support mechanism.*
Q14: What other issues should the Government consider when progressing work on the design of a GGR business model? Please focus your response on issues that are not directly considered through this consultation.

Negative Emission Markets

"The Government's long-term ambition is to deliver a competitive market for GGRs where the cost of these technologies is borne by polluting industries to compensate for their remaining emissions."

Possible Frameworks – Not Mutually Exclusive

UK Emission Trading Scheme

- Integrate GGR unit into trading market – recently supported by the REA in the UK ETS consultation.
- Satisfy Demand in hard-to –decarbonise sectors

GGR Obligation Scheme

- Creates market demand
- Follows Polluter Pays Principle
- But would require carful design – such as the buyout price and scope of obligation

Voluntary Carbon Market

- Expansion of registries – opening up international market and private investment
- Concern over reliable standards of negative emissions

Separate Regulated Market

- Underpinned by central MRV framework and registry for certified credits
- Could combine voluntary and compliance demand e.g. through eventual linking to UK ETS.

Questions

Q15: ***What do you believe is the most appropriate market framework for supporting initial GGR projects over the next decade, and how might this framework evolve over time?*** In your answer, please consider the market options outlined in Section 3, indicating which option or combination of options would be preferable to achieve our objectives.

Q16: ***What steps should the Government take to stimulate voluntary corporate demand for negative emissions credits***?

Q17: To maximise voluntary private investment in negative emissions credits, would it be preferable for the Government to ***(i) establish a regulated market for engineered GGRs or (ii) directly endorse voluntary carbon market bodies that meet high integrity and verification standards***? Please outline your view of the main benefits and challenges of each approach.

Q18: Would it be desirable for the Government to establish a regulated market for engineered GGRs to allow for future integration with the UK ETS and/or provide the foundation for a GGR obligation scheme? If so, how could this be achieved?

Standards – Monitoring, Reporting and Verification

- Consultation highlights immediate task of how to “appropraitly define legitimate removal and to determine the quality of evidnce required for ensuring that projects can meet this definition”.

- Build on Findings of Government 2021 MRV Task and Finish Group.

https://www.gov.uk/government/publications/monitoring-reporting-and-verification-of-ggrs-task-and-finish-group-report

- Government also aware of range of voluntary market standards currently being developed.

NGO	Private Voluntary	Intergovernmental
IC-VCM[40]	VERRA[41]	IPCC Guidelines[42 43]
ISO Standards[44]	Gold Standard[45]	CORSIA[46]
CCS+[47]	Puro.earth[48]	
GHG Protocol: Land Sector and Removals Guidance[49]		
Oxford Principles[50]		

Figure 1: Non-exhaustive table of GGR standard initiatives considered for future review

Consultation proposes a Set of Principles for determining the legitimacy of a negative emission.

- Carbon must be captured from the atmosphere (directly or via biological means)
- Net Negativity, Supply chain CO2 emissions must be lower than the total amount of stored carbon.
- Permeance: Atmospheric carbon, once captured, must be stored for a sufficiently long enough time period to be considered a valid removal.
- Negative emissions must be treated as distinct from avoided emissions.

Questions

Q19: Do you agree with the government's immediate priority for MRV, including a review of standards that could underpin business model support for initial GGR projects? Please share any views or suggestions that could help to inform our approach.

Q20: Beyond ensuring the legitimacy of initial projects, what is the appropriate role for the government in developing a robust and enduring framework for negative emissions MRV, compared to the role of other bodies such as those outlined in Figure 1?

Q21: Do you agree with our proposed principles for negative emissions legitimacy?

Technology Applicability

Consultation considers the applicability of the proposed Greenhouse Gas Removal (GGR) business model across different technologies, and how it might interact with other policies and business models under development.

DACCS	Consultation recognises specific policy challenges that the GGR Model might need to accommodate DACCS.
Power BECCS	Separate Power BECCS model being developed. **GGR model maybe applicable in other BECCS scenarios.**
BECCS in Industry and the Waste Sector	Expected to be supported through the industrial Carbon Capture Business Model and Industrial Emissions Transformation Fund, **not the GGR model.**
Hydrogen BECCS	The hydrogen business model is intended to incentivise low-carbon hydrogen and does not explicitly value negative emissions. However, the model will provide support to cover the costs of installing and operating CCS technology. This may be sufficient support without the GGR model. **Government welcomes view on interaction between Hydrogen Business Model/ GGR Model/ RTFO support for Hydrogen.**
BECCS Biofuels	In the RTFO, suppliers are currently permitted to use CCS to reduce the carbon intensity of their fuel to meet the GHG thresholds; however, there is no financial incentive to exceed the threshold by delivering negative emissions. **By rewarding negative emissions that would not otherwise be recognised under the RTFO, a GGR business model could provide a direct incentive for fuel producers to install and operate capture plants.**
SAF Mandate	The SAF mandate is still under development, including the Government's position on how GHG reductions associated with SAF will be rewarded with credits, and further work is needed to determine how the SAF mandate could incentivise CCUS and negative emissions. **GGR interaction will need to be considered.**
BECCS AD and Biomethane	GGSS scheme offers no incentive for plants to install carbon capture and storage technology to deliver negative emissions. **Possible interaction between GGSS and GGR Support.**

Questions

Q23: Do you have views on the applicability of the GGR business model to BECCS projects that are not eligible for the Industrial Carbon Capture or Power BECCS business models?

Q24: Do you have views on the applicability of the GGR business model to novel technologies excluding DACCS and BECCS? Please outline any specific policy requirements or other considerations we should take into account.

THE ASSOCIATION FOR RENEWABLE ENERGY & CLEAN TECHNOLOGY

Mark Sommerfeld, Head of Power and Flexibility
msommerfeld@r-e-a.net

Kiara Zennaro, Head of Heat, Green Gas Lead
kiara@r-e-a.net

Pablo John, Policy Analyst
pjohn@r-e-a.net