



UK Government



Scottish Government
Riaghaltas na h-Alba
gov.scot



Llywodraeth Cymru
Welsh Government



Department of
Agriculture, Environment
and Rural Affairs

An Roinn
Talmhaíochta, Comhshaoil
agus Gnóthaí Tuaithe

Department o'
Fairmin, Environment
an' Kintra Matthers

www.daera-ni.gov.uk

Integrating Greenhouse Gas Removals in the UK Emissions Trading Scheme

A joint consultation of the UK Government, the Scottish Government, the Welsh Government and the Department of Agriculture, Environment and Rural Affairs for Northern Ireland

Closing date: 15 August 2024

May 2024



© Crown copyright 2024

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3 or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

Any enquiries regarding this publication should be sent to us at: ukets.consultationresponses@energysecurity.gov.uk

Contents

General information	4
Introduction	8
Greenhouse gas removals (GGRs)	9
Principles for policy design	11
Cap	13
Allowance design for GGRs	21
Permanence	28
Pathway to integration	43
Consultation questions	50
Next steps	53

General information

Why we are consulting

The UK Emissions Trading Scheme (UK ETS) Authority (UK Government, Scottish Government, Welsh Government and the Department of Agriculture, Environment and Rural Affairs for Northern Ireland, hereinafter 'the Authority') is seeking input on the integration of greenhouse gas removals (GGRs) in the UK ETS.

This follows a commitment made in July 2023 to consult on proposals regarding the integration of engineered GGRs in the UK ETS and consideration of high quality nature-based GGRs, subject to further work to consider the range of potential issues raised regarding permanence, costs and wider land management impacts.

Consultation details

Issued: 23 May 2024

Respond by: 15 August 2024

Enquiries to:

Emissions Trading
Department for Energy Security and Net Zero
3rd Floor
3 Whitehall Place
London
SW1A 2EG

Email: ukets.consultationresponses@energysecurity.gov.uk

Consultation reference: Integrating Greenhouse Gas Removals in the UK ETS

Audiences:

This consultation will be of interest to individual companies and representatives of industrial, power and aviation sectors with obligations under the UK ETS, including future participants from the maritime and waste sectors.

The consultation will also be of interest to individual companies and representatives of the greenhouse gas removal sector, including both engineered and nature-based solutions. Other stakeholders including ETS market traders, financial institutions and investors, and environmental groups will also find this consultation of interest.

This consultation is not limited to these stakeholders; any organisation or individual is welcome to respond. To note, this consultation does not apply to Northern Ireland electricity generators who participate in the EU ETS by virtue of the Ireland / Northern Ireland Protocol and Windsor Framework.

Respondents need only reply to the questions that interest them or that they have views on. There is no requirement nor expectation to respond to every question in this consultation.

Territorial extent:

This consultation relates to proposals on the UK ETS, which operates across England, Scotland, Wales and Northern Ireland. This is a joint consultation, published by the UK Government, Scottish Government, Welsh Government and the Department of Agriculture, Environment and Rural Affairs for Northern Ireland.

How to respond

Respond online at: <https://energygovuk.citizenspace.com/energy-markets/integrating-ggrs-in-the-ukets>

or

Email to: ukets.consultationresponses@energysecurity.gov.uk

Write to:

Emissions Trading
Department for Energy Security and Net Zero
3rd Floor
3 Whitehall Place
London
SW1A 2EG

When responding, please state whether you are responding as an individual or representing the views of an organisation.

Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome.

Confidentiality and data protection

Consultation responses will be shared across the UK ETS Authority. Information you provide in response to this consultation, including personal information, may be disclosed in accordance with UK legislation (the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential please tell us, but be aware that we cannot guarantee confidentiality in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not be regarded by us as a confidentiality request.

We will process your personal data in accordance with all applicable data protection laws. See our [privacy policy](#).

We will summarise all responses and publish this summary on [GOV.UK](#). The summary will include a list of names or organisations that responded, but not people's personal names, addresses or other contact details.

Quality assurance

This consultation has been carried out in accordance with the government's [consultation principles](#).

If you have any complaints about the way this consultation has been conducted, please email: bru@energysecurity.gov.uk.

Introduction

The UK Emissions Trading Scheme (ETS) came into force on 1 January 2021. The scheme is a key part of our approach to addressing climate change, setting a limit on emissions from the sectors covered and ensuring an appropriate price is applied to them. The scheme is jointly run by the UK ETS Authority (or ‘the Authority’), which is comprised of the UK Government, Scottish Government, Welsh Government and the Department of Agriculture, Environment and Rural Affairs for Northern Ireland.

In March 2022, the Authority consulted on a wide range of changes to the scheme, with the aim of ensuring that it can continue to play a key role in reaching net zero targets. This included a call for evidence on the role of the UK ETS as a long-term market for greenhouse gas removals (GGRs).¹

In July 2023, the Authority confirmed that it believed the UK ETS was an appropriate long-term market for GGRs.² The Authority set out its intention to include engineered GGRs in the UK ETS, subject to further consultation, robust monitoring, reporting and verification (MRV), and the management of wider impacts. The inclusion of engineered GGRs in the UK ETS will incentivise investment in and provide a source of demand for GGRs from polluting sectors and futureproof the UK ETS so it continues to play a key role in delivering net zero. The Authority also confirmed that it believes that the UK ETS may offer an appropriate long-term market for high quality nature-based GGRs, subject to further work to consider the range of potential issues raised regarding permanence, costs and wider land management impacts.

¹ <https://www.gov.uk/government/consultations/developing-the-uk-emissions-trading-scheme-uk-ets>.

² Ibid.

Greenhouse gas removals (GGRs)

GGRs is the name given to a group of methods that actively remove greenhouse gases, predominantly CO₂, from the atmosphere, also commonly referred to as Carbon Dioxide Removal (CDR) methods and Negative Emission Technologies (NETs). For a GGR to deliver a negative emission, it must remove more greenhouse gases from the atmosphere than are generated from the carbon removal process (i.e. it is net negative). The range of GGR approaches fall broadly into two categories:

Nature-based approaches: such as afforestation, soil carbon sequestration and different types of land, coastal and marine habitation restoration.

Engineering-based approaches: such as Direct Air Carbon Capture and Storage (DACCS), Bioenergy with Carbon Capture and Storage (BECCS), wood in construction, biochar, and enhanced weathering.

Both engineered and nature-based approaches will be needed to remove CO₂ at the speed and scale required to meet our climate targets.

The Intergovernmental Panel on Climate Change (IPCC) sees the use of GGRs as unavoidable for achieving net zero emissions at a global scale and envisions rapid scale up of various approaches as part of this.³ The UK's independent Climate Change Committee (CCC) has also recognised the importance of GGRs to permanently remove carbon from the atmosphere, in order to offset remaining residual emissions in the UK and achieve net zero targets.⁴

As part of the policy framework for achieving this scale up of GGRs in the UK, the Authority has committed to exploring further how GGRs could be integrated into the UK ETS. This included an intention to integrate engineered GGRs in the UK ETS – subject to certain criteria being met – and a commitment to explore the possibility of integrating high-quality nature-based GGRs, which would be subject to further work to consider issues related to permanence, costs and wider land management impacts. The proposals in this consultation are set out with this position in mind. Many of the key market design questions will be relevant regardless of the types of GGR integrated into the UK ETS, but particular focus on the issues the Authority set out relating to nature-based GGRs are explored in detail in the 'Permanence' section.

Integrating GGRs into the UK ETS will mean that GGR operators that meet market participation requirements will be able to be awarded allowances for removing carbon from the atmosphere and storing it permanently (see 'Permanence' section for further detail).⁵

GGR operators will be able to sell these allowances on the UK ETS market, enabling scheme participants to purchase them and use them to fulfil their compliance obligation. An allowance

³ IPCC, 2022: Summary for Policymakers. In: *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)). Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001.

⁴ <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

⁵ The term 'operator' is conventionally used to refer to UK ETS participants. A 'GGR operator' refers to the entity responsible for carbon removal that will be awarded under the UK ETS.

awarded for carbon removal would therefore be the same as a conventional UK Allowance (UKA) in that it allows the UK ETS participant that purchases it to emit one tonne of CO₂e and surrender the allowance. The key difference is that allowances from GGRs also represent a negative emission (one tonne CO₂e removed from the atmosphere); they will not represent an emission avoided or reduced. Awarding GGR operators with allowances enables polluters to help finance GGR deployment as part of their UK ETS obligation.

GGRs are not an alternative to reducing emissions across the economy – the primary method of achieving net zero will be to take ambitious decarbonisation measures across the UK. Integrating GGRs into the UK ETS will require a range of decisions around market design, market eligibility requirements and when inclusion may take place alongside other relevant considerations. This consultation addresses these considerations.

Consultation structure

This consultation is split into the following five areas:

- Principles for policy design – this section considers what principles the Authority should consider when making decisions concerning integration of GGRs into the UK ETS
- Cap – this section considers what happens to the cap when GGRs are integrated into the UK ETS.
- Allowance design – this section considers how allowances should be awarded to GGR operators, the extent to which they differ from existing emissions allowances and how allowances should enter the UK ETS market alongside other related issues.
- Permanence – this section considers how carbon storage could be valued under the UK ETS, considering the duration of storage provided by different GGRs and the associated risks of that carbon being re-released into the atmosphere.
- Pathways to integration – this section considers the degree to which GGRs should be integrated into the UK ETS, and when integration should take place.

Principles for policy design

Integrating GGRs into an emissions trading scheme is complex and to manage this complexity in a transparent way the Authority is consulting on the following set of principles. These have been developed to serve as a framework for policy design and to help balance trade-offs between different objectives. This guide will ensure that integration of GGRs in the UK ETS meets the needs of scheme participants and GGR operators, whilst driving forward the overarching goal of providing long-term price signals and financial certainty for GGR deployment and delivering the climate targets of the UK Government, Scottish Government, Welsh Government and Northern Ireland Executive.

Principle	Description
<i>Maintain the incentive to decarbonise</i>	Integration of GGRs must ensure the incentive remains for sectors covered by the scheme to reduce their emissions in line with net zero.
<i>Maintain market integrity</i>	Integration should maintain the effective functioning of the market and the strong price signal provided through the cap, enabling participants to abate cost effectively. This could include considerations of liquidity, volatility, predictability and the opportunity for market abuse.
<i>Efficient long-term deployment of GGRs</i>	Integration should work towards establishing a market framework within which polluters can make economically efficient choices between reducing emissions and using a diverse portfolio of high-quality GGRs in a way that is consistent with national and international climate commitments. This will be in the context of ensuring the primary method of achieving net zero is to take ambitious decarbonisation measures across society.
<i>Environmental integrity</i>	Integration should set and adhere to evidence-led methodologies and standards (including monitoring, reporting and verification) for high quality, robust GGRs that can be legitimately regarded as equivalent to emissions under the UK ETS.
<i>Deliverability</i>	Integration should be designed such that it is operationally feasible in timescales relevant to net zero and interim carbon budgets and targets.
<i>Simplicity</i>	Integration should be consistent with government’s approach to wider GGR policy and consider best practice internationally or in other markets. Intervention should only take place where necessary and should aim to minimise additional burdens.
<i>Futureproofing and flexibility</i>	Integration should be designed to take account of and adapt to future changes to both the UK ETS and wider GGR policy and deployment.

<i>Fiscal impact</i>	Integration should be delivered in a way that maximises value for money for the taxpayer, taking into account the overarching objective of creating a self-sustaining market for GGRs and reducing government support over time.
----------------------	--

These principles are a guide on how the Authority will approach its ultimate decision-making. We recognise that some policy decisions concerning GGR integration will have to balance the demands of different principles. Therefore, any one decision may not be able to fulfil all principles at once.

1. Do you agree with the Authority's principles for policy design?

Cap

The UK ETS works on the ‘cap and trade’ principle, where a cap is set on the total amount of certain greenhouse gases that can be emitted by sectors covered by the scheme. This limits the total amount of carbon (or its equivalent) that can be emitted and, as the cap decreases over time, provides a signal to decarbonise at the pace and scale required to keep emissions at or below the cap. Participants in the UK ETS are required to obtain allowances equivalent to their annual emissions under the scheme. These can be bought in auctions or by trading on the secondary market; some participants at risk of carbon leakage receive some allowances for free.⁶ The cap and therefore the number of allowances is reduced over time, so that total emissions in the sectors covered must fall. From January 2024, the Authority has decided to implement a new cap that is consistent with the net zero trajectories across the UK. This decision was set out in the Authority response to the “Developing the UK ETS” consultation in July 2023.⁷

GGRs and net zero

GGRs must act as a complement rather than as a substitute for emissions abatement. There is scientific consensus that GGRs are essential for limiting the effects of climate change and meeting the goals of the Paris Agreement.⁸ In 2022, the IPCC described GGRs as ‘unavoidable’ for counterbalancing global residual emissions from hard-to-abate sectors that are unlikely to achieve full decarbonisation by the timelines for our net zero objectives. GGRs are part of every pathway to meeting the UK’s carbon budget 6 set out by the UK’s Climate Change Committee (CCC).⁹ Nevertheless, the primary method of achieving net zero is to take ambitious decarbonisation measures across the economy. The priority is therefore to reduce greenhouse gas (GHG) emissions from human activities and to only use GGRs to mitigate remaining GHG emissions that are unavoidable. Integration of GGRs in the UK ETS will need to be designed and executed within this context. Following the wider approach to net zero, the Authority believes that GGRs can be integrated into the UK ETS in a manner which provides long-term demand and therefore investment confidence while continuing to drive economy-wide abatement.

The IPCC set out the different roles GGRs can play in ambitious mitigation strategies where GGRs complement emissions abatement.¹⁰ In the short-term, the IPCC suggests that GGRs should be used to reduce net emissions, acting as a distinct source of abatement that contribute towards emissions reductions targets. Analysis across the UK Government, Welsh Government and Northern Ireland Executive has highlighted the importance of both nature-based and engineered GGRs in achieving net zero across the UK. UK Government analysis suggests that GGRs are needed in the short to medium term, alongside deep emissions

⁶ Note, anyone can purchase and trade UK Allowances (UKAs) so long as they hold a UK ETS Registry account. Further detail is provided here: <https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets#the-uk-emissions-trading-registry>.

⁷ <https://www.gov.uk/government/consultations/developing-the-uk-emissions-trading-scheme-uk-ets>

⁸ ‘Summary for Policymakers’ in Climate Change 2022: Mitigation of Climate Change, Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2022), IPCC, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>

⁹ ‘The Sixth Carbon Budget – The UK’s Path to Net Zero’, the Climate Change Committee, pp. 197-201, <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

¹⁰ ‘Summary for Policymakers’ in Climate Change 2022: Mitigation of Climate Change, IPCC.

reductions across the economy, to achieve legally binding carbon budgets and has set an ambition to deploy 5 MtCO₂e per year of engineered GGRs by 2030.¹¹

In the medium-term, the IPCC see the global role of GGRs shifting towards the balancing of residual emissions from hard-to-abate sectors to support reaching net zero emissions. The UK's Net Zero Strategy estimated that between 75 and 81MtCO₂/year of engineered removals will be needed in 2050 to balance the UK's residual emissions. Finally, in the long-term the IPCC suggest that GGRs could provide the opportunity for reaching a net negative world by providing removals beyond those needed to balance residual emissions. As noted previously, in all instances within this framework, GGRs (both engineered and nature-based) are used to reduce net emissions and not as a tool for deterring abatement by allowing emissions to remain at current levels.

Implications for UK ETS integration

The Authority believes that any approach to the overall supply of allowances, i.e. the UK ETS cap, will need to ensure that GGRs act as a complement to emissions reductions from UK ETS sectors to ensure that the scheme continues to deliver our net zero goals. In the Authority response to the “Developing the UK ETS” consultation, the Authority stated that integration of GGRs will be managed in a way that ensures covered sectors continue to prioritise decarbonisation. This is reinforced in the “Maintain the incentive to decarbonise” principle, which underlines the importance of the role of the UK ETS in reducing emissions in line with net zero.

The UK ETS cap is the primary lever for setting the ambition of the scheme – it sets a limit on emissions from sectors covered by the scheme and provides them with a signal to decarbonise at the pace and scale needed for net zero. The cap sets a limit on the total emissions in the scheme over a phase, with Phase I of the UK ETS running between 2021 and 2030. It is broken down into an annual supply of UKAs with each allowance representing the right to emit a tonne of carbon dioxide equivalent. The cap declines over a phase meaning that each year there are fewer allowances available in the market compared to previous years. In July 2023, the Authority confirmed a new net zero-aligned trajectory for the cap in the remainder of Phase 1 of the UK ETS.

Integrating GGRs in the UK ETS means that the Authority will create and distribute allowances to GGRs that meet the UK ETS market participation requirements by removing and storing carbon. This has implications for the total supply of allowances in the UK ETS and the corresponding emissions they represent, as allowances from GGRs will remove the equivalent of one tonne of carbon dioxide emitted by the UK ETS participant that purchases and surrenders it.

The Authority has identified three options regarding GGR integration and the cap. It is important to consider these options across different time periods, where GGRs will have differing roles in delivering net zero, and the challenges that this poses for the UK ETS. In the period of initial integration, significant decarbonisation from the traded sector will be required to support net zero delivery; GGRs will be needed to provide additional net emissions reductions whilst not displacing abatement activity. In this initial period of integration, GGR deployment rates will be more uncertain as this nascent removal industry develops and voluntary carbon markets are also expected to provide an important source of demand for GGRs. Given the

¹¹ Net Zero Strategy: Build Back Better (2021), UK Government, <https://www.gov.uk/government/publications/net-zero-strategy>; and confirmed in the Net Zero Growth Plan (2023), UK Government,

uncertainty around GGR supply that could enter the UK ETS in the short-term, we are minded that any cap option would sit alongside a supply control mechanism for the initial years of GGR integration. The Authority will consider the need to provide a strong demand signal to GGR developers in any decisions around the use of supply controls for initial integration of GGRs. Further details are outlined in the 'Pathway to integration' section of this consultation. In the longer-term, there will be greater certainty over GGR deployment rates as technologies mature and costs fall, and traded sector emissions will also have fallen by this point. GGRs will be important to deal with residual emissions from hard-to-abate sectors whilst ensuring that, where possible, abatement continues to be driven by the UK ETS.

The cap can be considered in two ways with respect to GGR integration:

1. As a 'gross cap': this is the total number of UKAs and allowances from GGRs in the market. This refers to gross emissions from the UK ETS as both allowance types are used for compliance purposes and so result in one tonne of CO₂e emitted.
2. As a 'net cap': this is the total number of UKAs in the market. The number of allowances from GGRs is excluded from this definition as it represents both a positive unit of emissions from the UK ETS participant that purchases and surrenders it, and a negative unit of emissions from the GGR operator that sold the allowance. The overall impact is zero emissions, hence the number of allowances from GGRs does not feature in the net cap.

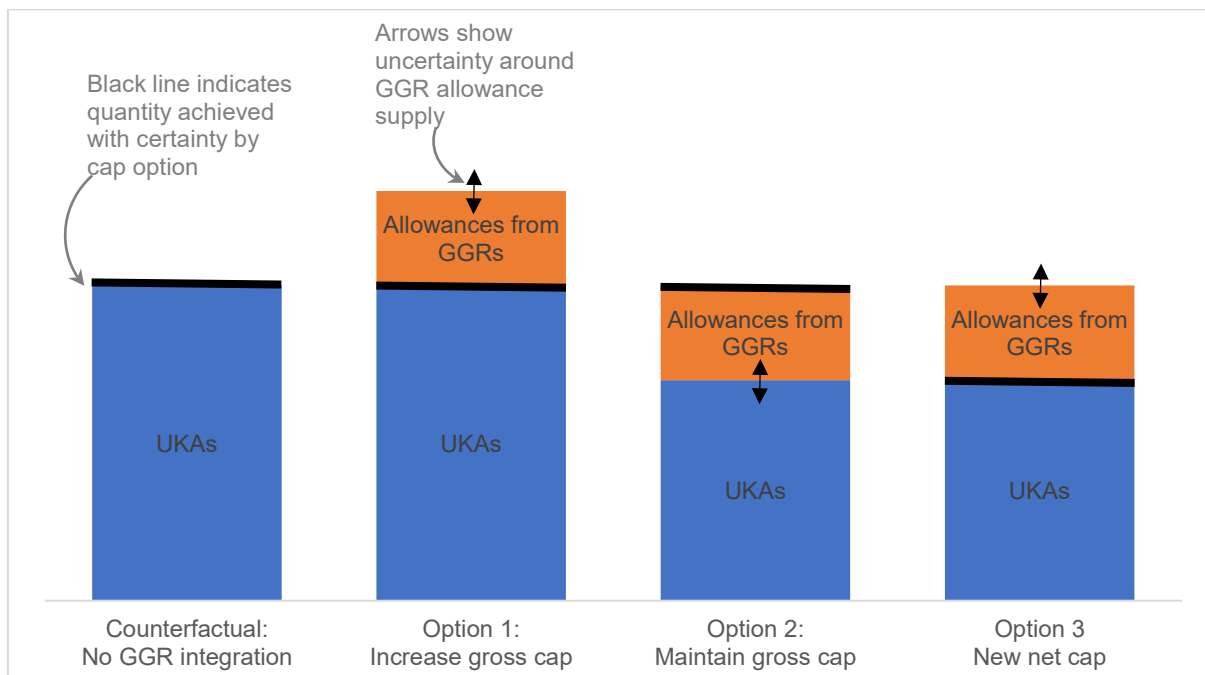
The options set out below can be considered on these terms.

Option 1: Increase the gross cap i.e. do not apply the existing cap to GGRs. This means that GGR operators would be issued allowances in addition to the existing supply of allowances as set out by the cap. This would, in effect, mean that the gross cap is increased and the extent to which it rises will be based on the GGR supply entering the market, with no upper limit on that supply.

Option 2: Maintain the gross cap i.e. apply the existing cap to GGRs. This means that an emissions allowance (UKA) would be replaced every time an allowance is issued to GGR operators. Swapping an emissions allowance with those awarded to GGRs would ensure that the overall supply of allowances in the market remains the same, i.e. in line with the existing net zero consistent trajectory set out by the Authority. This means that net emissions under the UK ETS would reduce.

Option 3: Set a new net cap i.e. set a new lower cap but do not apply this to GGRs. This means that the Authority would reduce the existing cap based on an expected supply of GGRs that would enter the UK ETS. Allowances issued to GGR operators would then enter the market in addition to the supply of allowances set out by this new cap. The new cap would not impose a limit on the number of allowances that could be distributed to GGRs. The relationship between the cap and GGRs is the same as in Option 1, but in Option 3 the Authority would have pre-emptively reduced the number of emissions allowances in the market to ensure emissions reductions are delivered in a way that is consistent with net zero.

Figure 1: Cap options for GGR integration.



Notes: Components of the cap other than UKAs and allowances from GGRs (such as allowances from the New Entrant Reserve which are not issued) are ignored for simplicity. The diagram is illustrative only – the bars are not drawn to scale.

Options	Initial Integration	Longer-term
1: <i>Increase the cap</i>	Gross UK ETS emissions increase and GGRs do not contribute to net emissions reductions. Incentive to decarbonise provided by the UK ETS undermined by unconstrained allowance supply.	
2: <i>Maintain the cap</i>	Gross UK ETS emissions fall and GGRs contribute to net emissions reductions. Incentive to decarbonise provided by the UK ETS maintained in line with net zero cap trajectory.	Gross UK ETS emissions fall and GGRs contribute to net emissions reductions as in initial integration. Incentive to decarbonise kept in line with net zero, but UK ETS no longer sustains GGR demand needed for net zero in the long-term if GGR deployment outstrips size of UK ETS.
3: <i>Set a new cap</i>	Gross UK ETS emissions fall within trajectory, GGRs contribute to net emissions reductions. Any over-delivery increases gross UK	As with initial integration, but greater certainty over GGR supply means new cap can be set with greater confidence, reducing risk to UK ETS participants from under-delivery of GGRs.

	<p>ETS emissions with no impact on net emissions.</p> <p>Incentive to decarbonise provided by UK ETS strengthened by initial reduction to auction supply. UK ETS participants will see reduced allowance supply potentially resulting in higher prices if GGRs are underdelivered.</p>	
--	--	--

Proposal: The Authority will maintain the gross cap (Option 2) for initial integration of GGRs and will consider how to sustain the role of the UK ETS in achieving the most efficient outcome and generating demand for GGRs in the long-term.

Rationale for proposed approach

Initial integration

For initial integration, the Authority does not propose to allow GGRs to increase the overall supply of allowances in the UK ETS (Option 1). This is because, under this scenario, gross emissions from the UK ETS would increase. An increase in the total supply of allowances via GGRs would provide UK ETS participants with the opportunity to emit more than the limits set by the existing cap over the phase. The UK ETS would become a combination of the existing cap on existing UKAs and the allowances from GGRs. This would contravene the role of GGRs in being used to reduce net emissions across the economy by allowing UK ETS participants to emit more. The higher supply of allowances would decrease the incentive on UK ETS participants to decarbonise. Further detail on the impacts of the options set out in this section is provided in Analytical Annex published alongside the consultation.

Example (NB figures are illustrative and do not take into account the proposals set out in the Permanence section): in year X the UK ETS cap is set at 100MtCO₂. GGR operators remove 20MtCO₂ and are issued 20 million allowances in the UK ETS. These allowances are sold on the UK ETS market, in addition to the 100m UKAs. The total supply of allowances released to market in that year is 120 million (100m UKAs + 20m allowances from GGRs).

Gross emissions = 120MtCO₂. Net emissions = 100MtCO₂.

Instead, for initial integration the Authority proposes that for every allowance awarded to a GGR, a UKA will be removed from the auction share under the existing gross cap (Option 2). This approach would maintain the gross UK ETS cap and therefore the limit on current traded sector emissions. This is because the Authority wants to ensure that gross UK ETS emissions continue to reduce in line with the net zero trajectory of the existing cap, with GGRs providing additional net emissions savings across the economy. Maintaining the cap therefore protects both the role of the UK ETS in incentivising decarbonisation and the role of GGRs in providing additional abatement by keeping the gross cap on emissions the same. It

means there will be no overall change to the trajectory of the net zero cap as outlined in July 2023. Only the type of allowances that make up the overall cap will change. An increase in the supply of GGRs will mean a decrease in supply of auctioned UKAs, and this balance will change over time depending on the quantity of GGRs integrated into the UK ETS.

Example (NB figures are illustrative and do not take into account the proposals set out in the Permanence section): in year X the UK ETS cap is set at 100MtCO₂. GGR operators remove 20MtCO₂, and are issued 20 million allowances in the UK ETS. As these allowances are distributed to GGR operators the number of UKAs sold via auctions is reduced by 20 million. The total supply of allowances released to market in that year is 100 million (80m UKAs + 20m allowances from GGRs).

Gross emissions = 100MtCO₂. Net emissions = 80MtCO₂.

The Authority will have to consider how and when auctions will be updated to reflect the GGR supply. We are conscious that if auction volumes are not updated at regular intervals, and as GGR supply grows, there could be uncertainty about future auction volumes. We will explore how auctions can be updated to respond to GGR supply to provide foresight on future supply and will consider how existing processes, such as for Activity Level Changes, could inform this design. This will, in part, depend on a position taken regarding the design of, and route to market for, GGR allowances. This is covered in further detail in the 'Allowance design for GGRs' section.

The Authority does not consider setting a new, lower net cap (option 3) a viable option for initial integration. This is because setting a new, lower cap based on an expected GGR supply would be challenging whilst there is initially more uncertainty over GGR deployment as this nascent sector is scaled up. If GGRs are deployed in fewer quantities than expected, the constrained allowance supply would place undue burdens on UK ETS participants and could result in higher allowance prices. Conversely, any over-delivery of GGRs would allow gross UK ETS emissions to increase in proportion to any GGRs that exceeded the expected supply, without an impact on net emissions. This is why for initial integration we consider a decision to maintain the cap (Option 2) to be the most effective option as GGR deployment is initially more uncertain. The 'maintain the cap' approach means that no additional risk is placed on UK ETS participants whilst still delivering the decarbonisation objectives of the net zero consistent cap.

Example (NB figures are illustrative and do not take into account the proposals set out in the Permanence section): in year X the UK ETS existing cap would have been set at 100MtCO₂. With GGR integration a new cap is set for year X at 80MtCO₂ with an expected trajectory of 20MtCO₂ removals from GGRs. The total supply of allowances in the UK ETS will depend on GGR delivery:

The GGR trajectory is delivered – GGRs remove 20MtCO₂ and are issued 20 million allowances. The total supply of allowances released to market in that year is 100 million (80m UKAs + 20m allowances from GGRs).

Gross emissions = 100MtCO₂. Net emissions = 80Mt.

The GGR trajectory underdelivers– GGRs remove 10MtCO₂ and are issued 10 million allowances. The total supply of allowances released to market in that year is 90 million (80m UKAs + 10m allowances from GGRs).

Gross emissions = 90MtCO₂. Net emissions = 80MtCO₂.

The GGR trajectory is over-delivered – GGRs remove 30MtCO₂ and are issued 30 million allowances. The total supply of allowances released to market in that year is 110 million (80m UKAs + 30m allowances from GGRs).

Gross emissions = 110MtCO₂. Net emissions = 80MtCO₂.

Longer-term:

The Authority believes that maintaining the cap may not be a suitable approach in the long-term as it requires replacing emissions allowances with allowances awarded to GGRs. As emissions decline in line with the net zero consistent trajectory of the cap, GGR deployment is expected to increase. Depending on the quantity of GGRs entering the market, the UK ETS could reach a point where it can no longer provide a sufficient market for the GGRs needed to reach net zero as there will not be enough emissions allowances that can be replaced by allowances from GGRs. The Authority is therefore considering how, in the longer-term, the UK ETS can sustain demand for GGRs.

The Authority is considering the option of setting a new net cap and enabling the allocation of allowances from GGRs to enter in addition to the supply of allowances set out by a new cap (Option 3) to sustain GGR demand.¹² This would remove any potential constraint on GGR supply and provide a strong demand signal to GGR operators. However, reducing the supply of emissions allowances issued by other means would ensure that the UK ETS delivers its decarbonisation objectives in line with net zero. A new cap could also bring the attractive opportunity to deliver a more economically efficient net zero by setting an ambitious target for net emissions reductions, enabling the market to drive emissions reductions to reach a state of residual emissions and providing for an efficient mix of removals and abatement to reach the cap's target. In the Authority response to the "Developing the UK ETS" consultation, the Authority set out a vision of an integrated market framework that could sustain net zero – or net negative – and setting a new cap could allow for this to develop in a way that is consistent with our approach to net zero and maximises the resulting economic efficiencies. The Analytical Annex published alongside this consultation provides further detail on the potential effects of setting a new cap.

Setting a new ambitious cap presents opportunities to design the scheme innovatively and futureproof its role in delivering and sustaining net zero. For example, the UK ETS cap could be set at net zero, with allowances from GGRs providing the only source of supply to balance residual emissions from sectors covered by the scheme. Studies from the International Climate Action Partnership (ICAP) have also considered whether caps for emissions trading schemes could be set at 'net negative', meaning there would be more emissions being removed than emitted. ICAP consider that additional demand to meet this net negative cap could come from, for example, government, or from additional obligations on sectors within or outside the scheme.¹³

Moreover, as set out in the long-term pathway published in December 2023, the Authority intends to continue the UK ETS at least until 2050 and to explore its expansions to new sectors.¹⁴ The trajectory of future UK ETS scope expansion will therefore be an important factor when considering demand for GGRs from UK ETS participants. An expanded UK ETS

¹² This would be subject to the continued extension of the UK ETS past 2030, which the Authority committed to in December 2023. <https://www.gov.uk/government/publications/uk-emissions-trading-scheme-long-term-pathway>

¹³ <https://icapcarbonaction.com/en/publications/emissions-trading-systems-and-net-zero-trading-removals> and <https://icapcarbonaction.com/en/news/out-now-icap-report-ets-and-carbon-capture-and-storage>.

¹⁴ <https://www.gov.uk/government/publications/uk-emissions-trading-scheme-long-term-pathway>

will likely mean increasing the gross cap to account for emissions from new sectors in the scheme, providing additional sources of demand for GGRs and therefore delaying the point at which demand for GGRs is constrained by the cap. This is coupled with the wider benefits associated with scope expansion. For example, a larger market ensures that decarbonisation takes place where it is most cost effective to do so, reducing economy-wide abatement costs, and trading across a larger pool of participants can improve market liquidity. It also ensures that a greater proportion of polluters will be paying for their emissions, rather than externalising the cost to society. Given the role of carbon pricing in enabling cost-effective decarbonisation, the Authority will continue to explore expanding the scheme to more sectors of the economy, including high emitting sectors.

Choosing a point at which to set a new cap will be complex and largely driven by the extent to which UK ETS sectors have decarbonised, and the supply of GGRs. To set a new cap, the Authority would need sufficient confidence in the supply of GGRs expected to enter the UK ETS market over time. The Authority is therefore considering the benefit of setting a new cap in the longer-term to provide a deeper base of demand and to maximise economic efficiency whilst continuing to achieve climate targets. We welcome views on how this can be achieved.

- 2. Do you agree the Authority should maintain the gross cap for initial integration of GGRs in the UK ETS (Option 2)? Please explain your answer.**
- 3. How can the UK ETS sustain demand for GGRs in the long-term, taking into account the consideration of setting a new cap (Option 3)?**

Allowance design for GGRs

As set out at the beginning of this document, GGR integration involves the creation of a new source of allowances under the UK ETS. This section considers how that allowance should be designed and the route to the UK ETS market for this allowance.

Standards and Methodologies, including monitoring, reporting and verification

GGR Standards and methodologies, including monitoring, reporting and verification (MRV) requirements, are fundamental to integrating GGRs into the UK ETS. A Standard helps to ensure projects generate robust, high-quality credits and market confidence by setting out rules and guidance for projects to follow when generating credits on issues such as environmental integrity, with methodologies being vital to quantifying the amount of CO₂ removed from the atmosphere and permanently stored. Without robust standards and methodologies the Authority cannot proceed with integration.

In the case of engineered GGRs, there have been rapid developments in standards and methodologies across the voluntary sector. The UK Government's Department for Energy Security and Net Zero commissioned Environmental Resources Management (ERM) to conduct an independent review of existing standards, which was published in December 2023.¹⁵ As a result of that review the UK Government has decided to define the methodologies, which will set out requirements and procedures to quantify removals that GGR projects eligible for funding via the engineered GGR business model will need to meet.¹⁶ The methodologies to support the business model will ensure consistency across the wider existing standards and policies such as the Storage of Carbon Dioxide Regulations 2010, biomass sustainability requirements, and the Low Carbon Hydrogen Standard.

The UK Government expects methodologies to develop and improve over time. Therefore, it expects to define methodology quality thresholds for early projects, allowing projects to come forward with proposed methodologies. These would specify what projects must cover as part of their calculations and would reference best practices such as the Core Carbon Principles from the Integrity Council for the Voluntary Carbon Market and existing government standards where appropriate, such as the Carbon Capture and Storage (CCS) regulations and the Renewable Transport Fuel Obligation. This approach will support the development of a full Standard whilst allowing for the development and innovation associated with first of a kind deployment. The Authority envisages that this GGR Standard will form the basis of UK ETS MRV for engineered GGRs and will work in conjunction with the development of the business models to ensure that methodologies are suitable for UK ETS integration.

Should the Authority decide to integrate woodland carbon removal into the UK ETS, the Woodland Carbon Code framework would form the starting point for MRV for woodland in the UK ETS. The Authority would need to consider whether changes need to be made for its use in the UK ETS. The Woodland Carbon Code is the UK's government-backed voluntary carbon

¹⁵ <https://www.erm.com/public-information-sites/a-review-of-engineered-greenhouse-gas-removal-ggr-standards-and-methodologies/>

¹⁶ Further information on the GGR business model can be found here:

<https://www.gov.uk/government/publications/greenhouse-gas-removals-ggr-business-model>.

standard for woodland. It provides quality assurance standards for projects to generate high integrity and independently verified carbon units; it is internationally recognised for high standards of sustainable forest and carbon management. The MRV requirements for woodland in the UK ETS will also need to reflect the outcomes of the permanence framework, which sets out measures to take into account the duration of storage provided by GGRs and the risk of reversal of that storage. More detail is provided in the 'Permanence' section of this consultation.

The remainder of this section will cover the following policy questions:

- When and to whom should allowances from GGRs be awarded?
- Should allowances from GGRs be differentiated from conventional auctioned UKAs?
- How should allowances from GGRs enter the market?
- Where should a GGR project be located to be eligible for receiving allowances under the UK ETS?

Allowance distribution

An allowance will be awarded to GGR operators for removing carbon dioxide from the atmosphere or sea and storing it in accordance with the methodologies and standards (including MRV) and permanence frameworks. We need to consider at what stage in the removal process this allowance is awarded. Conventionally, in other markets there are two options:

- **Ex-ante** – allowances are awarded before the removal has taken place. The allowance would be awarded on the expectation of future delivery of the carbon removal.
- **Ex-post** – allowances are awarded after the removal has taken place and been verified.

In markets that award ex-ante allowances or credits, these are converted into ex-post once the promise to deliver has been fulfilled and verified. Established practice in voluntary carbon markets (VCMs) is to issue allowances ex-post.¹⁷

Proposal: The Authority believes that GGR operators should be issued with allowances in the UK ETS after the removal has taken place and been verified (ex-post).

Rationale for proposed approach

The Authority believes that awarding allowances only after the activity has happened and been verified represents the most environmentally robust form of crediting. This approach will help to build confidence in the market as GGRs are integrated into the UK ETS. If allowances were issued ex-ante and GGR operators failed to deliver the negative emissions promised, this could have impacts on the overall UK ETS cap and emissions. Ex-ante allowances could harm progress towards statutory carbon budgets and net zero targets; it could also undermine

¹⁷ For example, ex-post credits are issued under the Verra Verified Carbon Standard, The Gold Standard and Puro.earth's Puro Standard. In October, 2022, Puro.earth launched Pre-CO2 Removal Certificates, representing a tonne of future negative emissions, which will then be converted to a conventional CO2 Removal Certificate following removal and verification.

confidence in the market by making it harder to assess the current and future supply of allowances from GGRs. This difficulty does not arise with ex-post allowances as the removal has already taken place, allowing buyers to purchase allowances with confidence. Ex-ante allowances also introduce additional complexities into the proposed permanence framework for GGR integration (further detail is set out in the 'Permanence' section of the consultation).

We recognise that in some instances ex-ante allowances would represent a more attractive option for GGR operators by providing revenue in advance to support initial costs related to GGR deployment. However, ex-post allowance issuance does not preclude the opportunity for GGR operators to commit to offtake agreements outside of the UK ETS. An offtake agreement is a contractual commitment for a buyer to acquire carbon removal from a GGR operator at a predetermined price upon its delivery in the future. These could represent an important form of financing for GGR operators.

The Authority would like to understand whether any specific measures in the UK ETS are required to allow for these offtake agreements to take place. The Authority is also interested in understanding the impact of ex-post allowance distribution on different types of GGRs, particularly those with longer lead times. Finally, the Authority is interested in understanding whether ex-post allowance distribution would have any impacts on smaller scale GGR operators and what measures if any should be considered to mitigate any adverse competitive impacts, noting the wider policy support that could be offered via funding from the UK Government's business models for GGRs.

- 4. Do you agree that GGR allowances in the UK ETS should be issued ex-post (i.e. after the removal has taken place and been verified)? Please explain your answer.**
- 5. Does the Authority need to consider any additional measures for the UK ETS to ensure GGR operators are able to arrange offtake agreements? If yes, please provide specific details of which measures should be considered.**
- 6. Does the Authority need to consider any specific measures for smaller scale GGR operators, including smaller scale landowners if woodland is included in the scheme? If yes, please provide specific details of which measures should be considered.**

The Authority will need to decide to which stakeholder in the removal process the allowance from GGRs should be awarded. The Authority expects that the allowance will be awarded to the GGR operator or developer, although it should be noted that some GGR processes can involve multiple actors in the value chain and in some processes, it may be more unclear who should be awarded for the delivery of removals. For example, with GGRs such as biochar or enhanced rock weathering, there could be different entities supplying the biochar or rock dust, and the landowner or other storage vector that applies it. The Authority therefore welcomes evidence on different GGR processes and how they should be awarded.

- 7. Who should receive the GGR allowance? Please consider whether this would also apply for GGRs that involve multiple actors in the value chain and provide examples.**

Allowance differentiation and route to market

Allowance differentiation

GGR operators will be awarded an allowance for carbon removal which will be sold on the UK ETS market and can be used for compliance in the same manner as an existing UKA. The Authority is exploring whether there is a benefit in differentiating UKAs from allowances generated by GGRs. This would not impact how allowances from GGRs can be used for compliance purposes but would simply provide the holder of the allowance with more information on how it originally entered the market.

There are a number of options for this aspect of allowance design:

- **No new type of allowance is created** – GGR operators are issued with UKAs.
- **Generic GGR Allowance** – GGR operators are issued with a “GGRA”, a generic allowance that signifies that it has been awarded for carbon removal. This allowance would not provide details of the technology that has generated the removal.
- **Technology-specific GGR Allowance** – GGR operators are issued with a “GGRA from X”, which also provides detail on the method of GGR used to generate the allowance.

Route to market

Currently UKAs are introduced to market through Free Allocation or auctions. This section considers the role of the Authority in introducing allowances from GGRs into the UK ETS market.

The Authority has the following options:

- The Authority plays no role in supporting GGR operators to sell allowances that they have been awarded. Allowances from GGRs are issued to GGR operators that meet the UK ETS market participation requirements, and these allowances can then be sold to buyers, for example on the secondary market, without any further Authority intervention.
- The Authority supports GGR operators by facilitating auctions on their behalf, with the revenue received being distributed back to those operators. There are three possible iterations of this option:
 - **Combined auctions** – allowances from GGRs are combined with the fortnightly UKA auctions.
 - **Separate auctions** – allowances from GGRs are auctioned separately to UKAs, in a “GGR auction” that includes allowances from all removal types.
 - **Separate auctions by removal type** – allowances from GGRs are distributed into separate auctions by different removal types (e.g. DACCS, BECCS).

Key considerations for allowance design and route to market

The choices around allowance differentiation and route to market are interlinked. A decision on allowance differentiation will affect the options available for the route to market for GGRs in the UK ETS. For example, respondents should consider the merits of differentiating allowances in the context of whether they would support the Authority holding separate auctions for

allowances from GGRs. Likewise, respondents should also consider whether there would be any benefit in holding such auctions if allowances were not differentiated. The key considerations for these two issues are:

- **Price** – differentiating GGR Allowances from UKAs would demonstrate whether market participants are willing to pay for allowances associated with the different types of high quality GGR technologies that the Authority admits into the UK ETS. Currently, in the voluntary market buyers are willing to pay significantly more than the UK ETS carbon price for engineered carbon removals.¹⁸ A GGR Allowance differentiated from a UK Allowance could reflect the value of carbon removals currently seen in the VCM. If GGR operators could attract a higher price, this could enable greater access to finance and more cost-effective deployment. Additionally, a higher price for GGR allowances would represent better value for money for Government. Conversely, not differentiating GGR allowances would mean that there would be a unified price across the market, with no difference emerging between UKAs and allowances from GGRs.
- **Purchase of GGRs for non-compliance reasons** – differentiating GGR Allowances from UKAs could encourage buyers outside of conventional UK ETS market participants (UK ETS operators, brokers and traders) to purchase allowances associated with GGRs. Such buyers could choose to purchase GGR Allowances within the UK ETS due to perceived higher quality in the compliance market. However, without a compliance obligation there would be no mechanism for surrendering these allowances and it is therefore uncertain to what extent this scenario could materialise. If this were to occur, it could have impacts for UK ETS participants that require allowances to fulfil their compliance obligation and the role of the cap in setting overall supply.
- **Market efficiency and GGR deployment** – differentiating allowances would enable buyers to choose to direct carbon costs towards GGR operators and make more informed choices around what type of allowance they are purchasing. This will provide greater information on the level of demand for GGRs and, depending on allowance design, which GGRs and at what price. The Authority's ambition is for the UK ETS to become a competitive market for removals, in which polluters can make economically efficient choices, whilst overall maintaining the net zero consistent trajectory. Differentiating allowances could lay the foundations for this market by enabling that competition between removal types to emerge.
- **Liquidity** – although all allowances will be fungible, differentiating allowances could effectively create different types of supply in one market. Whilst both GGR Allowances and UKAs would fulfil the same function as a compliance instrument, separating the market in this manner could reduce the opportunity for trading allowances and could therefore result in lower liquidity. The potentially negative impact on liquidity could be considerably greater under the technology-specific GGR allowance option, as this could result in greater fragmentation of the market.

8. Should allowances from GGRs be differentiated from UKAs and, if so, how?

9. Do you think that differentiated GGR allowances would attract a higher price than existing emissions allowances and why? To what extent does this depend on the

¹⁸ Frontier, a collection of carbon removal purchasers, has committed to a number of offtake agreements, including a \$53m purchase of 112,000t/CO₂ removal from bio-oil sequestration in May 2023 and a \$20m purchase of 45,500t/CO₂ removal from DAC in November 2023. <https://frontierclimate.com/>

degree of differentiation (e.g. a generic GGR allowance versus a technology specific GGR allowance)?

10. Will differentiated GGR allowances encourage non-compliance or non-trading entities to purchase these allowances?

11. What should the Authority's role be in facilitating a route to market for allowances from GGRs?

Location of eligible GGRs

Proposal: For initial integration, the Authority proposes that only UK-based GGRs will be eligible for participation in the UK ETS.

Rationale for proposed approach

The Authority believes that only UK GGRs should be allowed to participate for the following reasons:

- A key objective for GGR integration is to support the development of the GGR sector across the UK and the ability to reach the Nationally Determined Contribution and each country's net zero pathways.
- Enabling international GGRs to access the UK ETS would have significant implications for the stability of the UK market, regulatory requirements and for revenues generated by the UK ETS.
- There is a commitment across the UK Government, Scottish Government, Welsh Government and Northern Ireland Executive to meet our climate targets through reducing and removing emissions domestically.¹⁹
- Administration of the UK ETS would be less complex, as it would only consider GGR projects within the jurisdictions of the UK and a single emissions trading scheme that also meet the UK's GGR standards and methodologies.
- The UK has a strong legal framework and robust environmental credentials, providing confidence to the market that any allowance awarded through GGR will be high quality and properly verified.

We recognise that UK ETS currently includes a portion of the UK's international aviation emissions, specifically emissions from flights from the UK to the European Economic Area (EEA) and Switzerland. These are likely to grow as a proportion of emissions in the UK ETS over time as other sectors can decarbonise more quickly. These flights are also within scope of the International Civil Aviation Organization (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and the UK Government is currently considering how to address this overlap in scope. The Government supports a global approach to tackling international aviation emissions, including work in ICAO. That is why it supports CORSIA - the

¹⁹ While the UK Government intends to meet its climate targets for each of carbon budgets 3 to 6 through reducing emissions domestically it reserves the right to use voluntary cooperation under Article 6 of the Paris Agreement. <https://www.gov.uk/government/publications/net-zero-strategy>.

first global market-based measure to address emissions in a single sector. Operators under CORSIA must cancel units in line with their offsetting obligations. There are no geographical restrictions on the source of CORSIA Eligible Units cancelled by operators in the course of their CORSIA compliance. The science is clear that international aviation must address any residual emissions via genuine and durable GGRs in the long term.

That said, the Authority considers it an important principle that GGRs included in the UK ETS are only be based in the UK. The UK ETS and CORSIA are distinct schemes that operate differently with varying scopes and obligations. The UK ETS operates based on the application of an emissions cap specifically designed to meet the UK's net zero objectives and changes to the scheme must be designed to support that goal. Linked to this, the Authority recognises the imperative to develop a UK-based market for GGRs to enable the deployment of a nascent technology and support the growth of a market that will be crucial to delivering the UK Government's Net Zero Strategy and the climate targets of the Scottish Government, Welsh Government and Northern Ireland Executive. The UK ETS Authority, therefore, sees enabling UK-based GGRs to be included in the UK ETS as the right approach, balancing complexity and ease of compliance, whilst being key to achieving our ambitious climate goals. The Authority will consider any views provided by stakeholders with regard to only including UK-based GGRs. Views are particularly welcome from airline operators and the Authority will consider any feedback.

12. Do you agree that allowances should only be awarded to UK-based GGRs? We welcome views from all stakeholders including sector-specific considerations. Please explain your answer.

Permanence

What do we mean by ‘greenhouse gas removal’ and ‘permanence’?

This consultation uses the term ‘Greenhouse Gas Removals’ (GGRs) to describe methods of removing greenhouse gases (GHG), mainly carbon dioxide, from the atmosphere.

For any GGR technology to deliver a ‘negative emission’, it must remove more greenhouse gases from the atmosphere than are generated from the carbon removal process. The Authority will only be considering GGRs for inclusion in the UK ETS where there is sufficient confidence that the greenhouse gas storage provided is highly durable, and risks of leakage are minimal and can be sufficiently managed. The Authority will continue to review what removals are eligible for inclusion in the UK ETS as evidence regarding their permanence and robustness develops in the future.

In the Government Response to the Engineered GGR Business Model consultation, the UK Government confirmed its criteria for robust negative emissions, as set out in the table below, and published a GGR taxonomy across engineered GGR technologies covering those not dependent on carbon capture and storage.²⁰

Criteria	Description
<i>CO2 Sources</i>	CO2 must be directly captured from the atmosphere or seawater (via biological, chemical or geochemical means).
<i>Net Negativity</i>	End-to-end CO2 emissions must be lower than the total amount of stored carbon. For some technologies, requirements would be set to limit the level of supply chain emissions, to ensure that GGR technologies achieve a minimum level of net negative emissions.
<i>Permanence</i>	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.

These criteria will be relevant for all GGRs that are being considered for inclusion in the UK ETS.

There are many ways to categorise and group these technologies, but when thinking about integration into a compliance carbon market like the UK ETS, the two most important characteristics are the duration of the carbon storage provided by different technologies, and

²⁰ <https://www.gov.uk/government/consultations/greenhouse-gas-removals-ggr-business-models>

the risk of reversal (i.e. how likely is it that the carbon will be re-released over a given period of time). Taken together, these two characteristics allow the Authority to create a ‘permanence’ framework to value carbon storage under the UK ETS. The IPCC categorise GGRs into three different storage timescales: decades to centuries, centuries to millennia, and 10,000 years or longer.²¹ This provides a useful basis for this permanence framework.

Integrating GGRs with different durability and leakage risks

Integration of GGRs into a market like the UK ETS requires the creation of a fungible (i.e. replaceable by another identical item or mutually interchangeable) commodity in two ways – the GGRs included in the UK ETS need to be fungible with each other, and 1 tonne of CO₂e removed by a GGR will need to be viewed as legitimately fungible as the emission of 1 tonne of CO₂e under the UK ETS. This fungibility is essential for allowing efficient trading, for UK ETS participants to decarbonise where it is most cost-effective, and to maintain market confidence.

Climate change is driven by the cumulative emissions of greenhouse gases to the atmosphere.²² For GGRs to make a contribution to tackling climate change, they need to remove and durably store greenhouse gases like carbon dioxide, thereby limiting and reducing the stock of these gases in the atmosphere. Leakage of CO₂ from a GGR project/site (i.e. when stored carbon is re-released) would reduce the contribution of that project to long term climate stabilisation and repair beyond 2050. The longer the carbon is stored, therefore, the greater the benefit in terms of climate repair. This means that GGRs that store carbon for longer and more securely will need to be valued more highly under the UK ETS because they make a greater contribution to tackling climate change. The assessment of permanence is important for the UK ETS as any leak of carbon could invalidate a participant’s ability to fulfil their compliance obligation using allowances from GGRs.

The Authority will only consider GGRs for inclusion in the UK ETS where there is sufficient confidence that the greenhouse gas storage provided is highly durable, and risks of leakage are minimal and can be sufficiently managed. However, even within these limits there will be variation between the storage and security provided by different GGRs. There is currently no accessible and agreed upon framework for evaluating the quantitative relationship between 1 tonne of CO₂ stored for 10,000+ years compared to 1 tonne of CO₂ stored over a shorter time period (e.g. 100 years). There is also no widely accepted definition of ‘sufficiently permanent’.

It is the role of the Authority to ensure that the market participation requirements are set in such a way to incentivise and reward sufficiently permanent storage, and adequately manage the risk of leakage to ensure we can confidently meet our emissions targets. This is reflected in the criteria for negative emissions set out above. The Authority’s proposed options for managing permanence of carbon storage with the UK ETS are set out below.

²¹ <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>

²² [://www.ipcc.ch/report/ar6/wg1/](https://www.ipcc.ch/report/ar6/wg1/)

Policy framework – minimum storage period, liability and fungibility measures

Burke and Schenuit (2023) propose a typology of policy measures and bundles that can be used to help address the challenging questions on permanence and tradability in GGR policymaking. The measures are grouped into: MRV, de-risking, durability, fungibility, liability measures. A three-stage policy sequencing is proposed to apply these measures to carbon markets like the UK ETS.²³

The first stage is to ensure there is a credible certification of any GGRs proposed for integration. GGRs cannot be integrated into the UK ETS without adherence to robust standards and methodologies to ensure the technologies that are integrated represent real, verifiable and sufficiently permanent removal. The Authority's approach to this is outlined in the 'Allowance design for GGRs' section.

The second stage is to ensure there are measures to govern reversal events, i.e. if the carbon stored by a GGR is later released back into the atmosphere. Many GGRs are highly durable, however these liability measures would need to apply to all types of GGRs integrated into the UK ETS, however low the risk of a reversal might be. Liability measures apply at the point at which the reversal event takes place.

The third stage is a range of measures that create fungibility between different GGRs to allow for their trading alongside emissions allowances within compliance carbon markets like the UK ETS. These measures attempt to assign relative value between GGRs that store carbon for different periods of time and with varying levels of security of storage. The fungibility measures may interact with the liability measures proposed in stage two. Fungibility measures apply to GGRs in advance of any potential reversal event taking place.

Applying this to the UK ETS, the Authority proposes the following permanence framework to govern GGRs in the UK ETS:

- GGRs will be required to prove they can store carbon for a minimum period of time in order to be eligible for UK ETS participation.
- A liability measure which will apply to the GGR operator (or other entity responsible for stored CO₂) included in the UK ETS in the event of a reversal event.
- A fungibility measure which will apply to some GGRs, where GGRs that store carbon for shorter periods of time and/or with a higher risk of that carbon being released will be awarded fewer allowances compared to GGRs that store carbon for longer periods of time and with greater security.

Minimum storage duration

In order to be eligible for UK ETS participation, GGRs will be required to prove they can store carbon for a minimum period of time. This will ensure that only robust and sufficiently permanent GGRs are able to participate in the UK ETS. There is a lack of consensus on how long this storage period should be in order to be sufficiently fungible with fossil emissions as

²³ Burke, J and Schenuit, F. (2023) Governing permanence of Carbon Dioxide Removal: a typology of policy measures. CO2RE – The Greenhouse Gas Removal Hub.

covered by the UK ETS. The Authority welcomes feedback on what this minimum period of time should be.

Liability measures

Liability measures refer to a set of mechanisms that set out the storage duration period required from GGRs participating in the scheme and place an obligation on GGR operators to take some corrective action in the event of a reversal event during the specified storage period. Liability measures apply at the point at which the reversal event takes place. These are needed because leakage from a GGR would constitute a release of CO₂ into the atmosphere which could undermine the delivery of climate targets and would reverse their intended function within the UK ETS system. Liability measures help ensure that GGR operators are incentivised to ensure carbon is durably stored and allows the Authority to assign liability for reversal events to the GGR operators in the first instance.

The Authority will ensure that there will be a mechanism to deal with any potential reversal events from GGRs within the specified storage period. However, it is challenging to design liability measures for events that may take place many years in the future as the Authority does not have certainty over what mixture of policies will exist at the point at which reversal events could happen. Within this context, the Authority is exploring the following options:

- The GGR operator (or other entity responsible for stored CO₂) could be required to purchase and surrender UK ETS allowances in the event of rerelease,
- The GGR operator (or other entity responsible for stored CO₂) could be required to purchase negative emissions from a GGR outside the UK ETS (which meets the UK ETS market participation requirements).

The GGR operator (or other entity responsible for stored CO₂) could be required to purchase UK ETS allowances to account for any reversal event. If there is a leak of one tonne, and the GGR operator purchases and surrenders a UK ETS allowance to account for it, this would mean there is one fewer allowance available in the UK ETS for purchase by the sectors covered by the scheme. This would mean other sectors in the scheme would not be able to emit that one tonne, and therefore the Authority would be able to ensure that the UK ETS was still aligned with net zero. This would be an extension of how the emissions from regulated activities are treated under the UK ETS – operators engaging in regulated activities that result in emissions are required to purchase emissions allowances to account for these emissions. This measure already applies in the UK for leaks from UK geological storage sites and would therefore apply to GGRs using this form of storage that are integrated into the UK ETS. Responsibility for monitoring emissions and surrendering UK ETS allowances in case of leakage from storage remains with the storage entity for a minimum of 20 years after the closure of the geological storage site. The Authority would need to balance the need to ensure that GGR operators are liable for reversal events with the need to protect the functioning and integrity of the UK ETS market. Large reversal events could lead to a sudden increase in demand for allowances under the UK ETS, which may have an impact on the price of these allowances for other sectors in the scheme.

A reversal event could take place many years in the future where there may not be certainty that an ETS or similar measure would exist. Therefore, it is important for the Authority to consider liability measures outside the UK ETS to strengthen the permanence framework and ensure durability of carbon storage is incentivised. Due to the potential impacts on the UK ETS market from reversal events, and the need to ensure liability measures exist in the long run, the Authority is also exploring a liability measure that requires GGR operators (or other entities

responsible for stored CO₂) to purchase negative emissions from GGR project(s) outside the UK ETS to compensate for reversal events. Under this option GGR operators would be required to purchase high quality and robust negative emissions that are not currently integrated in the UK ETS. These negative emissions would need to be as robust as the GGRs that enter the UK ETS. This option would mean that any potential reversal event would be matched by an equal and contemporaneous removal and storage of carbon, thereby mitigating the impact of the reversal event. This option is not without complexities. The Authority would need to consider whether there would be sufficient availability of high quality GGRs that meet the standards we set for GGRs to participate in the UK ETS that are not already integrated in the UK ETS, and where these GGRs would come from. These solutions may also differ in price, and there will be challenges in ensuring the GGRs used to compensate for reversal events meet the robust standards of the UK ETS. However, this option provides the Authority with a mechanism to manage liability outside the UK ETS market and therefore minimise the risk of adverse impacts on UK ETS sectors.

A combination of both measures is also possible – for example the Authority could sequence these options by requiring GGR operators to purchase GGR allowances from a different GGR operator outside the UK ETS as far as possible (to minimise any market impacts) and then buy allowances from the UK ETS to compensate for any remaining elements of the leakage if needed. There may also be other liability options that have not been considered.

In respect of GGR projects that deliver CO₂ onto the Transport and Storage Network in the Carbon, Capture, Utilisation and Storage (CCUS) clusters, the Authority will ensure that its proposals are developed with due regard to the UK Government's liability frameworks for CO₂ following the injection of CO₂ in the storage site. Further details are provided in the update on the business model for Transport and Storage published in December 2023.

Fungibility measures

Whilst liability measures apply at the point of a reversal event, fungibility measures apply to GGRs in advance of any potential reversal event taking place and can therefore be viewed as safeguarding or insurance mechanisms to protect against risk of reversal for certain GGRs. Fungibility measures assign a quantitative value to GGRs with different levels of permanence and reversibility. The outcome of fungibility measures is to award some GGRs with fewer allowances compared to the carbon that has been stored, on the basis that there is sufficient risk that some of that carbon may be released. There are two ways this can be achieved:

- Some operators could be required to contribute a proportion of their allowances to a 'buffer pool'.
- The Authority could create 'equivalence ratios' between GGRs that store carbon for different periods of time.

Under buffer pools, certain projects who may have a higher risk of reversal would not be allowed to sell an allowance for every tonne of carbon they capture and store. They would be required to contribute a percentage of generated allowances to a 'buffer pool' held by the market administrator. The contribution rate could be the same for every project to which the requirement applies or be based on project-specific risk of leakage or a combination of both. If a reversal event happened, allowances from the buffer pool would be cancelled by the market authority, corresponding with the emissions from the reversal event. The UK's Woodland Carbon Code and the four biggest carbon credit registries (Verra, Gold Standard, American Carbon Registry and Climate Action Reserve) all use buffer pools. Some projects may not

have to contribute to a buffer pool, or only have to contribute a very small portion of allowances if the risk of reversal is low.

Under equivalence ratios, projects would not be awarded an allowance for every tonne of carbon they captured and stored. Instead, they would receive a proportion of allowances based on their equivalence rate. This rate would be based on the risk that the project may release the stored carbon in a given period of time. Equivalence ratios can be set using the standard economic approach to calculating the net present social value of a project. This involves (a) calculating the emissions flows when carbon is stored that may be eventually released, (b) taking into account increased social costs of emissions over time, (c) taking into account the relative importance of impacts occurring soon compared to far in the future. A number of different inputs could be used, for example Green Book discounting or Stern discount rates in combination with carbon values from the UK Government²⁴, US Interagency Working Group²⁵, or Nordhaus²⁶.

In theory both buffer pool and equivalence ratio approaches would have the same outcome on the GGR operator if applied – fewer allowances would be awarded to the project compared to the carbon they store, based on the premise that some of that carbon might leak. Both deal with the risk of reversal upfront – the buffer pool does this by asking the project to contribute some of its allowances to a pool held by the market authority, and equivalence ratios award fewer allowances to the project in the first place. Both would be challenging to design and set – the buffer pool requires a decision on contribution rates and how this applies to different GGRs types, and equivalence ratios require decisions on which inputs are used in the calculation and how this applies to different GGRs.

Interaction between liability and fungibility measures

The application of the liability measure may differ depending on whether the GGR operator is subject to a fungibility measure. This could depend on whether the reversal event was avoidable, i.e. within the control of the GGR operator or unavoidable i.e. due to factors outside of the control of the GGR operator. This occurs in the Woodland Carbon Code – if there is a reversal event, first any unsold units in the project developer's account can be cancelled. If that is not enough to compensate for the leak, then units are cancelled from the buffer pool to cover the remaining shortfall. If the reversal event was avoidable, the project reimburses the buffer for all cancelled units. If the reversal was unavoidable, the project is only required to reimburse the buffer with additional units if the reversal event is larger than their existing contributions to the buffer.

The design of both fungibility and liability measures will impact the profitability and economics of GGR projects. The Authority will balance environmental integrity with the intention of using the UK ETS to support GGR deployment to ensure that projects are fairly rewarded for their activities and risks are managed in a proportionate manner.

13. Do you agree with the proposed permanence framework of both a minimum storage period, a liability measure and a fungibility measure? Please explain your answer.

²⁴ <https://www.gov.uk/government/collections/carbon-valuation--2#update-to-traded-carbon-values:-2023>

²⁵ https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

²⁶ <https://onlinelibrary.wiley.com/doi/full/10.1111/eocj.12188>

- 14. What minimum storage period duration should the Authority set for GGRs entering the UK ETS? Please explain your answer.**
- 15. How should the Authority manage potential reversal events from GGRs? Please consider the liability options outlined above, whether any options exist that have not been considered, and how the potential liability options could be used together or in sequence.**
- 16. Where should the liability for any re-release of stored emissions apply if there are multiple actors in the GGR value chain?**
- 17. Should the liability measure differ if the GGR is also subject to a fungibility measure? For example, if the reversal event was avoidable (i.e. within the control of the GGR operator) or unavoidable (i.e. due to factors outside of control of GGR operator).**
- 18. Should the Authority use a buffer pool or equivalence ratio?**
- 19. How could the Authority set the contribution rate for a buffer pool? Should this be a flat rate contribution across all applicable projects, or should this vary per project?**
- 20. Which factors should be considered when determining the appropriate contribution rate for a buffer pool?**
- 21. How should the Authority decide which GGRs would be required to contribute to a buffer pool and at what level any threshold should be set for contributions?**
- 22. Should buffer pool contribution rates remain fixed over time or could they vary? If they vary how should this be assessed? For example, the Authority could require projects to contribute depending on an assessment of risk at each verification period, and this could change over time.**
- 23. How could the Authority design equivalence ratios?**
- 24. Which inputs should be used in determining the appropriate equivalence ratios?**
- 25. Should these equivalence ratios be fixed over time or regularly reviewed and amended?**

Geological storage in the UK – a case study: 10,000 year retention

Carbon Capture and Storage (CCS) is the process of capturing carbon dioxide for permanently storing it, deep underground, where it cannot enter the atmosphere. The UK is leading the development of CCUS and with the pace of CCS activity accelerating across the globe, the UK has been rated amongst the top five nations globally for CCS readiness.²⁷

The UK has significant geological assets, with the UK Continental Shelf (UKCS) potentially having enough capacity to safely store up to 78 billion tonnes of carbon, one of the largest potential CO₂ storage capacities in Europe.²⁸ The UK Government is exploring different kinds of projects that take advantage of CCUS and the UKCS's storage opportunities, including abatement activity in waste management, hydrogen production, power generation, and industrial processes. As well as this abatement, to reach net zero we will also have to take advantage of emerging technologies that remove CO₂ directly out of the atmosphere and create negative emissions.

Engineered GGRs cover a wide range of technologies, some of which require access to a CO₂ transport network to permanently store the removed CO₂ - these are 'CCS-enabled' GGRs. These include technologies such as Bioenergy with Carbon Capture and Storage (BECCS) and Direct Air Carbon Capture and Storage (DACCS). The UK Government aims to support a mix of GGR technologies, noting the most significant removals at scale in the 2030s are likely to come from those technologies which require geological storage of CO₂. The UK Government expects a range of GGR technologies to come forward, with the GGR sector both becoming a major user of the CO₂ transport and storage network by the mid-2030s as well as seeing growth in non-CCS GGR technologies.²⁹

Deep geological storage of CO₂ is the long-term containment of captured CO₂ in geological formations. CCS technologies involve the separation and capture of CO₂ from large-scale processes to prevent CO₂ from being released into the atmosphere. In CCS, the captured CO₂ is then transported to be securely stored deep underground in geological formations.

A public perception study on CCS commissioned by the UK Government in 2021³⁰ found that public support for CCUS was conditional on it being a safe and effective strategy to reduce CO₂ emissions. The safety of storage of CO₂ beneath the seabed was of particular interest to participants in the study, with induced earthquakes, containment risks of storage and potential harm to marine life highlighted as potential concerns from participants.

The UK Government commissioned a group of independent expert advisors to produce a report into the security of geological storage of CO₂ in the UK.³¹ The report found:

- A very high level of confidence in the long-term security of CO₂ containment in typical CCS storage complexes on the UK continental shelf.

²⁷ Statista (2023), 'The Carbon Capture and Storage (CCS) Readiness Index Worldwide in 2023', <https://www.statista.com/statistics/1411813/carbon-capture-and-storage-readiness-index-by-country-worldwide/>

²⁸ <https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-a-vision-to-establish-a-competitive-market>

²⁹ CCUS Vision / Net Zero Strategy / Carbon Budget Delivery Plan in March 2023

³⁰ <https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-public-dialogue>

³¹ <https://www.gov.uk/government/publications/deep-geological-storage-of-carbon-dioxide-co2-offshore-uk-containment-certainty>

- More than 99.9% of the injected CO₂ will be retained within the storage complex – based on estimates of containment probabilities for two ‘typical UK’ offshore sites modelled over 25 years of injection operations and 100 years of post-injection monitoring.
- Findings consistent with previous studies – the 2005 IPCC Special Report on CCS³² found that the fraction of CO₂ retained in appropriately selected and managed storage sites is very likely to exceed 99% over 100 years and is likely to exceed 99% over 1,000 years. This is consistent with a report from the Zero Emissions Platform (ZEP) published in 2019³³ which states that for a typical North Sea storage site, over 99.99% of injected CO₂ is expected to remain stored deep underground for at least 500 years.

Woodland in the UK – a case study

As mentioned in the Authority response to the ‘Developing the UK ETS’ consultation, the Authority believes that the UK ETS may also offer an appropriate long-term market for high quality nature-based GGRs located in the UK, subject to further work to consider the range of potential issues brought forward through the Call for Evidence and by the Climate Change Committee regarding permanence, costs and wider land management impacts. Below, and in the accompanying Analytical Annex, we set out further evidence regarding these issues in the context of UK woodland and the Woodland Carbon Code.

Permanency of newly created UK woodlands

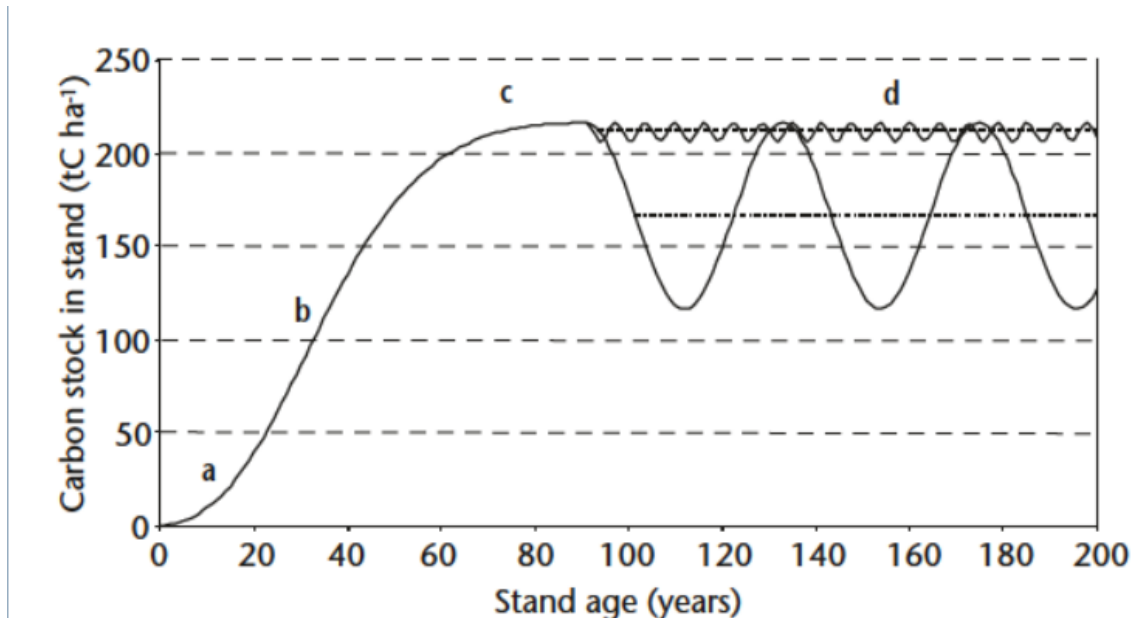
The Woodland Carbon Code (WCC) drives the creation of high integrity and permanent woodland carbon units. The WCC is a carbon verification standard that is endorsed by the UK Government and operated by Scottish Forestry. It is recognised as a leading nature-based carbon code, with a strict additionality framework. Its MRV framework, based on the latest carbon science from Forest Research, requires onsite verification of sequestration by UK Accreditation Service (UKAS) accredited independent verifiers before woodland carbon units are issued, ensuring credible, high integrity ex-post units.

UK woodland can provide durable carbon storage. UK woodlands sequester carbon as they grow until their carbon stocks stabilise between years 100 and 300, depending on species mix and management approach. As set out in figure 2, when very young, carbon accumulation is slow in a woodland (stage a) followed by rapid growth and accumulation in years 20 to 50 (stage b), and tapering off at stage c, before reaching a stable state in stage d, also known as old growth. At old growth stage, any forest will have natural disturbances and decay which are offset by new growth, providing the forest with a long-term carbon average stock. Two example natural fluxes are represented by the peaks and troughs in stage d, and the long-term average carbon stock is represented by the horizontal lines at 170 and 210 tC per hectare. There are examples of old woodlands in the UK, demonstrating their durability; 28% of England’s current woodland cover has been continuously forested since at least 1600AD, and they hold 38% of England’s woodland carbon stock.

³² IPCC, “Carbon Capture and Storage,” 2005.

³³ Zero Emissions Platform (ZEP), “CO₂ Storage Safety in the North Sea: Implications of the CO₂ Storage Directive,” November 2019.

Figure 2: An example of carbon accumulation in a newly created stand of trees. From Broadmeadow and Matthew, 'Forests, Carbon and Climate Change: the UK Contribution' (2023), <https://www.woodlandcarboncode.org.uk/images/PDFs/fcin048.pdf>.



Institutional and policy mechanisms to ensure permanence of woodland

In the UK woodlands are considered a permanent land use change and are afforded legal protection. For example, in England and Wales, under the Forestry Act 1967, a woodland owner requires a felling license from the regulator (Forestry Commission and Natural Resources Wales, respectively) to fell trees, except for certain exemptions set out in legislation. When the felling licence is granted, such as for clearfell timber production, a condition is typically applied by the regulator to restock land, maintaining overall forest cover. The felling licence regime is highly effective with a pre-pandemic average in England of 99.9% of known tree felling carried out with Forestry Commission approval.³⁴ Where unlicensed tree felling does occur, it is frequently, although not always, in anticipation of property development.³⁵ The infrequent instances of illegal tree felling that occur annually do not equate to overall forest loss, as restocking is normally required.

As of January 2023, there are enhanced legislative powers which can assist with addressing illegal felling. These include a court being able to impose an unlimited fine for illegal felling and make a restocking order (meaning any felled trees must be replanted) which if not complied with would put offenders at risk of imprisonment.³⁶

To safeguard woodland carbon permanency against forest loss, the WCC operates a pooled buffer requiring 20% of all carbon units created by WCC registered woodlands to be set aside to address reversals. The buffer ensures that if a reversal of emissions removal occurs, the buyer of the woodland carbon unit can still claim the removal because the wider pooled buffer units act as substitutes. Separately, the woodland owner that had a reversal event must replenish the buffer units lost. To date, the WCC's buffer has never been used.

³⁴ <https://www.gov.uk/government/statistics/forestry-commission-key-performance-indicators-report-for-2022-23>.

³⁵ <https://www.gov.uk/government/statistics/forestry-commission-key-performance-indicators-report-for-2022-23>.

³⁶ [New powers to crack down on illegal tree felling - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/new-powers-to-crack-down-on-illegal-tree-felling)

The WCC's carbon calculator predicts and verifies carbon accumulation for different management techniques, allowing timber producing woodlands to enter the Code. Under the WCC, a productive timber woodland would produce significantly fewer woodland carbon units than an amenity woodland, all else equal, because its long-term average carbon stock is much lower.

Risk of reversal for UK woodland

The risk of reversal for new UK woodlands is driven by two factors: legal deforestation due to development and natural disturbances such as wildfire or pest and diseases.

A woodland owner is exempt from obtaining a felling licence if such felling is immediately required for the purpose of development which has been authorised by planning permission. Development on woodlands is also discouraged through the requirement to undertake a forestry Environmental Impact Assessment for deforestation projects that are likely to have a significant effect on the environment. Planning authorities are also required to take the wider benefits from natural capital and ecosystem services of the woodland in question into account when making decisions, as set out in the National Policy Planning Framework. That said, development leads to around [400 hectares of woodland loss in England annually](#), which gives a legal forest loss of 0.03% annually in England.

We expect these figures to fall following the introduction of Biodiversity Net Gain (BNG) in England for new major developments on 12th February 2024 and for small sites on 2nd April 2024, under Schedule 7A of the Town and Country Planning Act 1990 (as inserted by Schedule 14 of the Environment Act 2021). BNG will also be mandatory for Nationally Significant Infrastructure Projects from November 2024. Developers must use the statutory biodiversity metric to baseline their development site and explore options to increase the quantity and quality of natural habitat. BNG should incentivise developers to identify land with low biodiversity value (i.e. not woodlands) for development, to reduce the cost of delivering BNG.

The second threat to UK woodlands, in common with forests globally, are disturbance events such as wildfire and windstorms and these are becoming more likely with climate change. Defra are investing in research and developing policy to improve UK forest resilience. The characteristics of UK forests, such as their fragmentation, means that large scale catastrophic disturbance events are unlikely. While summer droughts have impacted on the growth and condition of UK forests in the past, they have not led to widespread mortality and a robust biosecurity framework is in place to protect UK forestry from serious pest and disease outbreaks. Natural disturbances in the UK are estimated in the National Forestry Accounting Plan of the United Kingdom 2021-2025. Wildfire, extreme weather, geological disturbances, and insect pests and diseases are all considered and result in an annual average loss of woodland to natural disturbance of 0.14% per year. The vast majority of woodlands are restocked after a natural disturbance, meaning that rather than causing a permanent loss, these disturbances slightly reduce the long-term carbon stock average of UK woodlands.³⁷ All of these disturbances are expected to increase as a result of climate change.³⁸ However, there is currently no evidence quantifying the potential impact of future changes on the permanence of carbon stored in woodlands.

³⁷ See [UK National Forestry Accounting Plan 2021-25](#). Losses from are estimated to average 4,500 hectares per year.

³⁸ See [Forestry Commission \(2010\)](#).

All UK woodland creation must meet the UK Forestry Standard (UKFS) ensuring good site selection, community consultation and minimal environmental harm.³⁹ The UKFS provides the latest information on creating and managing climate resilient woodlands. Newly created woodlands are required to enhance their resilience, undertake an Environmental Impact Assessment which is submitted for approval to the regulator, and mitigate the risks posed by the effects of climate change or pests and diseases.

Cost and potential supply of UK woodland carbon

The UK WCC's woodland carbon units are high integrity, as described above. WCC carbon units obtain a much higher price than average carbon units globally, demonstrating that buyers recognise their integrity due to high permanency, independent verification and trusted regulation, and are therefore willing to pay more; in 2023, the UK woodland carbon price was £25/tonne, compared to the international VCM price of \$7/tonne.⁴⁰

Furthermore, the current WCC price (£25/tonne) does not cover the full costs of woodland creation and once planted, woodland is permanent with limited scope for income. At the current WCC price, it is estimated that a typical mixed woodland is only able to cover up to 17% of woodland creation costs through carbon income over the first 20 years. Woodland management is also costly with funding required to manage deer and squirrel damage and pay for onsite carbon audits. Alternative land use is often more commercially viable than woodland creation, especially in England.

This is why a higher carbon price is required to generate enough income to cover woodland creation and management costs and compete with alternative land use activity. However, even with higher carbon prices, woodland creation would not be financially viable for many landowners. Further support alongside potential UK ETS inclusion may therefore need to be considered in order to meet UK woodland targets. Defra analysis suggests that woodland creation under the UK ETS at projected market carbon values would not result in more woodland carbon than is required to meet UK net zero targets.⁴¹ This analysis considered the financial viability of woodland creation under the UK ETS under different scenarios for future woodland creation costs and grant rates, farm incomes, carbon prices and timber incomes, whilst also factoring in supply constraints and behavioural assumptions.

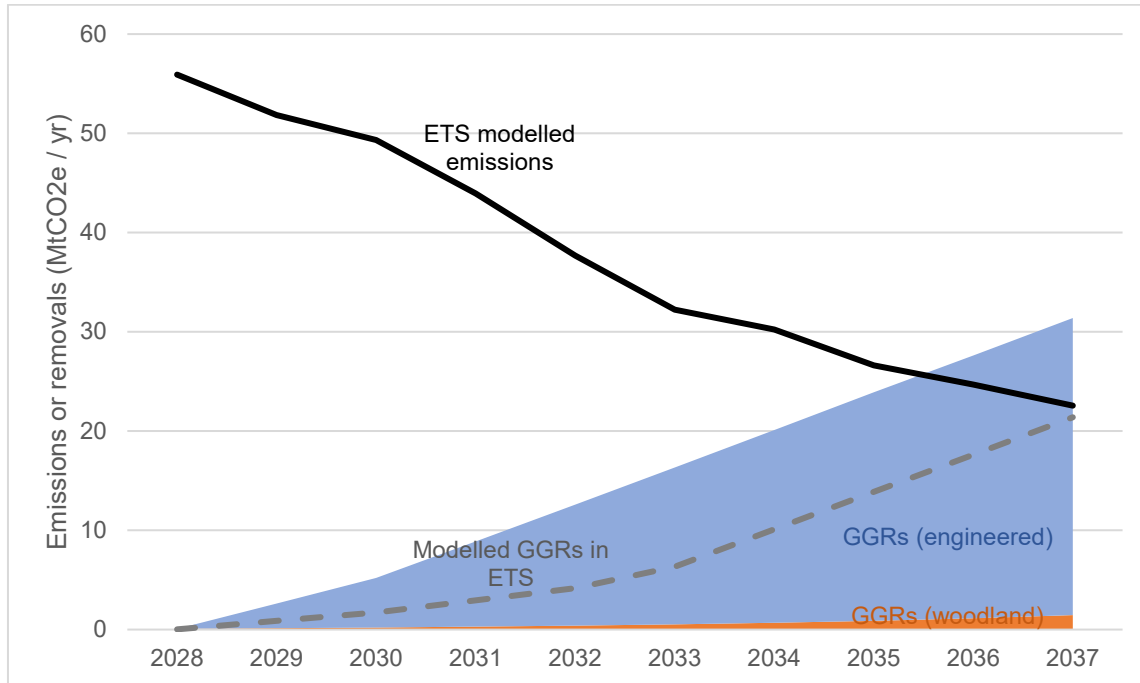
The potential supply of carbon if all UK woodland targets are achieved is shown in Figure 3 below, relative to UK ETS emissions and engineered GGR deployment.

³⁹ This includes grant aided re-establishment of woodland following clear-felling. See more here - <https://www.gov.uk/government/publications/the-uk-forestry-standard>

⁴⁰ <https://www.ecosystemmarketplace.com/articles/new-state-of-the-voluntary-carbon-markets-2023-finds-vcm-demand-concentrating-around-pricier-high-integrity-credits/>.

⁴¹ <https://www.gov.uk/government/publications/traded-carbon-values-used-for-modelling-purposes-2023>

Figure 3: Illustrative Net Zero Strategy pathways for woodland, engineered GGRs and UK ETS emissions. GGR trajectories are illustrative pathways with considerable uncertainty – we do not expect all GGRs in the Net Zero Strategy to enter the UK ETS due to voluntary demand.



Note: Net Zero Strategy (2021) and internal DESNZ modelling. UK ETS emissions after 2030 are projections consistent with the Net Zero Strategy, not based on legislated annual caps. Figures do not include any scope expansion. GGR trajectories are illustrative pathways subject to considerable uncertainty. For a description of assumptions underpinning Modelled GGRs in ETS, see ‘Modelling methodology’ section in the Analytical Annex published alongside this consultation.

Wider impacts

Food security

The UK Government intends to meet the woodland cover target while maintaining overall food production.⁴² Additional measures, such as restricting woodland being planted on the best and most versatile agricultural land and overall control over the amount of woodland creation, may help mitigate adverse food security impacts if these were to arise.

Land management, social and cultural impacts

The call for evidence highlighted potential wider social and cultural impacts from the inclusion of nature-based solutions in the UK ETS, focusing on socioeconomic development, such as

⁴² As outlined in the UK [Government food strategy \(2022\)](#) and the Prime Minister’s remarks to the [Farm to Fork Summit \(2023\)](#).

increased land prices and the impact on local communities.⁴³ These impacts are inextricably linked to land use policy.

There is already a long-term trend of increasing land values, timber prices and natural capital market values. Impacts of entry of woodland carbon into carbon markets must be set in the wider context of the agricultural transition, and the need to achieve significant environmental, nature recovery and net zero targets.

The Authority will consider the potential wider social and cultural implications of the proposals in this consultation and of the potential inclusion of woodland in the UK ETS, for example on rural communities and the Welsh language, and welcomes any evidence from respondents related to these impacts.

Defra and the British Standards Institution (BSI) have launched the Nature Investment Standards Programme which is committed to exploring how social impacts should be considered across all nature markets. It is expected to build on the Scottish Facility for Investment Ready Nature in Scotland funded 'community benefits standard', which considers how habitat creation for nature markets, like carbon, could be accredited as benefiting communities. Adherence to these standards may mitigate potential wider impacts from inclusion of woodland into compliance carbon markets.

Defra have also launched England's Local Nature Recovery Strategies (LNRS) to identify locations where habitat creation and restoration will maximise benefits for nature and the wider environment, balancing these against other trade-offs. They are led by local authorities and collaboratively produced with local communities and businesses, ecological experts and landowners. Each strategy will go through consultation, meaning that they could form an important source of information for market design, helping to mitigate wider social and economic impacts and maximise benefits.

As land use and forestry policy is devolved and wider land management impacts are often localised, potential options to mitigate land management impacts must be built into wider land use policy, as well as carbon market design. The scale of potential impacts will also be linked directly to the potential quantity of woodland carbon generated through inclusion in compliance carbon markets. As outlined above, Defra analysis suggests that woodland creation under the UK ETS would not result in any more woodland carbon than is already required to meet UK net zero targets. Figure 3 shows the potential supply of woodland carbon if all UK woodland targets are achieved.

Additional measures around market design could further mitigate land management impacts. This could include when woodland carbon is awarded, how much information buyers are provided, whether markets have a cap on overall supply of woodland carbon, and whether specific entry requirements are placed for woodland projects. For example, awarding landowners once the woodland is verified to have sequestered carbon (ex-post) means that woodland carbon units will be produced at regular instances throughout the woodland contract. This would ensure that landowners manage woodlands for the long-term, mitigating against speculation and short-term profit. The Woodland Carbon Code also applies a project-based approach to assessing additionality through a legal and investment test, both of which need to be passed for a project to be eligible.⁴⁴

⁴³ Responses to the Call for Evidence are summarised here:

<https://www.gov.uk/government/consultations/developing-the-uk-emissions-trading-scheme-uk-ets>.

⁴⁴ <https://woodlandcarboncode.org.uk/standard-and-guidance/1-eligibility/1-6-additionality>

26. Should new ex-post woodland units generated in line with UK Woodland Carbon Code standards be considered for inclusion in the UK ETS? Please base your response on the evidence outlined around permanence, costs and wider land management impacts, and on the policy options outlined in the rest of this consultation.

27. If the Authority does include new ex-post woodland units generated under the UK Woodland Carbon Code in the UK ETS, should any changes be made to the Woodland Carbon Code? For example, this could include changing the 20% flat-rate buffer contribution, or changes to the MRV and measures to mitigate wider land management impacts. Details of the woodland carbon code can be found here: <https://woodlandcarboncode.org.uk/standard-and-guidance>

28. If the Authority does include new ex-post woodland units generated under the UK Woodland Carbon Code in the UK ETS, should any measures be taken to mitigate potential social and cultural impacts? Please provide details of the impacts, including consideration of impacts on different land ownership models, and potential measures.

The Authority is not considering the inclusion of avoided emissions or offsets in the UK ETS. Utilisation of carbon in short-lived products, such as fuels and plastics, does not constitute a negative emission and therefore is not being considered for inclusion as a GGR. Similarly, restoration of peat is not being considered for inclusion at this stage, because, using the methodology for calculating emissions savings, peatland restoration currently represents a reduction of emissions rather than an overall removal. Peatland in the UK is a source of greenhouse gas emissions due to unsuitable land management practices and credits issued through the Peatland Code represent the prevention of further emissions.⁴⁵ The Authority understands that the current calculation methodology may be missing transitional carbon gains that arise during restoration, which could constitute an overall removal and would therefore welcome evidence to inform longer-term thinking.

29. Do you agree with the Authority's assessment of peatland restoration?

⁴⁵ <https://www.iucn-uk-peatlandprogramme.org/peatland-code-0>

Pathway to integration

In the government response to the “Developing the UK ETS” consultation, the Authority set out that it would consider a pathway by which GGRs could be integrated into the market. The Authority has identified two key questions to help inform a pathway for integration:

- **Degree of integration** – this considers whether the Authority establishes a separate market for removals, and whether there will be any supply restrictions on GGRs entering the UK ETS and/or demand restrictions on who can buy GGRs in the ETS. The nature of these design options and how they change over time will determine whether GGRs are fully integrated into the ETS or whether there is a phased integration.
- **Timing** – this relates to the point in time from which GGRs that meet the market participation requirements are allowed to enter the UK ETS market.

Degree of integration

Proposal: The Authority is minded to adopt additional supply controls as part of a pathway to full integration of GGRs in the UK ETS. The Authority will consider the need to provide a strong demand signal to GGR developers in any decisions around the use of supply controls for initial integration of GGRs. The Authority is not considering creating a new and separate market for GGRs and is not proposing to place demand controls on who can buy GGRs in the UK ETS at this stage.

Rationale for proposed approach

There have been a number of studies exploring how removals could be integrated into emissions trading schemes.⁴⁶ Generally, these explore how governments can facilitate the entry of GGRs that are currently sold on the voluntary carbon market (VCM) into their own compliance schemes and design options that assign differing roles to government in that process. Some scenarios envisage the creation of two separate markets - the compliance system for emissions reductions and a voluntary removal market - with government providing a link between the two, whether through quantitative limits on GGRs entering the compliance market or by purchasing GGRs directly. Alternatively, other scenarios envisage that government may choose to more fully integrate removals, with removals providing supply to both the government-administered compliance markets and wider private voluntary markets. In this scenario, government may also choose to apply quantitative limits on supply entering the ETS or controls on how GGRs can be used, and this can be changed over time.

Different design options will be suitable depending on the jurisdiction in which integration is proposed. In the context of the UK ETS, it is important to consider both the wider GGR policy landscape and proposals set out in this consultation. For engineered GGRs, the main driver of deployment in the immediate term will be via the UK Government’s Greenhouse Gas Removals (GGR) business model and Power Bioenergy with Carbon Capture and Storage (Power BECCS) business model, which aim to attract private investment in GGR projects by

⁴⁶ For example: <https://icapcarbonaction.com/en/publications/emissions-trading-systems-and-net-zero-trading-removals> and <https://www.oxera.com/insights/reports/market-design-for-negative-emissions-in-the-uk-ets/>.

providing revenue support for negative emissions. The business models will be based on a ‘contract for difference’ structure, whereby projects may receive a ‘top-up’ payment from government if the market ‘reference price’ is lower than the ‘strike price’ reflecting the cost of producing negative emissions. Further details on the design of the market reference price, and its potential link to the UK ETS, are set out in the December 2023 business model update.⁴⁷ In addition, the Industrial Carbon Capture (ICC) and Waste ICC business models have the potential to deliver negative emissions by supporting the capture and storage of biogenic carbon in industrial and waste management facilities.

The Authority views the UK ETS as a possible market into which GGRs receiving business model support can be sold, linking polluters to removers, and providing the possibility in the long-term for finance from UK ETS participants to fund GGRs. The purpose of integrating GGRs in the UK ETS is to provide a strong base of compliance demand for removals and to ensure that participants can effectively tackle residual emissions. As a result, for the purposes of UK ETS integration, the Authority is not considering creating a separate market for removals with no link to compliance demand in the UK ETS. This does not rule out the importance of voluntary markets - they will play an important role in helping to deploy GGRs by unlocking private capital and reducing support costs to government. Working in conjunction with the business models for engineered GGRs, UK ETS integration could be designed in a way that incentivises the use of voluntary markets first.

An “integrated” market for removals means that GGR operators would be able to sell directly into the compliance market. In this instance, government may wish to exert some control over when and how GGRs can be used within the compliance market. Through the call for evidence in the “Developing the UK ETS” consultation, a number of proposals were raised for how these controls could be designed which can be split broadly into the following categories:

- **Supply controls:** quantitative limits set on the GGR supply entering the UK ETS. The Authority could choose to set a GGR “cap” within the overall UK ETS cap which changes over time, for example starting at a fixed amount of removal in year one, rising by a set number of removals each year.
- **Demand controls:** constraints set on the way in which allowances from GGRs can be used. This category is more diverse and can range from determining which UK ETS participants are allowed to purchase allowances from GGRs (for example by assigning some sectors as “hard to abate”) to setting a limit on the proportion of a participant’s compliance obligation that can be used with GGRs (e.g. 5% rising over time). Other proposals suggested some form of conditionality, with access to GGRs only being granted once a proportion of decarbonisation is demonstrated or once a credible decarbonisation plan is submitted to the Authority.
- **Other novel uses for GGRs:** submissions also proposed using allowances from GGRs in more specific ways, such as:
 - **Replacing free allocation (FA) with GGRs.**
 - **Using GGRs to stock a supply adjustment mechanism (SAM).** A SAM is a type of market stability policy that predictably amends the supply of allowances in the market in response to certain pre-determined criteria and market conditions.

Generally, these mechanisms were put forward as a solution to the risk of mitigation deterrence, i.e. the risk that integration of GGRs means that emissions reduction activities are

⁴⁷ <https://www.gov.uk/government/publications/greenhouse-gas-removals-ggr-business-model>.

disincentivised in favour of relying on removals. In this instance, it is important to consider the policy proposal set out in the ‘Cap’ section of this consultation. The Authority is proposing to maintain the total supply of allowances by removing an emissions allowance (UKA) for every allowance generated by GGRs – this will be the fundamental design that underpins market integration. The Authority has assessed that by maintaining the gross cap on emissions for the initial stages of GGR integration, cap policy successfully combats the risk of mitigation deterrence. By replacing UKAs with allowances from removals, this risk is removed at a scheme-wide level by ensuring that participants must reduce their emissions in line with the declining net zero consistent cap. However, the Authority believes there are other reasons for wishing to apply additional controls to GGRs. For example, controls could be used to phase GGR integration or address market impacts.

Therefore, the Authority is considering how these mechanisms could be used to target any other impacts. It is important to consider what effect these will have on the demand signal that is sent to the GGR sector. Any controls would dampen the extent to which GGRs can be deployed within the UK ETS market. A decision on the design of additional controls will therefore be made with these impacts in mind, balancing the extent to which the UK ETS market is affected and the role that the UK ETS could have in encouraging GGR deployment. The Authority is not considering the use of GGRs as a form of free allocation (FA) or to stock a supply-adjustment mechanism (SAM) as viable options at this time. The Authority launched consultations in December 2023 to review FA and markets policy, including consideration of a quantity-triggered SAM.⁴⁸

As noted, the Authority regards the proposals for cap policy as the primary lever for ensuring that UK ETS participants continue to decarbonise and do not delay abatement via the purchasing of GGRs. The most popularly cited reason for using demand controls is to combat this risk to mitigation activity but, with the cap policy proposed, the Authority considers that such additional controls would dampen the demand signal for the GGR sector. By maintaining the total supply of allowances in the UK ETS, participants will not be able to emit more by purchasing allowances from GGRs and will be required to abate in line with the net zero consistent cap. The Authority is open to considering whether demand controls could be used to target any other impacts.

The Authority is minded to set supply controls as part of a pathway to GGR integration which would put an upper limit on how many GGRs can enter the market in the early years of integration. Supply controls may be useful to help manage the integration of GGRs into the UK ETS and preserve market stability. The Authority will consider the need to provide a strong demand signal to GGR developers in any decisions around the use of supply controls for initial integration of GGRs. The Authority will establish robust market participation criteria for GGRs to ensure that only a supply of robust and high quality GGRs will be able to enter the market.

Supply controls could be used to phase integration over time to enable the market to adjust to GGR supply. Additionally, controls could be used as a more reactive form of market management by introducing controls on specific GGRs if their integration results in unintended impacts, such as for woodland as set out in the case study. These uses for supply controls are set out in more detail below.

⁴⁸ <https://www.gov.uk/government/consultations/uk-emissions-trading-scheme-future-markets-policy> and <https://www.gov.uk/government/consultations/uk-emissions-trading-scheme-free-allocation-review>.

Potential uses for supply controls		
Name	Description	Considerations
<i>Phased integration</i>	Supply controls could be used to ease GGRs into the UK ETS to manage potential market impacts. By setting the initial supply at a low level the Authority could review how integration is affecting the UK ETS market and increase supply over time. Regular review points could be used to formalise this mechanism. This would be a form of proactive market management.	This would provide a level of flexibility for the Authority to manage GGR integration and provide more space to respond to any impacts. The Authority would have to consider what an appropriate level of supply is in the first instance and how that could change over time, and the resulting impact on GGR operators.
<i>Market Stability</i>	Supply controls could be used to target specific market impacts related to GGR integration if these were to occur. The Authority could also consider using controls to cap supply of specific GGR types if necessary, such as for woodland as set out in the case study. This would be a form of reactive market management.	The Authority would need to consider whether there was a need for this use of GGR supply controls given the proposals set out in the UK ETS Future Markets Policy consultation in December 2023.
<i>Revenue Impacts</i>	By replacing emissions allowances with allowances from GGRs, the Authority is foregoing revenue gained from the auctioning of UKAs. Supply controls on GGRs could be used to manage these revenue impacts.	GGR allowances are effectively a cost to government – and as such there is a case for controlling this to ensure that this delivers value for money for the Exchequer. Whilst cap policy will reduce UK ETS revenue, this impact will be mitigated by a reduction in subsidy payments for any GGRs deployed under the GGR business model following sale on the UK ETS. The Authority would have to consider this interaction.

The Authority believes it is sensible to adopt supply controls to ensure that integration of GGRs into the UK ETS is implemented successfully. When considering these instruments, it is important to note that a number of factors will control overall supply of allowances regardless of any additional control:

- **The cap** – by removing emissions allowances for GGRs and therefore maintaining the gross cap, the total supply of allowances will remain the same, setting an upper bound for how many GGRs can enter the UK ETS.
- **Voluntary markets** – by exploring the role of voluntary markets and their potential as a primary market for GGR demand, a level of control could be placed on GGR supply before it enters the market.
- **Market participation requirements** – the market participation criteria that the Authority establishes for GGRs to enter the UK ETS will ensure that only a supply of robust and high quality GGRs will be able to enter the market.

The Authority would also like to gather evidence on whether controls could be used in any other way to those set out above.

30. Do you agree with the Authority's assessment that, by maintaining the gross cap on emissions, additional controls could be used to target wider impacts but not mitigation deterrence?

31. To what extent will GGR operators seek to sell into voluntary markets and will this provide a control on GGR supply entering the UK ETS?

32. Should the Authority consider the use of demand controls to target any impacts other than mitigation deterrence?

33. Do you agree with the Authority's minded to position to adopt supply controls to target other objectives, such as phasing GGR integration or addressing market impacts? Please consider how supply controls can be used in a way that is compatible with providing a strong demand signal for GGRs.

Timing of integration

Proposal: The Authority has not made a decision on timing and would like to gather further evidence. The Authority believes that the earliest date that the UK ETS could be ready to integrate GGRs is from 2028 onwards, but an appropriate date may be later depending on the evidence gathered through consultation.

Rationale for proposed approach

We believe 2028 is the earliest feasible integration date due to a number of factors, including:

- The development of methodologies and standards (including MRV) and capability for engineered GGRs and their integration into UK ETS frameworks. The Authority will work alongside the UK Government's development of methodologies and standards for engineered GGRs to ensure operability within the UK ETS
- The need for further consultation on any technical aspects of integration and making the necessary legislative changes to account for GGR integration.

- Updating delivery systems, such as the UK ETS registry and the METS (Manage Your UK ETS) reporting service to account for GGR operators and the allowances from GGRs entering the market.
- Preparing and resourcing regulators to take on new functionality for GGR operators and methodologies and standards (including MRV).
- Possible new auctioning of allowances, depending on the outcome of the policy proposals set out in 'Allowance design for GGRs' section.

Integration from 2028 is the earliest feasible date and does not necessarily mean an influx of GGRs allowances from then. The supply of GGRs will be related to a number of factors that will affect some engineered GGR deployment in the UK, including dependencies on the CCUS cluster programme for some engineered GGR technologies, and deployment of GGRs via business models. The Climate Change Committee recommended that engineered GGRs are only fully integrated once the technologies have matured and there are multiple facilities operating.⁴⁹ The UK Government's Net Zero Strategy does not show engineered GGRs being deployed at scale until the mid to late 2020s and, should woodland be integrated into the UK ETS, the proposals set out in 'Allowance design for GGRs' section on ex-post crediting would mean that there would be a time delay until allowances were awarded to eligible projects. Later implementation of GGRs could mean a higher supply of GGRs entering the UK ETS at the beginning of integration, although this could be mitigated by any additional controls should they be set by the Authority.

If the Authority decides to include woodland in the UK ETS, it will also need to consider the tree planting eligibility date. If the Authority decides to integrate woodland into the UK ETS from 2028 or any date following, eligibility dates for new tree planting under the UK ETS would likely be earlier than the integration date. This is to factor in the time lag between planting and carbon sequestration, and to avoid any disincentive to planting trees in any potential intervening period until the UK ETS is ready for GGR integration. The Authority would set this out as part of any future decisions around integration, taking into account any potential changes that may need to be made to the Woodland Carbon Code framework. If the Authority does not decide to integrate woodlands in the UK ETS, woodland planted and registered with the WCC will remain eligible to sell carbon to the voluntary carbon market.

It may be beneficial to align integration of GGRs with other developments in the UK ETS. For example, the scope of the UK ETS is expanding to waste incineration and energy from waste in 2028. There is the potential for waste management facilities to generate negative emissions through the capture and storage of biogenic carbon. Alternatively, integration could align with Phase II of the UK ETS, beginning in 2031 and the setting of a new net zero consistent cap for that phase. More widely, integration could be timed to align with beginning of carbon budget 6, from 2033. Later integration could enable GGR operators to maximise demand from voluntary markets, minimising the cost of reducing auction revenues through cap policy, and enabling GGR technologies, standards and methodologies to develop further. The Authority believes it is important that any decision around timing balances deliverability with the objective of supporting GGR deployment as much as possible and welcomes evidence on how different timing options would affect these considerations.

⁴⁹ <https://www.theccc.org.uk/publication/letter-development-of-the-uk-emissions-trading-scheme-uk-ets/>

A decision to implement from a chosen date will therefore take into account the relevant dependencies set out above and the evidence submitted by respondents to this consultation, and the Authority will communicate this with the market clearly.

34. What would be the optimal timing for GGRs to be integrated into the UK ETS, taking into account the considerations set out above? Please explain your answer with reference to impacts on both the UK ETS and GGR deployment.

Consultation questions

1. Do you agree with the Authority's principles for policy design?
2. Do you agree the Authority should maintain the gross cap for initial integration of GGRs in the UK ETS (Option 2)? Please explain your answer.
3. How can the UK ETS sustain demand for GGRs in the long-term, taking into account the consideration of setting a new cap (Option 3)?
4. Do you agree that GGR allowances in the UK ETS should be issued ex-post (i.e. after the removal has taken place and been verified)? Please explain your answer.
5. Does the Authority need to consider any additional measures for the UK ETS to ensure GGR operators are able to arrange offtake agreements? If yes, please provide specific details of which measures should be considered.
6. Does the Authority need to consider any specific measures for smaller scale GGR operators, including smaller scale landowners if woodland is included in the scheme? If yes, please provide specific details of which measures should be considered.
7. Who should receive the GGR allowance? Please consider whether this would also apply for GGRs that involve multiple actors in the value chain and provide examples.
8. Should allowances from GGRs be differentiated from UKAs and, if so, how?
9. Do you think that differentiated GGR allowances would attract a higher price than existing emissions allowances and why? To what extent does this depend on the degree of differentiation (e.g. a generic GGR allowance versus a technology specific GGR allowance)?
10. Will differentiated GGR allowances encourage non-compliance or non-trading entities to purchase these allowances?
11. What should the Authority's role be in facilitating a route to market for allowances from GGRs?
12. Do you agree that allowances should only be awarded to UK-based GGRs? We welcome views from all stakeholders including sector-specific considerations. Please explain your answer.
13. Do you agree with the proposed permanence framework of both a minimum storage period, a liability measure and a fungibility measure? Please explain your answer.
14. What minimum storage period duration should the Authority set for GGRs entering the UK ETS? Please explain your answer.
15. How should the Authority manage potential reversal events from GGRs? Please consider the liability options outlined above, whether any options exist that have not been considered, and how the potential liability options could be used together or in sequence.
16. Where should the liability for any re-release of stored emissions apply if there are multiple actors in the GGR value chain?

17. Should the liability measure differ if the GGR is also subject to a fungibility measure? For example, if the reversal event was avoidable (i.e. within the control of the GGR operator) or unavoidable (i.e. due to factors outside of control of GGR operator).
18. Should the Authority use a buffer pool or equivalence ratio?
19. How could the Authority set the contribution rate for a buffer pool? Should this be a flat rate contribution across all applicable projects, or should this vary per project?
20. Which factors should be considered when determining the appropriate contribution rate for a buffer pool?
21. How should the Authority decide which GGRs would be required to contribute to a buffer pool and at what level any threshold should be set for contributions?
22. Should buffer pool contribution rates remain fixed over time or could they vary? If they vary how should this be assessed? For example, the Authority could require projects to contribute depending on an assessment of risk at each verification period, and this could change over time.
23. How could the Authority design equivalence ratios?
24. Which inputs should be used in determining the appropriate equivalence ratios?
25. Should these equivalence ratios be fixed over time or regularly reviewed and amended?
26. Should new ex-post woodland units generated in line with UK Woodland Carbon Code standards be considered for inclusion in the UK ETS? Please base your response on the evidence outlined around permanence, costs and wider land management impacts, and on the policy options outlined in the rest of this consultation.
27. If the Authority does include new ex-post woodland units generated under the UK Woodland Carbon Code in the UK ETS, should any changes be made to the Woodland Carbon Code? For example, this could include changing the 20% flat-rate buffer contribution, or changes to the MRV and measures to mitigate wider land management impacts. Details of the woodland carbon code can be found here: <https://woodlandcarboncode.org.uk/standard-and-guidance>
28. If the Authority does include new ex-post woodland units generated under the UK Woodland Carbon Code in the UK ETS, should any measures be taken to mitigate potential social and cultural impacts? Please provide details of the impacts, including consideration of impacts on different land ownership models, and potential measures.
29. Do you agree with the Authority's assessment of peatland restoration?
30. Do you agree with the Authority's assessment that, by maintaining the gross cap on emissions, additional controls could be used to target wider impacts but not mitigation deterrence?
31. To what extent will GGR operators seek to sell into voluntary markets and will this provide a control on GGR supply entering the UK ETS?
32. Should the Authority consider the use of demand controls to target any impacts other than mitigation deterrence?

33. Do you agree with the Authority's minded to position to adopt supply controls to target other objectives, such as phasing GGR integration or addressing market impacts? Please consider how supply controls can be used in a way that is compatible with providing a strong demand signal for GGRs.

34. What would be the optimal timing for GGRs to be integrated into the UK ETS, taking into account the considerations set out above? Please explain your answer with reference to impacts on both the UK ETS and GGR deployment.

Next steps

The responses to this consultation will be used to develop final policy decisions for the integration of GGRs. The consultation will be open for 12 weeks before closing. The Authority will work through all responses and aim to publish a response in due course.

This consultation is available from: www.gov.uk/government/consultations/integrating-greenhouse-gas-removals-in-the-uk-emissions-trading-scheme

If you need a version of this document in a more accessible format, please email alt.formats@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.