



UK Emissions Trading Scheme: Non-pipeline transportation of carbon dioxide

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: 23 January 2025

Introduction

The UK Emissions Trading Scheme (ETS) came into operation on 1st 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'), and 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 play a key role in reaching net zero targets, while supporting businesses in the transition. This included a consultation to recognise non-pipeline transport of CO₂ to geological storage in the ETS.

In the July 2023 Authority Response, the Authority confirmed its intention to recognise NPT by enabling UK ETS participants who use NPT for CO₂ storage purposes to make carbon subtractions.

The environmental principles, as set out in the Environment Act 2021, are embedded within the policy logic of UK Emissions Trading Scheme (ETS). The UK ETS is our principal mechanism for pricing the 'carbon externality' that greenhouse gas emissions represent, in line with the polluter pays principle. Expanding the scheme to new sectors and technologies will increase the coverage of the scheme and capture more emissions and should lead to positive decarbonisation outcomes for the sector.

The purpose of this consultation is to provide more detail and consult on the regulatory framework for the recognition of NPT in the ETS.

Respondents need only reply to the questions that interest them or that they have views on. There is no requirement or expectation to respond to every question in this consultation

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General information

Why we are consulting

The UK ETS Authority is seeking feedback on a proposed regulatory framework which will enable emitters sending CO₂ to permanent storage via non-pipeline transport (NPT) to deduct the amount of permanently stored CO₂ from their UK ETS allowance surrender obligations.

Carbon Capture and Storage (CCS) will be crucial for the UK to meet its net zero targets, especially for sectors such as steel, cement, and chemicals that lack alternatives for deep decarbonisation. Sites without direct pipeline connections will require NPT to access CCS, sending CO₂ by road, rail, or ship. However, the UK ETS currently lacks a framework for operators to deduct CO₂ transported to storage via such methods from their reportable emissions.

The purpose of this consultation is to propose a regulatory framework that will allow for UK ETS deductions of permanently stored CO₂ that is transported via NPT. The consultation proposes options and seeks views on the approach outlined, with particular focus on:

- The Authority's regulatory model for NPT and UK ETS requirements for participants in NPT value chains.
- The regulation of transport emissions.
- The treatment of CO₂ transporting ships.
- The regulation of intermediate storage sites.

Consultation details

Issued: 28 November 2024

Respond by: 23 January 2025

Enquiries to:

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

Email: ukets.consultationresponses@energysecurity.gov.uk

Consultation reference: UK Emissions Trading Scheme Scope Expansion: Non-pipeline transportation of carbon dioxide

Audiences:

The consultation seeks views from:

- Companies proposing to offer NPT CCS services, including capture installations, transport operators, intermediate storage sites, and operators of geological stores

- UK ETS installations that are considering the use of NPT CCS.
- Any other potential participants in the NPT value chain.
- Experts, academics, and organisations in the third sector with views on our proposed approach.
- Verifiers and technical experts on monitoring, reporting and verification (MRV).
- Any other stakeholders with interest on our CCS/NPT policy proposals.

Territorial extent:

This consultation relates to proposals to develop 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/non-pipeline-transport-methods-for-co2-storage/>

or

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

Write to:

Emissions Trading
Department for Energy Security and Net Zero
Third 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

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).

Consultation responses will be shared across the UK ETS Authority and may be shared with other government departments, such as the Department for Environment, Food and Rural Affairs.

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

UK ETS: Carbon Capture and Storage (CCS)

CCS will be essential to meeting net zero targets across the UK. For sectors such as steel, cement, and chemicals, which lack viable alternatives to achieve deep decarbonisation, CCS will be key to transforming emissions profiles and will help to create world-leading low-carbon manufacturing clusters.

To achieve the desired level of CCS deployment envisaged in projected decarbonisation pathways, it is essential to design a framework that supports the creation of a sustainable and viable market for CCS. The UK ETS is instrumental in driving growth in this market by enabling installations to deduct CO₂ that they emit, capture, and send onwards towards permanent geological storage from their UK ETS surrender obligations.

The UK ETS Authority is seeking input from industry and UK ETS participants on how this framework can be further developed to achieve net zero targets across the UK and the aims of the UK ETS.

This consultation sets out proposals for a regulatory model which will enable UK ETS participants to subtract CO₂ sent to permanent storage via NPT from their reportable emissions.

Non-Pipeline Transportation (NPT)

Currently, UK ETS legislation only explicitly allows operators to deduct captured CO₂ from their reportable emissions when it is transferred from their installation via pipeline to another UK ETS installation – such as a capture plant, pipeline network or geological storage site – for the purpose of long-term geological storage. NPT, where CO₂ is moved between installations by means such as road, rail, or ship, is not explicitly referenced in existing legislation. There is therefore a lack of clarity for operators transporting CO₂ to permanent storage via NPT.

The Authority recognises that NPT will be essential to enable CCS for dispersed sites and industrial clusters that do not have easy access to pipelines or local storage sites. To allow these installations to cost-effectively link with transport and storage (T&S) operators, we deem that the UK ETS framework should change to explicitly account for non-pipeline CCS.

In 2022, the Authority consulted on amending the scheme to include NPT of CO₂. 100% of respondents endorsed the proposal. In the Authority Response to the consultation¹, published in July 2023, the Authority confirmed that:

- We will enable UK ETS participants who use non-pipeline transport for CO₂ storage purposes to make carbon subtractions.
- We will explore options for how NPT emissions can be handled through the inclusion of NPT via an appropriate regulatory model.
- We will aim to implement this change by the mid-2020s.

This will require a regulatory framework that can track and account for CO₂ transported via NPT methods, a policy for accounting for transport emissions resulting from NPT journeys, a

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

policy on CO₂ shipping that aligns with the UK ETS Authority’s proposals for expansion of UK ETS to emissions from maritime, and an approach to the regulation of intermediate and buffer storage of CO₂. We are also consulting on approaches to, and controls on, the mixing of CO₂ from multiple points of origin during NPT journeys, and the point at which UK ETS obligations for NPT CO₂ should transfer from one installation to another.

Executive Summary

This consultation sets out the following options and positions:

<p>General NPT Regulatory Framework</p>	<ul style="list-style-type: none"> • A minded-to position that NPT land transport operators are not directly regulated by the UK ETS (i.e. that land transport of CO₂ itself is not made a regulated activity under the scheme), and so UK ETS responsibility for CO₂ remains with the stationary installation from which NPT CO₂ is being transported, until that CO₂ reaches another UK ETS regulated stationary installation (e.g. a regulated CO₂ transport and storage site, or the installation permanently storing the CO₂). • A call for views on the alternative approach: making NPT transport a regulated activity under the UK ETS.
<p>Transport emissions</p>	<ul style="list-style-type: none"> • We are considering an approach to account for emissions produced as part of capturing transporting and storing carbon dioxide by exploring options to calculate transport emissions for road, rail and shipping journeys below the UK ETS Maritime threshold (5000GT) via a single or range of emissions factors. • A call for views on the merits of high-level vs detailed emissions factors. • A call for views on the likely direct and compliance costs of the above approach, and on the possibility of leaving transport emissions uncoded.
<p>Alignment with UK ETS policy for maritime emissions</p>	<p>Three approaches are presented:</p> <ul style="list-style-type: none"> • Alignment with UK ETS maritime approach without additional requirements. CO₂ transporting ships would be treated identically to any other UK commercial shipping. Ships over the maritime threshold for inclusion in the UK ETS would monitor, report, and verify (MRV) emissions and surrender allowances for fuel use, but would not have any additional permitting requirements. • Alignment with UK ETS maritime approach, but with additional requirements on CO₂ transporting ships above the maritime threshold, requiring operators to report in/out flows of CO₂ and surrender allowances for any losses/fugitive/vented CO₂. • Making transport of CO₂ by ship a regulated activity. Under this approach, all CO₂ transporting ships would require specific ETS permitting, with no minimum size threshold. They would be

	<p>regulated similarly to other CO₂ T&S network operators and would be responsible for ensuring transported CO₂ complied with network codes. Shipping operators would have to MRV and surrender allowances for any losses, any fugitive CO₂, any venting, and any transport emissions.</p>
<p>Intermediate storage</p>	<p>Three alternative approaches are proposed:</p> <ul style="list-style-type: none"> • Intermediate stores are not made UK ETS installations, the original emitters or capture plants retain custody of CO₂ whilst in intermediate stores, and estimates are used to assign responsibility for CO₂ as it passes through the storage chain. • Full regulation of all intermediate stores, where any site providing storage services as part of an NPT supply chain would require a UK ETS permit, assume responsibility for CO₂, MRV emissions, and surrender allowances for any losses, being treated analogously to a node in the CO₂ T&S network for ETS purposes. • Mixed regulatory approach, whereby complex intermediate stores that process CO₂ from multiple UK ETS installations are regulated and require UK ETS permits as above, whilst simpler stores that only process CO₂ from a single UK ETS installation have the option of simpler regulation. For such stores, the UK ETS installation using the store would retain UK ETS obligations for the CO₂ whilst in transit and in the store. With only one installation involved, this would ensure clear responsibility for CO₂, and there should be a strong incentive to ensure effective processing, as they would be accountable for any losses, venting and non-compliant CO₂.
<p>UK ETS obligation transfer - mixing of CO₂</p>	<ul style="list-style-type: none"> • An approach to obligation transfer and mixing of CO₂ that mirrors the third approach to intermediate storage above – CO₂ from multiple installations can only be mixed at UK ETS-regulated installations, and those installations take over UK ETS obligations for CO₂ transferred into their boundaries. • Alternatively, for obligation transfer: UK ETS installations transporting CO₂ via NPT can only deduct it from their surrender obligations once they can demonstrate that this CO₂ has reached the T&S pipeline network and geological storage. • Alternatively, for mixing of CO₂: EITHER restriction of mixing, strengthening the tracking of NPT CO₂ by requiring it to be transported in sealed standardised containers, OR unregulated mixing, using rules of thumb to track CO₂, and sharing risks/obligation between all originating installations.
<p>Greenhouse Gas Removals (GGRs)</p>	<ul style="list-style-type: none"> • A call for views on interactions between our proposed NPT policy and GGRs.

UK ETS Cap	<ul style="list-style-type: none">• A minded-to position that our NPT policy will not require an adjustment to the UK ETS cap.
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General Regulatory Framework

The Authority has considered implementation methods for the integration of NPT into the UK ETS. This has required building options for a specific model that accounts for CO₂ emissions during transport, regulation of intermediate/buffer storage, treatment of CO₂-transporting ships, and the possible mixing of CO₂ from multiple installations. We will also have to consider how and when UK ETS responsibility and burden to surrender allowances will transfer for NPT CO₂, and our approach to MRV of CO₂.

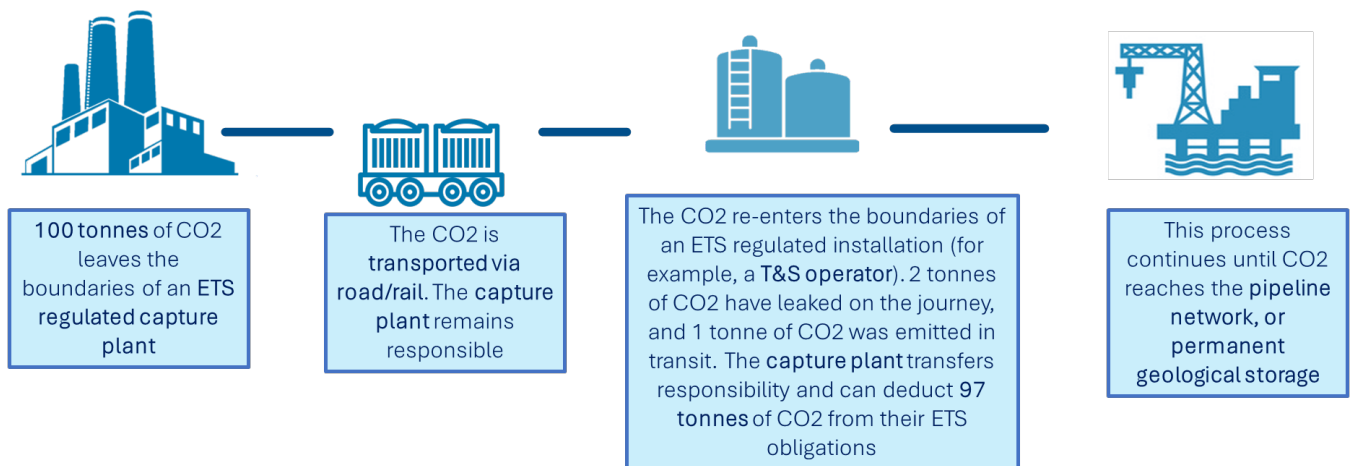
The Authority recognises that NPT-enabled CCS is an emerging technology. The proposed regulatory model is intended to enable UK ETS oversight of the NPT process, and to allow operators to make UK ETS deductions with full confidence that CO₂ has been transferred to storage. We will keep the model under review and may consult on further changes as the market and technology matures.

We have considered the possibility of making transport of CO₂ via NPT methods a specific UK ETS-regulated activity. However, our proposed regulatory model does not take this approach. We do not propose that operators moving CO₂ via NPT methods should require a UK ETS permit for the act of transport, nor that they be required to MRV emissions. Instead, the permitting and MRV burden will remain with the last installation in the NPT chain. This avoids the complexities involved in permitting and regulating transport operators, and the concomitant expansion of UK ETS obligations onto parts of the land transport sector, the impacts of which have not yet been explored.

Under this regulatory model, once NPT CO₂ leaves the boundaries of an UK ETS-regulated stationary installation, it will remain the responsibility of that installation until it re-enters the UK ETS. The responsible installation will have to MRV the quantities of CO₂ leaving its site and will be required to account for fugitive and, potentially, transport emissions during the journey. Delivery will be recorded when the CO₂ reaches another UK ETS-regulated stationary installation, which will then assume UK ETS responsibility for the CO₂. This installation will MRV the quantity of CO₂ received, and the difference between CO₂ sent and CO₂ received will be used to calculate fugitive emissions.

The originating installation will be able to deduct the amount of CO₂ that arrives at the receiving installation from its surrender obligations, less any fugitive emissions, and (depending on the Authority's final agreed policy), less any transport emissions not already captured by the UK ETS. A system of custody certificates, similar to those used for chain-of-custody in waste transport, would likely be required to track the installation responsible for in-transit CO₂.

Figure 1: NPT Model in practice (road/rail, assuming transport emissions are costed)



Questions:

- 1) What are your views on the proposed regulatory framework? You may wish to consider: the choice not to make NPT of CO₂ a regulated activity; the metering, monitoring, or permitting implications; the approach to fugitive emissions, and any other practical implications.**
- 2) Are there any issues or concerns, not set out in our proposals, that the Authority should consider or address in order to enable this framework? Please provide detail/evidence where appropriate.**

Treatment of Transport Emissions

We do not intend to make road and rail transport a regulated activity. A stationary installation from which CO₂ is transported via road or rail will remain responsible for the CO₂ and related emissions until it arrives at another UK ETS-regulated installation. Land transport operators will not have to seek permits or directly MRV their transport emissions.²

We are considering to account for emissions that are produced as part of capturing, transporting and storing CO₂ in the treatment of NPT under the UK ETS, to ensure balance between the UK ETS benefits associated with CCS (i.e. the ability to subtract permanently stored CO₂ from surrender obligations) and the net CO₂ emissions resulting from the transport. We also believe that carbon pricing transport emissions will help incentivise the use of lower-carbon transport methods. For this reason, we propose that operators should determine the emissions from transporting a unit of stored CO₂ and deduct these from the total quantity of CO₂ that they can report as stored via NPT. The amount of CO₂ that operators could deduct from their UK ETS surrender obligations would therefore be reduced by the calculated transport emissions associated with the NPT journey.

² The transport emissions of shipping operators may be captured under the UK ETS Authority’s proposals for the regulation of maritime emissions – see below.

For simplicity, we propose calculating the CO₂ emissions from road and rail NPT using distance-based emissions factors, as opposed to more rigorous but onerous MRV (e.g. direct monitoring of fuel use). We will work with industry and technical experts to develop appropriate emissions factors, which are likely to be similar to those used for existing emissions statistics and reporting. For more detail, please see section “Choice of Emissions Factors” below – we invite comment from stakeholders on possible emissions factors and on our assumptions.

To simplify the calculation of transport emissions, we propose that emissions factors be based on tonne-kilometre calculations, covering the emissions caused by moving 1 tonne of CO₂ for 1 km via NPT (i.e. transport emissions, per tonne of CO₂ transported, per km travelled).³ Installations can then multiply their total NPT exports in tonnes by the journey distance to a particular delivery point to calculate their liability. As an illustrative example, using fictional, round figures for ease, if an installation transported 100 tonnes of CO₂ a distance of 100 km to a storage site via rail-based NPT, and the transport emissions factor for this kind of journey was determined to be 0.01 tonnes per tonne.km, the installation would only be allowed to deduct 99 tonnes from its reported emissions; i.e. 100 tonnes – (100 km x 0.01 tonne.km) = 99 tonnes.

In 2020, the Welsh Government conducted a study⁴ indicating that the total costs of NPT for the South Wales Industrial Cluster would be between £100 and £345 per tonne of CO₂ stored. We deem that the per-tonne costs of transport emissions for typical NPT journeys are unlikely to be disproportionate when compared to the overall costs of conducting NPT. See the Analytical Annex for example calculations of costs using indicative emissions factors.

Responses to the Developing the UK ETS consultation raised concerns that carbon pricing of transport emissions might impose undue costs and burdens on operators who will rely on NPT. We will therefore consider the possible cost impact of these proposals, particularly when considering the overall policy in line with pipeline CCS to ensure both are viable and incentivised. We welcome evidence of the potential impact as part of responses to this consultation.

Options for the application of emissions factors for road and rail transport

We believe that there are three possible approaches for the application of emissions factors:

Option 1	Apply a single tonne-kilometre emission factor for road transport, and a single factor for rail – likely based on estimated emissions from a loaded HGV for road, and average tonne-kilometre emissions for diesel freight for rail.
Option 2	Allow a range of emissions factors – for example, emissions factors could take the fuel used into account or zero-rate electric trains/HGVs. This would require UK ETS installations to retain evidence, following an MRV process, to prove that the correct emissions factor was used.
Option 3	Do not apply emissions factors and leave transport emissions uncoded.

³ For example, if an operator moved 10 tonnes of CO₂ for a 10km distance, this journey would constitute 100 tonne-kilometres. If this process released 5 kg of CO₂, then the emissions per tonne-kilometre would be 5kg/100 = 0.05 kg CO₂/tonne km.

⁴ <https://www.gov.wales/sites/default/files/publications/2021-10/a-carbon-capture-utilisation-and-storage-network-for-wales-report.pdf>

Option 1 meets the objectives of costing transport emissions – it ensures that emissions produced by CCS are captured in the UK ETS, and as road transport would result in higher emissions per tonne.km, there would be an incentive via the UK ETS for the use of lower carbon methods (i.e., rail, with lower tonne.km emissions, would have lower transport costs). It would also be significantly simpler from a compliance perspective, as operators would only have to demonstrate the total quantity of CO₂ transported over a reporting period to a particular delivery point over a set distance and prove whether rail or road NPT was used.

Option 2 provides a greater incentive for the use of low-carbon transport and rewards operators who chose to decarbonise their transport chain. It recognises the decarbonisation benefits of electrification of road and rail transport. However, it would require more stringent MRV – operators would have to demonstrate exactly which vehicle/fuel was used for each NPT journey, and verifiers/regulators would have to be satisfied that this information was accurate.

Choice of Emissions Factors

We propose that a single emissions factor for road transport, as with Option 1), could be based on:

- The [Government Conversion Factors for company reporting of greenhouse gas emissions database](#).⁵ In this instance, the sheet would be *SECR kWh pass & delivery vehs*, the vehicle type would be *HGV (all diesel)*, *All HGV*, and the kWh emissions factor would be the *tonne.km* value for *100 % Laden* (Cell G94). The fuel, from the *Fuels* sheet, would be *Diesel (Average Biofuel Blend)*. This leads to a figure of 0.07kg CO₂/tonne.km).
- [UNFCC emissions factors](#)⁶ for *All HGV* (See sheet *Owned Vehicles*, Cell K14) in kg/km, divided by the average load of a road-base CO₂-transporting HGV (which, based on a [2021 study](#)⁷ would start at 20 tonnes), leading to a tonne.km value of 0.04 kg CO₂/tonne.km
- Other recognised emissions calculators, such as [COPERT](#).

Detailed emissions factors for road transport, as with Option 2), could account for biofuel content of diesel, engine size/overall size of HGVs, balance of motorway, urban and rural driving, average load of the HGVs, and use of hybrid/electric/hydrogen-fuelled HGVs. We believe that such detailed factors could be drawn from existing emissions calculators, but we seek the views of respondents on this.

We propose that a single emissions factor for transport of CO₂ by rail, as with Option 1), could be based on:

- [Office of Road and Rail statistics](#)⁸ for average tonne.km emissions for UK rail freight (0.026 kg CO₂/tonne.km), or the similarly derived figures in the [Government Conversion](#)

⁵ <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023>

⁶ https://unfccc.int/sites/default/files/resource/GHG_emissions_calculator_ver01.1_web.xlsx

⁷ [A CARBON CAPTURE, UTILISATION, & STORAGE NETWORK FOR WALES](#), Welsh Gov, 2021,

⁸ <https://dataportal.orr.gov.uk/statistics/infrastructure-and-emissions/rail-emissions/> . See also [Table 6110](#)

[Factors for company reporting of greenhouse gas emissions database](#)⁹ (0.027 kg CO₂/tonne.km)

- The fuel use for CO₂ trains as calculated in a [2020 HMG study on CCS at dispersed sites](#)¹⁰, multiplied by the emissions factor for diesel in the above Conversion Factors dataset (0.01 kg CO₂/tonne.km)
- The [UNFCCC emissions factor](#)¹¹ for *Rail – Freight Train* (See sheet *Freighting Goods*, Cell K.10) in tonne.km (0.03 kg CO₂/tonne.km)

If we chose to apply detailed emissions factors for rail-based NPT, as with Option 2), this could entail zero-rating electric (or, in future, hydrogen-powered) freight, and applying one of the above factors to diesel freight only. We could also take the average load of NPT freight trains into account.

A mixture of Option 1 and Option 2 may also be possible – for example, an operator could either accept a default road/rail emissions factor or could apply for a more detailed/specific emissions factor (which might, for example, allow zero-rating of electric transport), accepting the requirement for more stringent MRV.

We invite comment from respondents on the emissions factors proposed above, including consideration of which, if any, might be most or least appropriate, with reasons. We also invite views, with any relevant detail, on other appropriate emissions factors.

Option 3 does not capture the UK ETS Authority’s objectives regarding transport emissions in the NPT supply chain, but it does reduce compliance costs. We have already proposed to cost transport emissions in the Authority Response to the Developing the UK ETS consultation. We are however interested in receiving evidence from respondents on the possible costs of compliance and the accuracy of our assumptions.

We note that further work is needed to understand the scale of costs related to NPT to incentivise the investment in CCS as a decarbonisation technology, and we are committed to further exploration of these issues. We may also consider phasing the introduction of transport emissions factors, depending on the quality of evidence and scale of evidenced impacts submitted in response to this consultation.

At this stage, we do not propose to track or apply an emissions factor to return journeys, or to other distances covered by empty road or rail vehicles in the NPT supply chain, due to the complexities involved and the possibility of inaccurate measurement.

Questions:

- 3) Between Option 1 and Option 2, which is your preferred approach? Please give reasons for your answer. You may wish to consider decarbonisation benefits, MRV/compliance implications, and possible impacts on accessibility of NPT.**

⁹ <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023> , see “Freighting goods” Cell E106

¹⁰ [CCS at Dispersed Sites](#), BEIS, 2020, p. 65

¹¹ https://unfccc.int/sites/default/files/resource/GHG_emissions_calculator_ver01.1_web.xlsx

- 4) **What are your views of the merits of Option 1/Option 2 vs Option 3? Please provide as much detail as possible on direct and associated costs of our proposed approaches to transport emissions, in the context of the overall costs of NPT journeys.**
- 5) **What are your views on the possible emissions factors we propose for road and rail? If you would suggest any alternative emissions factors, please detail them and explain your preference. If you have views on the considerations that the specific emissions factors for road/rail for Option 2 might take into account, please share them here.**

CO₂ transported via ships

In the Authority’s response to the Developing the UK ETS Consultation, we committed to expanding the UK ETS to include emissions from maritime from 2026, and we outlined that we were minded-to apply the scheme to vessels over 5000GT. For reference, please see the [UK ETS Authority’s Consultation on Maritime](#).

Our evidence, including that submitted as part of the last consultation, suggests that most ships transporting CO₂ will be above this 5000GT threshold. Under the Authority’s proposals for the regulation of maritime vessels, the emissions from these ships would be covered by the UK ETS. We are aware that barge-based NPT is also being considered, and we welcome information from respondents on the likely size of these vessels with regard to the 5000GT threshold.

We are consulting on three options for the regulation of CO₂ transported via ships:

<p>Option 1: align with existing UK ETS maritime proposals without additional requirements</p>	<p>Ships over the UK ETS maritime threshold (5000GT) would have their transport emissions covered under the proposed UK ETS maritime regime. They would have to MRV based on their fuel use but would have no additional UK ETS responsibilities for NPT purposes. CO₂-transporting ships would be treated analogously to road/rail transport for NPT purposes: they would not have UK ETS responsibility for the CO₂ they carried, which would remain with the last UK ETS-regulated stationary installation, until delivered to the next ETS installation in the chain.</p> <p>Ships under the UK ETS maritime threshold would not be directly regulated by the UK ETS, and we could explore the option of costing their transport emissions via emissions factors (see below), with the last onshore UK ETS installation responsible for these emissions.</p>
<p>Option 2: Alignment with existing UK ETS maritime proposals, but with additional MRV requirements</p>	<p>Under this approach, ships over the UK ETS maritime threshold would have to comply with fuel based MRV requirements as per the UK ETS maritime proposals. They would also be required to MRV in and out flows of CO₂ to the ship, and surrender allowances for any differences between CO₂ transferred in, and CO₂ transferred out, making them responsible for any fugitive, vented and lost CO₂.</p>

	<p>Installations transferring CO₂ to a UK ETS-regulated ship would be allowed to deduct that CO₂ from their surrender obligations.</p> <p>Ships below the UK ETS maritime threshold would be treated as per Option 1 above.</p>
<p>Option 3: Regulate transport of CO₂ by ship by creating a new regulated activity</p>	<p>Under this approach, transport of CO₂ by ship would be made a regulated activity under the UK ETS. All ships transporting CO₂ for CCS purposes would require a specific UK ETS permit for this activity, with a specific emissions monitoring plan. This would be additional to any UK ETS maritime permitting. Ships would have to MRV and surrender allowances for any fugitive/transport emissions. There could also be additional requirements to maintain and ensure the purity/compliance of CO₂, in line with network codes. There would be no threshold, and ships above and below 5000GT would have compliance obligations.</p> <p>Ships would be regulated similarly to other nodes in the CO₂ T&S network. As above for Option 2, installations transferring CO₂ to an ETS-regulated ship would be allowed to deduct that CO₂ from their surrender obligations.</p>

Questions:

- 6) **What are your views on each of the options presented for the regulation of CO₂ transporting ships? Please consider the practicalities of each approach and the impact of any compliance burden. If there are any emissions associated with the storage, transport and processing of CO₂ by ship that you believe either option would not capture, please highlight this in your answer.**
- 7) **Please highlight if you have a preferred option, and the reason for this preference.**

Transport emissions of ships below the UK ETS Maritime threshold

Current UK ETS maritime proposals do not propose to cover emissions from ships of less than 5000GT upon implementation in 2026, although the UK ETS Maritime consultation proposes that this threshold will be subject to review.

If the Authority chooses to proceed with emission-factor based costs for CO₂ transported via all road and rail journeys (see above), the approach to shipping should be consistent with this. This would mean that a carbon price should be paid on all shipping emissions, not just those on ships above the UK ETS maritime threshold.

If we follow Option 1 or Option 2, above, transport emissions from ships below 5000GT would not face a carbon price. To enable carbon pricing, we suggest their obligation could be calculated using emissions factors.

To minimise burden on operators, we propose a high-level emissions factor, as opposed to one based on measured fuel use. We therefore propose a tonne-kilometre based emissions factor. We seek views from respondents on this approach, and on

possible emissions factors for CO₂-transporting ships.¹² Depending on evidence provided in response to this consultation, the Authority may commission a study to develop an appropriate set of factors to use for CO₂ transport via ships. Questions:

- 8) What are your views on the proposal to apply a tonne.km based emissions factor to the emissions of CO₂-transporting ships which are below the proposed UK ETS Maritime threshold of 5000 GT?**
- 9) What are your views on the possible emissions factors we propose (see footnote 12)If you would suggest any alternative emissions factors, please detail them and explain your preference.**
- 10)What proportion of CO₂-transporting ships, in your view, will be <5000GT? What sorts of journeys would such ships conduct?**

Emissions from ships collecting CO₂ from more than one store or port

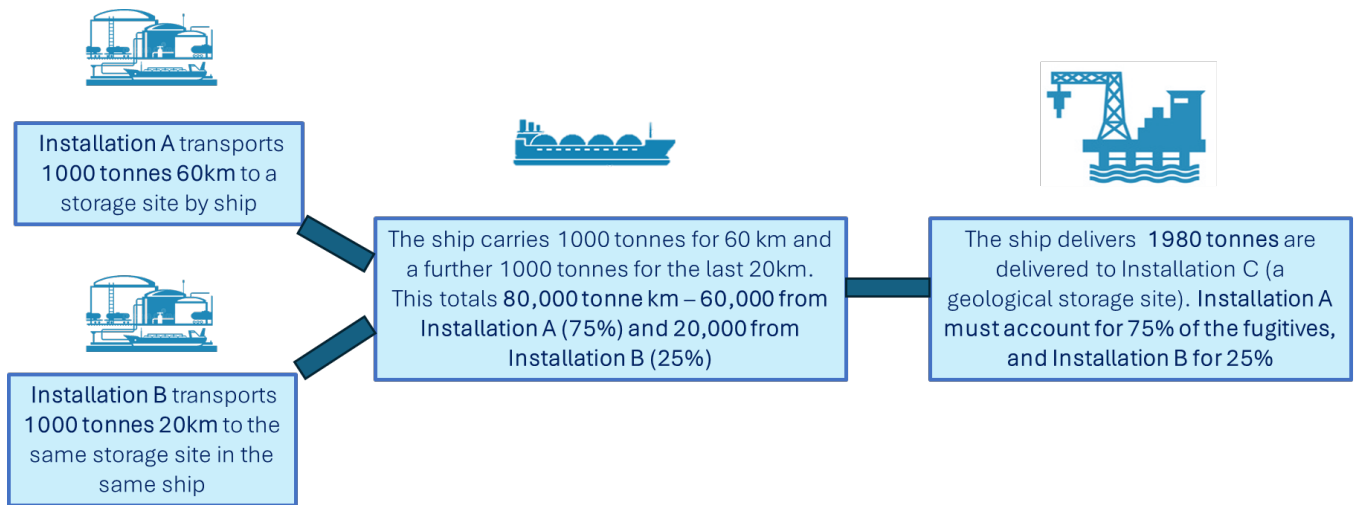
We envisage circumstances in which a ship might collect CO₂ from more than one port, before continuing to its final destination (either an onshore facility where CO₂ might be deposited for future pipeline and non-pipeline transport, or an offshore node in the T&S network). If the Authority chooses to pursue Option 1 for shipping (see above), CO₂-transporting ships will have no UK ETS responsibility for on-board CO₂.¹³ Responsibility would remain with the last onshore installation whilst the ship was at sea. Under this approach, during a multi-port journey, more than one UK ETS installation could be responsible for the CO₂ on the ship. To share responsibility for any fugitive or vented emissions in these circumstances, we propose a proportionate tonne-kilometre based approach.

Per our proposals for intermediate storage (see below), the final delivery point for CO₂ and any pick-up points would likely be either UK ETS regulated, or the responsibility of a single UK ETS installation, and would therefore be able to assume responsibility for any CO₂ received.

¹² This could include consideration of whether any of the emissions factors quoted for tankers in the “Freighting goods” sheet of the [Government Conversion Factors for company reporting of greenhouse gas emissions database](https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023) would be appropriate: see <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023> “Freighting goods”, rows 11-134

¹³ This could also be the case for Option 2 if a ship below the UK ETS maritime threshold conducted a multi-port journey.

Figure 2 – Responsibility and allowance surrender for ships collecting CO₂ from more than one port



Ship-to-Ship transfers

If we pursue Option 1,¹⁴ we propose that where NPT CO₂ is directly transferred from one ship to another:

- The quantity of CO₂ transferred be recorded.
- The originating onshore installation retains responsibility for the CO₂.
- The journey from that point onward be treated analogously to a multi-port journey, as above.

We understand that ships conducting NPT would already have the metering and recording capacity to follow the above processes.

Question:

- 11) What are your views on our proposed approach to multi-port journeys? Do you believe it will be achievable without imposing additional MRV/metering requirements on CO₂-transporting ships? Please explain your answer and provide evidence where possible.

Intermediate Storage

Intermediate storage refers to a temporary storage phase during the transportation or handling process of CO₂. Intermediate stores may act as holding areas for CO₂ before it leaves a capture plant, or before transfer into the T&S network or storage site, or they may act as a buffer during the capture, transport and storage process. They may also be used to facilitate transfer between transport types including, for example, at port facilities, to store CO₂ moved by road, rail or to local pipelines before loading onto CO₂-transporting ships.

¹⁴ Or, under Option 2, where NPT CO₂ is transferred between two ships below the UK ETS maritime threshold.

Existing UK ETS legislation already regulates emissions from intermediate storage facilities at capture plants and in the pipeline network.¹⁵ We deem this to be adequate to ensure that all emissions from storage in these facilities will be captured by the UK ETS. However, intermediate storage during NPT journeys is not currently captured.

NPT intermediate stores will receive, process, and store CO₂, before it is loaded onto road, rail, or ship-based transport, or transferred into a UK ETS regulated facility. As NPT transit chains may involve multiple transport modes and transfer points, a unit of CO₂ might pass through several intermediate storage points during an NPT journey.

During storage and transfer, CO₂ must remain compliant with T&S network codes (such as purity requirements), and quantities transferred will need to be monitored (e.g. via mass-balance measurement) to track fugitive emissions. Some stores will hold CO₂ from multiple installations and, in these cases, we will need to determine UK ETS responsibility for the CO₂.

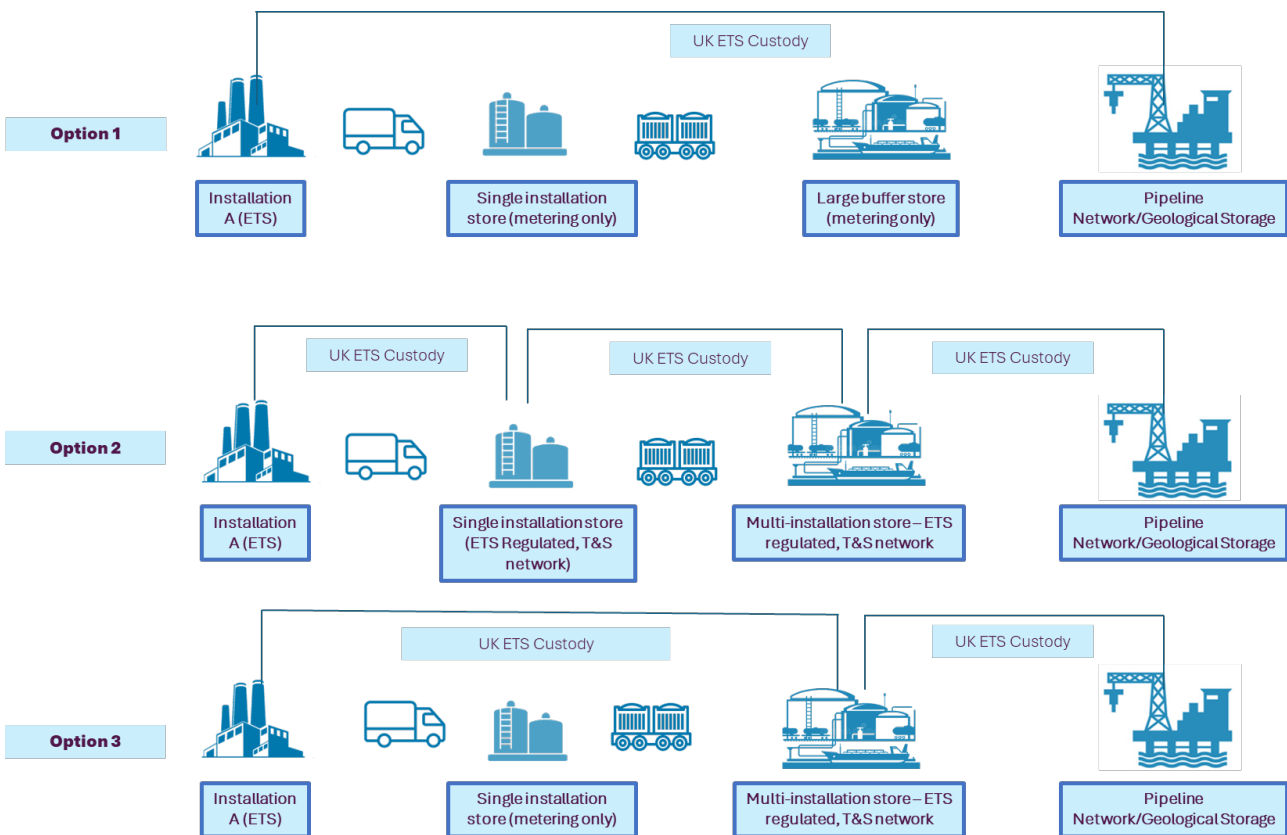
To achieve this, the Authority is considering three approaches to the regulation of intermediate storage, and we are consulting on these three options:

<p>Option 1: ‘Light touch’ regulation with no direct UK ETS responsibility for stores</p>	<p>Limit regulation of stores to in and out flow metering. Do not track or assign responsibility for CO₂ during the NPT journey. Subtractions can only be made once CO₂ arrives at a known final delivery point (i.e. a UK ETS regulated T&S site or geological store).</p> <p>On an annual or quarterly basis, the difference is calculated between the amount of CO₂ that all originating installations have transferred out via NPT, and the amount delivered to the known final delivery point. Each originating installation is allowed to subtract a % of the CO₂ delivered to storage, based on the % of total CO₂ that their installation originally transferred out. Transport emissions from road or rail are assigned in the same way.</p>
<p>Option 2: Full regulation of all NPT storage sites, as if they were in the CCS pipeline T&S Network.</p>	<p>Require metering and purity testing at each transfer point/store. All intermediate stores in the NPT process become UK ETS installations, and so are required to secure permits, conduct MRV, and surrender allowances for emissions. UK ETS responsibility for NPT CO₂ would transfer to a store once the CO₂ was transferred into its installation boundary.</p>

¹⁵ See e.g. [Commission Implementing Regulation \(EU\) 2018/2066, Annex IV, 21](#) for capture plants, and [22](#) for T&S network. The Regulation is applied, with modifications, for the purposes of the UK ETS by article 24 of the Greenhouse Gas Emissions Trading Scheme Order 2020.

<p>Option 3: Use a mixture of light-touch and full regulation, depending on scale/type of storage site, requiring different metering and testing.</p>	<p>Sites that exclusively process CO₂ from a single originating UK ETS installation could either have simple flow metering, or no metering, and they could potentially be included within the permitting requirements of the originating installation. Fugitive and transport emissions could be calculated when the CO₂ was ultimately transferred to the next UK ETS installation in the NPT chain and assigned to the originating installation.</p> <p>Such stores would be the UK ETS responsibility of a single installation, including for any non-compliant CO₂ in breach of network codes, and there would be a strong incentive for that installation to ensure effective management/handling when CO₂ was transferred into/out of such stores.</p> <p>To mitigate risk and allow clear assignment of responsibility, sites that store and process CO₂ from multiple installations would be treated as nodes in the T&S network, and would be regulated as UK ETS installations, subject to network codes, MRV, allowance surrender, and metering requirements – as with Option 2) above.</p>
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Figure 3 – Visualisation of the three options proposed for intermediate storage



Option 1 is the lightest-touch approach with the lowest compliance burden for storage sites, but the Authority's view is that it may not be viable in practice, for the following reasons:

- NPT CO₂ may pass through multiple stores before reaching final geological storage, and each of these stores may process CO₂ from multiple installations. There is no guarantee that all CO₂ passing through an intermediate store will be sent to the same final destination. Tracking how much CO₂ from each originating ETS installation has arrived at each final storage site may therefore be very challenging, and assigning responsibility for transport emissions could be prohibitively difficult. Installations using more efficient NPT would be penalised for the fugitive, transport and venting emissions of less efficient operators, as estimates and rules-of-thumb would be needed to divide and assign responsibility for CO₂ over an NPT journey.
- There are risks associated with not being able to track and assign responsibility to CO₂ through the NPT journey. For example, if CO₂ is processed and mixed several times in a journey without full metering and purity testing, there is a risk that a batch of CO₂ will fall below network codes and, upon mixing into a larger batch, contaminates that larger batch. When this CO₂ arrived at a regulated delivery point in the T&S network, it would have to be vented. As it would be impossible to determine at which point in the journey it had become non-compliant, there would be no installation to which to assign responsibility for the surrender of allowances for the vented CO₂. The same issue would apply if, for example, a vehicle transporting CO₂ from an unknown number of installations were to crash or sink.
- It is unclear which entity would be responsible for logging data on the flows of CO₂ through intermediate stores and relaying this data to the responsible installations, in order for them to calculate their share of CO₂ in transit and any deductions. Ensuring the collection, transmission, and verification of this data might also require permitting or regulation.

Option 2 provides assurance against these risks. Each store would be a UK ETS installation, providing a clear chain of UK ETS responsibility for the CO₂ and, as stores would be subject to network codes, non-compliant CO₂ would not enter the NPT chain. However, this would place all smaller stores (e.g. tanks used for transfer of CO₂ from one transport medium to another) under potentially disproportionate compliance costs.

The Authority deems that **Option 3** could strike an appropriate balance between these risks. Stores that only serve one UK ETS installation can be the UK ETS responsibility of that installation. Responsibility for any fugitive or transport emissions will be simple to assign to that originating installation at the next delivery point. Any venting or non-compliant CO₂ will be that installation's responsibility, providing an incentive to manage these risks.

By only allowing UK ETS-regulated stores to manage CO₂ from multiple installations, we can ensure the accurate recording of a chain-of-custody for CO₂ and prevent the risks of non-compliant CO₂ entering the NPT chain without a clear responsible party.

We propose that regulated intermediate stores would also assume UK ETS responsibility for CO₂. Under this model, CO₂ delivered to these stores would be analogous to CO₂ delivered to a node in the T&S pipeline network. The originating installation could deduct the CO₂ (less fugitive and transport emissions) from its surrender obligations. The intermediate store would then carry the allowance burden for the CO₂ until it was delivered to another UK ETS installation, or to final storage.

We recognise that this may allow originating installations to claim the UK ETS benefits of NPT CCS before the CO₂ reaches final storage (as the UK ETS cost saving for NPT CO₂ would be achieved at point of delivery to the first UK ETS regulated intermediate store), and that this may reduce the incentive for the originating installation to ensure effective transport of CO₂ to final storage. It may also place UK ETS risks on stores which do not have the capacity to ensure onwards transport of CO₂ from their facility. For example, a temporary store at a port may provide only storage as a service and have no direct contractual relationship with the shipping company or offshore storage site that will transport and receive their CO₂.

We deem that these issues can be resolved commercially or contractually, and that UK ETS regulated stores would be able to manage their risks by passing on UK ETS costs to their customers, who would then be incentivised to avoid those costs by arranging quality delivery to final storage. We invite views on this from stakeholders.

All options will likely require custody certificates when NPT CO₂ is transported outside of the UK ETS. These would be analogous to the chain-of-custody for waste, providing assurance of the point-of-origin and point-of-delivery for CO₂ upon transfer of responsibility.

We are aware that metering and control testing may be necessary at various points in the NPT chain, regardless of any UK ETS regulations. For example, customer or supplier contracts may require monitoring of the quantities of CO₂ transferred or delivered, and installations may wish to monitor CO₂ transfers to provide assurance, manage risk, or provide a basis for payment. We are interested in stakeholder views on any other regulatory, commercial, or contractual requirements that would lead to metering or testing during NPT journeys.

Questions:

12)What are your views on the three options presented for the regulation of intermediate storage? Would you suggest any alternative approaches? In your answer, you may wish to consider: the possible infrastructure/compliance costs of each option; compatibility with any other likely metering, or monitoring requirements; potential impacts on the viability of any possible form of NPT; and whether all types of intermediate storage and associated emissions would be captured.

13)Do you have a preferred option, and if so, which one? If you would suggest any other approach to the regulation of intermediate stores, please outline it here.

14)Do you have views on the appropriate MRV and metering methodology for each option? Please explain your response, providing evidence where possible.

Mixing of CO₂, and Transfer of ETS responsibility

The NPT regulatory model will need to set out when UK ETS responsibility and custody of CO₂ should transfer: in other words, at what point will an UK ETS installation be allowed to subtract CO₂ moved by NPT from its reportable emissions/surrender obligations?

Our approach to intermediate storage (see above) will, to a certain extent, dictate the approach to these issues. If intermediate storage is regulated under the UK ETS, and intermediate stores can take over ETS custody for CO₂ and conduct CO₂ mixing under regulatory oversight, specific policies will not be necessary.

Regulation of mixed CO₂

If CO₂ from multiple installations is stored or transported together, we will need an approach to guarantee that UK ETS responsibility for the CO₂ can be determined, and that mitigates the risk of contaminated CO₂ reaching the T&S network, where it would have to be vented, without a clearly identifiable responsible party.

We are considering the following options:

Option 1	Prevent contamination and ensure chain-of-custody is traceable by only allowing CO ₂ to be transported in sealed standardised gas containers tracked to a single point of origin. This would reduce the need for intermediate storage. Containers could be transferred from road to rail transport as needed. Transport emissions would be tracked through their journey. Only UK ETS regulated sites with metering, permits, and monitoring/purity testing could open or transfer from these containers (for example, to transfer CO ₂ onto a ship or into a T&S pipeline).
Option 2	Mixing is restricted to UK ETS regulated intermediate stores – as with Option 2 or 3 for intermediate storage above.
Option 3	Limit regulation of intermediate storage and allow unregulated mixing of CO ₂ outside the UK ETS. Require stores to meter and assign batches of CO ₂ to originating installations via mass-balance or first-in, first-out approaches. Originating installations would comply with this method and could trace their CO ₂ to point of final delivery. Responsibility for venting, losses, and fugitives during NPT journeys is also determined in this way.

Transfer of ETS responsibility

We are considering two approaches. **Option 1** simplifies the tracking of CO₂ through the NPT journey whilst maintaining accuracy. **Option 2** preserves the stronger incentive for the original emitter to ensure delivery of CO₂ to geological storage.

Option 1	UK ETS responsibility transfers at each installation in the chain, with each major intermediate store treated as a full installation. Allows for greater oversight of the NPT journey.
Option 2	UK ETS responsibility transfers when CO ₂ reaches final geological storage or the T&S pipeline network. Mass balance/first-in-first out approaches are used to track and assign responsibility for CO ₂ as it moves through the NPT journey.

Questions:

- 15) Please give your opinion on the two proposed options for UK ETS custody transfer, and state whether you have a preference, explaining the reasons for your views.**

16) Please give your opinion on the three proposed options for regulating the mixture of CO₂, and state whether you have a preference, explaining the reasons for your views.

Interactions with Greenhouse Gas Removals (GGRs)

In the Authority Response to the Developing the UK ETS consultation, the Authority stated that it believes the UK ETS is an appropriate long-term market for GGRs. We intend to include engineered GGRs in the UK ETS, subject to further consultation, a robust MRV regime being in place, and the management of wider impacts.

Some engineered GGRs may use NPT as part of their processes to capture and store carbon. It is therefore important that the regulatory options proposed for NPT under the UK ETS account for any specific implications for GGRs.

Question:

17) Does this NPT model have any implications for GGRs if they are included in the UK ETS?

Cap Adjustment

Allowing operators to subtract NPT CO₂ from their reported emissions and surrender obligations will not change the scope of the UK ETS. It will not result in the addition of a new traded sector nor a change in the composition of an existing traded sector. Instead, it will make CCS more viable for some dispersed sites, effectively increasing the accessibility of a decarbonisation technology and ensuring recognition of all CCS transport approaches. This is in line with underpinning CBDP-based cap calculations, which already assume NPT uptake as part of the broader uptake of CCS. On this basis, we do not believe that the UK ETS cap will need to be adjusted to account for our proposals for the regulation of NPT.

Question:

18) Do you agree with our position on cap adjustment for NPT?

Implementation date

We currently propose to bring the UK ETS NPT regulations into force by the late 2020s. We will continue to review this following feedback from stakeholders and will provide more detail in the government response.

Question

19) What are your views on this implementation timeline? Please provide information and evidence where appropriate and indicate if there is a date by which you believe UK ETS NPT regulations would need to be confirmed or in force.

Consultation Questions

- 1) **What are your views on the proposed regulatory framework? You may wish to consider: the choice not to make NPT of CO₂ a regulated activity; the metering, monitoring, permitting implications; the approach to fugitive emissions, and any other practical implications.**
- 2) **Are there any issues or concerns, not set out in our proposals, that the Authority should consider or address in order to enable this framework? Please provide detail/evidence where appropriate.**
- 3) **Between Option 1 and Option 2, which is your preferred approach? Please give reasons for your answer. You may wish to consider decarbonisation benefits, MRV/compliance implications, and possible impacts on accessibility of NPT.**
- 4) **What are your views of the merits of Option 1/Option 2 vs Option 3? Please provide as much detail as possible on direct and associated costs of our proposed approaches to transport emissions, in the context of the overall costs of NPT journeys.**
- 5) **What are your views on the possible emissions factors we propose for road and rail? If you would suggest any alternative emissions factors, please detail them and explain your preference. If you have views on the considerations that the specific emissions factors for road/rail for Option 2 might take into account, please share them here.**
- 6) **What are your views on each of the options presented for the regulation of CO₂ transporting ships? Please consider the practicalities of each approach and the impact of any compliance burden. If there are any emissions associated with the storage, transport and processing of CO₂ by ship that you believe either option would not capture, please highlight this in your answer.**
- 7) **Please highlight if you have a preferred option, and the reason for this preference.**
- 8) **What are your views on the proposal to apply a tonne.km based emissions factor to the emissions of CO₂-transporting ships which are below the proposed UK ETS Maritime threshold of 5000 GT?**
- 9) **What are your views on the possible emissions factors we propose (see footnote 12)? If you would suggest any alternative emissions factors, please detail them and explain your preference.**
- 10) **What proportion of CO₂-transporting ships, in your view, will be <5000GT? What sorts of journeys would such ships conduct?**
- 11) **What are your views on our proposed approach to multi-port journeys? Do you believe it will be achievable without imposing additional MRV/metering requirements on CO₂-transporting ships? Please explain your answer and provide evidence where possible.**

- 12) What are your views on the three options presented for the regulation of intermediate storage? Would you suggest any alternative approaches? In your answer, you may wish to consider: the possible infrastructure/compliance costs of each option; compatibility with any other likely metering, or monitoring requirements; potential impacts on the viability of any possible form of NPT; and whether all types of intermediate storage and associated emissions would be captured.**
- 13) Do you have a preferred option, and if so, which one? If you would suggest any other approach to the regulation of intermediate stores, please outline it here.**
- 14) Do you have views on the appropriate MRV and metering methodology for each option? Please explain your response, providing evidence where possible.**
- 15) Please give your opinion on the two proposed options for UK ETS custody transfer, and state whether you have a preference, explaining the reasons for your views.**
- 16) Please give your opinion on the three proposed options for regulating the mixture of CO₂, and state whether you have a preference, explaining the reasons for your views.**
- 17) Does this NPT model have any implications for GGRs if they are included in the UK ETS?**
- 18) Do you agree with our position on cap adjustment for NPT?**
- 19) What are your views on this implementation timeline? Please provide information and evidence where appropriate and indicate if there is a date by which you believe UK ETS NPT regulations would need to be confirmed or in force.**

Next steps

The responses to this consultation will be used to develop final policy decisions for implementation.

The consultation will be open for 8 weeks before closing. The Authority will then work through the responses and aim to publish the Authority Response in due course.

This consultation is available from: www.gov.uk/government/consultations/uk-ets-scope-expansion-ccs-non-pipeline-transport-of-carbon-dioxide

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.