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Analytical Annex to Developing the UK Emissions Trading Scheme (UK ETS)

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

March 2022



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This annex covers proposals made in the consultation. Hence, the material in chapters 4, 8 and parts of chapters 6 and 7 (e.g. Thermal Thresholds) are not covered in this annex as these chapters/sections are calls for evidence and as such do not set out proposals requiring assessment at this stage (this annex also does not cover proposals on CCUS and Transportation at this stage). From chapter 5, the aviation free allocation, UK to Switzerland flights, and Virtual Site Visit sections are covered. The impacts of proposals on the cap and free allocation are covered in the annex to chapters 1-2, with more evidence presented in the economic research study. Other sections within this chapter are at the early stages of policy development and proposals do not require assessment at this stage.

Analytical annex

This annex is intended to provide an overview of the factors influencing the impacts of the consultation proposals. It is not intended to reflect the full evidence base on which decisions will be taken, nor the full evidence base on which proposals have been developed. It is not intended as a formal impact assessment. We will seek to gain further evidence as part of this consultation.

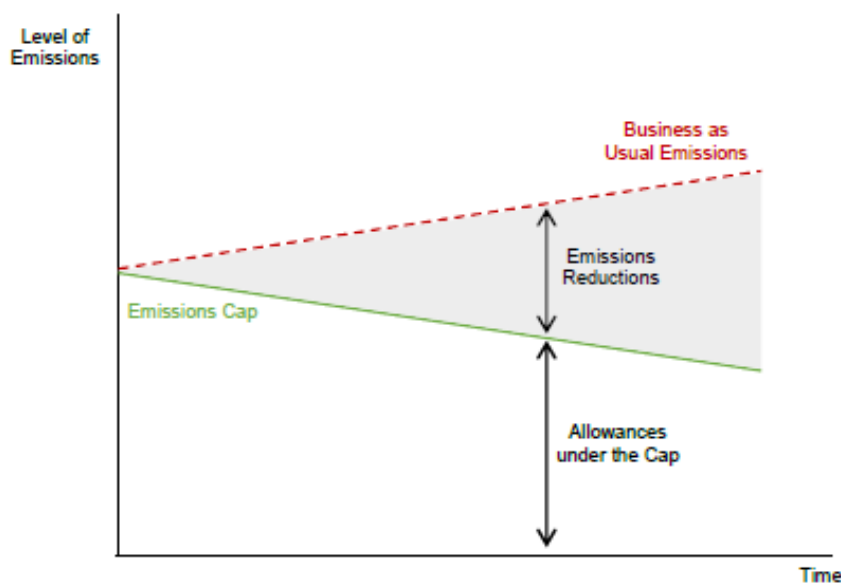
The UK ETS Authority will set out its assessment of the impact of the proposals in the consultation response, including regional and sectoral impacts where feasible and appropriate. We will set out the actions we will take to appropriately mitigate any such impacts where it is necessary to do so.

Annex to Chapters 1 - 2

Section 1.1: UK ETS overview

The UK ETS works on the principles of cap-and-trade (see Figure 1A below for illustration). A cap is set on the total quantity of emissions permitted in the system, which is reduced over time.

Figure 1A: Illustration of emissions reductions under a cap-and-trade system



Allowances within the cap are distributed to system participants primarily via auctioning or free allocation – where each allowance under the cap represents a permit to emit one tonne of CO₂ equivalent (CO₂eq). The system then provides flexibility over how and when installations / operators within scope reduce emissions to meet the annual cap through the trading of allowances on secondary markets.

The allowance prices that result from auctions and trading between market participants create the incentive to reduce emissions. Participants whose marginal abatement costs are lower than the prevailing market carbon price can reduce their emissions and thereby reduce the number of allowances they need to purchase, or can earn revenue by selling their allowances. Participants whose marginal abatement costs are higher than the market price also benefit as a result of this transfer by purchasing allowances at a lower cost than reducing their emissions. In theory, trading will occur until participants' marginal cost of abatement is equal to the market price. This facility to trade ensures that emissions are reduced where it is most cost-effective to do so.

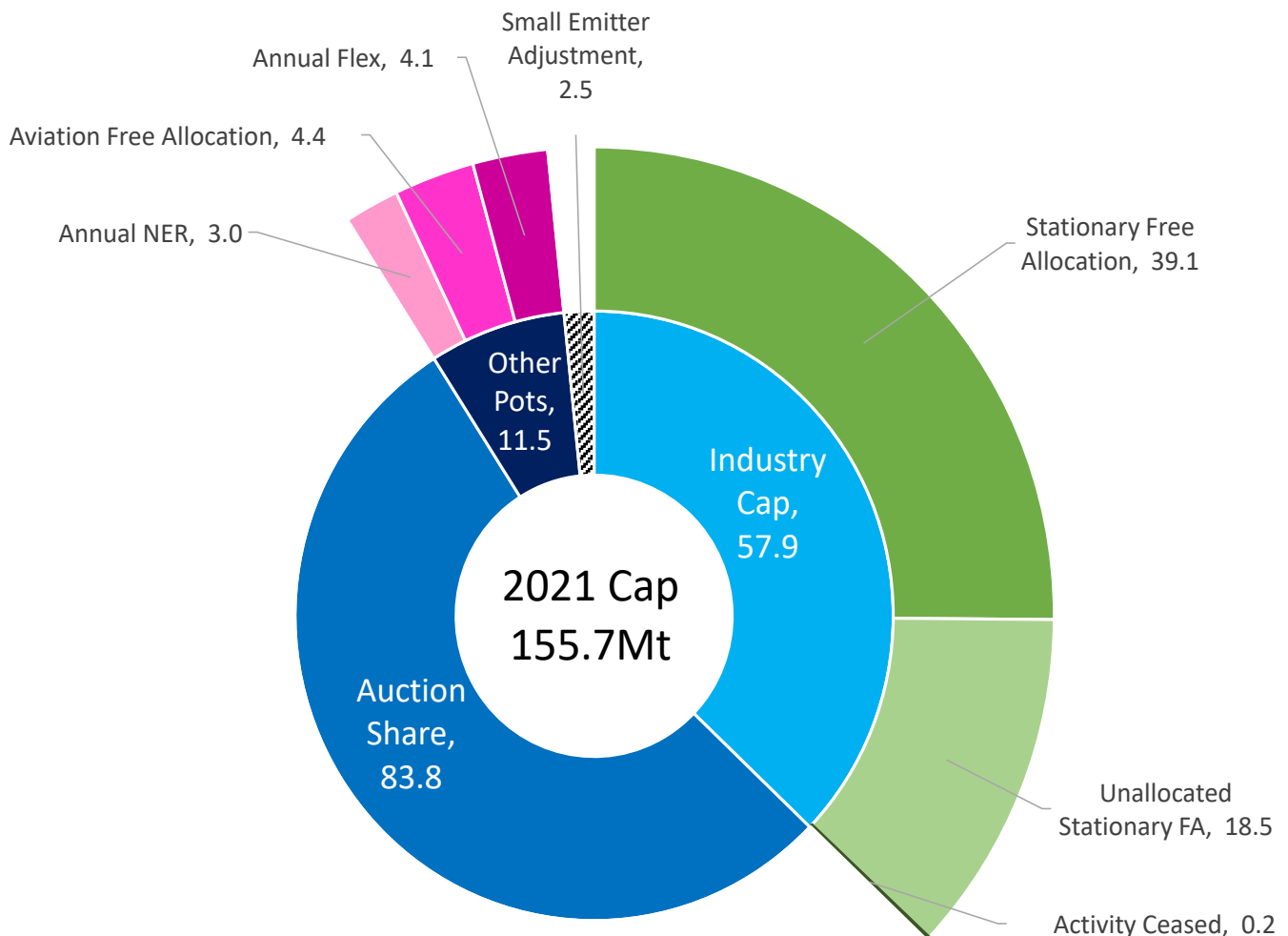
Additionally, the UK ETS contains a number of provisions to ensure the market has sufficient flexibility over the timing of abatement, while retaining a clear and consistent incentive to decarbonise. This means that annual emissions can fluctuate around the trajectory of the cap. These mechanisms come in two broad groups:

UK ETS mechanisms that allow flexibility over the annual issuance of allowances relative to the annual cap. These include the use of unallocated allowances, the flexible share, new entrant provisions and market stability provisions, which are designed to support the ability of the UK ETS to deliver a clear and consistent signal to participants. Note, these mechanisms only change when allowances are issued, and do not alter the total cap over the phase.

Market mechanisms that allow flexibility over annual emissions relative to the annual issuance of allowances. These include hedging, banking and "borrowing" of allowances. These give participants the capacity to manage the timing of abatement and emissions, and do not alter the total cap over the phase.

Figure 2A. sets out how allowances under the UK ETS cap are distributed across different mechanisms. This is intended to facilitate the interpretation of the consultation, and as such emphasises how the different UK ETS mechanisms interact within the cap. It is not intended to reflect the volume of allowances made available in a given calendar year. 2021 was used as the basis for this figure as it is the first complete year of the UK ETS, however some figures remain subject to revision as per normal scheme operation, such as volumes and new entrant reserve (NER) use (see chart notes for details).

(Illustrative breakdown: does not necessarily reflect the volume of allowances made available in 2021 calendar year)*.



*The UK ETS Cap is defined in legislation for the trading period (2021-2030). An annual breakdown (the "base") is defined in Article 22** to facilitate various ETS rules which operate on an annual basis under the cap. The industry cap is also defined in the regulations. This chart reflects one internally consistent way of understanding the "2021" base value. **It is not intended to reflect the volume of allowances made available in calendar year 2021.**

Stationary Free Allocation (FA), Unallocated Stationary FA and Activity Ceased FA are all consistent with the published UK ETS Allocation Table as of 11.05.2021. This does not reflect activity-level changes impacting 2021 FAs. [For the latest figures see: <https://www.gov.uk/government/publications/uk-ets-allocation-table-for-operators-of-installations>]

Aviation Free Allocation consistent with Published UK ETS Aviation Allocation Table as of 28.6.2021. [For the latest figures see: <https://www.gov.uk/government/publications/uk-ets-aviation-allocation-table>]

Auction Share reflects the Auction Calendar as of 19.10.2021, adjusted to not double-count carry-over between auctions [<https://www.theice.com/emissions/auctions/uk-emission-allowances>]

The remaining segments are presented to illustrate other key ETS mechanisms. Annual flexible share (Annual Flex) and Annual New Entrant Reserve (NER) figures are illustrative values reflecting 1/10 of their values for the trading period (2021-2030), which are defined in the regulations. This does not necessarily reflect the volume that will be made available in calendar year 2021. Small Emitter Adjustment indicates the volume of allowances associated with the hospital and small emitter reduction factor per article 21.

**For full details see The Greenhouse Gas Emissions Trading Scheme Order 2020 [<https://www.legislation.gov.uk/uksi/2020/1265/contents/made>]

Further context: Free allocations and emissions by region and sector

The below figures are based on 2019 emissions data and 2021 free allocation data. The stated emissions proportions are broadly comparable for 2020 and are expected to be broadly comparable in 2021, however 2021 emissions data are not yet available and will be influenced by a number of macroeconomic factors including (but not limited to) the continued impacts of COVID-19, developments in global energy markets, as well as the launch of the UK ETS.

Table 1A: 2019 Emissions as a percentage of all traded sector emissions and 2021 free allocation by region¹

Region	Emissions Share 2019	Free Allocation Share 2021
England	64%	59%
Wales	15%	22%
Scotland	7%	10%
Northern Ireland	3%	1%
Offshore	11%	8%

Differences between the share of emissions and the share of free allocations within regions reflect differences in their sector compositions.

Table 2A: 2019 Emissions as percentage of all traded sector emissions and 2021 free allocation by sector²

Sector	Emissions Share 2019	Free Allocation Share 2021
Iron & Steel	10%	27%
Refining	10%	21%

¹ **Notes to Table 1A and Table 2A:** Free allocation data used correct as of the stationary allocation table on 11.05.2021. 2021 Activity level changes not reflected, but are not expected to substantively change these results. UK ETS emissions data for 2021 is not available at the time of drafting. 2019 emissions are presented and expected to be broadly comparable. Using 2020 emissions would not fundamentally change the results, however 2019 is presented for context-setting. Region defined by the regulator for each site.

² As above and sector assigned at site level. Note, different definitions of sectors used in other contexts may give different results.

Cement	6%	14%
Chemicals	5%	14%
Oil and Gas Extraction	13%	11%
Power	47%	1%*
Other	9%	13%

*Electricity generation is generally not eligible for free allowances. However, a small number of sites within the broader power sector have some activity eligible for free allowances.

In England and Scotland, activity is generally spread across multiple sectors, with refining and iron & steel having the largest shares of free allocation in England and refining and chemicals in Scotland.

Wales and Northern Ireland are generally more concentrated in particular sectors. In Wales, the majority of free allocation was associated with the iron and steel sector. In Northern Ireland the majority of free allocation was associated with the cement sector.

Section 1.2: Options and Counterfactual

Counterfactual – Do nothing

For the purposes of this annex, the current legislated UK ETS cap and free allocation system³ are taken as the counterfactual, which is compared against when considering the impact of the proposals. We also assume the continuation of the current key related policies to the UK ETS, these include:

- **Climate Change Levy (CCL) & Climate Change Agreements (CCAs):** CCL main rates are paid by large energy intensive businesses (non-domestic) on their supply of electricity, gas and solid fuels.⁴ Industry operators who have entered into a Climate Change Agreement receive a discount on the CCL in exchange for meeting targets for carbon or energy efficiency improvements.⁵ Potential reforms to the CCA policy are being consulted on from December 2021 - March 2022.⁶

³ For further details, see: <https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets>

⁴ Note, policies are designed to mitigate double-counting. Government has set out rates and reduced rates through to 31 March 2024: <https://www.gov.uk/government/publications/changes-to-rates-for-the-climate-change-levy-for-2022-to-2023-and-2023-to-2024/changes-to-rates-for-the-climate-change-levy-for-2022-to-2023-and-2023-to-2024>

⁵ For further details, see: <https://www.gov.uk/green-taxes-and-reliefs/climate-change-levy>

⁶ For further details see: <https://www.gov.uk/government/consultations/climate-change-agreements-ccas-proposals-for-a-future-scheme>

- **Carbon Price Support (CPS):** a tax paid by UK electricity producers⁷ on fossil fuels used to generate electricity, charged through a component of the Climate Change Levy. The government will continue the freeze on Carbon Price Support rates to maintain a cost of £18 per tonne of carbon dioxide in Great Britain from 2023-24⁸.
- **Indirect Cost Compensation (ICC):** compensates those electricity intensive industries deemed to be exposed to a significant risk of carbon leakage due to the indirect emission costs of the UK ETS and CPS.⁹

The current UK ETS cap

The current cap for Phase 1 of the UK ETS was initially set at 5% below the UK's expected notional share of the EU ETS cap for Phase IV of the EU ETS (2021-2030). This equated to around 156 million allowances in 2021 (covering both stationary installations and aircraft operators) and was set to reduce annually by 4.2 million allowances.

The consultation proposes that the revised net zero consistent cap would mean the total cap for the entire first Phase (2021-2030) will be between 887 million allowances and 936 million allowances. Compared to the current legislated cap for the whole phase, 1365 million allowances, this would equate to a reduction of between around 30-35% over the course of the phase. The UK ETS cap will need to be approximately 50 million allowances in 2030 to support the UK's NDC target. As we are implementing the revised cap in 2024 this would require a step change in the level of the cap in 2024, with the cap becoming tighter over the phase. This is illustrated in Figure 3A and Table 3A below. The exact distribution of allowances for different purposes will affect when allowances reach the market over the course of the phase. Notably, the proposals on 'Smoothing the transition to the net zero consistent cap' could change the precise trajectory for allowances released in individual years.

Figure 3A. The currently legislated cap (dotted line), which is not consistent with delivering net zero, will remain in place until end 2023. The illustrative trajectory below, represented as a range, is shaded in blue.

The proposed range for the net zero consistent cap (blue shaded region) which will be legislated to change from 2024 for the remainder of the phase. The currently legislated cap (grey dotted line), which is not consistent with delivering net zero, will remain in place until end 2023. As above, the total number of allowances distributed to the market in given years may be different to this (see Fig. 1.2).

⁷ Carbon price Support does not apply to NI electricity generators as they participate in the EU ETS by virtue of the Ireland / Northern Ireland Protocol

⁸https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1043689/Budget_AB2021_Web_Accessible.pdf (AB22 p145)

⁹ For further details, see: <https://www.gov.uk/government/publications/uk-emissions-trading-scheme-and-carbon-price-support-apply-for-compensation/compensation-for-the-indirect-costs-of-the-uk-ets-and-the-cps-mechanism-guidance-for-applicants>

Figure 3A: Legislated cap and illustrative trajectory (range)

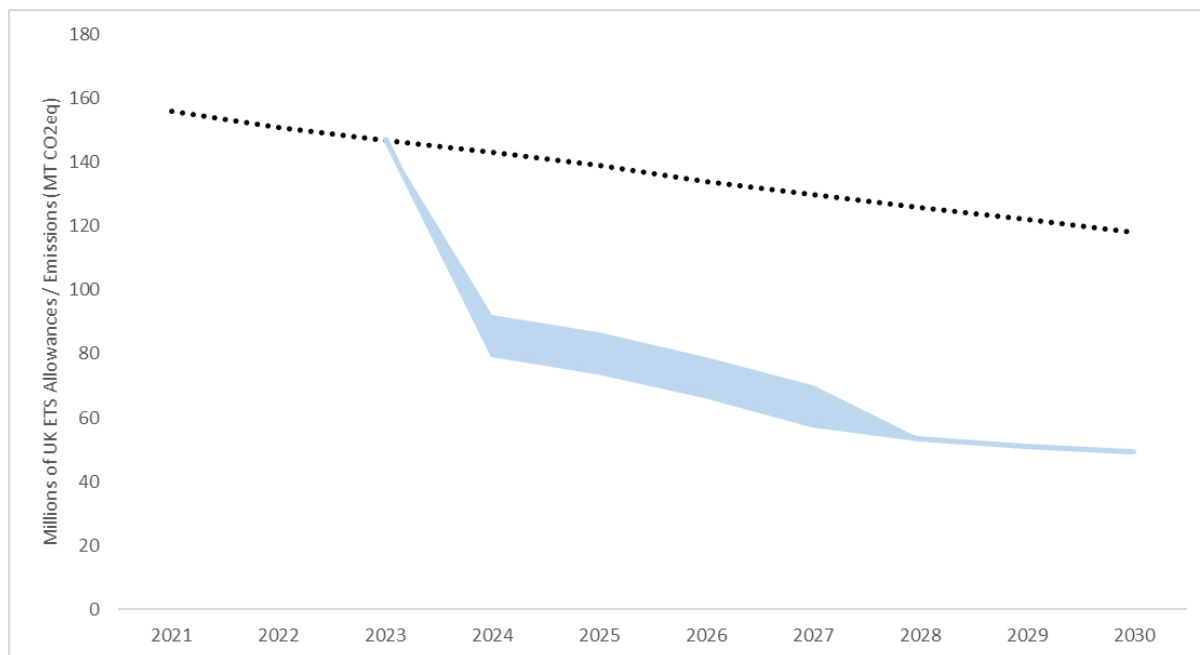
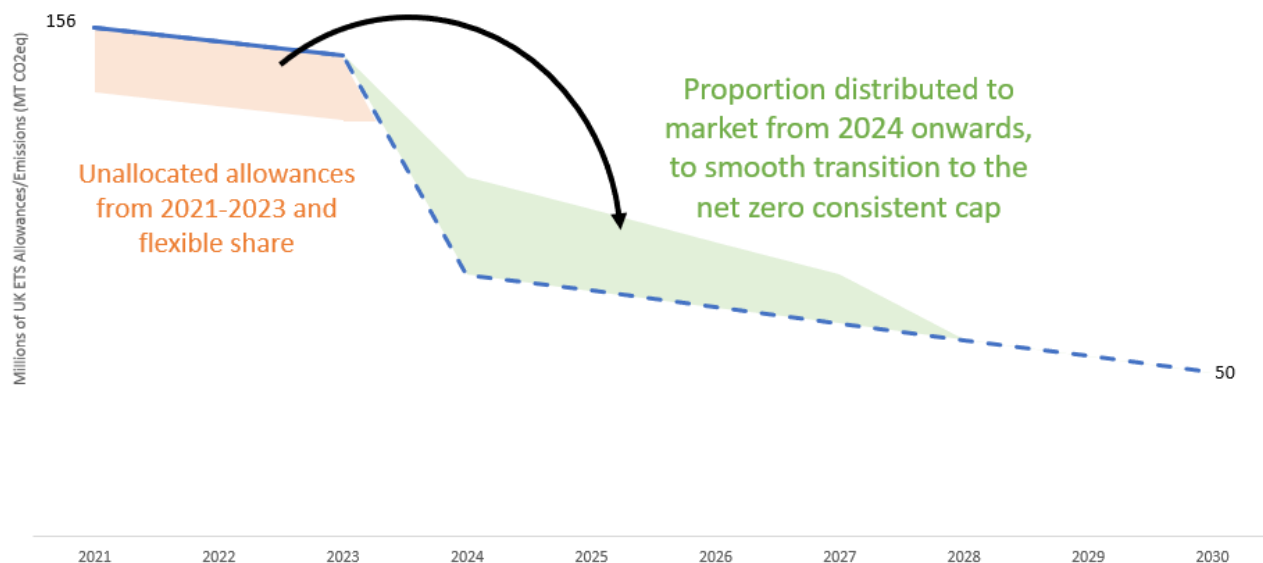


Table 3A Allowance volumes for illustrative trajectory (range)

(All figures in millions)	2021	2030 (approx.)	Total Phase 1
Quantity of allowances created under the top of the range	156	50	936
Quantity of allowances created under the lower end of the range	156	50	887

Figure 4A: Schematic diagram illustrating how the legislated cap may translate into the total allowances distributed to market over the phase. Recognising the need to manage the transition to the lower cap, the section on ‘Smoothing the transition to the net zero consistent cap’ sets out how unallocated allowances from 2021-2023 and the flexible share can be used to support participants through the transition; this would not change the total volume of allowances created over the phase but would change the precise trajectory of allowances released in individual years. As such, the number of allowances distributed to market each year may be different to the legislated cap. The final net zero consistent cap level and trajectory will be decided upon and announced when we respond to this consultation.

Figure 4A: Schematic diagram



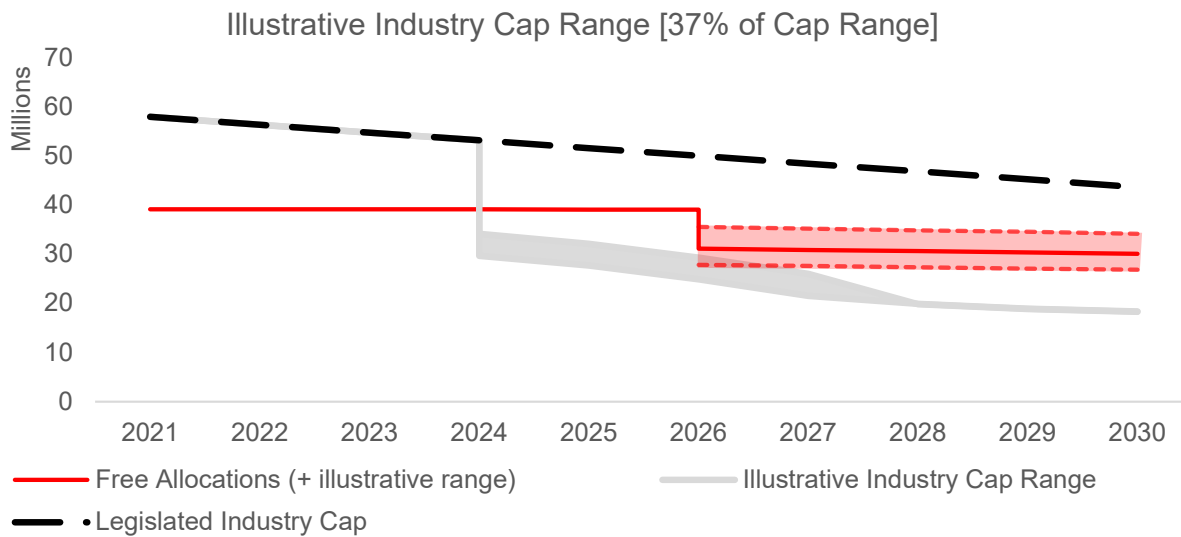
Net Zero consistent industry cap: The UK ETS Authority’s preferred industry cap option will be decided upon following analysis of responses to this consultation, and presented in the government response alongside a decision on the absolute level of the cap. This is in line with our objective to provide certainty to market participants, giving due notice to any proposed changes to the industry cap.

The analysis presented below is illustrative of what a reset industry cap could mean for the overall reduction in free allowances over the course of Phase I. Figure 5A shows an illustrative 37% industry cap¹⁰ relative to the current industry cap and the level of FAs under the current FA system. This is included to illustrate scale; per the free allocation section of the consultation, in the instance that the UK ETS Authority decides to implement an industry cap which would be lower than the level of free allocations, as per the scenarios outlined in the example below, we will use our reserve of unallocated allowances or the flexible share to mitigate against any application of a CSCF for the first allocation period (2021-2025), in line with their original intended use.

Proposals for the industry cap are considered alongside the overall UKETS cap. Technical changes (responses to the call for evidence into FA policy), and options for bringing unallocated allowances and/or flexible share to market, are considered separately afterwards.

¹⁰ 37% (rounded) is the current share of the industry cap within the cap and is presented for illustrative purposes.

Figure 5A. Illustrative Industry Cap relative to current FA system



FAs from 2026 onwards are not yet defined under current rules, and would depend on updates to benchmarks, as well as any changes in activity levels, and market entry & exit. The diagram reflects a plausible range of what the level of FAs may be if current rules were applied **for illustrative purposes only**. It does not represent an upper/lower bound on FAs and **it is not a projection**.

Section 1.3: Societal impacts: Cap and industry cap options

This section summarises the potential costs and benefits to society associated with the cap options outlined above compared to the counterfactual.

Emissions reductions and carbon prices

The primary benefit of an ETS is the benefit to society of emissions reductions (abatement) that are achieved as a result of the policy. Relative to the counterfactual we expect a significant reduction in traded sector emissions under all potential cap options in the consultation.

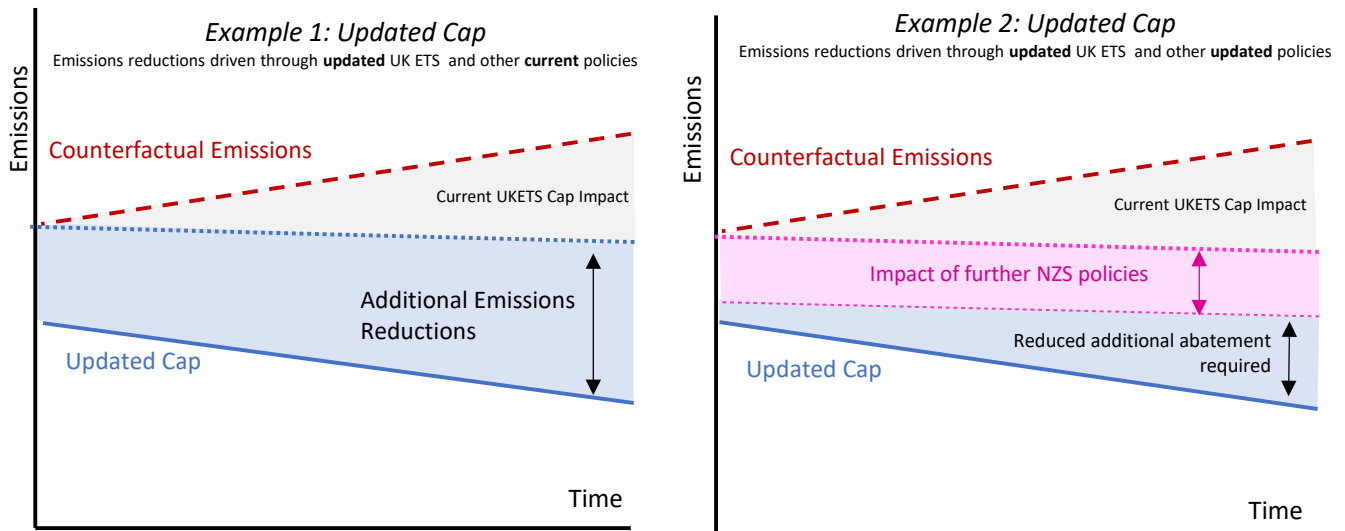
In general, we expect a relatively tighter cap option to be associated with greater reductions in emissions over the phase. However, as set out in section 1.1, mechanisms such as participants banking allowances, and building-up/winding-down hedges mean the distribution of emissions over time is designed to be able to be flexible around the cap in the shorter term. This allows participants greater capacity to plan and manage their compliance, as well as allowing the market to inform the timing of abatement, while remaining within the cap on emissions over the phase.

In general, all else being equal, we expect any substantive reduction in the cap to be associated with higher carbon prices on average over the phase **relative to the counterfactual**. However, the trajectory of carbon prices over time will also be influenced by a range of other factors, including market behaviour, such as foresight and interactions with energy markets, as well as being impacted by broader policies to support decarbonisation.

Emissions reductions will be achieved through the combined impact of the UK ETS, as well as the wider decarbonisation policy portfolio. However, the UK ETS has a clear and distinct role to

play in supporting both the achievement and cost-effectiveness of those emissions reductions. In general, where emissions reductions are supported to a greater extent by other policies within the traded sector, we expect to see lower additional abatement required to meet the UK ETS cap, resulting in lower demand for allowances and consequently, lower carbon prices. Figure 6A shows one way of conceptualising the impact of additional supporting policies on the impact of the UK ETS.

Figure 6A: Effect of other policies on UK ETS impacts



Examples of these policies which would impact the traded sector, as set out in the Net Zero Strategy,¹¹ would include the suite of policies to support the ambitions to fully decarbonise our power system by 2035, deliver 5 GW of hydrogen production capacity by 2030 while halving emissions from oil and gas, and deliver four carbon capture usage and storage (CCUS) clusters, capturing 20-30 MtCO₂ across the economy, including 6 MtCO₂ of industrial emissions, per year by 2030.¹²

Energy and air quality benefits

As well as incentivising decarbonisation through permanent abatement (i.e. deployment of low-carbon technologies), the UK ETS will also continue to incentivise energy efficiency improvements across a wide range of energy sources. This includes both fossil fuels, and electricity via the indirect impact of the carbon price. Cost savings through reductions in energy use through energy efficiency would constitute a benefit to individuals as well as society.

Many of the activities within scope of the UK ETS release air pollutants into the atmosphere in addition to greenhouse gases, such as nitrogen oxide (NO_x), sulphur dioxide (SO₂), and particulate matter (PM). These air pollutants can have a significant negative impact on human health and well-being, productivity, and the local environment.¹³ Insofar as reductions to the

¹¹ For further details see: <https://www.gov.uk/government/publications/net-zero-strategy>

¹² Net Zero Strategy pages 19-21

¹³ <https://www.gov.uk/government/publications/clean-air-strategy-2019>

cap drive reductions to in-scope emissions, and shifts in production methods, we would expect to also see net social benefits from a reduction or cessation of activities that generate air pollutants.

Compliance costs

Compliance costs reflect the costs incurred by operators to purchase the allowances necessary to meet their obligations under the UK ETS. These are also expected to be a key impact of the policy. In general, higher carbon prices will tend to increase compliance costs, while reductions in emissions will tend to reduce them. Compliance costs constitute a social transfer from participants to government.

Resource costs to system participants

One of the most significant costs across all policy proposals are expected to be the resource costs to participants associated with reducing their emissions in line with the increased ambition reflected in the tighter cap. It is expected that significant permanent abatement and efficiency measures will take place, relative to the counterfactual. Where a tighter cap drives greater reductions in emissions, we would also expect greater costs, both as more investment is needed, and as relatively cheaper abatement is used up. The nature and cost of this abatement and associated costs will be influenced by a number of other policies, as well as the UK ETS.¹⁴ Further, we would expect the cost of abatement to fall over time as technology is developed and deployed at greater scale.

The UK ETS also plays a key role in incentivising cost-effective emissions reductions over the covered sectors, and over time, as set out in section 1.1. Improvements in cost-effectiveness would contribute to reducing the cost to society of achieving the emissions reductions required by our climate targets and would by extension, be more cost effective for participants than paying higher compliance costs.

Power sector impacts

In the GB power sector,¹⁵ the balance of emissions reductions and increasing prices on compliance costs will differ across sites and over time. However, in general we expect UK ETS compliance costs in the power sector to be passed on to end users of electricity.

Increases in the carbon price could also impact the generation mix of technologies in the UK electricity system. An increased carbon price is expected to increase the marginal cost of electricity generation from fossil fuel generators (e.g. coal and gas) relative to other technologies (e.g. nuclear and renewables), promoting the displacement of fossil fuel generators with other lower carbon technologies. Increases in the carbon price feed through to wholesale prices. Higher wholesale prices should attract more electricity imports and displace some domestic generation. If electricity generated in these markets is relatively more carbon intensive than domestic generation, this could result in carbon leakage. However, this risk

¹⁴ For further details see: <https://www.gov.uk/government/publications/net-zero-strategy>

¹⁵ Northern Ireland electricity generators are not considered in this annex as they participate in the EU ETS by virtue of the Ireland / Northern Ireland protocol.

would also depend on the policies in interconnected jurisdictions, such as the EU which has the EU ETS covering power generation. Further, this is very dependent on future prices, including the relevant jurisdiction's carbon prices, in interconnected markets and the UK's future carbon leakage policy.

Industry impacts

Higher compliance costs for industrial operators could contribute to an increased risk of carbon leakage, or otherwise impact their competitiveness. Indirectly, where carbon costs in the power sector are passed-through to industrial operators, they may also face increased risk of carbon leakage or competitiveness pressures.

The impact of higher future carbon prices on direct compliance costs are currently substantially mitigated for many industrial operators by their free allocations (FA), and will also be further mitigated by future reductions in emissions.

Future decisions on the free allocation system are expected to be a key determinant of future compliance costs for most industrial operators. Given the consultation proposes not to amend stationary FAs over Allocation Period 1 (2021-2025) we expect the majority of potential changes to industrial compliance costs will not manifest until later in the phase, when FA policy is updated.

Under the current levels of FAs, the proportion of emissions covered by allowances from free allocations varies across sectors, as expected from the policy design. It also varies by site within sectors, with sites that perform better against their relevant benchmark(s) generally having lower emissions relative to their free allocation of allowances, for a given product/process. However, in general, it is consistent across regions, with the most variation expected to be due to differences in their sector composition.

Many electricity intensive industries deemed to be exposed to a significant risk of carbon leakage due to indirect emissions costs of the UK ETS (and CPS) via their electricity costs are also eligible for some compensation of those costs.¹⁶

Note that free allowances held by eligible operators have a market value. As such, a higher carbon price for these operators should still broadly increase the incentive to reduce their emissions where cost-effective to do so and to sell any unused free allowances.¹⁷ Compliance costs will also depend on operators' UK ETS market behaviours, such as banking, hedging and the use of future FAs.¹⁸

Additionally, industrial competitiveness depends on multiple factors. These include labour, energy and other input costs, access to finance, the number of competitors, openness to trade,

¹⁶ For further details see: <https://www.gov.uk/government/publications/uk-emissions-trading-scheme-and-carbon-price-support-apply-for-compensation/compensation-for-the-indirect-costs-of-the-uk-ets-and-the-cps-mechanism-guidance-for-applicants>

¹⁷ Some exceptions exist, such as where decarbonisation results in a site changing to producing products on a different benchmark.

¹⁸ Stationary operators have access to free allowances from the subsequent year when they comply.

the regulatory and tax environment, physical and technological infrastructure and innovation.¹⁹ A further important factor will be how these conditions differ for competitors in other jurisdictions. Hence, direct and indirect carbon costs are only one of many contributing factors to industrial competitiveness. These factors will also influence the risk of carbon leakage.

In some sectors, some or all carbon costs may be passed-through to their customers. The capacity for this depends on many factors, including the time-frame of cost increases, market conditions, exposure to international trade and the carbon costs faced by competitors, amongst other factors. In some sectors, firms may also be able to make use of product differentiation, marketing or innovation to mitigate impacts. In the longer term, carbon pricing could also increase the demand for the products of sectors, expanding or opening new consumer markets or bases.

Aviation impacts

As set out in the consultation, alongside the Call for Evidence, the UK Government's Department for Transport and the Department for Business, Energy and Industrial Strategy jointly commissioned an external economic research study to develop a robust evidence base on the extent to which potential aviation carbon pricing policies applied to UK departing flights could lead to carbon leakage and competitive disadvantage. The full report of the economic study contains a detailed summary of the findings of the impacts of carbon pricing on the UK aviation sector. See chapter 5 of the consultation for details.

All else being equal, a tighter UK ETS cap compared to the counterfactual would be expected to result in higher carbon prices and thus higher compliance costs for airline operators, which we would expect airlines to pass through to consumers in higher ticket prices.²⁰ The economic study tested the impact of a range of potential carbon prices on the aviation sector; the findings from this analysis are discussed in detail in Section 6.2.2 of the study report.

It is important to note, the methodology and mechanisms for issuing free allocations to aviation are distinct from, and substantively different to, those of the stationary system. These differences have implications for the way in which the level of free allocation affects abatement incentives across the two sectors. Further, the empirical evidence bases on how free allowances impact incentives and behaviour across the two sectors are also distinct. Hence, assumptions and conclusions on how free allocations affect abatement behaviour in the stationary sector should not be applied to aviation, and vice versa.²¹

¹⁹ For further details see: <https://www.gov.uk/government/publications/business-competitiveness-in-industrial-sectors-and-the-role-of-carbon-pricing-policy-in-the-uk>

²⁰ In practice, the extent to which airlines are able to pass through higher carbon prices in ticket prices will vary. In the UK aviation market, cost pass through is most likely to be incomplete on routes to and from congested airports. Therefore, impacts on passenger demand and profits are expected to be higher at uncongested airports. A more detailed discussion of cost passthrough can be found in Section 4.1 of the full report (see chapter 5 of the consultation for details)

²¹ Further details on evidence on industry can be found here: <https://www.gov.uk/government/publications/business-competitiveness-in-industrial-sectors-and-the-role-of-carbon-pricing-policy-in-the-uk>

Further details on evidence on aviation can be found in the aforementioned the aviation study.

Administrative costs

Administrative costs to participants are the costs incurred from complying with the obligations of the UK ETS. This includes costs associated with monitoring, reporting and verification, and the administration associated with managing, planning and surrendering allowances for compliance. Participants are already familiar with the scheme, so the cap and FA proposals are not expected to have a significant additional impact on administrative costs.

The potential impacts of the changes, such as higher carbon prices, and reductions in FA may lead some operators to engage in additional compliance planning, for example in the form of hedging, however where this occurs we would expect it to also be associated with benefits for operators, such as reductions in compliance costs and risk mitigation.

Administrative costs to government and regulators are not expected to be significantly impacted by the cap and industry cap proposals relative to the counterfactual.

The annex to chapter 9 covers operational changes.

Wider economic impacts and economic transfers

As well as driving the deployment of abatement measures and improvements to energy efficiency, higher carbon prices could also contribute to increased technological innovation, for example via increased R&D spending. This could lead to positive spill-overs, reducing the cost (and accelerating uptake) of future abatement. Additionally, this decarbonisation will support jobs and investment in the green economy across the UK.

A reduction in the UK ETS cap and correspondingly the volume of auctioned allowances would also impact UK ETS revenues. Revenues are a social transfer from compliance operators to government. Higher prices at auctions would tend to increase the size of the transfer, while reductions in total allowances sold would tend to reduce it. Free allocations of allowances also constitute a transfer from government to operators. Allowances have a market value which operators can benefit from, such as by offsetting their compliance requirements or selling allowances. Trading of allowances between market participants are also transfers.

Section 1.4 Societal impacts: Other FA proposals

Proposal one - Amendment to Activity Level Change Regulations due to 2020 Covid Year: For those installations whose emissions fell proportionally with production or who are not impacted by activity level changes, the proposals will have no impact regardless of option pursued. For any sites impacted by the proposals, this would generally be expected to increase their free allowances. This represents a transfer from government to these operators, and would, in general, reduce their compliance costs against the counterfactual.

Proposal two - Amendment to Activity Level Change Regulations to take into account the turn off of activity for maintenance or planned down time: the consultation proposes not to implement this, meaning this would not represent a change from the counterfactual of continued policy operation.

Proposal three - Amend Activity Level Change Regulations to treat incumbent sub installations in the same way as new sub installations: Incumbent sub-installations affected by this change would receive increased levels of free allocation from the first year of operation rather than seeing a gradual increase over two years. This would be beneficial to incumbent sub-installations who are expanding capacity as it would likely reduce the cost of their ETS compliance obligations. These changes to FAs constitute an adjustment to the transfer between operators and government. They would also mitigate a potentially distortionary effect and potentially improve the efficiency of the UK ETS.

Proposal four: putting current benchmark values in UK law. The Authority is minded to bring current benchmark values into UK law, by direct inclusion in UK ETS legislation. Should the Authority wish to change the policy position from current benchmarks, it may then do so through changes to UK ETS secondary legislation. This would not represent a change from the counterfactual of continued policy operation.

Proposal five - Amending the electricity generator definition to only consider electricity exports in the baseline period: This would be beneficial to operators whose classification is modified. Increasing eligibility for free allocation would constitute an adjustment to the transfer between operators and government and would likely reduce the cost of their ETS compliance obligations. All other operators would see no changes from this proposal.

Proposal six - Combined heat and power (CHP) plants and electricity generator definition. This would be beneficial to operators who are currently classed as electricity generators due to the export of excess electricity generated by CHP as part of their industrial process. Increasing their eligibility for free allocation would likely reduce the cost of their ETS compliance obligations, constituting an adjustment to the transfer between operators and government. All other operators would see no changes from this proposal.

Annex to Chapter 3: Unallocated allowances

Options for bringing unallocated allowances and/or flexible share to market

Neither unallocated allowances nor the flexible share have so far been utilised through existing mechanisms in legislation. This pool of allowances is expected to grow in the 2022-2023 period, as free allowances will continue to be below the industry cap. The Authority is considering options to bring allowances from the flexible share, and unallocated allowances from the industry cap to market. The options (not mutually exclusive) include:

- Utilising a portion of unallocated allowances and/or flexible share to mitigate against the application of a cross-sectoral correction factor prior to 2026.
- Bringing a portion of unallocated allowances and/or flexible share to auction, to smooth the transition to the net zero cap.
- Retaining allowances for market stability uses.

The impacts of these options will differ depending on the magnitude and timing of any allowances brought to market, the compliance strategies of market participants, as well as the mechanism(s) used. As set out in the consultation documents, these allowances can be used to increase the flexibility over the timing of abatement. Hence, in general, proposals which make more allowances available earlier in the phase could allow for higher emissions in those earlier years, offset by lower emissions in subsequent years. Generally, an increase in the supply of allowances relative to demand would be expected to reduce prices in those earlier years, and increase prices later where allowance supply relative to demand is tighter. However, neither outcome is guaranteed, and will depend on other factors affecting the demand for allowances. The distributional impacts of allowances brought to the market via free allocation to mitigate against the application of a cross-sectoral correction factor (CSCF) are discussed in the industry impacts section. A fuller assessment of the impacts will be provided at government response stage.

Annex to Chapter 5: Aviation

As set out in the main consultation document, we are proposing to expand the scope of the UK ETS within the aviation sector to include emissions from flights from the UK to Switzerland from January 2023. In 2019, UK to Switzerland flights included in the EU ETS accounted for approximately 0.28 Mt CO₂, which would equal roughly 2.7% of aviation emissions in the UK ETS if included.²⁷ Given the relatively small additional amount of emissions that this represents, we are not proposing to adjust the UK ETS cap for implementation in 2023; we will, however, account for these additional emissions in our proposals to align the UK ETS cap with a net zero trajectory. Given the relatively small amount of additional emissions covered by this proposal, we do not expect it to have any significant impact on the sector or the scheme as a whole.

We are also proposing to permit verifiers of aviation activities to conduct remote site visits, provided that an appropriate risk assessment has been carried out and any precautionary conditions have been met. We do not expect this proposal to have significant cost impacts on the sector or the scheme as a whole.

Annex to Chapter 6: Expanding UK ETS coverage within covered sectors

Upstream oil and gas

As set out in the main consultation document, we are consulting on expanding the coverage of the UK ETS in the (onshore and offshore) upstream oil and gas sector. Specifically, we are proposing that the venting of carbon dioxide is included in the UK ETS, alongside combustion

²⁷ Internal analysis of 2019 Eurocontrol data.

and flaring. While this is particularly relevant to the oil and gas sector, it would impact any other industrial sector where venting and/or flaring of CO₂ occurs.

Our analysis shows that carbon dioxide venting represents a total of less than 0.01 MtCO₂ of emissions per year, based on 2019 data; that is 0.02% of the 16.8 Mt CO₂e of emissions for the sector as a whole.²³ Extending UK ETS coverage to these emissions is thus unlikely to significantly impact the sector or the scheme more generally. However, it will avoid creating potential perverse incentives in situations where CO₂ venting may be used as an alternative to flaring, which is currently covered under the UK ETS. The existing MRV regime could be used to measure emissions from CO₂ venting at sites where it occurs, thus additional MRV costs are likely to be small, such as the cost of installing a meter on vents. We are considering whether to set a minimum threshold for CO₂ venting under the UK ETS, which would further reduce the potential additional MRV and wider administrative costs that might arise. Generally, our analysis so far suggests that the inclusion of CO₂ venting is unlikely to place an excessive cost burden on any installation.

As part of this consultation, we are also calling for evidence on the potential inclusion of methane emissions from venting, cold flaring, methane slip and fugitive emissions, as well as on a potential MRV requirement for other greenhouse gas emissions from the upstream oil and gas sector. Adding up all the elements on which we are calling for evidence amounts to 1.9 Mt CO₂e, roughly 11% of the sector's emissions.²⁴ That would bring all the emissions from the upstream oil and gas sector into the scope of the ETS.

Biomass

This consultation proposes that sustainability criteria be applied to solid, liquid, and gaseous biomass for all installations under the UK ETS, using a set of criteria that better align with other UK policies which already apply these standards. We do not expect this to have a significant effect on the use of biomass in installations, as most biomass currently used is likely to meet these standards. Nonetheless, our proposals would avoid potential divergence in the future and ensure consistency between the UK ETS and other biomass policies in each sector.

²³ BEIS analysis based on BEIS 2020, Final UK Greenhouse Gas Emissions National Statistics, <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2020>

²⁴ BEIS and OGA analysis based on BEIS 2020, Final UK Greenhouse Gas Emissions National Statistics, <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2020>

Annex to Chapter 7: Expanding the UK Emissions Trading Scheme to new sectors

Domestic maritime

*This section sets out preliminary analytical thinking on the expansion of the domestic maritime sector to the UK ETS, that is, UK-to-UK shipping by the mid-2020s*²⁵

In 2019, domestic shipping activity was responsible for around 6.0 MtCO₂e, representing roughly 5% of UK domestic transport emissions. Research commissioned by the government suggests that a carbon price would be a highly effective driver for change in the sector.²⁶

Early-stage investigation suggests that there are barriers to reduce GHG emissions because incentive structures are unclear. For example, vessel owners and charterers: in many cases, the party owning the vessel is not the same as the party responsible for paying for the fuel.

Our lead proposal is to apply UK ETS obligations based on vessel activity, with the point of obligation placed downstream, either on vessel owners or on vessel operators. We are minded that the policy would apply to vessels over 5000 gross tonnage and are seeking views on this, including how it can help with decarbonisation through the consultation. The consultation also presents two alternative options on the point of obligation. We are seeking more evidence on the impacts of these alternative options as part of the consultation.

Annex to Chapter 9: Operational amendments

Amendment to electricity generator and primary energy saving rules affect a small number of sites and are expected to largely constitute transfers and small administrative costs.

Flexible share: amends regulations to reflect original policy intent so has no impact against a counterfactual of normal policy operation.

Legal definition of verifier: amends regulations to reflect original policy intent so has no impact against a counterfactual of normal policy operation.

Permit mergers, transfers and splits: clarifies regulations. Any differences against alternative interpretations would likely impact a small number of firms and result in relatively small differences in free allocations, constituting primarily a social transfer.

Global Warming Potentials: per Chapter 9, changes to GWP values will only affect those operators which produce the non-CO₂ gases in scope of the scheme, currently a small number

²⁵ <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2020>

²⁶ UMAS, E4Tech, Frontier Economics, CE Delft (2019) 'Reducing the Maritime Sector's Contribution to Climate Change and Air Pollution. Scenario Analysis: Take-up of Emissions Reduction Options and their Impacts on Emissions and Costs. A Report for the Department for Transport'
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/816018/scenario-analysis-take-up-of-emissions-reduction-options-impacts-on-emissions-costs.pdf

of sites. These relatively small reductions to GWPs would result in small reductions in ETS compliance obligations for the small number of affected sites and emissions impacted.

Proposals regarding: updates required to EN ISO 14065, appeal routes, HSE re-entry to the scheme, penalties, surrender and revocation provisions: are expected to contribute to operational & administrative improvements for operators, regulators and the UK ETS Authority, as well as greater optionality for participants, and amendments to penalties. The primary impacts are expected to be improvements to operational & administrative efficiency, and some possible net social transfers from amendments to FAs and penalties.

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