

The shared benefits of linking EU and UK carbon markets

Supporting mutual EU and UK competitiveness and climate goals

Prepared for EDF, EnBW, RWE, SSE and Uniper

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#	Торіс	Page
1	Summary	3
2	Introduction	5
3	Benefits of ETS linking	8
4	Linking in practice	17

#	Торіс	Page
1	Summary	3
2	Introduction	5
3	Benefits of ETS linking	8
4	Linking in practice	17

Summary: linking the UK and the EU Emissions Trading Schemes would bring shared benefits, with €770m of savings up to 2030 from improved market liquidity alone

- The EU Emissions Trading System (ETS) was set up in 2005 and is now the world's largest carbon market by value, covering large emitters in the power, industry, maritime and aviation sectors. Since 2021, the UK has operated its own (separate) greenhouse gas ETS. The two schemes have a shared history, with the UK ETS similar in many respects to the EU ETS (the latter was itself inspired in part by an earlier UK pilot scheme)
- The UK-EU Trade and Cooperation Agreement (TCA) requires both parties to "give serious consideration" to linking their respective ETS (which would allow UK participants to use EUAs for compliance, and vice versa)
- In this report, we describe how ETS linking could bring significant mutual benefits to the UK and EU, supporting industrial competitiveness vis-à-vis wider international markets. Our findings are relevant given the UK's and EU's stated aim of delivering an ambitious package of measures to strengthen the UK-EU partnership at the planned EU-UK summit on 19 May

	Improved market liquidity	 Linking to market worsen 	would reduce transaction costs . We calculate indicative savings of €770 million (base case) over 2026-2030 et participants – with over half of these benefits falling to EU participants (€420 million). Market liquidity may as ETSs decrease in size. In a scenario reflecting reduced liquidity, benefits reach €1.25 billion
	Reduced price volatility	 Linking participa 	will also reduce price volatility, which should also contribute to reduced costs of risk management for ETS ants, further supporting industrial competitiveness
	Lower cost abatement	 Price co opportu 	nvergence resulting from linking will, other things equal, ensure the cheapest emissions reduction Inities are used across the UK and EU, generating further collective cost savings
	Avoiding frictions from Carbon Border	Trade in electricity	 The EU CBAM may not accurately reflect GB electricity carbon costs. Linking would therefore avoid additional possible friction in UK-EU power trade and disruption in connected markets. Other things equal, linking would therefore help to avoid increases in power prices for neighbouring power markets and help to limit curtailment of GB renewables (which would otherwise have been exported to the EU)
***	Adjustment Mechanisms (CBAMs)	Trade in all goods	 Linking would mean CBAMs would no longer be applied on UK-EU trade, reducing trade frictions: Avoided regulatory burdens for businesses related to embedded emissions reporting obligations A level playing field for exported goods (which CBAMs as currently designed do not ensure)

#	Торіс	Page
1	Summary	3
2	Introduction	5
3	Benefits of ETS linking	8
4	Linking in practice	17

UK Allowances have been at a discount to EUAs since 2023, but were at a premium in early years – with the outlook for relative prices uncertain...

Carbon pricing schemes such as the UK and EU ETS are an important part of the policy toolkit for decarbonisation

- The UK ETS and EU ETS are "cap-and-trade" systems: participating installations are legally required to acquire and surrender each year tradeable allowances (or permits) equivalent to their total GHG emissions in the preceding calendar year. Total emissions from the sectors covered are "capped" in the sense that the total volume of allowances allocated in any one year is fixed (with a share being auctioned by public authorities, who receive the corresponding revenues, and the remainder allocated for free)
- Participants are free to trade allowances between themselves. By putting a price on GHG emissions, schemes such as the EU ETS and UK ETS ensure efficiency: those participants that can reduce GHG emissions at least cost will be incentivised to do so, selling allowances to other participants for whom abatement is more costly

UKA and EUA prices are volatile, and there has been significant variation in the direction and magnitude of the UKA-EUA spread[†]



The outlook for relative UKA/EUA prices in the absence of a link remains uncertain

In the absence of a link, prices in each market will develop based on their own supplydemand dynamics. As such, there is no guarantee the UKAs will continue at a discount to EUAs into the future, or vice versa

Notes: *Frontier Economics analysis, based on ICE futures data (sourced via Bloomberg). ** Another example is <u>Carbon Pulse</u>. † In the UK, the <u>Carbon Price Support</u> results in GB power generation paying a higher effective carbon price than would be implied by the UKA price alone.

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Carbon Border Adjustment Mechanisms (CBAMs) will mean, in principle, that having a lower carbon price will not translate into a competitive advantage on EU-UK trade

Without carbon leakage protection, concern that imports to high carbon price jurisdiction might have competitive advantage over domestic production



CBAMs are tariffs on embedded emissions in imports. They aim to ensure a level playing field (in terms of the carbon price) for goods sold in the high carbon price market



- EU CBAM is currently in its transitional phase (2023-2025); the enduring regime will apply from 2026. UK CBAM will be implemented by 2027
- EU CBAM will erode any competitive advantage for UK goods exports to the EU (in CBAM sectors) that may otherwise have arisen from a UKA discount (relative to the EUA price). The same is true for the effect of UK CBAM on EU goods exports to the UK, were UKAs to trade at a premium to EUAs
- To the extent there is price divergence (and the outlook for relative UK/EU carbon prices is as noted previously uncertain), the operation of CBAMs will also result in transfers from industry in the lower carbon price jurisdiction to the jurisdiction with the higher carbon price. Frontier's <u>2024 analysis</u> estimated (based on UKA prices continuing to trade lower than EUA prices) **a potential transfer from UK industry to EU budgets of up to £0.8 billion** (cumulative over 2026-30)

#	Торіс	Page
1	Summary	3
2	Introduction	5
3	Benefits of ETS linking	8
3	8.1 Reduced transaction costs	
3	8.2 Reduced price volatility	
3	3.3 Lower cost decarbonisation	
3	8.4 Reduced friction in goods and power trading	
4	Linking in practice	17

Market participants will look to hedge allowance price risk - this is currently easier (and lower cost) in the EU ETS

Good availability of low-cost derivatives linked to allowance prices will support competitiveness

- Given volatility in allowance prices (see Section 2), to help stabilise cash flow, participants typically hedge allowance price risk (the extent to which they do so will depend on factors such as risk appetite)
- If participants cannot directly hedge allowance price risk at reasonable cost, they will turn to alternative risk management approaches that may come with higher costs
 – industrials exposed to international trade may be less able to pass on these costs to customers
- The bid-offer spread is the amount by which the offer (or "ask") price exceeds the bid price. It is essentially the difference in price between the highest price that a buyer is willing to pay for a product and the lowest price for which a seller is willing to sell it
- The bid/offer spread represents the transaction cost for participating in a market and is a key measure of liquidity: more liquid markets are characterised by lower bid/offer spreads

Hedging opportunities / costs have improved over time in the UK ETS, though the EU ETS remains more liquid



While UKA forward hedging opportunities have improved over time, they are **still comparatively limited** compared to EUA trading

Source for graph: Frontier Economics analysis, based on daily ICE futures data (04/01/2021 – 07/05/2025; sourced via Bloomberg). Boxes represent the 25th, 50th and 75th percentiles of the distribution of daily bid-offer spreads. Whiskers are the lower and upper "adjacent values". Outliers (daily observations) lying outside this range are indicated by the circles.

Reduced transaction

Linking the UK and EU ETS would nonetheless improve market liquidity for both UK and EU participants



 EU participants would also benefit from an increase in market size, with bid-offer spreads falling by a smaller amount, though across a greater volume (see next slide for details of assumptions)

Sources: (1) Gov.uk, December 2023, "Evaluation of the UK Emissions Trading Scheme, Phase 1 report", <u>Link</u>. (2) EC, "Scope of the EU ETS", <u>Link</u>. (3) Bloomberg, October 2023, "Global Carbon Markets Get Bigger, Even as Trading Dips", <u>Link</u>. (4) Excluding aviation ETS - see ICAP ETS Map, <u>Link</u>. (5) Frontier Economics calculations based on EC 2024 report (excl. aviation ETS), <u>Link</u>. Source for graph: Frontier Economics analysis, based on ICE futures data (see back cover page for disclaimer)

Reduced transaction costs

The resulting savings in transaction costs across UK and EU participants could amount to €770 million over 2026-2030, rising to €1.25 billion if liquidity worsens



(1) Trading activity could increase following linking – though this would only be the case if there were benefits associated with additional trading activity, which we do not capture in our analysis.
 (2) Source for graph: Frontier Economics analysis (rounded to nearest €10m), based on data provided by ICE for UKA/EUA futures products (see back cover page for disclaimer). We do not therefore account for EUA/UKA derivatives volumes traded on other platforms (OTC, other exchanges) and in other products (options, mini-futures), which account for a small share of overall traded volumes in EUAs and UKAs.
 (3) In other words, we assume, for the purposes of this calculation, that observed spreads in 2024 reflect a "steady state". As ETS caps decline, the market size and thus liquidity will likely reduce.

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Reduced transaction costs

Linking should lead to less volatile allowance prices supporting further reductions in bid-offer spreads

markets)*

Linked markets: Price impact of shocks dampened (for both linked

Single (smaller) market (no linking): a shock would have a significant impact on prices

Reduced price



- The price shock-dampening effects of linking could be significant. For example, a very large industrial emitter at 5MtCO2e / year would represent around 5% of the current UK ETS cap, but only around 0.3% of a combined UK/EU ETS cap
- Both UK and the EU caps will tighten going forwards, making them more exposed to shocks if they continue to operate separately
- Other things equal, lower volatility would be associated with lower risk management costs. This effect has not been accounted for in our modelling of transaction costs

*Assuming that shocks do not coincide across markets. **Another example might include policy announcements relating to the size of the cap – affecting market expectations regarding the level of abatement required.

Linking emissions trade schemes can support price convergence, generating collective cost savings for industry across the UK and EU

 A given market's carbon price is determined by the level of abatement required (i.e. as implied by the emissions "cap") and the market's MACC¹.

Lower cost ecarbonisatio

- In the absence of linking, prices can diverge across markets, given differences in abatement costs.
- Linking ETS means that allowances in one market can be used for compliance in the other, and vice versa.
- This allows for arbitrage: participants in the higher price market will purchase allowances in the lower priced market until the allowance price equalises across the two markets.
- The result is that, other things equal, the costs to industry of reducing emissions are minimised across both markets (i.e. net welfare gain).²
- The direction of trade in allowances will not be static over time: changes in abatement costs, driven (for example) by changes in commodity prices and industrial structure can lead to changes in the direction of allowance trade



(1) Marginal Abatement Cost Curve ("MACC"), which considers the costs associated with the available GHG mitigation measures. (2) There may also be distributional impacts associated with linking, such as impacts on prices and taxpayer revenues, though these will depend on relative prices in each market, which as noted previously are uncertain

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Reduced transaction

Even with ETS price convergence, in the absence of a formal link, EU CBAM could lead to acute distortions to power trade between GB and EU

CBAM may lead to GB power exports being over-burdened – even if UK / EU carbon prices are aligned

• EU's CBAM applies to the power sector and consequently to GB power exports (the UK CBAM does not cover electricity)

Reduced trade

- For power, which is traded anonymously and repeatedly, demonstrating that the carbon price on exported volume has been paid is challenging. There is therefore a risk that GB power exports to the EU do not receive rebates on the carbon price already paid in GB
- Even with rebates on UK carbon pricing, the EU CBAM may exaggerate the emissions intensity of GB power exports
 - Increasingly, emissions in periods of export are likely to be lower than average, given GB typically exports during periods of significant low-carbon energy
 - Default values for emissions intensity (see previous Frontier report for detail) will therefore likely overstate the embedded power emissions when exporting

Negative impacts on EU energy policy objectives

- Reduced imports from GB mean that EU requires increased domestic generation – potentially from fossil fuel sources (AFRY* estimates increase in EU thermal generation - mainly gas - of around 9TWh / year, central scenario)
- This is associated with large transfers from EU consumers to EU producers (AFRY* estimated EUR 2.3-4.6 billion/year)
- There may be further costs from the EU having to be more "self-sufficient" (e.g. additional grid and generation capacity needs)

Risks to UK decarbonisation aims

- Higher curtailment of renewable energy sources (RES) during periods of surplus (AFRY* estimates EU CBAM could lead to >50% increase in central scenario though impact is halved if GB exports can get rebates on CBAM for GB carbon price)
- Expectations of greater curtailment and increased policy-driven uncertainty on extent of impact of EU CBAM on curtailment will mean investors in new UK RES projects will require higher support levels – contributing to higher costs to energy consumers, other things equal

Source: *AFRY (2024) https://afry.com/sites/default/files/2024-03/afry_eu_cbam_impact_study_summary_report_mar_2024_v300.pdf

The EU CBAM may also raise power prices in markets connected to GB, with GB interconnectors able to meet up 35% of demand in some markets

Reduced trade frictions

If CBAM-affected GB exports set the wholesale electricity price in the neighbouring markets, or exports are reduced, prices in the neighbouring market will, all else equal, increase. The risk of this outcome is likely to be highest where import capacity from GB is most important for meeting demand

- As described previously, EU CBAM has the potential to distort crossborder power trade between the EU and GB, driven by uncertainties on the methodologies for: (i) treatment of carbon prices paid in third countries; and (ii) the assumed emissions intensity of imports
- As the GB interconnector export capacity constitutes a considerable share of demand of each connected market, this distortion may materially increase prices in the neighbouring markets (notably in the Single Electricity Market (SEM) between Ireland and Northern Ireland, which as well as being highly interconnected to GB, is also less interconnected with other markets, and therefore may be more exposed to higher GB power export costs)
- Impacts may also spill over to other markets not directly connected to GB
- The effects of EU CBAM on the GB market would be different (as discussed on previous slide) and the UK CBAM does not include electricity. But for reference, in 2030, GB's interconnector capacity with neighbouring markets, as a share of its peak, average and minimum hourly demand would amount to 24%, 39% and 75%, respectively



GB interconnector capacity as a share of local hourly demand (2030)

Linking the UK & EU ETS can remove distortions linked to EU CBAM, contributing to a level playing field for power trade between the UK and the EU

Source for graph: Frontier Economics analysis, based on ENTSOe demand data (link) and Ofgem interconnector data (link).

In addition, as things stand, the absence of an "export solution" could mean, if prices diverge, that CBAMs distort trade in goods more generally between the EU and UK

Reduced trade frictions

CBAM "tops up" the carbon price of imported goods, such that they are on a level playing field with domestic production in the high carbon price jurisdiction

Embedded import emissions face CBAM (which is, in principle, based on the difference between the exporting country's and domestic carbon prices) CBAM ETS cost ETS cost (jur. 2) (jur. 1) Export Production Production costs costs Jurisdiction 1 Jurisdiction 2 (low/no carbon price) (high carbon price)

However, unless there is a (partial) rebate on carbon price paid for exports from higher carbon price jurisdiction, exports will not be on a level playing field in international markets



- Based on UKA prices currently being below EUA prices, EU exports of CBAM goods to the UK would be negatively affected by the lack of an export solution for CBAM in 2026; or for differences in coverage from 2027. However, UK exports to EU could be disadvantaged should UKAs become more expensive than EUAs
- Further frictions arise from CBAM reporting burdens and the different scopes of the UK and EU CBAMs (UK CBAM includes indirect emissions, while EU CBAM does not)
- Linking the UK & EU ETS would mean a level playing field for trade in goods between the UK and the EU could be achieved without the distortions of CBAMs. Linking would also ensure a level playing field for UK-EU trade more generally, for goods not covered by carbon leakage measures.

Reduced transaction

#	Торіс	Page
1	Summary	3
2	Introduction	5
3	Benefits of ETS linking	8
4	Linking in practice	17

ETS linking negotiations could kick off at EU-UK Summit, aiming to conclude agreement by COP30 – with temporary measures to mitigate CBAM, if required

Negotiations could start immediately...

- Given the possibility of linking is included within the EU-UK Trade and Cooperation Agreement (TCA), linking negotiations could be initiated at the EU-UK Summit on 19 May. Completing an agreement by the end of the year would avoid the impact of the CBAMs from 2026, and would exhibit shared climate leadership ahead of the milestone COP30-climate negotiations, and is widely supported by EU and UK businesses
- To the extent negotiations on linking may still be ongoing when financial obligations under EU CBAM start to apply (from 1 Jan 2026), EU and UK policymakers could consider temporary / transitional arrangements to cover ongoing linking negotiations

...and whilst some operational alignment will be necessary, other areas may not be critical to market functioning...

- In principle, maintaining separate schemes would allow the greatest freedom for policymakers in the design of their respective schemes. However, this needs to be traded off against the various benefits that linking the UK and EU schemes would bring (discussed earlier in this report)
- Nevertheless, even with linking, some scheme differences may be possible (e.g. differences in sectoral coverage or the future of free allocation). Such differences would likely need to be addressed through negotiation, especially where there may be concerns regarding potential distortions to UK-EU trade. This highlights the importance, during negotiations, for any planned developments of both markets to be taken forward with future linking in mind (see later slide for examples)
- However, for linking to be feasible, rules on market operation (e.g. market stability mechanisms; registry interaction; use of negative emissions or international offsets) would likely need to be harmonised, and there would need to be agreement on administrative costs

...however, it may not be possible to escape wider issues

- Governance: Under the <u>EU-Swiss ETS linking agreement</u>, implementation is overseen by a "Joint Committee" that acts as a forum to discuss amendments to the agreement and resolve disputes. If necessary, disputes can be escalated to the Permanent Court of Arbitration in the Hague (i.e. there is no ECJ involvement). This could be a model to follow for UK-EU linking negotiations
- Funds: Contributions to EU ETS funds (e.g. Innovation Fund, Modernisation Fund) were not part of the EU-Swiss agreement. While the issue of funding could conceivably be raised with the UK, given it formerly contributed when part of the EU ETS, formally, UK contributions to the EU budget were dealt with under the UK's Withdrawal Agreement from the EU
- Wider relationship: With the review of the EU-UK TCA due to start in 2026, it is possible that ETS linking negotiations become enmeshed with negotiations on wider issues (e.g. youth mobility, fisheries) without relevance to ETS operation or trade arrangements. This underlines the importance of potential temporary arrangements (e.g. a CBAM exemption) as discussed above

Note: Any link would not be irreversible (though any agreement would benefit from a clear de-linking process allowing a sufficient lead time for avoiding market disruption)

The current similarities of the UK and EU ETS should facilitate linking...

 Linking was g on EU immigi conditions se essential crite An equivaler 	restrictionsfundamentally similar to the EU ETS indicating that linking with the EU ETS should be relatively straightforward				
	*** *** ***				
ETS sectoral coverage	 Industry, power, domestic aviation, maritime 	 Industry, power, domestic aviation 	 Industry, power, domestic aviation (maritime planned from 2026 onwards) 		
Overall GHG targets	 2030: 55% GHG emissions reduction on 1990 levels 2050: Climate neutrality 	 2030: 50% GHG emissions reduction on 1990 levels 2050: Net zero GHG emissions 	 2030: 68% GHG emissions reduction on 1990 levels 2050: Net zero GHG emissions 		
ETS cap	 ETS cap 2030: 774 MtCO2e (1,386 MtCO2e in 2024) 	 ETS cap 2030: 3.6 MtCO2e for industry/power (4.5 MtCO2e in 2023) 	 ETS cap 2026-30: 303MtCO2e (633 MtCO2e over 2021-25) 		
Use of international credits	 Not allowed 	 Not allowed 	 Not allowed 		
Penalties	 EUR 100/tCO2e (~GBP 85/tCO2e) 	 CHF 125/tCO2e (~GBP 110/tCO2e / EUR 130/tCO2e) 	 GBP 100/tCO2e (~EUR 120/tCO2e) 		
Sources: International Carbon Action Partnership, EU-Switzerland linking agreement, EU ETS Directive, https://www.klima-allianz.ch/wp-content/uploads/Klima-Masterplan_Teil_Inland.pdf					

Negotiations on linking the Swiss and EU ETS began in 2010. They were held up due to the results of a 2014 referendum in which Swiss citizens voted to restrict immigration from the EU.

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The UK ETS remains

... as long as planned developments of both markets are taken forward with future linking in mind

In some areas, divergence in market development could make linking more difficult. For example:

Approaches to market stability mechanisms

- The EU ETS has established a volume-based Market Stability Reserve (MSR) and relativeprice triggered cost containment mechanism ("Article 29a")
- The UK is considering a similar Supply Adjustment Mechanism (SAM) – and has a price-based Auction Reserve Price (ARP) which supported the ETS start up. It also has a relative-price triggered Cost Containment Mechanism (CCM)
- It is likely necessary that the EU and UK would need to align the operation of these mechanisms to enable linking

Sectoral coverage

- Sectoral coverage is broadly similar between the UK and EU schemes (see previous slide)
- However, there are some differences. For example:
 - Unlike the EU ETS, the UK has decided to not include emissions from wider international maritime transport in the UK ETS for the time being¹
 - The future of the EU's ETS II covering fuel combustion in buildings and road transport could create friction in the future
- In theory, such differences in coverage could exist in linked schemes, although it would leave competitive distortions in some sectors and therefore may also make negotiations more complex

Greenhouse Gas Removals (GGRs)

- The UK has a stated ambition to incorporate engineered GGRs into the UK ETS
- The European Commission is due to report on the potential coverage of GGRs by emissions trading by July 2026
- Depending on GGR standards and the precise approach to incorporating them (which may diverge between schemes), including GGRs in an ETS could lead to a relaxation of the cap, potentially dampening prices
- In principle, this could be dealt with in a linked system, for example through adjusting allowance supply downwards in the scheme incorporating GGRs. Addressing possible future differences in the use of offsets/removals/credits would need to be addressed in any linking negotiations between the UK and EU

1) https://assets.publishing.service.gov.uk/media/6747627277462f7809147537/uk-ets-scope-expansion-maritime-consultation.pdf



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