THE A-B-C OF BCAs

An overview of the issues around introducing Border Carbon Adjustments in the EU

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Published in December 2019 by Sandbag.

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Thanks
The author would like to thank Wilf Lytton, Suzana Carp and Adrien Assous for their helpul comments and input on this report.

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Border Carbon Adjustments (BCAs) price greenhouse gas emissions embodied in imports to the European Union (EU). This helps create a market for low-carbon goods inside the EU, while boosting global demand for such goods, helping safeguard the climate and provide a "level playing field" for EU industry. A carbon neutral European Union by 2050 can't and shouldn't be achieved at the expense of carbon intensive imports from other parts of the world. BCAs also help create further investor certainty that carbon pricing is here to stay, and therefore needs to be accounted for in investment decisions.

BCAs price emissions from imports

- BCAs may take the form of an obligation on imports to surrender allowances, or a tariff at the border.
- EU producers should not be able to benefit from both free allocation and shielding from BCAs for the same proportion of emissions, because this would over-compensate them and create surplus (windfall) profits.
- BCAs could be phased in as free allowances are phased out, with each mechanism covering a proportion of emissions. This could start in Phase IV of the EU ETS.
- It should be possible to design BCAs consistent with WTO rules. As part of this, rules may need to be established for recognising carbon costs already incurred by imports from jurisdictions with their own carbon pricing regimes.

BCAs are likely to be applied to emissions intensive bulk commodities

- BCAs are most suitable for emissions intensive trade exposed bulk commodities. These may include, among others, cement, iron and steel, aluminium, some bulk chemicals, pulp and paper and oil refining. They may also cover electricity.

BCAs have a range of advantages

- Unlike free allocation, BCAs can improve incentives to switch to lower carbon products by including the cost of carbon in the market price of products within the EU.

- BCAs can incentivise the introduction of other carbon pricing regimes in other jurisdictions, therefore potentially giving European producers a stronger incentive to remain in Europe, and therefore being a strong safeguard against any possible 'carbon leakage'.
- BCAs can address barriers to industrial decarbonisation which the EU ETS itself has created, because they price emissions rather than subsidising them, as the current system of free allocation does.
- BCAs will ultimately lead to attracting a range of low carbon goods to the EU, creating a market for such products.
- BCAs may raise additional revenue for governments.
- BCAs can, if necessary, continue as caps reduce, eventually to near zero, when allowances become scarcer, making free allocation more difficult. This can help sustain a level playing field for European industry into the long term.
- By reducing the risk of leakage BCAs would make the EUETS more robust to higher EUA prices and thus help enable tighter caps.

Despite their advantages, BCAs have been little used to date either in the EU or other jurisdictions because of the barriers to successful implementation

Key requirements for effective design are:

- ensuring compatibility with WTO rules, which may include use of environmental exemption provisions under the Article 20 of the GATT agreement;
- ensuring cooperation and overcoming opposition from industry and from exporting countries.
- putting in place significant administrative infrastructure, which is needed to track imports and their embodied carbon content; and
- minimising risks that exporters to the EU try to avoid BCAs or compromise their effectiveness, for example by rerouting production between markets or exporting semi-finished goods.

There are many issues to be addressed in designing BCAs, which are summarised in the table overleaf. This report includes an initial look at the issues, but extensive further research will be needed.

Issue	Questions
Form of BCA	Border tariff, or requirement to surrender EUAs, or other types of allowance? Implications for EUA demand and price?
Advantages of BCAs	Will BCAs lead to product prices in the EU that reflect carbon prices? Can substitute products be treated on a consistent basis? How much revenue might be raised?
Quantity of embodied emissions	How is the benchmark for BCAs be set, and how often is it updated? Can measured emissions be used? How are adjustments made for successive imports and exports from the EU during production? How are electricity related emissions treated?
Free allocation	How can BCAs be set to reflect continued free allocation of EUAs? How can excess profits from overlap of BCAs and free allocation be avoided?
Rate of introduction	How should BCAs change as free allocation is phased down? How quickly should free allocation be phased down?
Adjusting for carbon price already paid	How should an adjustment be made to reflect carbon pricing in the exporting jurisdiction? What if carbon costs are greater in exporting jurisdiction than the EU? What account should be taken of any rebates and financial assistance? How should any lack of market liquidity or transparency be addressed? What adjustments, if any, should be made for equivalent regulation, for example performance standards?
Exports	Should there be rebates or similar measures for exports?
Sectoral coverage	What criteria should be used to determine which sectors are covered? Which sectors fit these criteria? Are there barriers to including particular sectors?
WTO compatibility	What design principles can ensure compatibility with WTO rules?
Political concerns	How should design take into account the implications of EU BCAs for other jurisdictions? How should design of BCAs take account of other concerns about trade? How should design take into account the concerns of EU industry?
Administrative complexity and cost	How can design minimise the administrative burden, including by making use of existing reporting structures? How are place of origin and emissions to be tracked?
By-pass	How can rules be designed to minimise bypass?
Re-routing products	How can rules be designed to prevent "resource shuffling"?
Gaming the carbon price paid	How can gaming of the carbon price already paid be avoided?

1. Introduction and context

The challenges of reaching net zero emissions in the EU by 2050 are resetting many of the old conversations on climate policy. The old carbon leakage discussion is changing to one in which there is a realisation that the EU needs environmental policies that become a major driving element of industrial competitiveness. One such policy is a Border Carbon Adjustments (BCAs).

Producers covered by the EU Emissions Trading System (EUETS)[1] have long argued that they may be put at a disadvantage compared with producers in other jurisdictions that do not pay a carbon price, or pay a lower carbon price. This disadvantage may remain even if the EU producer otherwise has lower costs and lower emissions. This may result in production and investment relocating to outside the EU with no reduction in global emissions, and in some cases an increase. This is usually referred to as carbon leakage.

There has been no documented evidence of leakage on any significant scale so far. Nevertheless, the ambitious discussions on a net-zero EU by 2050 imply that ways are needed to help European industry to flourish in this emerging landscape. Innovation and deep technological transformation will be part of the discussion, but EU legislators also have to find a way to ensure that relocation outside of the EU does not appear as the simplest choice for industry.

To date free allocation of EU Allowances (EUAs) to industry helped EU producers and so reduced carbon leakage, and has in some cases generated surplus profits. However, this system of large-scale free allocation is not sustainable in the long term as the EUETS cap decreases, eventually to nearly zero. Sandbag has previously proposed border carbon adjustments as a means of ensuring European industries under the EUETS remain competitive as free allocation diminishes[2,3].

BCAs provide an alternative mechanism for reducing the risk of leakage. They seek to create a level playing field for industry by applying a carbon price on imports that reflects the carbon emissions from their production (often referred to as embodied emissions, or embedded emissions). BCAs may take the form of a tariff on imports, or a requirement that importers purchase allowances to cover the embodied emissions.

1. This report only looks at sectors that are covered by the EUETS. Other sectors lie outside the scope of this report. In any case, emissions intensive bulk commodities are best suited to BCAs, and they are mainly covered the EUETS at present.

2. Sandbag. (2017). An agenda for strategic reform of the ETS. p. 6. https://sandbag.org.uk/project/the-future-of-the-euets/

3. Sandbag. (2017). The Cement Industry of the Future. https://sandbag.org.uk/project/cement-industry-future/

BCAs have been discussed for many years as they are potentially a powerful instrument for emissions reduction that also addresses competitiveness concerns. The EUETS Directive refers to the possibility of such arrangements being introduced[4]. There have been various proposals for their adoption, including a French proposal for a Carbon Inclusion Mechanism in 2010[5], and in 2017 proposals were introduced for BCAs on cement, which passed the European Parliament's Environmental Committee's vote. However, none of these measures were eventually passed into legislation. BCAs have also received extensive consideration in the policy literature, implying there is a large amount of analysis available to draw on.

BCAs are usually considered to have advantages over the current approach of using free allocation to safeguard competitiveness. BCAs would in principle lead to a carbon price being included in the price of the product, and so passed on to consumers, increasing incentives to switch to lower carbon alternatives. They also provide incentives for jurisdictions exporting to the EU to introduce their own carbon pricing, and so capture the revenue for themselves rather than allowing it to be captured by the EU.

However, despite their advantages having been understood for many years, and proposals having been discussed, BCAs have had limited implementation to date either in the EU or in other jurisdictions. Electricity imports in California and Quebec under the Western Climate Initiative (WCI) cap-and-trade systems are subject to BCAs in the form of the requirement to surrender allowances[6]. However, this is almost the only example[7]. The requirement to surrender allowances to cover for electricity imports from the north-eastern USA to Quebec is the only instance a BCA that applies across national frontiers. BCAs have been seen as politically contentious, administratively complex, subject to potential avoidance, and difficult to reconcile with WTO rules. Instead of BCAs, almost all emissions trading systems have chosen to address competitiveness issues by free allocation of allowances, or by excluding sectors from carbon pricing.

4. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20140430&from=EN See Article 10(b)(1)(b).

5. https://www.euractiv.com/section/trade-society/news/france-details-plans-for-carbon-inclusion-mechanism/

6. See https://climatestrategies.org/wp-content/uploads/2017/12/CS_report-Dec-2017-4.pdf http://www.environnement.gouv.qc.ca/changements/carbone/Types-participants-SPEDE-en.htm https://www.edf.org/sites/default/files/Quebec_ETS_Case_Study.pdf
The obligation excludes imports from systems linked under the WCI.

7. There are other examples of carbon pricing with some similarities. For example, the Beijing pilot ETS has a treatment of electricity which includes some elements of border accounting.

The introduction of BCAs for sectors covered by the EUETS is now receiving renewed attention. The new President of the European Commission has asked for proposals to introduce BCAs[8]. Some industry associations also appear more open to discussions on the topic. There appear to be several reasons for this increased interest in the EU:

1. The number of allowances available for free allocation is decreasing as the EUETS cap reduces, potentially restricting the availability of allowances in future. This may include greater use of cross sectoral correction factors in the medium term. Furthermore, the EU ETS directive speaks of auctioning as the preferred allocation mechanism and free allocation as only a temporary exception. This temporary exception will be 25 years old in 2030 and therefore alternative mechanisms will have to be envisaged. The decline in the number of free allowances will continue in the long term. The cap is intended to lead to a reduction of 80-95% by 2050 under the current commitments, which may be strengthened further, leaving almost no permits on the market. This is within many investment lifetimes in energy intensive industries, implying solutions are required for investments being made now.
2. EUA prices have risen strongly over the last two years, giving increased urgency to the need for pricing to apply to all production competing in EU markets, given that free allocation will in future be unable to apply to cover all emissions.
3. The Paris Agreement recognises that jurisdictions will take actions based on their Nationally Determined Contributions, recognising different national circumstances. This implies that action will continue to be heterogenous across jurisdictions. Consequently, competitiveness concerns may persist. While Article 6 of the Paris Agreement makes reference to international mechanisms, a unified global carbon pricing regime appears at best a very distant prospect, and highly unlikely to be realised over any policy-relevant timescale.
4. Many major jurisdictions still do not yet have carbon pricing, or in some cases have only very low prices, with little prospect of the introduction of carbon pricing similar to that in the EU in many cases.

Like the free allocation of allowances, the idea underlying BCAs is simple in principle, but their introduction raises many significant issues. This should not deter the EU from adopting a beneficial policy, as part of a wider mix. This is because it is clear that neither the goals of the Paris Agreement, nor those of a carbon neutral EU by 2050 will be achieved with the current set of available policy solutions. Nevertheless, the difficulties need to be addressed.

8. https://ec.europa.eu/commission/sites/beta-political/files/mission-letter-paolo-gentiloni_en.pdf

This report sets out an initial overview of the issues that are likely to arise if the EU seeks to introduce BCAs. It also considers some possible ways forward.

This is a short report intended to inform the early stages of the renewed debate on BCAs in the EU. As such it looks at issues from a preliminary, high level perspective rather than seeking to provide specific policy recommendations. More detailed analysis, including modelling work, will be needed before specific proposals can be developed.

In reviewing BCAs we recognise that, if introduced, such measures should form part of a wider package of complementary policies needed to achieve decarbonisation of industry and the electricity sector. However, this report does not cover what those complementary policies might be, or how they might interact with BCAs.

2. Design of Border Carbon Adjustments

2.1 Form of BCAs

BCAs could be implemented as:

- a requirement to surrender EUETS allowances for imports; or
- a tariff on imports.

Requirement to surrender EUAs

A BCA could be imposed in the form of a requirement on an importer to surrender EUAs to cover the embodied carbon in its imports, including any emissions due to electricity used in production[9]. At its simplest, if there were, for example, two tonnes of emissions from the manufacture of one tonne of product imported to the EU, there would be a requirement to purchase two EUAs for each tonne of those imports.

This appears to be the type of approach envisaged in the EUETS Directive, which refers under "measures to support certain energy-intensive industries in the event of carbon leakage" (see Article 10b(1)(b)) to reporting on appropriate proposals which may include "*inclusion in the Community scheme of importers of products which are produced by the sectors or subsectors determined in accordance with Article 10a.*"

This has the advantage that the obligations on EU producers and importers are very closely matched.

The requirement to surrender EUAs also potentially reduces global emissions arising from consumption in the EU. This is because all consumption within the EU is accompanied by a requirement to surrender EUAs, and so all emissions from the production of included goods fall under the EU ETS cap. This is unlike the present situation where emissions due to imports lie outside the EU ETS, so there may an increase in global emissions due to consumption within the EU.

Such an approach would increase demand for EUAs, and so may increase the carbon price, other things being equal and if there are no accompanying exemptions for exports. This would help to give long term investor certainty that Europe is a place safe to attract investments in low carbon technologies.

9. Scope 1 and 2 emissions.

Even so, in the short term the effect on EUA markets would likely be small. There is currently a large surplus of EUAs, and annual emissions remain below the cap. Also, additional demand for EUAs will be small if BCAs are phased in gradually (see section 2.3). However, the increase in demand is potentially material as a proportion of the overall market in the longer term, especially as the cap declines over time, BCAs apply to a greater proportion of emissions, and free allocation in the EU is phased down. For example, the EU imported approximately 43 million tonnes of steel in 2018. Assuming 1.8 tonnes of emissions per tonne of steel[10], this would potentially increase demand for EUAs by nearly 80 million tonnes per annum, depending on the BCA benchmark used[11].

However, while this approach has advantages it represents an extension beyond the original scope of the EUETS which may prove contentious. It may also create difficulties in the very long term as the EUETS cap reduces to close to zero, implying a much smaller carbon market than at present, even allowing for some use of offsets or sinks. In this case, imports to the EU with some embodied emissions may still be allowed, requiring EUAs to be surrendered, but EUAs will be scarce. For these reasons an alternative mechanism may have advantages especially in the long term.

The obligations to surrender other types of allowances

An alternative to requiring importers to surrender EUAs would be to allow obligations to be met by surrendering a new class of allowances created for imports. These import allowances would be available in unlimited quantities at the prevailing EUA price. This would avoid placing emissions from imports under the EUETS cap while retaining an obligation to surrender allowances and pricing embodied emissions at the EUA price.

This has some precedent in the previous Australian ETS, although this did not apply to imports. During the first years of operation an unlimited number of allowances were sold at a fixed price of AU$23/tonne, essentially creating a carbon price at that level. The intention was to transition to a cap after three years but this was never implemented because the system was abolished.

Tariffs at the border

An alternative is to impose a BCA in the form of a tariff imposed reflecting embodied carbon. The level of the tariff may be based, for example, on average EUA prices over a year (or other period). For example, a border carbon tariff of €25/tonneCO_2 may be imposed on imports, representing the annual average EUA price. If each tonne of imported product has two tonnes of embodied emissions then each tonne of imported product will be subject to a tariff of €50/tonneCO_2.

10. Source: World Steel Association

11. Source: UN Comtrade. Net imports were much lower, approximately 11 million tonnes, so the effect would be much lower if EUAs were required to cover net imports only.

The tariff would likely need to be adjusted for any carbon price already paid in the importing jurisdiction (see section 2.5). Tariffs could be continued indefinitely, even when the number of allowances has been reduced to a very low level. They would not require any "sunset clause".

The letter from the President of the Commission makes reference to a border tax (although this may be a broad use of the term to include tariffs and surrender of allowances). This approach may be simpler in some respects than a requirement to surrender EUAs, because it does not require importers to participate in the EUETS. However, unless tariffs follow the EUA price very closely, fluctuations in EUA prices may lead to mismatches between the carbon price on imports and on EU production. Consequently, there may be a less close equivalence between the regime for domestic production and imports. This may reduce the BCAs' effectiveness in creating a level playing field. It may also raise greater issues about compatibility with WTO rules.

The alternative of a consumption tax

A consumption tax on emissions intensive goods has been suggested[12]. This would be a different approach to a BCA. It would be paid equally on all consumption of the product, including both imports and EU production. As such it would resemble an excise tax. This may reduce international legal barriers to a tax[13]. It would also ensure that carbon costs were passed through to product prices, and thus to consumers, because the tax would apply on all consumption.

However, an EU wide tax of this type would likely face major political and legal obstacles within the EU. Taxes normally fall under Member State jurisdiction, and so it may not be possible to introduce the measure at an EU level. At the very least it might require unanimity rather than a qualified majority to introduce such a measure.

A consumption based tax would apply both to EU production not exported and to imports. To create a level playing field, as BCAs are intended to do, it would need to be modified to reflect actual carbon prices already paid both on imports and on EU production. There would thus need to be a rebate on the consumption-based tax to reflect benchmarked carbon costs already paid under the EUETS, or continued free allocation. If a rebate (or continued free allocation) were not included, a consumption tax would fail to create a level playing field, as intended for BCAs, and thus it would not prevent leakage.

12. See, for example,. ECF report Industrial Transformation 2050 https://europeanclimate.org/wp-content/uploads/2019/04/Industrial-Transformation-2050.pdf

13. Some have argued that the consumption-based taxes might be more acceptable from a legal point of view – see Trachtman J. P. (2016). WTO Law Constraints on Border Tax Adjustment and Tax Credit Schemes to Reduce the Competitive Effects of Carbon Taxes. RFF. (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2738752). The author suggests a product-based tax that does not vary by reference to carbon intensity of production but is set at a fixed rate for specified categories of products, or a national carbon consumption tax that varies by reference to carbon intensity of production, are most likely to be compatible with WTO law. This proposal in its simplest form reduces the environmental effectiveness of the BCA by making it independent of embodied carbon.

2.2 Setting the level of BCAs

Introducing a BCA which prices embodied carbon in imports requires calculation of both:

- the quantity of embodied emissions, also known in the European Commission's Impact Assessment and elsewhere as carbon intensity; and
- the price of the embodied emissions.

We consider three cases:

- the simplest case where there is no free allocation of EUAs to producers in the EU and no carbon pricing in the jurisdiction exporting to the EU;
- where adjustments that may need to be made for carbon pricing already paid in the jurisdiction exporting to the EU;
- phasing-in of BCAs while some free allocation of EUAs remains.

Quantity of embodied emissions

The scope of embodied emissions included under BCAs should be compatible with the EUETS to minimise economic distortions and maximise compatibility with WTO rules. This is likely to imply, for example, exclusion of emissions from transport of the imports to the EU (subject to any developments in the treatment of emissions from international shipping). It also suggests coverage of gases needs to the same as under the EUETS, with CO_2 and some industrial gases included but others, notably methane, excluded.

BCA benchmarks

The quantity emitted in manufacture of products imported into the EU may be measured directly. However, measurement of embodied emissions in imports from a wide range of locations is potentially onerous. For example, any measurement would probably need to follow consistent guidelines across jurisdictions, and to include third party certification in the jurisdiction in which the imports are produced.

An alternative is to set the level of embodied emissions using a benchmark for a specified product. This may be set on the basis for example of the global average, regional average, or EU average emissions for each tonne of product. The benchmark may need to be set at a disaggregated product level, for example recognising different grades of steel. It will need to be updated periodically.

This benchmark for BCAs is unlikely to be at the same level as that used to set free allocation of EUAs, even if it refers to the same industrial process. This is because the benchmarks use different reference points for different purposes. The free allocation benchmark is based on efficient production with the EU (usually the top 10% of producers), whereas the benchmark for embodied emissions will likely be set on another basis, for example global average production for that particular process.

The European Commission should lead on making this data available and should do so as part of a legislative proposal for introducing a BCA.

Complications in measuring volumes arise when parts of a process are within the EU. For example, a raw material may be partially produced in the EU, then transported outside the EU for processing into the basic commodity, before being imported into the EU for final use. It is likely to be necessary to design rules to ensure that only the portion of emissions occurring outside the EU is covered by the BCA.

It may be necessary to avoid country-specific benchmarks because these risk being judged as discriminatory under WTO rules. However, this issue may be avoided if actual emissions data is used, and it is this we now consider.

Actual emissions embodied in imports

Importers may be able to replace a benchmark figure with actual emissions if they can demonstrate that these have been reliably measured, with robust monitoring, reporting and verification (MRV), consistent with that used within the EU. This would put an incentive on producers with emissions below the benchmark to measure and demonstrate their actual emissions.

The approach of using a benchmark and replacing it with a measured value was used for fugitive methane emissions from coal mining under the previous Australian carbon pricing regime, although this regime was subsequently abolished.

Embodied electricity and associated emissions

Clear principles and unambiguous rules are needed for estimating the embodied carbon in electricity-intensive imports such as aluminium and some chemicals. The carbon intensity of electricity production varies enormously, and consequently so does the carbon intensity of electricity-intensive imports.

There is a particular complication for electricity, because it comes via a grid and delivered electricity cannot be traced directly back to an individual power plant, or, depending on how large the grid is, even a single jurisdiction. (This is sometimes referred to as the “green electrons vs. brown electrons” issue.) Decisions will be

needed as to whether a consistent baseline, such as the grid average emissions factor, will always apply, or whether in some cases a measured value can be used, for example if there is an electricity purchase contract in place.

These will have a potentially large effect on the scope and size of the BCA for some commodities. There need to be safeguards against gaming of this, where there is potential to imply by a contract that low carbon electricity has been used, when in fact the electricity is from a largely high carbon grid with only a small amount of low carbon electricity (that under contract) and there is no additional low carbon electricity used in practice for the production covered by the BCAs.

In contrast, using grid intensity of the exporting country can create appropriate incentives. For example, it can disincentivise the building of further coal plants.

Setting the price of embodied emissions

The price on embodied emissions will usually be the EUA market price. Any national carbon taxes applied to electricity are unlikely to be taken into account in setting BCAs for the EU as a whole.

2.3 Treatment of free allocation of allowances

Free allocation of allowances and shielding from BCAs should not both apply to the same part of emissions from EU producers. If they do the producer in the EU will benefit twice, from the value of free allowance, and from the increase in costs for importers increasing market prices. This will create excess profits[14].

This is illustrated in the chart overleaf. Importers face the increased costs due to their carbon emissions (blue bar on chart). With both EU producers and importers facing a cost at the margin, the market price of the commodity will increase to include the carbon cost. If the EU producer has lower carbon costs even without free allocation (blue plus green bars on chart) they will appropriately profit from the BCA due to their lower emissions. However, if at the same time EU producers have reduced costs due to free allocation (green bar on chart) they will see an additional profit that does not reflect lower emissions. They will thus earn excess ("windfall") profits.

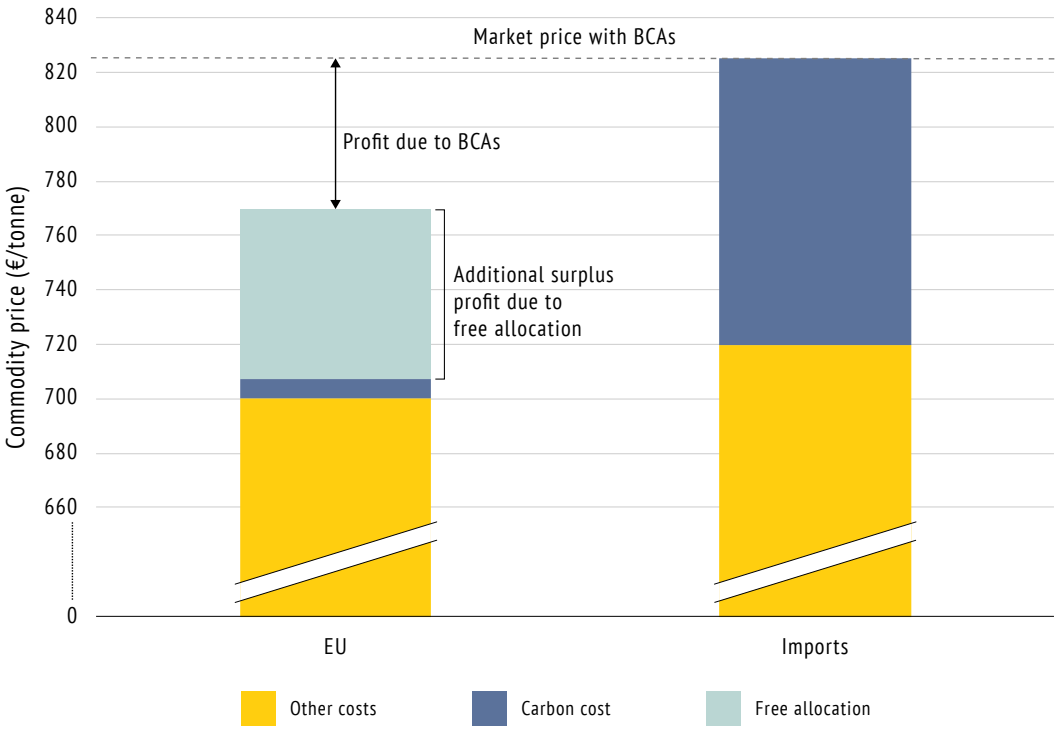
Something very similar to this has already been seen in the EUETS. There were surplus profits ("windfall gains") totalling tens of billions of Euros in the power sector during Phase 1 and Phase 2 of the EUETS[15].

14. Others have also made this point, see for example https://carbon-pulse.com/84419/ and https://europeanclimate.org/wp-content/uploads/2019/04/Industrial-Transformation-2050.pdf

15. See https://climatestrategies.org/wp-content/uploads/2012/02/cs-effectiveness-of-ets.pdf and reference therein.

CHART 1:

The prospect of windfall gains if both BCAs and free allocation are in place



Carbon costs could be passed through to the market because there was little competition from outside the EU. This led to a rise in electricity prices. At the same time free allocation of allowances to the power sector reduced carbon costs. This double compensation produced the surplus profits overall (though some individual power plants benefitted more or less than average). This was the principal reason why auctioning of allowances to the power sector was introduced in Phase 3 of the EUETS.

Putting in place BCAs in full while free allocation continues would also likely lead to challenges under WTO rules because similar ("like") imports would not be treated on the same basis.

BCAs on the difference between emissions and free allocation

To prevent this double profit, a BCA should be imposed only on the difference between any free allocation to EU producers and the amount of emissions embodied in imports. The quantity of embodied emissions subject to BCAs may then be increased as free allocation reduces.

To take a purely illustrative example, it may be that:

- the free allocation benchmark is 2 tonnes of CO_2 per tonne of product;
- there is 100% free allocation; and
- the imports' benchmark emission intensity is 2.3 tonnes of CO_2 per tonne of product.

In this case the BCA may apply to only 0.3 tonne for each tonne of product imported. However, if the free allocation is reduced to 1.0 tonne per tonne of product (for example due to application of the cross sectoral correction factor) BCAs would then apply to 1.3 tonnes of embodied emissions. However, this 1.3 tonnes might be reduced if the embodied emissions (either measured or set using a benchmark) are also reduced. This can be used as the basis of a phased approach to the introduction of BCAs, as we consider below.

2.4 The potential for a phased approach

Although BCAs and free allocation should not both be in place in a way that provides double shielding and so excess profits, there may be opportunities to adopt a phased approach to introducing BCAs. Under this type of approach border adjustments are phased in as free allocation is phased out. Free allocation could be phased out whether BCAs are in the form of an import tariff, or a requirement to surrender allowances.

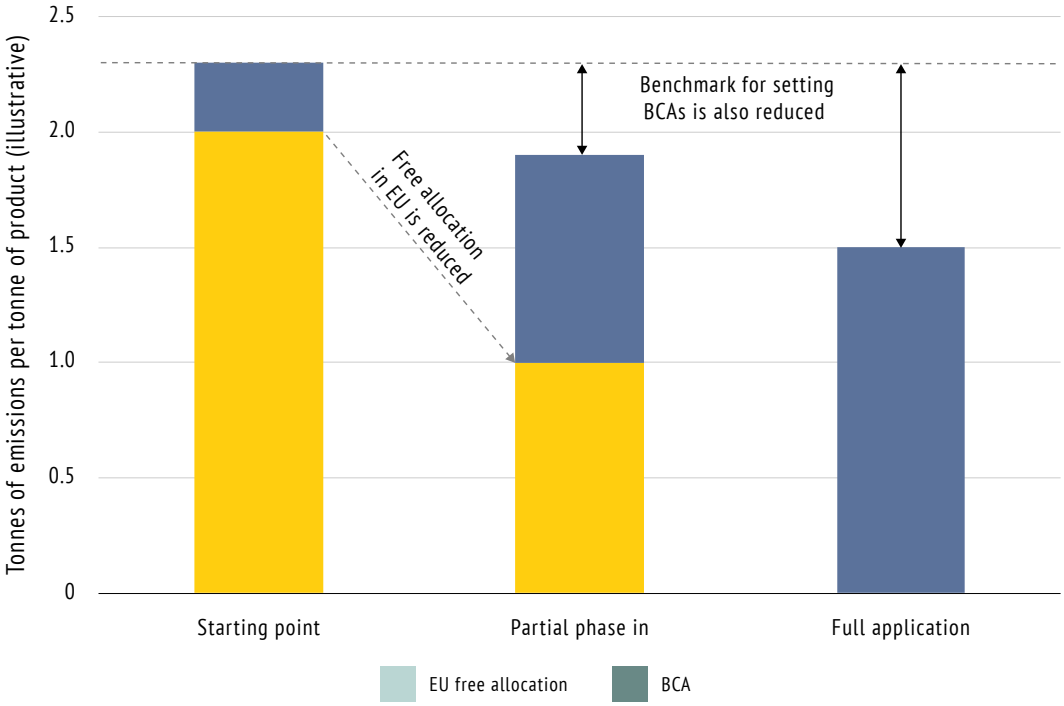
One way of achieving this is illustrated schematically in the chart overleaf. Initially there is free allocation at 100% of benchmark (2 tonnes per tonne of product). Importers are subject to a small BCA (on 0.3 tonnes) because the benchmark used to set BCAs (2.3 tonnes) is above the free allocation benchmark.

Over time the amount of free allocation decreases. As this happens, the amount of embodied emissions in imports for which BCA must be paid increases. The benchmark for setting BCAs also falls over time as production becomes more efficient globally. However, free allocation decreases more rapidly than the BCA benchmark, so the amount of emissions covered by the BCA increases. In the illustrative case shown the BCA benchmark falls to 1.9 tonnes per tonne of product, but free allocation falls to 1 tonne, so the BCA is payable on 0.9 tonnes. Eventually free allocation is removed completely, and the BCA is payable on the full benchmark amount.

Phasing in BCAs during Phase IV of the EUETS has a number of advantages. It will allow systems to be established and payments to be made while the size of the payments is relatively small, because free allocation remains in place. The effect on production and markets can then be assessed. This will enable informed,

CHART 2:

Schematic illustration of phase in of BCAs



evidence-based decisions for the second half of Phase 4 during the 2023 review, and Phase 5. By 2030, European industry will be approximately a third of way into their remaining transformation to a net zero economy and BCAs would be expected to play a greater role.

2.5 Setting the level of BCAs for imports from jurisdictions with carbon pricing

The case for lower BCAs to recognise carbon prices already paid during production

In the case of imports from other jurisdictions with carbon pricing, BCAs may need to be modified if a carbon price has already been paid on emissions during production. This is potentially a large and growing issue that needs to be addressed in the initial design of any system. When the EUETS was first introduced there was no significant carbon pricing system outside Europe. This situation has changed greatly since then. There are now, according the World Bank, 56 carbon pricing

systems in place around the world[16], a mixture of carbon taxes and emissions trading systems. Not all of these will export to the EU in the relevant sectors, and not all pricing covers industrial emissions. However, many will raise issues. For example, if the EU imports goods from California, South Korea or parts of China, all of which have carbon pricing systems, it may not be appropriate to pay the EU carbon price in full on imports.

One possibility is to exempt other jurisdictions with a carbon price from the application of EU BCAs. This has the advantage of simplicity. However, it would reduce the effectiveness of the BCA. For example, it would exempt imports even if they had only been subject to a very low carbon price on emissions from production. A more promising approach is to modify the BCA to reflect the carbon price actually paid, with adjustments made for differences in scope or carbon pricing regimes and levels of carbon pricing as necessary.

A reduced effective carbon price may, for example (depending on the form of the BCAs), involve paying a lower level of border carbon tariff, a requirement to surrender EUAs for only in part of the embodied carbon, rebates or exemptions from BCAs.

Calculating the modified BCA

The calculation of the reduction of the BCA to take account of carbon pricing in the exporting jurisdiction is likely to be based on seeking to reduce the BCA by the amount of carbon price already paid in the exporting jurisdiction[17]. This avoids pricing carbon twice. However, in practice this calculation raises a number of choices. For example, what should happen in the following cases?

- **The payment already made is above the BCA because there is less free allocation in an exporting jurisdiction, and if the carbon price is higher.** It may be preferable to exempt imports from BCAs is such cases.
- **Carbon prices in the exporting jurisdiction are higher, but volumes on which a carbon price has been paid lower.** This may occur for example because there is higher free allocation in the exporting jurisdiction. Will the higher price paid be used in calculating the reduced BCA, or will the lower volumes only be credited at the EUA price?
- **Prices in the exporting jurisdiction are lower, but the volumes on which a carbon price has already been paid are higher.** This might occur because

16. State and Trends of Carbon Pricing 2019, World Bank. See Figures 2 and 5 for number and coverage of carbon prices. This total includes many European national carbon taxes in addition to the EUETS. https://openknowledge.worldbank.org/handle/10986/31755

17. The carbon price already paid would need to have been efficiently incurred, with no gaming of the price. This may require, for example, the use of the average market price.

there is lower free allocation in the exporting jurisdiction. Should those additional volumes on which a price has been paid be credited in calculating the reduced BCA? This might also occur if measured emissions per tonne of product from the exporting facility are below the EU free allocation benchmark.

There are further issues that may arise in the setting a level of modified BCAs.

Rebates and financial assistance. The level of the price in the BCA may need to take account of any rebates for exports to the EU in the exporting jurisdiction's carbon pricing system. It will also need to take into account any other form of financial assistance to exporters to the EU, for example direct financial compensation for carbon costs.

Market liquidity and transparency. Some carbon markets are illiquid, including the Chinese pilot systems and the South Korean system. It may not be clear if the price paid by producers is equal to the apparent market price. In some cases this may reflect 100% free allocation and it may be possible to assume that no carbon price has been paid, but this may not always be the case.

Equivalent regulation. Regulations such as performance standards can impose costs similar to a carbon price. This raises the issue of whether or not the BCA should be modified to reflect these costs, for example by imposing a different BCA benchmark than that normally used. If so, further work is needed to assess how regulations maybe converted to an effective price. Attempts to do this in past have proved challenging and it may not be possible to do effectively. This may cause political difficulties with jurisdictions exporting to the EU which have effective carbon regulation in place but do not have an explicit price. A simpler solution may be to exclude such measures, and only adjust for explicit carbon prices.

Energy taxes. How, if at all, should differences in energy taxes and subsidies be taken into account?

All of these issues must all be addressed in ways that are compatible with WTO rules. This is likely to require a clear and consistent set of principles applicable across systems in a non-discriminatory way. There may be a balance between the accuracy with which an exporting jurisdiction is treated, and the consistency of treatment across jurisdictions.

At a minimum, consideration will need to be given to how rules should be applied in each carbon pricing regime covering producers that export to the EU. Specific calculations will need to be put in place to reflect particular rules under which carbon is priced in the jurisdiction exporting to the EU. This calculation may not be straightforward to define given the growing number of carbon pricing systems now in place around the world.

2.6 Treatment of exports

Continued free allocation of EUAs or other measures for exports may be necessary to avoid putting EU producers at a competitive disadvantage. This is because, in the absence of carbon pricing elsewhere, the international price for the product will still not include the cost of carbon, potentially putting EU producers that have paid the carbon price at a competitive disadvantage.

Electricity trade raises additional issues. At present emissions from electricity intensive production in the EU are treated differently from direct emissions under the EUETS. Instead of free allocation of allowances for indirect electricity-related emissions there is financial compensation to electricity intensive industry. It is possible that such arrangements could be retained for exports alongside continuing free allocation for direct emissions incurred in producing for export.

However, rules will need to be designed in a way that does not give producers incentives to simply export their higher carbon production, rather than reducing emissions.

Any rebates on exports may raise issues under WTO rules as to whether then constitute a subsidy[18], =for example because it is harder to justify them as an environmental measure.

18. See Mehling, M., Van Asselt, H., Das, K., Droege, S., & Verkuijl, C. (2019). Designing Border Carbon Adjustments for Enhanced Climate Action. *American Journal of International Law*, 113(3), 433-481. doi:10.1017/ajil.2019.22 page 470 (https://www.cambridge.org/core/services/aop-cambridge-core/content/view/BF4266550F09E5E4A7479E09C047B984/S0002930019000228a.pdf/designing_border_carbon_adjustments_for_enhanced_climate_action.pdf).

3. Coverage of sectors

3.1 Principles for establishing which sectors should be covered

Some commentators envisage a broad coverage across the economy for BCAs[19]. This may be appropriate in the very long term. However, for the foreseeable future it seems more likely that BCAs will be restricted to sectors with the following characteristics:

1. They face an explicit Europe wide carbon price. In practice this is sectors covered by the EUETS.
2. They are currently classified as at risk of carbon leakage,
3. They are able to meet the monitoring reporting and verification requirements of BCAs. This is usually likely to imply short, simple value chains. It is difficult to track emissions through complex production chains of the type that prevail in modern manufacturing.

These criteria all suggest focussing on a few sectors, mainly emissions intensive bulk commodities.

BCAs need not be introduced to all sectors simultaneously. For example, it might be possible to start with the power sector or cement, then extend to other commodities.

3.2 The power sector

BCAs are likely to be appropriate for the power sector, which is both emissions intensive and subject to potential undercutting from imports. The power sector is subject to border adjustments in California and Quebec, the only major example of BCAs to date.

EU power generators already pay a carbon price, which is reflected in the market price of electricity. This puts EU generators at a clear disadvantage to generators outside the EU that do not pay a carbon price, potentially leading to carbon leakage. BCAs can correct for this. However, ensuring their effectiveness will need careful implementation. Among other things, there is a need to ensure that BCAs are introduced in a way that is made compatible with other arrangements such as the Energy Charter, with modifications to these arrangements one possibility.

19. https://www.cer.eu/in-the-press/border-carbon-adjustment-how-get-it-right

At present there are imports of electricity into the EU from several jurisdictions without carbon pricing, mainly in eastern and south eastern Europe. Imports in recent years have been about 25-35TWh (net imports have been about 10-20TWh). This is only about 1%[20] of total EU electricity supply. Emissions are nevertheless material, at approximately 10 million tonnes more than if the same electricity had been generated in the EU[21].

The increase in EUA prices over the last three years may have incentivised increased imports from jurisdictions which do not have carbon pricing. BCAs would help prevent these imports unfairly undercutting EU production, and deter any future increases in high carbon imports.

TABLE 1:

Electricity trade between the EU and other countries (TWh)

	2015	2016	2017	2018
Imports	27	29	26	36
Exports	19	16	21	16
Net imports	8	13	5	20

Source: ENTSO

In addition, if the United Kingdom leaves EU, as currently planned, it is likely to continue importing significant amounts of electricity from the EU, as well as exporting electricity. Imports from the EU were 21 TWh in 2018, and exports were 2 TWh. Currently the carbon price in the power sector is much higher in the UK than in the EU. This raises the issue of whether the UK will wish to impose BCAs on

TABLE 2:

Electricity trade between the UK and the rest of the EU (TWh)

	2015	2016	2017	2018
Imports	23	20	19	22
Exports	2	2	3	1
Net imports	21	18	16	20

Source: https://www.gov.uk/government/statistics/electricity-section-5-energy-trends

20. https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_generation_statistics_%E2%80%93_first_results

21. Source: Sandbag estimates.

imports from the EU, and whether the EU will do the same for imports from the UK. This will depend in part on the eventual terms of any agreement between the UK and the EU, including whether the UK remains in the EUETS, has a linked trading system, or some other arrangement.

3.3 Other sectors

Most studies favouring BCAs advocate focussing on Emissions Intensive Trade Exposed (EITE) commodities, at least as a starting point[22]. The sectors other than power generation which are most likely to be suitable for BCAs include cement (including Portland cement clinker, the most heavily traded part of the sector), iron and steel, some bulk chemicals, aluminium and paper. Oil refining may also be added to the list.

These products are most suitable for BCAs because of their emissions intensity, potential trade exposure and commodity characteristics. Both the EU and California have previously looked at the possibility of BCAs for cement, though they have not implemented them. Cement has been identified as a suitable sector by the EU because it has trade intensity which only narrowly qualifies it to the carbon leakage list, but, given the regional dimension of the trade, it is nonetheless quite exposed to competition from neighbouring regions where carbon pricing is not yet part of the policy mix.

TABLE 3:

Direct emissions from sectors other than power generation most likely to be covered by BCAs

Sector	Emissions in 2018 (million tonnes of CO_2)
Cement	152
Iron and Steel	147
Bulk Chemicals	37
Pulp and Paper	27
Aluminium	10
Total	372

Cement emissions figures include CO_2 from the production of both cement clinker and lime, of which the latter is largely, but not exclusively, used in cement products. Similarly, iron and steel emissions figures include CO_2 from the production of coke, metal ore roasting and sintering, production of pig iron and steel, and the production and processing of ferrorus metals. Coke is largely, but not exclusively, produced for use in iron and steel production. Due to limitations on the availability of data, it was not possible to disaggregate the different uses of coke and lime for this analysis. Source: EU Emissions Trading System (ETS) data viewer.

22. See for example Chapter 8 of http://www.foes.de/pdf/2012-05_CETRiE_Carbon_Pricing_Report_web.pdf A more recent review reaching the same conclusion is https://www.climatechangenews.com/2019/07/22/von-der-leyen-make-carbon-border-tax-work/

If BCAs were applied to these sectors they would cover emissions equal to over half the EUETS cap excluding power generation, which was 670 million tonnes in 2018. Including these sectors in BCAs remains largely consistent with free allocation, reduces administrative burdens compared with wider coverage, and may help acceptability under WTO rules because it is easier to demonstrate equivalence of treatment for commodities.

Where two commodities compete as substitutes, for example as steel and aluminium do in many applications, it will be important that they are treated consistently to ensure that appropriate market signals are retained. For example, a situation where there are BCAs on steel but not on aluminium may lead to distortions in the market.

4. Advantages of BCAs and issues to be resolved

BCAs have advantages over free allocation. However, they have been relatively little used to date. The combination of known advantages of BCAs with the lack of implementation suggests there may be obstacles to their introduction. If the time is now right for the introduction of BCAs, care will need to be taken to overcome these obstacles.

This section considers both the advantages of BCAs, and apparent obstacles. Obstacles fall into three main groups:

1. Political and legal
2. Administrative complexity and cost
3. Problems with ensuring effectiveness

4.1 Advantages of BCAs over free allocation

Environmental effectiveness

Free allocation of allowances and BCAs can both in principle be effective in dealing with CO_2 emissions and the risk of leakage. However, they do so in different ways.

BCAs increase the costs to importers. This is in turn likely to lead to the carbon price being included in the market price of the product within the EU, as all producers will pay the carbon price[23]. The increased product price will incentivise changes towards less carbon intensive products. BCAs are therefore an environmental measure which furthers the purpose and goals of the EU ETS, doing so in a way that creates a level playing field.

In contrast, free allocation of allowances seeks to reduce or eliminate the carbon costs incurred by production in the EU. The carbon price is not included in the product price if the marginal producer internationally does not pay an effective carbon price. This absence of pass-through of carbon costs to commodity prices is the principal justification of free allocation. Previous reports by Sandbag have consistently highlighted the shortcomings of this approach and the barriers that it puts in the way of industrial innovation in Europe.

23. BCAs or the price of EUAs may fail to reflect the total environmental cost of emissions, for example because caps are insufficiently tight. However, BCAs will still have advantages over free allocation.

The effect of BCAs on prices for commodities is potentially quite significant. For example, recent steel prices are typically around €500/t. A border adjustment based on 1.8 tonnes of embodied emissions[24] and an EUA price of €24/tonne would lead to a price rise of about 9%. The price rise for cement would be greater in percentage terms.

There are also potentially important dynamic effects. For example, it has been argued that with innovation, the benchmark for the top 10% best performers is lowered for all of that industry. This risks creating incentives against innovation, especially if there are only a small number of producers in the EU, and therefore they risk reducing their own baseline. This may mean low carbon investments not coming to Europe. BCAs have the potential to address this problem, helping EU industry secure innovation.

Revenue raised

If BCAs take the form of border tariffs they raise revenue directly.

If BCAs take the form of a requirement to purchase EUAs, then BCAs may raise additional revenue, because:

- extra demand is likely to increase the EUA price, other things being equal and assuming no additional free allocation to exports; and
- they may allow more EUAs to be auctioned, because BCAs replace free allocation as a mechanism for preventing leakage.

The revenue raised will depend greatly on the number of additional EUAs auctioned. If BCAs quickly replace free allocation many additional EUAs may be auctioned, producing potentially billions of euros of additional revenue. If BCAs are introduced more gradually, very few additional EUAs may be auctioned.

Inclusion of the power sector of BCAs would not significantly affect auction volumes, because allowances are (with few exceptions) auctioned already, and the market price of electricity already includes the cost of carbon. However, it may raise additional revenue by increasing EUA prices due to purchases by importers of electricity into the EU.

If another type of allowance is introduced for imports it would be expected to have little effect on EUA prices, but might enable more EUAs to be auctioned as BCAs replace free allocation.

24. Source: World Steel Association.

The additional revenues gathered could be used in a number of valuable ways. For example, the could be used to:

- help build more robust MRV to support BCAs;
- create a European Climate Fund for the less developed countries;
- support environmental projects in trading partner countries.

Such measures my help to reduce international opposition to BCAs.

However, despite these advantages BCAs face a range of challenges, and it is to these we now turn.

4.2 Political and legal challenges

Political resistance from EU industry

Industry has so far largely preferred free allocation of allowances to BCAs. There appear to be several reasons for this resistance.

1. They are familiar with current system of free allocation and have processes in place for managing it.
2. The current system has until now largely insulated them from carbon costs, and in some cases has produced gains[25].
3. The current system is similar to that faced by competitors elsewhere, as most ETSs use some form of free allocation, whereas none use BCAs for industry.
4. They may be concerned that BCAs will not be reflected in market prices, thus failing to properly address leakage risks. There may be a number of reasons for this, including in particular resource shuffling (see below).

From industry's point of view, and for political interests sympathetic to industry's case, this is a compelling set of reasons for advocating continued free allocation.

However, as free allocation becomes increasingly constrained the choice may be less between BCAs and free allocation and more between BCAs and other measures which may be more difficult to achieve or may provide incomplete protection, such as subsidies for implementing new production technologies.

25. See https://sandbag.org.uk/wp-content/uploads/2017/01/170117-Cement-and-BAM-Digital-upd.pdf

The approach that is likely to be most acceptable to industry is a phasing in of BCAs as free allocation is phased out. A phase out of free allocation is likely to be more rapid if the EUETS cap is adjusted to reflect more ambitious climate goals, which Sandbag continues to advocate for.

Compatibility with WTO rules

The letter from the Commission President mentioning BCAs explicitly refers to seeking compatibility with World Trade Organisation (WTO) rules[26]. Compatibility with the General Agreement on Tariffs and Trade (GATT) is likely to be especially important. Other rules, such as those under the Agreement on Subsidies and Countervailing Measures (SCM) are also potentially relevant.

Reviews of the issues highlight the uncertainties and complexities around this[27,28,29] and the absence of well-established case law relating to BCAs. Issues include the equivalence between the treatment of imports and domestic production of similar products. Acceptance of BCAs under GATT may require demonstration of environmental benefits, so as to qualify for exemptions under Article 20, with Article 20 (b) and 20 (g) potentially especially relevant.

If application of Article 20 is sought, it is likely to be necessary to both demonstrate that BCAs fall under the exemption, and that the measures do not constitute a means of arbitrary or unjustifiable restriction, or a disguised restriction on international trade.[30]

The design of BCAs will need to take into account whether particular design parameters are consistent with acceptability under WTO rules. It is therefore likely to be appropriate early in the process of introducing BCAs to develop a set of principles that can be used to inform the design process.

26. https://ec.europa.eu/commission/sites/beta-political/files/mission-letter-paolo-gentiloni_en.pdf

27. A good recent review is Mehling, M., Van Asselt, H., Das, K., Droege, S., & Verkuijl, C. (2019). Designing Border Carbon Adjustments for Enhanced Climate Action. *American Journal of International Law*, 113(3), 433-481. doi:10.1017/ajil.2019.22
https://www.cambridge.org/core/services/aop-cambridge-core/content/view/BF4266550F09E5E4A7479E09C047B984/S0002930019000228a.pdf/designing_border_carbon_adjustments_for_enhanced_climate_action.pdf

28. Earlier reviews include Carbon Leakage Measures and Border Tax Adjustments under WTO Law, Joost Pauwelyn, 2012 http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2026879

29. An overview of general issues around BCAs, including WTO issues, is provided by A Guide for the Concerned: Guidance on the elaboration and implementation of border carbon adjustment, Cosbey at al. (2012) http://www.iisd.org/publications/pub.aspx?pno=1716

30. https://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf

International political challenges

One of the potential advantages of BCAs is that they encourage action by other jurisdictions. For example, a country may be motivated to establish its own carbon pricing because it will then retain the revenue, rather than have it captured by the EU. This effect has long been considered in the economics literature[31].

However, interaction with policies in other countries can also cause tensions, even if BCAs are legally compatible with WTO rules. There is a risk of retaliation if treatment is considered unjust or contrary to another jurisdiction's interests. Consequently, substantial political effort may be required to establish BCAs.

Such issues may be particularly sensitive in the current uncertainty about international trade and tariff regimes. The introduction of something perceived to be a new tariff may be more contentious than it would otherwise be.

Building political acceptability may require bilateral discussions between jurisdictions, with discussions becoming numerous as the number of carbon pricing systems is now large (see Section 2.5). The different levels of jurisdiction at which carbon pricing systems operate, including national versus provincial, may cause political as well as administrative challenges.

Disputes over the treatment of international aviation provide indicators of the sorts of tensions that can arise. The EU introduced proposals to include flights to and from destinations outside the EU in the EUETS. Other jurisdictions were hostile to this proposal. The response to led the EU to halt ("stop the clock" on) their introduction while the International Civil Aviation Organisation (ICAO) developed alternative proposals for international aviation. The stop the clock provisions were then extended, and are currently due to expire in 2021[32].

Although not implemented, the proposals to include flights to and from the EU helped put pressure on ICAO and the international air transport sector to progress its own proposals, and they have therefore been valuable in a wider context. They nevertheless provide an illustration of how difficulties can arise.

31. See for example, Joseph E. Stiglitz, A New Agenda for Global Warming, (2006)., Elinor Ostrom, Governing the Commons (1990), William Nordhaus, Climate Clubs: Overcoming Free-Riding in International Climate Policy, 105 AM. ECON. REV. 1339, at 1347, 1367 (2015).

32. http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/603925/EPRS_BRI(2017)603925_EN.pdf

4.3 Administrative complexity and cost

Setting up the necessary administrative infrastructure

Application of BCAs requires the emissions involved in production and the price paid for those emissions (net of any allocation of free allowances) to be tracked, making them more administratively onerous than simple emissions monitoring. Third party certification is likely to be required. Systems will need to be flexible enough to accommodate not only default parameter values but specific values for individual producers.

This represents a significant challenge. However, more progress has been made in recent years on establishing the necessary infrastructure than when the debates on BCAs were taking place previously. A growing number of multiregional input-output databases contain detailed information on the greenhouse gas footprint of traded goods and effective carbon rates in different sectors[33]. Other activities such as the recent Carbon Loophole project also improve transparency of carbon embedded in traded goods[34]. This makes the challenge of setting up systems less daunting than it was a few years ago.

If BCAs are applied to imports from jurisdictions with less well-developed administrative capacity it may be desirable for the EU to provide administrative support for implementation. This could be funded, for example, from extra revenue raised by BCAs.

Tracking jurisdiction of origin and transhipment

The origin all any imports needs to be tracked. For example, if commodities produced in a jurisdiction without carbon pricing are exported via a jurisdiction that does have carbon pricing, there will be a need to levy a BCA based on its place of manufacture, not its place of final export.

Rules governing place of origin and transhipment (moving the product via intermediate jurisdictions) will therefore need to be established and, and systems put in place to implement them. This is likely to be especially challenging in view of the number of regional pricing schemes in place. There will be a need, for example, to track goods produced in Arizona (which does not have carbon pricing) but exported via California (which does).

33. Martin van de Lindt et al., Carbon Emission Mitigation by Consumption-Based Accounting and Policy: Final Project Report, at 28 (2017); Kirsten S. Wiebe, Simon Gandy & Christian Lutz, Policies and Consumption-Based Carbon Emissions from a Top-Down and a Bottom-Up Perspective, 7 LOW CARBON ECON. 21, 23 (2016); Kirsten S. Wiebe & Norihiko Yamano, Estimating CO2 Emissions Embodied in Final Demand and Trade Using the OECD ICIO 2015 (OECD Science, Technology and Industry Working Papers 2016/05, 2016).

34. Daniel Moran, Ali Hasanbeigi & Cecilia Springer, The Carbon Loophole in Climate Policy: Quantifying the Embodied Carbon in Traded Products (2018), available at https://buyclean.org/media/2016/12/The-Carbon-Loophole-in-Climate- Policy-Final.pdf.

4.4 Potential lack of effectiveness

Even if adequate monitoring and transhipment rules can be put in place, the effectiveness of BCAs may still be reduced by responses from exporters.

Bypass and semi-finished goods

Exporters to the EU may bypass BCAs by moving up or down the value chain to trade precursors or derivatives instead of the commodity itself. For example, if BCAs are imposed on steel imports, the exporting country may move into the production of semi-finished goods, which bypass the BCAs while leading to a loss of economic activity from the EU. It is likely to be necessary to define commodities in a way that discourages this type of behaviour.

Resource shuffling (re-routing products)

Among the most potentially serious problems with incentives created by BCAs seems to be "resource shuffling". This is the switching around of resource flows in a way that reduces or avoids payment of BCAs, while not reducing emissions from production, and potentially increasing transport costs and associated emissions.

For example, if the EU is currently importing high carbon product, and the USA has its own low carbon product, BCAs in the EU may simply to lead to the low carbon US product flowing to the EU (to obtain the benefit of the competitive advantage it now enjoys), while the high carbon product previously going to the EU instead is shipped to the USA. The only effect on emissions may be the increase in emissions from the extra shipping involved.

Resource shuffling is most likely to become a serious issue when there are very large variations in carbon intensity of production. This is especially the case, for example, for electricity and for some electricity intensive commodities, for example aluminium. (Electricity is difficult to switch to very distant markets, but there may be a large amount of flexibility within a regional grid with large variations in carbon intensity.)

Where there are large variations in carbon intensity of production this may greatly reduce the effectiveness of BCAs, because BCAs do not raise the price of products sufficiently in EU markets. The international price for a commodity may continue to be set by high carbon production which is not subject to a carbon price. EU producers will not benefit from a carbon component of the international price. However, if low carbon production is re-routed to the EU it will not be subject to a large BCA (this assumes the benchmark for the commodity is adjusted to reflect the actual emissions from the production of the imports). EU producers may therefore

not benefit from either a carbon component in the international commodity price, or an adequate increase in the price within the EU due to BCAs.

California has provisions in place to guard against resource shuffling for electricity. There is, however, some preliminary evidence that resource shuffling has occurred[35]. Achieving similar rules to prevent resource shuffling across multiple commodities for multiple carbon pricing regimes across countries with separate legal systems appears likely to be much more complex and difficult.

The scope for resource shuffling may also be influenced by the geographical scope of the market. There may be more opportunities for resource shuffling in global markets, where there may be more variation in production, than in regional markets. However, in the case of electricity there may be opportunities even within a region if power generation varies substantially in its carbon intensity.

Gaming the carbon price already paid

Any approach adopted must be robust to attempts by exporting jurisdictions to reduce or circumvent BCAs. For example, adjustments may be imposed by the EU because the user has already paid a carbon price, and has received limited free allocation (see section 2.5). However, exporters to the EU could be being aided in other ways to compensate for their carbon costs, for example, by being granted state aid or direct financial assistance rather than free allocation. This may not be transparent, because it may not be explicitly related to carbon costs. This type of behaviour may be difficult to counter while remaining consistent with WTO rules.

35. https://calepa.ca.gov/wp-content/uploads/sites/6/2018/10/Final_2018_IEMAC_Annual_Report_10-22-2018.pdf

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