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Five myths about an EU ETS carbon price floor

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Summary

This policy insight builds on the workshop EU ETS Reform: Taking Stock and Examining Carbon Price Floor Options, held at the Centre for European Policy Studies (CEPS) in Brussels on July 3, 2018. The workshop was cosponsored by CEPS and the AHEAD and Mistra Carbon Exit projects. While the paper draws on insights from workshop discussions, its views are solely those of the authors.

It outlines different perspectives on the past performance of the EU Emissions Trading System (ETS) in terms of its allowance price (Section 1), analyses how the recent reform responded to related challenges (Section 2), and considers the case for introducing a carbon price floor in the EU ETS (Section 3). The main part of the paper (Section 4) identifies five myths in the debate about an EU ETS price floor and critically challenges them. Section 5 concludes by discussing potential entry points for introducing a carbon price floor in the context of the upcoming EU climate policy process.

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1. Is there a problem? Different perspectives on EU ETS price formation

The EU ETS has for many years delivered prices well below initial expectations. Low prices might be considered a good thing if they indicate low compliance costs, but they may have negative long-term consequences if they fail to initiate and support the technological and economic transformations necessary to decarbonise the economy. The upward trend of European Emission Allowances (EUA) prices since mid-2017 and the sharp increase in 2018 suggest that there has recently been a regime shift from the low price in past years. The EUA price rose to €20-€25 in September 2018, which is in line with price levels required in EU least-cost decarbonisation scenario modelling (e.g., Knopf et al. 2013; Pahle et al. 2018b). At the same time, price volatility remains significant, and uncertainty prevails over the future development of the EUA price. Careful analysis of the reasons for the low prices in past years is essential to understand whether the EUA price is likely to rise at an economically efficient trajectory.

Different reasons for low EUA prices in past years have been suggested, not least because understanding of price formation drivers remains poor (Hintermann et al. 2016). The mainstream view is that the key reason for prices being lower than expected levels is an imbalance of allowance supply and demand, resulting mainly from the economic crisis, the influx of credits under the Clean Development Mechanism, rigid free allocation based on historical output levels, and additional renewable and energy efficiency policies at the EU and member state levels. This mainstream view has been guiding the recent EU ETS reform that essentially aimed at reducing aggregate allowance supply.

Others have emphasised additional factors depressing EUA prices in past years. In particular, theoretical analysis suggests that expected future downward price shocks can decrease current prices (Salant 2016). Also, there is empirical evidence suggesting that regulatory events in the past, such as the back-loading reform episode, have indeed negatively affected market credibility and triggered a price decrease in the EU ETS (Koch et al. 2016). Reduced market confidence and low prices arguably contributed to reinforce unilateral member states' efforts to introduce additional policies to attain national climate targets, further driving down prices in a negative spiral (the "waterbed effect"; Pahle et al. 2018b). Myopic behaviour by risk-averse market agents might also dampen near-term allowance prices (Kollenberg and Taschini 2016; Fuss et al. 2018).

2. The recent reform: A thorough remedy?

In response to the mainstream diagnosis, the recent reforms include a strengthening of the linear reduction factor, specifying the amount that the cap will be reduced annually, from 1.74 to 2.2 percent. They also change the market stability reserve (MSR), which diverts allowances from (or releases them into) the auctions when the stock of allowances in circulation exceeds (falls below) an acceptable range. The reforms temporarily double the rate at which allowances are withheld from auctions and – crucially – enable the invalidation of allowances when the total number of allowances in the MSR exceeds the previous year's auction volume from 2023 on. Another reform element is a provision allowing unilateral invalidation of allowances by member states in proportion to national regulations closing down certain facilities covered by the EU ETS, in particular coal power plants (EU 2018).

The reform will certainly reduce allowance supply, thus addressing concerns about supply-demand imbalances. According to first estimates by Burtraw et al. (2018), around 3.8 gigatons (Gt) of allowances will not be auctioned but rather moved to the MSR through 2030 as a result of the new rules for the MSR, effective starting in 2019. More important, around 3 Gt of allowances will be invalidated. This amount is in the same order of magnitude as the current cumulative surplus (1.7 Gt) plus the allowances backloaded from 2014 to 2016 (0.9 Gt) (EEA 2017). Estimates by Perino (2018) and Agora Energiewende und Öko-Institut (2018) are similar in magnitude, with differences stemming mainly from alternative assumptions about emissions pathways.

The reform has thus also addressed the waterbed effect of unilateral policies, but only partly. The figures below show the outcome of a marginal allowance becoming available as a result of unilateral policy, estimating the portion of the allowance remaining in circulation and the portion that will have been permanently invalidated by 2030. For allowances entering circulation in 2018, for example, 88 percent will have been cancelled by 2030, and 12 percent will remain in circulation (Figure 1). For allowances entering circulation in 2024, only 47 percent will be cancelled by 2030, while 53 percent will remain in circulation (Figure 2). These rates should be regarded as minimum rates, since they describe cumulative invalidation up until the year 2030, but invalidation could also occur after 2030 depending on decisions for the post-2030 period. Allowances entering circulation in a later year will be less likely to be cancelled and more likely to remain in circulation. Overall, while the recent reform succeeds at puncturing the waterbed, this effect remains limited.

In the few months since the reform was announced, the EUA price has risen discernibly, up to €20-€25 in September 2018. The most likely explanation is that anticipated future invalidation of allowances – reducing supply – resulted in increased current prices, implying that the market works. A complementary interpretation is that the reform has restored market confidence in the willingness of EU policymakers to invest political capital into sustaining the EU ETS. This enhanced confidence is said to have triggered the return of allowance traders (Sheppard 2018; Tagesspiegel 2018) with longer time horizons that factor in longer-term scarcities in the market.

Thus market confidence, possibly combined with (non-)myopic behaviour, may remain important for EU ETS price formation.

Figure 1. Outcomes in 2030 of a 1-marginal-ton reduction in 2018

Figure 2. Outcomes in 2030 of a 1-marginal-ton reduction in 2024

Source: http://www.rff.org/research/publications/european-union-reforms-its-carbon-emissions-market

It is uncertain, though, whether the problems of the EU ETS have been resolved. First, there is no solid evidence for what has actually driven the recent price increase. It might well be a temporary bubble in an overconfident market. There is also a persistent risk that market confidence may be undermined again, such as by future economic or political shocks. Given the complexity of the MSR mechanism, market actors may misjudge future effects, and unexpected outcomes may require further market interventions, possibly affecting market confidence.

Therefore, we argue that a price floor would be an important addition to the design of the ETS, helping safeguard against low or declining prices in the future, enhancing confidence, and ensuring the relevance of carbon pricing in the climate policy mix.

3. The case for a price floor and implementation options

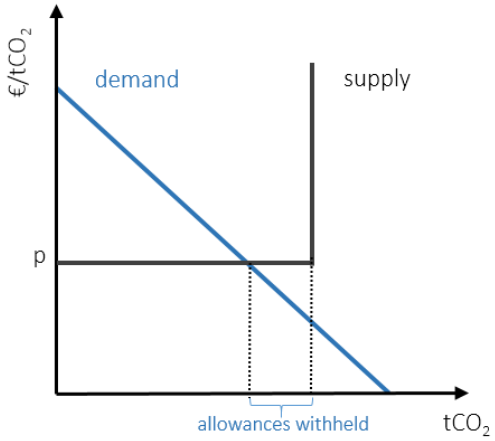
Several emissions trading systems, including the Regional Greenhouse Gas Initiative (RGGI) and those in California and Quebec as part of the Western Climate Initiative, have adopted price floors for allowances in the form of an auction reserve price. Based on observations of the EU ETS experience of a fluctuating and persistently low price, these systems introduced a price

floor to allow for price buoyancy in times of unexpected shocks, thereby maintaining market confidence and support. Allowances left unsold when the auction reserve price was not met have usually been invalidated later. To the extent that the prices have fallen as a result of companion policies, the auction reserve prices have helped address the waterbed effect.

More generally, the introduction of price floors can enhance long-term investment certainty by providing a clearer signal of regulators' commitment to implement policy that is in line with ambitious decarbonisation targets and is directly translatable into private and public investment decision calculations. Price floors may also help avoid myopic price formation if they align the carbon price trajectory more closely with the efficient level. From a more political perspective, price floors implemented at modest levels lock in current levels of ambition and enable ratcheting up over time when they automatically increase at a specified rate.

Both California and RGGI have implemented a price floor as a *reserve auction price*; that is, the regulator sets an auction price (reserve price) level below which no allowances will be sold (Figure 3). This is comparable to standard practice at auction platforms such as eBay, and economic analyses suggest having this feature to avoid a variety of problems.

Figure 3. Auction reserve price (p) as implemented in California



Source: Edenhofer et al. (2017).

Note: In the depicted outcome, some allowances are not auctioned and withheld from the market (and may be invalidated).

In the EU ETS, an EU-wide auction reserve price might be introduced by adjusting the MSR such that the trigger for removal of allowances from primary auctions would be an EUA primary auction reserve price rather than, or potentially in addition to, the arbitrary quantity threshold level of 833 megaton (Mt) allowances in circulation. Unsold allowances could be moved into the MSR, where they might eventually be invalidated.

A second EU ETS price floor implementation option has already been introduced by the UK (Hirst 2018). The UK carbon price floor (CPF) requires power sector facilities covered by the EU ETS to pay a carbon price support (CPS) that scales with EUA prices to ensure that a specific domestic minimum carbon price is always achieved. If, for example, the EUA price is expected

to be €5 per ton (t), and the UK CPF is set at €20/t, the CPS is set at €15/t. As the CPS is set several years in advance based on expectations about future EUA prices, the actual marginal price facing regulated entities can be higher than the envisaged CPF. As of September 2018, the CPS is set at £18/t (~€20), adding to an EUA price of about €20-€25/t. More flexible implementation of the CPS adapting to actual EUA price levels might be desirable, possibly drawing on experiences with contracts for difference in renewable power support.

In recent years, France was the only EU member state openly advancing the idea of a price floor (Szabo 2016). Like the UK CPF, the French initiative envisioned a price floor only for the power sector.[1] More recently, supportive signals have also come from the Netherlands (ICAP 2017), Sweden (Stam 2018), and Portugal and Spain (Brnic and Thévoz 2018). German discussions about the carbon price floor option have intensified in the last year (e.g., Edenhofer et al. 2017; Hecking et al. 2017; Fernahl et al. 2017; Matthes et al. 2018), with 11 member state governments recently asking the federal government to consider the introduction of an EU ETS price floor (Demirdag 2018). Given the size of the country's economy and emissions, German support would be a game changer. The distributional effects from a price floor introduced by a coalition of countries (Pahle et al. 2018b) or at the EU level (Hecking et al. 2017) would be relatively moderate in aggregate, even if at regional or national level the impacts may be more pronounced. Compensatory bargains among member states, such as by adjusting member state shares in auctioning rights, have been routinely used to ensure political support (Dorsch et al. 2018).

4. Five myths about an EU ETS price floor

In this section, we summarise five prominent but inaccurate arguments against the introduction of an EU ETS price floor. We aim at advancing the debate by confronting these myths and misconceptions with what we know.

4.1 Myth #1: The MSR reform removes the need for a carbon price floor.

Assertion: The recent price increase demonstrates that the fundamental problems of the EU ETS have been successfully addressed. The allowance removal and invalidation features of the MSR reform eliminate the waterbed effect and re-establish fundamental allowance scarcity. The policy environment for low-carbon investments is now stable and predictable. The recent reform should be allowed to unfold, and any modifications – if necessary at all – should be made only on the basis of the MSR review in 2021.

What we know: Beginning in 2017, and particularly since the adoption of the reform in early 2018, prices have increased sharply and now align with carbon prices indicated by least-cost modelling of the EU ETS (Knopf et al. 2013; Pahle et al. 2018b). The full causality and durability of this effect has yet to be determined, though. We cannot know whether the reform and

[1] Some note that because the French electricity mix is heavily based on nuclear power, it would benefit from an increasing carbon price (Hecking et al. 2017; Pahle et al. 2018b).

economic circumstances will sustain high price levels in the future. Market participants might misconceive the actual impact of the complex MSR invalidation mechanism. The waterbed effect has been temporarily reduced but not eliminated (see Section 2). Other political or economic shocks might again depress EUA prices to inefficiently low levels. A price floor provides insurance against such scenarios and is a no-regrets option if never invoked.

4.2 Myth #2: A price floor would transform the EU ETS from a quantitative policy instrument into a pricing instrument.

Assertion: Much effort has been invested in establishing the EU ETS as a quantitative policy instrument. This regulatory approach has ensured broad support from member states, industry, and EU institutions. One important reason for choosing a pure quantity instrument is that it guarantees the climate target is reached.

What we know: Price floors have been widely adopted in quantity-based ETSs worldwide, such as in California, Quebec, RGGI, and some Chinese pilot systems (ICAP 2018), and for good reason. In fact, the EU ETS is increasingly becoming a special case in that it does not feature some kind of quantity adjustment based on rule-based price triggers.[2] Furthermore, introducing a price floor does not mean the instrument is not based on quantity controls anymore. In fact, if unsold allowances are invalidated, a price floor would only enable achieving *more* ambitious environmental targets than those envisioned by the baseline cap.[3]

From an economic theory perspective, a hybrid instrument that combines elements of quantity and price regulation can be superior to either approach taken alone for regulating carbon emissions under uncertainty. This dominance can hold when the marginal benefits of emissions reductions (avoided climate damages) are flatter than marginal abatement costs in the short term (suggesting a price instrument) and if marginal benefits become much steeper in the long term as tipping points in the climate system are being approached (suggesting a quantity instrument) (see, e.g., Weitzman 1974; Roberts and Spence 1976; Newell and Pizer 2003; Hepburn 2009).

In practice, the price has always been a key feature for assessing the functionality of the EU ETS, even if that is not always explicitly stated. For instance, in Phase 1 of the EU ETS, the fear that prices might become too high led to an update of the Directive and Article 29a, "Measures in the event of excessive price fluctuations", which opens the opportunity for discretionary intervention in case of significant price spikes.[4] In Phase 3, it was the low price that triggered a

[2] Actually, the EU ETS already includes a price intervention feature in Article 29a (see note 4).

[3] We do not consider the case of a price ceiling that would trigger the release of additional allowances, which might lead to non-achievement of the original quantitative target.

[4] Article 29a of the EU ETS Directive begins by stating, "(1) If, for more than six consecutive months, the allowance price is more than three times the average price of allowances during the two preceding years on the European carbon market, the Commission shall immediately convene a meeting of the Committee established by Article 9 of Decision No 280/2004/EC. (2) If the price evolution referred to in paragraph 1 does not correspond to changing market fundamentals, one of the following measures may be adopted, taking into account the degree of price evolution: (a) a measure which allows Member States to bring forward the auctioning of a part of the quantity to

discussion of reform options leading to the adoption of back-loading and the MSR. Thus if the price is such an important feature of the EU ETS, for good theoretical and practical (investment planning) reasons, a provision enhancing price stability and levelling price in a more direct way should be regarded as an improvement.

4.3 Myth #3: A carbon price floor is not legally feasible.

Assertion: A carbon tax could not be introduced in the 1990s because of the EU Council unanimity requirement of EU treaties on tax matters. This would also make an EU ETS price floor legally infeasible.

What we know: Fischer et al. (2018) examine the relevant legal arguments for introducing an auction reserve price into the EU ETS and reject the claim of legal infeasibility. To trigger the special (unanimous voting) rather than ordinary (qualified majority voting) legislative procedure, a reserve price would have to be "primarily of a fiscal nature" or "significantly affect a Member State's choice between different energy sources." The first trigger ("primarily of a fiscal nature"), although not well defined in EU law, should not apply for three reasons: First, the primary aim of the EU ETS is to reduce emissions, not to raise government revenue, and a reserve price would support this goal. Much of the allowance revenue is either freely allocated (negating the revenue motive) or earmarked for mitigation programmes (as with a fee), but not collected for general revenues (as with a tax). Furthermore, an auction reserve price may lower or raise revenues, since the prices may rise but the number of allowances sold falls. Second, EU allowances have the status of financial instruments, and the ETS thus has already been shown not to be of fiscal nature. Third, an auction reserve price would not change this character or strictly fix the EUA price. Allowances could trade above or below that level in the secondary market, as has been the case in the California system, such as when a crisis in market confidence resulted in allowance prices trading below the auction reserve price (Cullenward and Coghlan 2016).

Concerning the argument that an ETS auction reserve price might "significantly affect a Member State's choice between different energy sources", Fischer et al. (2018) reject the applicability of this trigger based on two main arguments: First, an auction reserve price, as an allowance price more generally, does not directly determine the energy mix of member states. Instead, its effects depend on the broader market situation (e.g., fuel prices). A legal trigger for the treaty unanimity requirement should not depend on market circumstances. Second, the EU ETS embodies an important environmental goal in justifying the competence of the European Union to introduce a cap-and-trade system establishing an EU-wide carbon price, and an incremental reform supporting the system would rely on the same competence. The European Court of Justice soundly rejected a recent challenge by Poland to the initial version of the MSR based on this legal trigger, finding that market circumstances remain essential for the choice of energy sources and that the EU ETS constitutes a justified environmental policy. An auction

be auctioned; (b) a measure which allows Member States to auction up to 25 % of the remaining allowances in the new entrants reserve."

reserve price in the range of expected price levels either would have effects of comparable magnitude, as expected by the MSR reform, or would not be invoked.

Finally, member states have their own legal options to implement price floors. The UK carbon price floor has proven to be in line with EU legislation. While member states "shall" auction their allotted allowances, they are also free to trade in allowances as financial instruments, including using their revenues to purchase allowances and retire them.

4.4 Myth #4: A unilateral carbon price floor would fragment EU climate policy.

Assertion: A unilateral price floor implemented by one member state or a coalition of member states will reinforce political fragmentation and divergence in decarbonisation pathways across Europe. Diverging carbon prices are economically inefficient and potentially create leakage within the EU, especially in the electricity market.

What we know: Without doubt, a harmonised approach would be preferable, to avoid political fragmentation. However, if an EU-wide approach is not politically feasible, there may still be good reasons for a coalition to act as a first mover, implementing a price floor and allowing the remaining EU states to join later (Pahle et al. 2018b). This strategy entails the risk that convergence will not occur, but it would be in line with considerations of shifting towards a Europe where "those who want more do more" overcome the political impasse (European Commission 2017).

If the coalition chooses the UK model of a carbon price support provision, this could indeed result in diverging compliance costs among entities. However, if a coalition implements an auction reserve price, or takes equivalent action to the effect that at least some of the auctioned allowances are retired from the market, the overall supply of allowances is reduced and the single EUA price preserved. Thus concerns over diverging marginal prices would not apply.

Legally, withholding allowances from auction may require an update of the Auctioning Regulation, as currently it may be interpreted as requiring member states to auction all the allowances at their disposal for auctioning. Without such an update, member states could achieve a similar effect by using auction or carbon price support revenues to purchase allowances, and then at some point in time retire allowances by engaging in the markets through the establishment of an entity to trade in financial instruments. Such revenue earmarking would also increase EU-wide allowance prices and minimise price divergence (Boehringer and Fischer 2018).

If the coalition is large enough and well-chosen, electricity market leakage across different interconnected countries can be contained to a great extent (Matthes et al. 2018). In summary, the actual effects of a unilateral price floor crucially depend on its specific implementation.

4.5 Myth #5: It is impossible to find agreement on a common carbon price floor level.

Assertion: Reluctant member states will strongly oppose a price floor above current or expected prices, since that effectively increases the level of ambition of the EU ETS. If the price floor is set at a lower level than the current price, it is irrelevant.

What we know: To facilitate adoption, a price floor could be set below the prevailing level of the carbon price. The goal of the price floor would be, first, to provide insurance against the risk of price drops that threaten low-carbon investments. Second, it would lock in the current level of ambition and enable ratcheting up over time (Pahle et al. 2018a). The price floor can help achieve this outcome by automatically increasing at a specified rate, such as the opportunity cost of capital plus inflation. For example, the California ETS price floor increases at 5 percent plus inflation, and RGGI envisions a 7 percent annual increase of its Emissions Containment Reserve trigger price after it is introduced in 2021, independent of inflation (ICAP 2018).

In particular, stakeholders likely to benefit from higher EUA prices (e.g., nuclear and gas plant operators, allowance owners) can be expected to support this option. More broadly, energy-intensive industries will face additional policies to complement the carbon price, in particular to stimulate low-carbon investments to achieve ambitious medium- to long-term EU climate goals. A well-functioning and strong carbon price signal could alleviate pressure on policymakers to consider moving toward more inflexible command-and-control measures. Also, carbon pricing allows industries to receive indirect transfers via power-price compensation through state aid provision. This support is an accepted part of EU ETS governance, while the feasibility of compensations for direct regulations is much more uncertain. In addition to nuclear plant operators, renewable energy industries are increasingly in favour of significant carbon pricing, as it will enhance their competiveness even without subsidies, which are likely to be phased out eventually. In fact, the German Renewable Energy Association has already discussed the option of an EU ETS price floor complemented by a national carbon tax in a recent report (Fernahl et al. 2017).

5. Entry points and next steps

An EU ETS price floor to be adopted by *all* member states could be advanced in the context of various policy processes in the upcoming years:

- Late 2018: EU 2050 climate strategy. With this publication, the European Commission will indicate the level of effort required to achieve the ambitious long-term EU emissions reduction targets in the context of the Paris Agreement and 2°C. This offers an entry point for an agenda-setting discussion on whether EU ETS is suitable for this purpose and how the price floor option compares with other measures.
- 2021: MSR review. The review could be used to initiate the process for formally assessing and proposing price floor legislation, with a subsequent legislative process to

be finished around 2023. This avenue also offers an entry point for agenda-setting and comparison of alternative reform options. For example, an EU-wide auction reserve price could be considered that would adjust the MSR such that the trigger for removal of allowances from primary auctions would be an EUA primary auction reserve price rather than, or potentially in addition to, the arbitrary quantity threshold level of 833 Mt allowances in circulation

- 2023: Paris Agreement stock-take. This effort could be used to initiate a process for formally assessing and proposing price floor legislation, with a subsequent legislative process to be finished around 2025.

In contrast to an EU-wide price floor, a *coalition of a few countries* would have much more flexibility in the timing of their action. An agreement between Germany and France would arguably be essential to advance such a coalition.

To prepare the introduction of an EU-wide or coalition-level price floor, a number of initiatives would be useful. First, rigorous empirical analyses explaining the recent price increase could illuminate the debate on effective further reform steps. Second, economic modelling comparing different price floor implementation options (e.g., auction reserve price or UK CPF; with or without allowance invalidation) and coalition sizes (EU-wide or coalition) would be useful to analyse impacts on emissions and distribution of costs over time. Legal analyses of the various options would help reduce related uncertainty. Finally, more exchange among related stakeholders in governments, research, business, and NGOs would build capacity to advance this important institutional innovation in climate policy.

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About the partnering institutions

AHEAD is a three-year project funded by Stiftung Mercator aiming at **assessing climate policy in California and Germany** and promoting mutual exchange, learning, and joint thinking among scientists and stakeholders in these two jurisdictions. The participating organisations include Resources for the Future **(RFF)**, the Potsdam Institute for Climate Impact Research **(PIK)**, and the Mercator Research Institute on Global Commons and Climate Change **(MCC).**

CEPS Energy Climate House (CEPS-ECH) is the policy arm of the **Energy and Climate Unit** of CEPS, a Brussels-based think tank. It provides **a forum that stimulates discussions** among both EU and non-EU stakeholders and decision-makers, where the participants feel free to discuss, analyse, and communicate solutions to today's energy, climate change, and geopolitical challenges.

Mistra Carbon Exit is a four-year research programme with the aim of identifying and analysing the technical, economic, and political opportunities and challenges for Sweden to reach the target of net zero greenhouse gas emissions by 2045.