

# Methodological Annex

## EUROPEAN CARBON PRICING: A PATHWAY TO NET-ZERO BY 2050

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This Methodological Annex includes a summary of our approach to the Capstone Project, outlines our methodology and structure of the conducted expert interviews, includes a statement of equal contribution, and adds information about our materials and literature used in the policy brief.

### 1) Approach to the Capstone Project

Starting off with the overall question *“Through which policy tools can the EU (with consideration of the political and strategic challenges facing EU MS) achieve carbon neutrality by 2050? Is this a realistic goal, or not ambitious enough?”*, the discussion with our supervisor agreed to narrow down the focus of the capstone project to make it feasible for the work to be conducted and presented the limited format of the policy brief.

Therefore, we decided to focus on the EU's carbon price setting, the most important existing EU policy tool used to achieve carbon neutrality. We chose to evaluate and suggest improvements to the ambition behind the current carbon trading scheme and argued for further changes being needed to ensure its objectives are realistic. Carbon price setting at EU level takes place as a cap-and-trade scheme within the EU Emissions Trading System (EU-ETS) which was introduced in 2005 and covers sectors responsible for around 40% of total CO<sub>2</sub> emissions, including e.g. electricity and heat and energy-intensive industry sectors. The framework of the European Green Deal and the Proposal of the Fit-for-55 Package includes several potential adjustments to the EU-ETS and additional policies to the EU carbon price regime which are currently negotiated at EU and member states' level. Therefore, we decided to not only look at the scientific evaluations of the current system and proposed adjustments, policy papers and proposals but additionally conduct three short expert interviews (see Methodology below) with experts from the Hertie School, Bocconi University, and the European Commission, to get more up-to-date insights from both academia and the policy world on its current developments.

Following background research, further internal group meetings, consultations with our supervisor, the presentation in the Future of Europe course, and the insights of our experts, we concluded that next to technical adjustments to the price system, the issues of uncertainty and fairness and social acceptance are central to make recommendations for a revised EU carbon price system that is in line with its climate targets. Therefore, we have come to the conclusion to put the EU's pricing system into a larger context by discussing current challenges in our paper and by addressing aspects of fairness and uncertainty in our recommendations in addition to technical aspects. In doing so, we have cautiously prioritised our recommendations according to the order depicted in the policy paper.

### 2) Statement of Team Contribution

Students of Group 25 contributed equally to the Capstone project in the scope of the CIVICA Future of Europe Course, Fall Semester 2021.

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### 3) Methodology

We used the following threefold methodological approach:

- We use a literature review to critically assess the prevailing body of knowledge on the EU ETS and identify key issues.
- Additionally, we conducted three semi-structured problem-centred interviews with academic and professional experts on the EU ETS.
- We used our analysis and the insights gained through the interviews to develop policy recommendations.

The expert interviews were structured in the following manner:

Aspects	Issues/ Policies/ Proposals (asked during the interviews)
'Technical adjustments'	to the EU's carbon price system, especially the EU-ETS <ul style="list-style-type: none"> <li>• Setup of new ETS</li> <li>• Covering additional sectors (e.g. agriculture)</li> <li>• Price floor and price ceiling</li> </ul>
Implementation	<ul style="list-style-type: none"> <li>• practical implementation</li> <li>• differences in prices and uncertainty</li> </ul>
Fairness and (political) Feasibility	<ul style="list-style-type: none"> <li>• Social fairness</li> <li>• Societal acceptance of carbon prices</li> <li>• Political support (especially for redistributing revenue from</li> </ul>
Complementary policies to EU-ETS	<ul style="list-style-type: none"> <li>• Social Climate Fund</li> <li>• Carbon Border Adjustment</li> <li>• Additional national measures (frontrunner initiatives)</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>• Measurement of emissions</li> </ul>

The expert interviews were partially anonymized, so that the position of the expert can be recognized, but not the name - as per request of the interviewed experts.

### 4) Literature and further Materials

The literature and policy papers we used as material for our analysis and writing of the policy brief can be found in the Reference section of the paper. Recordings and partial transcripts of the interviews are available on request to Group 25.

**Additionally we made use of the following materials:**

**A. 4.1. Box:** A brief summary of different Carbon Price Floor (CPF) implementation mechanisms. Following analysis in the above policy paper and given the existing body of literature, we recommended that the Buyback System seems most optimal out of the three to implement the EU-wide CPF.

<b>Mechanism of CPF Implementation</b>	<b>Description</b>
<b>Auction Reserve Price</b>	Governments restrict the quantity of allowances supplied to the market below the CPF. Unsold (not auctioned) permits are allowed to be used in the future, enter the MSR, or are cancelled. The CPF is not stern, i.e. the price can drop beneath it, however arbitrage opportunities between today's price and future auctions is seen as a way to prevent prices dropping too far. Allowances are auctioned if and only if the bids proposed are above the CPF level. Were all allowances auctioned, this would prove equivalent to the buyback system discussed below. An Auction Reserve Price approach for the ETS is not feasible due to the presence of free permit allocations.
<b>Top Up Carbon Price</b>	Often a tax on emissions that reflects the difference between the CPF level and ETS price, or a fixed price (that can be changed dynamically), enhancing the ETS price. This is the case of Great Britain or the Netherlands. It works from implementation onwards. The tax being positive establishes a source of revenue. A Top Up resolution could lead firms to augment their emissions in the short-run due to anticipation of impending tax, while abating them only post-implementation (Hintermayer, 2020)
<b>Permit Buyback System</b>	The market operator (i.e. European Commission) engages in to buying back allowances at the CPF level should market price fall below it, which limits their supply. It directly sets a minimum price for permits from the point of implementation. Due to post-announcement anticipations, the price immediately increases. Hence, agents are induced to decrease emissions and sell permits, which in turn triggers increased MSR intake and more cancellations. The buyback design creates additional costs for the government to buy allowances and hold them in times when prices are not on the rise. Therefore, governments must credibly commit to bear these costs. Therefore, given post-announcement anticipations, the price immediately surges due to agents intending to make arbitrage profits in expectation of the CPF surge, which induces cutbacks in emissions and increased permit supply

## A. 4.2. Technical Definitions

- **Brown Investment:** An investment that leads to a negative environmental externality (i.e. fossil fuels) (Duchêne, S. et al. (2021). [Why finance professionals hold green and brown assets? A lab-in-the-field experiment.](#))

**Carbon Leakage:** the situation that may occur if, for reasons of costs related to climate policies, businesses were to transfer production to other countries with more relaxed emission constraints. This could lead to an increase in their total emissions. The risk of carbon leakage may be higher in certain energy-intensive industries. (European Commission (2021). [Carbon Leakage.](#))

- **Carbon Shadow Price:** “a [supplementary] tool in internal financial and economic appraisal to encourage low-carbon investment or de-prioritise high-emission projects. If shadow carbon prices are applied at the correct level and in the correct way, theoretically, only projects compatible with a low-carbon transition would gain funding (...) [It] can be used to inform decision making” (E3G (2021). [Shadow Carbon Pricing.](#))
- **Futures Markets:** A market in which future contracts are bought and sold. According to Investopedia, futures are “financial contracts that obligate the parties to transact an asset at a predetermined future date and price. The buyer must purchase or the seller must sell the underlying asset at the set price, regardless of the current market price at the expiration date.” (Investopedia: Fernando, Jason, 2021, [Futures](#))
- **Green Investment:** An investment that leads to a positive environmental externality (Duchêne, S. et al. (2021). [Why finance professionals hold green and brown assets? A lab-in-the-field experiment.](#))
- **Linear Reduction Factor:** “The annual decrease of allowances provided to the market either via free allocation or via auctions” (IETA (2018). [IETA Insights.](#))
- **Market Stability Reserve:** “As a long-term solution, a market stability reserve began operating in January 2019. The reserve: addresses the current surplus of allowances and improves the system’s resilience to major shocks by adjusting the supply of allowances to be auctioned (...). Unallocated allowances will also be transferred to the reserve. (European Commission (2021). [Market Stability Reserve](#))
- **Net-Zero:** “Achieving a balance between the amount of greenhouse gas emissions produced and the amount removed from the atmosphere. There are two different routes to achieving net zero, which work in tandem: reducing existing emissions and actively removing greenhouse gases.”(Institute for Government (2020). [UK net zero target.](#))
- **Waterbed Effects:** “The phenomenon where if additional abatement efforts are implemented, for example, due to some supplementary climate policy, total emissions will not change because the overall emissions cap is fixed. Instead, emissions from other sources will increase correspondingly [in a future year, for example]”. (Rosendahl (2019). [K.E. EU ETS and the waterbed effect. Nat. Clim. Chang. 9, 734–735.](#))

#### A. 4.3. Box: Popular News on the ETS

This box presents the interested reader with a selection of headline quotes on the ETS which were found throughout our research so as to provide a more intuitive feel for the concerns related to its shape and reforms needed outlined in the policy paper. They were not discussed in the main document for the purpose of brevity.

***“We will make sure households with small incomes get support for mobility, driving and heating,”*** Ursula von der Leyen, President of the European Commission (*Guardian* (2021). [Von der Leyen pledges fuel poverty help amid EU emissions trading concerns](#))

***“politically suicidal, [...] a huge political mistake”*** Pascal Canfin, the chair of the European parliament’s environment committee on the plan to create an ETS for transport and buildings (*Guardian* (2021). [Von der Leyen pledges fuel poverty help amid EU emissions trading concerns](#))

***“Taking into account the enormous costs for society and the little achieved in terms of emission reductions, one has to wonder whether this instrument, combined with the equally dubious carbon adjustment mechanism, should be the foundation instrument of the EU’s energy transformation”*** Marcin Nowacki, member of the Employers' Group of the European Economic and Social Committee in *The Parliament Magazine* (2021) (Nowacki, M. (2021) [The chronicle of a crisis foretold: Price bubbles in the EU’s CO2 emissions trading scheme. The Parliament Magazine.](#))

***“We’re putting a price on carbon so people have the incentive to use less carbon and we put a premium on decarbonising so that we stimulate innovation and adaptation”*** Frans Timmermans, the European Commission’s vice-president in charge of the European Green Deal. (*Euronews* (2021). [Why is the EU’s new Emissions Trading System so controversial?](#))

***“Unfit for the climate crisis.. [the new ETS] could harm poorer households, with no guarantee of meaningful emission cuts.”*** (*Greenpeace* (2021). [EU Commission ‘Fit for 55’ package unfit to contain climate crisis](#))

***“Alarmingly, the Commission wants citizens and other sectors to foot some of the bill for industrial decarbonisation.”*** (*WWF* (July, 2021). [Half-baked EU climate proposals missing key ingredients.](#))

***“Protecting citizens is the objective of the work we are carrying out with the implementation of the EU Green Deal and with the Fit for 55 package (...)”*** Nicolás González Casares, Spanish lawmaker for the Socialists and Democrats during an interview with Euractiv. (*EURACTIV* (November, 2021). [Europe’s climate legislation must work for citizens. says Spanish lawmaker](#))

***“We are also talking about the transition towards a green economy, right? We asked Commission officials how it is financed and their concrete proposal on how to meet this target, but they did not give a real answer. (...) The Green Deal cannot be paid by the most vulnerable people forced to live in run-down, energy inefficient housing. If this is not prevented, the climate policy will divide society. The gap between rich and poor will become even wider.”*** Barbara Steenberge, Head of the International Union of Tenants (IUT) EU liaison office, Vice-Chair of the Tenant Union of Bonn, Germany, and chairs the European Responsible Housing Awards jury interview with Euractiv. (*EURACTIV* (November, 2021). [Barbara Steenbergen: Green Deal cannot be paid by the most vulnerable tenants.](#))

#### A. 4.4. Paris Agreement Legislation

The Article 6.2 of the Paris Agreement reads as follows:

*“Parties shall, where engaging on a voluntary basis in **cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions**, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement.” Paris Agreement (2015, p.4)*

*[Available at: [https://unfccc.int/files/meetings/paris\\_nov\\_2015/application/pdf/paris\\_agreement\\_english\\_.pdf](https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf)]*