Strengthening the EU ETS price signal

Implementing an explicit, predictable and steadily increasing auction reserve price on carbon within the EU ETS to favor low-carbon investments

Paris, April 2016.

The Shift Project is a think tank which advocates a shift to a low-carbon economy. It seeks to provide guidance to companies and public institutions to help shape climate and energy policies on a national and European level. Committed to serving the general interest through scientific objectivity, The Shift Project brings forward innovative proposals and tools to accelerate the transition to a post-fossil economy, engages in lobbying initiatives targeting institutional decision-makers and organizes high-impact events gathering key stakeholders.

The Shift Project – Transparency Register ID n°: 793026615069-12

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Acknowledgements

We are grateful to: Emilie ALBEROLA, Matthieu Auzanneau, Sarah DEBLOCK, Anne-Caroline DUPLAT, Jean-Noël GEIST, Alain GRANDJEAN, Jean-Marc JANCOVICI, Lionel MAMILONGUI, Thomas PELLERIN-CARLIN, Cédric PHILIBERT, Cédric RINGENBACH, Aurélien SCHÜLLER, Florian TETU, Raphaël TROTIGNON, Sam van den PLAS for their reviews, advice and comments.

Executive Summary

The EU ETS shows a surplus of allowances, and several issues related to the price signal: it is too weak, lacks predictability, and risks collapsing at any time despite increasing climate ambitions.

We support the Market Stability Reserve and we recommend implementing an auction reserve price starting at €20/tCO_2 and increasing over time. In addition to the "quantity-only" reform set in motion by the European Commission, this "price also" approach would prevent the market from "revealing" higher prices too late – i.e at a time when carbon-intensive solutions are already locked-in.

This paper shows that all 2°C scenarios converge towards a robust and steadily increasing price on carbon, reaching $140 in 2040. The ETS will not reach that price level on its own, especially since the EU has been increasing fossil fuel subsidies. We therefore recommend reinforcing country- and sector-specific measures together with the ETS, in order to generate implicit and explicit carbon prices at a level compatible with EU climate ambitions.

This paper also highlights the co-benefits of an auction reserve price, as it would bear a positive impact on sustainable development, economic "green" growth, innovation, and Member State auctioning revenues in a predictable manner. More specifically, this paper shows that an auction reserve price would create rewarding opportunities to reduce emissions within ETS sectors while protecting ETS prices from external demand shocks and would not directly affect the secondary market.

Implementing an auction reserve price within the EU ETS would serve as a reference level for other jurisdictions setting a price on CO_2 emissions.

8 Key messages

1. Long-term, low carbon investments in ETS sectors will not be triggered as long as there is no guarantee on the return on investment. Implementing an explicit, predictable and steadily increasing auction reserve price on carbon within the EU ETS would solve this issue and avoid locking-in carbon intensive technologies. It would enable nearly all investors to assess risks and opportunities without requiring expertise on EU Allowances. An auction reserve price would also increase the predictability and the amount of Member States revenues.

2. More specifically, the 2°C climate goal requires a CO_2 price of about $ 140/ton by 2040 (according to IPCC, IEA etc.). Such a price trajectory cannot be achieved solely through the ETS price, and is hampered by negative carbon prices induced by fossil fuel subsidies (FFS).

3. We recommend the implementation of an explicit, predictable and steadily increasing price in the form of an auction reserve price starting at €20 per ton of CO_2 and increasing – in addition to the Market Stability Reserve. This would solely affect the primary market, while preserving the secondary market.

4. We also recommend the drastic reduction of fossil fuel subsidies in Europe. IMF data show a significant increase (+12%) in fossil fuel subsidies across almost all EU ETS participating Member States from 2013 to 2015, reaching $335 billion in 2015 and thereby further straying from climate goals. Reverting that trend will probably take years and call upon the consideration of major economic, social and environmental impacts (e.g. addressing energy poverty issues).

5. We recommend combining the EU ETS with other climate and energy policies inducing implicit positive carbon prices, such as regulating industrial emissions, setting carbon performance standards, supporting low carbon research and innovation, supporting low carbon energy sources etc. The idea is to flood the economy with positive prices on carbon – similar to fossil fuel subsidies currently flooding the economy with negative ones.

6. We recommend proceeding with respect to national circumstances and sectoral specificities, starting with the power sector in countries connected to the UK grid, and combining this with measures to limit the extent of the "waterbed effect" (i.e. unused allowances resulting from the switch from coal to gas can be auctioned to power or industrial installations in other countries). We wish to emphasize the fact that the auction reserve price limits the adverse impacts of the waterbed effect on market prices resulting from the UK national tax.

7. We recommend reviving domestic projects (intended here as projects hosted by EU Member States) and we propose preliminary design features that meet the following requirements: not adding to the surplus; not releasing allowances from the MSR; not reducing Member States auctioning revenues; and ensuring that these domestic projects actually achieve more emission reductions than would otherwise have occurred had Member States auctioned allowances instead of crediting projects and recycled auctioning revenues.

8. We recommend carefully looking at the potentially adverse impacts on sustainable development associated with an increase in CO_2 prices, including on power supply and energy sources. Increasing the price of CO_2 does not always trigger emission reductions, and when it does, it can induce other forms of negative impacts. Sustainable development safeguards should play a key role when phasing out CO_2 emissions.

Content

Introduction

The ongoing ETS reform is necessary, but it still lacks predictability

To trigger significant emission reductions, the ETS needs to create either **scarcity of allowances** or **a steadily growing, predictable and sufficiently high carbon price (and at some point: both).** Ten years after its implementation, **the ETS is characterized by:**

- **A surplus.** Instead of the rarefaction of allowances, there is a surplus of about 2 billion tons of CO_2[1] (about one year of emissions for all installations covered by the ETS). The structural reform of the ETS addresses this problem through the Market Stability Reserve (MSR)[2], a mechanism triggered by surplus thresholds that will dynamically reduce the quantity of allowances auctioned in the coming years to backload them at a later stage. The MSR does not affect free allocation, neither does it cancel allowances. The MSR alters the cap profile, anticipating a more stringent cap, and smoothening the cap in the longer term. In particular, the MSR is a prerequisite to the implementation of a cap-neutral price-ceiling, as explained in our former paper (March 2015[3]).
- **Highly volatile, abruptly decreasing and lasting low carbon prices**. This issue is not addressed by the structural reform, as it expects the MSR to solve both the quantity issue and the price issue. External demand shocks, flat growth, and so-called overlapping policies will adversely impact the price of carbon on the EU ETS as long as this issue is not solved.
- **Lack of predictability.** Failed predictions (see the graph below) combined with the proven ability to fall to record-low prices despite frequent interventions from the European Commission do not attract low-carbon or long-term investors.

Since the EU ETS has not created the conditions to trigger significant emission reductions, the observed reduction of GHG emissions within the scope of the EU ETS is almost entirely due to other causes, including support to low-carbon energy sources, economic downturn, the phasing out of the most polluting and carbon intensive power plants and improvement in energy efficiency[4]. Despite experience and facts (e.g. missing investments and ongoing investments on coal-based power supply), there is still a prevailing belief that the market can solve all issues and will reveal by itself the lowest carbon price to reach our climate goals.

As it stands, the ETS reform is at risk of missing its target, leading to another ten years lost – at least. And we're running short on time.

Note: The EU ETS also contributes to Member States budgets through revenues from auctioned allowances. The ETS Directive provides that at least half of auctioning revenues should be used for climate and energy related purposes (non-binding, with some encouragement to act in a transparent manner). According to the European Commission[5], in 2013, total auctioning revenues for the EU reached €3.6 billion. From this, around €3 billion will be used for climate and energy related purposes. This represents 0.02% of EU GDP[6], which is a welcome addition. However it represents only a fraction of the 1% share of GDP (at a minimum) required to stabilize GHG emissions below 550 ppm.

[1] *European Commission, 18 May 2015. http://europa.eu/rapid/press-release_IP-15-4987_en.htm*
[2] *See our recommendations to amend the MSR design : http://www.theshiftproject.org/sites/default/files/files/pos__2014_the_shift_project_-_position_paper_-_msr_eu_ets__final_lt.pdf*
[3] *See : http://www.theshiftproject.org/sites/default/files/files/2015_the_shift_project_-_auction_reserve_price_-_final.pdf*
[4] *See Gloaguen and Alberola, 2013 http://www.cdcclimat.com/IMG/pdf/13-10_cdc_climat_r_wp_13-15_assessing_the_factors_behing_co2_emissions_changes.pdf*
[5] *See http://ec.europa.eu/clima/policies/ets/cap/auctioning/index_en.htm*
[6] *Source : European Union. See : http://europa.eu/about-eu/facts-figures/economy/index_fr.htm*

Focus on the predictability issue

The two graphs below show the gap between prices and theirs forecasts. In particular, Price Forecasts and their updates show that:

- Price forecasts always anticipate progressively increasing prices;
- Phase II forecasts have been revised downward over time;
- Actual price trends and levels evolve in contradiction with all forecasts.

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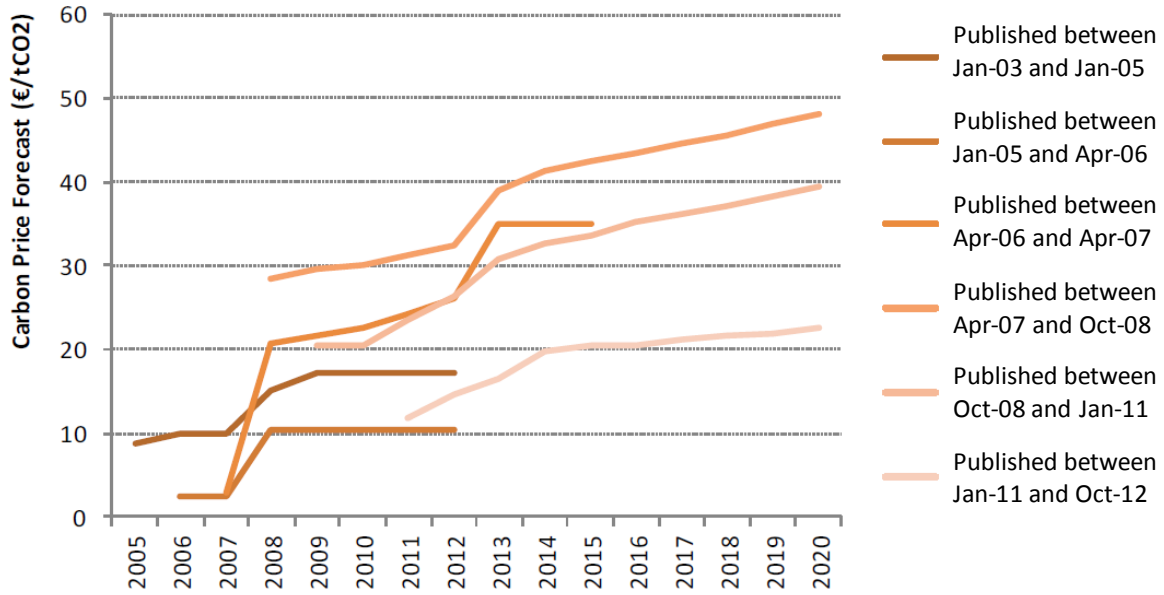
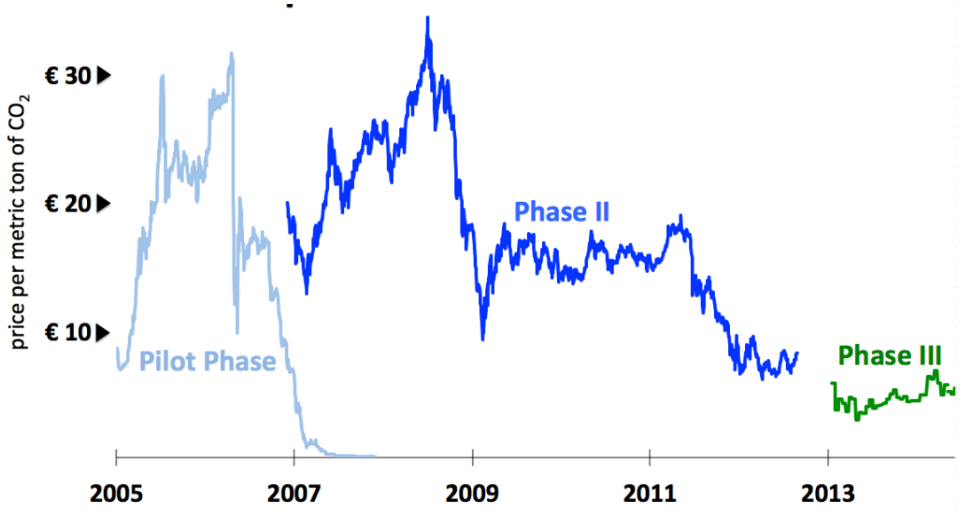
Graph – Decreasing carbon price forecasts from 2003 to 2012 (more than 100 forecasts compiled).



Source : Trotignon, R. (2012)

Graph – Carbon Price on the EU ETS since inception in 2005 significantly differs from forecasts.



The lack of predictability of carbon markets has played a key role in the COP21. The initial text of the Paris Agreement referred to carbon pricing (which is distinct from transferrable mitigation outcomes) as part of the "Climate Finance" section of the Agreement applicable to country parties. Most other parties have opposed this statement being part of the Agreement[7]. Two main reasons were that carbon markets do not provide climate finance for developing countries but rather among industrialized parties, and that carbon markets do not deliver **predictable** finance. The reference to "carbon pricing" therefore does no longer appear in the Agreement (applicable to Parties), but as part of the decisions for non-party stakeholders (decision 137) or as a reference to the social, economic and environmental value of voluntary mitigation actions and their co-benefits for adaptation, health and sustainable development (Paris Agreement, decision 109). Carbon markets will not be part of the Climate Finance ($100 billion per year expected by 2020).

The lack of predictability is an issue, affecting both the long term credibility and the global recognition of the environmental efficiency of carbon pricing and domestic policies such as ETS and other market-based mechanisms.

Price incentives should take precedence over scarcity constraints

With a quantity-only ETS - as it stands and as it will remain after the reform - the scarcity of allowances is expected to trigger both emission reductions at the lowest cost, and long term low carbon investments requiring prices to increase over time, while respecting a decreasing cap.

The design of the ETS is extremely rigid, restricting the role of the carbon price to a symptom of market fundamentals (supply adjustments by the regulator and trends in verified emissions and other drivers for demand such as hedging).

Under current ETS design and as per the ETS structural reform: the cap commands, the MSR controls and adjusts, the price reflects. And the fact that all the price does is reflect market fundamentals, poses an issue.

Under certain conditions (explicit, predictable, and steadily increasing over time), the price could also trigger emission reductions and attract long term low carbon investments.

The auction reserve price in a context of surplus, is a "soft" incentive allowing installations to choose (to pay or to reduce their emissions).

On the contrary, scarcity of allowances is a "hard" constraint that cannot be overridden and that could limit production levels if not decarbonized on time.

It is therefore preferable to start with a soft price incentive progressively reinforced by an increasing scarcity.

We recommend partially decoupling prices from quantities, and using an auction reserve price to create a positive incentive to achieve the low carbon transition within the right timeframe.

An auction reserve price would empower the price of carbon with some "command" capacity, triggering transformational change through attractiveness to public and private investments.

[7] *See Andal Conseil's (technical expert in the COP21 negotiations, involved in facilitating the negotiations on climate finance) blog : http://arbrapalabres.blogspot.fr/*

Context

Since 2014, The Shift Project has advocated an explicit, predictable and increasing carbon price within the EU ETS, recommending an auction reserve price integrated with the Market Stability Reserve[8]. The context is one where a few stakeholders (especially gas sellers) are in favor of a carbon tax on the power sector on top of the ETS (as it is the case in the UK), and where **most to all forces (industry, energy), while publicly affirming their support to a global and significant price on carbon, remain firmly opposed to any price floor or other forms of price management mechanism within the EU ETS**[9]. Neither is the European Commission favorable to price management mechanisms for the EU ETS, as it appears from the biased question in the 2012 public consultation to reform the ETS (The EC considers that price management mechanisms are discretionary and adverse to their market-oriented views).

Although there is overwhelming support in favor of putting a price on carbon, most supporters refuse a carbon price floor within the EU ETS, and support carbon pricing initiatives provided that others pay that price (while they receive the additional revenues generated as a reward for selling relatively less carbon-intensive products or services).

In December 2015, the Paris Agreement set our common climate goal to limiting global warming well below 2°C and aiming for the neutrality of anthropic GHG emissions by 2100. Such a target means that in the long term, carbon price will not fall to zero "because we would have reached our targets", but rather reach higher levels ensuring there is no relapse back to CO_2. The more ambitious 1.5°C goal can only reinforce this trend.

In February 2016, the French Environment Ministry issued a non-paper in favor of a carbon price corridor within the EU ETS, which shows a new direction – the first of its kind - in the debate[10]. The Shift Project welcomes and supports this new direction.

This paper provides updates for our advocacy in favor of an auction reserve price, especially considering the option for complementing carbon pricing policies aiming at achieving our climate goals.

Limits of this paper

In this document, we do not address governance issues, except if we consider the governance required to periodically revise and publish the auction reserve price.

Neither do we address quantity-related inconsistencies between the linear reduction factor and the EU climate commitments. The option to revise the ETS cap is not addressed, considering that this would require a very improbable unanimity.

This document doesn't address - yet - the legal issues associated with avoiding the requalification of ETS into a tax.

[8] See The Shift Project, Dinguirard, F., 2015. France: EU ETS structural Reform - the option for an auction reserve price http://www.theshiftproject.org/fr/cette-page/renforcer-le-signal-prix-du-carbone-pour-generer-les-investissements-necessaires-a-la-tra
[9] See Consultation on structural options to strengthen the EU Emissions Trading System, 2012
[10] French Environment Ministry: http://www.developpement-durable.gouv.fr/Segolene-Royal-a-demande-a-l-Union,45185.html

Why does the ETS need a carbon price floor?

There are many **reasons why the EU ETS needs an explicit, predictable and steadily increasing price on CO_2**, especially for the purpose of achieving significant emission reductions for both health (air quality, beyond CO_2) and climate change mitigation. Among the key reasons are the enhancement of green growth and innovation, the attraction of risk-averse long-term investors within the scope of the EU ETS, and the move the decarbonation investment decisions out of the field of a few expert insiders skilled with the specific complexity of EU allowances, into mainstream (price based) business decisions at all levels. The table below briefly recaps those reasons.

Topic	Issues
Health	The World Health Organization estimates that air pollution in 2012 was responsible for 7 million premature deaths including 600 000 in the WHO EU Region[11] as well as tenths of thousands of under-five, infant and neonatal deaths within EU ETS participating Member States[12]. Bearing this in mind, this paper recommends not only to trigger emission reductions through an auction reserve price, which would also reduce other particle emissions, but also to further develop policies aiming at reducing industrial pollution, imposing carbon performance standards, and supporting low-carbon energy sources.
Climate Change mitigation ambition	**Achieving the 2°C trajectory, aiming for 1,5°C and achieving zero net emissions by the end of the century requires a certain carbon price to trigger the appropriate trajectory as well as to avoid reverting back to coal once phased out.**
	The initial belief was that CO_2 prices within the EU ETS would fall to zero in the long term because we would have achieved our climate goals. The IPCC, the IEA and many other organizations publish scenarios where our climate ambitions require prices to rise and remain very high. This is not compatible with a "quantity-only" ETS, aiming for the lowest cost, including no cost at all, and including being paid to emit CO_2 through overgenerous free allocations. **A regulated price management mechanism is required, as has been applied by most if not all other ETS in the world.**
	Decoupling the price signal from the scarcity of allowances is necessary if we want to simultaneously decrease CO_2 emissions including in situations where the cap reveals too generous, while increasing CO_2 prices.
Green growth.	**An auction reserve price would reinforce the ETS long term credibility as well as the ETS price signal, reinforcing economic attractiveness of low carbon solutions.**

[11] *WHO, 2015 : http://www.euro.who.int/__data/assets/pdf_file/0004/276772/Economic-cost-health-impact-air-pollution-en.pdf*
[12] *WHO statistical data : http://apps.who.int/gho/data/view.main.CM1320N?lang=en*

Topic	Issues
R&D, Innovation.	**Create an economic incentive to develop and to invest in low carbon innovation.** An auction reserve price enables business plans to integrate certainty on revenues from emission reductions up to the floor price. Existing policies in favor of research and development would contribute to supporting emission reductions without requiring additional or specific efforts.
Generating a predictable increase in Member States revenues	**An auction reserve price would directly increase all Member States revenues from auctioning, in a predictable manner.** It would also indirectly increase some Member States revenues due to the two redistributive mechanisms (funds) established under the 2030 climate energy framework.
Wider workability of the price signal across all levels of economic decisions	**Workability of the price signal even for industrials without a trading desk.** Not all industrials, not all providers of low carbon products and services have access to a trading desk with expertise in EU allowances. However all of them usually make investment decisions based on price-based business plans. An auction reserve price would enable economic agents at all scales to make decisions based on a predictable and certain price resulting from the expected emission reductions.
Risk-averse long term investment	**Return on investment and limited losses.** An auction reserve price makes it possible to determine if and when switching to low carbon technology will be profitable, and at what rate. In the absence of an auction reserve price, the risk associated with price fluctuations combined with the possibility of falling to very low price levels, leaves few to no opportunity for low carbon investors.
Preservation of the "market" nature of the ETS	**An auction reserve price would only affect the primary market.** Given the huge amount of surplus, the secondary market could show price fluctuations below the auction reserve price, simply because sellers and buyers would both benefit from trades above former market prices – and below the auction reserve price.
Protection of the ETS price signal against missing demand for allowances and against the impact of surplus on CO_2 price	**An auction reserve price preserves the price signal including in a context of surplus of allowances, diminishing demand for allowances, or flat growth.** Meanwhile the market may "discover" the appropriate price, above the auction reserve price.
Easy to implement	**Technically, implementing an auction reserve price within the ETS legal framework is simpler than revising the cap.**

All 2°C scenarios require a higher and steadily increasing price on CO_2

The 2°C climate goal requires a certain, sufficient, and lasting CO_2 price of about $140 / ton by 2040 (according to the IPCC, the IEA etc.). The section below clarifies the various meanings of a price on CO_2, in particular the distinction between social cost and social value.

Various approaches to link political climate goals with CO_2 price

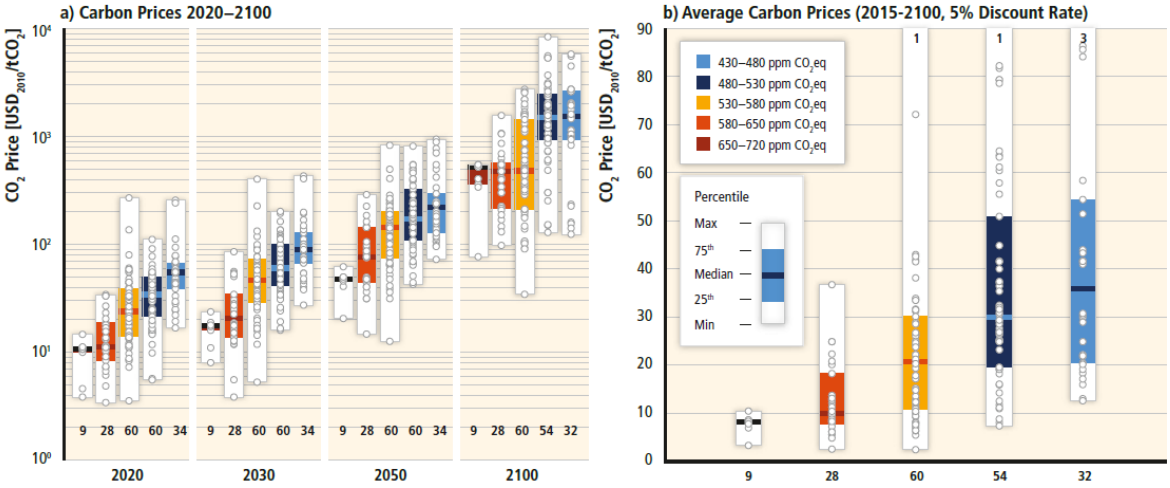
The table below outlines various definitions of carbon prices, and the main sources referring to these prices.

Type of carbon price	Specificities	Example / referred to by
Social **Cost** of Carbon	- Estimate of future economic damages associated/avoided with a marginal increase/reduction in CO_2 emissions exclusively (no other GHG), in a given year and a given currency. **- Currency-year sensitive.** **- Discount rate sensitive.** **- Controversial** due to the range and uncertainty associated with underlying assumptions and key arbitrary option for a discount rate	EPA[13] (USA) IMF Stern N.
Reference **value** of carbon Social **value** of carbon Environmental value of mitigation actions	- Result of a cost-benefit analysis to achieve commitments to limit GHG atmospheric concentration to a **given value**;	IPCC WG3 Paris Agreement[14] France[15] United Kingdom[16]
Mitigation costs Marginal abatement costs of CO_2	- Estimate of the cost associated with reducing emissions of one more Ton of CO_2 equivalent - sector, scope, method (…) sensitive	Mc Kinsey
Allowances Primary Market Price (Auction clearing price)	- Price of allowances for a given auctioning session, as set by the EU Auctioning Regulation[17]	EU ETS Installations
Allowances Secondary Market price	- The price at which buyers and sellers agree to trade a given quantity of allowances at a given time.	EU ETS Installations
Comprehensive costs	- Based on a **lifecycle analysis** (LCA) - Emissions and emission reductions are aggregated on the product Lifecycle (e.g. including a building's exploitation phase) - arbitrary rules, company-specific	Economic agents
Shadow Price	- Arbitrary company-specific choice to put a price on carbon (e.g. anticipating future environmental regulations)	Economic agents

[13] *Source : EPA, USA. See : http://www3.epa.gov/climatechange/EPAactivities/economics/scc.html*
[14] *See decision 109 in the Paris Agreement adopted at COP 21.*
[15] *Dominique FINON, CIRED 2015 see : http://www.strategie.gouv.fr/actualites/reconnaissance-dune-sociale-carbone-laccord-climat*
[16] *See Department of Energy & Climate Change: https://www.gov.uk/government/collections/carbon-valuation--2*
[17] *See: COMMISSION REGULATION (EU) No 1031/2010, Art. 7*

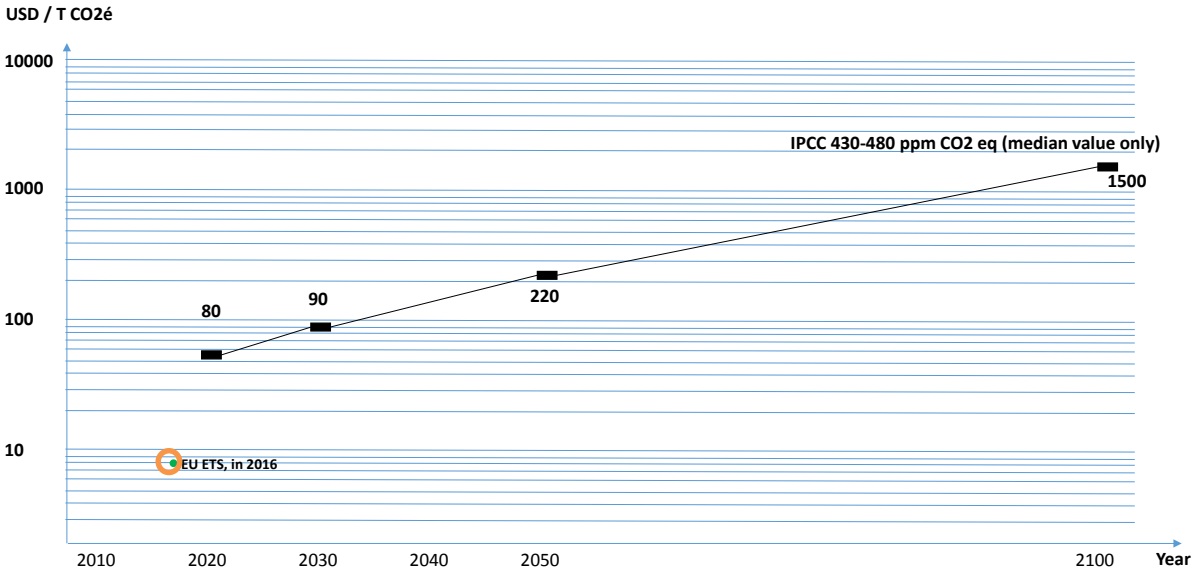
The IPCC's AR5 WG3 links carbon price with ppm scenarios

- According to the IPCC's AR5, the majority of scenarios with a greater than 66 % chance of limiting temperature change to less than 2 °C are those that reach between 430 and 480 ppm CO_2eq;
- IPCC graphs below show the global price trajectory (in USD as of year 2010) required by the 2°C goal (see 430-480 ppm scenario).



Source: IPCC WG3 AR5 Chapter 6 page 450[18].

- The graph below isolates median prices required according to IPCC to achieve the 2°C goal through a 430-480 ppm scenario. The ETS price in January 2016 is visible in the bottom left corner of the graph.



Source: Author according to IPCC.

[18] *See IPCC WG3 AR5 Chapter 6 pages 440 to 450.*

- CO_2 price floor figures extracted from IPCC graph for median values associated with the 430-480 scenario, are the following:

	2020	2030	2040	2050	2100
CO_2 minimum Price (per ton of CO_2eq) for the 430-480 ppm scenario (IPCC median values)	**$ 80**	**$ 90**	**$ 140**	**$ 220**	**$ 1500**
	€ 72	**€ 81**	**€ 126**	**€ 198**	**€ 1351**

Note: these values are those we can read on the graph. Conversion in Euros has been made as of February 19th 2016.

On one hand, modeling in years 2050 to 2100 is far from what we can reasonably believe from a model.

On the other hand, if CO_2 emissions are to be permanently excluded from human activities in the future as per the Paris Agreement, then it makes sense to tend to extremely high CO_2 prices in the long term, even if the cost of reducing CO_2 emissions would drastically diminish.

- Caveat:

Many assumptions are needed to provide such figures out of economics models, especially regarding expected growth and future costs of reducing GHG emissions.

- Acceptability of induced costs:

Implementing such an auction reserve price trajectory on the EU ETS is acceptable in light of the following:

- The cost of oil and wholesale price of electricity has reached a very low level, creating room for a higher carbon price while preserving energy affordability;
- Free allocation in the ETS is based on the need to protect industrial sectors against competitiveness distortion (carbon leakage risk) up to €30 per Ton of CO_2 [19]. According to the European Commission, the competitiveness distortions generated by an auction reserve price level below the €30 threshold are consequently prevented by free allocations as envisioned by the current reform.
- The power sector is committed to pass-through the cost of CO_2 on electricity wholesale markets, and electro-intensive industries receive specific state-aid compensation for these costs (indirect carbon costs); other sectors also can pass-through some to all of their carbon costs[20];
- In some countries still relying on coal to produce their electricity, industry and the power sector benefit from free allocation. This exception is no longer slated to end by 2020;
- An auction reserve price would increase Member States revenues from auctioning in a predictable manner. Redistributive mechanisms as per the 2030 climate-energy framework will even further increase revenues for those Member States benefitting from these mechanisms (10% of allowances to be auctioned will be distributed to the least wealthy EU Member States as an additional source of revenue. This will help them invest in the reduction of their economy's carbon intensity and their adaptation to climate change. Furthermore 2% is given as a 'Kyoto bonus' to nine EU Member States, which by 2005 had reduced their greenhouse gas emissions by at least 20% compared with their Kyoto Protocol base year or period. These countries are Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia[21]).

[19] *European Commission Impact Assessment, Commission Staff Working Document http://ec.europa.eu/clima/policies/ets/cap/leakage/docs/20140502_impact_assessment_en.pdf*
[20] *http://ec.europa.eu/clima/policies/ets/revision/docs/cost_pass_through_en.pdf*
[21] *Source : European Commission, http://ec.europa.eu/clima/policies/ets/cap/auctioning/index_en.htm*

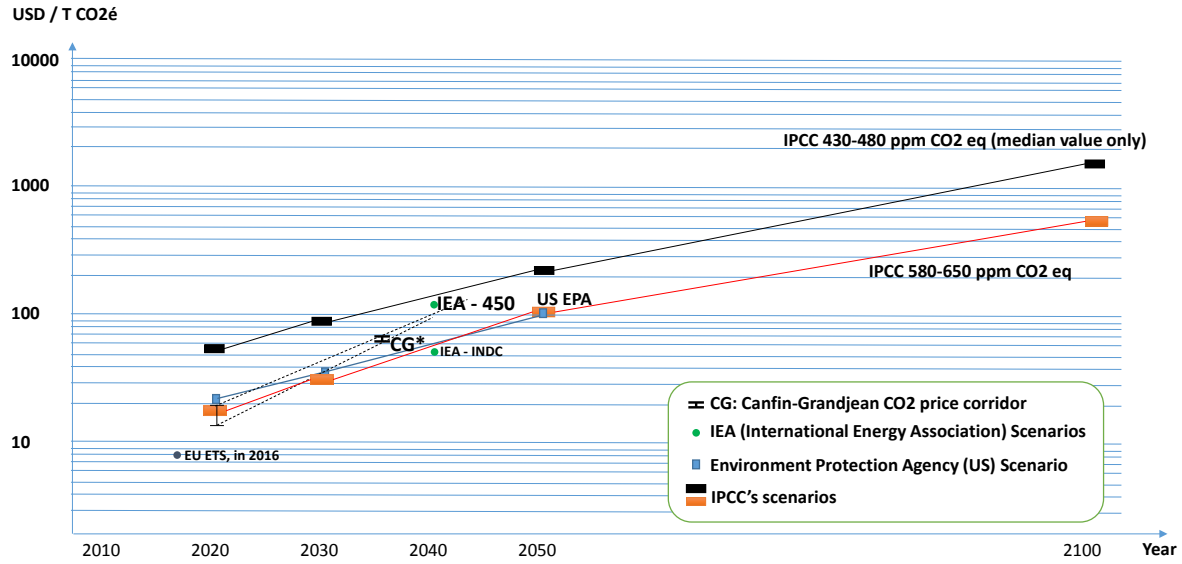
Other sources converge on the appropriate carbon price corridor required by 2040

The graph below shows a compilation of various CO_2 price scenarios compatible with the 2°C goal.

The graph shows differences between those scenarios - some of them are quite close to leading to a "likely" 530-580 ppm scenario, which would not be compatible with COP21 and EU climate goals.

This compilation also shows that the IPCC, the IEA and the Canfin-Grandjean commission all converge on the need for **a carbon price corridor in a range of $ 100 - $ 140 per metric Ton of CO_2 as of 2040 (€90/tCO_2 to €126/tCO_2), steadily increasing over time.**

The London School of Economics has reviewed a range of scientific scenarios[22] and suggests that the price of CO_2 in the UK should reach £120 to £140 / T of CO_2 (US$173 to US$201) which is even higher than these values.



Sources: Author, according to IPCC[23], IEA[24], Canfin-Grandjean[25], and EPA[26]

- Note: The OECD Environmental Outlook to 2050, published in 2012, mentions that "Curbing global emissions beyond 2020 would require a rapidly increasing carbon price (to US$ 325/tCO_2e in 2050)".

Implementing an increasing price within the EU ETS can easily be achieved through an auction reserve price. However, the price level required by our long term climate goal seems much higher than any reasonable auction reserve price. Therefore, the ETS would still need to be complemented by others forms of implicit and explicit "positive" carbon prices (through other climate and energy policies such as industrial emissions regulations, carbon performance standards, support to low carbon research and innovation, support to low-carbon energy sources…), and by a reversal of the current trend of increasing fossil fuel subsidies which are equivalent to "negative" carbon prices.

[22] *Bowen, A. 2010. UK. London School of Economics The Case for Carbon Pricing. See page 11 (page 9 in the document)* http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2014/02/PB_case-carbon-pricing_Bowen.pdf
[23] *See IPCC WG3 AR5 Chapter 6 page 450*
[24] *See World Energy Outlook special report 2015, pages 17 to 33*
[25] *See* http://www.elysee.fr/assets/Report-Commission-Canfin-Grandjean-ENG.pdf
[26] *See* http://www3.epa.gov/climatechange/Downloads/EPAactivities/EPA_APA_Analysis_6-14-10.pdf

A recommended auction reserve price starting at €20

Free allocation is determined on the basis of an impact assessment where the price of allowances may reach a certain price level. Currently, this price level is set at €30/tCO_2eq for the next phase of the EU ETS. As long as ETS prices remain below this threshold, existing mechanisms are designed to protect the industry from controversial competitiveness distortions due to carbon costs which have not been passed-through.

An auction reserve price starting at €20/tCO_2, and escalating with an annual inflation of + 5%, would consequently have a limited impact on competitiveness, since this price level is largely covered by free allocation. Ongoing discussions regarding the cross sectoral reduction factor and the need for a better protection for the most exposed entities will further help avoid adverse effects.

This price trajectory combined to a replication of the UK carbon price floor on the Power sector (£18/tCO_2eq) would trigger an immediate switch from coal to gas in any implementing member-state while remaining below the €30 threshold for ten years.

We reiterate our support to the Market Stability Reserve, which is the ideal complement to an auction reserve price. Indeed this reserve creates the possibility to symmetrically implement a ceiling price in case of a sudden rise in carbon price (if ever). We explained this feature, inspired by the California-Quebec ETS, in a former position paper (The Shift Project, 2014[27]).

[27] http://www.theshiftproject.org/sites/default/files/files/pos_-_2014_the_shift_project_-_position_paper_-_msr_eu_ets__final_lt.pdf

EU ETS participating Member States significantly increase fossil fuel subsidies

The effectiveness of the price of CO_2 in Europe depends on various implicit and explicit, positive and negative carbon prices such as fossil-fuel subsidies

Economic agents in the EU face various explicit carbon prices (taxes, allowances) and implicit carbon prices (e.g. carbon performance standards), depending on the country and the sector.

Some CO_2 prices are positive (taxes), while others are negative prices (fossil fuel subsidies, state aid compensation for indirect carbon costs, free allocation…) and we roughly estimate that it is most probably increasing anthropic GHG emissions.

One may even consider that low prices on the EU ETS are equivalent to a negative price, as it is the case for any under-taxation, or for exemptions.

The resulting CO_2 price, is made of positive and negative, implicit and explicit prices, and varies depending on national regulations and circumstances, sectors, and on the size of economic agents.

IMF data show an increase of fossil fuel subsidies in each EU ETS participating Member State, generating an implicit negative price on carbon

EU ETS participating Member States subsidies to fossil fuels generate an implicit negative price on CO_2.

- Those subsidies amount to about **$300 billion in 2013, rising to $335 billion in 2015** (+12%), more than 7 times the $46 billion (€40.32 billion) of EU subsidies to renewable energy sources (Ecofys, 2014);
- The EU INDC[28] commits to a binding target of at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990 levels (5 750 $MtCO_2$[29]), which means reducing emissions by 2300 MT. Under IPCC's extracted figure of $90 per ton in 2030 (see the table above in this document), this results in a $207 billion "social value" (2 300 $MtCO_2$ at $90/$tCO_2$) which contains both public and private expenses. Fossil fuel subsidies are public costs that further increase public and private costs of achieving a given climate goal.

Reducing fossil fuel subsidies would also reduce the need for subsidies in low carbon solutions to achieve a given climate goal.

IMF FFS calculation rely on specific methods (post-tax) and definition of energy subsidies. The OECD and the IEA do have other methods. For a discussion on methodological issues, see ECFIN[30] Economic Brief, issue 40 box 1, March 2015.

IMF data[31] show an average of 12% increase in fossil fuel subsidies in each EU ETS participating Member State, except in Romania (-1%). We recommend reverting that trend, and aiming at minimizing those subsidies with respect to social impacts.

[28] *http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf*
[29] *Source : eurostat (see http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Total_greenhouse_gas_emissions_by_countries_%28including_international_aviation_and_excluding_LULUCF%29,_1990_-_2013_%28million_tonnes_of_CO2_equivalents%29_updated.png)*
[30] *See : http://ec.europa.eu/economy_finance/publications/economic_briefs/2015/pdf/eb40_en.pdf*
[31] *See IMF website, http://www.imf.org/external/pubs/ft/survey/so/2015/new070215a.htm*

The table below sorts EU ETS participating Member States fossil fuels subsidies in 2015. These totals are not weighed here by GDP for the purpose of estimating an equivalent price per ton of CO_2 in absolute terms and not in terms of GDP CO_2 intensity.

Table – Post-tax subsidies in US$ billions for EU ETS participating Member States by product.

Country	2015 Nominal GDP US$, billion	2015 Population, millions	2015 Post-tax subsidies in US$ billions (nominal)				
			Petroleu	Coal	Natural Gas	Electrici	Total
Germany	3908,79	81,36	2,97	40,80	11,87		55,64
Poland	593,76	38,02	3,31	47,64	3,25		54,20
United Kingdom	3002,95	64,94	0,28	28,62	12,34		41,23
France	2935,36	64,21	16,65	6,93	6,54		30,12
Spain	1421,71	46,39	14,14	6,27	3,77		24,18
Bulgaria	57,60	7,17	1,81	17,40	0,29		19,50
Czech Republic	208,87	10,53	1,27	15,16	1,15		17,58
Romania	215,30	19,83	0,84	11,44	1,75		14,03
Italy	2152,99	60,24	0,00	4,02	9,25		13,27
Belgium	536,14	11,24	5,50	2,58	2,14		10,21
Netherlands	891,55	16,94	2,14	2,69	5,25		10,08
Greece	252,42	10,98	0,28	5,88	0,44		6,60
Denmark	361,33	5,63	4,28	0,82	0,69		5,78
Hungary	132,18	9,86	0,37	3,27	1,57		5,21
Norway	523,19	5,21	3,57	0,39	0,68		4,64
Austria	448,08	8,56	1,71	1,11	1,00		3,82
Slovak Republic	103,21	5,42	0,25	2,22	0,76		3,24
Lithuania	51,00	2,93	1,23	0,41	0,60		2,24
Portugal	231,97	10,40	0,81	0,93	0,47		2,22
Croatia	59,91	4,24	0,81	1,07	0,34		2,22
Luxembourg	66,01	0,57	1,94	0,02	0,17		2,14
Sweden	572,69	9,83	1,15	0,54	0,16		1,85
Finland	280,67	5,51	0,00	1,13	0,32		1,45
Ireland	252,64	4,65	0,00	0,62	0,60		1,22
Slovenia	50,71	2,06	0,00	1,11	0,09		1,20
Latvia	34,12	2,03	0,14	0,06	0,25		0,46
Estonia	27,41	1,32	0,00	0,02	0,10		0,13
Iceland	17,22	0,33	0,04	0,05	0,00		0,09
Malta	10,61	0,43	0,02	0,00	0,00		0,02
Cyprus	21,41	0,90	0,00	0,00	0,00		0,00
EU ETS Total	**19 421,79**	**511,70**	**65,52**	**203,22**	**65,83**	**-**	**334,57**
(Liechtenstein: no data)							

Source: IMF, 2015.

Table – Trend in fossil fuel subsidies from 2013 to 2015 in EU ETS participating Member States (2015 post-tax subsidies in USD billions (nominal).

Country	Total 2013	Total 2015	2013 - 2015 Trend
Germany	50,29	55,64	11%
Poland	46,73	54,20	16%
United Kingdom	36,70	41,23	12%
France	26,59	30,12	13%
Spain	20,67	24,18	17%
Bulgaria	18,22	19,50	7%
Czech Republic	15,15	17,58	16%
Romania	14,11	14,03	-1%
Italy	12,79	13,27	4%
Belgium	9,22	10,21	11%
Netherlands	9,89	10,08	2%
Greece	5,91	6,60	12%
Denmark	5,17	5,78	12%
Hungary	4,57	5,21	14%
Norway	3,97	4,64	17%
Austria	3,16	3,82	21%
Slovak Republic	2,82	3,24	15%
Lithuania	1,96	2,24	14%
Portugal	1,91	2,22	16%
Croatia	1,91	2,22	16%
Luxembourg	1,89	2,14	13%
Sweden	1,25	1,85	48%
Finland	1,36	1,45	6%
Ireland	1,09	1,22	12%
Slovenia	1,09	1,20	11%
Latvia	0,32	0,46	42%
Estonia	0,11	0,13	11%
Iceland	0,04	0,09	99%
Malta	0,01	0,02	152%
Cyprus	0,00	0,00	19%
EU ETS Total	**298,90**	**334,57**	**12%**
(Liechtenstein: no data)			

Source: IMF, 2015

Combining climate-energy policies for a higher efficiency towards political goals

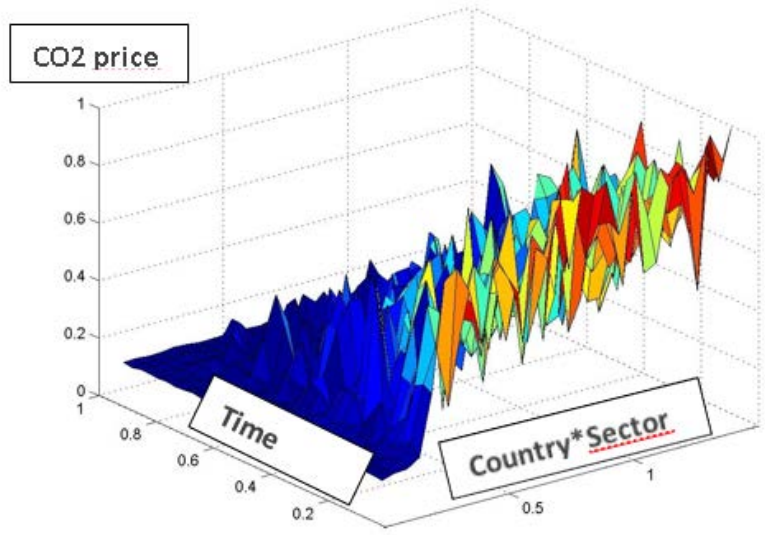
We also recommend combining the EU ETS with other climate and energy policies inducing implicit positive carbon prices, such as industrial emission regulations, carbon performance standards, and support to low carbon research and innovation, support to low-carbon energy sources… **The idea is to flood the economy with positive prices on carbon** – similar to fossil fuel subsidies currently flooding the economy with negative ones. Effectiveness requires mainstreaming climate change. Combining FFS drastic reduction with other climate-energy policies to induce a "field of CO_2 prices"

The effectiveness of the price of CO_2 depends on the level of coordination between policies, altogether generating a field of implicit and explicit, positive and negative CO_2 prices, characterized by price levels that may differ by country, by sector, by size of economic agents among other parameters.

The price of CO_2 that is required to trigger low carbon investments, which in turn achieve significant emission reductions vary from one sector to the other and from one market to the other (e.g. the carbon price necessary to ensure switching from coal to gas in electric generation differs from one "market" to the other). This is reflected by CO_2 abatement cost curves such as "The Global Mc Kinsey GHG abatement cost curve[32]".

The graph below is an abstract representation of a steadily increasing carbon price showing "Country*Sector" variations.

Graph - Abstract representation of a "field of CO_2 prices", increasing over time while showing country and sector specificities



Source: L. Mamilongui.

Sector-specific complementing policies include among others: taxes (e.g. UK carbon price floor), inclusion of importers of good (e.g. fossil fuels) into the ETS, control and restrictions on industrial emissions (Sox, NOx, Hg…).

[32] *Source : Mc Kinsey http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/impact-of-the-financial-crisis-on-carbon-economics-version-21*

An example of national and sector specificity is already in place in the UK. The country indeed has implemented a carbon tax (carbon price floor) on top of the ETS, applicable to the sole power sector, aiming at reducing the use of coal for electricity generation.

Energy intensive industries are and will be protected against such an increase in their indirect carbon costs through EU-approved state-aide compensation.

However, emission reductions resulting from this tax, will increase the quantity of allowances made available to other installations in the EU ETS (e.g. the "waterbed effect"). In addition, grid connection enables British companies to import cheaper and eventually more carbon intensive electricity from neighboring countries. It has to be noted here that any form of price support and especially an auction reserve price, would protect market prices from adverse impacts of the waterbed effects as from any exogenous demand shock.

A coalition of Member States could coordinate their action to implement an auction reserve price, in articulation with a carbon tax on top of the ETS, and reinforce the environmental efficiency of the UK's carbon price floor.

- This would require first, that those Member States connected to the UK's electricity grid implement a similar carbon price floor applicable to the power sector. Those countries currently are Ireland, France and the Netherlands. This list will grow to include Belgium and Norway;
- This would also benefit from measures addressing the "waterbed effect" (allowances made available to any other country and sector) and avoiding the creation of new surplus. Such measures could be a mix of the following:
  - Voluntary cancellation of allowances, to an amount equivalent to the emission reductions resulting from this electricity-only carbon price floor. However this would probably reduce Member States auctioning revenues;
  - National Banking: freezing those allowances into a reserve dedicated to "power security of supply": this would avoid the transfer of allowances unused by the power sector to other countries and sectors. It would postpone auctioning revenues. Implementing a steadily increasing auction reserve price would make this option even more rewarding for participating Member States.

In the case of the power sector, switching from coal to gas is a transitional progress, and the auction reserve price combined with a sector specific tax would reduce the probability to relapse back to coal at a later stage..

Domestic projects

Domestic projects are intended here as projects hosted in any EU ETS participating Member State, and reducing GHG emissions not covered by the EU ETS (e.g. emission reductions from installations below the thresholds of ETS applicability, or emissions falling in the scope of the Effort Sharing Decision such as Agriculture, Transport, Building).

Domestic projects would provide additional flexibility to comply with the ETS regulation, and would most probably be supported by industrial sectors.

Note that other ETS in the world all have some room for project-based domestic emission reduction flexibility.

How to avoid creating "additional" surplus... In the context of an enormous surplus of allowances, the European Commission fears that domestic projects could add to the surplus. Indeed, the two options usually envisaged to credit domestic projects are at run counter-trend to the implementation of the MSR.

The first option consists in the conversion of allowances from the MSR into credits, which credits could be used within the EU ETS. Obviously, while this option remains cap-neutral from an ETS point of view, it would nevertheless release allowances earlier than what the MSR would have done in the absence of the project.

The second option consists in mimicking the MSR functioning: credits would be issued from allowances that otherwise would have been auctioned. This option has no adverse impact on the functioning of the MSR, and would not create surplus. However, it would reduce Member States revenues from auctioning and subsequent reinvestment of these revenues as per the ETS Directive. From an environmental point of view, domestic projects could be less efficient than the reinvestment of auctioning revenues.

Reviving domestic projects in the context of the ETS. Finally, crediting domestic projects as a flexibility in the context of the ETS have to be reinvented, fulfilling the following requirements:

- **Do not release allowances out of the MSR**: credits should then come from future auctions, mimicking the functioning of the MSR. Furthermore, this option mean that the quantity of credits issued would be part of the MSR calculation of "allowances in circulation", exactly as if those credits had not been issued.
- **Do not create surplus**: the above mentioned option does not create surplus, since all credits come from the ETS cap, and are used within the ETS. This option is not only cap neutral from an ETS point of view, but it helps Member States to achieve their commitments in the other scopes.
- **Demonstrate additionality as compared with reinvestment of auctioning revenues**. This can be implemented as part of project eligibility criteria. By doing so, there is another positive impact of domestic projects. The first projects identifying low-hanging fruits in the scope of the Effort Sharing Decision, would get credits at the scale of the project while the government could immediately decide to reinvest auctioning revenues in similar action, preventing future windfall profits and reducing emissions.
- **Do not reduce Member States revenues**: it is quite simple to **increase the auction reserve price** by the amount required to compensate missing revenues due to domestic projects crediting. **This is another argument in favor of decoupling quantity management and price management in the ETS.** Note that usually, domestic projects achieving X tons of emission reductions will only receive credits worth a lower share of this amount. The remaining amount, unallocated to the proponent project, is kept by the issuing State, as a provision for risks and/or a share of proceeds.

Domestic projects create flexibility for ETS participants, and detect opportunities for low cost emission reductions. In the context of the ETS and its surplus, domestic projects would be credited through the conversion of allowances that would otherwise have been auctioned in order not to create additional surplus but rather. The auction reserve price would then protect Member States auctioning revenues from marginal adverse effects induced by domestic projects.

Increasing the price of CO_2 doesn't just have benefits

Carbon leakage and competitiveness: preliminary considerations

Increasing the price of CO_2 may, over time, create or increase the risk of carbon leakage as well as competitiveness distortions with less demanding jurisdictions. This would happen if the price of carbon results in significant direct and indirect costs for producers, as compared to other costs (fiscal, social, raw materials and processes, energy, transport…), and without a possibility to pass the carbon costs through to clients.

This risk may significantly vary from one product to the other. The following elements need to be considered: the complexity involved in assessing this risk, the lack of data and the lack of transparency, the usual "lobby approach" of bringing the competitiveness issue on the table even without any prior assessment, the growing momentum for carbon pricing initiatives and more generally climate change mitigation policies - which is implicitly or explicitly equivalent, and the need for an adaptive solution.

Policymakers have a range of options to address the risk for environmental policies to induce carbon leakages, including partial exemptions, free allocation, state aid compensations for carbon costs, border adjustment measures, output-based and cap adjustment measures, scope expansion and linking…

All of them require ex-post assessment of actual impacts on the economy and on GHG emissions.

Comparing these options would make it possible to look at induced emission reductions, carbon cost pass-through, impacts on Member States budgets (auctioning revenues, state aids…), opportunities for windfall profits and contribution to the surplus of allowances, impact on competitiveness and export / import balance.

These elements are not addressed in this document.

Increasing the price of CO_2 does not always trigger emission reductions

Purchasing CO_2 allowances gives no guarantee that the seller will reinvest the money received to reduce his emissions.

Selling CO_2 allowances, especially if allocated for free, is not necessarily the outcome of a mitigation effort (e.g. it may result from market arbitrations such as importing instead of producing in the EU).

Companies may pass the costs through and/or pay the costs associated with CO_2 emissions instead of reducing their emissions for a range of reasons including the following:

- Higher **priorities** to deal with or to invest in, in line with the company's strategy;
- More rewarding investment opportunities rather than reducing CO_2 emissions or CO_2 intensity;
- Lack of significance of the cost of CO_2 , compared with other costs;
- Ability to pass CO_2 costs through to customers.

As long as carbon costs are not significant, the price of CO_2 may increase without triggering low-carbon investments. Also, significant carbon costs, if passed-through to captive final consumers, do not always require reducing emissions.

Increasing the price of CO_2 requires safeguards with respect to sustainable development

Increasing the price of CO_2 is expected to create additional support for the transition to sustainable human activities, especially sobriety, efficiency, renewable and other low-carbon energy sources. It can also be favorable to the forestry sector through economic incentives to substituting carbon-intensive material and energy with wood.

However, increasing the price of CO_2 also creates a relative advantage to nuclear energy, which many citizens are opposed to. Removing CO_2 emissions must be achieved on time, however the transition to a low carbon society also requires paying attention to other impacts on sustainable development.

Conclusions

Investments required in the power and industrial sector to achieve the 2°C to 1.5°C climate goal won't occur as long as carbon prices on the EU ETS will remain low and with a potential to collapse to near zero.

The structural reform of the ETS establishes a market stability reserve which will progressively absorb some surplus of allowances, but without directly addressing the issue of carbon price.

We recommend implementing an auction reserve price starting at €20 so as to remain in the price range covered by carbon leakage prevention measures; this price would be subjected to a steady increase in a predictable manner. Such a floor price would contribute to the deployment and lock-in of low carbon solutions.

The majority of other ETS in the world rely on price management mechanisms which places a cost on putting off the reduction of emissions and which enable price signal increases, consistently with political ambitions regarding climate change. An auction reserve price also increases revenues for State's budget, enabling further public investments in the transition to a low carbon economy.

All 2°C scenarios (e.g. IPCC, IEA etc.) affirm the need for an increasing carbon price which reaches about \$140/tCO_2 by 2040.

This price reference level is made up of implicit and explicit carbon prices, as well as negative and positive prices. And while the ETS shows a lasting low and potentially collapsing positive price, EU ETS participating Member States significantly increase their fossil fuel subsidies beyond \$ 300 billion.

That is why we recommend to not only reinforce the ETS price signal, but also multiply other forms of positive carbon prices through carbon performance standards, sector-specific taxes (e.g. in the power sector), support to low-carbon energy sources...

Should the EU adopt an auction reserve price on carbon within the EU ETS, it would serve as a reference for any other jurisdiction implementing any form of carbon pricing mechanism.

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