POLICY INSIGHTS

Thinking ahead for Europe

# The EU ETS price may continue to be low for the foreseeable future – Should we care?

Milan Elkerbout & Christian Egenhofer

No 2017/22, June 2017


## Summary

Carbon prices in the EU ETS have been low for a number of years and might remain at relatively low levels for the foreseeable future. That does not mean that the EU ETS, or the price signal it produces, is meaningless. Incentives to abate greenhouse gas emissions exist at any price level (it is just stronger with higher prices). This is true even if the impact is different between the power and industrial sectors, partly but not only because of the difference in allocation rules. What the ETS price signal does not drive, however, is long-term investment decisions, which are more a function of price expectations and expected returns on investment.


Carbon prices in the EU emissions trading system (ETS) have for a number of years been lower than many expected. For some time early on in the second trading phase (2008-12), prices came close to the 'reference level' of €30 per tonne used in ETS impact assessments and implementing legislation. But following the economic crisis, reduced output, combined with a rigid supply, has led to a situation in which supply continuously outstrips demand. The resulting surplus of allowances continues to hold prices down to this day.

The adoption and entry into force of the Paris Agreement notwithstanding, EUA (i.e. ETS allowances) prices have fluctuated between €4 and €6 throughout 2016 and 2017 so far. This has led to a continuous debate on what the role of the EU ETS in the decarbonisation of the EU's economy will be.

Although steps have been taken to address the glut of allowances, ETS prices may continue to be low for the foreseeable future. The Market Stability Reserve (MSR), as the primary

Milan Elkerbout is a Researcher at CEPS Energy Climate House. Christian Egenhofer is Associate Senior Research Fellow at CEPS and Director of CEPS Energy Climate House.



CEPS ENERGY CLIMATE HOUSE

978-94-6138-583-3

Available for free downloading from the CEPS website (www.ceps.eu)
and
the ECH website (www.ceps-ech.eu)

mechanism to correct the supply-demand imbalance in the EU ETS, will only start operating from 2019 onwards. Even as the Council and European Parliament have recently adopted more ambitious positions on the MSR and on cancelling allowances, EUA prices remain a far cry from €30 a tonne.

The lower-than-expected carbon prices also affect the outlook and expectations for future price developments, which play a greater role in investment decisions than do spot prices. Price expectations, however, are not determined by liquid markets and as such may vary widely between different players.

What are the implications of these low prices? This paper examines the role of the price signal in an ETS and also looks at the role of an ETS beyond this price signal. We differentiate between the short and medium term, where the impact on operational changes is most relevant, and the long run, where changes in investment patterns are more relevant.

## The role of the price signal

### In the short and medium term: Operational efficiency

In its most simple way, a carbon price signal serves as an incentive to reduce emissions and increase carbon efficiency in the production processes. The higher the price, the higher the costs of complying with the climate policy obligations, and thus the stronger the incentive to abate emissions. Carbon pricing is considered economically efficient, as the cheapest available abatement options are picked first.

In the EU, this carbon price is generated by the scarcity of allowances in the ETS. Unlike with a carbon tax, changes in demand (and to a lesser extent, supply) ensure that the level of the carbon price signal is subject to day-to-day variations as well.

At a given price level, it may be that operational adjustments to abate emissions are not available (as they would only be profitable at a higher carbon price), or are not significant in terms of inducing meaningful emissions reductions. The impact of the price signal also depends on how the emissions arise across different sectors. While most emissions are the result of combusting fuels (especially, but not exclusively in the power sector), a considerable amount of emissions in the EU ETS arise from specific industrial processes.

Whenever the emissions are the result of combusting fuels for energy needs, the choice of the fuel represents the main variable in affecting emissions levels. A sufficiently high carbon price could then induce operators to switch between different fuels, such as coal or gas. Specifically, the carbon price can lead to changes in the merit order, which subsequently affects the fuel mix, and with it, emissions levels.

However, this role of arbitrage between fuel inputs, and its impact on the merit order is greatly influenced by the other determinants of these fuel prices: the supply and demand for fuels at any time are affected by myriad economic, political and technological developments. With inevitably variable commodity prices, the level of the carbon price that would induce fuel

switching is continuously changing as well. Therefore, even at constant price levels, the impact of the carbon price will vary over time. Nevertheless, even if such a fuel switch is not triggered, any carbon price will give competitive advantage to operating plants that are more efficient over those that are comparatively less efficient. This holds true in any ETS sector, power or industry.

*Power sector.* In the power sector the carbon price signal impacts the dispatch of electricity. This can take place in two ways. If the carbon price is sufficiently high, a change in the merit order induces a change in the choice of energy (fuel) sources, which immediately affects emissions levels. However, even without inducing fuel switching, a carbon price at any level will have an impact on dispatching choices through the merit order.

What induces a change in the merit order is the pass-through of the allowance price on to (wholesale) power prices. Since the move to full auctioning for the power sector in 2013, this pass-through rate is considered to be 100%.[1]

The higher the carbon price, the sooner the moment when a power plant becomes uneconomical to run. Less efficient power plants face higher total carbon costs in operation, and will thus be retired before others would. Therefore, even if a carbon price signal is insufficient to drive changes in the fuel mix, or indeed in future investment, it can nevertheless play a role in the phase-out of older and inefficient plants.[2]

*Industry.* In industrial sectors, even if it lacks a merit order effect, changing costs of technology can similarly impact the level at which the carbon price makes certain abatement options profitable. Even so, a carbon price at any given level will provide an incentive to improve efficiency in the production process. The carbon price enacts a cost, and reducing costs wherever possible is in the interest of any operator.

Equally so, just as with the power sector, industrial firms will operate numerous plants and installations at different levels of efficiency. Irrespective of how high the carbon price is, the price signal serves as an incentive to retire comparatively inefficient installations before more efficient ones, as they become uneconomical to run.

There is an important difference, however, between the power and industrial sectors, as the method of allocation differs between them. For the power sector, allowances are in principle auctioned (bar some exceptions for lower-income member states). Conversely, for industrial sectors categorised as being at risk of carbon leakage (accounting for well over 90% of industrial emissions), allowances are freely allocated, subject to benchmarks.

[1] For more discussion on the merit order and cost pass-through, see Jos Sijm, Karsten Neuhoff and Yihsu Chen, "CO2 Cost Pass Through and Windfall Profits in the Power Sector, Working Paper (CWPE 0639 and EPRG 0617), May 2006.

[2] A. Denny Ellerman, Frank Convery and Christian De Perthuis, *Pricing Carbon*, Cambridge: Cambridge University Press, 2010, p. 174.

Benchmark-based free allocation ensures that more efficient installations face fewer carbon costs, as they will receive a larger share of their total required allowances for free. The exact quantity of allowances received for free also depends on historical production levels. For some installations, this leads to situations in which their free allocation exceeds annual emissions, in which case, no action is required to ensure compliance with the EU ETS.

Even so, the level of the ETS price may then affect abatement decision. Holding onto ETS allowances carries an opportunity cost for the operator, which varies with the level of the ETS price. With higher carbon prices, there is an incentive to prioritise operating more efficient installations, as this would free up more allowances to be sold.

While the opportunity cost of free allowances therefore ensures that there is an incentive to abate, if free allocations exceed emissions, it is in principle no longer necessary to participate in the market, which depresses liquidity. This has negative consequences for price discovery, and subsequently for economic efficiency.

### In the long term: Investment and expectations

In the long term, the carbon price signal could also be expected to drive future investment decisions. To meet the long-term climate targets of the EU (an 80-95% reduction of GHG emissions by 2050 compared to 1990; a commitment that may be revisited by 2018 as part of the Paris Agreement's 'informal dialogue'), continued investment in the power and industrial sectors is required.

The power sector will need to essentially decarbonise in full by 2050. To achieve this, various options are available: renewable energy (in its many forms, combined with electricity storage/batteries), nuclear power, or abating emissions through carbon capture and storage or use (CCS/CCU). Increased energy efficiency also plays a role, although this does not befall to the power sector themselves. Likewise, industrial sectors are expected to cut emissions considerably by mid-century, even if the low-carbon roadmap still foresees some emissions to continue by 2050.

With the long lifetime of capital in certain energy-intensive industries, there is a risk of producing economically inefficient outcomes if climate objectives necessitate the closure of plants before completing their natural life cycles. It is therefore important that climate policy signals create long-term visibility and investment horizons. While uncertainty is a fact of life in any economic activity, policy commitments and signals should ideally be seen as stable and credible. Moreover, even though climate objectives are by nature long-term, firms often focus on shorter time horizons. To induce the desired investment decisions, in terms of reducing GHG emissions, short- and medium-term policy signals should be in line with the longer-term targets.

Absent long-term visibility of policies (e.g. to 2050 and beyond), the uncertain returns to investors may deter investment. Conversely, if investment still takes place on the basis of shorter time horizons that do not correspond to longer-term pathways, 'stranded assets' may

arise, where plants would need to be closed from an environmental perspective, even if this is politically and financially unattractive.[3]

Neither deterred investment nor investment in comparatively carbon-intensive assets is desirable. Ideally, a policy mix would create investment signals in line with long-term climate policy objectives. Specifically, what is desirable is that a policy first deters 'bad' investments into capital that would make long-term climate goals more tenuous to achieve, and second triggers new investments. But to actually make new investments happen, short and medium term profitability are necessary, if not sufficient conditions. What role can the carbon price signal play in triggering these investments? In contrast to short-term operational decisions, daily carbon prices arguably do not affect such investment decisions. The long life cycles and time horizons associated with capital investments make expectations of future carbon prices, rather than carbon prices today, more relevant for investment.

Here, policy credibility plays a role. If there is the expectation that allowances in the EU ETS will be sufficiently scarce in the future, with concomitantly high carbon prices, the risk of carbon lock-in would be limited, as carbon costs would already be internalised. The expectations of future scarcity and future carbon prices will be translated by many firms into internal carbon prices, which affect investment decisions.

A problem for both the EU ETS and the electricity market is that they are significantly oversupplied and therefore out of equilibrium with market forces. The MSR may address this oversupply, but it will take time to draw down the surplus in emission allowances. For the electricity market towards 2030, conventional generation will be idled during increasingly large parts of the day due to the continued proliferation of renewable energy in the electricity mix. At the same time, zero marginal cost generation will push down wholesale prices, thereby also reducing the impact of the ETS price signal.

A similar dynamic is playing out in industrial sectors, which (indeed, like any other industry) require free cash flow to fund investments. While free allocation safeguards free cash flow by mitigating carbon costs, it also undercuts incentives to abate emissions. This may have the perverse effect of encouraging the continued operation of comparatively inefficient installations with the principal aim of ensuring that the operator continues to receive free allowances. While a higher carbon price increases the opportunity costs of using these allowances, the allocation method of free allocation based on historical emissions as such is an incentive to maintain older installations, instead of choosing to invest in new ones, as might be considered in the absence of the distortionary effect of free allocation.

Nevertheless, a carbon price in itself, whether explicit – as observed in EUA prices – or implicit – through internal carbon prices used by firms – is not sufficient to trigger low-carbon investments. While deployment of low-carbon technologies is linked to marginal abatement costs (MAC), it does not necessarily follow that a carbon price in excess of the MAC will trigger

[3] Christian Egenhofer, Andrei Marcu and Anton Georgiev, *Reviewing the EU ETS Review*, CEPS Task Force Report, CEPS, Brussels, November 2012, p. 5.

associated abatement actions. There are market failures that can hinder triggering new investments. Capital costs that require high upfront investments can further distort deployment, in addition to long payback periods.

## Conclusions: The EU ETS beyond the price signal

The ETS price signal, irrespective of the level, is an incentive to improve operational efficiency in sectors covered by the ETS. While it is true that these incentives are stronger when the price is higher, any price level, however modest, "promotes emissions reduction in an economically efficient way", as required by Article 1 of the EU ETS Directive. For investment, the role of the price signal is more ambiguous, even if expectations of future scarcity and prices can influence firms' internal carbon prices, which influence investment decisions.

Yet, beyond the price signal, an ETS offers more benefits. The fact that every tonne of emissions requires an allowance to be surrendered has injected considerable transparency and precision in recording the emissions of thousands of installations in the EU Transaction Log. Moreover, the ETS cap combined with the linear reduction factor, creates a long-term pathway with a pre-defined endpoint, which in turn provides long-term certainty for covered industries about when the cap reaches zero, after which time no new allowances will be made available (currently the year 2058, under proposed Phase 4 legislation).

Within the constraints of this cap, demand and supply will continue to fluctuate (and with it, the ETS price). With variations in economic output, and technological and regulatory changes, demand will likely continue to be more variable than supply, whose rules and parameters are determined ex-ante by policymakers. This imparts an anti-cyclical element into the EU ETS, which makes the system act to some degree as an automatic stabiliser. At the same time, the ETS price level will reflect the totality of the abatement efforts undertaken in ETS sectors, whether driven by the ETS itself or by other measures or circumstances.

Meanwhile, expectations about future carbon prices remain an important factor driving the required investments towards a low-carbon transition. Ironically, the more people expect higher prices, the more they should invest, in principle, which in turn could lower emissions and the demand for allowances, and thereby depress prices. This quandary, however, is an inherent tenet of an emissions trading system and underscores the need for a stable policy mix which is able to reconcile short- and long-term climate goals.

# ABOUT CEPS

Founded in Brussels in 1983, CEPS is widely recognised as the most experienced and authoritative think tank operating in the European Union today. CEPS acts as a leading forum for debate on EU affairs, distinguished by its strong in-house research capacity and complemented by an extensive network of partner institutes throughout the world.

## Goals

- Carry out state-of-the-art policy research leading to innovative solutions to the challenges facing Europe today
- Maintain the highest standards of academic excellence and unqualified independence
- Act as a forum for discussion among all stakeholders in the European policy process
- Provide a regular flow of authoritative publications offering policy analysis and recommendations

## Assets

- Multidisciplinary, multinational & multicultural research team of knowledgeable analysts
- Participation in several research networks, comprising other highly reputable research institutes from throughout Europe, to complement and consolidate CEPS' research expertise and to extend its outreach
- An extensive membership base of some 132 Corporate Members and 118 Institutional Members, which provide expertise and practical experience and act as a sounding board for the feasibility of CEPS policy proposals

## Programme Structure

### In-house Research Programmes

Economic and Finance
Regulation
Rights
Europe in the World
Energy and Climate Change
Institutions

### Independent Research Institutes managed by CEPS

European Capital Markets Institute (ECMI)
European Credit Research Institute (ECRI)
Energy Climate House (ECH)

### Research Networks organised by CEPS

European Network of Economic Policy Research Institutes (ENEPRI)
European Policy Institutes Network (EPIN)