Energy Efficiency and the ETS
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STUDY

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Energy Efficiency and the ETS

Abstract

The recently adopted Energy Efficiency Directive and other EU and Member State level policy instruments on energy efficiency as well as international greenhouse gas emissions trading systems will have interactions with the EU Emissions Trading System. These are analysed in the present briefing, highlighting possible problems with conflicting or misaligned policy instruments, and providing recommendations on the design of policy instruments, in particular the Emissions Trading System.
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<tr>
<td>APCR</td>
<td>Allowance Price Containment Reserve</td>
</tr>
<tr>
<td>BEV</td>
<td>Battery Electric Vehicle</td>
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<td>CCA</td>
<td>Climate Change Agreements</td>
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<td>CCL</td>
<td>Climate Change Levy</td>
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<td>CCS</td>
<td>Carbon Capture and Storage</td>
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<td>CDM</td>
<td>Clean Development Mechanism</td>
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<td>CER</td>
<td>Certified Emission Reduction</td>
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<td>CO₂</td>
<td>Carbon Dioxide</td>
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<td>COP</td>
<td>Conference of the Parties</td>
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<td>CRC</td>
<td>Carbon Reduction Commitment</td>
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<td>EED</td>
<td>Energy Efficiency Directive</td>
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<td>ERU</td>
<td>Emission Reduction Unit</td>
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<td>ETS</td>
<td>Emissions Trading System</td>
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<td>EUA</td>
<td>EU Allowances</td>
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<td>FCEV</td>
<td>Fuel Cell Electric Vehicle</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<td>ICAP</td>
<td>International Carbon Action Partnership</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<td>JI</td>
<td>Joint Implementation</td>
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<tr>
<td>LPG</td>
<td>Liquefied Petroleum Gas</td>
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<td>NER</td>
<td>New Entrants’ Reserve</td>
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<td>NZ ETS</td>
<td>New Zealand Emissions Trading Scheme</td>
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<td>PHEV</td>
<td>Plug-in Hybrid Electric Vehicle</td>
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<tr>
<td>REDD+</td>
<td>Reducing Emissions from Deforestation and Forest Degradation Plus</td>
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<td>RGGI</td>
<td>Regional Greenhouse Gas Initiative</td>
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<td>TWC</td>
<td>Tradable White Certificate</td>
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<td>UNEP</td>
<td>United Nation Environmental Program</td>
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<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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EXECUTIVE SUMMARY

Background
The three headline targets of EU energy and climate policy are to increase the share of renewable energy sources to 20%, to increase energy efficiency by 20% and to decrease CO₂ emissions by 20% by 2020. Furthermore, the EU has the objective of reducing greenhouse gas (GHG) emissions by 80-95% by 2050 compared to 1990.

In order to reduce GHG emissions, the EU Emissions Trading System (ETS) has been established by Directive 2003/87/EC, fixing a cap-and-trade system, which currently involves over 11,000 large emitters covering around 40% of European GHG emissions. In its recent communication to the European Parliament and the Council, the European Commission observes a significant oversupply of emission allowances identifying six options to reform the European carbon market.

The recently adopted Energy Efficiency Directive (EED) establishes a common framework of measures for the promotion of energy efficiency within the Union, and is estimated to have the potential to achieve energy savings of 17-20% by 2020.

Aim
It is the aim of the present briefing to analyse the interplay between improvements in energy efficiency and GHG reductions, to analyse the interactions between EU and international policy instruments on energy efficiency and on GHG reductions, to highlight possible problems with conflicting or misaligned policy instruments, and to provide recommendations on the design of policy instruments, in particular the ETS system.

General analytical approach
Based on the identification and description of a relevant set of energy efficiency policies at Member State and EU levels as well as of carbon trading schemes introduced in different world regions in chapter 1, and based on fundamental technical considerations on direct and indirect effects of energy efficiency improvements on the ETS sector in chapter 2, chapter 3 analyses conflicts and misalignments between different policy instruments on energy efficiency and CO₂ reduction. Chapter 4 provides conclusions and recommendations on the design of policy instruments, in particular the Emissions Trading System.

Policy instruments on energy efficiency and CO₂ reduction
Internationally, several GHG emissions trading systems based on the Kyoto Protocol signed in 1997 have been established, including the EU ETS launched in 2005, the New Zealand Emissions Trading Scheme in place since 2010, the Californian Cap-and-Trade Program launched in January 2012, and the Australian Carbon Pricing Mechanism launched very recently in July 2012. Progress in the global integration of carbon markets so far is limited to a few regional initiatives and bilateral agreements.

Europe has implemented a number of energy efficiency instruments. Examples of Member State level instruments include the Italian Tradable White Certificates (TWC) of efficiency improvements in place since January 2005, the Swedish carbon tax established in 1991, and the UK tools mix including the Climate Change Levy, the UK Carbon Reduction Commitment energy efficiency scheme and other instruments. At EU level, the Energy Efficiency Directive (EED), the Ecodesign Directive and the Energy Performance of Buildings Directive are cornerstones of the energy efficiency policy.
**Technical interplay between energy efficiency and CO2 reductions**

Energy efficiency gains can translate into a wide range of CO₂ reduction values: hard coal savings reduce CO₂ emissions by 40% more than natural gas savings, while saving renewable energy will not reduce CO₂ emissions. This is described by the CO₂ emission factor of each fuel, which can vary regionally. Emission reductions induced by reduced electricity consumption depend on the electricity generation mix, which differs from country to country. In a more detailed perspective, the merit order curve determines which power plants will generate less electricity if demand decreases; the CO₂ emission reductions thus depend on whether e.g. coal fired power plants reduce output, or wind power plants.

Energy efficiency improvements in ETS and non-ETS sectors will reduce overall emissions, but may also shift emissions between the sectors through indirect effects, e.g.:

- The shift of heat generation from non-ETS to ETS installations reduces overall CO₂ emissions and non-ETS emissions, but increases ETS emissions;
- The shift of power generation from ETS power plants to non-ETS small cogeneration units reduces overall emissions and ETS emissions, but increases non-ETS emissions.

Taking a more holistic view, a life-cycle emissions approach to fuels should be preferred including the emissions of fuel extraction, generation, transport/distribution, etc. as e.g. included in the Renewable Energy Directive and the Fuel Quality Directive for biofuels.

**Interplay between the ETS and other policy instruments**

The economic crisis, progress in achieving the national non-ETS CO₂ reduction targets and the 20% renewables target as well as international credits under the Kyoto Protocol have resulted in lasting negative impacts on the carbon price. Endogenous impacts of the ETS itself or changes thereof, and exogenous interactions between the ETS and energy efficiency instruments as well as Member State level regulations put the carbon price of the ETS under downward pressure.

Endogenous impacts occur as a result of the ETS itself or changes thereof, both on the supply side and on the demand side. On the supply side, the inclusion of international credits or any future mechanism discussed in the United Nations Framework Convention on Climate Change negotiations, and possibly from other emissions trading systems into the EU ETS, will affect the carbon price. On the demand side the implementation of Community Projects under Art. 24a of the ETS Directive brings low-cost projects into the ETS. The proposed temporary suspension of international aviation from the ETS will also reduce the demand for allowances.

Endogenous impacts on the carbon price are also caused by Member State level regulations in the form of carbon taxes or option contracts. The extent to which the ETS is affected depends on their scope, with more severe effects where ETS sectors are covered or where a switch from non-ETS to ETS sectors is caused.

The principal effect of exogenous interactions is that they reduce the demand for ETS allowances putting the carbon price under downward pressure if ETS allowances are not reduced accordingly. With regards to distributional effects, energy efficiency measures in parallel to the ETS benefit energy efficiency equipment producers, somewhat reduce the gains of low CO₂ electricity producers, and are to the detriment of high CO₂ electricity producers. On the other hand, the EED could help to overcome market failures, thereby positively affecting the costs of future emission reductions.
Outside the ETS, the EED may lower the incentive for Community Projects, thus leaving the carbon price closer to the level resulting from the cap. From an EED perspective, the ETS supports the incentive to invest in energy efficiency measures. The size of this effect depends on the composition of the retail electricity price, which is subject to ambivalent pressures.

The EED encourages Member States to use ETS auctioning revenues for the financing of energy efficiency projects while Directive 2009/29/EC amending the ETS Directive states that at least 50% of the ETS auctioning revenues should be used, among various options, for reducing GHG emissions, promoting renewable energy and energy efficiency measures as well as sustainable transport. This may solve the issue of financing of energy efficiency measures, and of private sector under-investing in energy efficiency projects in case downward pressure on carbon prices can be relieved and auctioning revenues increased.

Demand for ETS allowances is also reduced by other policies at the EU and the international levels, the Large Combustion Plant Directive and a possible UN Convention on Mercury being prominent examples.

**Conclusions and recommendations on the design of policy instruments, in particular the ETS system**

This briefing provides five main conclusions.

First, the current low EU Allowances (EUA) price reflects market participants’ perception of regulators’ willingness to adopt measures that are additional, either to the activities covered by the ETS or that impact the ETS sectors.

Second, in contrast, the EUA price is only to a limited extent owed to actual or potential interactions between the EED and the ETS Directive.

Third, the EU ETS covers around 40% of GHG emissions while EU and Member State policies directed at energy efficiency in principle aim at the other 60%, i.e. the ‘effort sharing’ sectors. Hence, the interactions between the ETS and energy efficiency measures are limited. There are important interactions with the EU Renewables Directive and most important, the economic cycle.

Fourth, the EUA supply and demand have been more affected by ETS-inherent parameters than by non-ETS policies and measures including access to international credits from CDM and JI projects under the Kyoto Protocol, and the suspension of inclusion of international aviation and potentially, the implementation of Community projects under Article 24a of the ETS Directive.

Fifth and lastly, there is a strong need for ‘risk management’ and adjustment on the supply side of EUAs. To predict or even project these multiple interactions seems next to impossible, even though predictability somewhat increases the more EU policies on renewables and energy efficiency are harmonised across the EU and legally binding. The lack of flexibility on the side of the ETS makes it impossible to respond to situations that are outside the boundaries of the ETS such as the economic crisis following the banking crisis or even – as aviation shows – only partly within the parameters of the EU ETS design. This gives support to the idea of having some sort of adjustment mechanism directed at supply, able to deal with changes in demand, be they the result of the economic cycle, impacts of ETS design or policy interaction.
The European Commission has recently identified six options to reform the European carbon market:

1. “Increasing the EU reduction target to 30% in 2020”;
2. “Retiring a number of allowances in phase 3”;
3. “Early revision of the annual linear reduction factor”;
4. “Extension of the scope of the EU ETS to other sectors”;
5. “Limit access to international credits”;
6. “Discretionary price management mechanisms”, such as price floor or price management reserve.

Additional short-term options include a revision of the EED in such a way that it avoids the overlap of coverage of the EED and the ETS sectors; politically, this does not seem to be a likely option, given the EED’s very recent adoption. Hence, the only realistic short-term option is back loading, which should be designed and put in a framework that will guarantee good market functioning. However, back loading will not be sufficient to solve the oversupply issue, and thus will need to be combined with set-aside/retiring a number of allowances. Other options are less efficient and/or effective.

In addition, there is a need for an adjustment mechanism in the longer run to avoid the repetition of ad-hoc policy interventions. If rules of an adjustment mechanism are formulated ex ante and are predictable, this will create stability and predictability in the market, which is a key requirement.
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