INCLUSION OF LV/MV CONSUMERS IN EMISSION TRADING SCHEME

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ABSTRACT

In this paper, the opportunity of other participants - particularly LV / MV consumers- apart from conventional power plants to be integrated in the Emissions Trading Scheme is explored, a review of literature and current standards and regulations is realized and it is concluded that there are many barriers, technical and non-technical, that need to be overcome. To fill the gaps several measures are proposed.
This paper will present a regulatory structure accounting for the fact that emissions from electricity are allocated to the end-use sector. The DSO and TSO new roles will be described.
Main strategic issues, objectives and drivers of the proposed scheme, are discussed. Conclusions are drawn about the relative and absolute targets, reporting level of the customer activities, stakeholders' role.

INTRODUCTION

The European Union's (EU) Emissions Trading Scheme (ETS) is a cornerstone of the EU's efforts to meet its obligation under the Kyoto Protocol. It is a key tool for reducing industrial greenhouse gas emissions cost-effectively.

Being the first and biggest international scheme for the trading of greenhouse gas emission allowances, the EU ETS covers some 11,000 power stations and industrial plants in 30 countries; covered entities emit about 45% of the EU's carbon dioxide emissions.

ETS covers CO2 emissions from installations such as power stations, combustion plants, oil refineries and iron and steel works, as well as factories making cement, glass, lime, bricks, ceramics, pulp, paper and board, airlines, and is further expanded to the petrochemicals, ammonia and aluminium industries and to additional gases. The electricity commercial and residential sectors are not included in ETS. These sectors account for 40% of the energy related greenhouse gas (GHG) emissions in EU. Therefore it is essential that they would be included in the ETS, giving this way, incentives for household owners and small businesses/industries to reduce GHG emissions.

It is necessary to come up with common standardized ways to meter/calculate CO2 and allocate this information, in order to give the opportunity to a large set of players to take part in the CO2 market.

In order to apply the proposed scheme, several matters are addressed such as market structure, measured quantities, time interval and the amount of data exchanges.

The transition of the market from the present scheme to the proposed structure, accuracy level of the measured carbon footprint, assurance adoption, training of the players and adoption of regulations are matters of key importance to be discussed accordingly.

IMPORTANT POLICIES

The relationship Energy – Climate changes and Energy – Economic competitiveness can be noticed in almost all the political documents on energy and environment issued at the European level. The legislative and energy policy framework for attaining the objectives is ensured by the directives envisaging the specific sectors: buildings, GHG trade, energy services and final users, renewable energy sources, highly efficient co-generation. The most important EU environmental policies are:

The Green Paper of Energy Efficiency or to do more with less (COM (2005)265 final)

The Green Paper on the market instruments used for environmental policy purposes (COM (2007) 1 final)

Directive 2006/32/EC on energy efficiency and energy services

Directive 2009/28/EC on the promotion of the use of energy from renewable sources

Directive 2009/29/EC to improve and extend the greenhouse gas emission allowance trading scheme of the Community

PROPOSED METHODOLOGY

Barriers

There are no standardised methodologies adopted for CO2 emissions calculations up to now, concerning the depiction of CO2 emissions created from electricity consumption by LV / MV customers. Measurement equipment is used so far to show the emissions as a result of the consumption by the carbon footprint. 'Carbon footprint' is a shorthand term to describe the total amount of greenhouse gas (GHG) emissions for which an organization, household or individual is responsible. A carbon footprint takes into account all types of greenhouse gases – not just carbon, but it is usually expressed as a carbon dioxide equivalent (CO2-e) which is a simple unit for adding up and comparing the amount of global warming caused by different greenhouse gases.

There are many different ways of calculating a carbon footprint, ranging from a quick estimate to a comprehensive audit done by qualified experts. To convert the electricity consumption to carbon footprint an "emissions factor" is used

An 'emissions factor' is a multiplier based on the standard rate of greenhouse gas emissions for a given activity. Governments and international bodies such as the International Panel on Climate Change agree on standard emission factors for calculating the emissions from different activities. Emission factors are regularly being reviewed and updated based on new scientific research, changes in the way energy is produced, or amendments to the agreed way of measuring emissions. The emissions factor used for regular electricity is given in kg CO2-e per kilowatt hour (kWh). This is the "full fuel cycle factor" which takes into account direct emissions from burning fuel at the power plant, indirect emissions from the extraction, production and transport of the fuel, indirect emissions attributable to the electricity lost during transmission from the power station to the point of use.

At the same time, when metering systems are applied in electricity customers for online DSM techniques, it is often that CO2 is calculated following the same concept and the equipment exploits the measurement of the energy consumption and depicts the associated CO2 to the user at anytime. The degree of accuracy depends on the methodology and assumptions involved, and how much time and effort are put into collecting quality information. To calculate a carbon footprint, and integrate the calculation in a measurement equipment, someone must first define the scope of what is being measured i.e. what is and isn't included. Decisions about the scope of a carbon footprint depend on the purpose for doing the footprint, the information available and other considerations.

On the other hand the Emission Trading Scheme does not include all the Energy Sectors -it includes the power production units and some industries but not the distribution companies either the consumers- in order to give the opportunity to a large panel of users to take part in the emissions reduction. Of course the cost of the ETS System participation is transferred to the consumers through their electricity bills. If the ETS allows the inclusion of the rest sectors then a real incentive for CO2 reductions will be given, since the actions and results will be linked directly, while the effort of DNOs, TSOs, end users for linking and transferring real time information will be necessary.

Overall, the regulation framework of the countries is setting the rules, the limits, the policies, the government (financial) incentives, to move more aggressively on the issue of CO2 awareness, the inclusion of the rest of the sectors in the Emissions Trading Scheme, the promotion of the environmental impact on the metering equipments. The lack of motivation for moving to a low carbon economy is linked to the lack of policies that give the right incentives, economic such as regulation.

Reviewing the above it becomes obvious that when the CO2 system is mature the knowledge that is increased can be exploited in order to broaden the Emission Trading Scheme and include other sectors. Of course, in order to regulate, employ, exploit the possibilities of the Scheme, knowledge should be concentrated, and trained staff should be able to use it on behalf of the corresponding players in the emissions market.

Solutions

Market structure

So far the scheme that is followed is represented in Figure 1. Conventional Power Plants are taking part in the ETS, and the cost of the participation in transferred in electricity customers through the TSO / DSO.

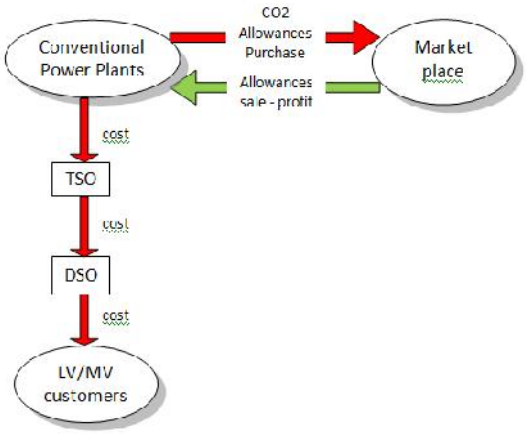

Figure 1. ETS current operation

As seen in Figure 2 the structure of a new ETS framework, may be the following: The ESCO Company, as the responsible for the transactions between the Electricity System and the LV / MV consumers is responsible for a portfolio of consumers and renewable generation. When the power plants should buy CO2 allowances, the ESCO should be informed and two different incentives may be given to its clients. The consumers may apply DSM techniques and the renewable generation owners may provide green certificates, so the total service given from the ESCO to the power plants will cost less that the value buying CO2 certificates. In this way the profit of avoiding CO2 trade, may be returned to the customers that they are responsible for it.

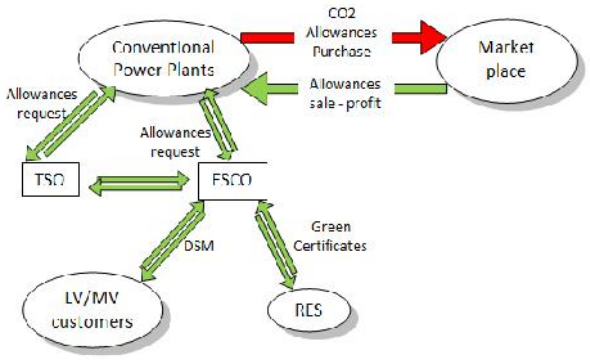

Figure 2. ETS proposed operation

CO2 measuring

Standardised ways of CO2 calculation should be adopted for the ETS inclusion of a large set of players. In order for the ESCO to apply DSM techniques and provide service the CO2 avoided must be linked directly with the consumption. For this to happen ESCO should be able to aggregate an amount of data. Initially for each client apart from the consumption measurements, the grid topology is crucial information to convert the losses from generation to consumption. Moreover the energy mix of the system power plants is essential in order to depict real time the CO2 emitted by the consumers through the power plants. A structure for the measuring concept may be seen in Figure 3.

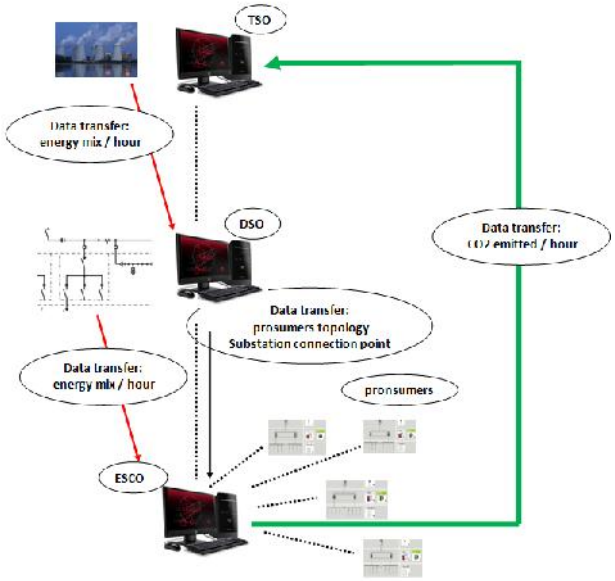

Figure 3. CO2 measurement process

Data Collection

The development of internal procedures and guidance is needed to provide data to ESCO companies. This process should include:

- establishing data requirements including format, frequency, materiality, accuracy, and treatment of anomalies
- establishing quality control/monitoring procedures to address reporting risks. Information should be reviewed and challenged to expose any weaknesses in completeness or accuracy
- creating incentives for accurate reporting.

Key performance indicators (KPIs) should be integrated into management reporting frameworks, to remind of the importance of the task.

Reporting

The baseline and targets should be discussed and assessed when the initial strategy is created. After the emissions data have been collected they should be reassessed and defined, in accordance with the quality of data available and the message the customer wishes to communicate to its stakeholders. An historic baseline will demonstrate progress already made, but it is essential to disclose any assumptions and estimates that have been used to arrive at this historic picture; they may be based on less accurate information. The essential backbone of a report on GHG emissions is a clear description of the scope of reporting, the methodology used, and any key assumptions used in making calculations.

The next step is to demonstrate an understanding of the risks and opportunities that climate change poses to the energy customer as a whole and to quantify their financial impacts, as well as how the customer intends to deal with them.

CONCLUSIONS

The CO2 reduction and Energy Efficiency objectives are very challenging and can be reached only through a global action joining all sectors, including the end customers. With the proposed scheme the electricity sector can move towards a decentralized energy system (opening the ETS), obtaining energy efficiency and environmental conscience- environment protection

- In this direction, Regulators should open the discussion towards the admission of all stakeholders to the CO2 market
- Specific recommendations should be the outcome of this activity so that companies are prepared for the market transition
- The example of early adopters like UK can be followed for the CO2 market opening to other sectors
- Companies and Consumers (LV and MV customers) that can be included in the ETS should have the right to sell and purchase CO2 allowances, since they are expected to pay for

polluting the environment.

Acknowledgments

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