SEESGEN-ICT

4°GENERAL WORKSHOP

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WP6b: ICT systems to encourage the application of techniques for reducing GHG emission

Main issues examined

What is GHG emission reduction ?

How ICT systems can encourage it?

EU ETS

- The EU Emissions Trading System (EU ETS) is a cornerstone of the European Union's policy to combat climate change
- It's 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**.
- Launched in 2005, the EU ETS works on the "cap and trade" principle.
- This means there is a "cap", or limit, on the total amount of certain greenhouse gases that can be emitted by the factories, power plants and other installations in the system.
- Within this cap, companies receive emission allowances which they can sell to or buy from one another as needed.
- The limit on the total number of allowances available ensures that they have a value.

EU ETS

- The ETS now operates in 30 countries (the 27 EU Member States plus Iceland, Liechtenstein and Norway).
- It 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 will join the scheme in 2012.
- The EU ETS will be further expanded to the petrochemicals, ammonia and aluminium industries and to additional gases in 2013, when the third trading period will start.
- At the same time a series of important changes to the way the EU ETS works will take effect in order to strengthen the system.

CO2 emissions + DR

- The relationship Energy – Climate changes and Energy – Economic competitiveness can be noticed in almost all the political documents on energy and environment.
- In order to guide the political priorities in practice, the European Union agreed on the following overall objectives:
- GHG reduction up to 20% by 2020, in comparison with 1990
- Studies prove that Demand Response (DR) alone could achieve between

25-50% of the EU's 2020 targets concerning energy savings and CO2 emission reductions. The customers can play a critical role, participating in the CO2 market

	Moderate Scenario	Dynamic Scenario	Dynamic % of EU 2020 Targets
Energy Savings	59 TWh	202 TWh	50%
CO2 Emissions reduction	30 Mt	100 Mt	25%
Peak Generation Capacity Avoided	28 GW	72 GW	
Avoided Investment	€ 20 billion	€50 billion	

British paradigm

- The UK Emissions Trading Scheme was a voluntary emission trading system created as a pilot prior to the mandatory ETS which it now runs in parallel with. (from 2002 and closed to new entrants in 2009).
- It ran in parallel to a tax on energy use, the Climate Change Levy → companies could get a discount on the tax if they elected to make reductions through participation in the trading scheme.
- The voluntary trading scheme recruited 34 participants from UK industries and organisations who promised to make reductions in their carbon emissions, this has since expanded to 54 sectors of the UK economy.
- In return they received a share of a £215 million "incentive fund" from the Department for Environment, Food and Rural Affairs (DEFRA).

British paradigm

- Each agreed to participate in a cap and trade system, with an annually-reducing cap.
- Each participant could decide to take action to manage its emissions to exactly meet its target, or reduce its actual emissions below its target (thereby releasing allowances that it could sell on, or save for use in future years), or buy allowances from other participants to cover any excess.
- The sectors currently in the scheme are:
  - Water utilities
  - Electricity generators
  - Electricity transmission
  - Electricity distribution
  - Gas transporters
  - Rail
  - Strategic airports
  - Harbour authorities
  - Economic regulators

Emsland paradigm

- **Calculations:** Private households emit around 160 million tonnes of the greenhouse gas carbon dioxide into the atmosphere every year, accounting for a significant amount of all CO2 emissions.
- For this reason EWE launched a pilot project in collaboration with the district of Emsland in 2006 which **will allow private households to trade CO2 reduction certificates in the future.** The project is the only one of its kind in the country.
- Around 150 homeowners are taking part in the research project, which is scheduled to last four years.
- Participants are given CO2 credits for emissions which they manage to reduce via energy efficiency measures. These credits are paid out to the owners through a fund.
- EWE and the district of Emsland are using the project to establish an important basis for **evaluating CO2 reduction certificates in private households** and send a **clear message** about the importance of climate protection.

Other efforts on the same direction

MEREGIO project

- Known as MEREGIO, the project is currently under development for pilot deployment in the Karlsruhe-Stuttgart region of southern Germany, one of the most densely populated areas of the country and widely considered Europe's biggest manufacturing and high-tech hub.
- The objective of the project is to create an optimized and sustainable power network that reduces CO2 emissions to as close to zero as is technically feasible and humanly possible – a so-called Minimum Emissions Region (MEREGIO)
- Consumers will be able to monitor their energy consumption and CO2 footprint, respond to price signals and adapt consumption according to price and availability, and sell surplus power from their own generators to the grid when price conditions are most favorable.

Other efforts on the same direction

Aim project

- The residential area accounts for the largest part of CO2 emissions (about 35 percent of the energy production of power stations is consumed by households).
- This leads us to the question, how effective existing CO2 control mechanisms are for households.
- Massive installation of smart metering devices could solve the problem of energy metering, and thus address the issue of calculating CO2 emissions, but at the expense of extra energy. The alternative: recently emerged technologies enable the automated calibration of energy consumption on the basis of user-configurable thresholds.

Other efforts on the same direction

DEHEMS project

- The Digital Environment Home Energy Management System (DEHEMS), is a project looking at how technology can improve domestic energy efficiency.
- The project partnership includes a mix of European local authorities, private business and universities.
- The intention is to develop and test a home energy management system for the home market using Living Labs in 5 cities across Europe.
- The aim is to improve the current monitoring approach to levels of energy being used by households, with an **overall aim of reducing CO2 emissions** across Europe

Companies in the sector

- Worldwide there are companies that develop or provide CO2 emissions monitoring-management systems. Characteristically,
- We can mention the TechniData Environmental Performance Solutions (EP) that supports a business compliance management which covers all regulatory requirements in the environmental domain.
- Typical examples include support with recording and submitting emissions data to national or international pollutant registers or tracking corporate programs like carbon footprint initiatives worldwide
- Another example would be SAP, which taking into account that companies need to track, measure, and comply with emissions requirements, ensuring compliance with regulations, automating data collection, emissions tracking, and calculations, develops appropriate software solutions.

WP6: Objectives

The WP6-B took into account the following aspects:

- The most important EU environomental policies
- ICT requirements for CO2 inclusion
- ICT-CO2 applications Best practices and solutions
- Surveys in industry and research organisations that develop or use ICT for CO2 monitoring
- Surveys in other projects that apply ICT for CO2 monitoring.

WP6: Milestones

- Identified technical and non-technical barriers and solutions for ICT and Environment protection

- Identified policy actions and recommendations for ICT and Environment protections

Results

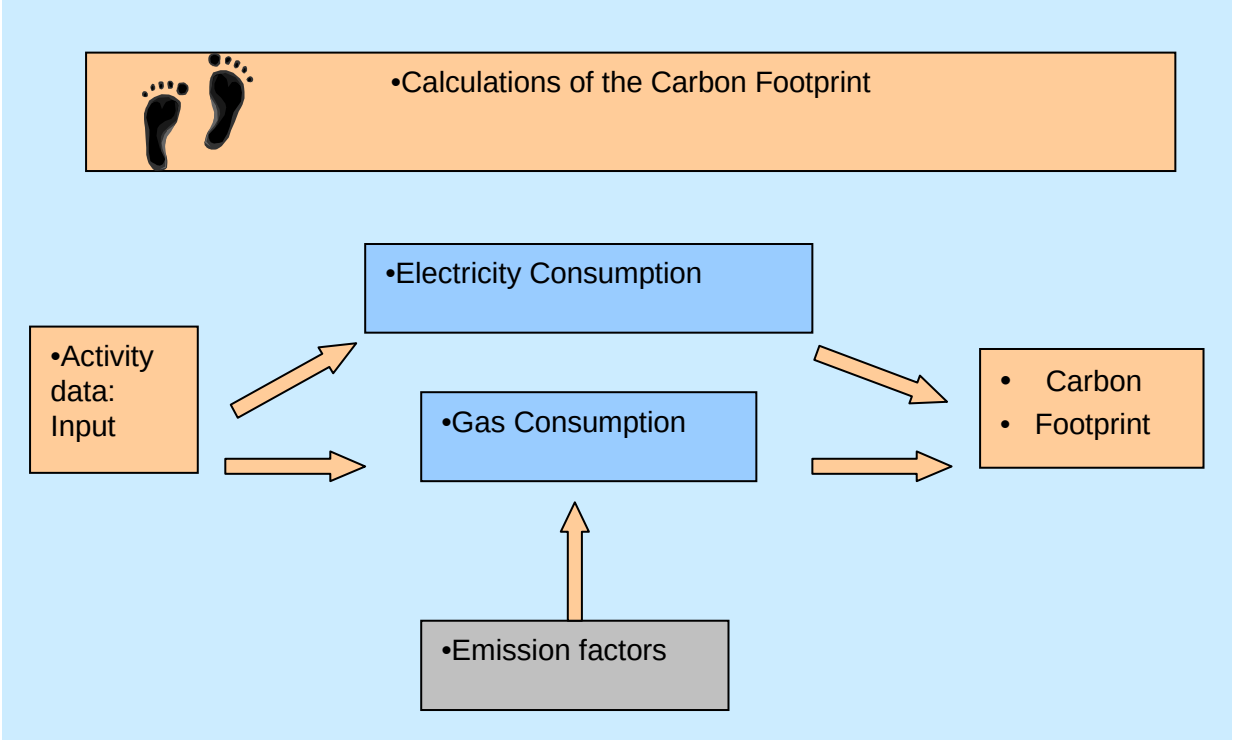
- Many metering devices are available in the market as well as internet applications

Results

- The estimations on the carbon footprint, for converting the electrical consumption to its carbon dioxide equivalent is based most of times on a grid average (mean factor of kg CO2/kwh)
- The more upgraded calculations within the metering systems use the electricity generation mix of coal, nuclear, gas turbines etc. In this case the factor that is included is calculated as follows:
- More accurate calculations take into account grid losses.
- An issue : whether the data of the emissions factors should be included in the metering systems or sent to them from the TSO ?
- That would strongly have to do with the usage of the measuring device.
- Should the device be used by a company participating in the ETS, the calculations have to be accurate, depicting if possible the hour change of the total system emissions factor, because of the change of the generation mix.

Results

- There are no standardised methodologies adopted for CO2 emissions calculations up to now, concerning the depiction of CO2 emissions by several measurement equipment used in the LV / MV

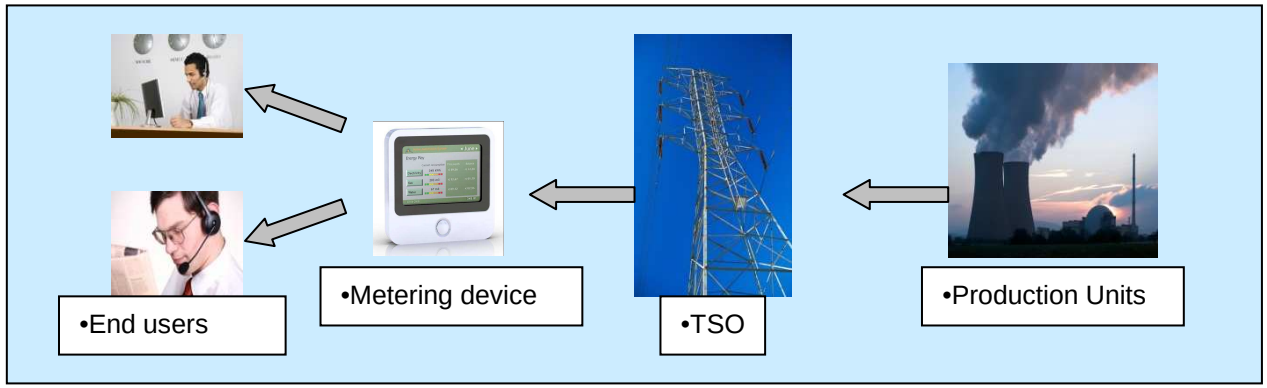


Results

- The degree of accuracy depends on the methodology and assumptions involved, and how much time and effort are put into collecting quality information.
- Of course the lack of the accuracy requirements leads to lack of the assurance methodology.
- 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
- The costs for maintiaining the ETS system (trading, monitoring, verification) are also a non-technical barrier to apply more ICT tools that facilitate GHG reductions, especially if one looks at smaller customers and generators.

Results

- Standardised ways of CO2 calculation should be adopted should the carbon footprint be integrated in the metering devices. These calculations will follow the rules that will be adopted according to the inclusion of the players (MV/LV customers) in the ETS Scheme. As an example the following structure can be indicative:
  - The Production Units send their emission factors to the TSO
  - The TSO send the total factor of the system to the DSO, who can be the Operator of the Metering devices, or the device directly, depending on the type of customer, HV or MV/LV respectively
  - The DSO send the factor to the device
  - The devices depict the CO2 emitted and inform the end user



Results

Steps to be done

- **Inclusion of other Sectors in Emission Trading Scheme:** *the discussion on the opening of the CO2 market should open between stakeholders, DNOs, TSOs, energy companies, EC*
- **The level of accuracy for CO2 metering:** Decisions on the level of accuracy should be made among TSOs DNOs and Utilities / The accuracy that should be agreed should be linked with to the Standards on the CO2 Data that should be communicated to the customers
- **Data Standards:** The main way of obtaining a common CO2 monitoring, that would lead to comparable reporting is by setting rules through Standardization bodies concerning what is measured, who the information is transmitted to, the amount of data, the volume of data
- **Issues data collection / reporting / assurance:** to be commonly agreed
- **Training the players through EU projects on the topic:** through projects test the operation of such a market- the data management, locally information is to be distributed to the citizens

Thank you for your attention