Carbon Emissions Trading Dialogue for Guangdong Industrial Enterprises
MRV experience sharing – Power Industry
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How EU ETS Effect Power sector companies
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  - Administrative Activities
  - Asset Management Optimization
  - Investment Decision

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How EU ETS Effect Power sector companies

EU ETS is affecting European power companies in various way, short and long term, direct and indirect.

• The most obvious effects are related to the **direct impact** of the mechanism in itself and to the strategy used by a company to ensure its compliance:
  
  a. Carbon Strategy
  
  b. Administrative activities

• The existence of the scheme and the carbon price is certainly affecting the way companies run their assets on a daily basis but it also **effect investment (short, middle and long term) decisions**
  
  a. Optimisation of asset management
  
  b. Investment decision
Carbon Strategy

- During Phase 3 carbon related liabilities will be much higher than in Phase 2.
- Companies need a compliance strategy able to utilize the different available options in order to hedge carbon position minimizing the compliance cost.
- Available options are:
  a. Emission abatement opportunities
  b. Primary Market
  c. Secondary Market
Many factors have influence on the carbon strategy.

The decision horizon has to be the compliance period (2012-2020) even if there still are uncertainties:

- EU ETS EUA set-aside mechanism
- New qualitative restrictions for CDM
- Total reduction commitment

The strategy will be tailored on the specificities of the company:

- Generation Mix (tech and age)
- International operations
- Initial stock
The activities related to EU ETS requirements are spread all over the solar year and include monitoring, reporting and verification of emissions. Allowance issuance by the competent authority and surrender by the operators.

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Opportunity Cost of Carbon

• Under a cap-and-trade system, the **price of emissions ought to be treated as a marginal cost**. As a generator, the opportunity to reduce CO2 emissions competes with the possibility to purchase allowances to the market. In the same way a player holding allowances can decide to sell them or to use them for compliance. This so-called opportunity cost of CO2 allowances, equal to the CO2 market price, is therefore incorporated in operators’ decisions to generate electricity.

• The economic rationale behind a “cap-and-trade” system is that the **price of emissions should be reflected in final prices, to encourage lower consumption, and to encourage cleaner generation through higher expected revenues**. Only then can such a scheme trigger an overall cost-effective response to the emission constraint.

• Power companies are incentivized to pursue a series of abatement opportunities:
  
  a. Asset management and fuel switching
  
  b. Investment
In a wholesale pool market, the price for electricity is set by the cost of the most expensive generator running at any time and this price is paid for all electricity generated (so-called marginal pricing). If the marginal generator is a fossil-fuelled plant, it will add the cost of allowances to its offer price and this emissions price premium is then paid on every unit of electricity across the market, whether it is fossil-fuel derived or not. The increase in electricity price makes new low-carbon generation more profitable, encouraging investment.

- Carbon Cost included in optimization of asset management (internalization of opportunity cost of carbon).
- In economic language: higher CO2 costs for companies under a cap makes emissions i.e. production move to areas where carbon has no/lower cost.
Investment Decisions

Carbon price is factored, together with equally important other factors, into investment decisions.

- Carbon prices are integrated into investment decisions. Carbon price is factored into investment decision running several price scenarios.

- EU ETS is just one factor taken into account, fuel prices, power prices and direct government subsidies or targets (for renewable) are also important.

- Although carbon price alone doesn’t justify an immediate shift to lower CO2 technologies, it is making power companies include lower carbon technologies in their future plant mix. Significant the Spanish example where the massive investment in CCGT and wind technology shifted coal fired plants to the end of the merit order, allowing Spain to increase its power production while simultaneously reducing CO2 emissions.

- EU ETS has an impact on early closure of older and less efficient oil, coal and lignite plants, particularly in the context of the Large Combustion Plant Directive.

- In Phase 3 effort to reflect long term CO2 constraint into carbon market price in order to facilitate the integration of carbon price in LT investment decisions.
“A tonne must be a tonne!”

Both carbon market participants and competent authorities want to have assurance that one tonne CO2 equivalent emitted finds its equivalent of one tonne reported

- Monitoring, reporting and verification (MRV) of emissions play a key role in the credibility of any emission trading system
- An ETS is at the same time a market based mechanism and a political instrument to achieve environmental goals and MRV has to guarantee:
  - Environmental integrity
  - Equity
  - Comprehensiveness
  - Market transparency
  - Data uncertainty
Why is robust MRV so important?

- Create and maintain trust in the emissions market
- Prevent fraud or cheating – fairness issue
- Give reliable information to the regulator – are we meeting our targets?
- Give information to companies – where are we in terms of compliance?
- Give information to the market – signaling scarcity
- Precondition for linking different schemes (internationally, but also domestically)
Monitoring in the Power Sector – a good starting position

Some inherent advantages for MRV in the power sector:

- Relatively few streams to monitor
- Fuel inputs are often traded, and therefore measured
- Fuel cost often a high share of total operating cost, therefore interest in managing fuel consumption
- Cost of MRV not disproportionate in relation to overall operating cost
- Some data available from pre-existing regulation (e.g. SO2)
- Reporting structures, responsibilities available from other regulation
- Concentrated point sources – not too many actors
Monitoring in the Power Sector - Annual Emission Report

What has to be reported by a fossil fuel power plant?

- Amounts of fuels and materials consumed
- Emission factors, net calorific value (NCV), oxidation factor, biomass content
- Resulting emissions
- Information on uncertainties
- All elements reported on an annual basis
- Not reported: Production data
The compliance cycle in EU ETS

The annual process of monitoring, reporting, verification of emissions and the competent authority’s procedure for accepting emission reports are often referred to as the “compliance cycle”

- Resulting data must be sufficiently robust for creating trust in the reliability of the ETS
- The operator must ensure that the monitoring methodology is documented in writing, and cannot be changed arbitrarily. In the case of the EU ETS, this written methodology is called the Monitoring Plan (MP) of the installation
- MP, although very specific for an individual installation, must follow the requirements of the EU-wide applicable legislation (MRR)
The EU ETS compliance cycle is built around the requirement that monitoring is always related to the calendar year.

Operators have three months after the end of the year to finalize the emission reports and to get them verified by an accredited verifier.

By 30th of April operators have to surrender the corresponding amount of allowances.

Subject to national legislation, the competent authority may perform (spot) checks on the reports received, and

If an operator fails to submit an emissions report, or where a report has been submitted, but it is either not compliant with the MRR or not verified the competent authority must determine a conservative estimate of the emissions.
Roles and Responsibilities

High level of control is efficiently built into the MRV system. The monitoring and reporting is the main responsibility of the operators (who are also responsible for hiring the verifier and for providing all relevant information to the verifier). The CA is in control over the final result. The verifier is ultimately answerable to the accreditation body.
The Monitoring Plan

Approved monitoring plan is the most important document for every installation participating in the EU ETS

Operator has to draft a Monitoring Plan (MP): a detailed, complete and transparent documentation of the monitoring methodology of the installation, describing:

- configuration and complexity of the installation/facility, its activities, emission sources, source streams and their location etc.
- how the responsibilities in the installation for the monitoring and reporting of emissions are managed and assigned
- procedure for evaluation of the MP, its functioning and possibilities for improvement
- control activities of an operator to manage the risks of misreporting, i.e. mistakes in the monitoring and the flow of data
There are important guiding principles that an operator have to follow fulfilling his obligations:

**Completeness**: The completeness of emission sources and source streams is at the very core of the EU ETS monitoring principles.

**Consistency and comparability**: Time series of data need to be consistent throughout the years. Arbitrary changes of monitoring methodologies are prohibited. This is why the monitoring plan has to be approved by the competent authority, such as also significant changes to the MP. Because the same monitoring approaches are defined for all installations data created is also comparable between installations.

**Transparency**: All data collection, compilation and calculation must be made in a transparent way.

**Data uncertainty**: Operators have to take care that data is accurate. Due diligence is required.

**Integrity of methodology**: this principle is at the very heart of any MRV system. Operator shall aim for “highest achievable uncertainty, unless this is technically not feasible or would lead to unreasonable costs.”

**Continuous improvement**: this principle is the foundation for the operator’s duty of responding to the verifier’s recommendations.
MP - Main Terms

- **Emission source:** separately identifiable part of an installation or a process within an installation, from which relevant greenhouse gases are emitted.

- **Source streams:** “all the inputs and outputs which have to be monitored when using a calculation based approach. In other words “fuel or material entering or leaving the installation, with a direct impact on emissions”.

- **Measurement point:** “the emission source for which continuous emission measurement systems (CEMS) are used for emission measurement”

- **Emission points:** “a list of all relevant emission points during typical operation, and during restrictive and transition phases, including breakdown periods or commissioning”
Operator can choose the monitoring methodologies from a building block system based on different monitoring approaches. All types of combinations of these approaches are allowed, under the condition that the operator demonstrates that neither double counting nor data gaps in the emissions will occur. The choice of methodology needs the approval of the CA, which is given usually implicitly as part of the monitoring plan approval.

The following methodologies are available:

1. **Calculation based approaches:**
   a. Standard methodology (distinguishing combustion and process emissions);
   b. Mass balance;
2. **Measurement based approaches**;
3. **Methodology not based on tiers** (“fall-back approach”);
4. **Combinations of approaches**.
Standard methodology

The principle of this method is the calculation of emissions by means of activity data (e.g. amount of fuel or process input material consumed) times an emission factor. Oxidation factor for combustion emissions and the conversion factor for process emissions are used for correcting the emissions numbers in case of incomplete chemical reactions.

\[
\text{Emissions} = \text{Input} \times \text{Emission factor}
\]
Standard methodology for combustion emissions

\[ Em = AD \cdot EF \cdot OF \]

Where: \( Em \): Emissions [t CO2]; \( AD \): Activity data [TJ, t or Nm3]; \( EF \): Emission factor [t CO2/TJ, t CO2/t or t CO2/Nm3]; \( OF \): Oxidation factor [dimensionless]

Factors with units in tonnes are usually to be used for solids and liquids. Nm3 are usually used for gaseous fuels. In order to achieve numbers of similar magnitude, values are usually given in [1000 Nm3] in practice.

Activity data of fuels has to be expressed as net calorific value:

\[ AD = FQ \cdot NCV \] (2)

Where: \( FQ \): Fuel quantity [t or Nm3]; \( NCV \): Net Calorific Value [TJ/t or TJ/Nm3]

Under certain conditions (where the use of an emission factor expressed as tCO2/TJ incurs unreasonable costs or where at least equivalent uncertainty of the calculated emissions can be achieved) the CA may allow the operator to use an emission factor expressed as t CO2/t fuel or t CO2/Nm3.

\[ Em = FQ \cdot NCV \cdot EF \cdot OF \]

(Where biomass is involved, the emission factor must be determined from the preliminary emission factor and the biomass fraction of the fuel)
Mass balance approach

The standard approach is easy to apply in cases where a fuel or material is directly related to the emissions. However, in cases such as integrated steelworks or sites of the chemical industry, it is often difficult to relate the emissions directly to individual input materials, because the products (and wastes) contain significant amounts of carbon (e.g. bulk organic chemicals, carbon black,…). Thus, it is not enough to account for the amount of non-emitted carbon by means of an oxidation factor or conversion factor. Instead, a complete balance of carbon entering and leaving the installation is used.

\[
\text{Emissions} = f \times (\sum C_{\text{Input}} - \sum C_{\text{Output}})
\]
Measurement based approaches

In contrast to the calculation based approaches, the greenhouse gases in the installation’s off-gases are themselves the object of the measurement in the measurement based approaches. This is difficult in installations with many emission points or indeed impossible where fugitive emissions have to be taken into account. On the other hand, the strength of the measurement based methodologies is the independence of the number of different fuels and materials applied.

The application of CEMS (Continuous Emission Measurement Systems) always requires two elements:

• Measurement of the GHG concentration
• Volumetric flow of the gas stream where the measurement takes place.
How to calculate emissions: Tiers System

It is a basic philosophy in the MRV system of the EU ETS, that the biggest emissions should be monitored most accurately, while less ambitious methods may be applied for smaller emissions. By this method, cost effectiveness is taken into account, and unreasonable financial and administrative burden is avoided where the benefit of more efforts would be only marginal.

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<tr>
<th>Installation Category</th>
<th>Tiers or “data quality levels”</th>
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<tr>
<td>C &gt;500k tCO2eq</td>
<td>4: uncertainty ±1.5%</td>
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<tr>
<td>50k&lt;B&lt;=500K tCO2eq</td>
<td>3: uncertainty ±2.5%</td>
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<td>A=&lt;50k tCO2eq</td>
<td>2: uncertainty ±5%</td>
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<tr>
<td>Small Emitters &lt;25k tCO2eq</td>
<td>1: uncertainty ±7.5%</td>
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must meet highest tiers

must meet minimum tier requirements
Tiers System: combustion emissions example

In case of calculation based approach the tiers system for combustion emissions are

<table>
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<tr>
<th>Fuel quantity</th>
<th>Net calorific value</th>
<th>(prelim.) Emission factor</th>
<th>Biomass fraction</th>
<th>Oxidation factor</th>
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<td>Tier 4</td>
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Developing a MP: present burden future benefit?

Implementing a comprehensive monitoring plan can be a facility’s launch pad to developing a GHG strategy. These emission numbers will translate into a form of currency, either by establishing baseline numbers to support operations and decisions or by converting to offsets under a cap-and-trade program.

When developing a monitoring plan, operators should follow some guiding principles:

- **Knowing in detail the situation of their own installation**, the operator should make the monitoring methodology as simple as possible. This is achieved by attempting to use the most reliable data sources, robust metering instruments, short data flows, and effective control procedures.

- Operators should imagine their annual emission report from verifier’s perspective. What would a verifier ask about how the data has been compiled? How can the data flow be made transparent? Which controls prevent errors, misrepresentations, omissions?

- Because installations usually undergo technical changes over the years, monitoring plans must be considered living documents to a certain extent. In order to minimize administrative burden, operators should be careful which elements must be laid down in the monitoring plan itself, and what can be put into written procedures supplementing the MP.
Developing a MP: step by step approach

1. Define the installation’s boundaries.
2. Determine the installation’s category based on an estimate of the installation’s annual GHG emissions.
3. List all emission sources and source streams in order to decide on calculation or measurement based approach. Classify the source streams as major, minor and de-minimis as appropriate.
4. Identify the uncertainty (tier) requirements based on the installation
5. List and assess potential sources of data
6. Check if the required uncertainty can be met (in EU ETS the required tiers)
7. If measurement based approach is to be used check that required uncertainty can be met
8. Define all data flows (who takes which data from where, does what with the data, hands over the results to whom, etc.) from the measuring instruments or invoices to the final annual report.
9. With the overview of all data sources and data flows a risk analysis should be carried out in order to determine where system errors might occur most easily.
10. Using risk analysis, appropriate control measures should be taken and decision on the process should be made in order to mitigate the identified risks
Developing a MP: sources of data

For activity data:

• How can the amount of fuel or material be determined?
  • Are there instruments for continual metering, such as flow meters, weighing belts etc. which give direct results for the amount of material entering or leaving the process over time?
  • Or must the fuel or material quantity be based on batches purchased? In this case, how can the quantity on stock piles or in tanks at the end of the year be determined?

• Are measuring instruments owned/controlled by the operator available?
  • If yes: What is their uncertainty level? Are they difficult to calibrate? Are they subject to legal metrological control
  • If no: Can measuring instruments be used, which are under the control of the fuel supplier? (This is often the case for gas meters, and for many cases where quantities are determined based on invoices.)

• Estimate uncertainty associated with those instruments and determine the achievable uncertainty

Calculation factors (NCV, emission factor or carbon content, oxidation or conversion factor, biomass fraction):

1. Are default values applicable? If yes, are values available?

2. If no default values are applicable, chemical analyses have to be carried out for determining the missing calculation factors. In this case the operator must
   a. Decide on the laboratory to be used.
   b. Select the appropriate analytical method (and applicable standard);
   c. Design a sampling plan
Procedures and the MP

The monitoring plan should ensure that the operator carries out all the monitoring activities consistently over the years. In order to prevent incompleteness, or arbitrary changes by the operator, the competent authority’s approval is required. However, there are always elements in the monitoring activities, which are less crucial, or which may change frequently. Such monitoring activities may be put into “written procedures” which are mentioned and described briefly in the MP, but are not considered part of the MP.

Typical examples of procedures are:

- Managing responsibilities and competency of personnel;
- Data flow and control procedures
- Quality assurance measures;
- Estimation method for substitution data where data gaps have been found;
- Regular review of the monitoring plan for its appropriateness (including uncertainty assessment where relevant);
- A sampling plan and its revision
- Procedures for methods of analyses, if applicable;
- Procedures for use of measurement based methodologies, including for corroborating calculations and for subtracting biomass emissions, if relevant;
Verification

The objective of verification is to ensure that emissions data have been monitored in accordance with the MRR and that reliable and correct emission data are being reported. The verifier is contracted by the operator.

- Goal is to create trust in the reported data through the opinion of an independent and competent body
- Under the EU ETS, this is carried out by a private entity
- Private verifier needs to be accredited
- Verifier assesses whether he can conclude with reasonable assurance
- The data in the report are fairly stated (free from material misstatements)
- The operator has complied with the approved monitoring plan
- Verifier shall also recommend improvements found during verification
Use of Information Technology in the MRV

The monitoring plan is an Excel spreadsheet that, the competent authority provides various templates.

- Reduces compliance costs, e.g. single data entries, automated reminders
- Can increase the transparency of the system
- Increases reliability of ETS data handling & processing
- Allows automatic timeliness and completeness checks
- Reduces the risk of transcription errors or human errors
- Enhances the capacity for reliable storage of data
- Offers potential for cost-effective data interrogation and analysis – also for other purposes - e.g. verification, input to the national emission inventories and improved national statistics
Assessing the cost to UK operators of compliance with the EU ETS Final Report

For the larger installations ... others would have put under internal / external costs; hence one reason for the variation observed between sectors.
Challenges for an effective and efficient MRV

The monitoring plan is an Excel spreadsheet that, the competent authority provides various templates.

- Trade-off between quality, cost and timeliness
- A ton must be a ton – but different regulatory cultures exist in the 30 EU ETS countries
  - E.g. definition of an installation – entire site, or individual units?
  - E.g. regular inspections at the installation, or emphasis on high-quality verification and supervision
- Common elements, standards, procedures needed to build up trust:
  - Transparency of the system rules
  - Existence of an effective control system
BACK UP
• **Greenhouse gas abatement cost curve** provides a quantitative basis for discussions about what actions would be most effective in delivering emissions reductions, and what they might cost.

• The values expressed in the curve are function of a wide number of variables such as technological innovation, fuel price, GDP growth etc.
The essence of emissions trading is very simple: **different companies, sectors, countries have different “abatement cost curves”**

- MC-3 switches from delivery in atmosphere to destroy methane from landfills
- MC-1 can only switch from coal-to-gas

Include as many sectors, companies, countries as possible – create a large pool of emission reduction opportunities

- Emission reductions coming from lower abatement cost offer a cheaper option to sectors, companies, countries with high abatement costs
- With time the available abatement options will move toward more expensive solutions increasing carbon prices
Theoretical price formation

- Theoretically the CO₂ price is formed where the demand level meets the marginal abatement cost curve
- The demand is created at political level
EU Emission Trading Scheme


- Currently covers 40% of EU CO2 emissions

- **Flexible mechanism** linkage (CERs and ERUs)
  - but offset use limit: 2008-10 only 5.1% of total surrender

- **Linear emission reduction factor** (-1.74%) from 2013
  - Review in 2025

- **Penalties** for non-compliance

- Continues after 2020
EU ETS Phase 1 and 2

Industries concerned (% of total EU emissions – year 2000)

- 54% Power generation (including CHP)
- 30% Other industries (including steel, paper and pulp, concrete)
- 16% Industries not included (may be reviewed):
  - Chemicals
  - Transportation
  -…

How emission trading works

1. Member states are responsible for allowances allocation after establishing the criteria for their distribution among industries and companies.

2. Companies must return to the member state a number of allowances corresponding to the previous years’ real emissions.

3. In case of non-compliance the non-compliant must pay a penalty and surrendered missing emission allowances the following years.

At least 95% for free allowances
Penalty for non-compliant entities: €40 / ton CO2

At least 90% for free allowances
Penalty for non-compliant entities: €100 / ton CO2
EU Emission Trading Scheme – Phase 3

The revised Directive includes:

• Centralised, EU-wide cap which will decline annually by 1.74% delivering an overall reduction of 21% below 2005 verified emissions by 2020.

• Adjustment of the EU ETS cap up to the 30% GHG reduction target when the EU ratifies a future international climate agreement.

• A significant increase in auctioning levels – at least 50% of allowances will be auctioned from 2013; compared to around 3% in Phase II.

• 100% auctioning to the power sector (with marginal exceptions) across most of the EU from 2013.

• Sectors at significant risk of carbon leakage will receive 100% (reducing by years) of their benchmark or other allocation methodology for free.

• Legally binding commitment from EU member states to spend at least half of the revenues from auctioning to tackle climate change both in the EU and in developing countries in renewable development and low carbon technologies.

• Access to international project credits from outside the EU will be limited to 50% of the reductions required in the EU ETS.

• Inclusion of aviation, shipping, and other new sectors in the EU ETS from 2012

• Additional reserves made for subsidy of CCS demonstration projects
Efforts to fix issues of the previous phases

Over-allocation
Carbon leakage
Fraud
Short term focus

- EU-wide allocation
- Auctioning power sector (transitionary rules for some)
- EU benchmarks for free allocation
- Compensation for electricity costs
- Same rules for auction platform(s)
- Offset restrictions
- EU-wide MRV standards
- Enhanced security in registries
- Additional reserves made for subsidy of CCS demonstration projects
From grandfathering to auctioning

<table>
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<tr>
<th>PHASE 1</th>
<th>PHASE 2</th>
<th>PHASE 3</th>
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| • Allocation: “grandfathering” via national allocation plans (NAPs), based on historical data on emissions or fuel use  
  • Member States (MS) were permitted to auction up to 5% of allowances. | • Allocation: “grandfathering” via NAPs  
  • European Commission conducted more stricter review  
  • MS were permitted to auction up to 10% of allowances | • Allocation: the default allocation method will be via auctioning  
  • 2013: 100% auctions in power sector; 20% for others and linear increase up to 70% by 2020. Full auctioning for all by 2027  
  • Free allowances allocated using benchmarks  
  • Exemption for energy intensive sectors. |

- Over allocation  
  • Too much attention given to competitiveness issues  
  • NAPs: strong bargaining power for the industry  
  • Absence of harmonization across EU

- EC tried to harmonize allocation across EU through NAP’s review  
  • NAPs were part of MS policy for implementing the Kyoto Protocol (national target)

- Allocation fully harmonized across EU  
  • Exemptions based on a detailed assessment of “carbon leakage risk”
Approaching phase III of EU-ETS

2008 - 2012

Phase II

- Compliance with Kyoto targets by 2012
- Kyoto commitment
- Country level cap
- As phase I
- Norway, Iceland and Liechtenstein join
- Aviation joining in 2012
- According to NAPs
- Grandfathering
- ~50% of reduction target (1.4 Gt 2008-2012)
- LULUCF and large hydro not allowed

2013- 2020

Phase III

- Post-Kyoto framework: no deadline set on Phase III
- 1.74% annual reduction (21% below 2005 by 2020)
- Single EU cap
- As phase I plus aluminum, ammonia, petrochemicals
- Inclusion of nitrous oxide and perfluorocarbons
- Approx. 50% of EU emissions
- Harmonized rules, but derogation and opt-out allowed
- Partial move to auctioning (carbon leakage sectors still receiving free allowances)
- Same as 2008-2012 plus new entrants (1.6 Gt 2008-2020)
- Quality restrictions on the use of credits from HFC-23 and adipic acid N2O projects
- Geography restrictions (only LDCs or countries with bilateral agreements) in case of no post-Kyoto agreement
- Allowed between phase II and III

Target

Cap

Coverage

Allowances

Offsets

Banking

- Not allowed between phase I and II
Sectoral coverage of EU ETS and verified emissions

EU-27 verified emissions 2010 (tCO2e)

- Combustion installations: 329 (74%)
- Coke ovens: 8 (6%)
- Pig iron or steel: 16 (1%)
- Glass including glass fibre: 7 (1%)
- Pulp, paper and board: 27 (1%)
- Mineral oil refineries: 1 (1%)
- Metal ore roasting or sintering: 1 (1%)
- Cement clinker or lime: 6 (8%)
- Ceramic products by firing: 0}

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“Emission Trading” a world overview

- At time about 20 Countries round the world are considering the option to adopt a “cap and trade” scheme to reduce carbon emissions (following the sample of EU ETS)
- The widespread of Emission Trading systems create opportunities for “linking” different region schemes all over the world (following the principle “a ton is a ton”) with vantages in terms of cost efficiency abatements and increasing of market liquidity

Source: IETA
Long Term CO2 constraint into Carbon Price

Phase III EU ETS revisions aim at facilitating the reflection of long term CO2 constraint into carbon market price

- EU harmonization (Global emissions ceiling, harmonized allocations, infrastructure /registries, etc.)
  ➔ Subsidiarity / Member State strategies minimized
  ➔ Increased certainty in future ETS rules
  ➔ Increased predictability of the price signal over the long term
  ➔ Increased confidence of market players

- Global & long term ceiling of emissions
  ➔ Linear decrease of ceiling (1.74% of 2010 emissions).
  ➔ 2020 level: -21% vs 2005
  ➔ Longer time horizon, explicit vision of the decarbonization process of the economy

• Auctioning
  ➔ Free allocation & “compliance approach” tend to “mask” carbon value in industrial operations
  ➔ Increased integration of CO₂ price in investments and operations

Source: Point Carbon
In regulated electricity systems the impact of emissions pricing on electricity prices is reasonably straightforward. In general, regulators will allow actual costs incurred to be passed through in electricity prices. If there is full auctioning of allowances, electricity prices should therefore be expected to rise to cover the costs faced by generators in meeting the emissions goal (through actual emissions reductions or the purchase of allowances). This price rise for end consumers is a desirable policy outcome, as it reflects the environmental cost of emissions and will prompt some changes in electricity demand and energy efficiency investments. However as discussed above, governments do have the option of either compensating consumers for these price rises using auction revenue, or shielding consumers from price rises by providing free allocation to distribution companies.

If on the other hand there is free allocation to electricity generators, regulators would require the value of this free allocation to be passed on to consumers, offsetting the price rise. However, free allocation to generators can perpetuate high-carbon generation and even lock-in new investment in high-emissions plant if free allocation is given to new entrants. Given the pivotal importance of the power sector to decarbonisation, it is critical that carbon price signals are fully seen when generation investment decisions are taken. As such, if the desire is to limit price increases to consumers, free allocation should be delivered as close to the end-consumer as possible (that is, to distribution companies not generators), so that investors in new generation face the full emissions price in their investment decisions.

Where wholesale electricity markets set the price of electricity, the impact is more complex. In a wholesale pool market, the price for electricity is set by the cost of the most expensive generator running at any time and this price is paid for all electricity generated (so-called marginal pricing). If the marginal generator is a fossil-fuelled plant, it will add the cost of allowances to its offer price and this emissions price premium is then paid on every unit of electricity across the market, whether it is fossil-fuel derived or not. In this way fossil-fuel generators are on the whole able to pass through their emissions costs, so allocation of free allowances would lead to windfall gains.43 For this reason the New Zealand and RGGI schemes provide no free allocation for electricity generation and the EU ETS is moving to full auctioning for electricity generators from Phase III.

The increase in electricity price makes new low-carbon generation more profitable, encouraging investment. However all existing generators benefit from the price rise, whether they are fossil-fuelled or not. If existing hydro and nuclear plants form a large share of the generating mix, consumers can therefore end up paying significantly more than the actual cost of emissions allowances. For this reason, compensating consumers is more problematic where wholesale markets set the price, because the total increased cost to consumers can significantly exceed the revenue collected from the auctioned allowances. This has been a contentious issue in New Zealand’s trading scheme. It has led to the proposal for a windfall tax in Finland and the implementation or increase of existing property taxes in Norway and Sweden to recover some of the windfall from hydro-generators.

As electricity systems decarbonise, this effect will become more pronounced: electricity prices will continue to rise with allowance prices, but the revenue available for recycling declines.44 As an issue for the long term, the economic impacts of these uncompensated price rises needs to be considered and alternative mechanisms for pricing emissions may need to be developed (Redpoint, 2009; Ofgem, 2008).

In either case – regulated or liberalised markets – the need for significant decarbonisation of the power sector means there should be no free allocation directly to power generators (Reinaud, 2007).
Carbon Leakage

- Carbon leakage is due to unilateral climate policies and not specifically ETS

- In economic language: Higher CO2 costs for companies under a “cap” make capital move to areas where carbon has no cost

- In normal language: loss of competitiveness

- Carbon leakage undermines effectiveness of CO2 policies and brings an additional welfare cost for countries that implement climate policies

- Model studies show small impacts. Biggest impact is fossil fuel price