Carbon Pricing

Lessons from the EU Emissions Trading Scheme

Christian de Perthuis
Université Paris-Dauphine
Mission Climat of Caisse des Dépôts

LSE / Imperial College

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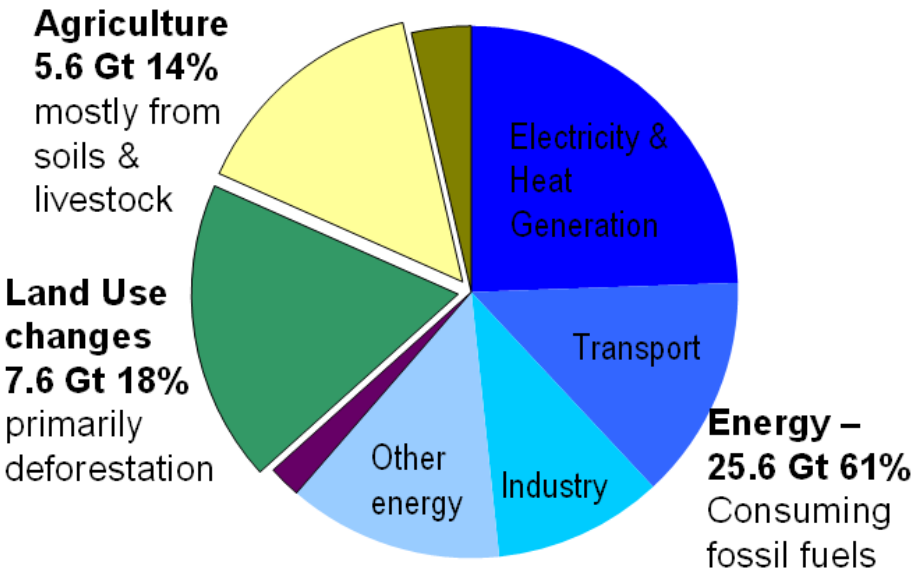
Outline

- **The general context of dealing with global warming**
  - ✓ To combine strong economic incentives with equity rules
  - ✓ The principal of common but differentiated responsibility
- **Three main lessons from EU-Emissions Trading Scheme**
  - ✓ Carbon emissions now have a price
  - ✓ This price has triggered emissions reductions
  - ✓ A multinational agreement
- **Two main challenges**
  - ✓ How to cope with price instability?
  - ✓ Learning to manage the “Carbon Rent”

Combining Economic Incentives with Equity Rules

- **Reducing GHG emissions:**
  - ✓ Reorganizing the way we produce and use energy
  - ✓ Reorganizing the way we manage agriculture & forestry
- **Existing economic tools:**
  - ✓ EU-ETS and CDM/JI mechanisms
  - ✓ Cap & trade scheme working for energy linked emissions, not for agriculture and forestry
- **Equity is essential:**
  - ✓ Differentiated responsibilities and vulnerabilities
  - ✓ A condition to extend the capping of emissions to emerging economies

Global GHG Emissions by sector



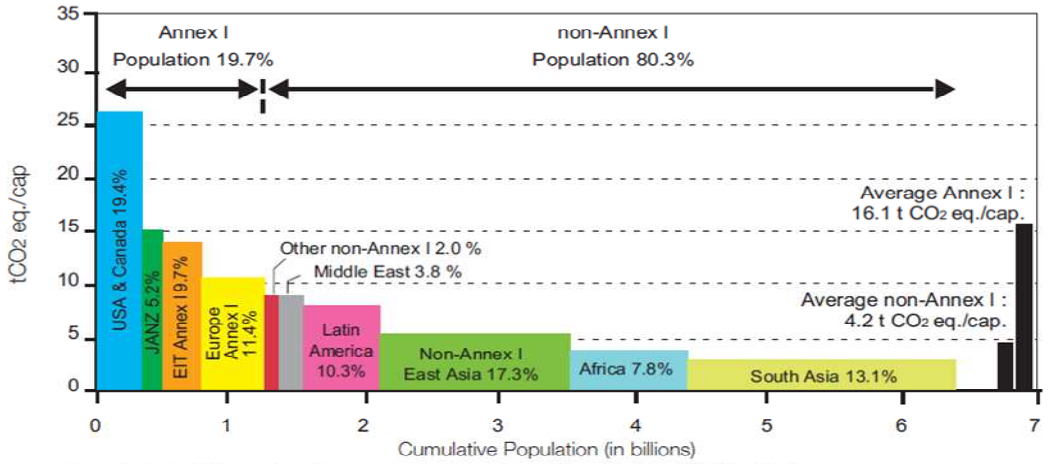
All GHG in CO_2 equivalent

Source: IPCC, 2007.

The Principal of Common but Differentiated Responsibility

- **The distribution of responsibilities and damages:**
  - ✓ 80% of historical cumulated emissions come from industrialized countries
  - ✓ High vulnerability of developing countries to climate change impacts

Regional GHG Emissions per capita



The percentage indicated for each region corresponds to its portion of global GHG emissions.
EIT : Economies in Transition, JANZ : Japan, Australia, New-Zealand.

Source: IPCC, 4th report of the 1st working group, 2007

- **The current interpretation of Equity rules:** Unlimited rights to emit GHG in non-Annex 1 countries

- **Looking for new equity rules:**
  - ✓ North / South resources transfers: adaptation, agriculture development and forest protection, low carbon technology diffusion
  - ✓ Enlarging the restriction of GHG emissions rights into non-Annex I countries

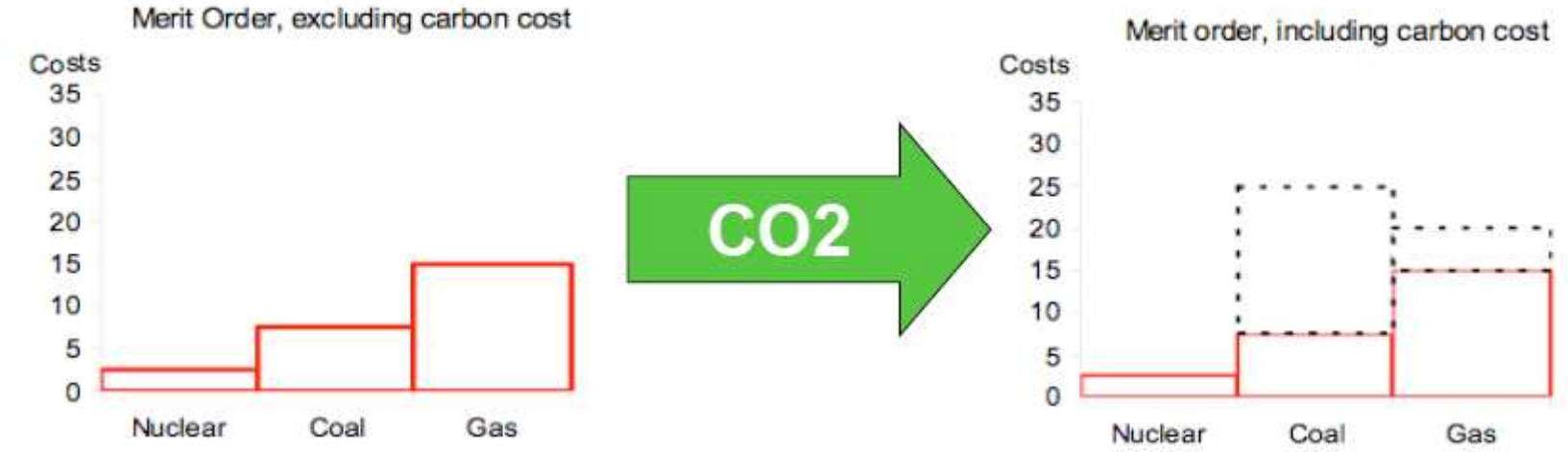
Carbon now has a price

- **Value traded on the EU-ETS:**
  - ✓ $ 79.8 billion in 2008
  - ✓ $ 7.9 billion in 2005
- **Carbon price signal is effective (with some volatility), and reflects the present and anticipated scarcity of CO_2 allowances in European industries**
- **European carbon price has become an international reference**
  - ✓ EU-ETS has triggered the development of Kyoto credit market
  - ✓ CER prices linked to EUA prices

No one believes that we will return to the free emissions of carbon in Europe

The EU ETS has led to some emissions abatement

- **Preliminary results indicate that the EU ETS did in fact induce emissions abatement during the first period (between 50 Mt and 100 Mt per year)**
- **Emissions abatement is likely to have mostly taken place in the power sector:**
  - ✓ Fuel switching: from brown coal (lignite) to lower-emitting hard coal
  - ✓ Enhanced CO_2 efficiency of coal plants: biomass use, improved energy efficiency

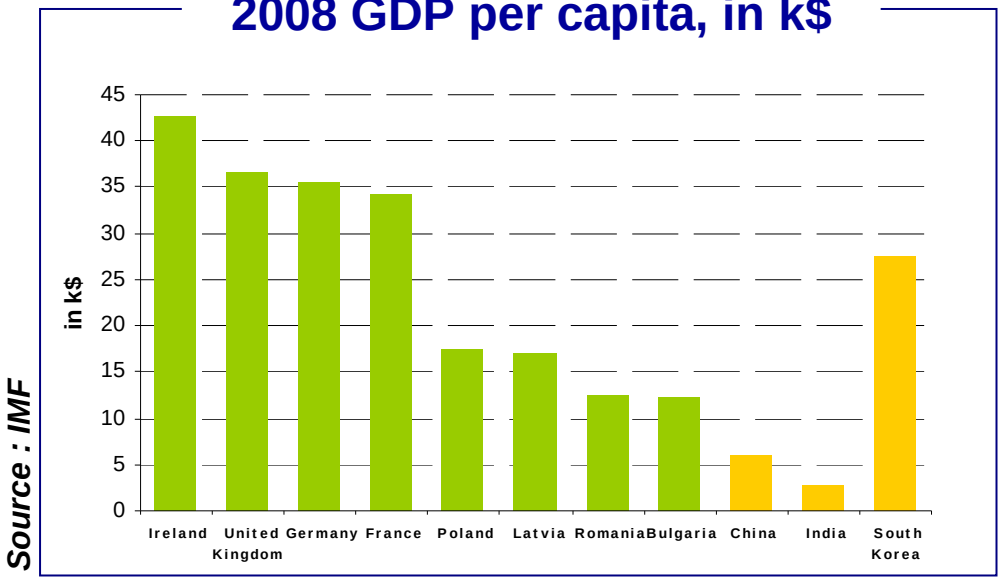


Source: Sijm (2006).

A multinational trading scheme

- **EU-ETS covers the emissions of 27 EU member states :**
  - ✓ Speaking more than 20 languages
  - ✓ With very different historical backgrounds
  - ✓ And a great diversity of energy situations

- **Diversity of development levels**
  - ✓ GDP per capita gaps inside EU wider than between China or India and some State members



Cap & Trade mad it possible to reach reliable political commitments between very different countries.

Coping with carbon price instability

- **If the goal is to know in advance the level of carbon price:**
  - ✓ set up a carbon tax, not a cap & trade !

- **If the goal is to use the carbon market as a tool for public authorities to change the way companies decide on their investment:**
  - ✓ it makes sense to avoid excessive price instability on the market to send the right price signal to investors

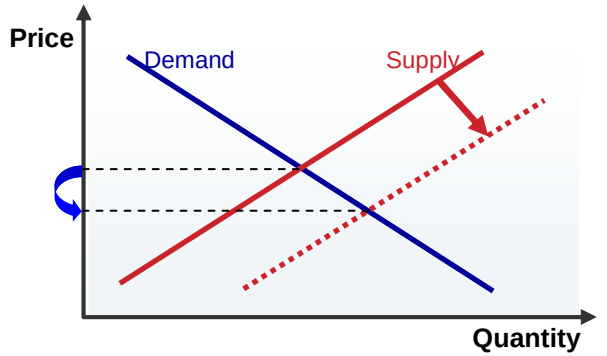
The main tools for public authorities : rules of banking and borrowing and action on supply/demand

Carbon price collapse during the first period

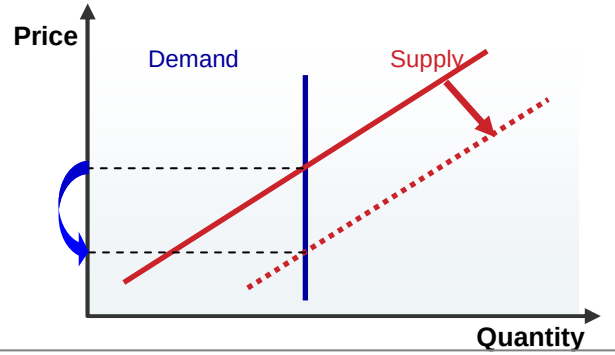
- **"King's Law":**
  - ✓ According to King's observations (1648-1712), farmers' revenues go up when crops are bad, and collapse when crops are abundant
  - ✓ This is due to the inelasticity of wheat demand which induces great instability of wheat prices.
- **King's Law has many other illustrations, including carbon price collapse during the 1st period of EU-ETS:**
  - ✓ The lack of inter-period banking creates inelasticity of the CO_2 aggregate demand
  - ✓ This inelasticity pushes CO_2 prices toward zero as soon as it becomes clear that the market is long

Market equilibrium

With Elastic Demand:



With Inelastic Demand:



Appropriate Answer : free inter-period banking (already decided for the following periods)

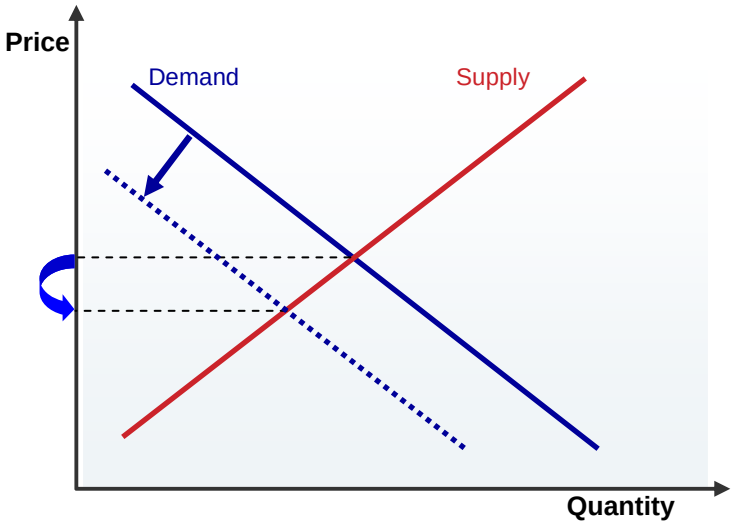
Carbon price fall during the second period

- **Economic recession has two effects on EU-ETS:**
  - ✓ A new balance between supply and demand of allowances:
    - Elasticity of CO_2 emissions to production > 1
    - New equilibrium price between 15 and 20 euros / tonne
  - ✓ The behavior of market players affected by the crisis:
    - Selling CO_2 quotas to get cash (liquidity crisis)
    - Possibility to borrow up to 1 year of quotas

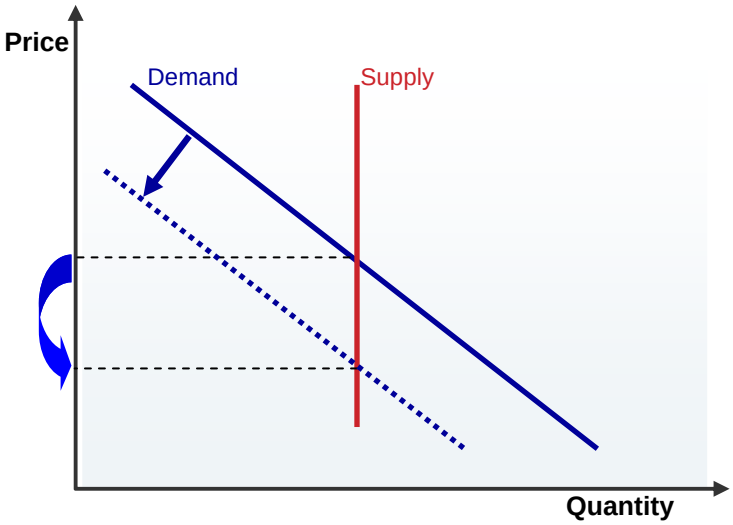
Appropriate Answer: Don't change the rules, even uncertain provisions on borrowing. It is decisive for the credibility of Public Authorities.

What happens on a pure Cap and Trade scheme when demand falls

Demand Reduction on a Standard Market:



Demand reduction on a cap and trade market:



Future Institutional Answers

- **During the third period, auctioning should help avoid price falls:**
  - ✓ Calendar and coordination of quantities auctioned
  - ✓ Use of “reserve prices” during the auctions

- **The simplest and easiest ways to avoid rocketing prices:**
  - ✓ An appropriate regulation of offset credits entering the market
  - ✓ Using the penalty as a price-cap (payment in full discharge)
  - ✓ Price-cap can be compatible with environmental integrity in the long term, see Pfizer (RFF) or Philibert (IEA) studies.

As the market is currently organized, inappropriate institutions act as a barrier : toward a European Carbon Central Bank ?

What is Carbon Rent ?

Oil Rent

- ✓ Scarcity of oil :
  - Short term : market supply
  - Long term : oil reserves
- ✓ Differential rent :
  - Oil production cost :
    - 2 dollars/barrel (Ghawar)
    - 20 dollars/barrel (North Sea)
    - 80 dollars/barrel (Non conventional oils)

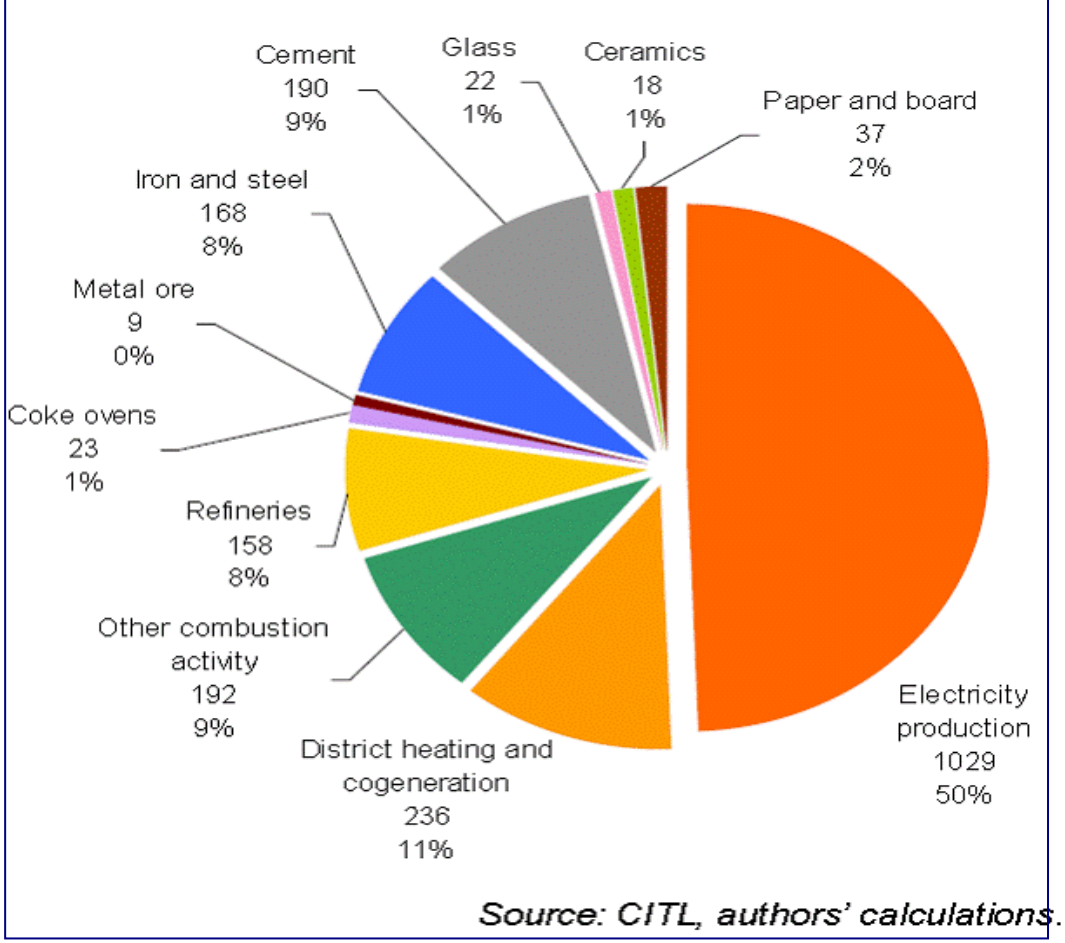
Carbon Rent

- ✓ Scarcity of emission rights :
  - Short term : the cap
  - Long term : credibility of the commitments
- ✓ Differential Rent :
  - CO_2 cost to produce 5000 kWh with a 20€/t price :
    - 100 Euros (Coal)
    - 50 Euros (Gas-Fired)
    - 0 Euros (Renewable, Nuclear)

Carbon Rent distribution during the EU ETS Trial period

- **Almost all allowances allocated for free**
- **Non-Power Industries:**
  - ✓ Net sellers of €2 billions
  - ✓ Possible pass-through of carbon price?
- **Power Industry:**
  - ✓ Net buyer of €2 billions
  - ✓ Electricity market deregulation
  - ✓ Buyers of electricity at non-regulated tariffs: first contributors

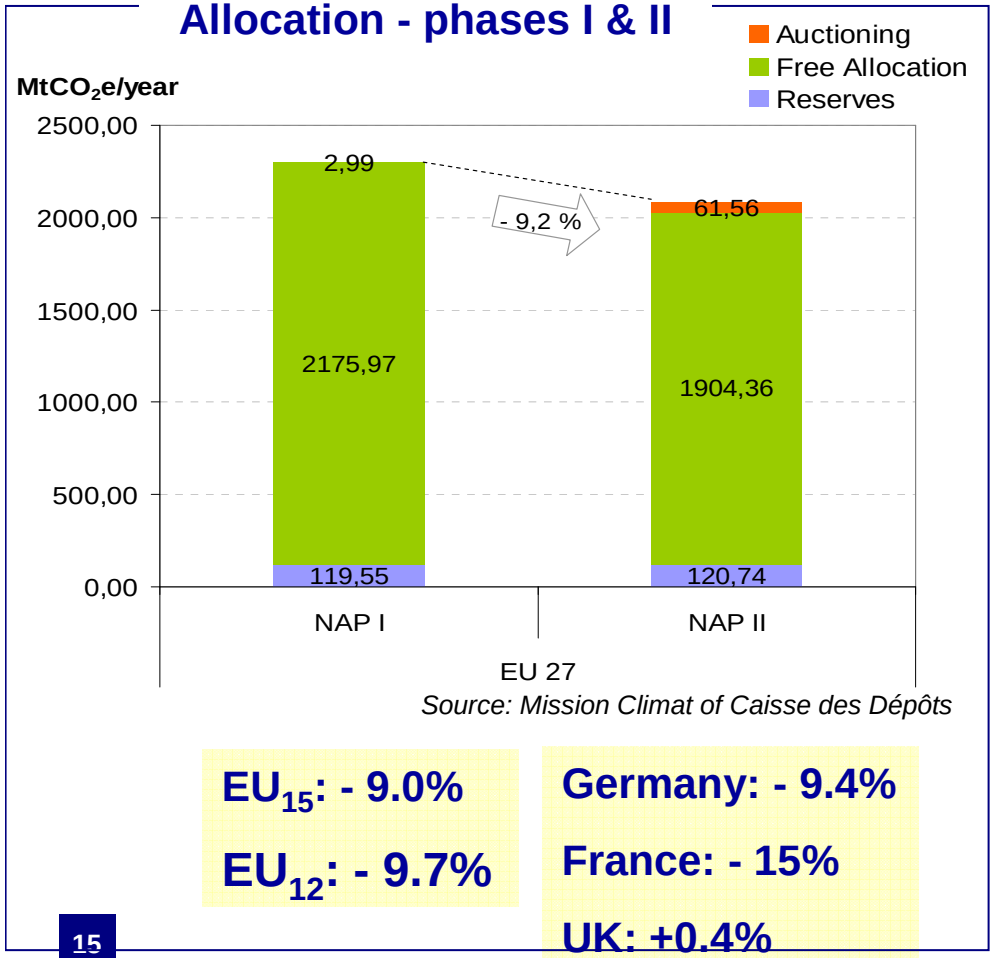
Phase 1 Allocation, by sector



Source : Mission Climat, of Caisse des Dépots

From Phase I to Phase II

- **Constraint increases, logic remains the same**



Source: Mission Climat of Caisse des Dépôts

EU_{15}: - 9.0%

EU_{12}: - 9.7%

Germany: - 9.4%

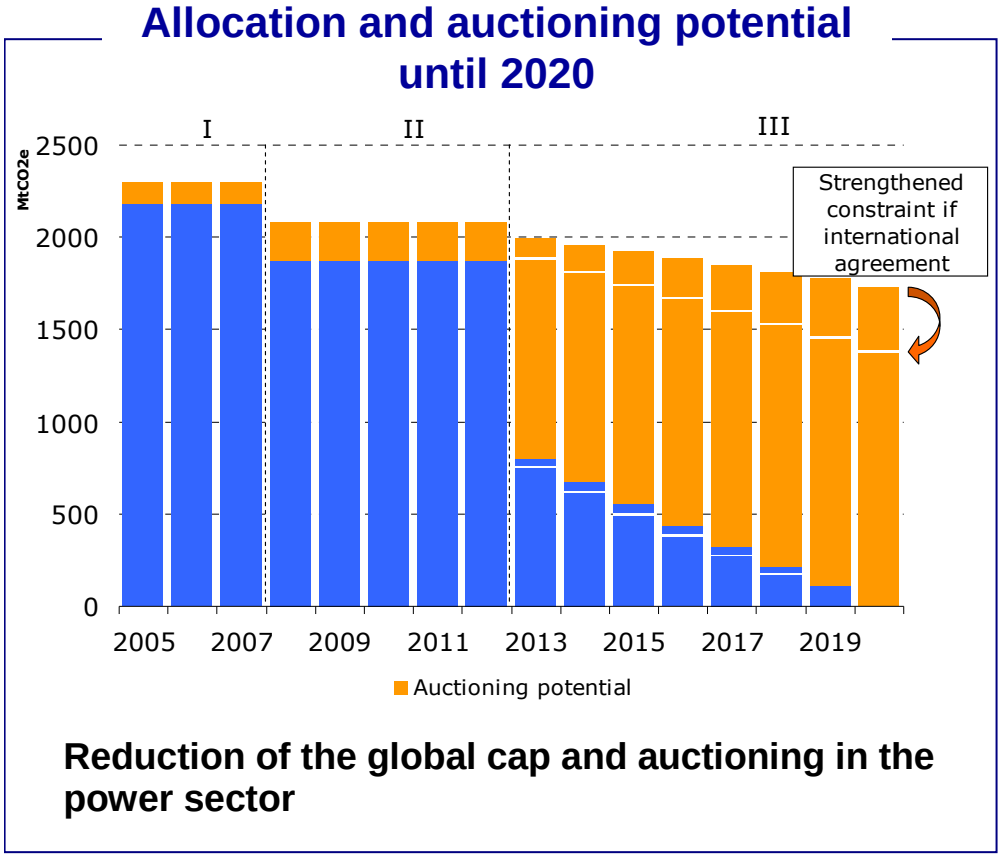
France: - 15%

UK: +0.4%

- The use of auctioning has slightly increased: a part of the carbon rent is captured by the Public Authority
- Possibility to use up to 13% of Kyoto credits during the period: a part of the rent is used to develop the international offset market
- A difficult assessment of the constraint's level due to the industrial production's fall in 2008-2009.

The two major changes in Phase III (2013-2020)

The Energy-Climate Package



Reduction of the global cap and auctioning in the power sector

- New public resources in the hands of European Governments;
- The importance of reducing free access for “newcomers”: return on investment will depend on differential rent. A new incentive for low carbon investments.
- Distribution of rents according to the difference in carbon intensity in the power sector: Sweden and France vs. Germany and England.

Source: European Commission, Mission Climat of Caisse des Dépôts

Learning to manage the Carbon Rent

- **Europe has set up the largest cap-and-trade scheme, distributing a huge amount of the carbon rent to private players**
- **During the second period, a diversification of carbon rent use:**
  - ✓ Financing Kyoto project-based mechanisms
  - ✓ Some significant auctioning by governments.
- **The Energy-Climate package :**
  - ✓ Major transfers of rent from power sector to governments;
  - ✓ Among the power sector, auctioning provides low carbon facilities with differential rent benefits and new incentives for investments;
  - ✓ Uncertainty on how the governments will use this rent inside and outside Europe.

The right strategy for public authorities : distribute free rents at the beginning to convert them in new public resources then.

Thank you for your Attention

For more information

Please contact me : **Christian de Perthuis**
Université Paris-Dauphine
Mission Climat of Caisse des Dépôts
christian.deperthuis@caissedesdepots.fr

Or consult :

The European Carbon Market in Action: Lessons from the First Trading Period - Interim report
By Frank Convery, Denny Ellerman and Christian de Perthuis – March 2008
http://www.caissedesdepots.fr/IMG/pdf_08-03-25_interim_report_en.pdf

Et pour quelques degrés de plus…
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Pricing Carbon : the European Union Emissions Trading Scheme
By Frank Convery, Denny Ellerman and Christian de Perthuis, Cambridge University Press, forthcoming in 2010