The End of Free Carbon

Lessons from Kyoto Protocol & EU ETS

ENGREF

Benoît Leguet

Mission climat – Caisse des Dépôts

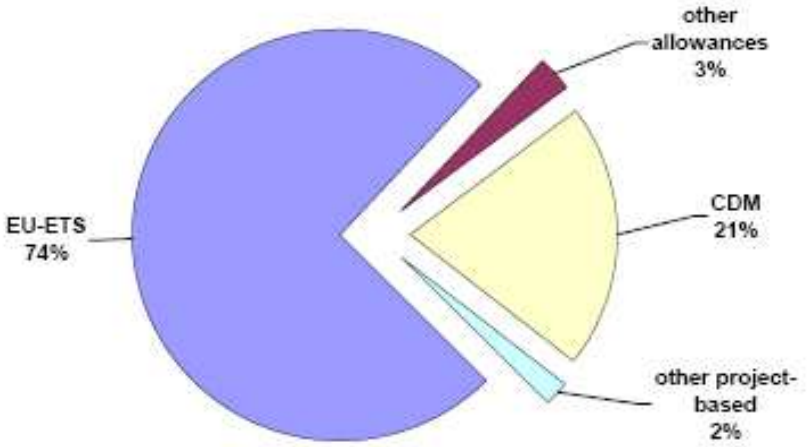
Paris, 28/11/07

The End of Free Carbon

- The Kyoto Protocol: Two Innovations
  - ✓ A « Cap and Trade » Trading System between the Annex B countries
  - ✓ Two Project Mechanisms: Clean Development Mechanism & Joint Implementation
- The European Trading Scheme
  - ✓ The Set-Up Period : 2005-2007
  - ✓ The 2008-2012 Period: Kyoto Protocol Compliance Period
- The Non-Kyoto Markets: New South Wales (Australia), The Chicago Climate Exchange (CCX), The Regional Greenhouse Gas Initiative (RGGI), California

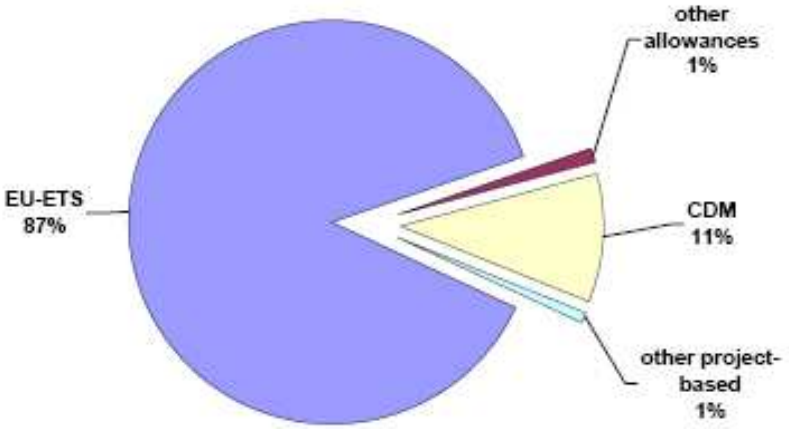
The EU ETS in the international context

EU ETS Takes all: Share of Volume and Value in the Carbon Market – until September 30, 2006



Volume

Source : World Bank.



Value

Source : World Bank.

I – EU ETS Issues

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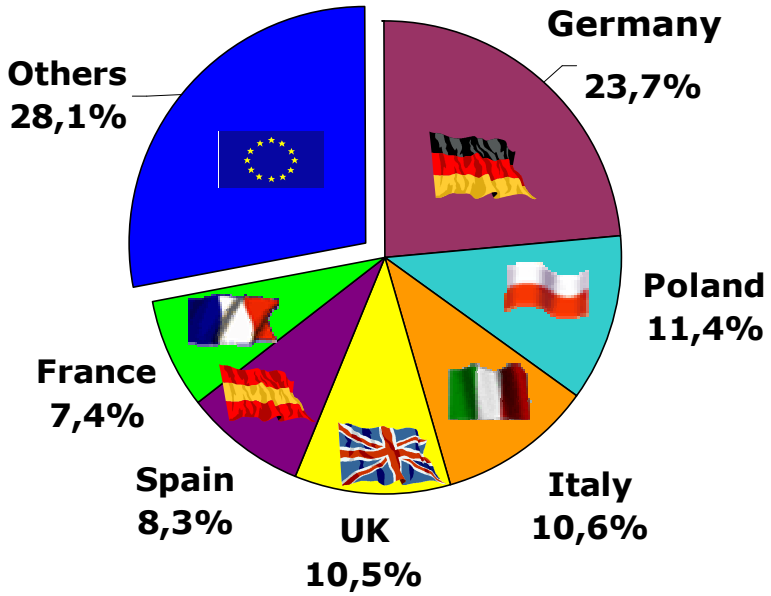
The EU Emission Trading Scheme : How does it work ?

- **CO2 emissions from European industries have been capped ;**
- **Every year, each industrial plant is allocated allowances corresponding to its cap (One allowance = 1 ton of CO2);**
- **The allowances are tradable all around Europe ;**
- **Every year, industrial installations have the obligation to restitute as many allowances as actual CO2 emissions ;**
- **First two market periods : 2005-2007 and 2008-2012 ;**
- **Free banking and borrowing during each period ;**
- **No possibility of banking and borrowing between the first two periods.**

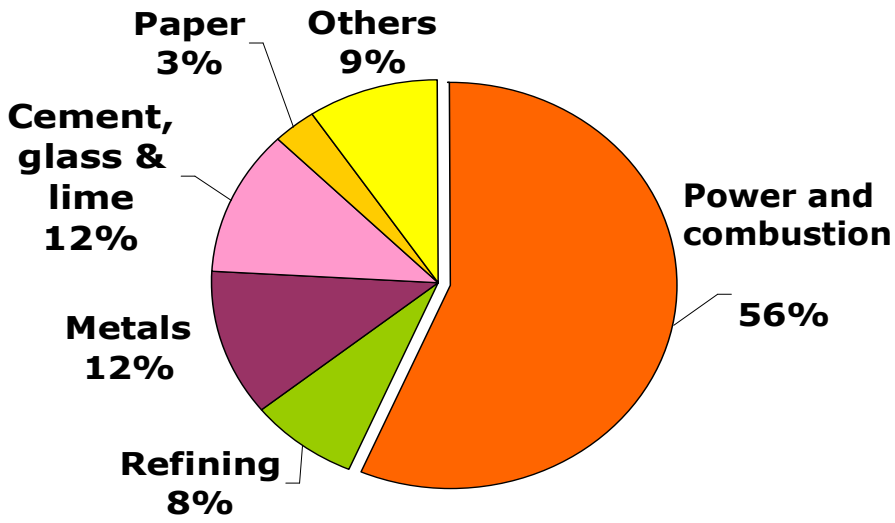
More than half of the allowances to power and heating activities – NAP I

Total : 2.2 billion CO2 (50 % of the EU CO2 emissions)
11 000 industrial sources

Breakdown per country

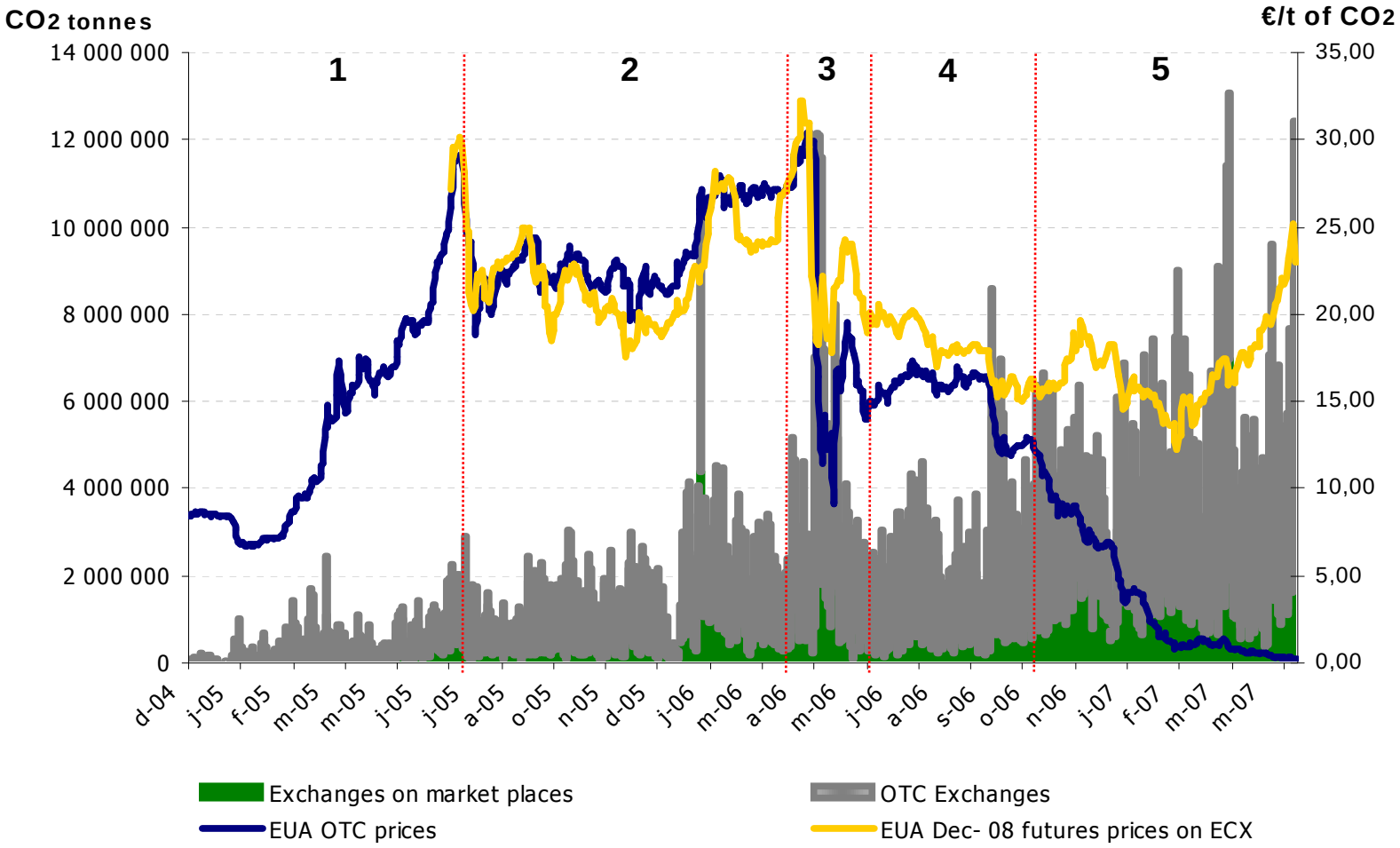


Breakdown per industry



Source: National Allocation Plans

The Five Stages of the EU ETS Market



Source : Point Carbon, Powernext and ECX.

The Five Stages

- **Stage 1 (Jan-Jul ’05): increasing price during this phase can be explained by tightness of the market and its lack of symmetry. Demand came from power producers but supply was not there because other players generally not prepared to sell;**

- **Stage 2 (Aug’05-Mar’05): expanding market reached equilibrium with the supply at around €25/t. Demand continued to come from power producers; increasing during the winter on account of the rise in gas price;**

- **Stage 3 (Apr-May ’05): market correction followed European Commission announcement of initial compliance that market was long by approximately 4%;**

- **Stage 4 (Jun-Sep’06): market stabilised at around €15/t. Demand of power producers met by increasing supply following initial compliance announcement;**

- **Stage 5 (Since Oct’06): divorce between prices for first and second periods became final. First period price fell to €0.5/t while second period price remained in the range €15-20/t. The Commission’s tightening of Member State allocation caps for the second period has lead to second period allowance prices rising to €25/t in May 2007. Current prices (Nov’07) have stabilized around €22/t.**

The probability of a EUA shortage at the end of the first period

- **The ratio between the 1st and 2nd period prices plus the 40€ of penalty expresses the probability that the market is short at the end of the 1st period.**

- **Before the 1st compliance, the probability was estimated at 35-45% but less than 1% since May 2007**

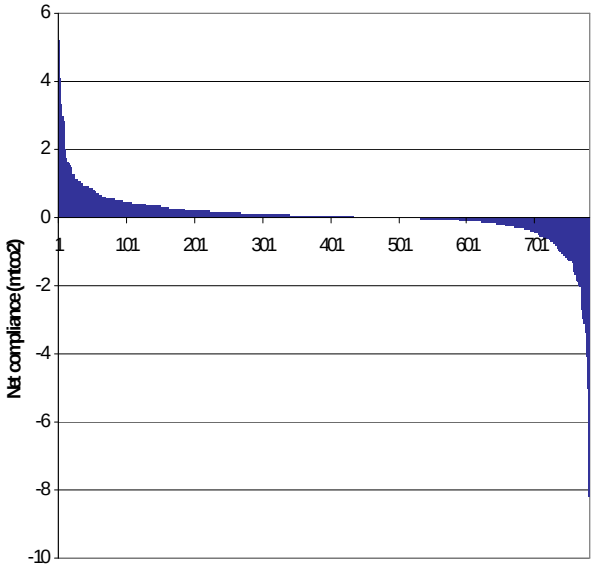
$$\Pr(shortage) = \frac{EUA_{0507}}{EUA_{0812} + 40}$$

Source : Climate task force, from the formula of Parsons et Ellerman, MIT 2006.

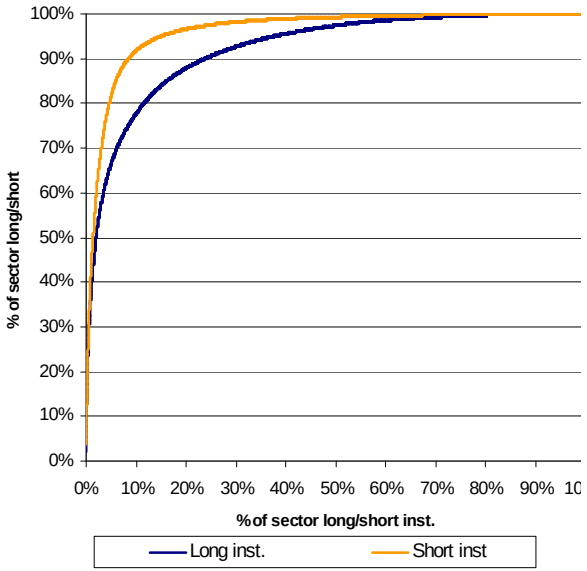
Supply and demand in EU 25

EU 25 - installations compliance

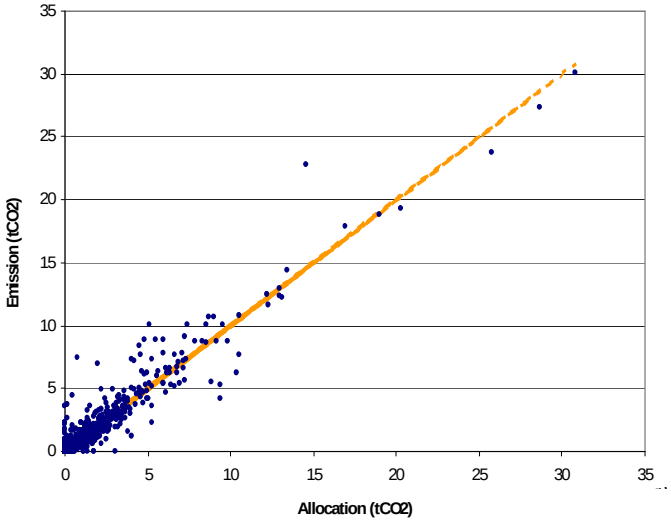
Allowance > 500 000 t



Long and short installations concentration EU 25



EU 25 Compliance by installation



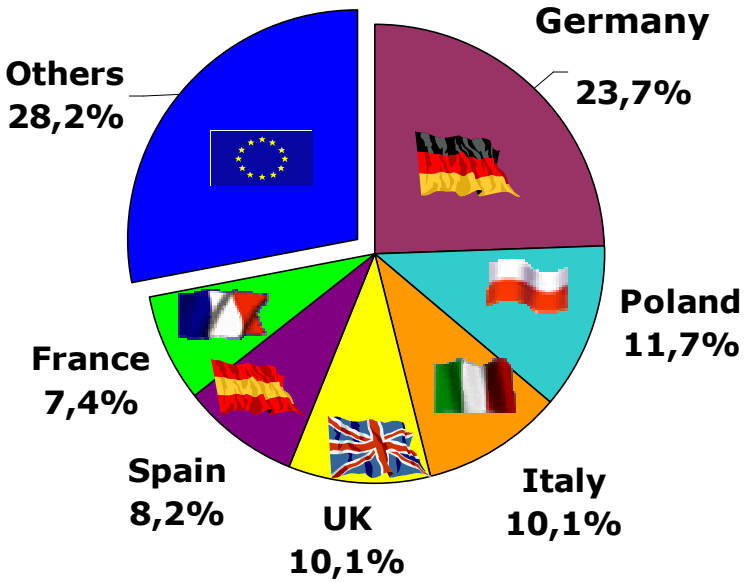
Source : Climate Task Force, Caisse des Dépôts, CITL data.

- Among 7 311 installations which are in a long position, 10% represent 77% of the total surplus (254 Mt) and 2% of them represent more than 50%.
- Among 3 134 installations which are in a short position, 10% represent more than 90% of the total deficit (-225 Mt) and 1.5% of them represent 50%.

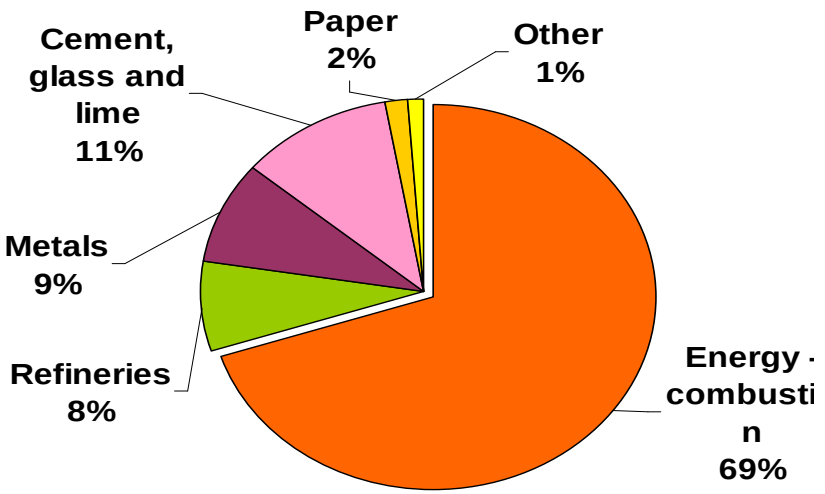
More than 2/3 of the allowances to power and heating activities – NAP II

Total : 2.1 billion CO2 (50 % of the EU CO2 emissions)
11 000 industrial sources

Breakdown per country

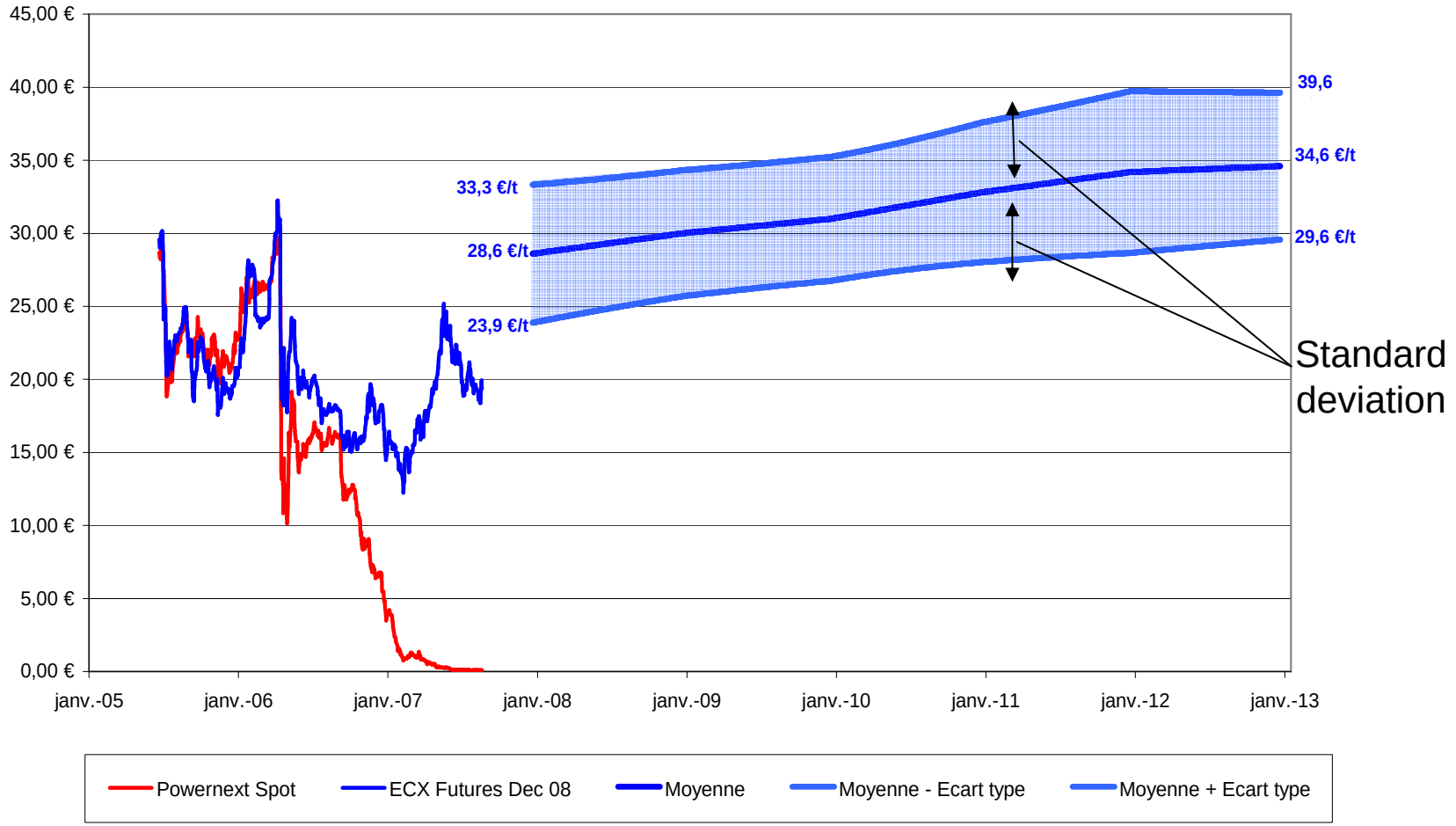


Breakdown per industry



Source: CITL (2007)

The mean trend of the second period prices expectations.



Source : Mission Climat de la Caisse des Dépôts

II – The Kyoto Project-Based Mechanisms

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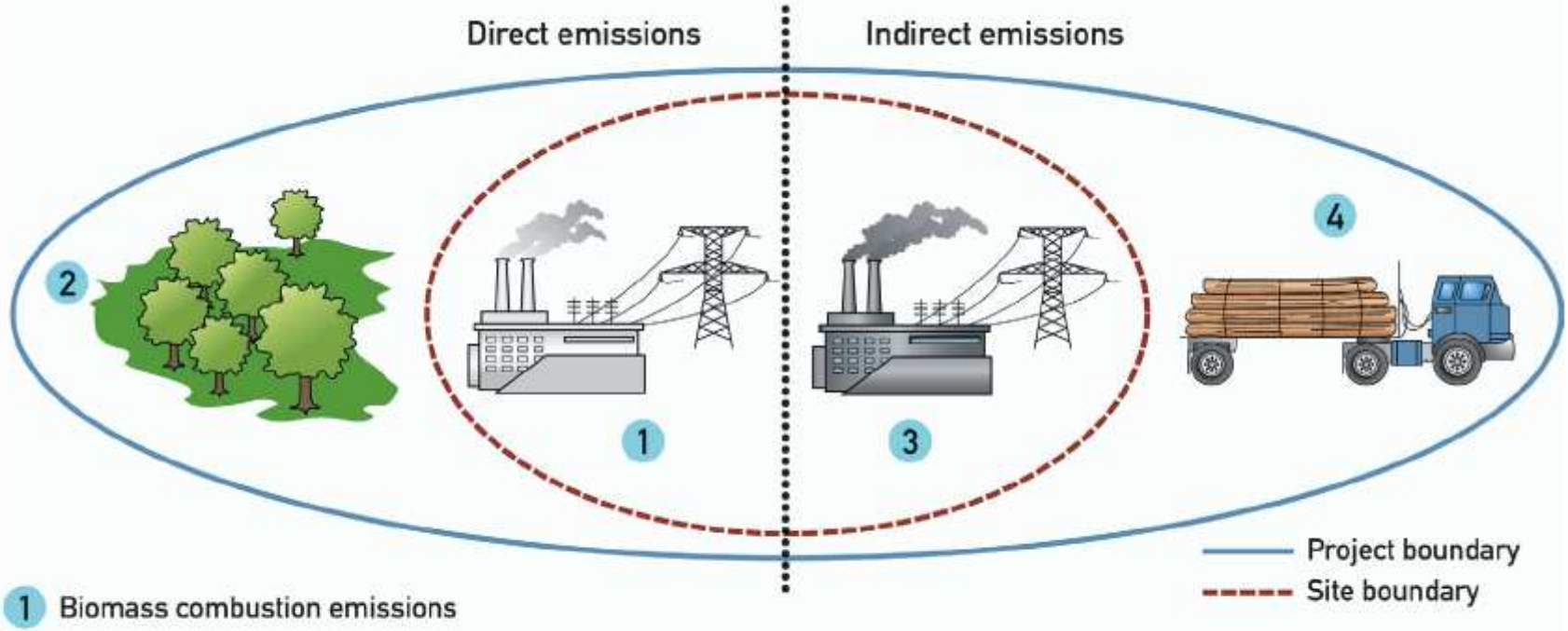
Project mechanisms - boundary

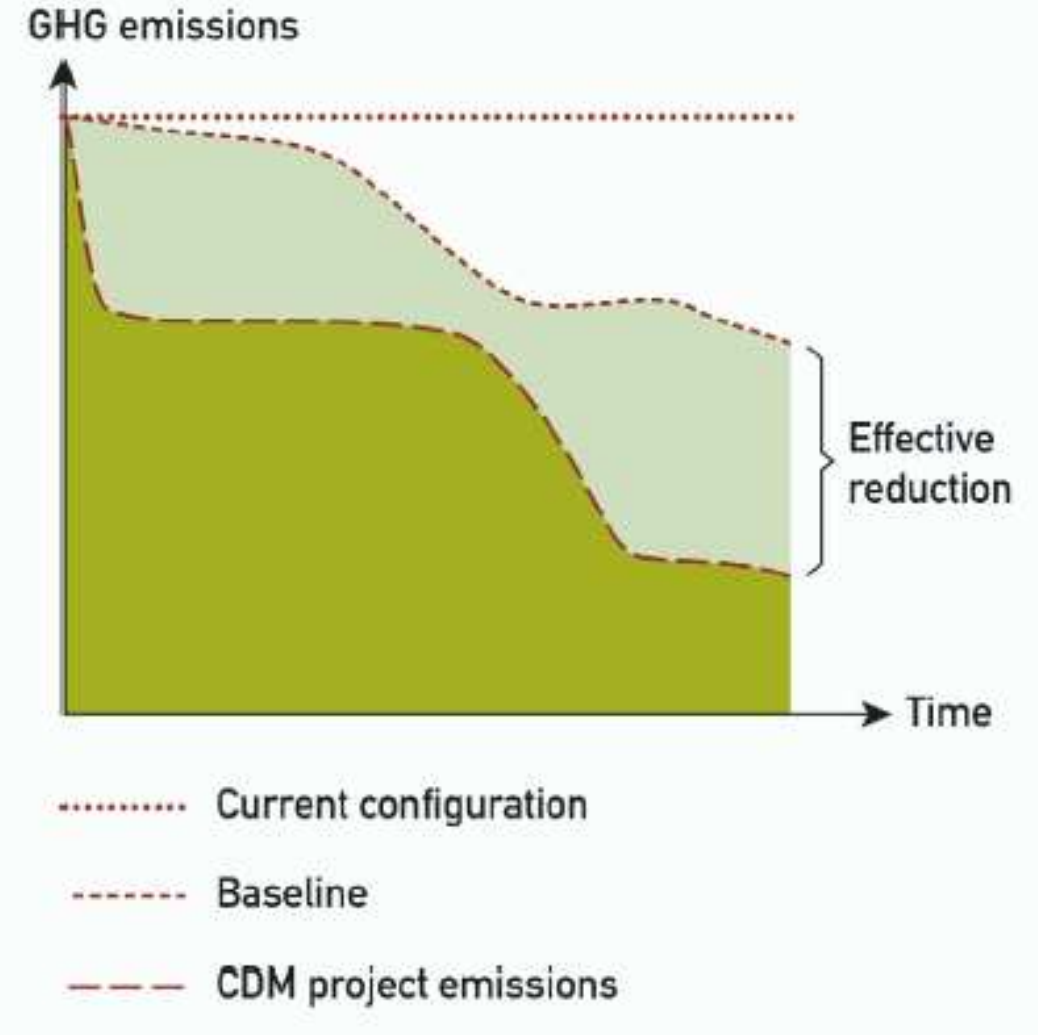
Project: Replacement of a power station's fuel oil boiler with a biomass boiler



1. Biomass combustion emissions
2. CO_2 sequestration in forests from which the wood is used as fuel as part of the project
3. Avoided CO_2 emissions from the fuel oil combustion that would have been required for electricity production in the absence of the project
4. Emissions related to the transport of wood fuel

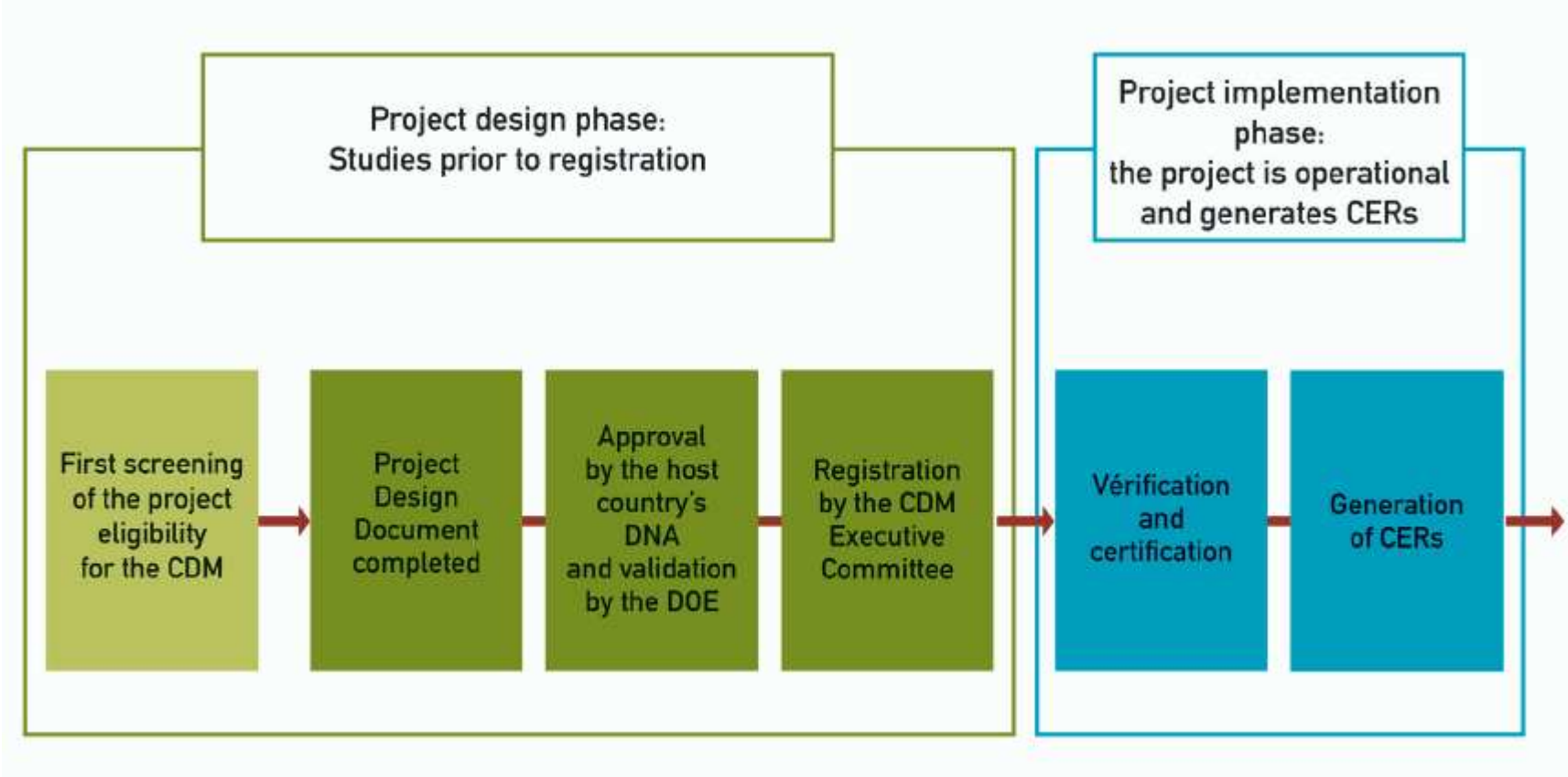
Source : MIES, Guide on project mechanisms

Project mechanisms – avoided emissions



Source : MIES, Guide on project mechanisms

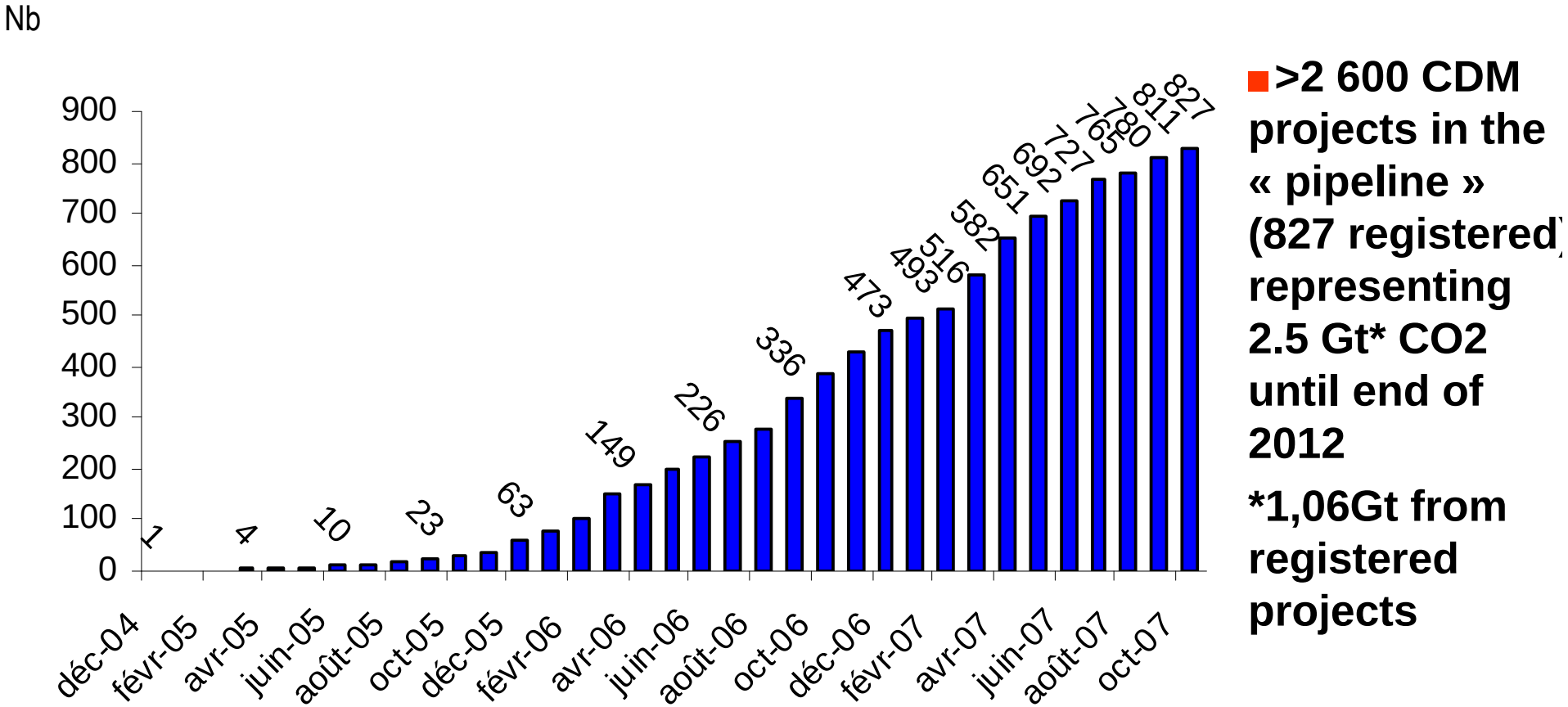
Project mechanisms – simplified process



Source : MIES, Guide on Project mechanisms

The implementation of Clean Development Mechanism Projects

Evolution of registered Kyoto CDM projects (cumulative)



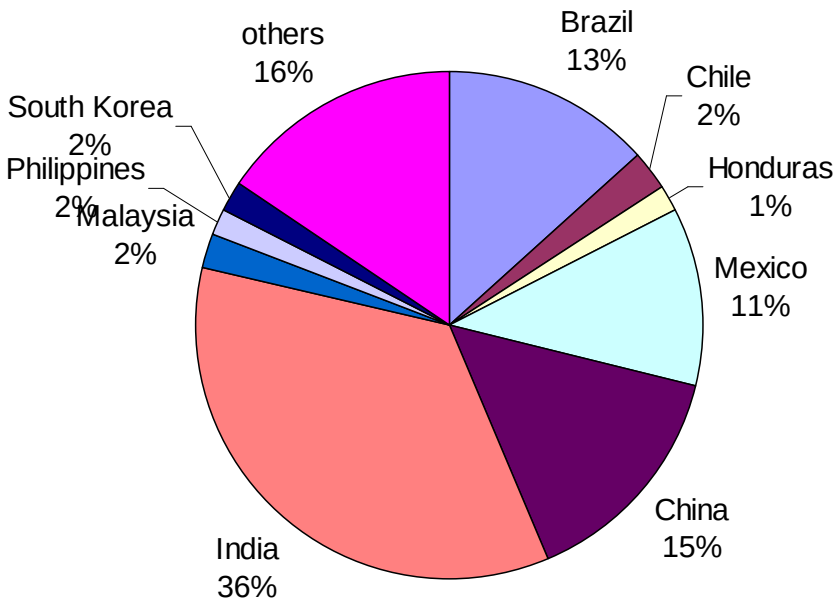
- **>2 600 CDM projects in the « pipeline » (827 registered) representing 2.5 Gt* CO2 until end of 2012**

***1,06Gt from registered projects**

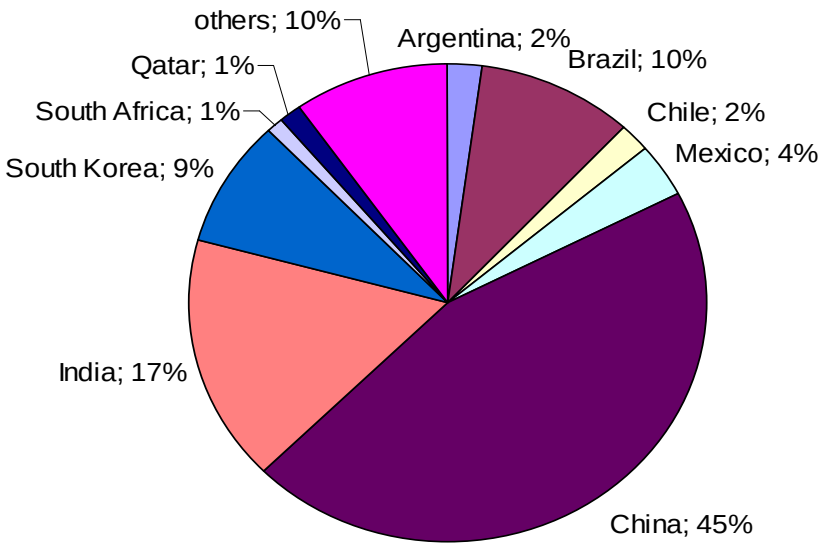
Source: UNFCCC

Registered project activities by host country (29 October 2007)

Number of projects (Total: 827)



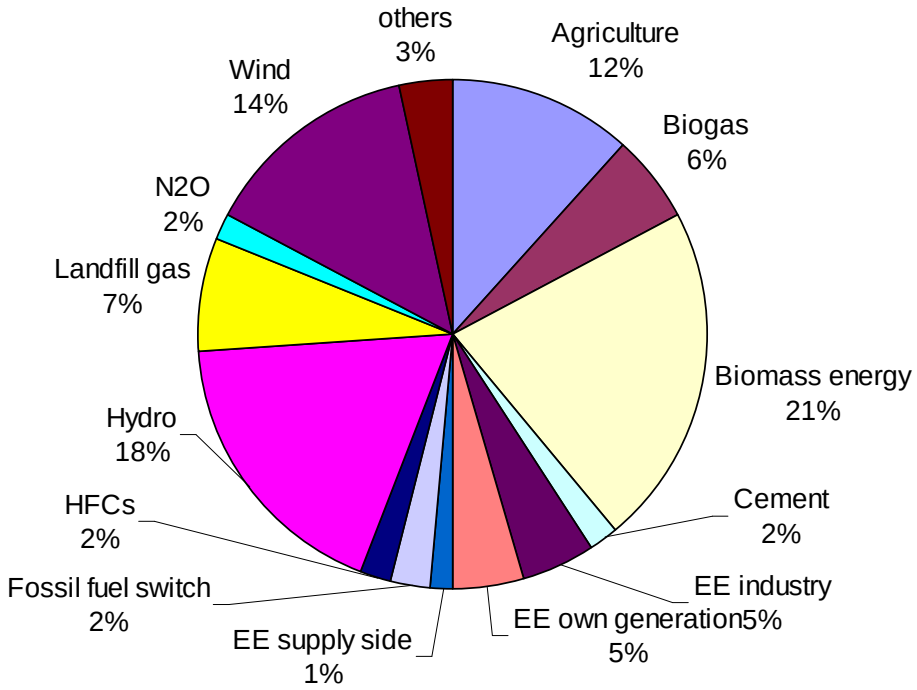
Average annual CERs (Total: 171.5 Mon CERs)



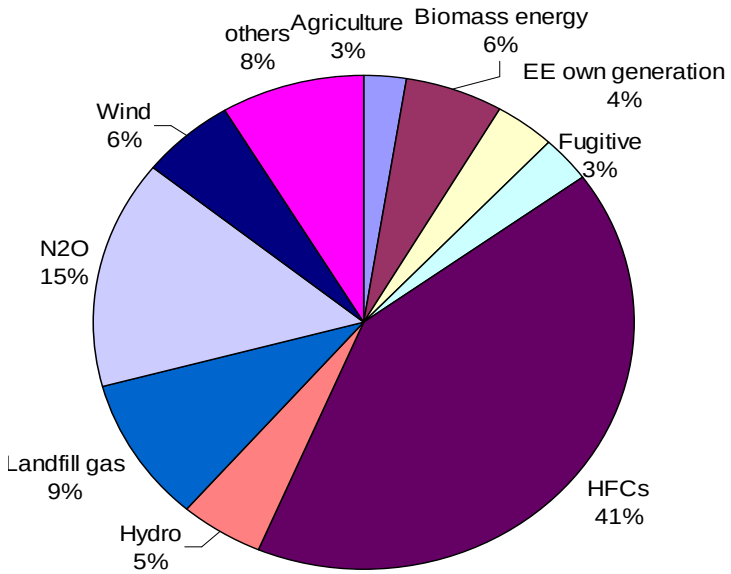
Source: UNFCCC

Distribution of registered projects by scope (29 October 2007)

Number of projects (Total: 827)



Average annual CERs (Total: 171.5 Mon CERs)

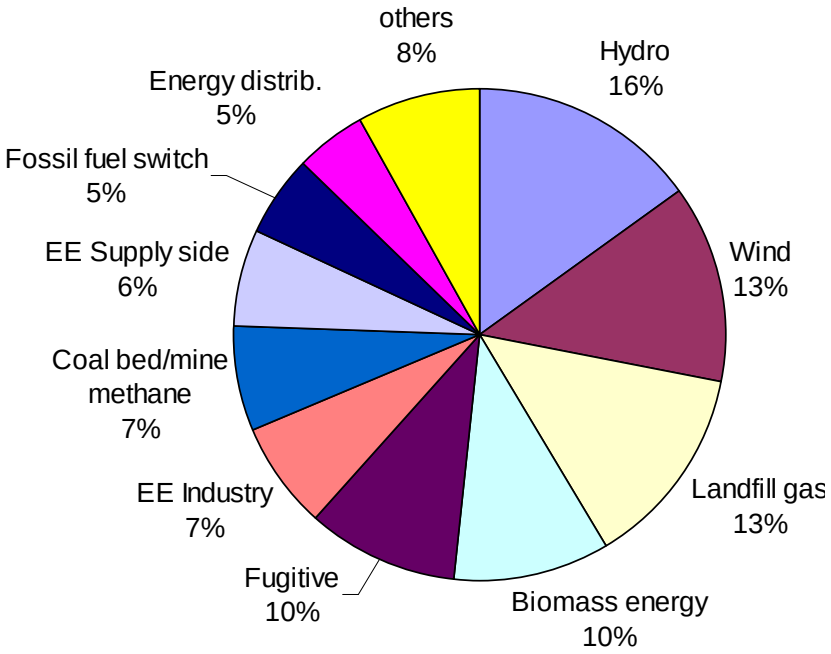


- Only 7 HFCs projects -in India (4), China, Republic of Korea and Brazil provide 41% of the credits issued.

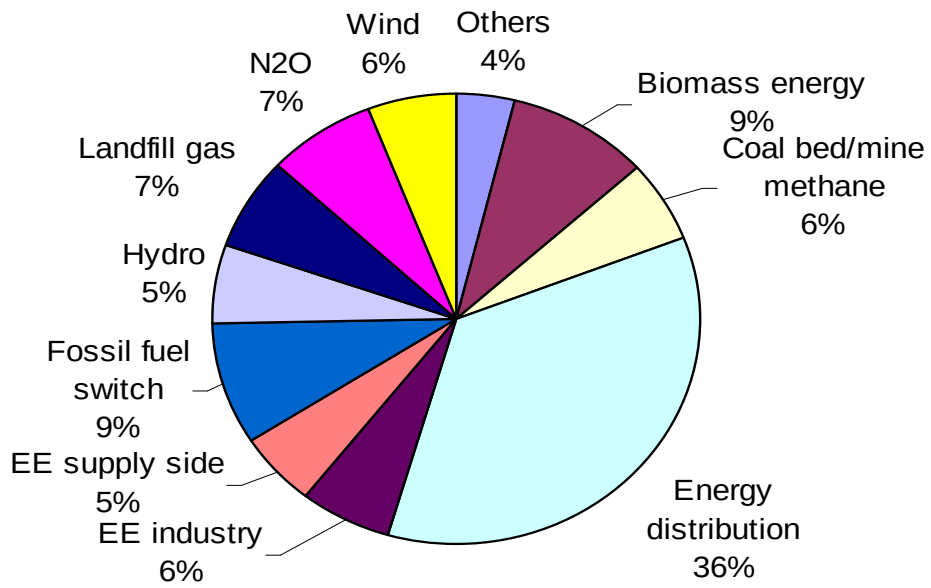
Source: CDM pipeline-UNEP RISOE

Distribution of JI projects by scope (October 29 2007)

Number of projects (Total: 188*)



Average annual ERUs (Total: 38.5Mons ERUs)

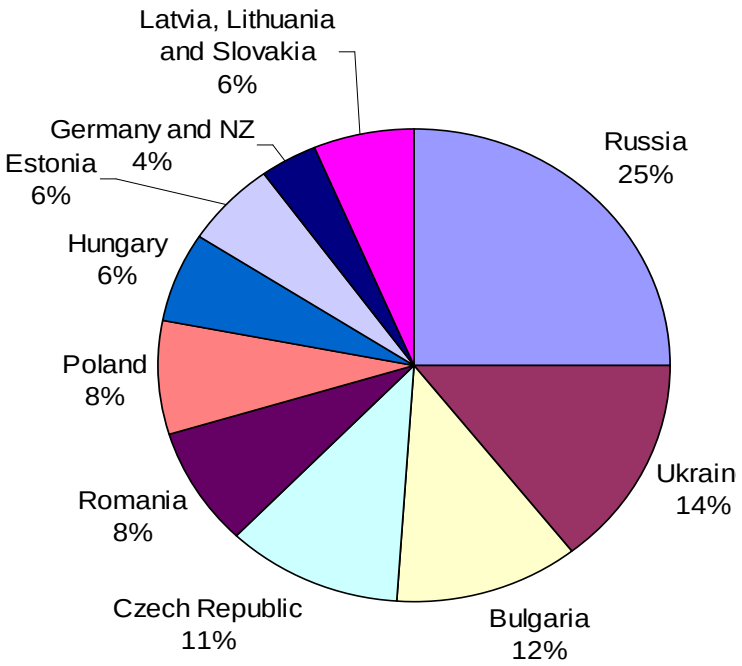


***Only 1 registered**

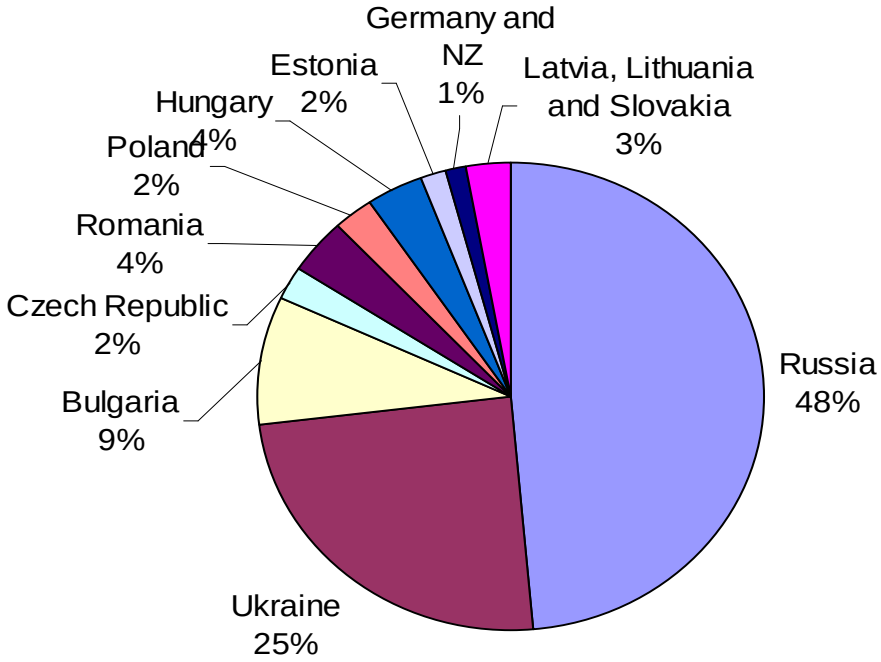
Source: JI pipeline-UNEP RISOE

JI project activities by host countries (October 29 2007)

Number of projects(Total: 188*)



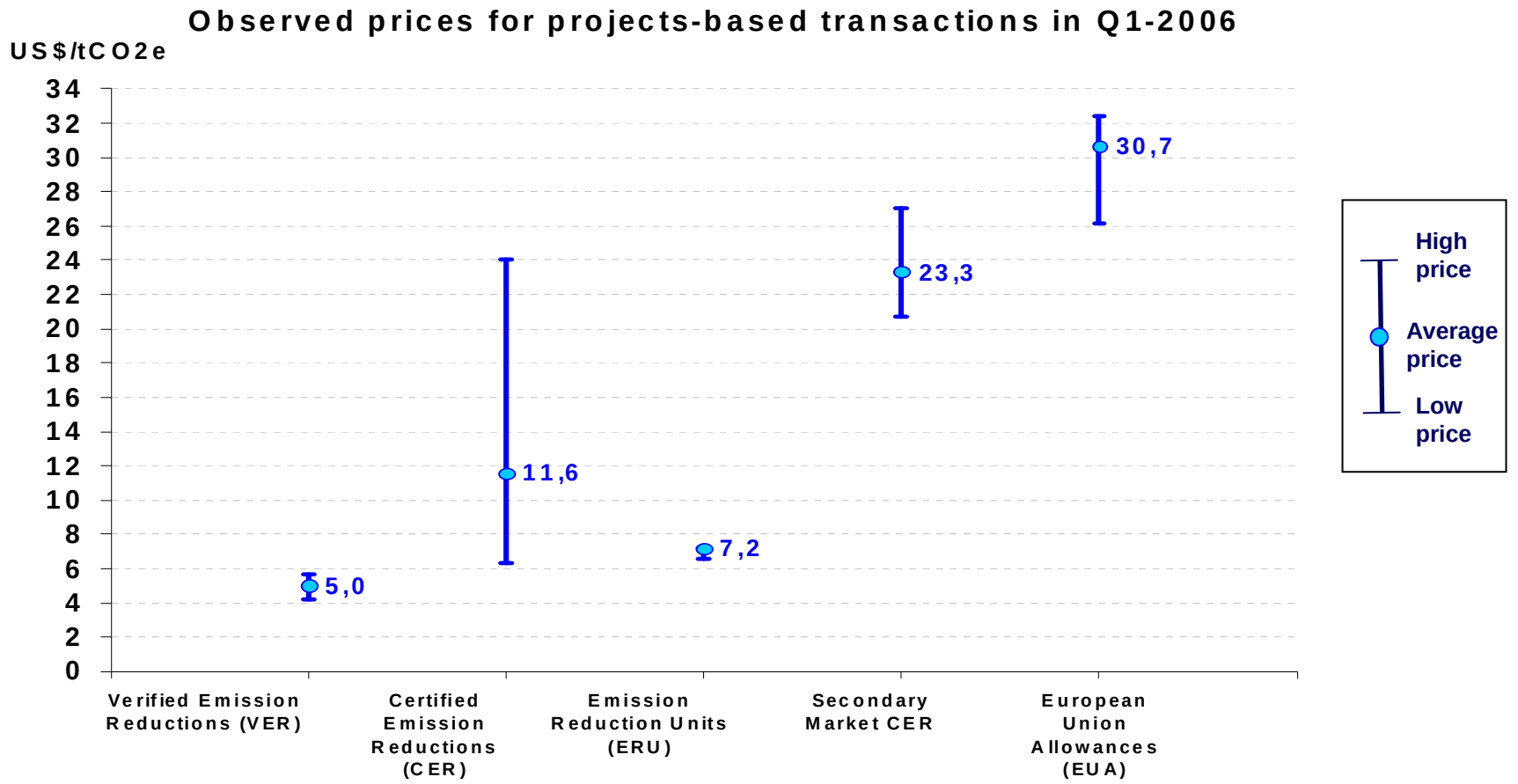
Average annual ERUs(Total: 38.5 Mon ERUs)



*Only 1 registered

Source: JI pipeline-UNEP RISOE

Observed prices for project-based transactions



Average exchange rate on the period: 1€ =1.2029 US$

Sources: World Bank, Powernext

III - Post 2012 Issues

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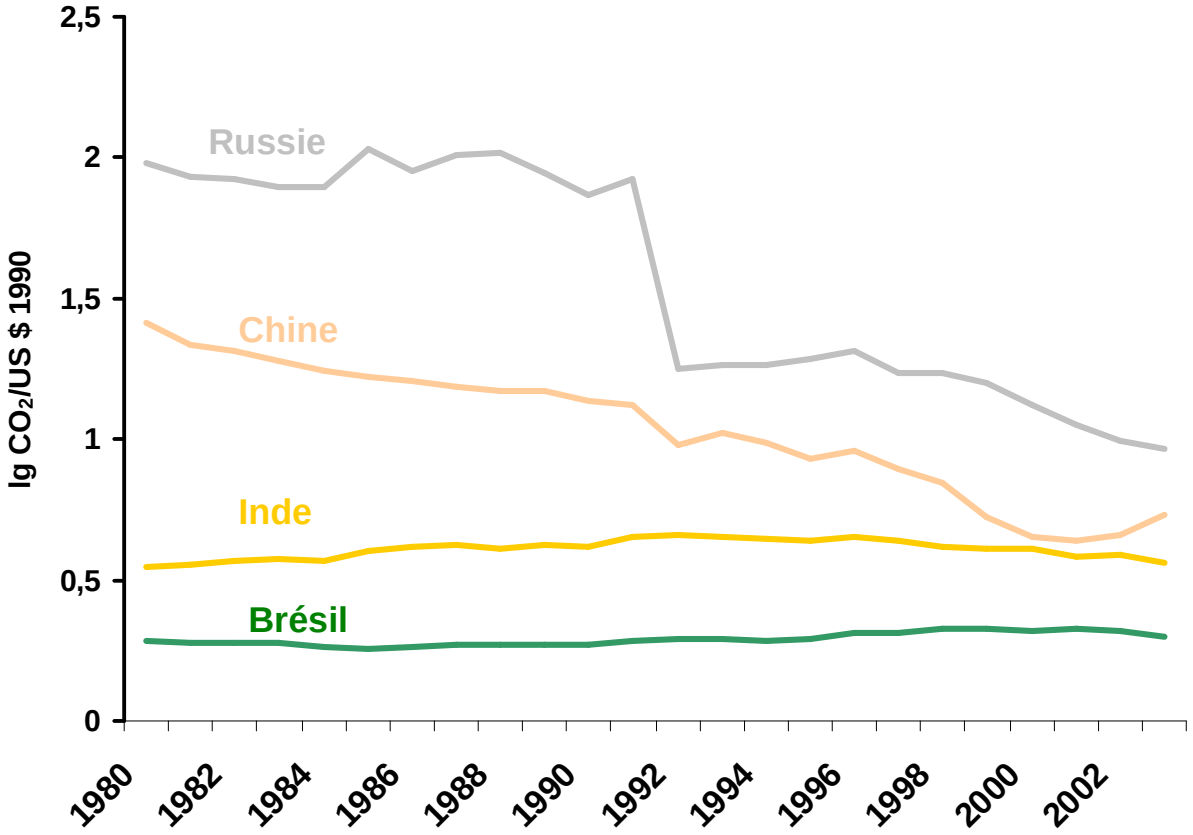
The CDM Assessment

	2000 GHG Emissions (Mt CO2 eq)	% of World total	Gross Capital Formation (current billion $)	FDI, net inflows (%GCF)	Estimated Annual ET/CDM investment* (in current $m)	% GCF
China	4963	14,7%	747	2,8%	463	0,062%
India (2003)	1889	5,6%	164	0,8%	119	0,073%
Brazil	850	2,5%	129	3,0%	154	0,120%
Indonesia	505	1,5%	67	0,4%	9	0,013%
Iran	476	1,4%	61	0,3%	0	0,000%

*Source : WRI, World Development Indicators2006, UNFCCC. * according to Carbon Finance March 2007*

- **CDM Projects are growing quite fast**
- **Nevertheless, their impact is a symbolic part of total investments in developing countries**

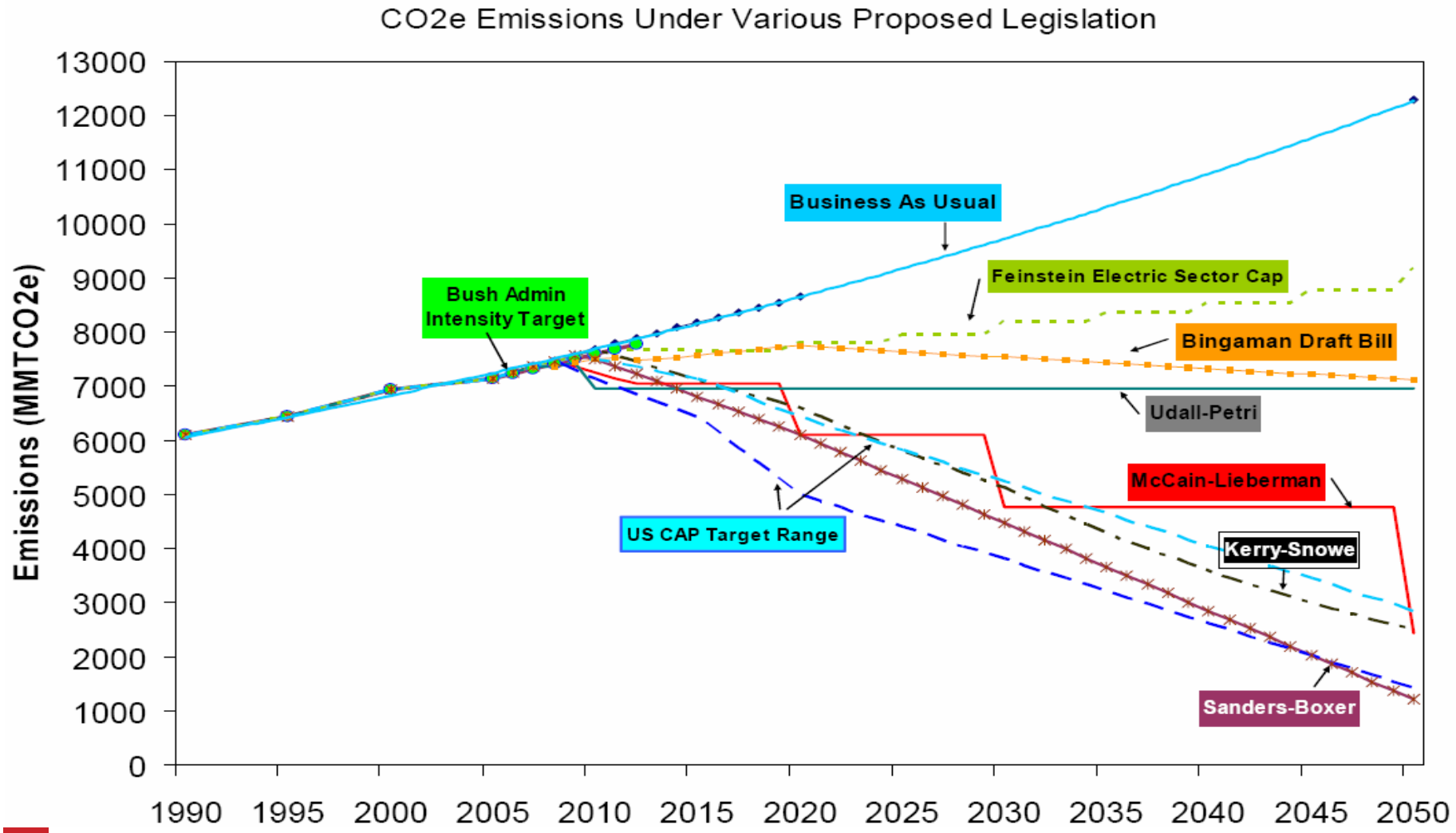
The Chinese Case



Source : CDIAC, Groningen Growth and Development Centre, WRI.

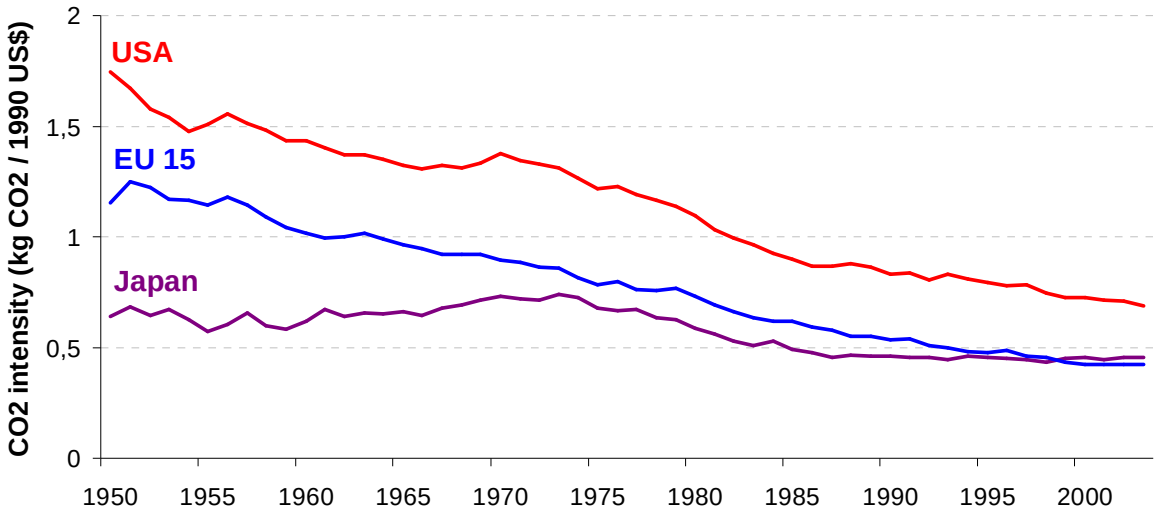
- **In most emerging countries, carbon economic intensity has been decreasing since the 1990s.**
- **China has also followed the trend**
- **The overheating of the Chinese economy has triggered a new increase in carbon intensity since 2000.**

The US evolution



A huge carbon emission reduction potential in the US

Carbon intensity in developed countries



- ✓For years, Parallel progress in carbon efficiency have been observed in the US and in the EU
- ✓ Today US carbon intensity (CO2 emissions per PIB Unit) is 60% above EU
- ✓ A national cap and trade system in the US would create huge new opportunities of CO2 emission reductions.

Source: Mission Climat

What will the post-Kyoto world look like ?

- **No return to the free carbon economy prevailing before 2005**

- **Three possible scenarios :**
  - ✓ Kyoto agreement is saved : very unlikely
  - ✓ Several carbon markets in the world, without multilateral agreement : possible but not desirable
  - ✓ A new international climate agreement with a strong commitment of industrial countries (US included) and efficient ways to associate emerging countries

- **Two important issues :**
  - ✓ Russian harming ability
  - ✓ Difficulty to include the developing countries with grandfathering allocation

How to engage the right transition?

- **Two main basis of the world carbon finance in 2012 :**
  - ✓ The EU-ETS
  - ✓ The Kyoto international project based credits (JI/CDM)

- **What is needed :**
  - ✓ To make the second period of EU-ETS a success, economically and ecologically
  - ✓ Investments in post-2012 carbon assets, especially CERs
    - Too risky for most of private investors
    - Key measure for governments, public and multilateral agencies

The EU-ETS Medium and Long Term Issues

Thank you for your attention

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IV - ANNEXES

Benoît Leguet

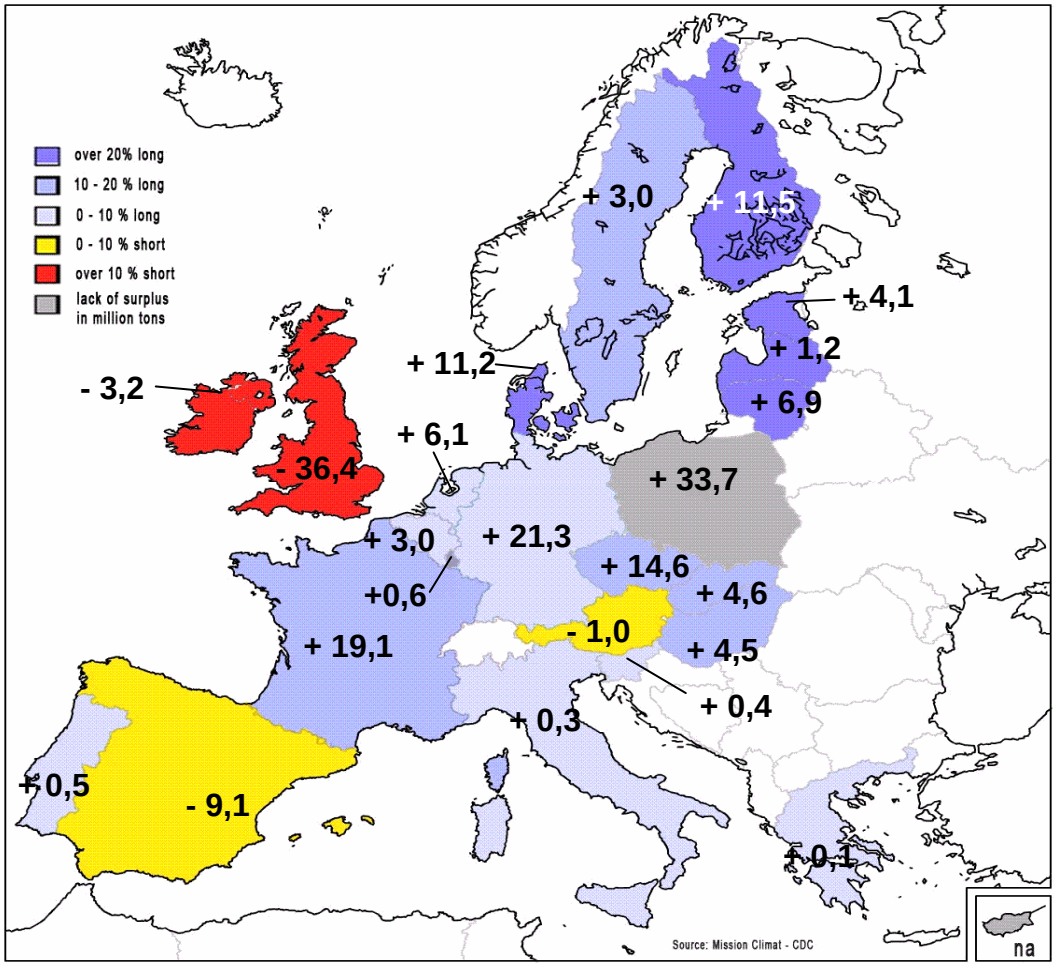
What we have learned : Four main market drivers

Long term

Short term

- Level of carbon constraint
- Economic growth
- Energy relative prices
- Temperatures and rainfall

EU 2005 Emissions vs. Allocation : carbon constraint distribution



Globally : 80 Mt long (less than 4%)

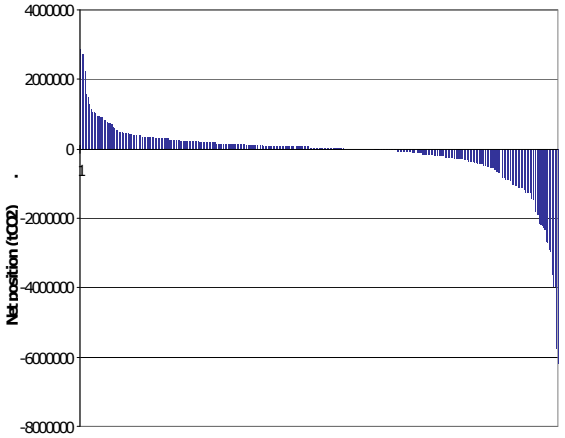
Short : UK, Ireland, Spain, Austria

Long : Germany, France, Nordic countries, Eastern countries

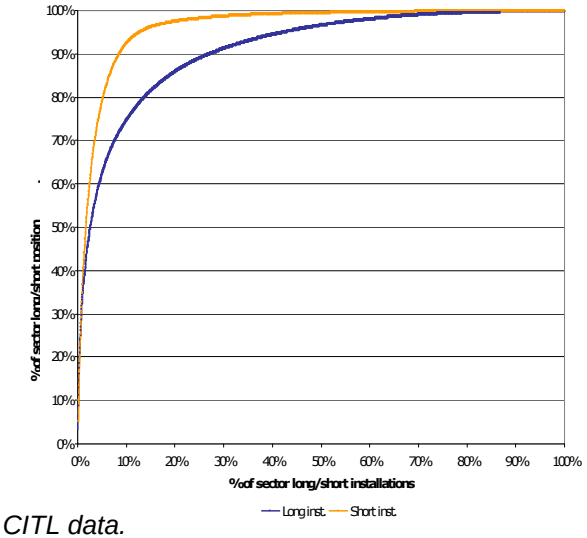
Source: Mission Climat

Supply and demand : the energy sector in EU 6

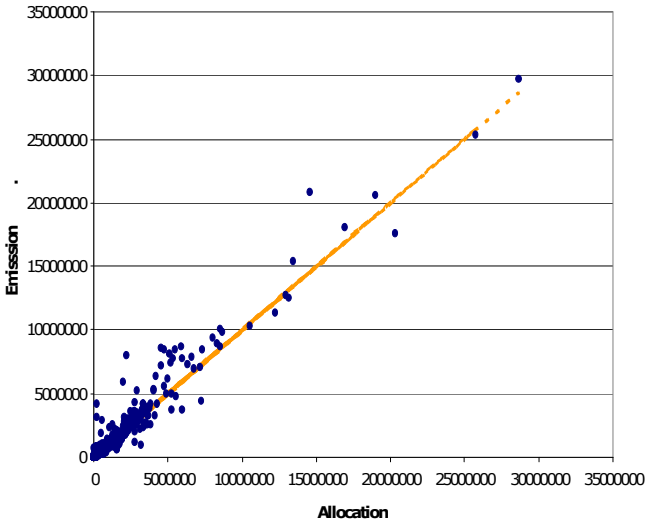
EU 6 - installations compliance - Energy sectors - Allowance > 500 000 t



Long and short installations concentration EU 6 energy sector



EU 6 Compliance by installation - Energy sector



Source : Climate Task Force, Caisse des Dépôts, CITL data.

- In the energy production sector, of 2 590 installations which are in long positions, 10 % represent 70% of the total sector surplus (90 Mt) and 3% of them represent 50%.
- Of 1 221 installations which are in a short position, 10% represent more 90% of the total sector deficit (-120 Mt) and 2% of them represent 50%.

Environmental Performance of EU ETS

- **2005 verified emissions showed the market to be long by 80Mt. Was the EU ETS overallocated and did it induce any emissions reductions?**

- **Ellerman & Buchner (MIT) :**
  - ✓ Potential overallocation of 100Mt
  - ✓ EU ETS did in fact induce abatement during 2005.
  - ✓ Evidence that indicates abatement of approximately 73Mt during 2005. This equates to 3.5% of the 2005 emissions cap.

- **Emissions abatement is most likely to have taken place in the power sector. In addition to being the largest sector in the EU ETS, the power sector can have a big impact on emissions abatement because of '*fuel switching*' or '*changes in merit order*'.**

From First Period to Second Period: What will change?

- **Industries coverage :**
  - ✓ Towards limited extension (Air transportation starting in 2011, chemical industry)
  - ✓ Some countries will experiment with Domestic offset projects
- **Level of carbon constraint has increased for the period 2008-2012:**
  - ✓ The emissions cap for the second period is *10%* lower compared to the first period cap

1st Period Emission Cap (Mt of CO2)	2005/2006 Average Verified Emissions (Mt of CO2)	Commission Approved 2nd Period Cap (Mt of CO2)	Emissions Difference (Mt & %): 1st Period Cap – v – Approved 2nd Period Cap
2058	1895	1859	199Mt (9.7%)

The figures in this table are based on the 21 NAP IIs that the European Commission has approved thus far.

- **Linkage with Kyoto projects mechanisms**
  - ✓ An important issue for post-2012 outlooks
- **Providing long term incentives**
  - ✓ New entrants and plants closures rules
  - ✓ Post-2012 issues

Post 2012 Issues & Long Term Incentives

- **Post 2012 issues:**
  - ✓ European Council has committed to reducing EU GHG emissions by 20% relative to 1990 by 2020;
  - ✓ However, there remains great uncertainty at the international level regarding future GHG emission reduction commitments.

- **Free banking is a condition for long term price signals**

- **New entrants:**
  - ✓ Free allowances allocation for new entrants could have undesirable effects on investment decisions :
    - Subsidizing carbon-intensive investment (ecological damage) ;
    - Inciting to over-investment (economic damage)

- **Plants closure:**
  - ✓ As yet no European common rules
  - ✓ In most countries : restitution of allowances to the Government in case of plants closure

Post 2012 Issues (2):

Main points of discussion in the European Commission EU ETS Working Group

- **Allocation issues:**
  - ✓ EU Commission favors a more centralized process to allocation;
  - ✓ While the second period will be 5 years there is a growing desire among participants that future trading periods should be longer in duration, i.e. 8, 10 years at a minimum.

- **Free allocation vs. auctioning:**
  - ✓ Power sector has made significant windfall profits because of free allocation;
  - ✓ Free allocation hurts the carbon price signal. Allocation method should be an incentive to carbon intensive industry to reduce emissions. Alternative allocation methods such as benchmarking, fixed or output based may be more appropriate than grandfathering at providing this incentive.

- **Difficulty of managing a trading scheme where participating sectors are exposed to different degrees of competition:**
  - ✓ Because the power sector is limited in exposure to competition it is able to '*pass through*' allocation costs to consumers;
  - ✓ With energy intensive sectors such as cement and steel exposed to international competition they are forced to absorb allocation costs without passing them on to consumers;
  - ✓ Possible solution considered by working group:
    - Setting up border taxes; or
    - Different rules for different sectors

Domestic Offset Projects

Greenhouse gas emissions in France

Sector	Greenhouse gas emissions in 2003		Change (metric tonnes, millions) 1990 to 2003	Share of emissions under NAP
	tCO_2eq millions	%		
Energy production	72	13%	-8	100%
Industry	111	20%	-31	70%
Agriculture	108	19%	-11	0%
Transport	149	27%	28	0%
Buildings	102	18%	13	0%
Waste	14	3%	-2	0%
TOTAL France	557	100%	-11	27%

Interests of DOPs:

Create a price signal for fields where emissions are growing and uncovered by the ETS

Reduce the overall cost of emission reductions

Extend the possibility for States to reduce emissions in their own territory

Source: Climate Task Force's report on domestic offset projects

Caisse des Dépôts involvement in carbon finance

- **Development and Management of National registries (Seringas) :**
  - ✓France : on behalf of the Central Government
  - ✓EU: 10 countries use Seringas (60 % of the EU allowances)
- **Associated with Powernext carbon**
  - ✓ Leading spot carbon market in Europe
- **Sponsor of the European Carbon Fund :**
  - ✓ € 147.5 million to be invested (€ 25 million from CDC)
- **Promotion of CO2 Domestic offset Projects in France**
- **Research and analysis**