Reliability

Innovation

Expertise

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Caisse des Dépôts GROUP

Kyoto Protocol Principles

Carbon Finance and Flexibility Mechanisms

17th May 2011

The Kyoto Protocol Principles

Innovation
Expertise
Reliability

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Caisse des Dépôts GROUP

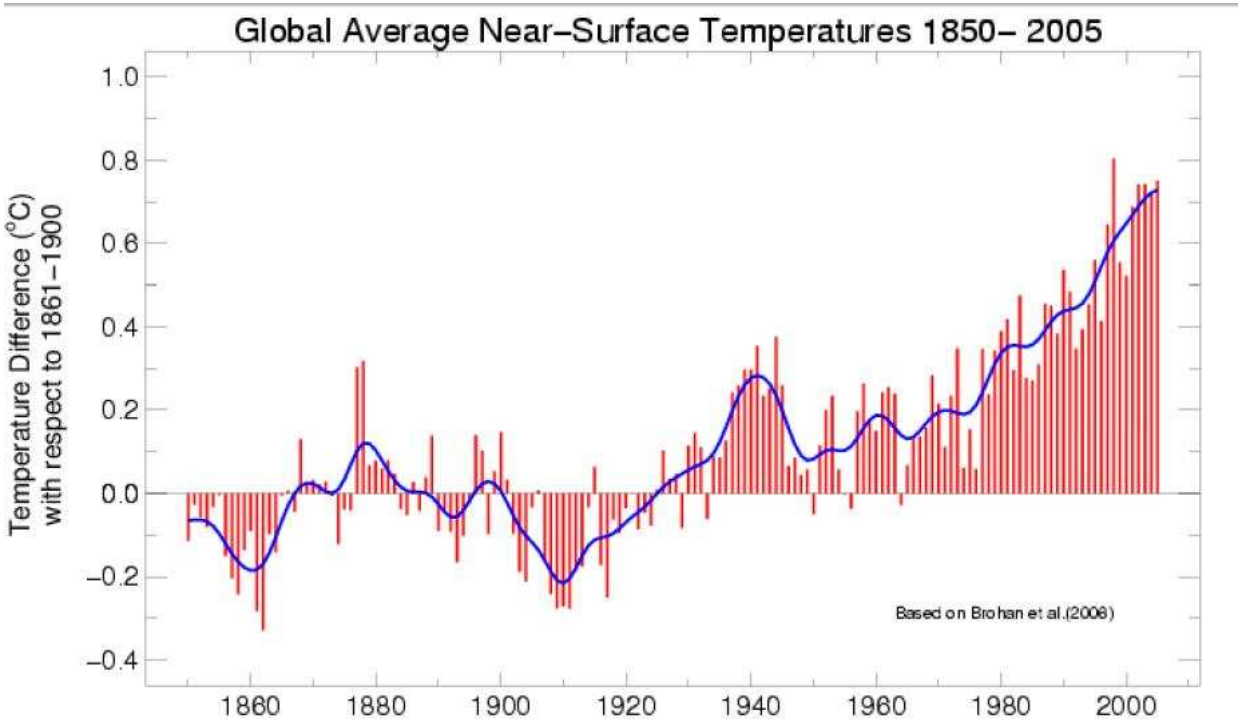
1. Introduction

2. Emission Trading Schemes

3. Project Mechanisms

Climate Change Phenomenon

- **Observed temperature: + 0,7°C** since beginning of industrial era, for 50 years : **+ 0,1°C per decade**
- Rain and drought rate modification
- Extreme events
- Rise of sea level
- Lost of Biodiversity



Causes : GHG emissions

- Increase of greenhouse gas in the atmosphere: CO2, CH4, N2O, HFCs, …
- GHG emission due to human activity: industry, agriculture, energy, …

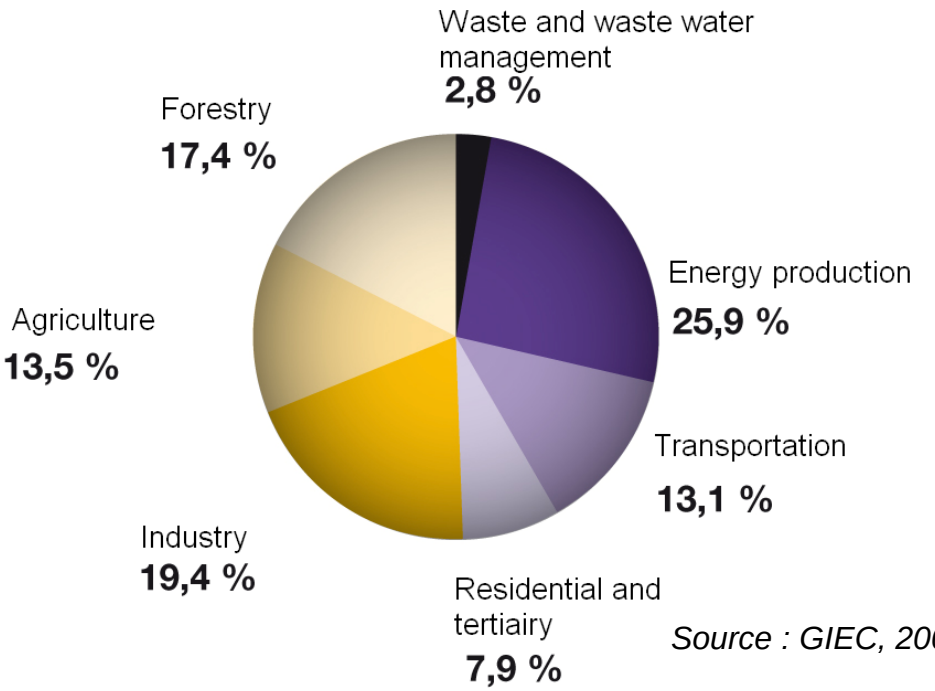
Fossil fuels

More than 60% of GHG emissions (Oil, natural gas, coal in power sector, transportation, building and industry)

Agriculture and forestry

Around 33% of emission : (methane from cattle, N2O in culture and CO2 from deforestation)

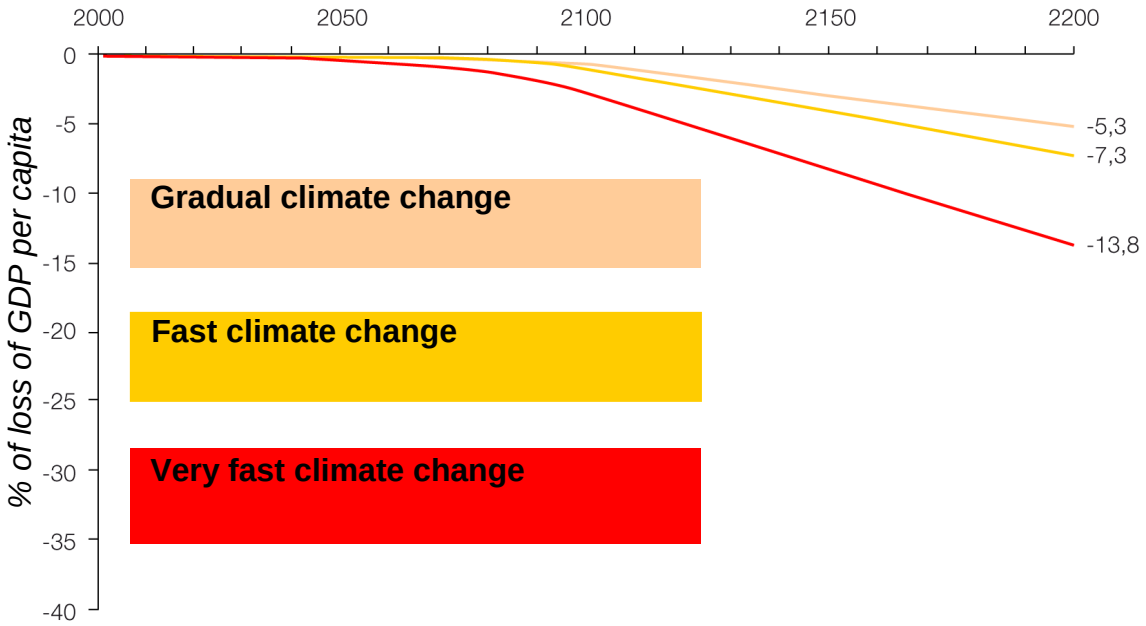
GHG emitting sectors in the world



Source : GIEC, 2007

Cost of fight against Climate Change

- In order to limit the increase of temperature at 2°C by 2050 the IPCC recommends a stabilization of CO2 concentration in the atmosphere of 450 ppm



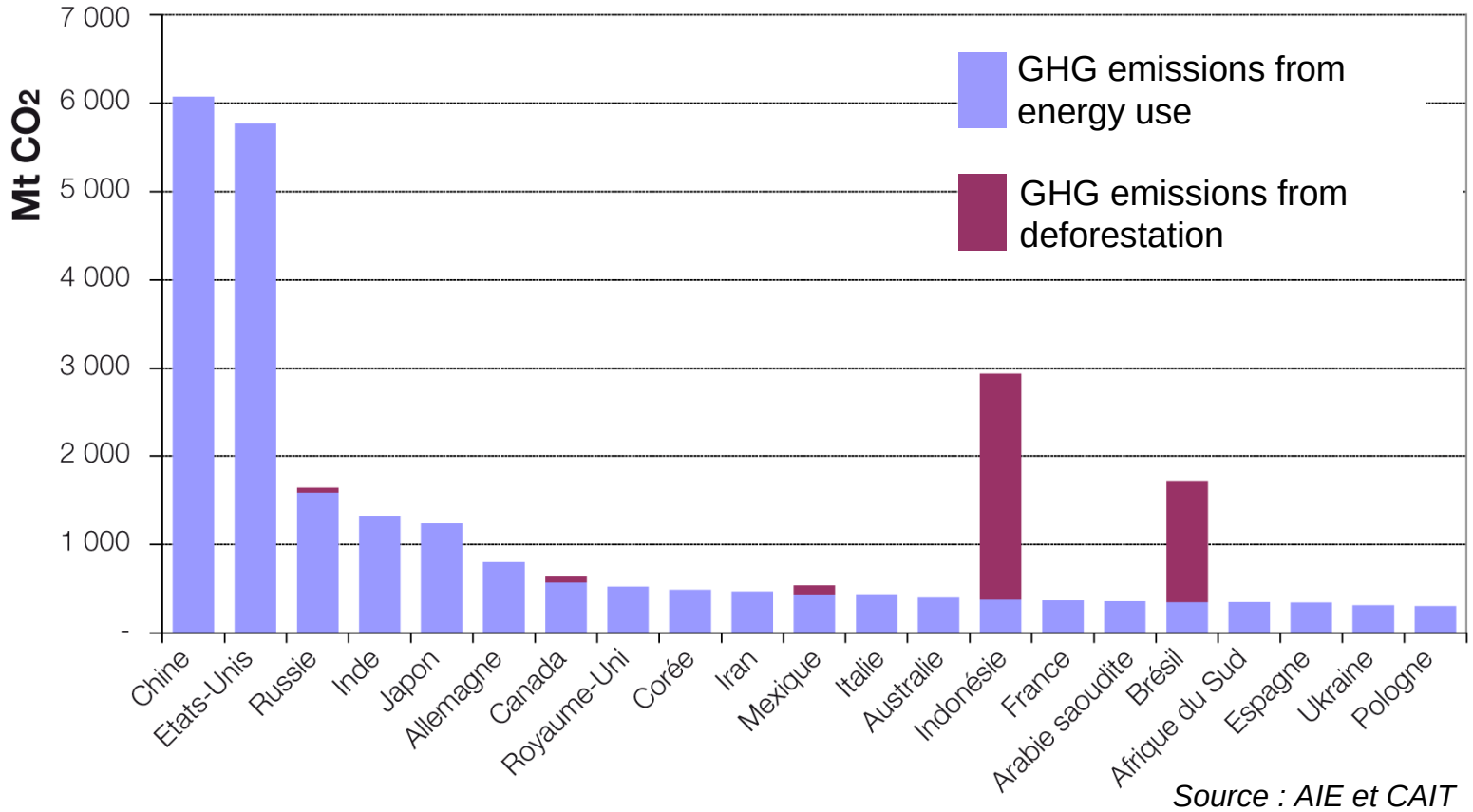
Source : Stern review, 2006

- **Stern, economist at the UK government (2006)**
- Cost evaluation for a stabilization at 550 ppm : **1 to 3 % of global GDP**
- The estimation of cost of inaction is higher : **5 to 20 % of global GDP**

Geographical distribution (1)

- **An historical responsibility of industrialized countries**
- **Now and for the future:** emerging countries become the biggest emitters

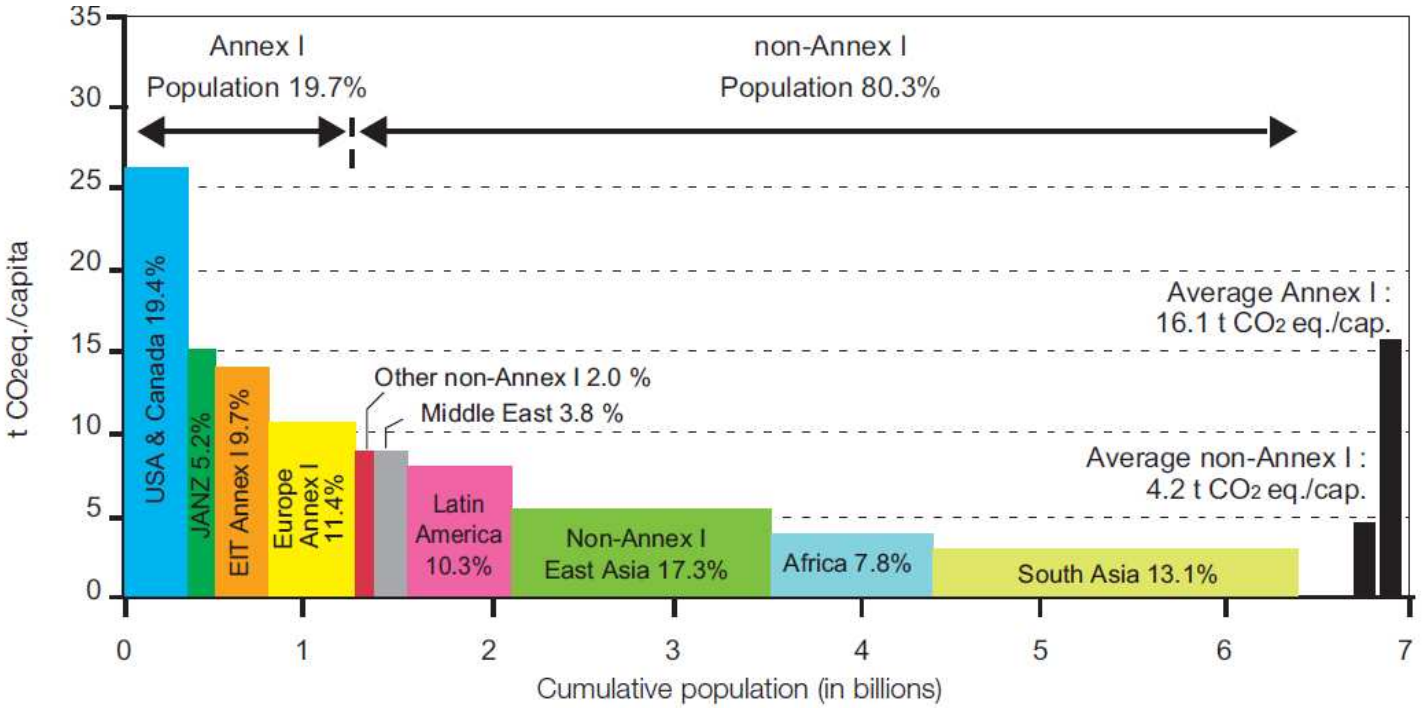
Biggest emitters in 2007



Source : AIE et CAIT

Geographical distribution (2)

- 20% of the population emits 46% of GHG
- A European emits 10 tCO_2/y, an American more than 20 tCO_2/y
- A Chinese emits around 4 tCO_2/y, an Indian around 1 $tCO_{2/y}$.



- JANZ : Japan, Australia and New-Zealand

EIT : Economies in Transition (Russia, Central and Eastern Europe)

Source : GIEC, 2007

Climate : Historical Events

1979 First international conference on climate (UN)

1988 Creation of Intergovernmental Panel on Climate Change (IPCC) under the UN

1992 Signature of the United Nations Framework Convention on Climate Change (UNFCCC) : principles

1997 Signature of the Kyoto Protocol, major application text of the UNFCCC: objectives definition at State level and application mechanisms

2001 Withdrawal of the USA from the Kyoto Protocol ratification process, signature of Marrakech Accords on Kyoto **project mechanisms**

2005 Launch of the European Trading Scheme

2008 – 2012 1st commitment period of the KP (and 2nd phase of the EU-ETS)

The Kyoto Protocol

- **The KP defines a reduction constraint on developed countries:**
  - Ratified by 172 countries with the exception of the US
  - **38 developed countries** (OECD and ex-USSR countries)
  - Average GHG emission reduction objective : **- 5 % over 2008-2012** compared to 1990
  - No constraints on developing countries but incentive via Clean Development Mechanism

- **Three flexibility mechanisms under the KP :**
  - Quota Trading between industrialized countries
  - Two project mechanisms for emission-reducing project certified by the UN :

    - Clean Development Mechanism (CDM) : in developing countries

    - Joint Implementation (JI) : in industrialized countries

Kyoto Principles

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ETS Principles

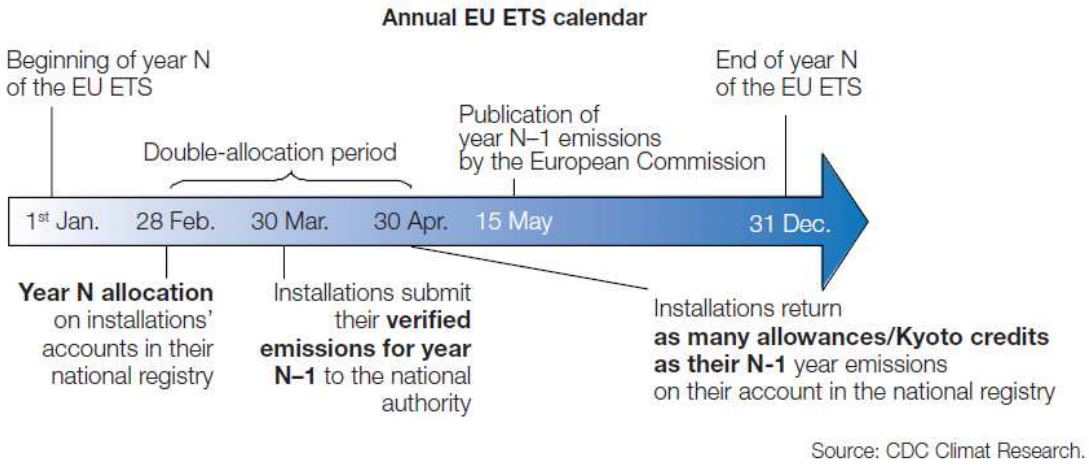
- Emission Trading Scheme = « Cap & Trade » = « Carbon Market ».
- **Cap on emissions through quota allocations with the possibility for participants to exchange quotas**. The Carbon price depends on the offer-demand equilibrium
- Advantages :
  - **Incentive** : a price for GHG emissions
  - **Flexible** : Participants choose to reduce emissions « in-house » or to buy achieved reduction to another participant
  - **Efficient** :
    - Economic : Strategic choice between quota purchase and « in-house reductions » with the carbon price fluctuation. Reductions are achieved where they are the cheapest
    - Environmental : dissuasive penalty in case of non compliance
  - **Transparent** : reliable procedures and verification of emission reductions

Innovative role of EU

- With the signature of the KP, the EU took the commitment to reduce its emissions by 8% in 2012 compared to 1990
- The burden was shared between the 15 members States
- The creation of an internal ETS covering industrial and power sectors is to help countries to achieve their reduction objectives
- The EU ETS is currently divided in three phases:
  - **2005 - 2007 Phase 1 : launching period**
  - **2008 - 2012 Phase 2 : 1st KP application phase**
  - **2013 - 2020 Phase 3 : Target defined by the Energy-Climate package**

EU ETS Principles (1)

- Each year, Member States allocate quotas to installations under the control of the Commission through National Allocation Plans (NAPs)
- Installations must give back a quantity of quotas corresponding to their actual emissions



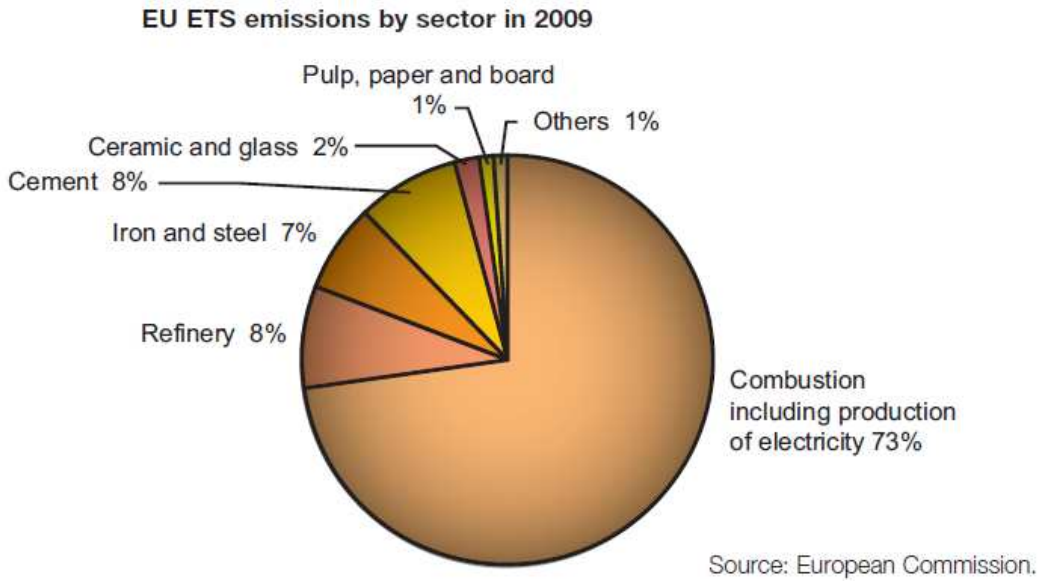
Source : CDC Climat Recherche.

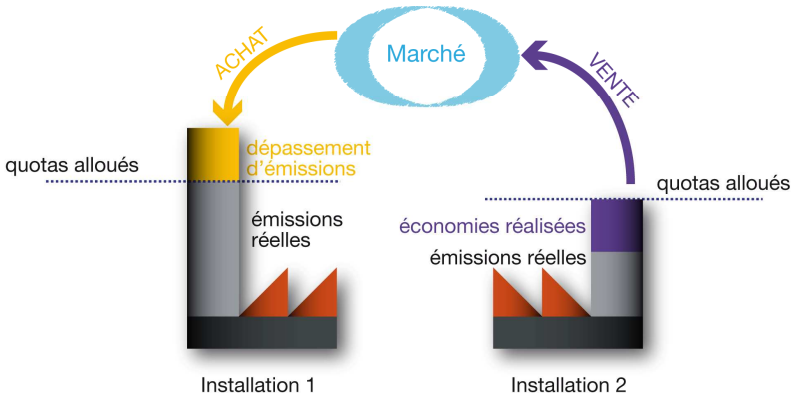
- **Mostly free allocations until 2012**: 4% of auctions between 2008 and 2012
- In 2008, extension to 3 additional States : Lichtenstein, Norway and Iceland
- In 2012, extension to the **aviation sector**
- Between 2008 and 2012, installations are allowed to use (up to 13.5% of their allocation) credits generated by Kyoto project mechanisms

EU ETS Principles (2)

ETS scope until 2012:

- 46 % of emissions of the EU
- 10 200 industrial and power installations
- GHG : only CO_2 (+N2O in 2013)
- 1 European quota = 1 ton of CO_2

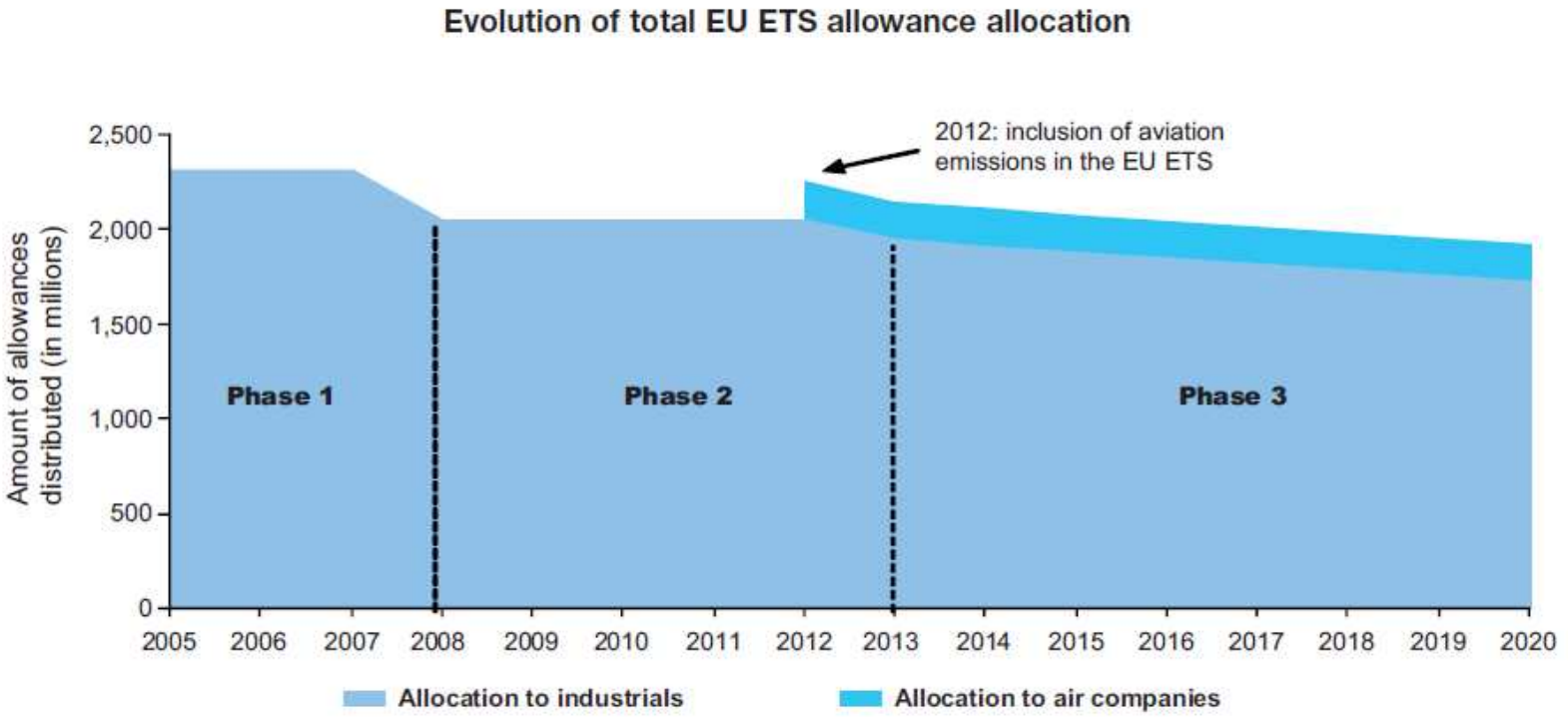




Source : CDC Climat Recherche.

Example: A Polish power plant using coal emits more than its target because of a cold winter.
It buys quotas from a German chemical plant which has achieved energy efficiency improvement

Evolution of the EU ETS Cap



Source: CDC Climat Research, from European Commission data.

ETS in the World

- **Existing ETS:**
  - European Union (2005)
  - New-Zealand (progressive sector inclusion)
  - Tokyo (2010)

- **ETS in project:**
  - Japan (initially 2013 but postponed)
  - California (2012)

- **ETS principle considered for the future:**
  - Australia
  - USA
  - South Korea
  - China

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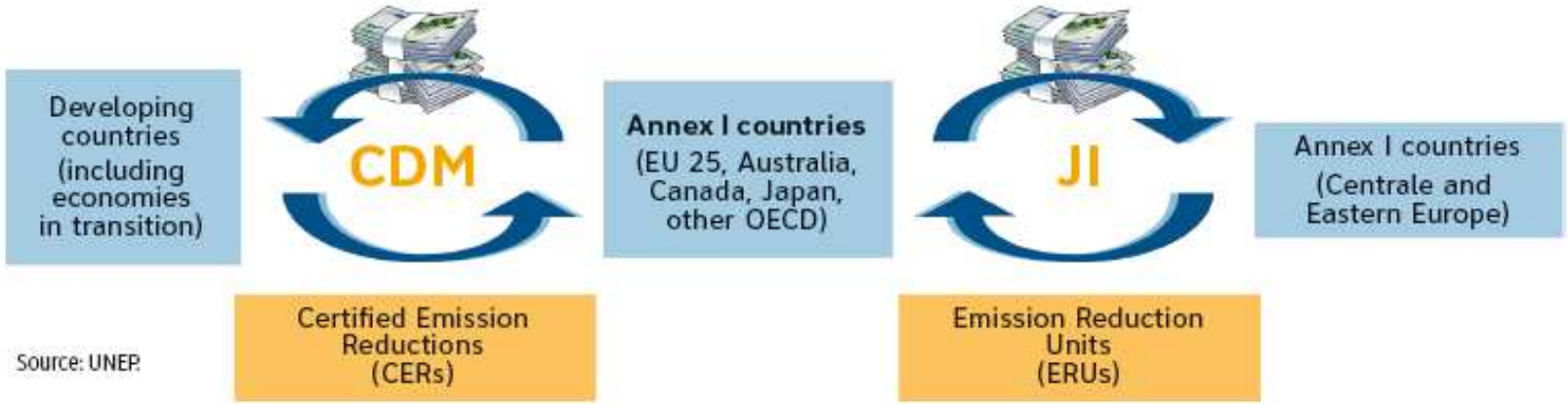
Project mechanisms under Kyoto Protocol

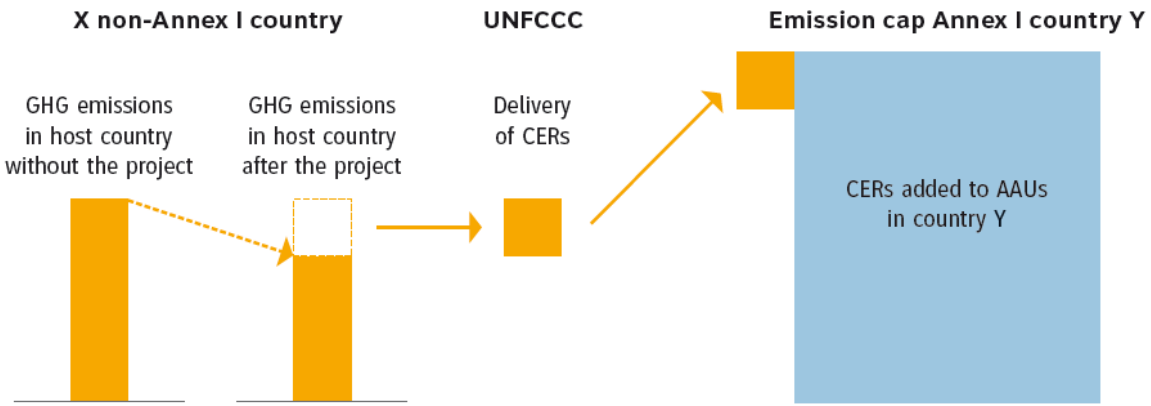
- A project that reduces emissions (Energy efficiency, renewable energy, waste management, clean transportation building,…) can, if registered by the UN, generate carbon credits.
- It has to demonstrate its additionnality, i.e. that it couldn't be implemented without the carbon revenue.
- Countries or installations under quotas can use carbon credits for their compliance. Then they finance reductions achieved by the project

Creation of financial flows between developed and developing countries



Clean Development Mechanism (CDM)

Project implemented in developing countries



Source : MEEDL

Advantages

- generates credits eligible for Kyoto compliance
- finances projects in developing countries
- transfers clean technologies

Disadvantages

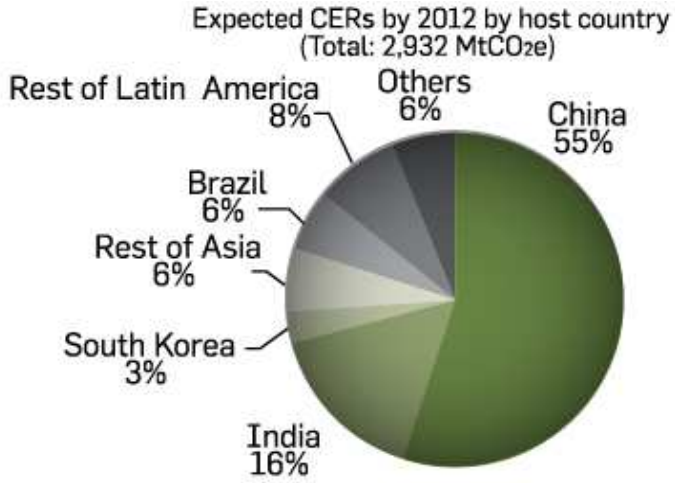
- Additionality demonstration uneasy
- Complexity and high transaction costs
- Heterogeneous development among countries

> Possible improvement Through programatic approach

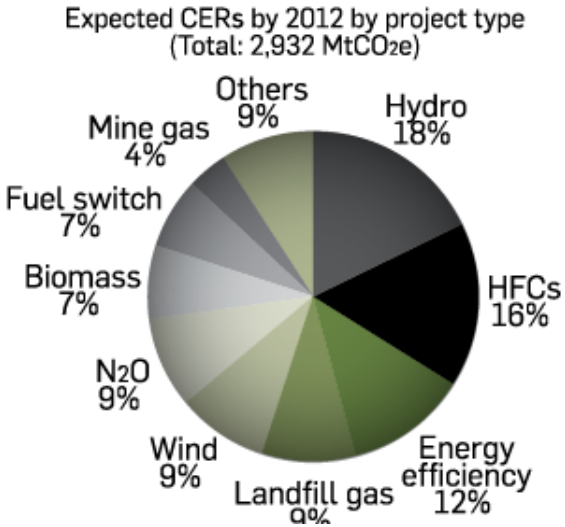
CDM Results

Certified Emission Reductions (CER) from CDM expected by 2012 : 2 932 Mt CO_2

By host country



By project type



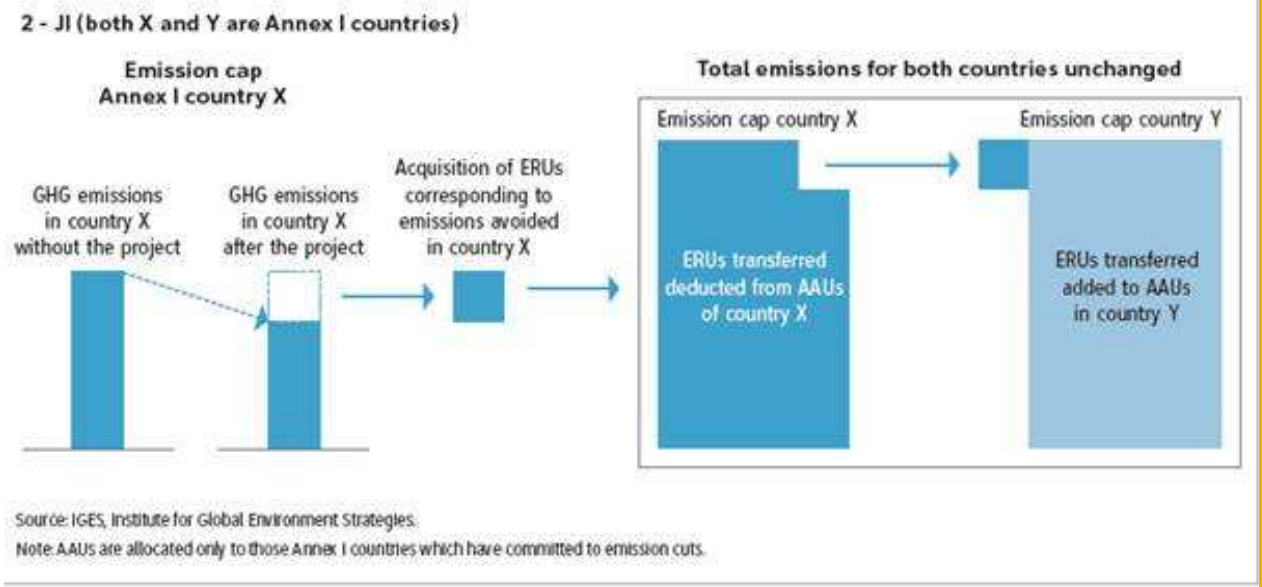
> Asia : 75% of CERs expected by 2012.

- Diversification: emission reductions of **HFC, easy to achieve, are replaced by renewable energy and energy efficiency projects.**

Source : UNEP-Risoe Centre

Joint Implementation (JI)

Projects implemented in developed countries



Source : IGES

Advantages

In Europe: promotion of emission reductions outside the scope of the ETS

No impact on public budget

Disadvantages

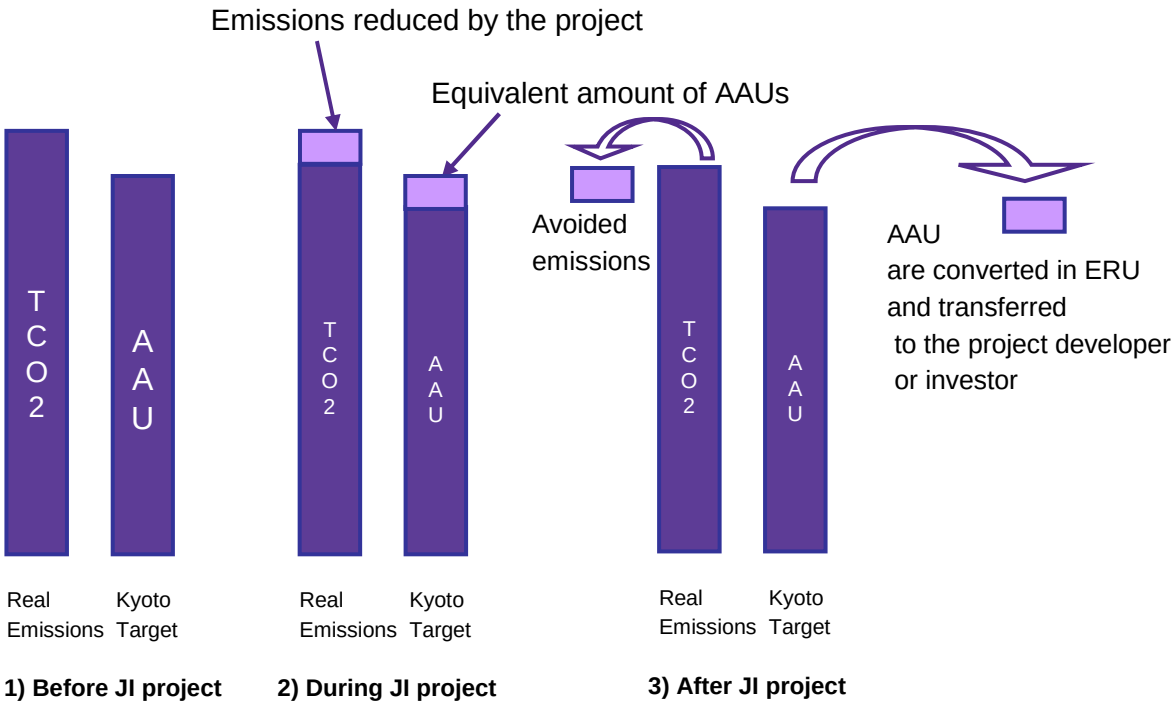
- same as CDM

Main difference with CDM:

no creation of new credits but conversion of national quotas (AAUs) into Emission Reduction Unit (ERUs)

Joint Implementation (JI)

How JI works in an annex 1 country ?



JI is neutral on the State Carbon Balance Sheet

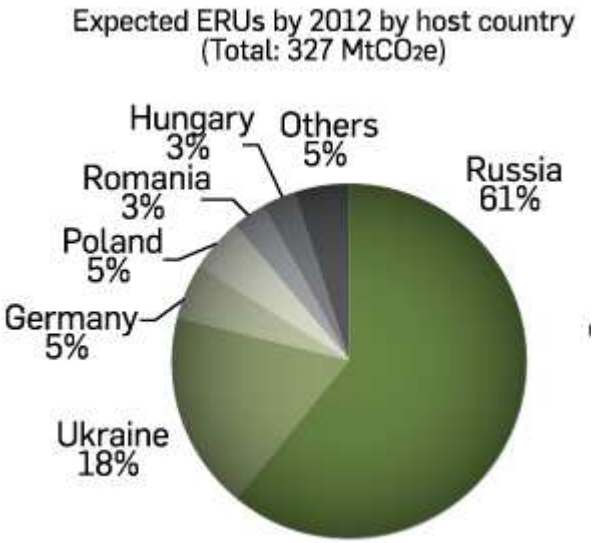
JI is an incentive to projects developers to support national efforts to reduce GHG emissions reductions

JI is a way to transfer responsibility and *financial means* to a third party

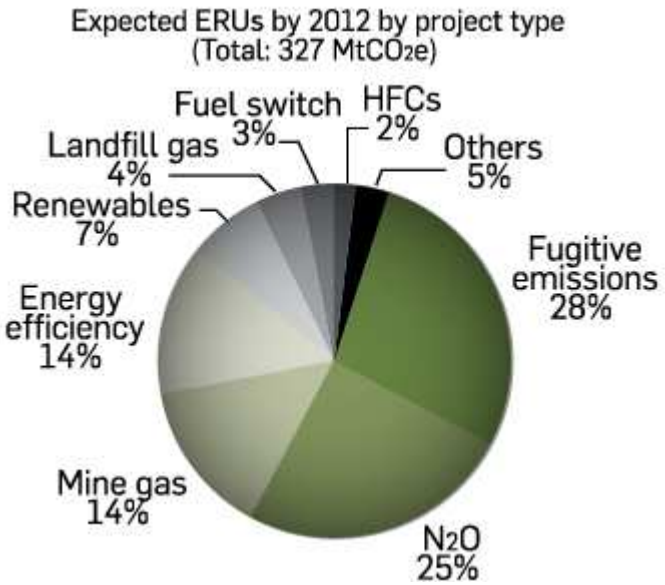
JI Results

ERU expected by 2012 : 327 Mt CO_2

By host country



By project type



Source : UNEP-Risoe Centre

> Eastern Europe and Russia: 75% of ERUs generated before 2012.

- JI projects has been mostly implemented in renewable energy, energy efficiency, methane abatement and N2O reductions

Domestic Offsetting

- A domestic project is a project based on JI mechanism implemented on the national territory in sectors that fall out of the scope of the

  Example: In France, the call for domestic projects of the Caisse des Dépôts (Oct. 2007 – Jan 2009) entailed the implementation of 7 projects on 43 sites, with a reduction potential of 5 $MtCO_2$:

  - Energy (biomass) and energy efficiency : 6 projects
  - Industry : 1 project

For example : **Coop de France-Déshydratation project** : fuel switch from fossil fuel to biomass in lucernes drying installation

- Expected emissions: 800 000 tCO_2 between 2008 and 2012.

The Kyoto Protocol Principles

Thank you for your attention

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