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Climate change policies, European and French energy policies

Thierry Hommel – June 2008

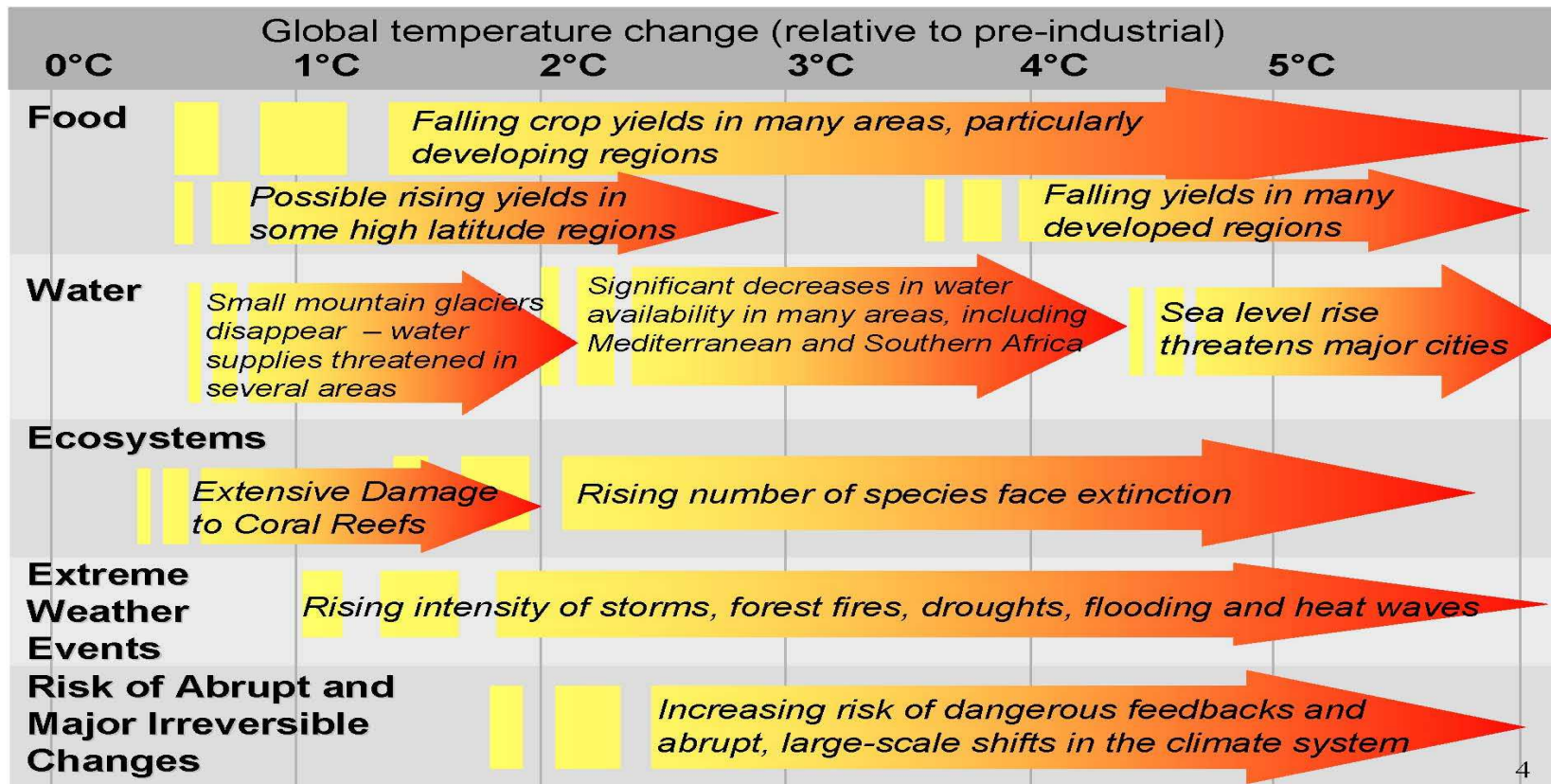


- 1. Measuring the action to prevent the risk**
- 2. Current emission dynamics - the french situation**
- 3. French policies and measures aimed at reducing GHG emissions**
- 4. Long Run scenarios toward Low-carbon society**

1. Measuring the action to prevent the risk

Measuring the risks

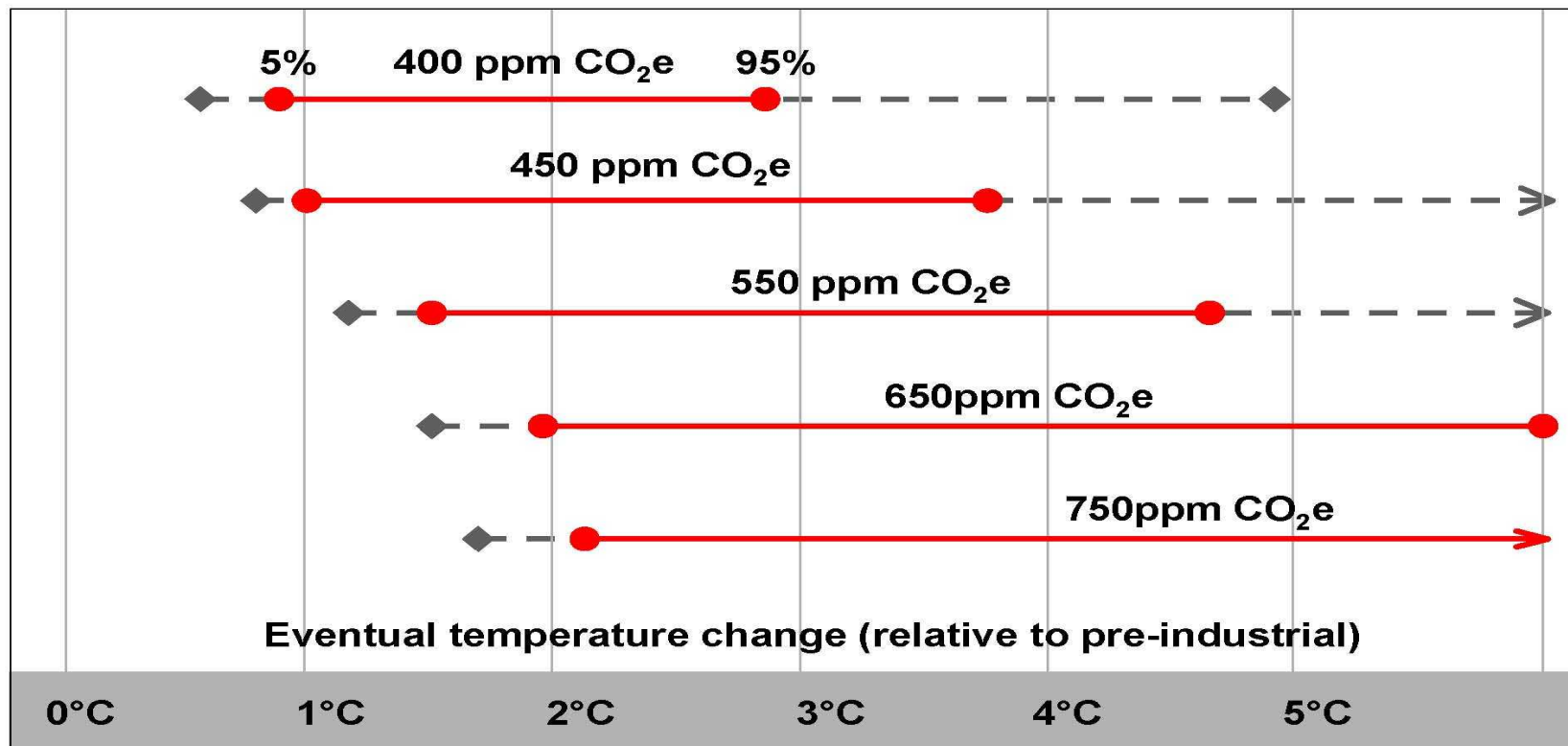
Projected Impacts of Climate Change



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Measuring the action to prevent the risk

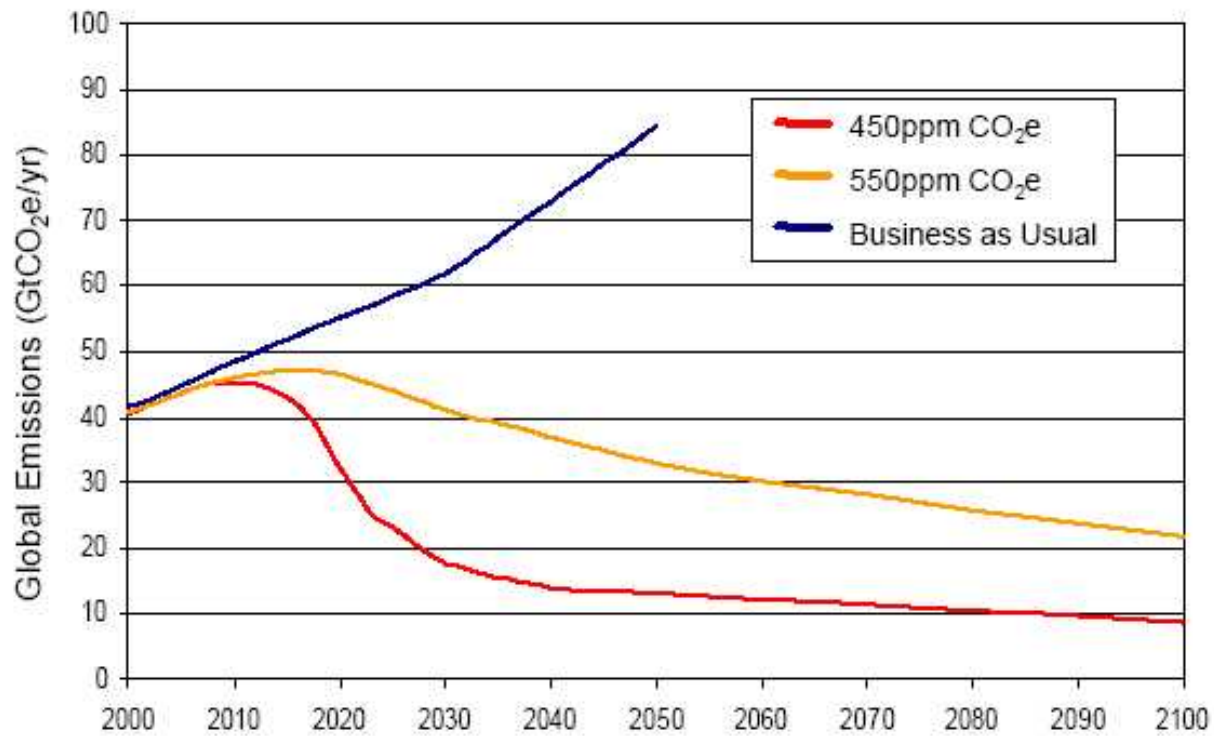
Stabilisation and Commitment to Warming



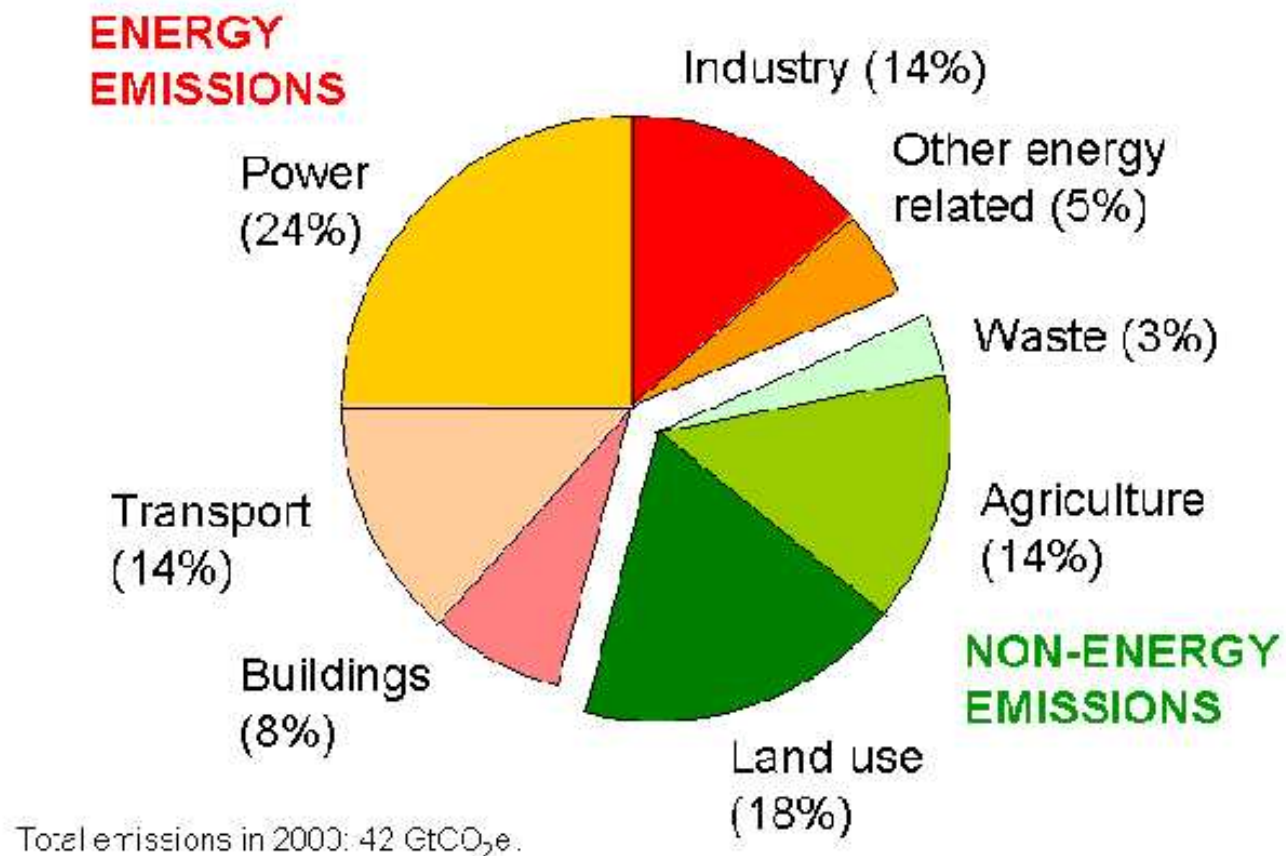
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Emissions have to pick between 2015 and 2020

Emissions Paths to Stabilisation



Global Emissions by Sector



Options for international collective action

- **Kyoto logic**
 - Agreement on quantified targets for nations states
 - Markets mechanisms for efficient implementation
- **Bali road map**
 - Integration of emerging countries
 - US vs EU : different visions /necessary coordination
 - 4 issues : mitigation, technology, funding, adaptation
- **A possible breakthrough**
 - US & China : internal implementation needs international coordination
 - A very different Post Kyoto : hybrid, more inclusive but less coverage and fragmented
- **No exclusive options but combination : technological innovation / coordination framework/ international regulation**
 - Carbon value = managed scarcity
 - Market failures needs accompanying measures (technological pull/push capital markets failures for innovation)

What reducing emissions in developed countries by 80 % in 2050 means ?

Strategic implications for energy

Risks and opportunities

Energy mix transformation

Risks on renewables resources

(hydro, wind, biomass...)

Risks on users conflicts

Advantage to non carbon energy

Vision 2030 : electricity without CO2?

Revolution in demand

New demand profile (hotter winter and summers)

Buildings : less energy demand but advantage to electricity

Urban mobility: more electricity in individual and collective transport

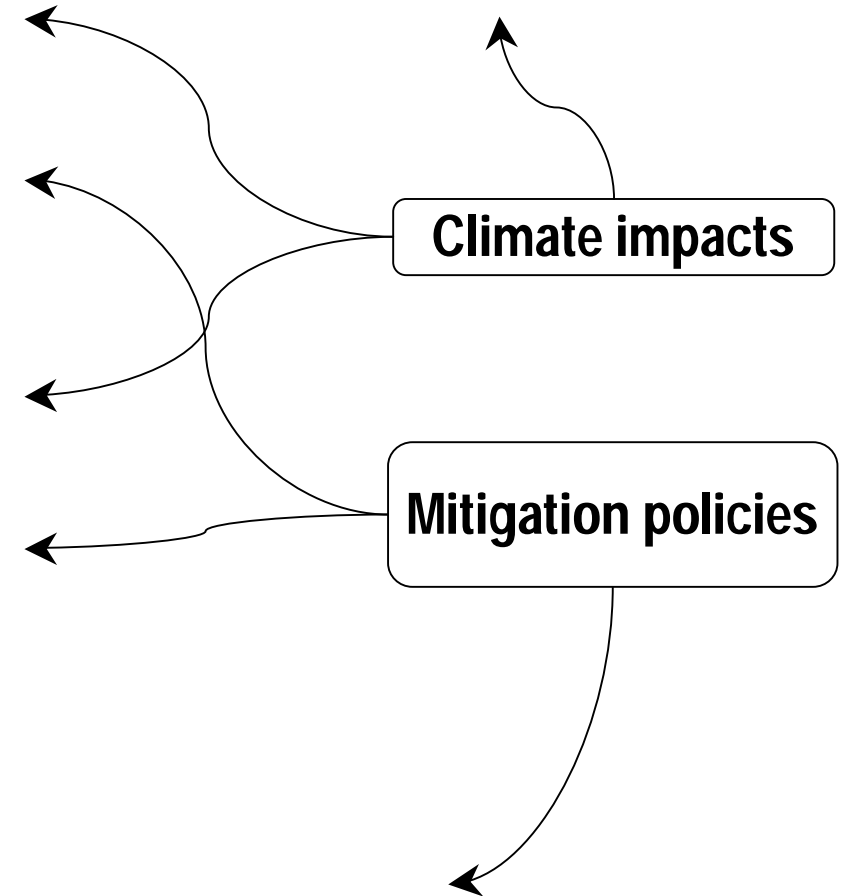
New business model

More expansive and scarce energy with higher added value

More decentralized energy

Energy services and integrated management of buildings

Network Climate vulnerability



2. Current emission dynamics – The French situation

Current emission dynamics - the French situation (1)

- **Kyoto Protocol - First commitment period : France committed to a 0% increase of its GHG emissions compared to 1990**
 - **EU** : 8% emissions reduction target at the global level
 - **EU-countries** : agreed on differentiated commitments depending on national circumstances within the so-called European « bubble »
- **2005 : French GHG emissions equal to 553,4 Mt CO₂-eq (Eurostat)**
 - 8,73 t CO₂-eq per capita (lower than EU 15 mean value – 10.82 t CO₂-eq per capita)
 - Main reason : low carbon content of power generation : 80% nuclear, 12% hydro)
 - French emissions were 1,9% (i.e 11 MtCO₂-eq) under the objective

Current emission dynamics - the French situation (2)

- **C02, 1990-95 :** 19,8 Mt +5%

- Increase :
 - Transportation 21,3 Mt + 18%
 - Residential and tertiary energy use 9,2 Mt + 11%

- Significant reduction achieved in :
 - Industry 5,3 Mt - 5,3%
 - Energy supply 3,5 Mt - 5%
 - Agriculture 1,2 Mt - 12%
 - Waste management 0,7 Mt - 28%

Current emission dynamics - the French situation (3)

- CH₄ and N₂O emissions have decreased respectively by 12 Mt CO₂-eq (-18%) and 22,6 Mt CO₂-eq (-24%)
 - **Industry alone** : responsible for a 17,4 Mt CO₂-eq reduction of N₂O
- F-gases have increased by 4,1 Mt CO₂-eq (+40%), because of their increasing use in cooling equipments; their contribution to national global emission remains low (2,5%)
- Sectors pushing global emissions upwards are well identified : **Transportation and Energy use in domestic building!**

Current emission dynamics - the French situation (4)

Transportation :

- Domestic air transport has been stabilized thanks to the development of the high speed train network
- Main concern is about the road transportation :
 - Number of cars and the number of passenger-kilometers increased by 25% since 1990
 - Road freight increased by 15% since 1990, now accounting for 80% of total domestic freight, including international transit
 - Rail freight remains inefficient and decreased by 14% since 1990

Current emission dynamics - the French situation (5)

Energy use in buildings :

- Dwellings has increased by 15% since 1990, as the occupancy rate declined from 2,6 to 2,3 inhabitants per dwelling
- Mean surface of housing increased from 85 to 90 square meters

Parallel trends in residential and passenger road transports can be explained by the evolution of prices : building price index increase and domestic fuel price decrease during this period !

Current emission dynamics - the French situation (6)

- 1990 - 2004 : Carbon intensity of the French GDP decreased by 17% (annual decrease of 1,4%)
 - 80% improvement in energy efficiency
 - 14% improvement from energy substitution : energy mix partially shifted to electricity and natural gas instead of oil
- 2004 - 2014 : Emissions reduction for non-CO2 gases in the industry are likely to slow down in absolute terms : Most of the cheap reductions have already been done, partly for non climate reasons
- 2004 - 2012 : CO2 emissions from transportation and residential energy uses are expected to keep increasing significantly

Current emission dynamics - the French situation (7)

- **Drivers that could hamper futures efforts to reduce French emissions or even stabilize them at their 1990 level during the next five years: inertia of Transportation and Residential**
 - The largest mitigation potential could be achieved in the **building sector** with existing technologies and significant benefits that would result from higher energy efficiency allow for a low unitary cost of reduction
 - Mitigation in **transportation** is usually assessed as expensive and difficult : it does not require only technological change but also investment reallocation to low emissions modes, infrastructure management and urban planning

3. Reducing GHG Emissions : French policies and measures

Reducing GHG Emissions : French policies and measures (1)

- **France, 2004 : To be in observance with its Kyoto targets, adoption of the « climate plan »**
 - Reinforced in comparison to the previous « National Program against Climate change » set in 2000...
- **Because this Program was assessed to be insufficient...**
 - Significant gap between measures early announced in the program and what has been really implemented
 - Emblematic countermeasure : the withdrawal of an energy tax that was supposed to induce 40% of the emission reduction target
 - Other measures or sector target were also unrealistic : doubling of the railway freight...
- **Less than 10 % of the measures initially contained in the plan have been now implemented**

Reducing GHG Emissions : French policies and measures (2)

- **Without Climate plan : business-as-usual emissions are projected to increase to 620 Mt CO₂-eq in 2020, i.e 10% above the French target**
- The « climate plan » provide additional measures and policies intended to curb emissions under this target :
 - 5,75% biofuel target in 2010
 - Larger tax credit for thermal renovation in buildings
 - Generalization of energy labels on energy end-use equipments
 - New taxes and subsidies on new cars in function of their emissions
 - Control of emissions due to the development of air cooling in buildings and vehicles
 - Possibility for local authorities to commit themselves in the elaboration of local climates plans

Reducing GHG Emissions : French policies and measures (3)

- **Step forward, French parliament - 2005 : a new law on the energy strategy is adopted**
 - Sets national targets as a 3% year reduction of GHG emissions
 - Division by 4 or 5 of national emissions in 2050
 - Enumerates existing policies and measures as those included in the 2004 Climate Plan
 - Confirm the role of nuclear power as the major options to avoid GHG emissions in the French electric sector and to contribute to national energy security
 - Sets that public investments on collective transports, railways and waterways are going to be the priority over road infrastructure.

Reducing GHG Emissions : French policies and measures (4)

- 2005 : France is included in the new European Trading Scheme, involving :
 - Electric sector
 - Energy intensive industries
 - The biggest heat producers
- First three-year period is overlocated, but this new instrument has led major corporate players involved to get used to continuously monitor their emissions and to trade quotas, and raised new expertise to supply assistance and advice on the carbon market
- A new National Allocation Plan was recently published for the Kyoto commitment period 2008-2012

Reducing GHG Emissions : French policies and measures (5)

- **2007 : « Domestic project », Joint Implementation mechanism from the French Government**
 - Government will periodically announce a call for emission reduction projects for sectors not covered by EU ETS (Emission trading system) and for non CO₂-GHG
 - Company or communities may propose reduction projects and prove their additionality. For each approved project, a French agency entitled to manage financial transactions, real estate and carbon trading for the government, will buy all the corresponding credits, and manage subsequent exchanges on the international carbon market.
 - This policy tool is expected to foster reductions from 10 to 15 MtCO₂-eq over 5 years, i.e. around 0,5% of current French emissions

Reducing GHG Emissions : French policies and measures (6)

- **2007: Presidential election in France**
 - During the campaign, candidates had to face with strong claims for urgent and aggressive environmental policies, which led to inflation in their promises
 - **First outcome** of this pressure: integration of the ministry of environment and the ministry of transport, territorial planning and development to a **single ministry in charge of sustainable developments policies**
 - **Second outcome** : President Sarkozy promised to open broad negotiations about a new round of environmental policies to respond to ecological emergencies. This was named « **Grenelle of Environment** », in reference to the Grenelle Agreements, a successful negotiation between labour unions and employers in 1968 ;

Reducing GHG Emissions : French policies and measures (7)

- **2007, The « Grenelle of Environment »**, launched by President on the 21st of may 2007
 - Six working groups, including one on climate change and energy management
 - All the groups included 40/50 persons, from :
 - **NGOs,**
 - **administrations,**
 - **labor unions,**
 - **employer federations, and**
 - **local authorities**

Reducing GHG Emissions : French policies and measures (7)

- **2007, Grenelle of Environment process – The case of the working group on climate change and energy management**
 - Summer Objective : define a path to reach a **factor 4** in 2050
 - September, the group produced a **synthesis of all the propositions** that were consensual to the group and which constituted the basis of the final 2 days of negotiation with all minister concerned (agriculture, housing...)
 - End of October : **Outcome**

How to reach a “Factor 4”?

Forbidden

- Fossil energy power without cogeneration
- No Nuclear, no sequestration
- Transports = fossil energy
- Heating = fossil and inefficient buildings
- Massive use of fossils in industry
- Wait for energy efficiency
- *Wait and See* strategies
 - Lock in and path dependency in buildings and transport infrastructures

Incontrovertibles

- Energy efficiency
- Portfolio of advanced technologies CCS
- Renovation of old buildings
- Recycling of raw materials
- Development of renewables
- Structural change for transport
- Change in behaviors
- Coal to Gas

Factor 4 : Technological Innovations and social change

Two main errors:

- October : Short **phase of diffusion and consultation** of experts ad various national council and citizens

- **Everything changes** : Technological fix up? For the next 30 years we can anticipate
- **Nothing changes** : Technological innovations in a changing world innovations.

Limits on emissions will change context

- On one hand : more electricity means a more concentrated production for mass technology (nuclear or coal or gas plus sequestration)
- On the other hand : more renewables + hydrogen more decentralized production
- New electricity economy more complex : energy mix and network management
- Different technology different behaviors

Reducing GHG Emissions : French policies and measures (8)

- **Grenelle of Environment, climate change and energy group outcomes :**
 - **Renovation plan** for existing building, aimed at reducing energy consumption by 12% (resp 20%) in tertiary (resp residential) building in 5 years
 - For **new building**, a breakthrough toward 30% zero energy buildings in 5 years and 100% in 2020
 - An **increase the share of rail and water freight** from 14% to 25% of the total domestic freight in 15 years
 - **No new road infrastructures**, except projects already in the pipe, and systematic priority of investment in railways and waterways
 - Progressively **decreasing standards for a new cars**, e.g 120g of CO₂/km in 2012 (EU decision)
 - A **general fiscal reform** in favour of ecotaxes with a constant budget recycling
 - **Increase the share of renewables** in final energy from 9% to 20% in 2012 (EU decision)

Reducing GHG Emissions : French policies and measures (9)

- **Grenelle of Environment : new expectations of the civil society:**
 - A lot of observers and even some NGOs that had attended to the « grenelle agreement » were surprised by **an apparent higher level of political will** from policymakers
 - This process has raised large expectations from the parties involved and the wider society
 - It is now in the hands of central administration (for operational implementation) and the parliament (for new law projects), two steps that are like to modify the content and the ambition of final measures!

4. Long run scenarios toward low-carbon society, French target

Long run scenarios toward low-carbon society, French target (1)

- **French target** : reach a **division by 4 in 2050**, included as a national objective in the French energy law in 2005 but ...
 - Very vague in its formulation, for example about the reference level
- **March 2007 : the so called « 3 X 20 » target**, Council of Europe :
 - a voluntary commitment to reduce emissions by 20% in 2020 compared to the 1990 level
 - With 20% renewables in the primary energy mix
 - 20% energy efficiency
- ...the same objectives were adopted in the 'Grenelle agreement' final report
- There are still many things blurred about a precise definition of the targets in 2020 and 2050. As for 2020, the 20% reduction is indeed a global European target
 - But will this global commitment be translate in differentiated commitments depending on national circumstances ?

Long run scenarios toward low-carbon society, French target (2)

- **Long Run : the target for 2050 may seem identically approximate**
 - **Starting point : the + 2 ° C temperature ceiling** (compared to the mean pre-industrial level) adopted by the European Union
 - This maximum temperature increase is consistent with a **stabilization of GHG concentration around 450ppm CO₂-eq, which requires cutting emissions at least by 50%** in 2050 compared to emission in 2000 (IPCC, 2007)
 - **Factor 4** has been flagged for its simplicity, as a mobilizing utopia. Such a long run target does not pretend to be a precise commitment : it is supposed to help stabilizing expectations about the shared ambition of stabilizing GES concentration

Long run scenarios toward low-carbon society, French target (3)

- To date, no macroeconomic simulations have been done on the feasibility and the cost of a 'factor 4' scenario in France because of the lack of ready to use energy-economy model in France
- MIES uses a mee energy accounting approach to build 8 alternatives systems that could satisfy the factor 4 target in 2050
- OE-DGEMP describes a world scenario built from the MEDEE energy demand model
 - Scenario based on a global 450 ppm CO₂ target, with a division by 4 of OECD emissions (division by 3 for France)
 - It concludes that the target is feasible with existing or upcoming technologies !
 - The simulation shows a carbon price above 500 euros per ton of CO₂ even with all optimistic assumptions

Long run scenarios toward low-carbon society, French target (4)

- **All those reports do not provide a clear picture of what is the more efficient trajectory to divide French emissions by 3 , 4 or 5.**

But they bring some robust findings :

- A huge renovation plan must be achieved in all type of building
- The transportation sector will need both large infrastructure reorientation and technological innovation to reduce emissions for identical mobility services
- In scenarios that maintain a strong nuclear generation capacity, a strong development of renewables including biomass is needed to cover the final energy demand.
- Alternatively, a phasing out of the nuclear capacity imposes that a significant share of primary energy needs would be covered by fossil energy, thus requiring a massive and early development of Carbon Capture and storage in industry and in the electric sector.

Thank you for your attention!

