



EU ROADMAP FOR CO₂ EMISSIONS REDUCTION UNTILL 2050

CO₂ Transport and Storage

"Natural Gas Knowhow Centre in Mediaş", Thursday, 9th June 2011

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If we want a future, we must to work on it now

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Winter Storm Xynthia, Spain & France, 2010



Russian Heat Wave & Wildfires, 2010



Pakistan Flooding, 2010

Source: NatCatSERVICE, Geo Risks Research, Munchen RE (February 2011)

Greenhouse Gas Emissions Challenge

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❑ Natural consequences of greenhouse effect:

- ✓ with greenhouse effect: + 15°C
- ✓ without greenhouse effect: - 18°C

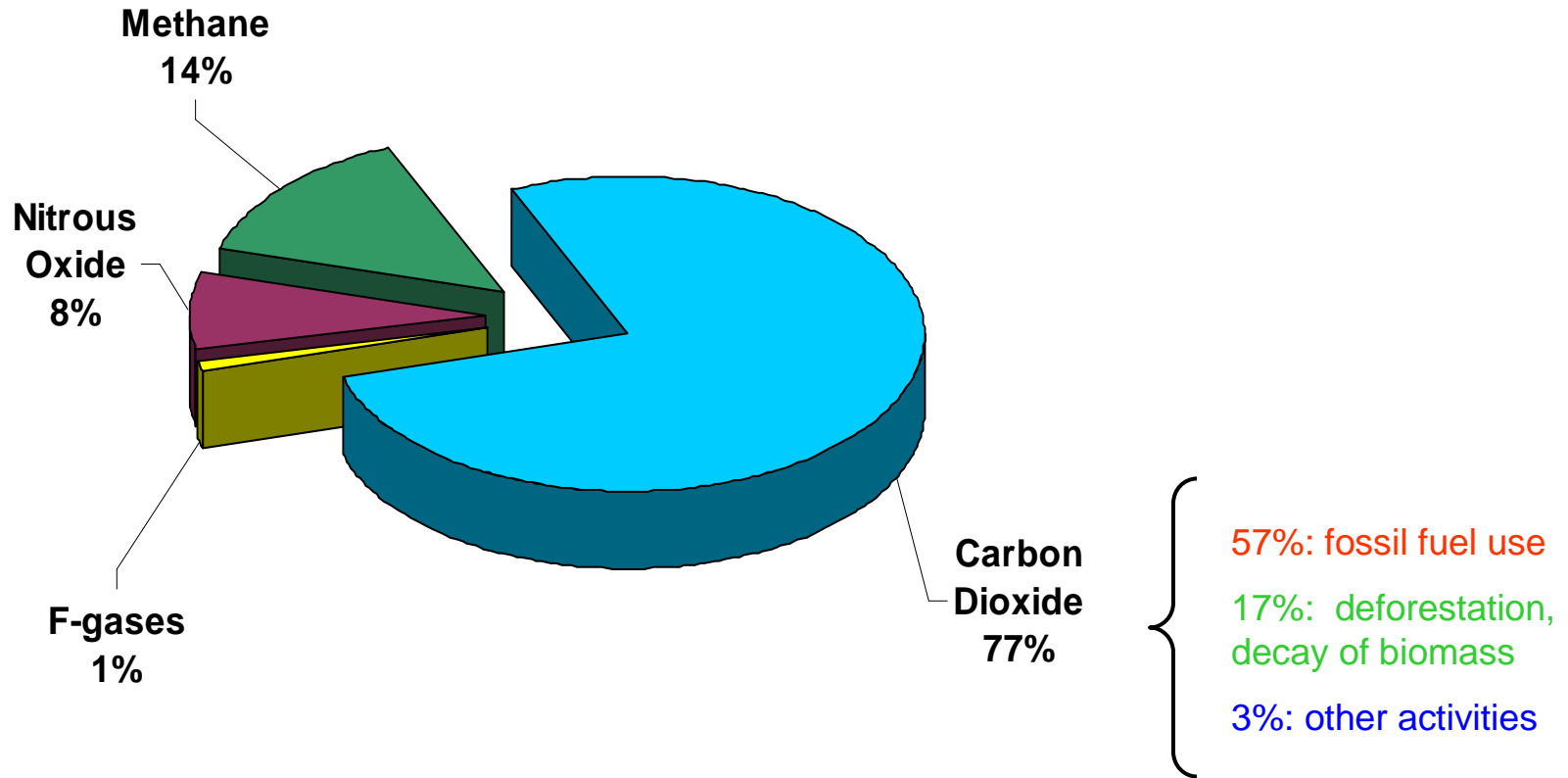
❑ Human enhanced greenhouse effect:

- ✓ Start of global warming





Global Greenhouse Gas Emissions



Source: 4th IPCC Assessment Report



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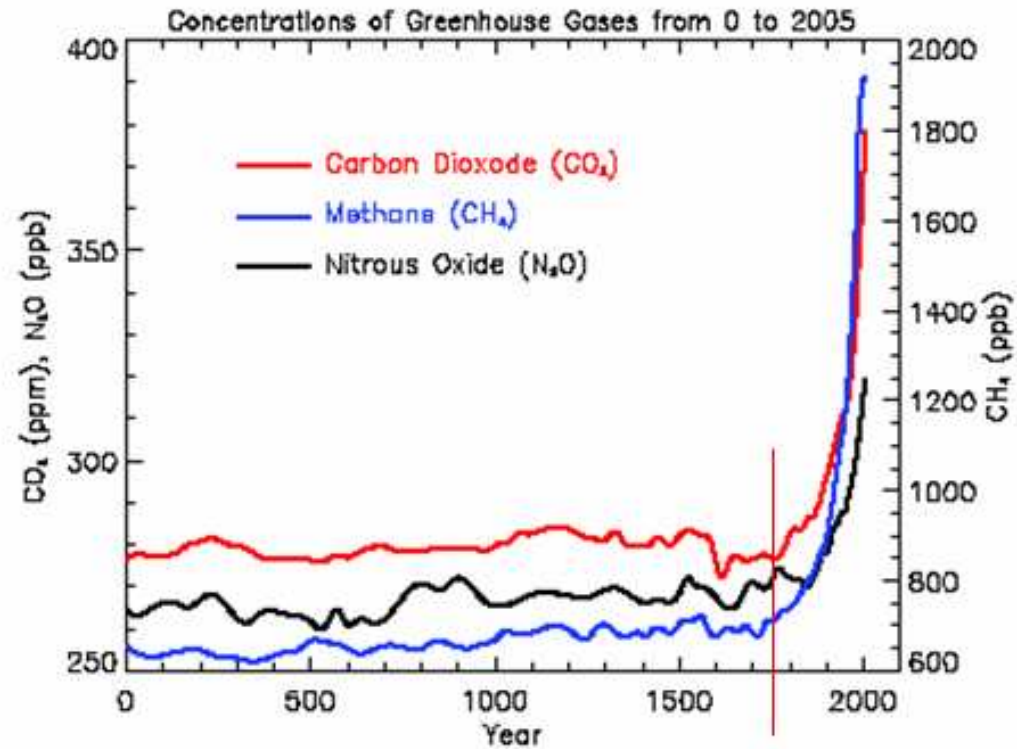
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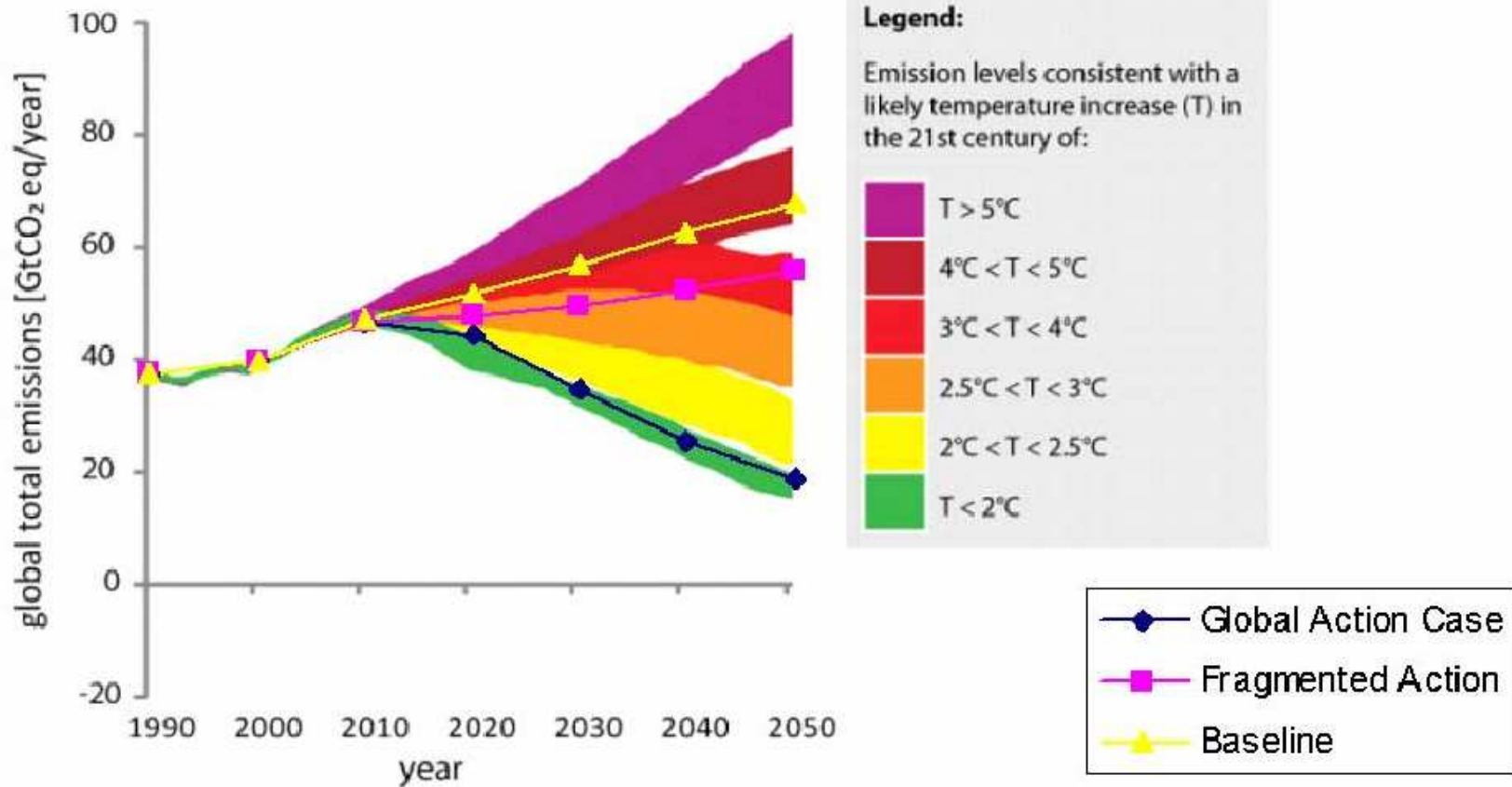
Evolution of main GHGs concentration in the last 2000 years



Source: Climate Changes. Contribution of Working Group 1 to the 4th IPCC Report



Increase of Global Temperature



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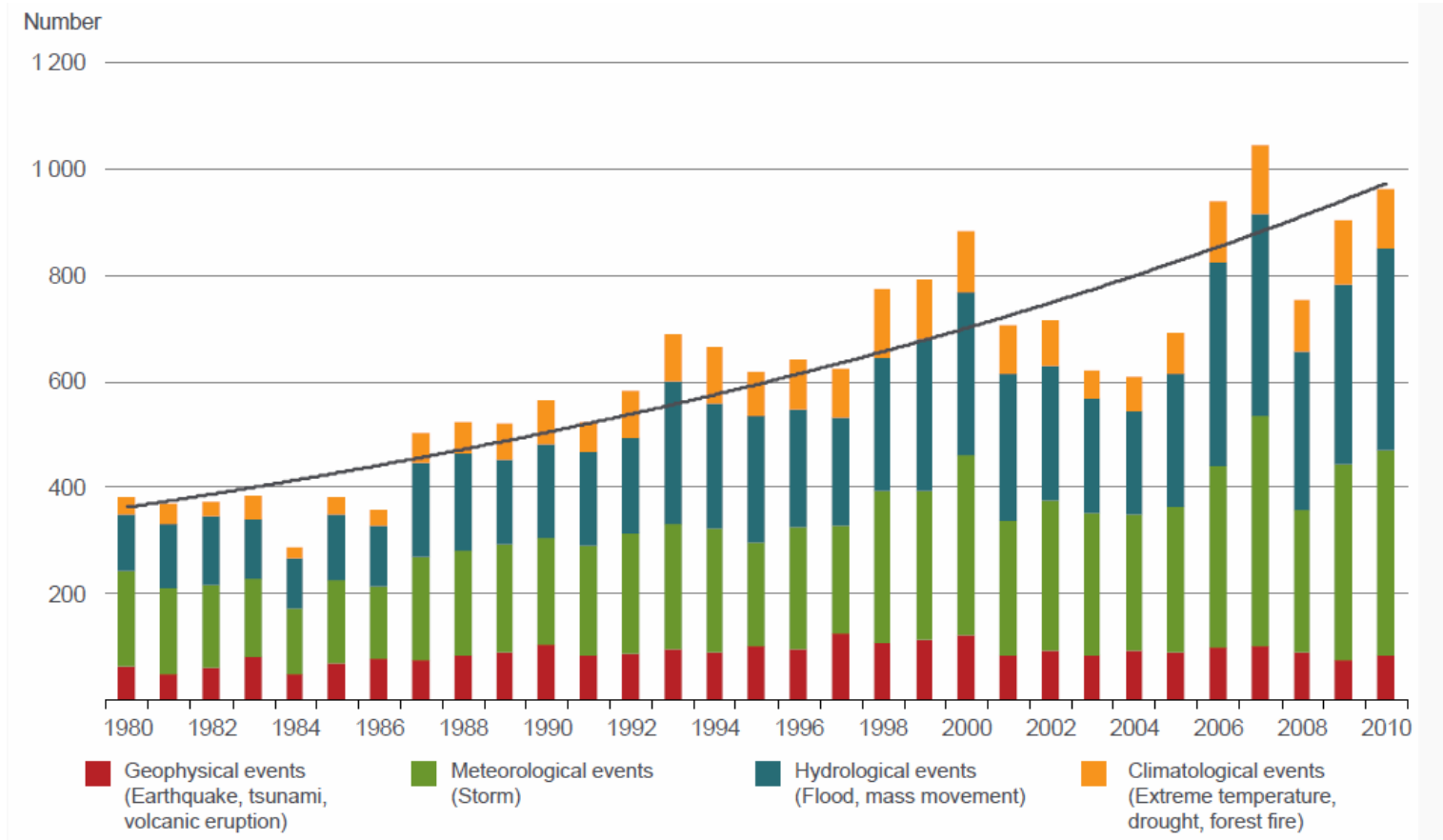
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Trend of Natural Catastrophes Worldwide 1980-2010



Source: NatCatSERVICE, Geo Risks Research, Munchen RE (February 2011)





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EU Objective

- ❑ February 2011: European Council reconfirmed the EU objective of reducing GHGs emissions by 80% ÷ 95% in 2050, comparative with 1990, in order to maintain the increase of global temperature below 2°C
- ❑ A Roadmap for moving to a competitive low carbon economy in 2050 - COM(2011) 112 final
 - ✓ Issued on March 8, 2011
 - ✓ After comprehensive analysis on global and European level
- ❑ To be taken into account by MS, European institutions, in the further development of EU, national and regional policies





Roadmap Objective

- How to develop the EU policy framework in the next years, so that:
 - ✓ to allow substantial reductions of GHGs emissions
 - ✓ to reduce the vulnerability to oil shocks and other aspects of energy security
 - ✓ to benefit of the opportunities regarding the sustainable growth and new jobs (related to the new low carbon technologies), correlated with the sustainability and efficient use of resources

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Targets and Intermediate Steps

❑ EU must prepare for internal reductions by 80% in 2050 comparative with 1990

1990	2020	2030	2040	2050
100%	- 20%	- 40%	- 60%	- 80%

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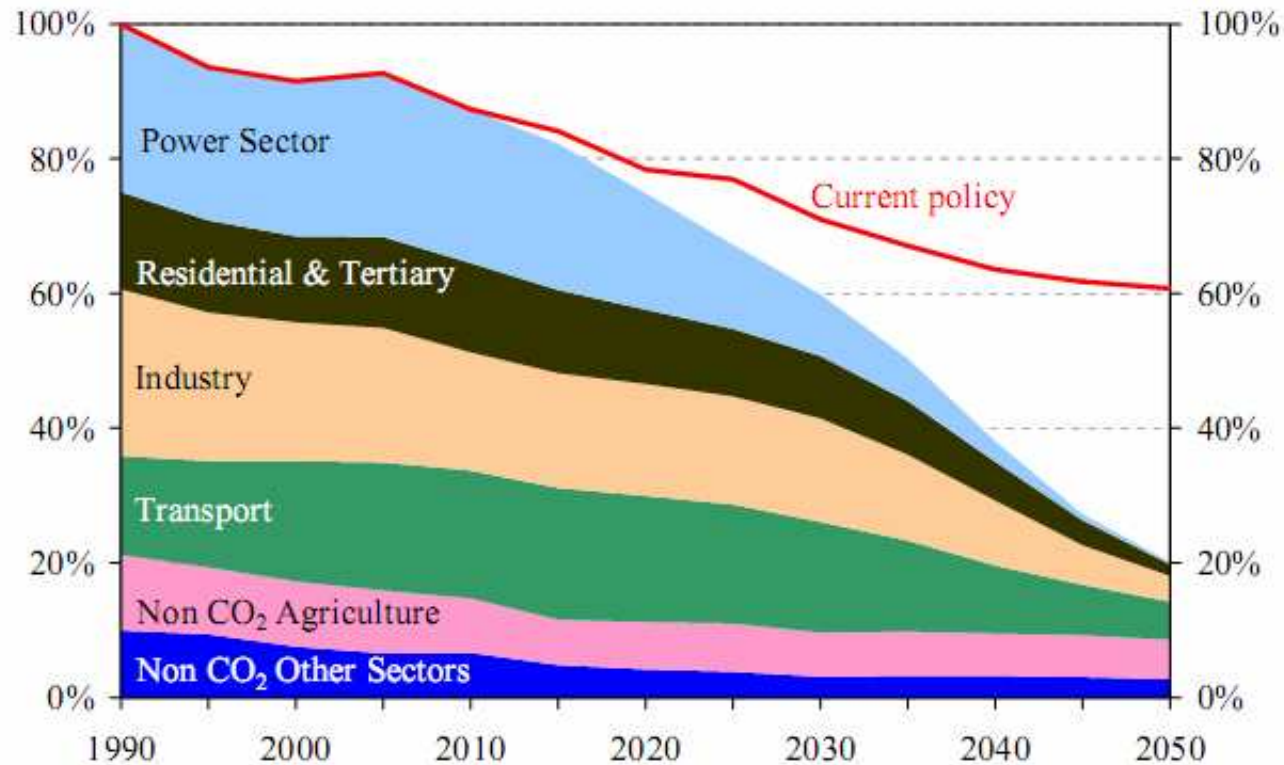
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Targets and Intermediate Steps (2)



□ Current policies full implementation → 20% GHG reduction in 2020, but only 10% reduction for energy efficiency

Electricity Sector

GHG	2005	2030	2050
CO2	- 7%	- 54% ÷ - 68%	- 93% ÷ - 99%

- ❑ Demand increase (due to transport and heating) → total consumption increase by historical percents due to energy efficiency increase
- ❑ The preference of the MS for a energy mix which reflects the national circumstances will be however taken into account
- ❑ The three main low carbon technologies in the power sector are:
 - ✓ Renewables
 - ✓ Nuclear
 - ✓ CCS equipped fossil fuel plants
- ❑ Near complete decarbonisation is mainly achieved by the combination of these different low carbon technologies
- ❑ The projected shares of single low carbon technologies should be taken with some caution
 - ✓ the uncertainty of individual technological progress rates
 - ✓ the difficulty of a possible complete change of the power network

Transport Sector

GHG	2005	2030	2050
CO ₂	+ 30%	+ 20% ÷ - 9%	- 54% ÷ - 67%

❑ Energy efficiency is one of the major contributors to decarbonisation of transport

- ✓ gradual efficiency improvements of internal combustion engines and subsequently gradual hybridisation leading eventually to high penetration rates for electric propulsion vehicles

❑ The extent of the contribution of electric vehicles is dependent on a quick overcoming of barriers to the further development and cost reduction in battery technology

❑ Biofuels are also important to further decarbonise transport

❑ Three key factors:

- ✓ vehicle efficiency by new engines
- ✓ materials
- ✓ design



Buildings and Service Sector



GHG	2005	2030	2050
CO2	- 12%	- 37% ÷ - 53%	- 88% ÷ - 91%

- Offers opportunities with low costs and on short term, by improving the energy performance
- Directive 2010/31/UE on building energy performance:
 - ✓ from 2021, new buildings will be near “zero energy buildings”
- Challenge: renovation of the existing buildings stock and its financing



Industrial Sector

GHG	2005	2030	2050
CO ₂	- 7%	- 34% ÷ - 40%	- 83% ÷ - 87%

❑ Possible contributions to GHGs emissions reduction:

- ✓ Advanced resources
- ✓ Energy efficient equipment and processes
- ✓ Increase of recycling
- ✓ Technologies for reducing no-CO₂ emissions
- ✓ CCS (large scale after 2035), for process emissions (cement and steel industries)

❑ Sectoral specific solutions → EC will develop specific roadmaps, co-operating with industrial sectors

❑ Attention paid to EU / non Eu competitiveness UE / non UE (relocation risc)

- ✓ Continuously monitoring and analysis of the impact on industry competitiveness and necessary measures to be taken
- ✓ Continuously updating of the list of sectors with relocation risc



Agriculture Sector



GHG	2005	2030	2050
non CO2	- 20%	- 36% ÷ - 37%	- 42% ÷ - 49%

- ❑ Share of emissions from agriculture in Eu emissions in 2050: 33%
- ❑ Agricultural policies will focus on:
 - ✓ efficient fertilizer use
 - ✓ bio-gasification of organic manure
 - ✓ improved manure management
 - ✓ local diversification and commercialization of production
 - ✓ maximizing the benefits of extensive farming
- ❑ Measures for:
 - ✓ maintaining grasslands
 - ✓ restoring wetlands and peat lands
 - ✓ reducing erosion
 - ✓ development of forests
- ❑ The dual challenges of global food security and action on climate change need to be pursued together



Investment and Financing

□ Increase of public and private investment on the following 40 years:

- ✓ Euro 270 billion annually
- ✓ Represents 1.5% increase of GDP_{EU}
- ✓ Current investment represents 19% of GDP₂₀₀₉
- ✓ Percent of GDP allocated for investment in 2009: China (48%), India (35%), Korea (26%)

□ Key factors:

- ✓ policy for creating framework conditions
- ✓ new financial models

□ For implementing 20% target in energy efficiency, EC will monitor the impact of new measures on ETS, in order to maintain the scheme incentives (reward of low carbon investment, preparing the ETS sectors for the innovations needed in future)

- ✓ recalibrating the ETS by setting aside a corresponding number of allowances from the part to be auctioned during the period 2013 to 2020

Conclusions

- ❑ EU objectives are based on a detailed analysis of several decarbonising scenarios at global and EU level
- ❑ The decarbonising scenarios had taken into account:
 - ✓ level of climate action
 - ✓ fossil fuels prices
 - ✓ technological innovation rate
 - ✓ GDP increase, etc
- ❑ The analysis shows that 80% reduction in 2050 is feasible if a strong incentive related to carbon price is applied in all sectors
- ❑ The EU analysis shows that a less ambitious pathway will mean:
 - ✓ carbon intensive investment → later implications:
 - higher carbon prices
 - higher overall costs on the entire period



Conclusions (2)

- Not acting on global climate change will result in continued high risks for high oil prices or temporary shocks
 - It is impossible to achieve an 80% GHG reduction across the economy without a 95 to 100% decarbonized power sector
 - R&D, demonstration and early deployment of technologies:
 - ✓ various forms of low carbon energy sources
 - ✓ carbon capture and storage (CCS)
 - ✓ smart grids
 - ✓ hybrid and electric vehicle technology,
- are of paramount importance to ensure their cost-effective and large-scale penetration later on
- If these priorities are addressed in the next few years → it will be possible to move forward to 2020 and 2050 objectives



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Thank you for your attention!

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