



# Climate change and energy policies in the northern hemisphere

## Implications to air pollution?

get to grips with  
**climate  
change**



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and monitoring of EU action



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# 1. The science of climate change



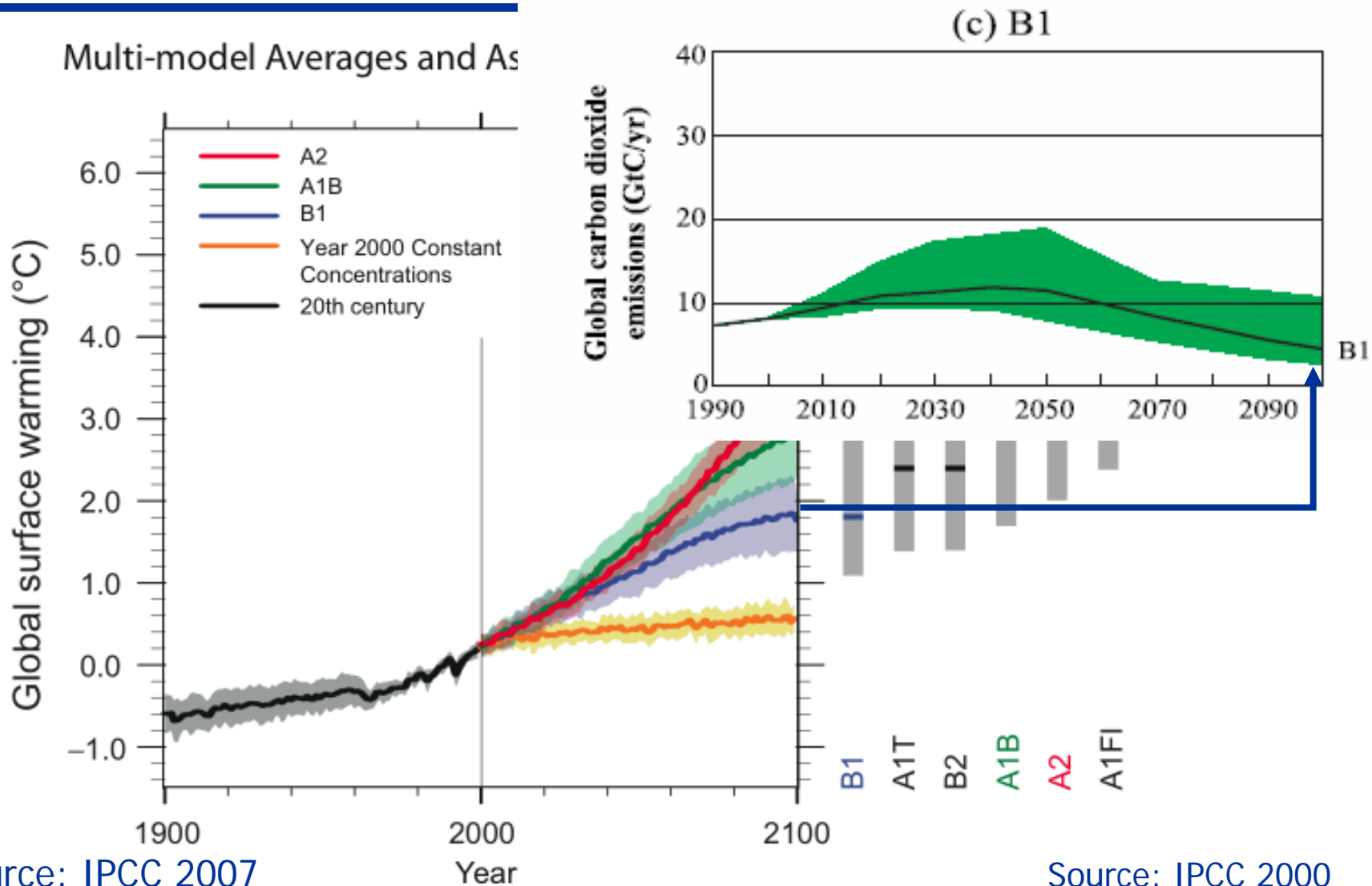
## Findings IPCC AR4:

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- During the last 100 years the Earth has warmed by **0.74°C** on average
- It is “extremely unlikely” that this warming was due to natural climate variability alone.
- best estimates of the projected further rise by 2100 range **from 1.8 to 4.0°C** if no further action is taken
- **Extreme weather events have increased** and regional climate patterns are changing

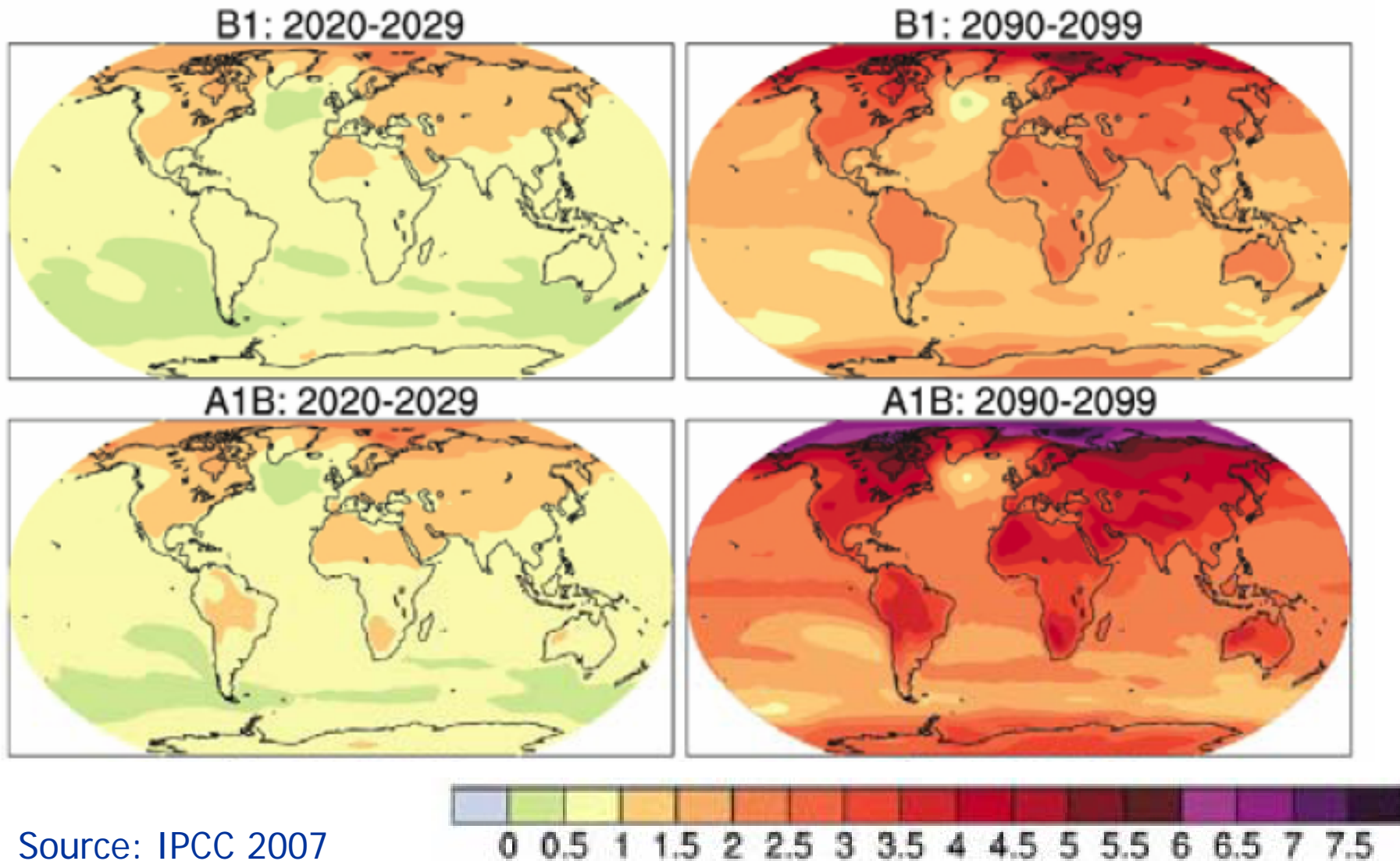


# Temperature go well above the EU's 2°C objective without action on climate change



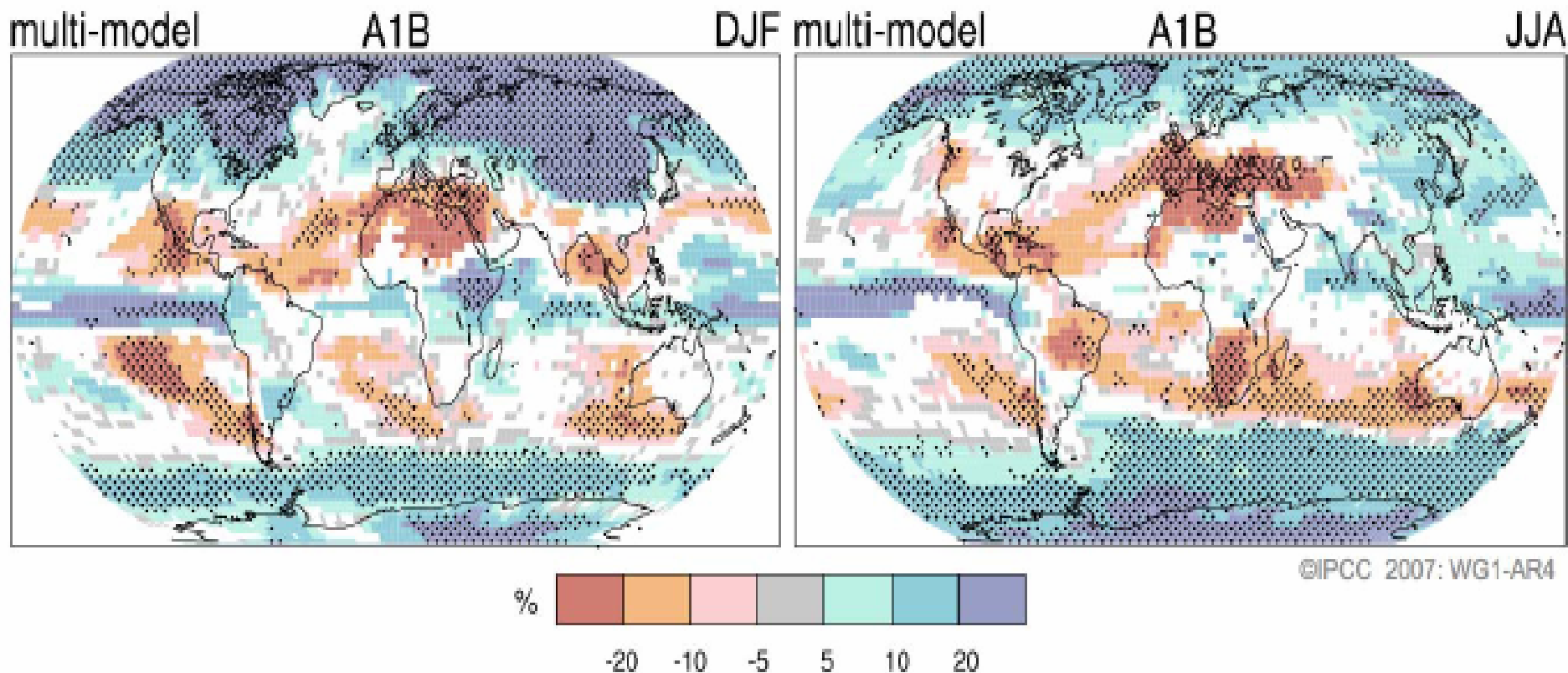


# Will temperature change effect the impacts of local air pollution?



Source: IPCC 2007

## Projected Patterns of Precipitation Changes



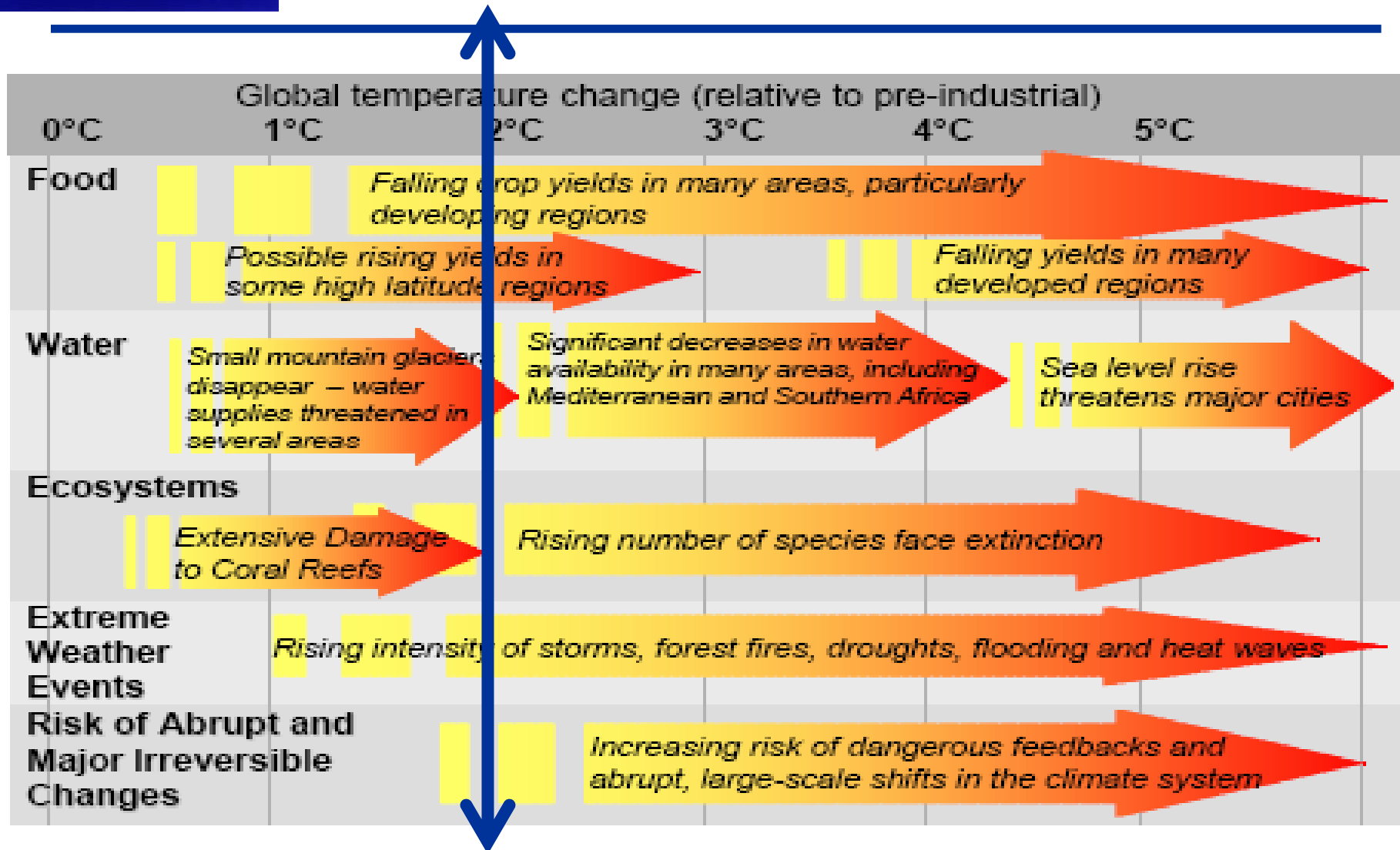


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## 2. The scientific case for action



# The EU's objective to limit temperature increase to 2°C

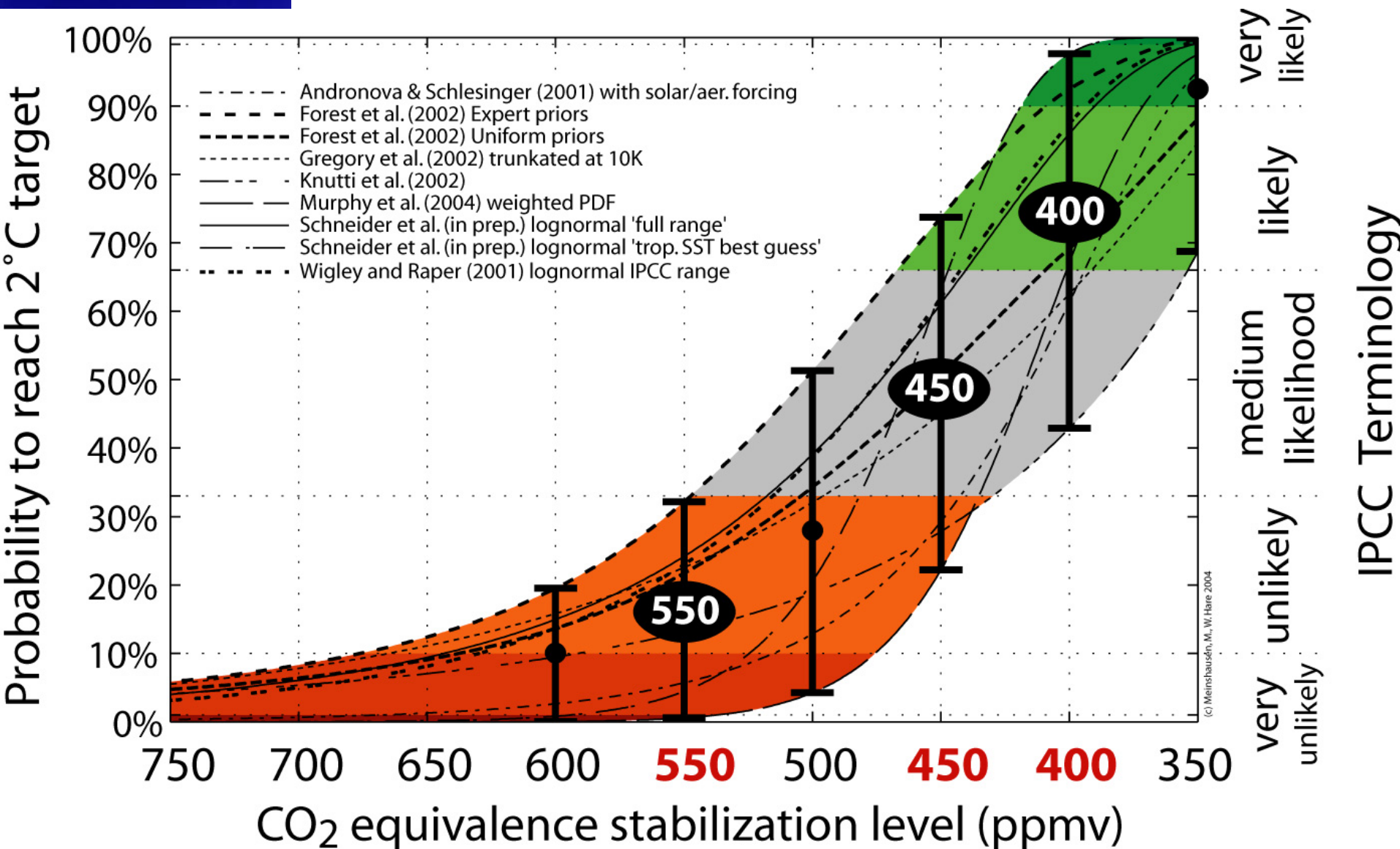


Source: Stern Review





# The probability to reach the 2°C target



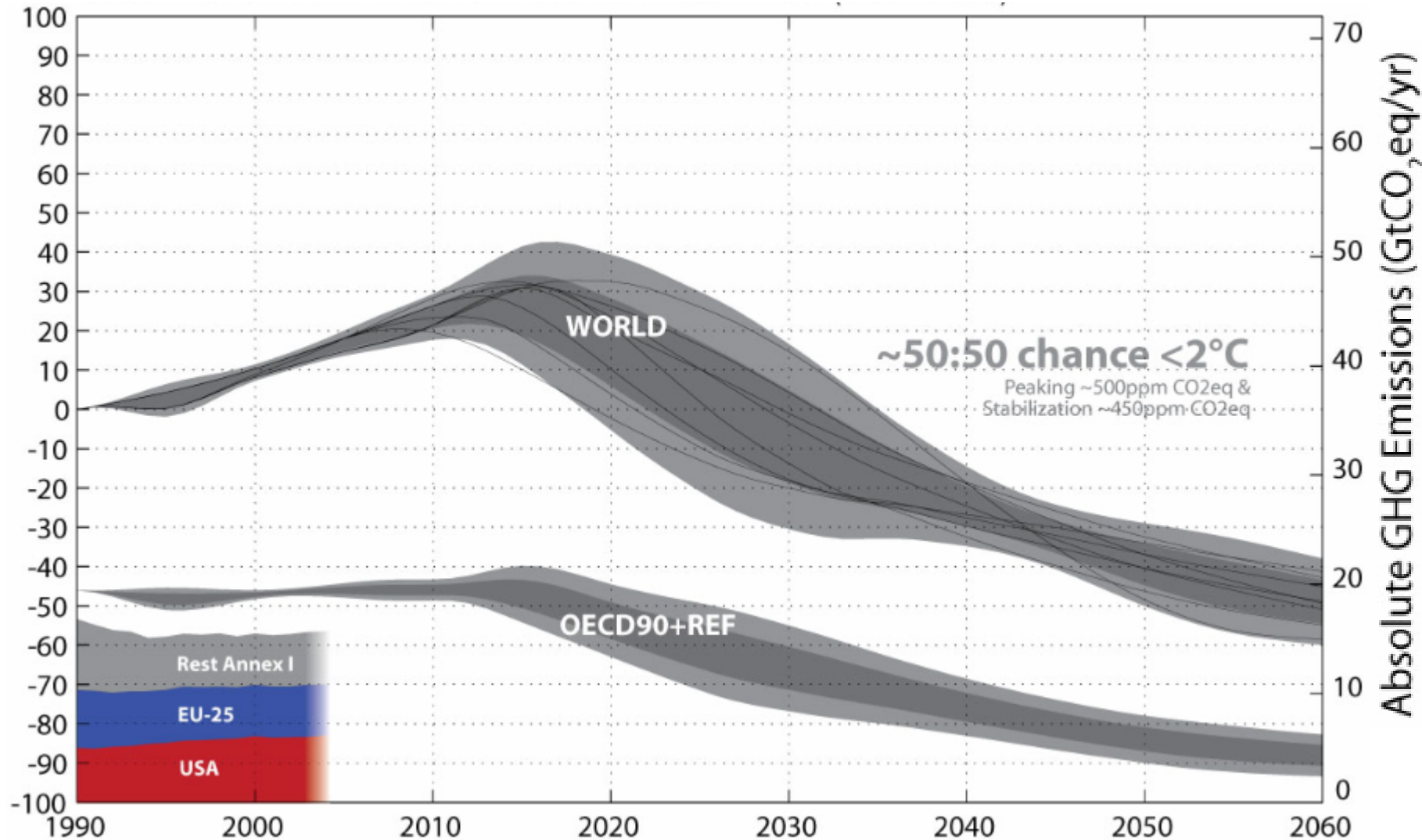


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### 3. Emission scenarios to attain 2 degrees Celsius



# Global Greenhouse gas emissions to reach the 2°C objective

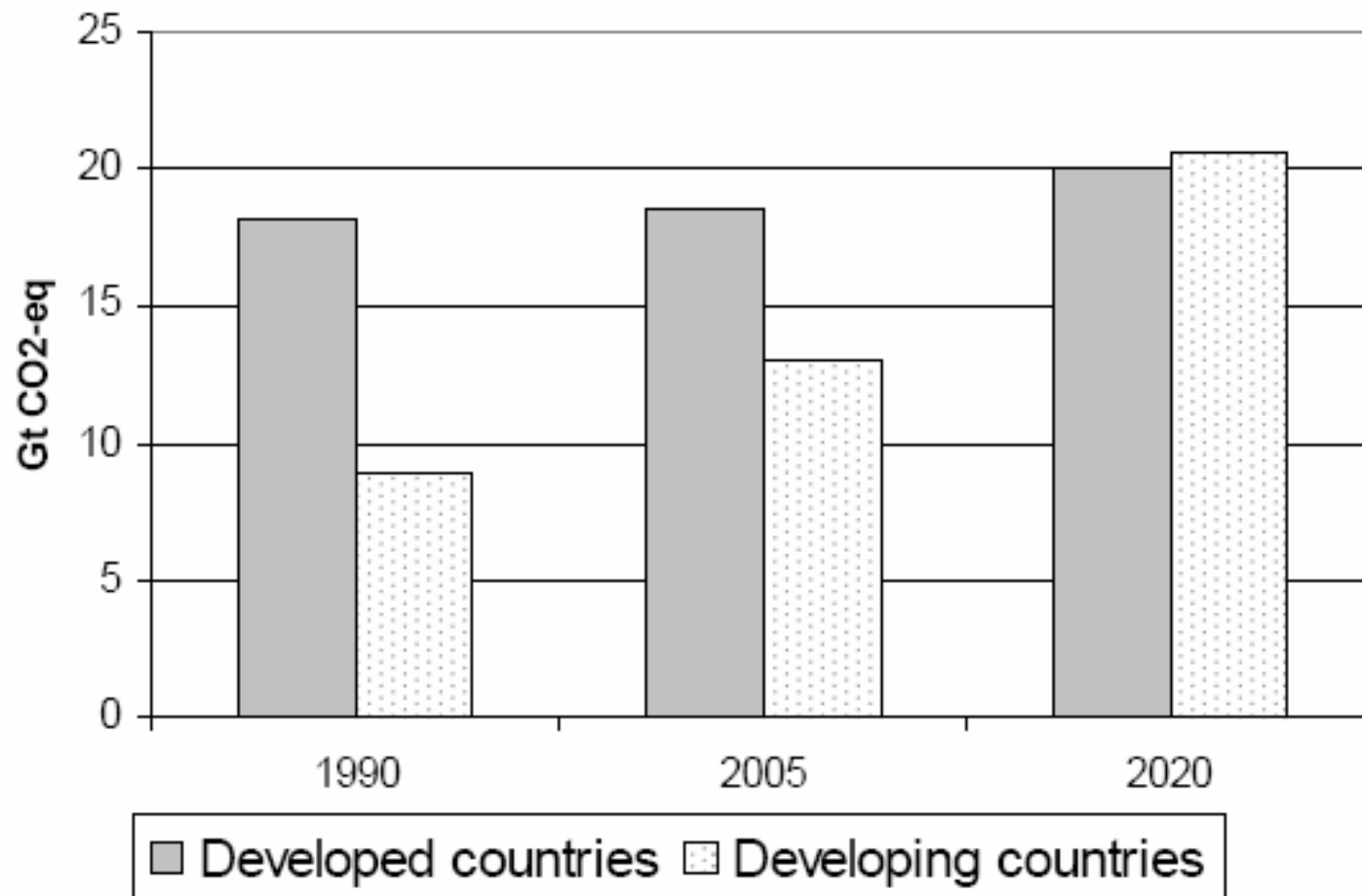


Source: Malte Meinshausen 2006



# The need for global participation

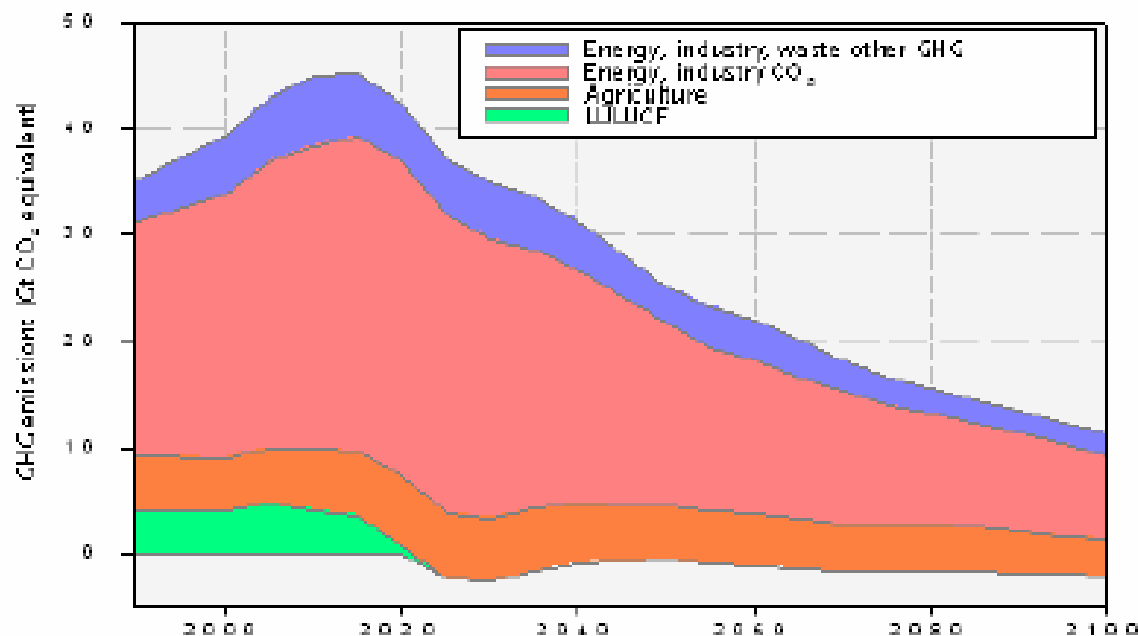
**Projected greenhouse gas emissions**  
(industry and energy, business as usual scenario)





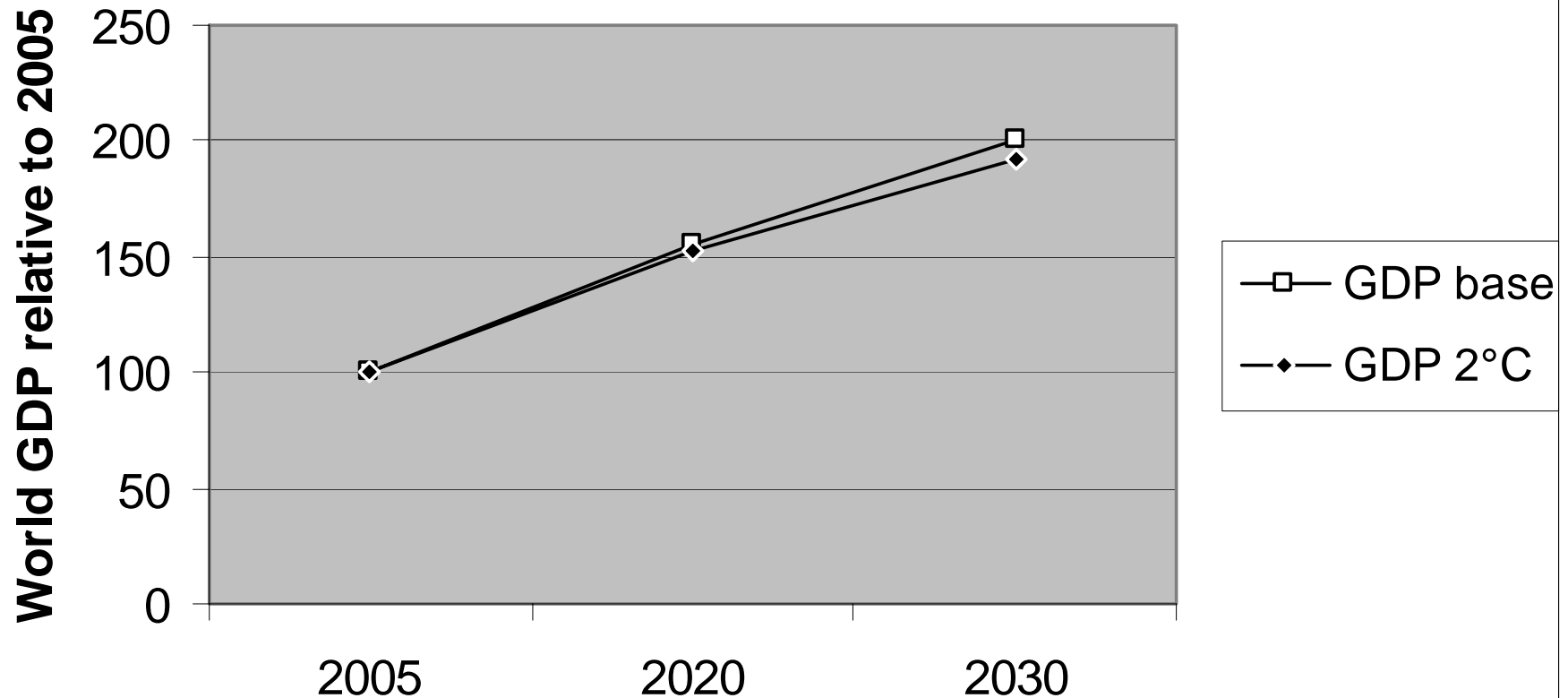
# The need for global participation

- The 2°C objective:  
Global GHG emissions need to peak around 2020
- EU & Developed countries need to take the lead!:  
30% GHG emission reduction target by 2020, compared to 1990 levels
- Developing countries:  
Reduced growth asap, absolute reductions after 2020
- Deforestation: halt within two decades and then reverse





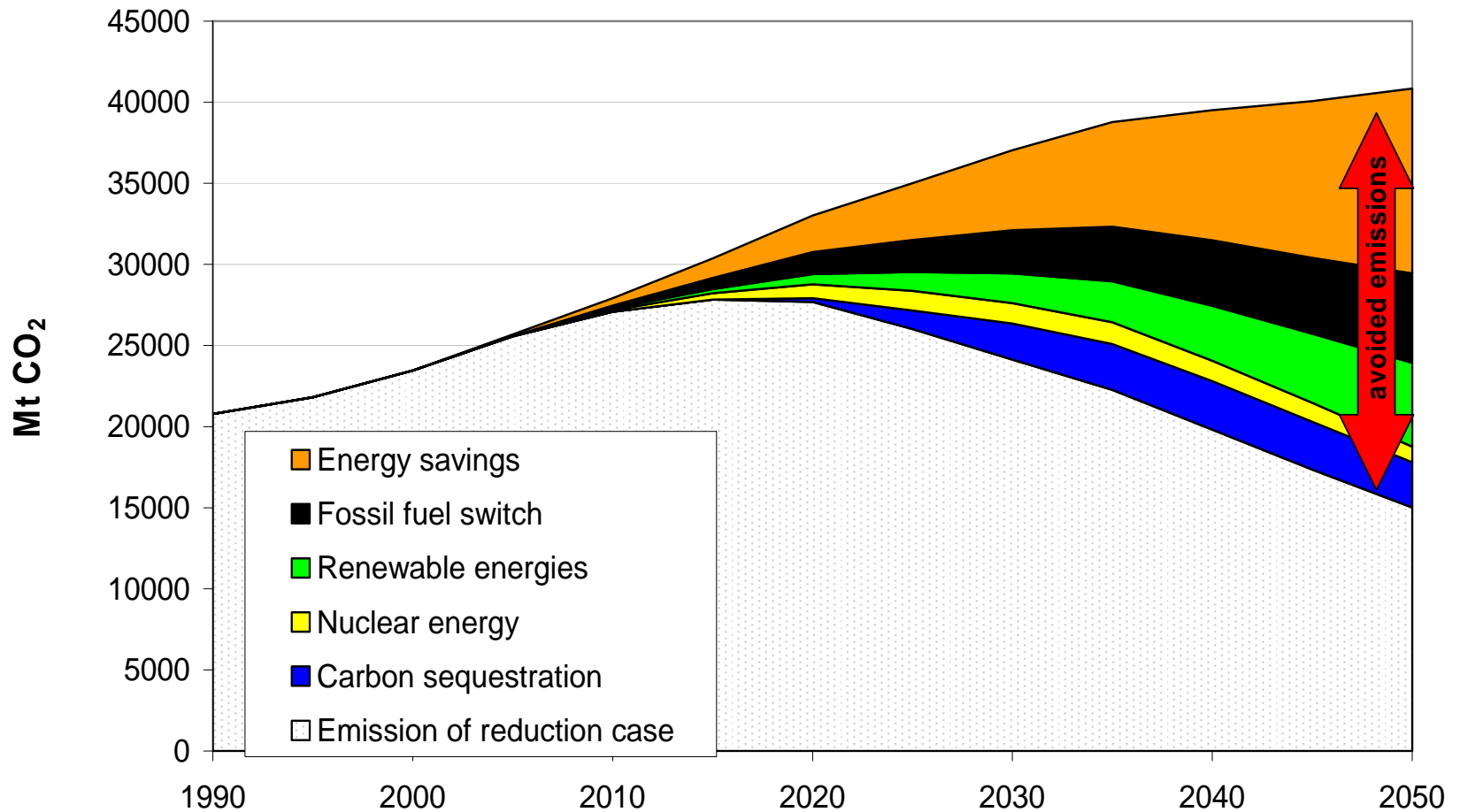
# Cost of action is consistent with global economic development





# Technologies to deliver GHG emission reductions

**Technologies that can reduce global CO<sub>2</sub> emissions from energy combustion**





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## 3. Scenarios for the EU





## EU Spring Council Conclusions: Objectives Climate Change and Energy

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- Meeting the 2°C objective (Top down):
  - *EU*: In the international negotiations set forward the collective GHG reduction target of 30 % by 2020 for developed countries (compared to 1990 levels).
  - EU ready to take on itself a 30% target if successful outcome.
  - *EU*: A firm independent commitment to achieve at least 20% GHG emission reductions by 2020 (compared to 1990)
- Tools (Bottom up):
  - "An Energy Policy for Europe"
  - GHG policies including Emissions trading
  - Global carbon market



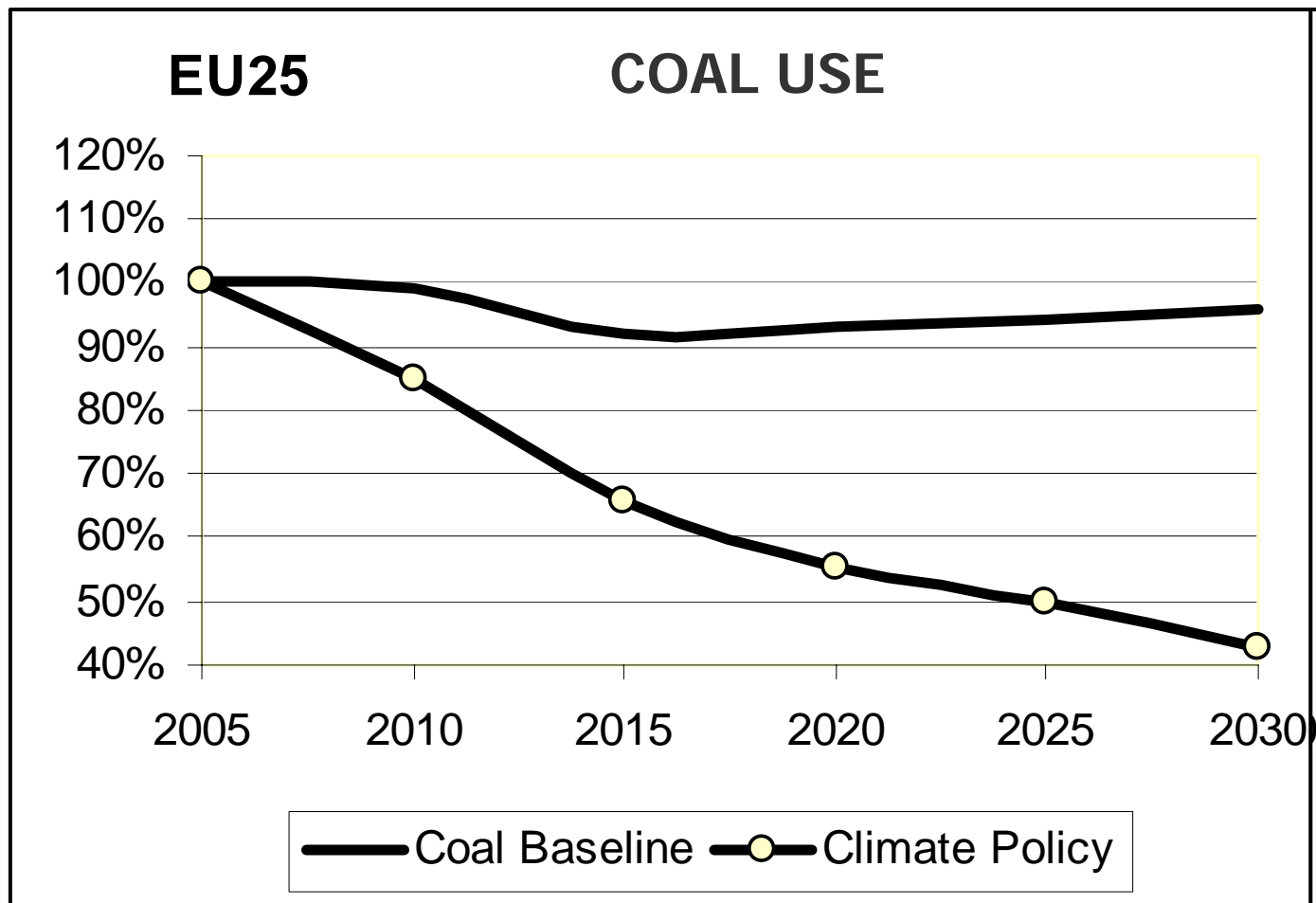
# Energy Policy for Europe will have specific impacts on all air pollutants

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- Renewable energy: 20% objective by 2020
  - includes minimum biofuels target of 10% by 2020
- Energy efficiency (eg. Cars: Co2 & cars, fuel quality directive):
  - to be improved by 20% by 2020
- Sustainable power generation from fossil fuels: aiming at near-zero emissions of new plants by 2020
- New steps to reach internal market – better interconnections and options for unbundling and regulatory powers:
  - important for functioning EU ETS
  - decrease hurdles for renewables
- Nuclear: Member States' choice
- Towards a European strategic energy technology plan



# Impacts Climate Policies

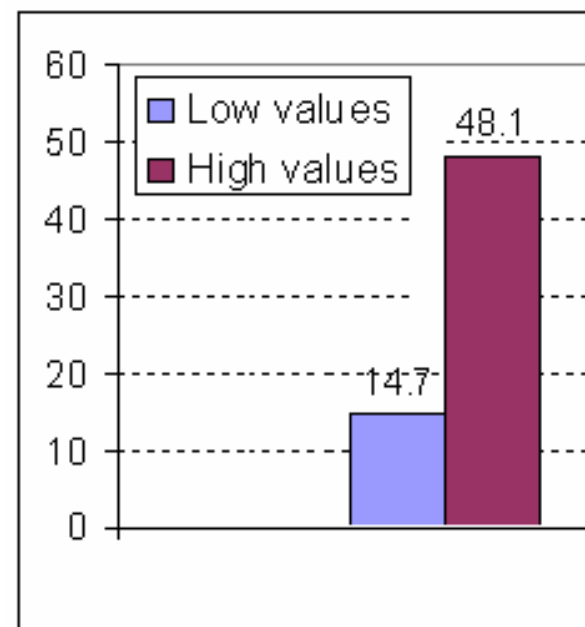




# Co-benefit EU Climate Change Policies on Air Pollution (Gains)

- Health benefits in the EU from reduced air pollution are substantial, up to € 48 billion per year by 2020

Co-benefits from Climate Change Policies		
	Reduction compared to 2020 baseline emissions	
CO <sub>2</sub>	-9.31%	-22.75%
SO <sub>2</sub>	-5.90%	-12.11%
NO <sub>x</sub>	-2.30%	-6.08%
PM <sub>2.5</sub>	-3.15%	-5.94%



Source: RAINS CAFE models

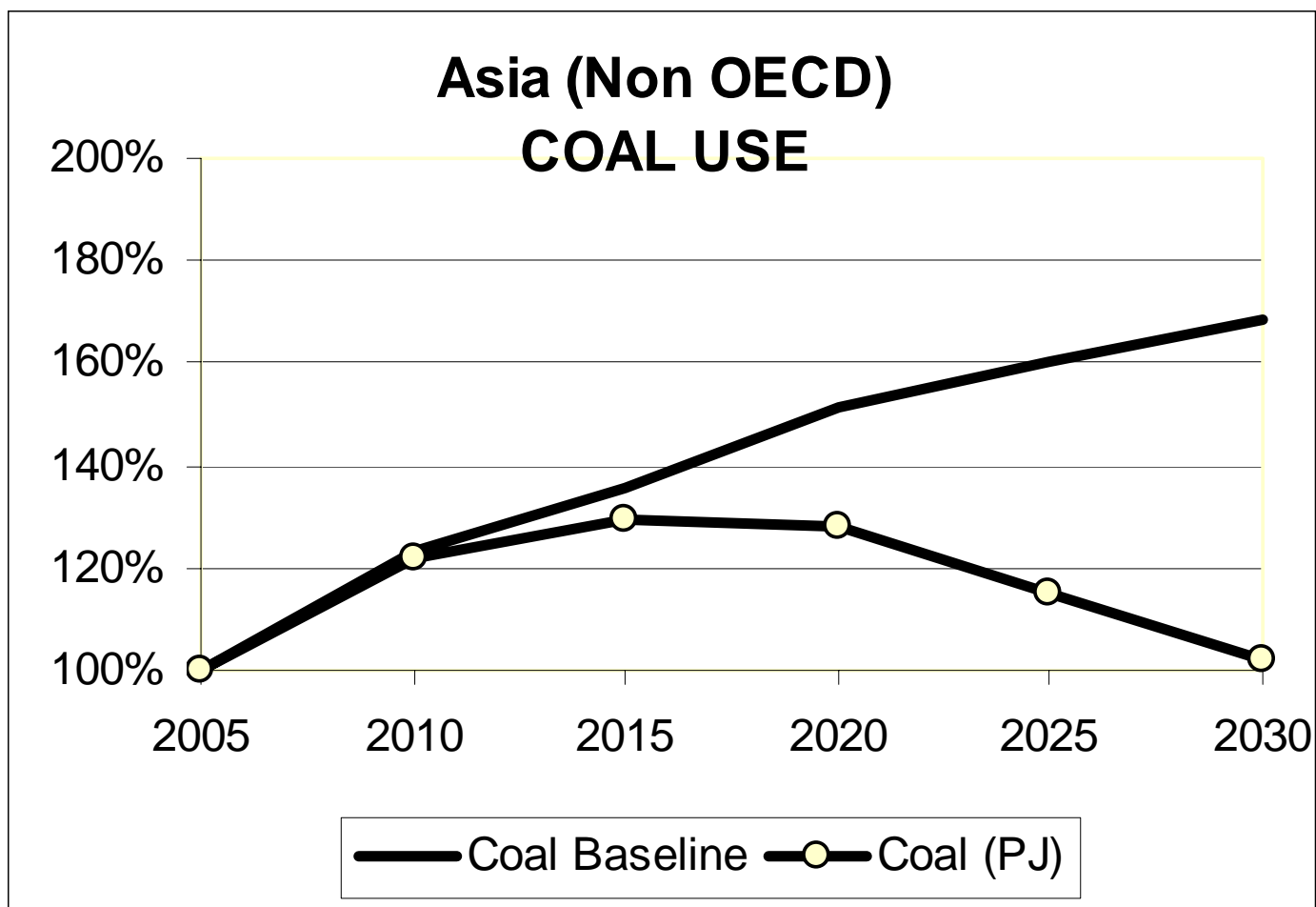


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## 4. Scenarios for Other Regions



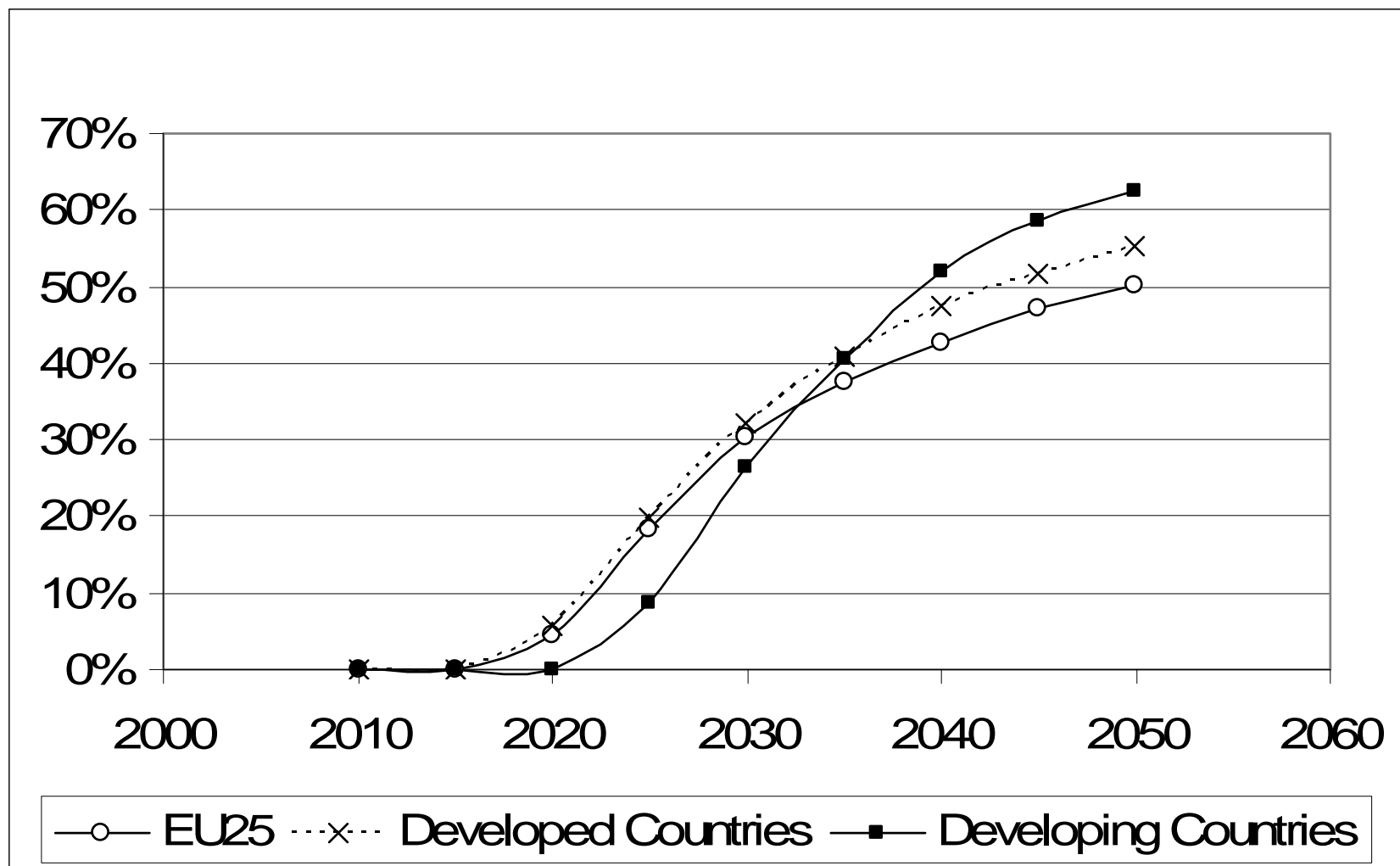
# Impacts Climate Policies



Source: Poles Model



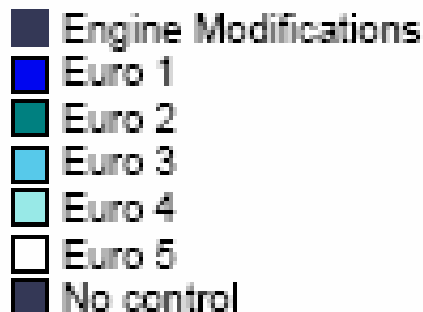
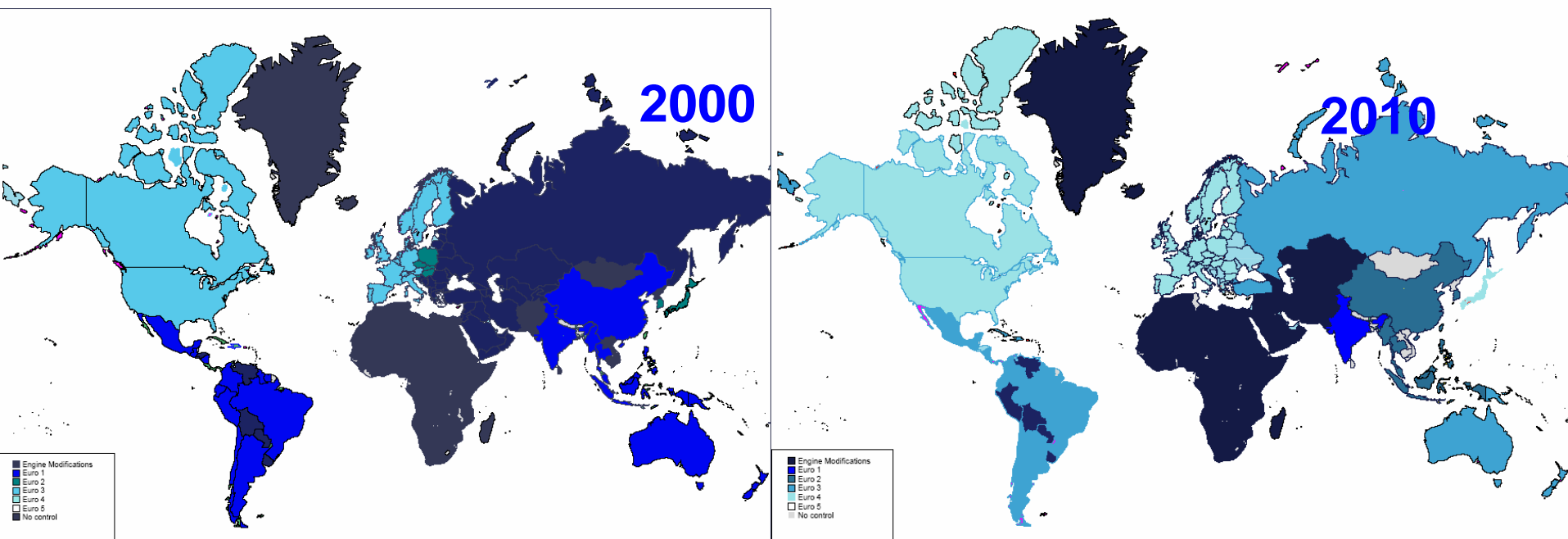
# Penetration of carbon capture and geological sequestration in the energy sector until 2050





# Emission standards for gasoline vehicles

## Current legislation (as of early 2005)







# More information on how to...

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get to grips with  
**climate change**



[http://ec.europa.eu/environment/climat/future\\_action.htm](http://ec.europa.eu/environment/climat/future_action.htm)

[http://ec.europa.eu/energy/energy\\_policy/index\\_en.htm](http://ec.europa.eu/energy/energy_policy/index_en.htm)