

# **IPCC 4<sup>th</sup> Assessment Report**

## ***Global view and IPCC outlook***

**Renate Christ  
IPCC Secretary**

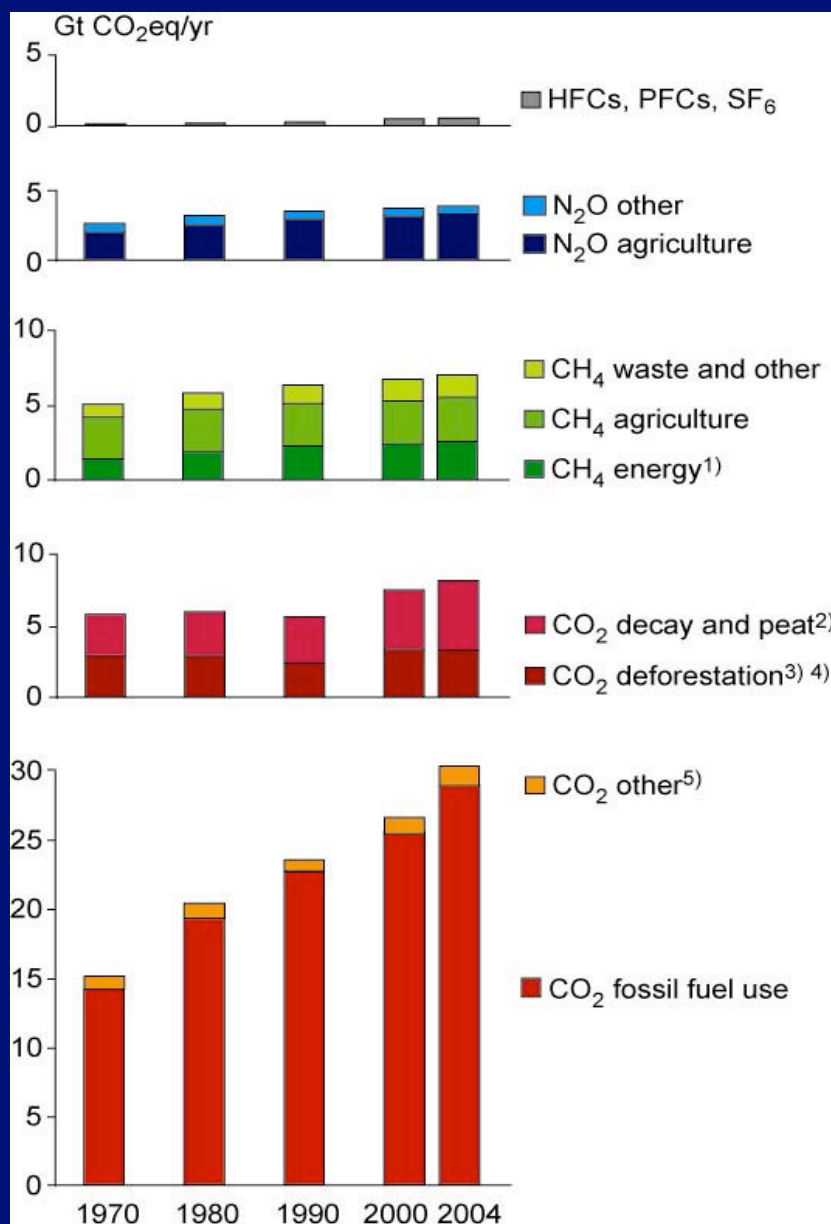
**Bern, 5 September 2007**

# Global view - long term stabilization

**Between 1970 and 2004  
global GHG emissions  
increased by 70 %**

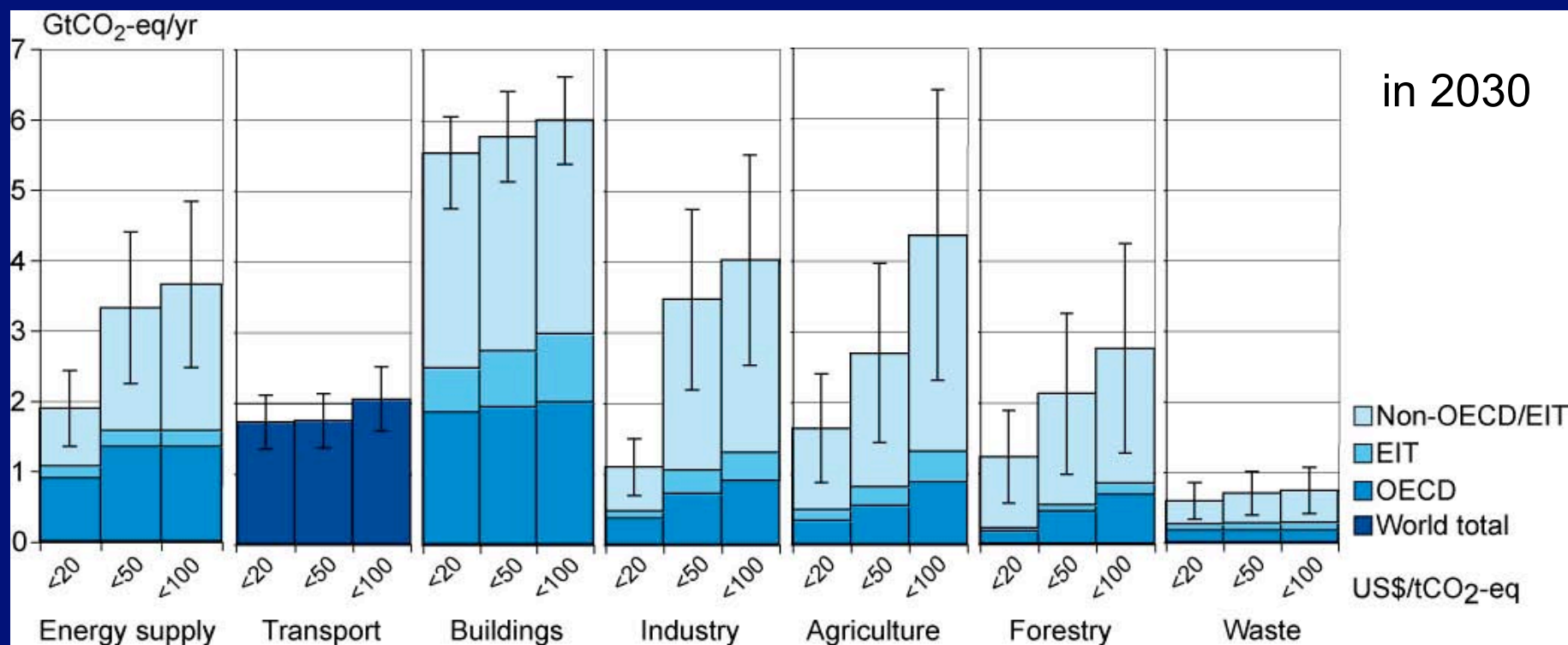
**CO<sub>2</sub> largest contributor**

**With current CC and SD  
policies global GHG  
emissions continue to  
grow - for IPCC SRES  
25-90 % in 2030 relative  
to 2000**



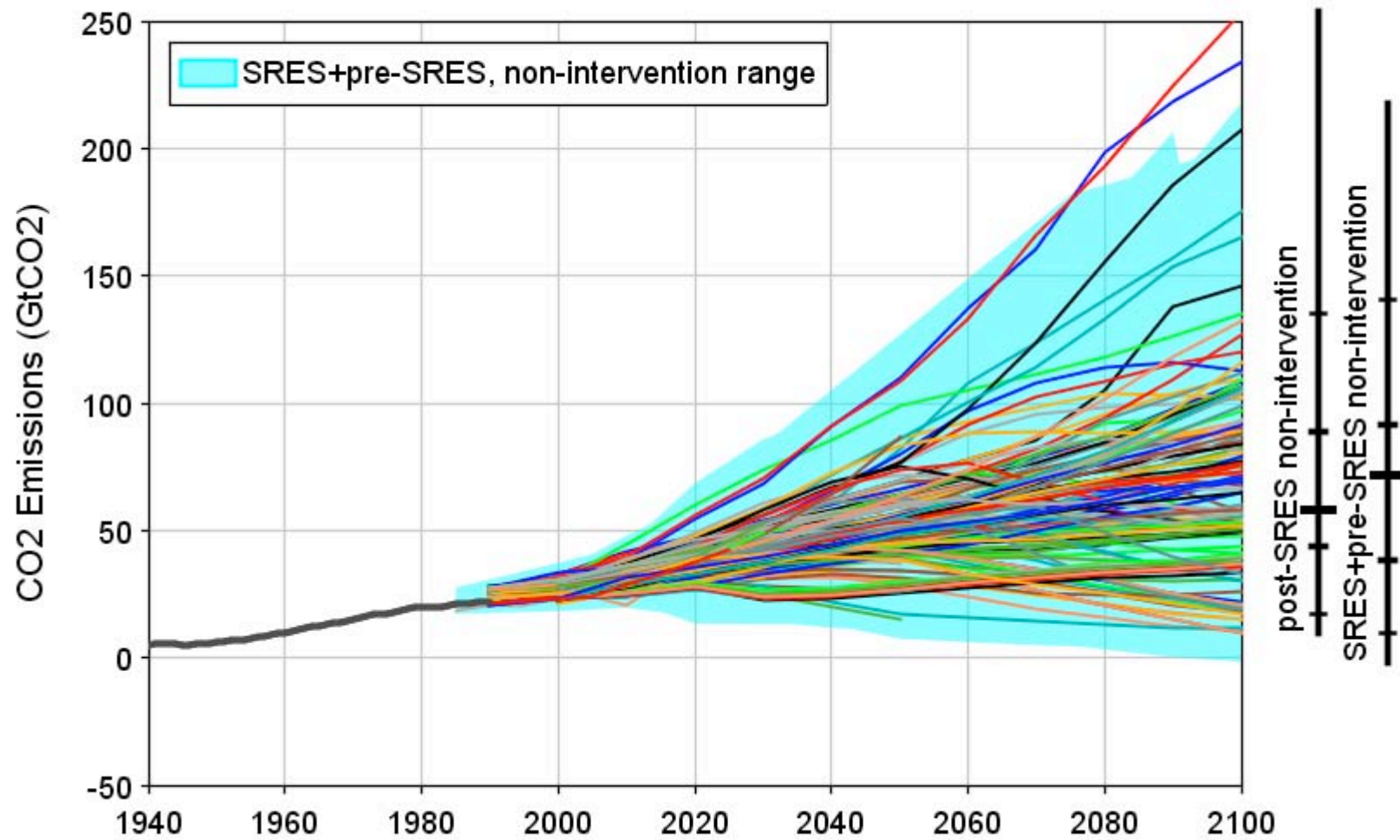
# Economic mitigation potential could offset projected growth or reduce emissions below current levels

All sectors and regions have the potential to contribute

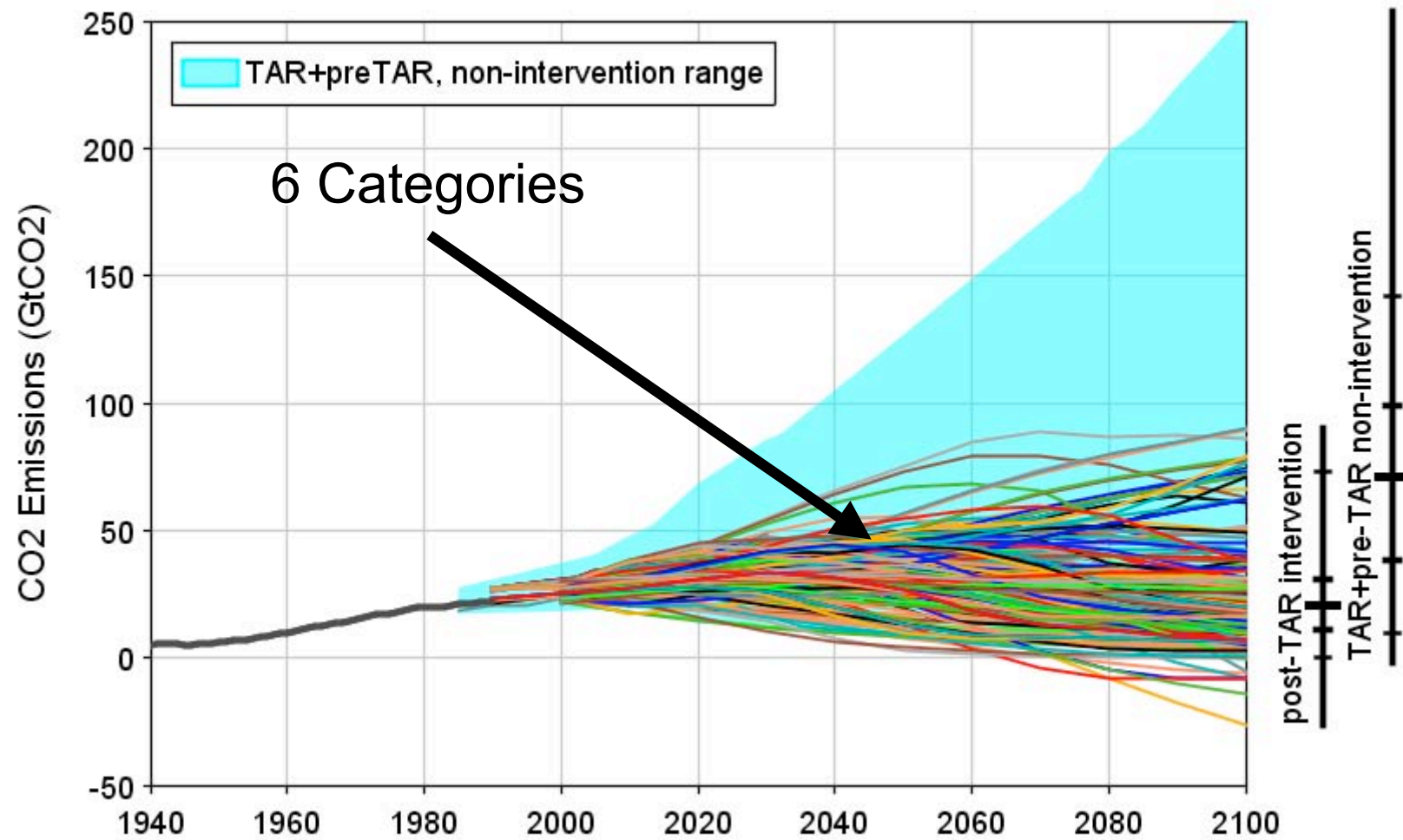


Note: estimates do not include non-technical options, such as lifestyle changes.

# Global CO2 Emissions

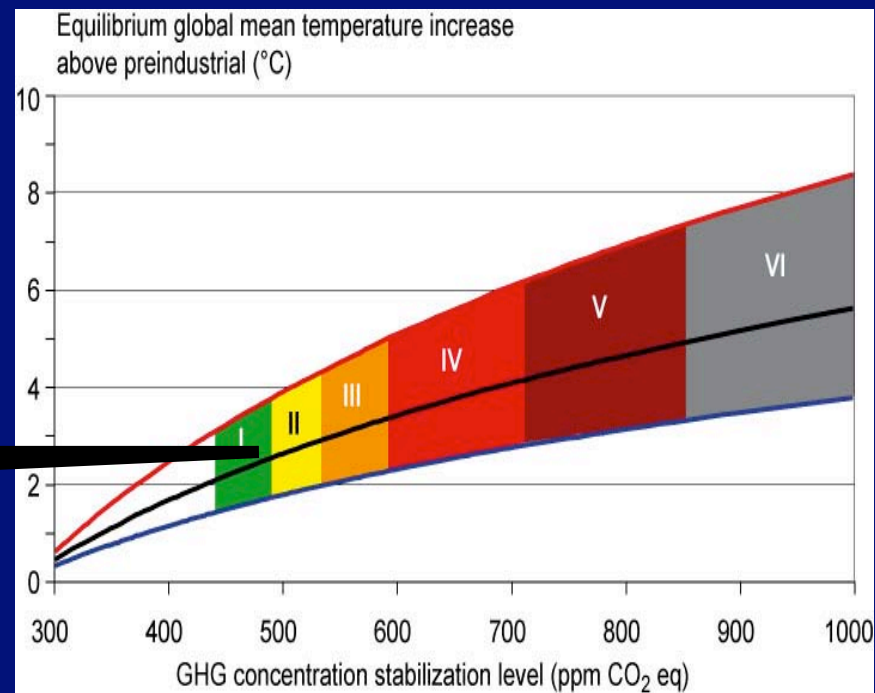
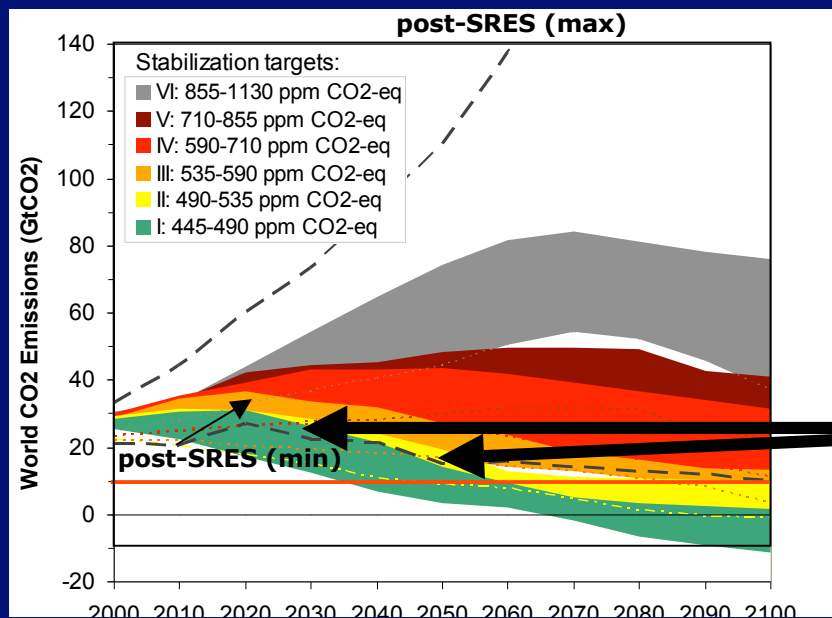


# Global CO2 Emissions



# Long-term mitigation: stabilisation and equilibrium global mean temperatures

- The lower the stabilization level the earlier global emissions have to peak
- Uncertainty of climate sensitivity is important



Multigas and CO<sub>2</sub> only studies combined

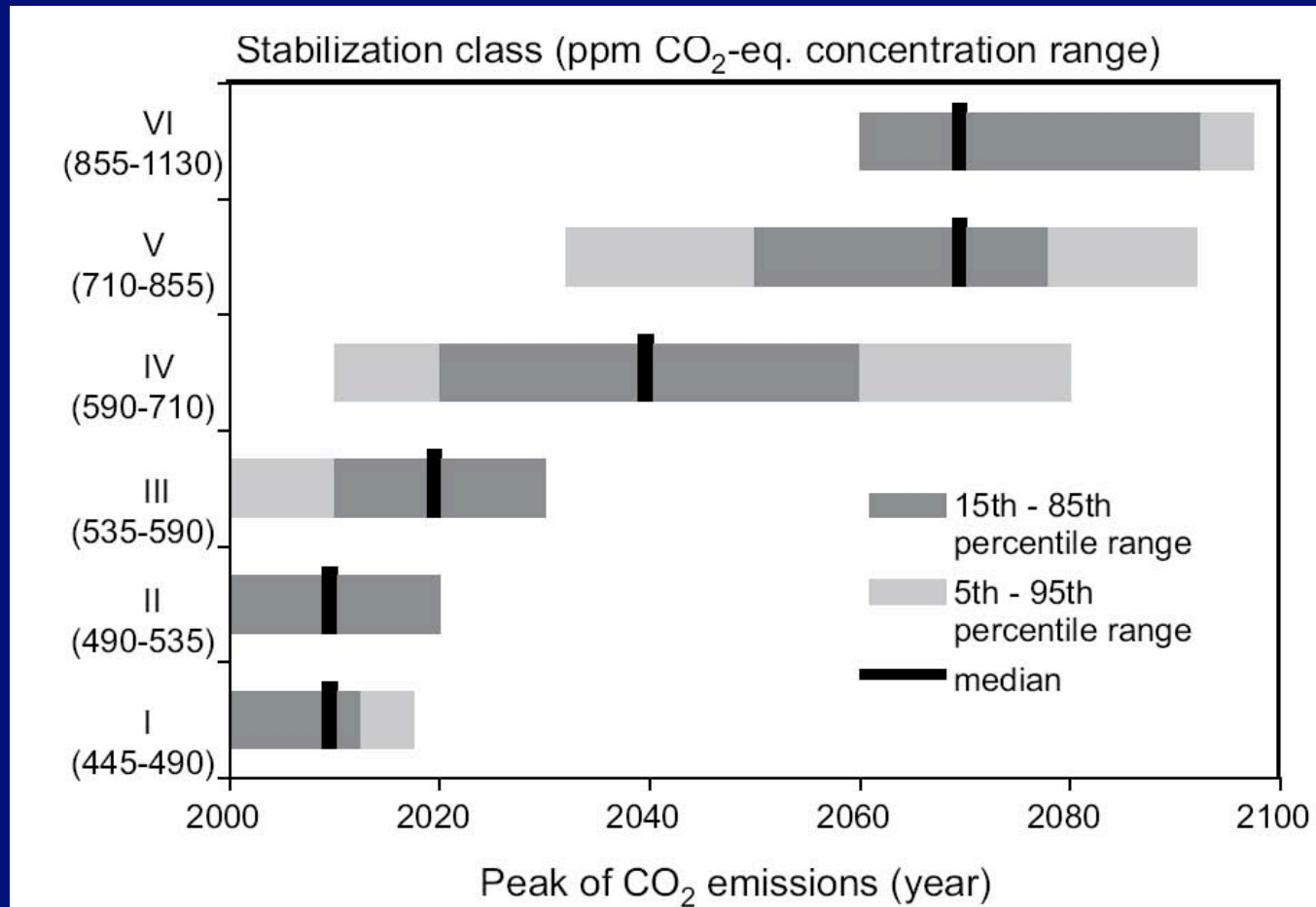
# Long term mitigation (after 2030)

Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilization levels

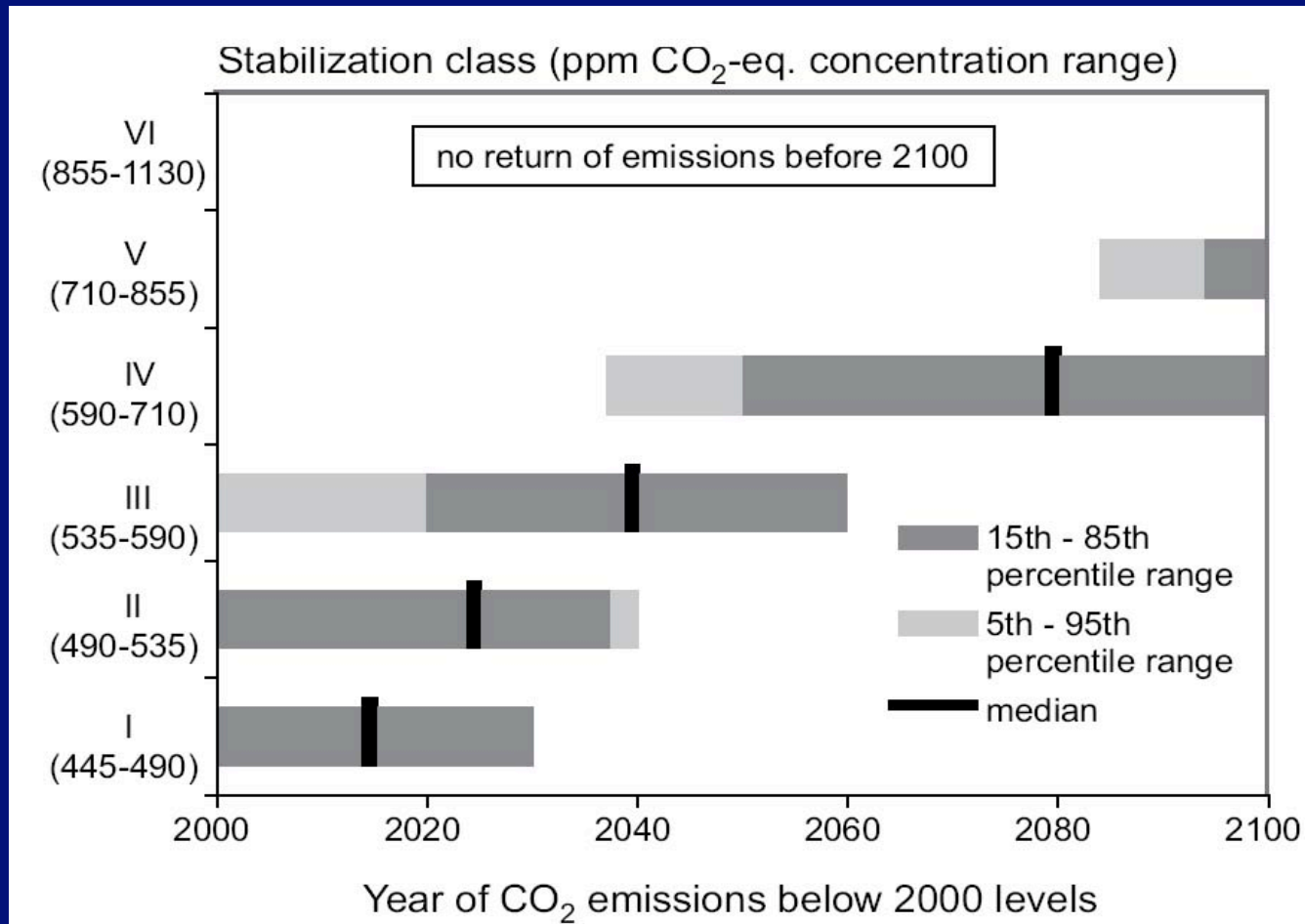
Stab level (ppm CO <sub>2</sub> -eq)	Global Mean temp. increase at equilibrium (°C)	Year global CO <sub>2</sub> needs to peak	Year global CO <sub>2</sub> emissions back at 2000 level	Reduction in 2050 global CO <sub>2</sub> emissions compared to 2000
445 – 490	2.0 – 2.4	2000 - 2015	2000- 2030	-85 to -50
490 – 535	2.4 – 2.8	2000 - 2020	2000- 2040	-60 to -30
535 – 590	2.8 – 3.2	2010 - 2030	2020- 2060	-30 to +5
590 – 710	3.2 – 4.0	2020 - 2060	2050- 2100	+10 to +60
710 – 855	4.0 – 4.9	2050 - 2080		+25 to +85
855 – 1130	4.9 – 6.1	2060 - 2090		+90 to +140



# Emissions Peak



# Below 2000



# What are the macro-economic costs in 2030?

- Costs are global average for least cost approaches from top-down models
- Costs do not include co-benefits and avoided climate change damages

Trajectories towards stabilization levels (ppm CO <sub>2</sub> -eq)	Median GDP reduction[1] (%)	Range of GDP reduction [2] (%)	Reduction of average annual GDP growth rates [3] (percentage points)
590-710	0.2	-0.6 – 1.2	< 0.06
535-590	0.6	0.2 – 2.5	<0.1
445-535[4]	Not available	< 3	< 0.12

[1] This is global GDP based market exchange rates.

[2] The median and the 10<sup>th</sup> and 90<sup>th</sup> percentile range of the analyzed data are given.

[3] The calculation of the reduction of the annual growth rate is based on the average reduction during the period till 2030 that would result in the indicated GDP decrease in 2030.

[4] The number of studies that report GDP results is relatively small and they generally use low baselines.

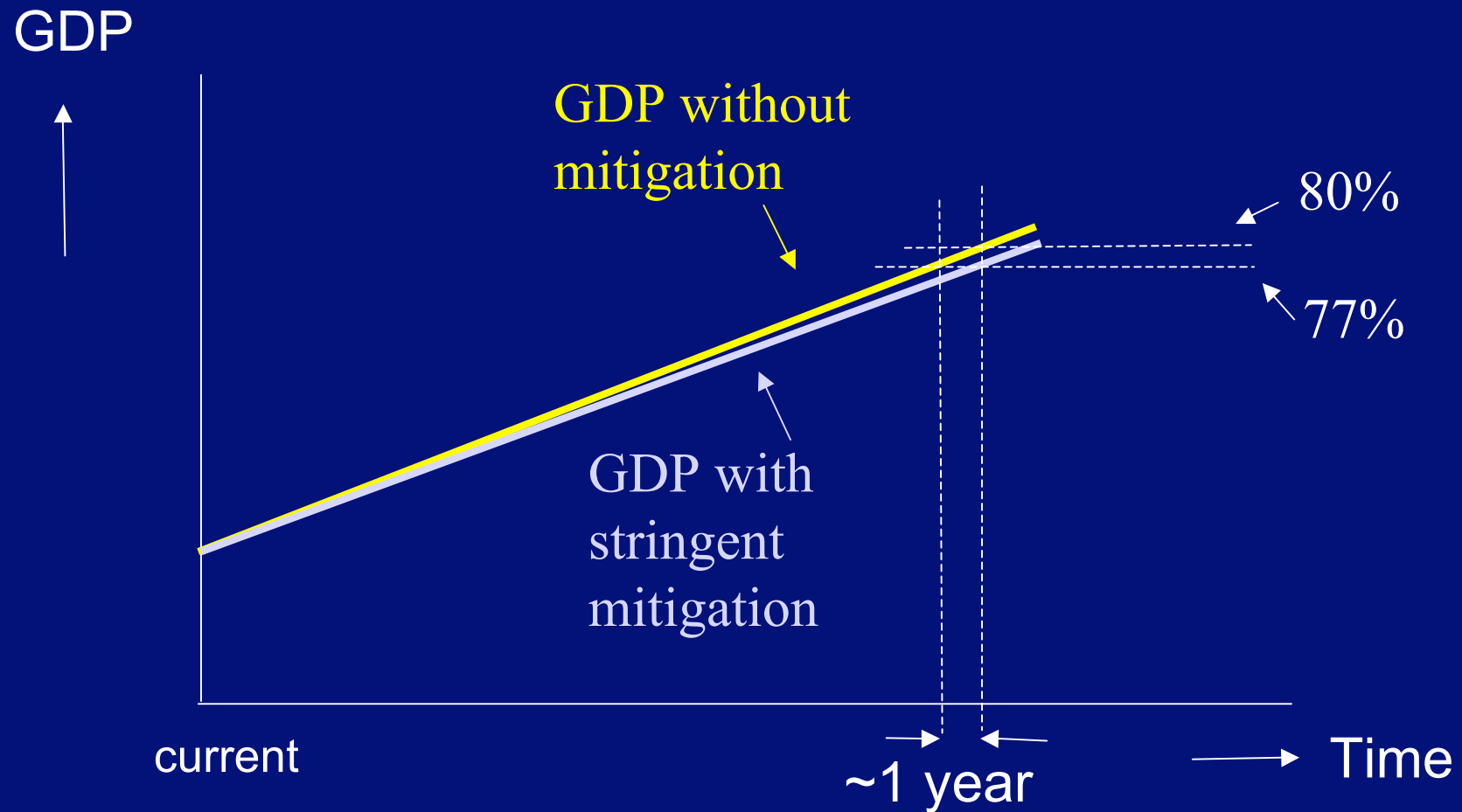
# VCCT Paper on GHG Stabilisation Scenarios

Category	CO <sub>2</sub> equivalent concentration (parts per million CO <sub>2</sub> equivalent)	Global mean temperature increase above pre-industrial at equilibrium using 'best estimate' climate sensitivity <sup>a</sup> (°C)	Change in global CO <sub>2</sub> emissions in 2050 (% of 2000 emissions)	Range of reduction in GDP in 2050 because of mitigation (%)	Allowed emissions by Annex I Parties in 2020 (% change from 1990 emissions)	Allowed emissions by Annex I Parties in 2050 (% change from 1990 emissions)
I	445–490	2.0–2.4	-85 to -50	Decrease of up to 5.5	-25 to -40	-80 to -95
II	490–535	2.4–2.8	-60 to -30			
III	535–590	2.8–3.2	-30 to +5	Slight gain to decrease of 4	-10 to -30	-40 to -90
IV	590–710	3.2–4.0	+10 to +60	Gain of 1 to decrease of 2	0 to -25	-30 to -80
V	710–855	4.0–4.9	+25 to +85			
VI	855–1,130	4.9–6.1	+90 to +140			

Source: IPCC. Fourth Assessment Report (AR4), Contribution of Working Group III. Columns 1–4, table SPM.5; column 5, table SPM.6, columns 6 and 7, box 13.7.

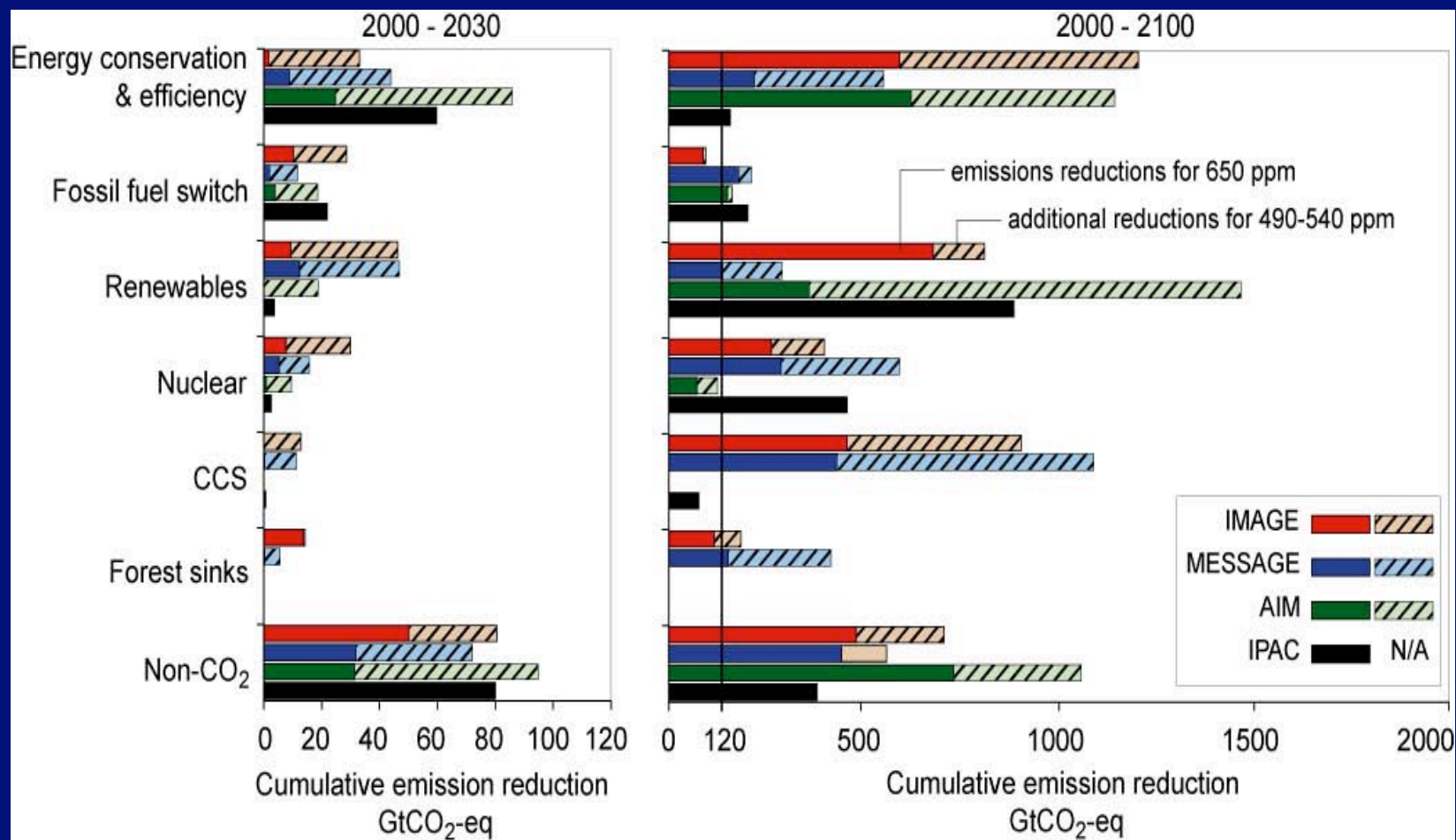
<sup>a</sup> According to the AR4, the best estimate of climate sensitivity is 3 degrees Celsius.

# Illustration of cost numbers



# Technology




## Cumulative emissions reductions 2000-2030 and 2000-2100



# Carbon-price signal and Investments

- Significant mitigation potential by 2030 and beyond at costs <\$100/tCO<sub>2</sub>
- For stabilisation at around 550 ppm CO<sub>2</sub>eq carbon prices should reach 20-80 US\$/tCO<sub>2</sub>eq by 2030 to achieve shift into low carbon technologies
- Returning global energy-related CO<sub>2</sub> emissions to 2005 levels by 2030 would require a large shift in the pattern of investment, although the net additional investment required ranges from negligible to 5-10%
- “Upfront” investments reduce longer-term mitigation costs and increase potentials
- Energy infrastructure investment decisions, (20 trillion US\$ till 2030) will have long term impacts on GHG emissions.

# Examples of side-effects of climate mitigation

OPTIONS	SYNERGIES	TRADEOFFS
<p><b>Energy:</b> efficiency, renewables, fuel-switching</p> 	<ul style="list-style-type: none"> <li>• air quality</li> <li>• supply security</li> <li>• employment</li> <li>• costs (efficiency)</li> </ul>	<ul style="list-style-type: none"> <li>• particulate emissions (diesel)</li> <li>• biodiversity (biofuels)</li> <li>• costs (renewables)</li> </ul>
<p><b>Forestry:</b> reduce deforestation, plant trees</p> 	<ul style="list-style-type: none"> <li>• soil protection</li> <li>• water management</li> <li>• employment</li> <li>• biodiversity (deforest.)</li> </ul>	<ul style="list-style-type: none"> <li>• biodiversity (plantations)</li> <li>• competition food production</li> </ul>
<p><b>waste:</b> landfill gas capture, incineration</p> 	<ul style="list-style-type: none"> <li>• health &amp; safety</li> <li>• employment</li> <li>• energy advantages</li> </ul>	<ul style="list-style-type: none"> <li>• ground water pollution</li> <li>• costs</li> </ul>



# Non-climate policies can influence GHG emissions as much as specific climate policies

Sectors	Non-climate policies - Candidates for integrating climate concerns	Possible influence (% of global emissions)
Macro-economy	Taxes, subsidies, other fiscal policies	All GHG emissions (100%)
Forestry	Forest protection, sustainable management	GHGs deforestation (7%)
Electricity	Diversification to low-carbon sources, demand management, limit distribution losses	Electricity sector emissions (20 %)
Oil-imports	Diversification energy sources/decrease intensity - > enhance energy security	GHGs from oil product imports (20 %)
Insurance (buildings, infrastructure)	Differentiated premiums, liability conditions, green products	GHG emissions buildings, transport (20%)
Bank lending	Strategy/policy, lending projects accounting for options emission limitations	Notably development projects (25%)
Rural energy	Policies promoting LPG, kerosene and electricity for cooking	Extra emissions over biomass (<2 %)

# IPCC outlook

# Ongoing IPCC activities

- **AR4 Synthesis Report**
  - Circulated for final government review
  - Adoption and approval at 27<sup>th</sup> Session of the IPCC, 12-17 November in Valencia, Spain
- **Technical Paper in Climate Change and Water**
  - Finalized by the IPCC Bureau in April 2008
- **NGGIP** – guidance and training on 2006 Guidelines
- **TGICA** – important contribution to NWP

# IPCC Work on New Scenarios (1)

- New scenarios needed well before completion of a possible AR5
- Scenario work undertaken by scientific community, IPCC will only have catalyzing role and promote readiness of scenarios for assessment in AR5
- Not only “emissions scenarios” but scenarios to be used for studying climate change, climate impacts and adaptation and mitigation
- Consistency between scenarios and comparable assumptions and definitions

# IPCC Work on New Scenarios (2)

## Expert meeting in Noordwijk, 18-20 September

- Identify requirements and plans for scenario development and underlying socio-economic conditions that shape emissions and vulnerability
- Illuminate key scientific issues for coordinated development of new integrated scenarios
- Consideration of institutions arrangements and participation of developing countries
- Proposed set of benchmark concentration pathways that will be used in initial Earth System model runs.

# Possible future IPCC activities

- Scoping meeting for a possible special report on renewable energy – January 2008
- Further proposals for special reports e.g. on adaptation or on climate change and disasters

# Lessons learnt from AR4

- WCRP/GCOS/IGBP meeting on future research needs identified by the AR4 - October 2007, Sydney
- Similar meeting planned with IHDP on adaptation and mitigation issues
- Feedback from information and outreach activities

# Planning for the next assessment

Discussion paper by the chair presented to IPCC-27

- Length of assessment cycle
- Staggered reports or ready within the same year
- Comprehensive assessment reports vs. more special reports focusing on topics, sectors or regions
- Combination of both with a Synthesis Report bringing the information together in a **comprehensive** way
- Are changes in Working Group structure or mandate of Working Groups needed



# Planning for the next assessment

- Consultations process leading to a broad discussion on key elements of future IPCC activities and products at IPCC 28 (early 2008)
- Information needs of policymakers and experience and advice of AR4 authors
- Election of new Bureau at IPCC-29 (mid 2008)