



WMO



UNEP

Kyoto and beyond

R K Pachauri
Chairman IPCC
&
Director General TERI
9th May, 2003
Wellington

The Kyoto Protocol



Post Marrakesh Developments

Kyoto Protocol yet to enter into force

- **Australia Withdraws**
- **Russia (17.4%) yet to decide**

**104 ratifications (43.9%)
including EU, Japan and
Canada**

Likely outcome

	<u>Mt c/yr.</u>	
Total Annex I reductions		
under KP : 607.9		“Hot air”: 92.4
Less: USA : 423.9		Forestry Management : 70.5
Less: Australia : 21.7		-----
	-----	162.9
	162.3	.

Targets can be achieved on basis of “hot air” trade and “forestry management” credits alone.

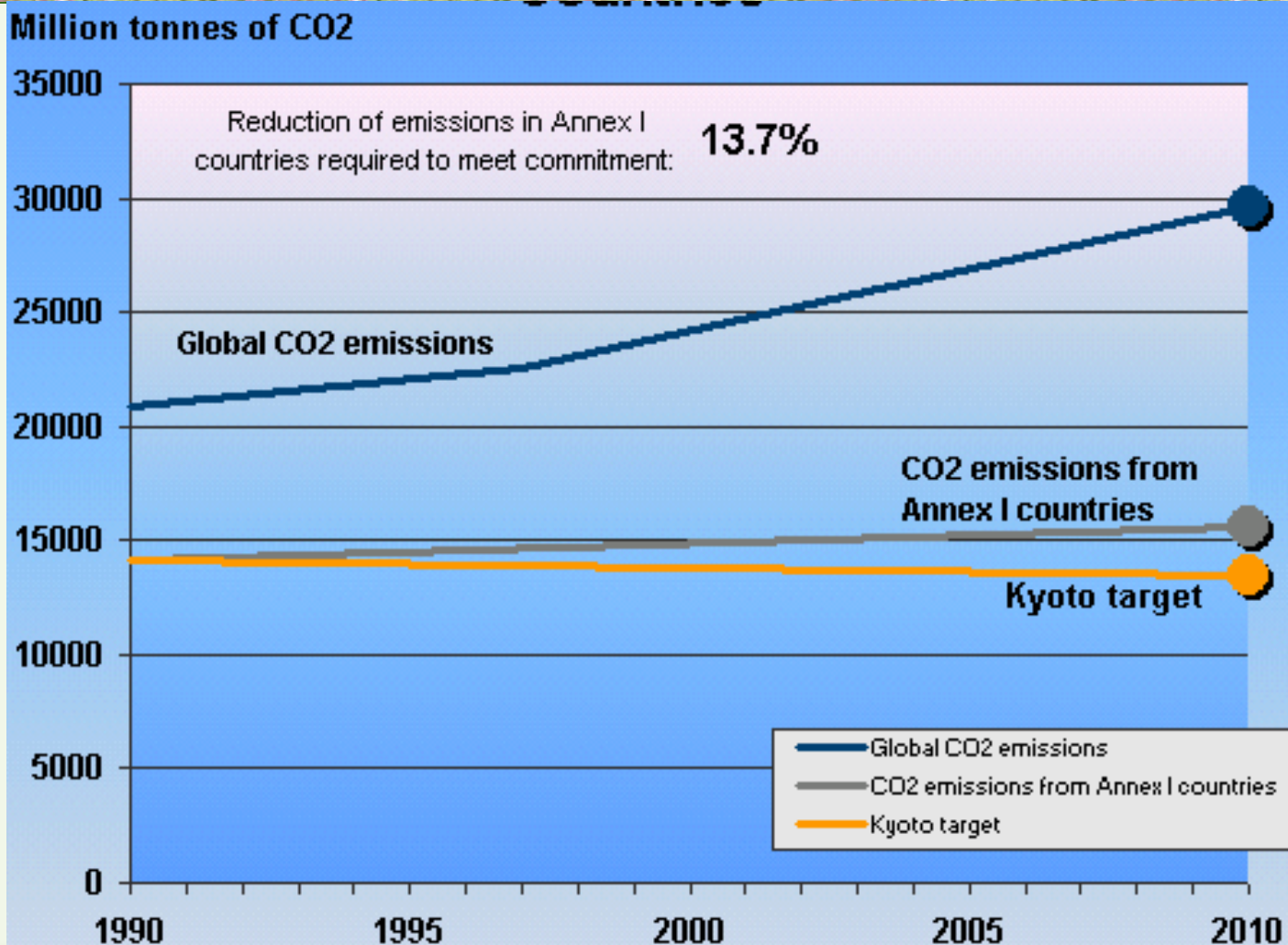
However, in practice:

- EU and some other countries will implement domestic action plans;
- There will be some demand for CDM credits

Impacts of Kyoto Protocol

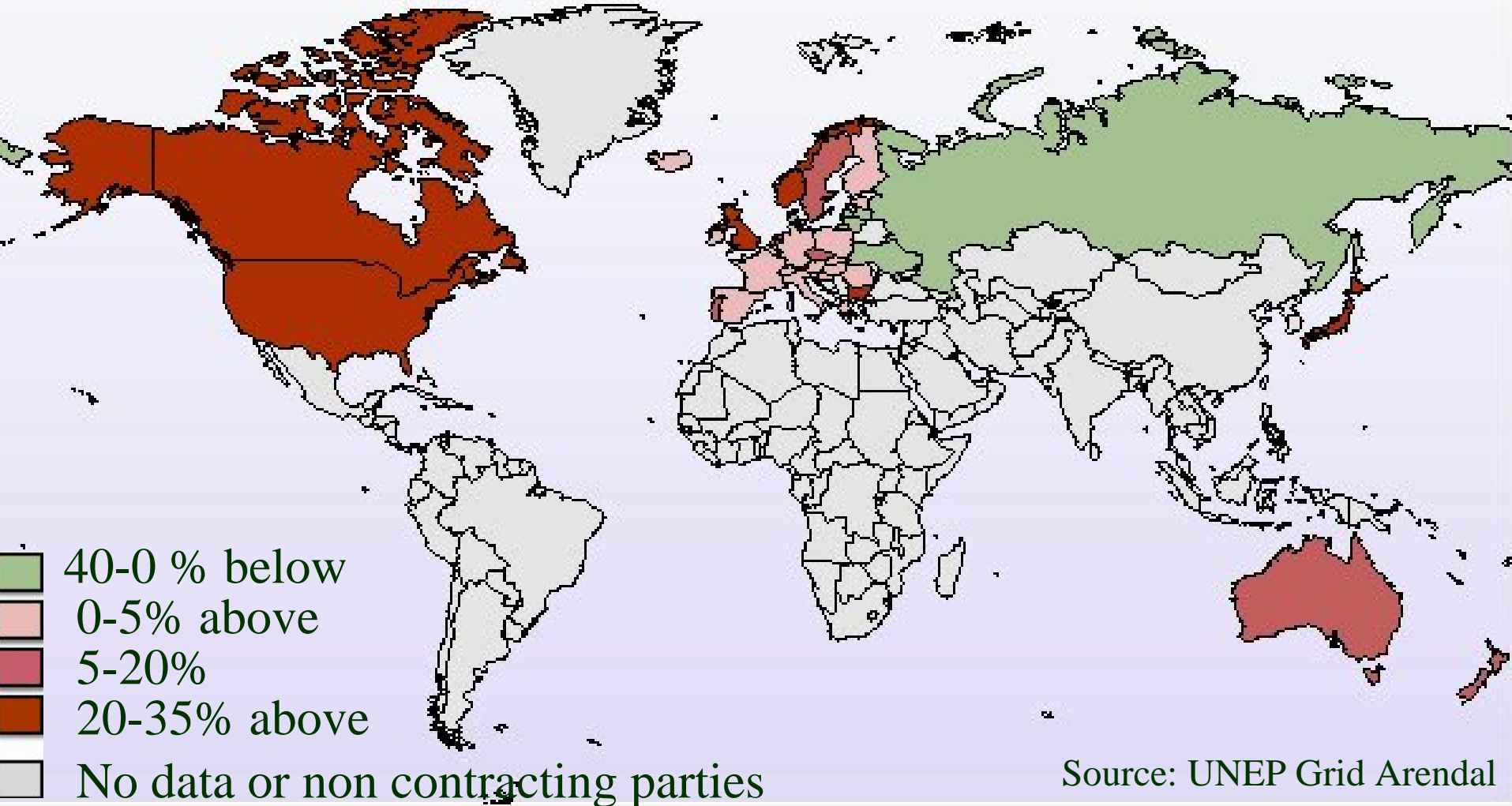
- Modest prospects of emissions reductions from Annex B Parties.
- Overall increase in emissions from developed countries (taking into account US & Australia emissions)
- Modest short-term prospects for CDM. CDM - TYPE Projects may hold out greater hope, depending upon US domestic legislation.
- K.P. may stimulate technology breakthrough for reducing GHG emissions.

Meeting the Kyoto Target



Source: UNEP,
GRID Arendal

Difference between the projected and targeted emissions 2010



Is redemption at hand?

‘Significant technical Progress relevant to GHG emissions reduction has been made since the SAR and has been faster than anticipated’

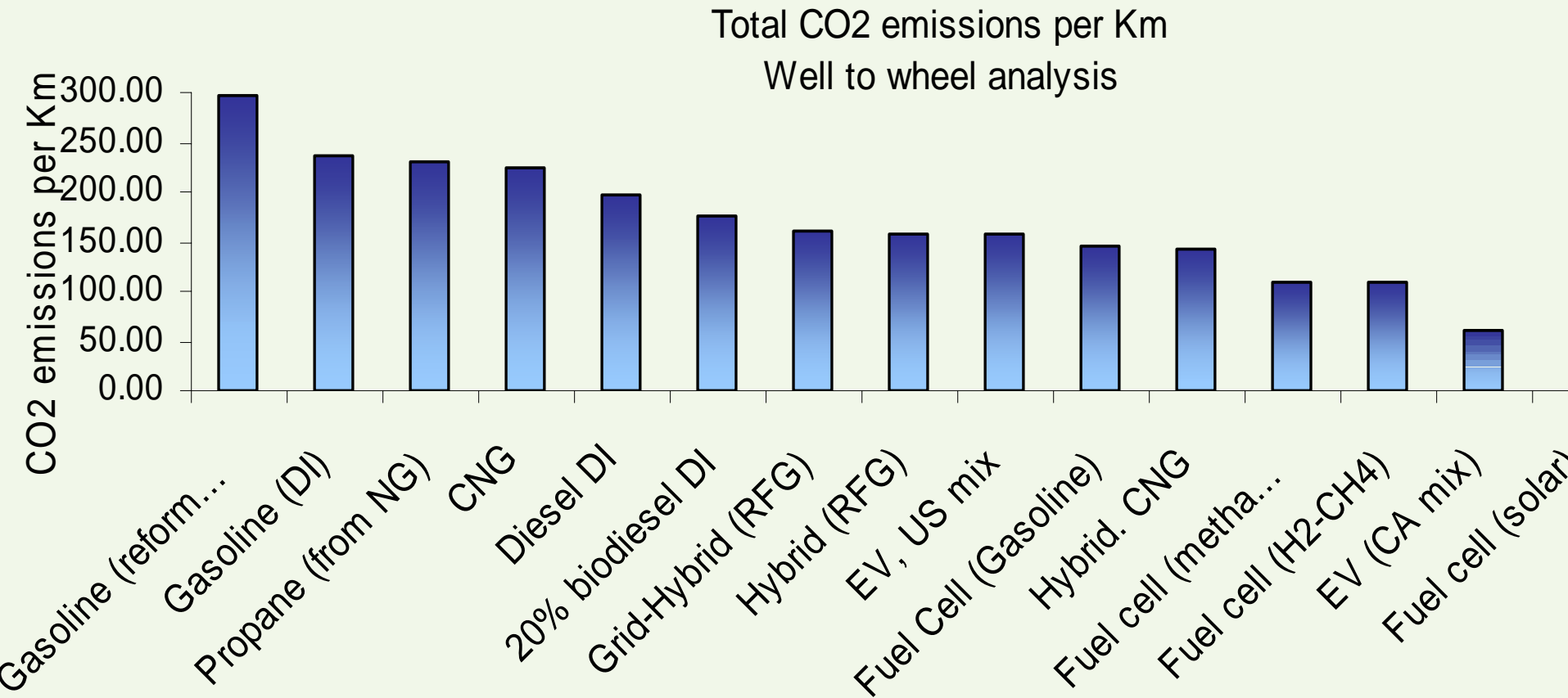
IPCC Third Assessment Report

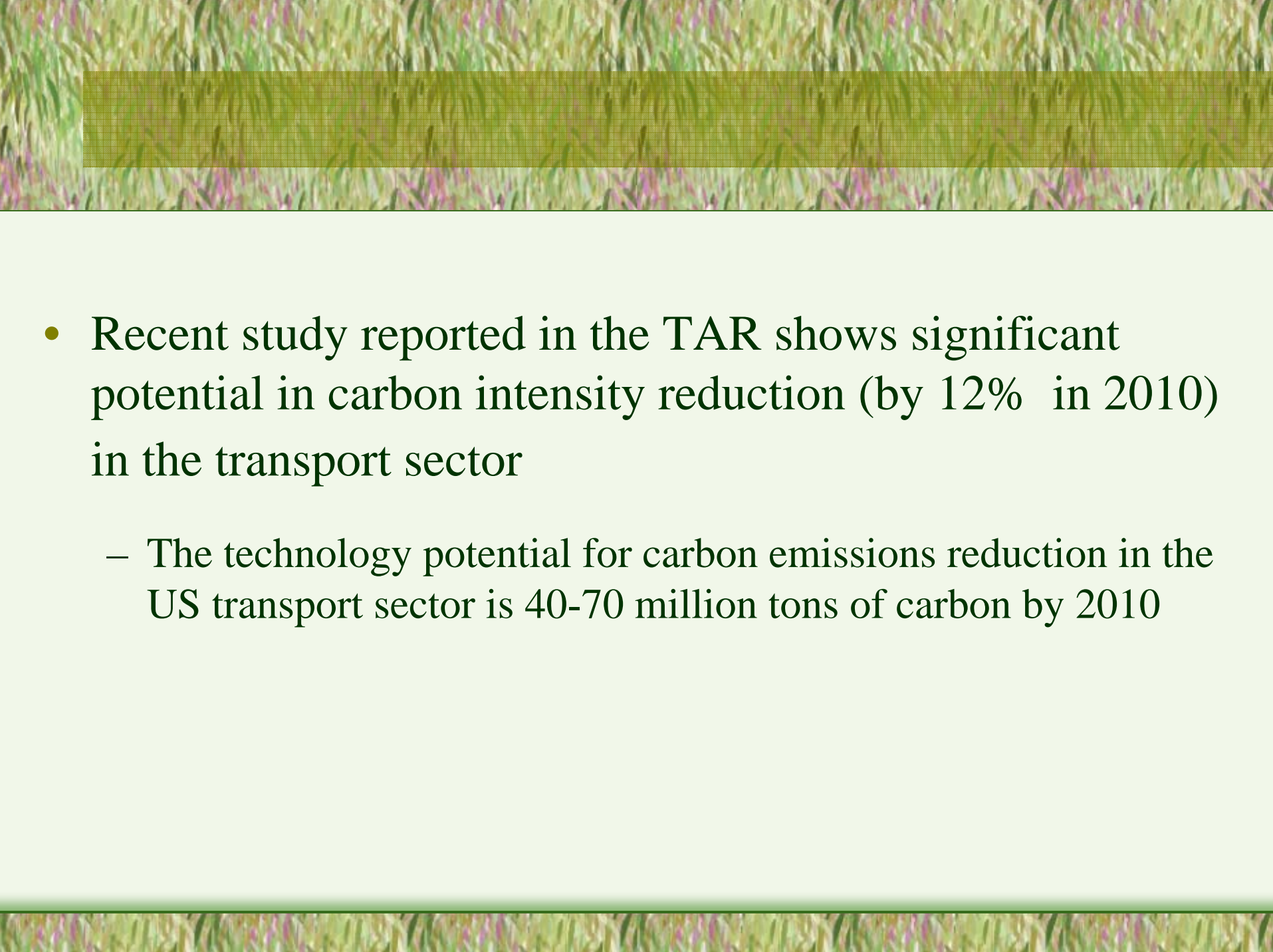
Promising technologies

The potential areas identified in the TAR for GHG emissions reduction in 2010 to 2020 timeframe are

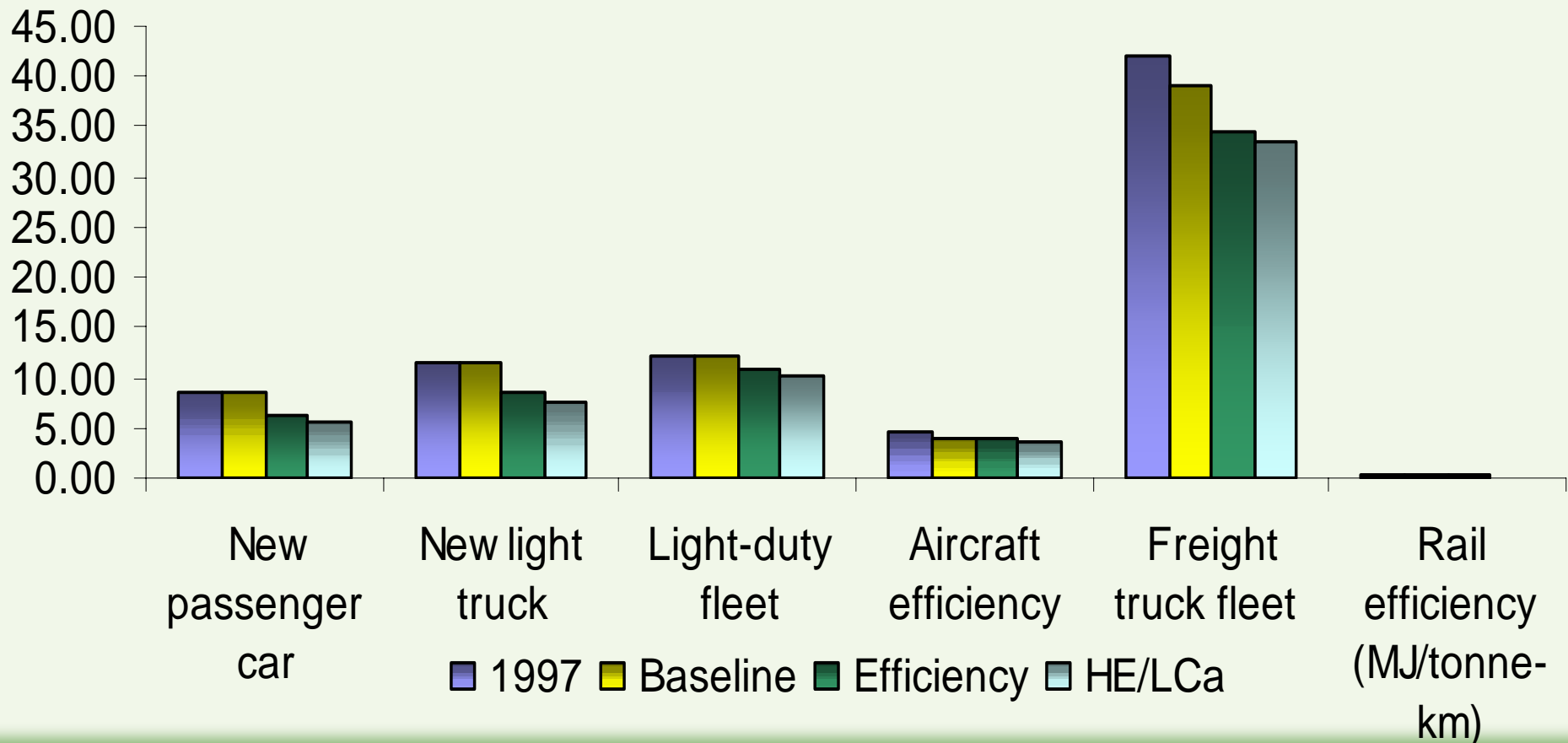
- Enhancing end use energy efficiency in buildings, transport and manufacturing industries
- Greater use of natural gas along with efficient technologies - Combined cycle and co gen plants
- Development of RETs- energy from biomass, waste, landfill methane, increasing share of hydro
- Reducing emissions of HFCs and PFCs through process changes, improved recycling, recovery and containment

GHG abatement potential of fuel cells



- 
- Recent study reported in the TAR shows significant potential in carbon intensity reduction (by 12% in 2010) in the transport sector
 - The technology potential for carbon emissions reduction in the US transport sector is 40-70 million tons of carbon by 2010

Projected transport efficiencies





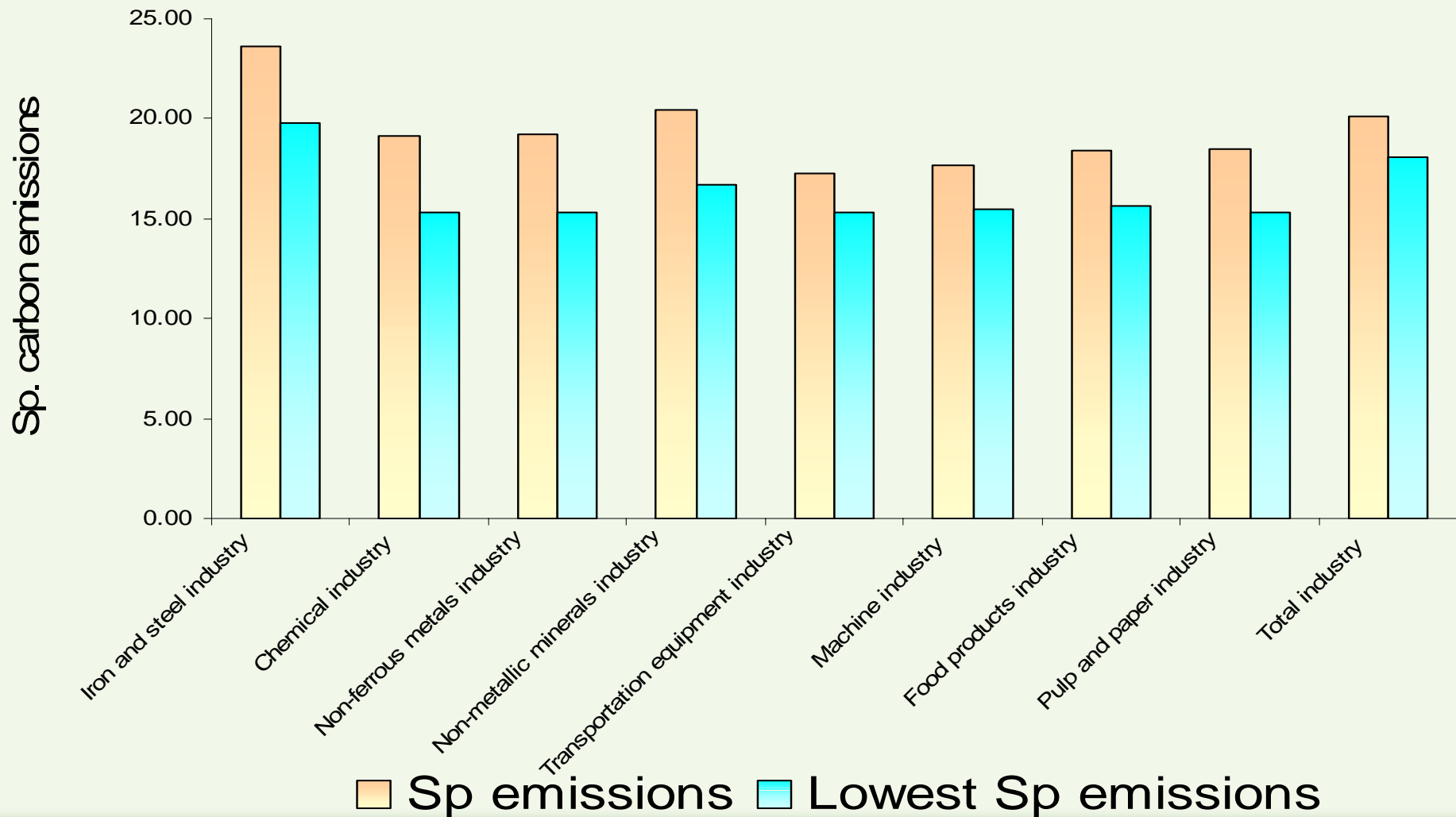
- Investing in the development of renewable technologies such as Solar PVs

- Improving conversion efficiency particularly for thin film technologies
- Energy Storage

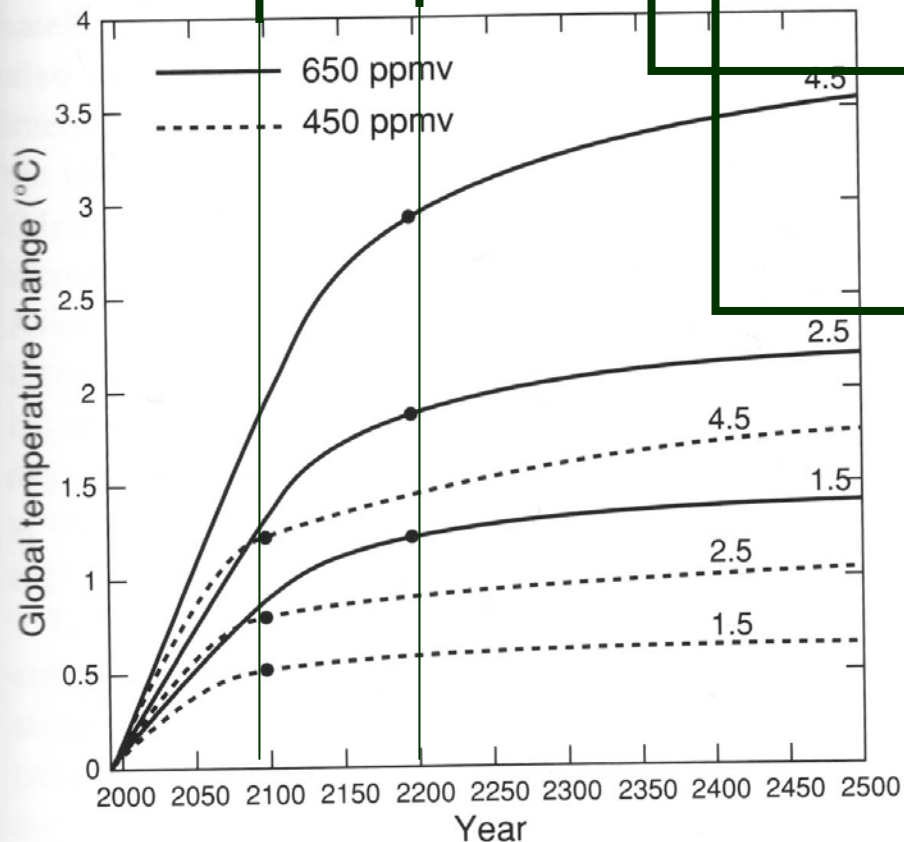
- Fuel switching in the manufacturing industry

When compared to the lowest carbon emissions there exists scope for reduction in average specific carbon emissions

Potential reductions in manufacturing industries



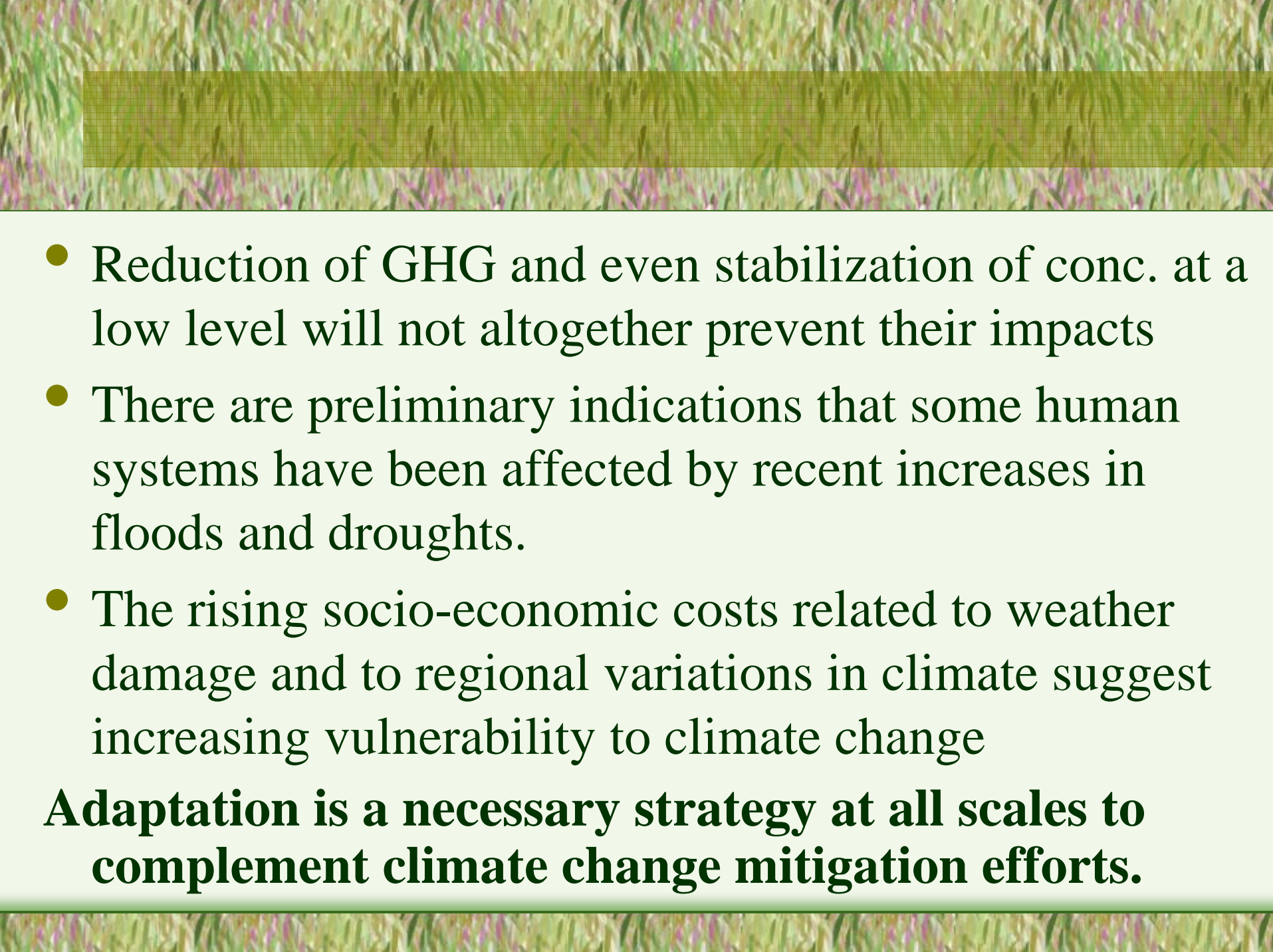
Inertia of the climate system



Conc. stabilization at 450ppmv

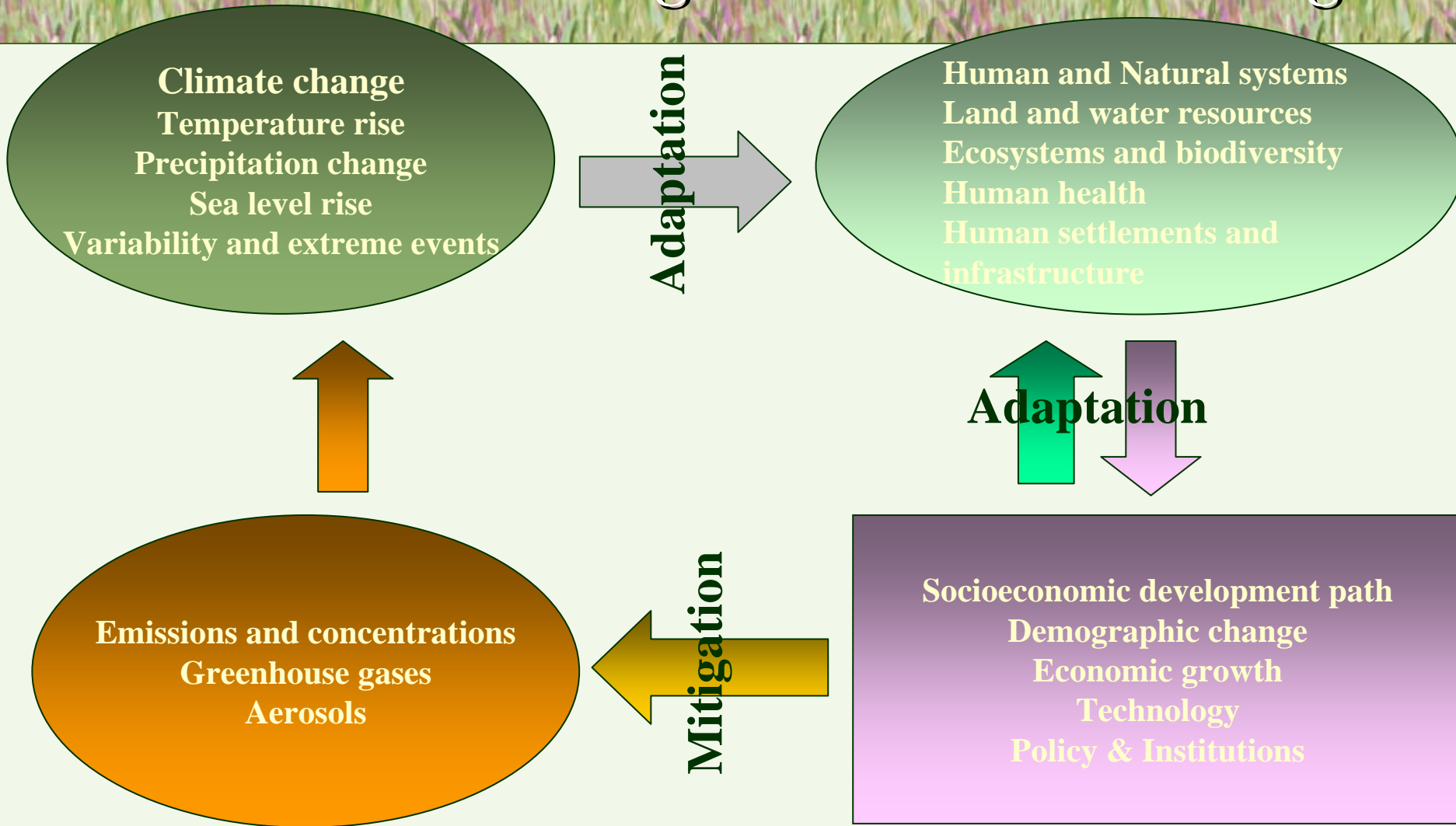
Conc. stabilization at 650 ppmv

Figure 6.26: Temperature changes for different climate sensitivities ($\Delta T_{2\times} = 1.5, 2.5$ and 4.5°C) for CO_2 concentration profiles stabilising at 450 ppmv (dashed lines) in 2100 and 650 ppmv (full lines) in 2200. Stabilisation dates are indicated by the

- 
- Reduction of GHG and even stabilization of conc. at a low level will not altogether prevent their impacts
 - There are preliminary indications that some human systems have been affected by recent increases in floods and droughts.
 - The rising socio-economic costs related to weather damage and to regional variations in climate suggest increasing vulnerability to climate change

Adaptation is a necessary strategy at all scales to complement climate change mitigation efforts.

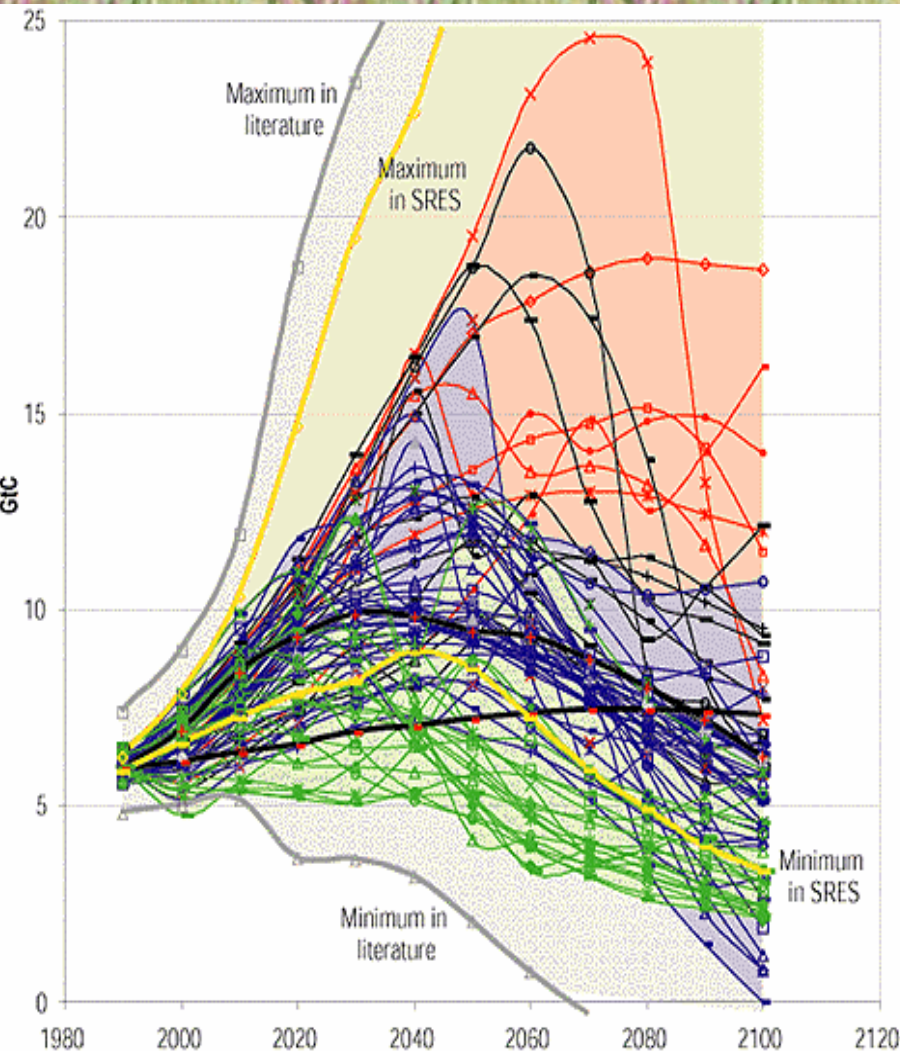
Adopting an integrated approach in dealing with climate change





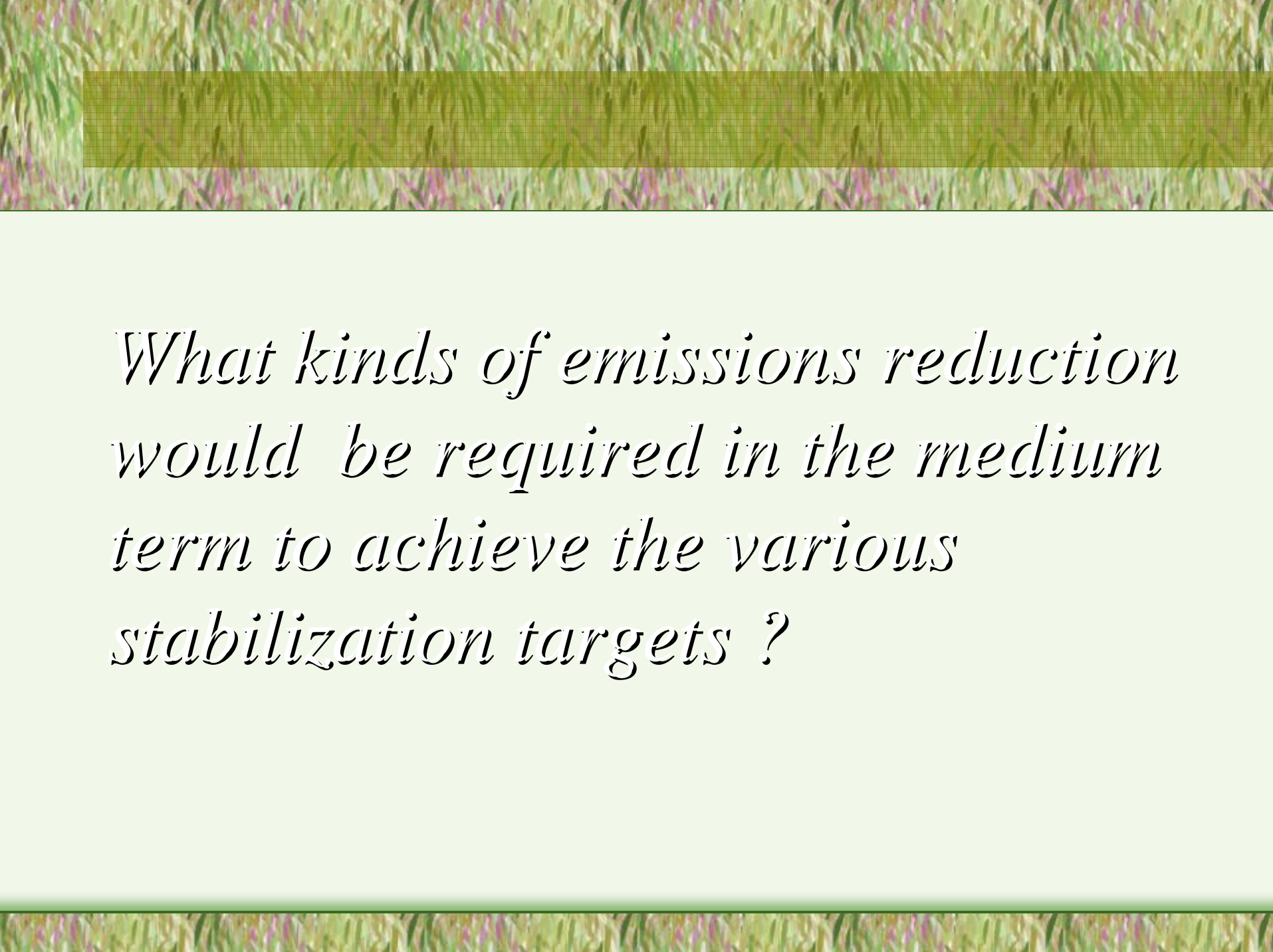
*Looking beyond the first
commitment period*

Alternate stabilization targets

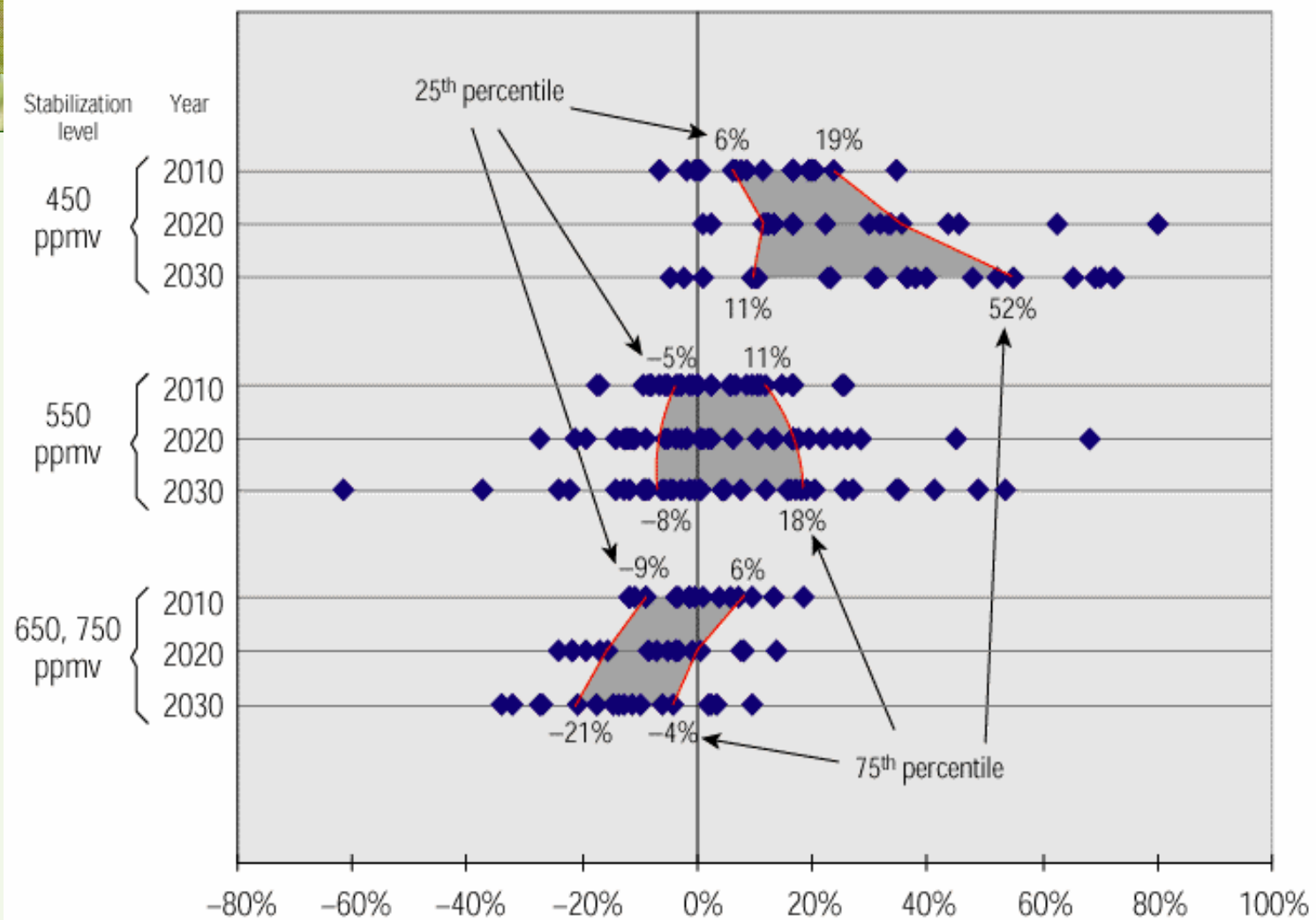


- A2-750 ASF
 - A1F1-750 MESSAGE
 - A1F1-750 MinvCAM
 - A2-750 PETRO
 - A1B-650 MARIA
 - B2-650 MARIA
 - A1F1-650 MESSAGE
 - A1F1-650 MinvCAM
 - A2-650 PETRO
 - A2-550 AIM
 - B2-550 AIM
 - A2-550 ASF
 - A1B-550 LDNE
 - B1-550 LDNE
 - A1F1-550 LDNE
 - A1B-550 MARIA
 - B1-550 MARIA
 - A1B-550 MESSAGE
 - B2-550 MESSAGE
 - A1F1-550 MESSAGE
 - A1B-550 MinvCAM
 - B1-550 MinvCAM
 - B2L-550 MinvCAM
 - A1B-550 PETRO
 - B1-550EA WorldScan
 - B2-550-EA WorldScan
 - A1B-550-DR WorldScan
 - A2-550-DR WorldScan
 - B1-450 IMAGE
 - A1B-450 MARIA
 - B2-450 MARIA
 - A1F1-450 MESSAGE
 - A1T-450 MESSAGE
 - A1F1-450 MinvCAM
 - A2-450 PETRO
 - B1-450-EA WorldScan
 - B2-450-DR WorldScan
 - A1B-450-DR WorldScan
 - A1B-450 WorldScan
 - WRE550
 - SRES-Minimum
 - Database Max
- A2-750 MESSAGE
 - A1F1-750 MESSAGE
 - A1B-750 PETRO
 - A1B-650 AIM
 - A1T-650 MARIA
 - A1B-650 MESSAGE
 - A1F1-650 MESSAGE
 - A1B-650 PETRO
 - A1B-550 AIM
 - B1-550 AIM
 - A1F1-550 AIM
 - A1B-550 IMAGE
 - A2-550 LDNE
 - B2-550 LDNE
 - A1T-550 LDNE
 - A1T-550 MARIA
 - B2-550 MARIA
 - A2-550 MESSAGE
 - A1F1-550 MESSAGE
 - A1T-550 MESSAGE
 - A2-550 MinvCAM
 - B2H-550 MinvCAM
 - A1F1-550 MinvCAM
 - A2-550 PETRO
 - B1-550-DR WorldScan
 - A1B-550-EA WorldScan
 - A2-550-EA WorldScan
 - A1B-450 AIM
 - A1T-450 MARIA
 - B1-450 MARIA
 - A1B-450 MESSAGE
 - A1F1-450 MESSAGE
 - B1-450 MinvCAM
 - A1B-450 PETRO
 - B1-450-DR WorldScan
 - B2-450-EA WorldScan
 - A1B-450-EA WorldScan
 - A2-450-EA WorldScan
 - WGI550
 - SRES-Maximum
 - Database Min.

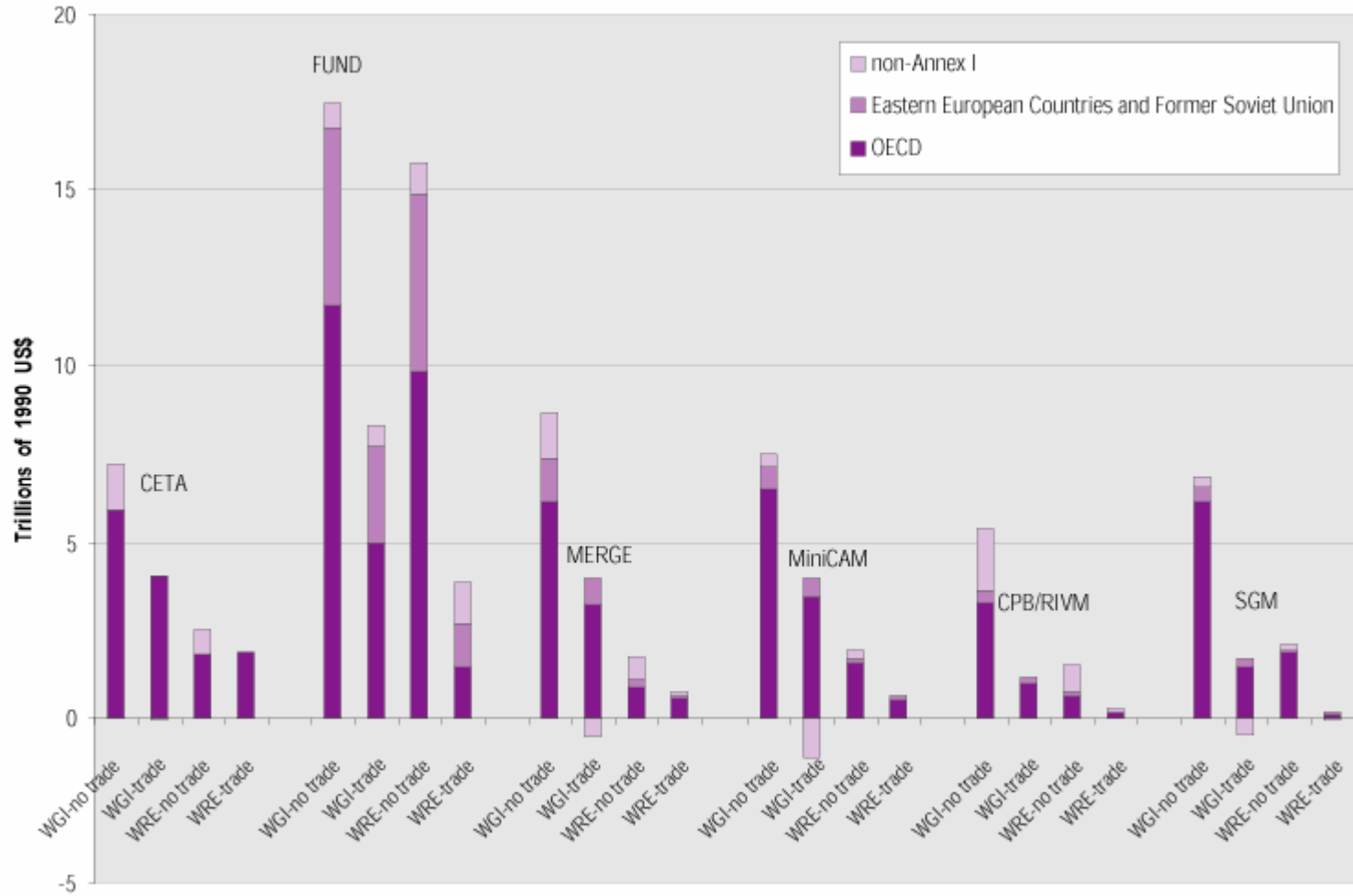
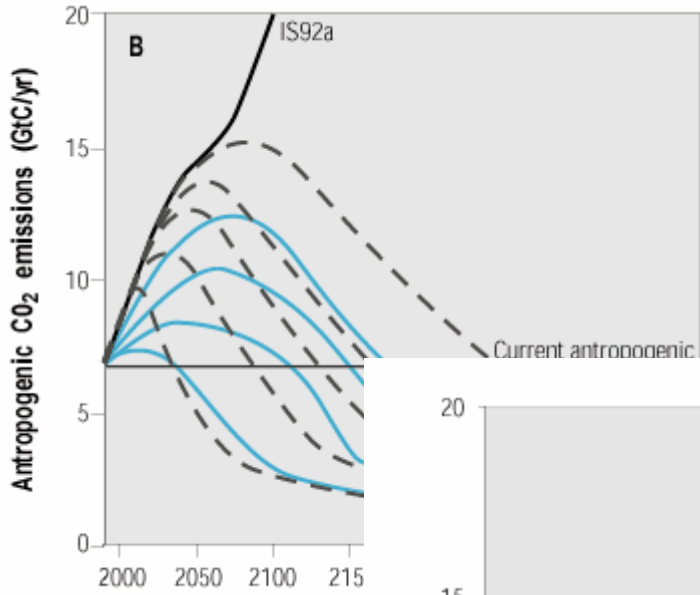
Red - 750 ppm
 Black - 650 ppm
 Blue - 550 ppm
 Green - 450 ppm



What kinds of emissions reduction would be required in the medium term to achieve the various stabilization targets ?

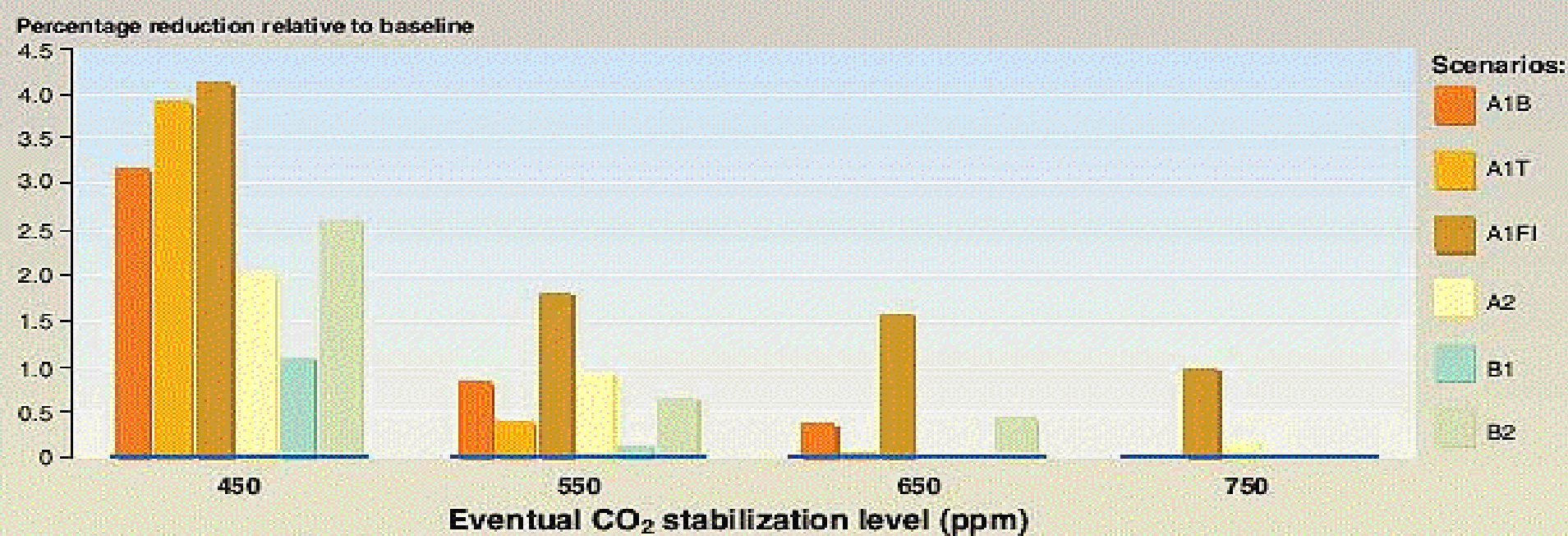


Cost of stabilization routes



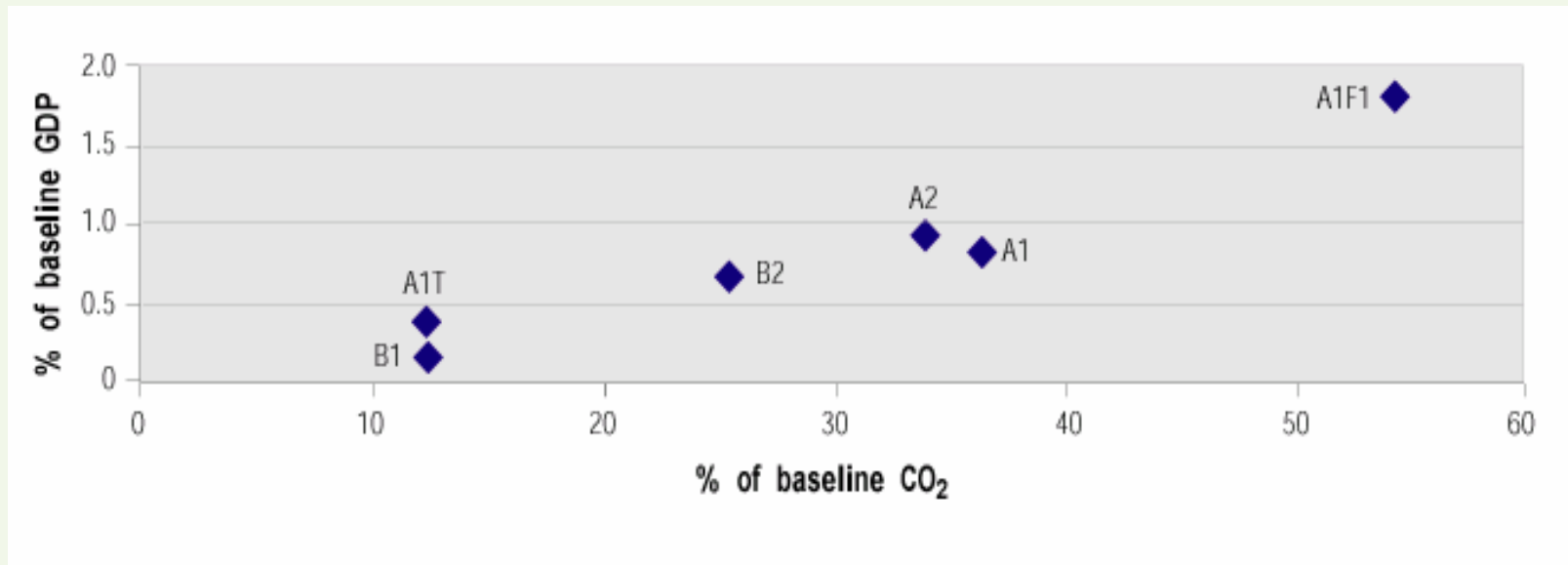
IPCC TAR,
WGIII

Global average GDP reduction in the year 2050



- Rapid rise in costs of mitigation when moving from 550 ppm regime to 450 ppm

Cost of stabilizing



The costs are sensitive to the choice of the baseline scenarios



*What constitutes dangerous
interference with climate system ?*

Responses to climate change


- Climate thresholds are complicated and levels of confidence to establish them vary with systems
- On exceeding climate thresholds, potentially damaging things may occur - these responses may be nonlinear, complex or discontinuous

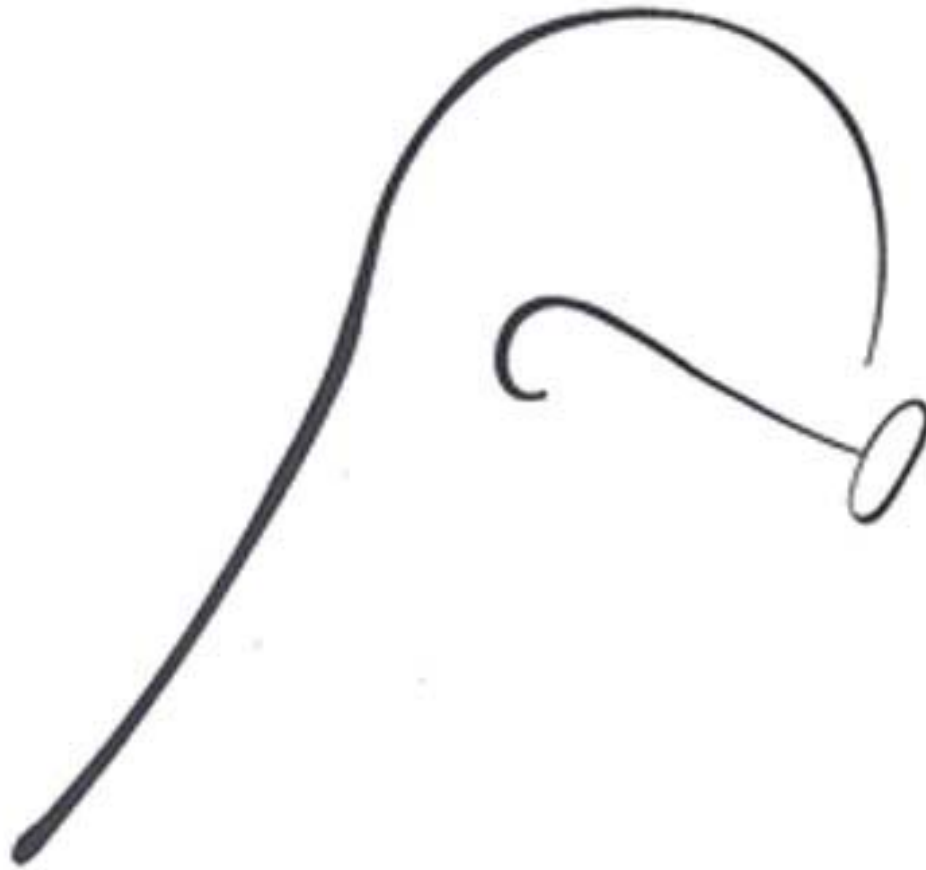
But it may be said

- Reducing emissions of GHGs to stabilize their atmospheric concentration would delay and reduce damages caused by climate change
 - GHG emissions reduction (mitigation) actions would lessen the pressures on natural and human systems from climate change
 - Mitigation actions to stabilize concentrations at lower levels generate greater benefits in terms of less damage

The role of IPCC- AR4

- Provide an integrated assessment of the status of scientific knowledge -addressing cross cutting issues by adopting specific themes for AR4
- Effort would be made to make it more ‘policy relevant’ by attempting to provide the public with
 - better regional scale assessment -focussing on regional concerns
 - quantification of uncertainties and
 - assessment of the link between climate change and development
 - risk management -options for hedging risks?

- 
- This round of assessment would also focus on integrated approaches to adaptation and mitigation in minimising climate related damages
 - Focus on developing countries
 - Inspire further research
 - involve experts as lead authors
 - Provide adequate coverage on socio-economic analysis of actions (adaptation and /or mitigation) Vs inaction and co benefits at a regional level



Man did not weave the web of life; he is merely a strand in it.

Whatever he does to the web of life, he does to himself