Planbureau voor de Leefomgeving

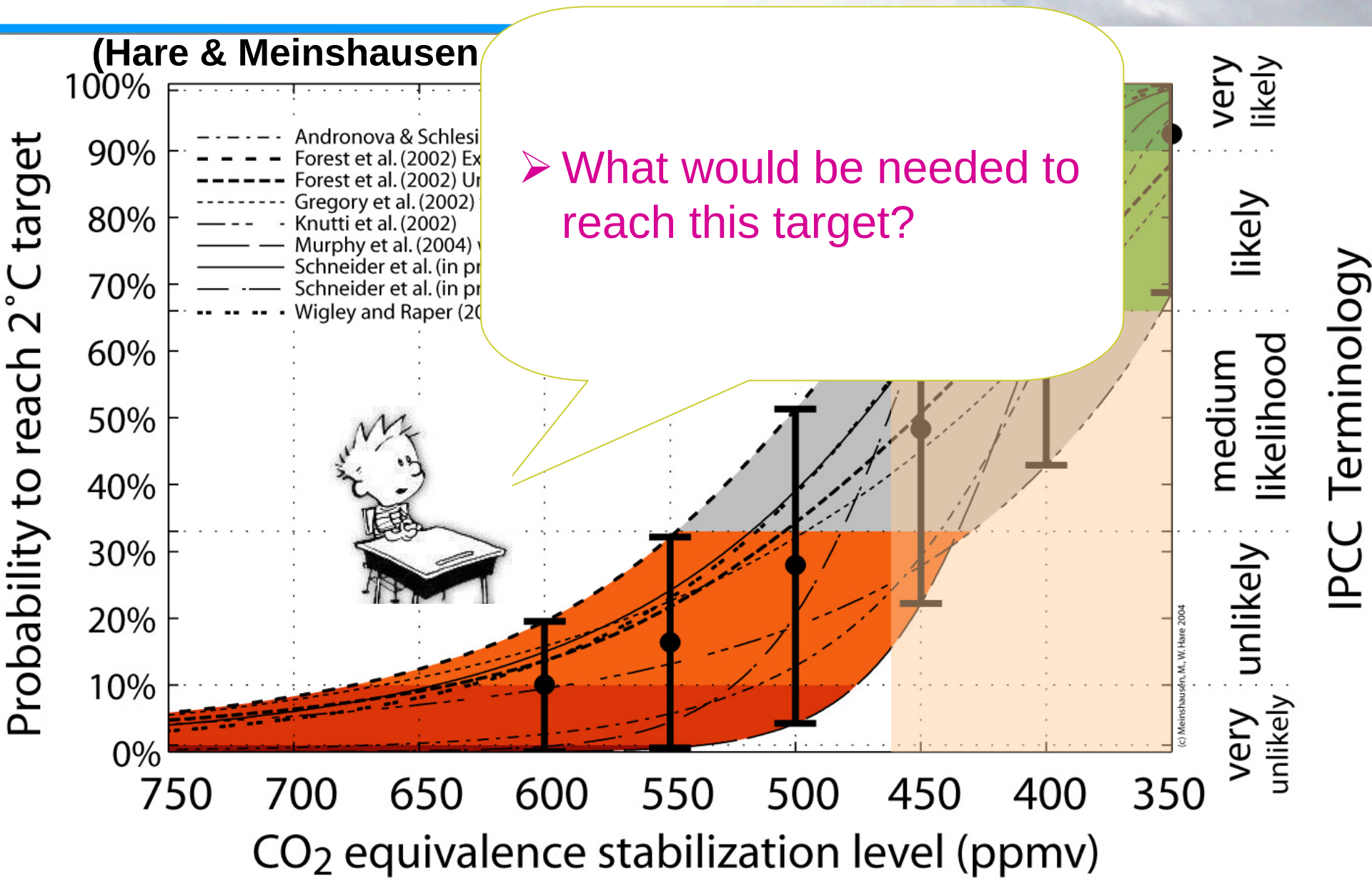
IMAGE RCP2.6

Tokyo, September 2009

Detlef van Vuuren, Tom Kram

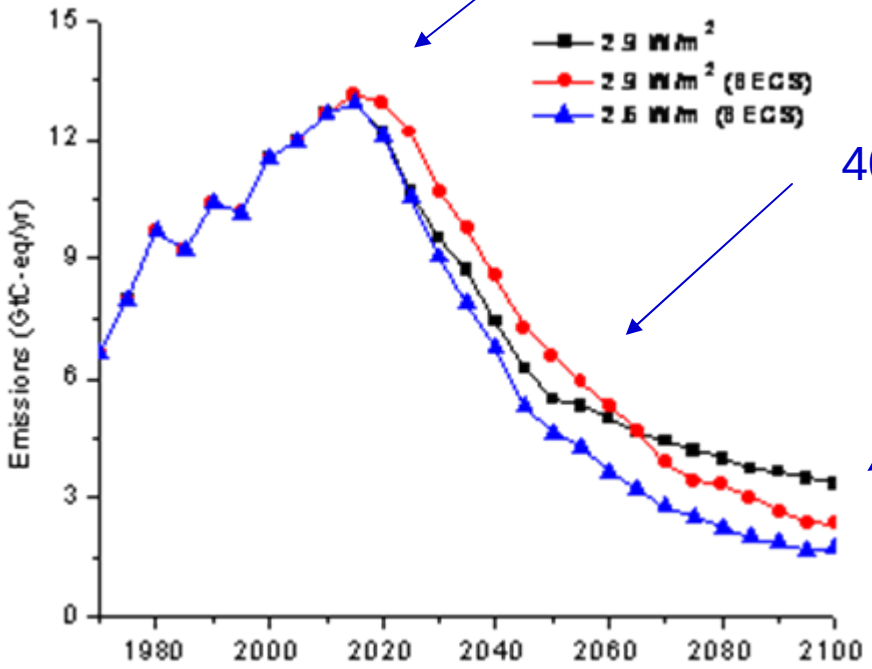
The probability to reach the 2°C target

(Hare & Meinshausen



- What would be needed to reach this target?

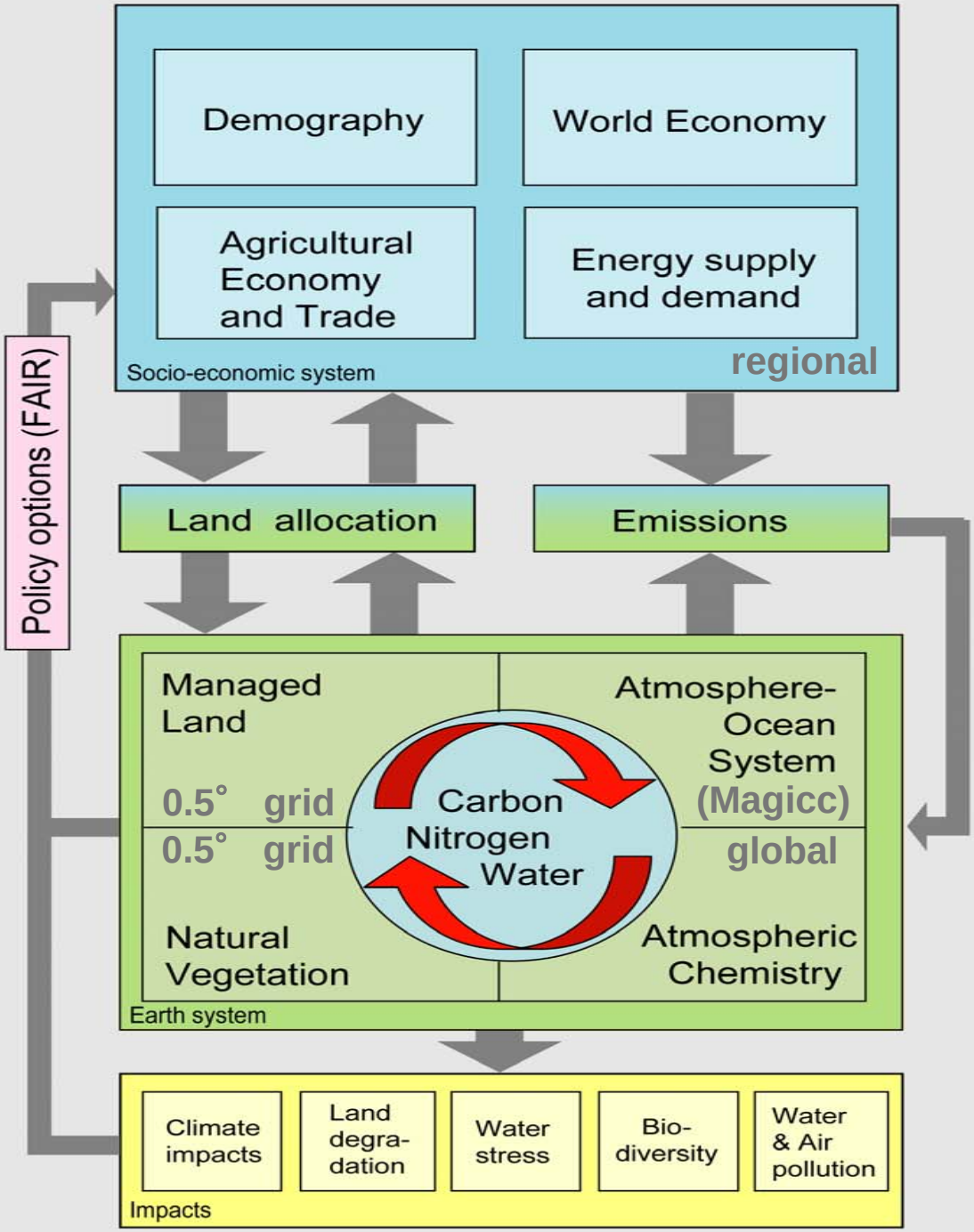
RCP 2.6



Peak in 2020/2025

40-50% reduction in 2050

Net negative for CO_2 in 2100



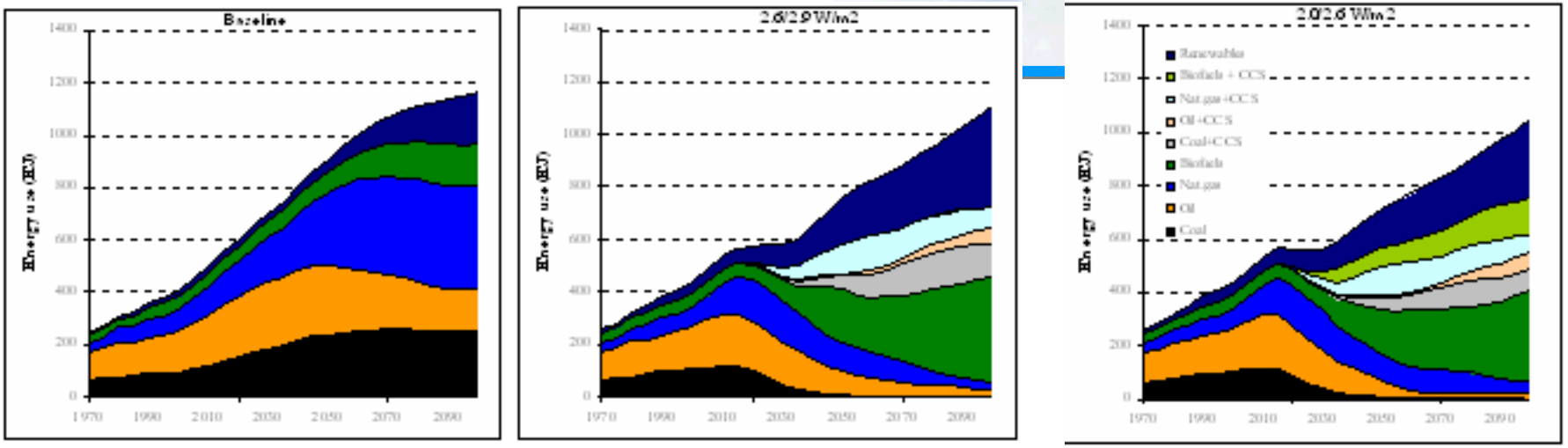
mitigation

Baseline (BL)

IMAGE modelling framework

IMAGE 2.4
www.mnp.nl/image

RCP 2.6



Nuclear | Biofuels + CCS | Oil+CCS | Biofuels | Oil

Renewables | Natural gas+CCS | Coal+CCS | Natural gas | Coal

- Major changes in the global energy system

Default

BioEnergy +

CCS (BECS

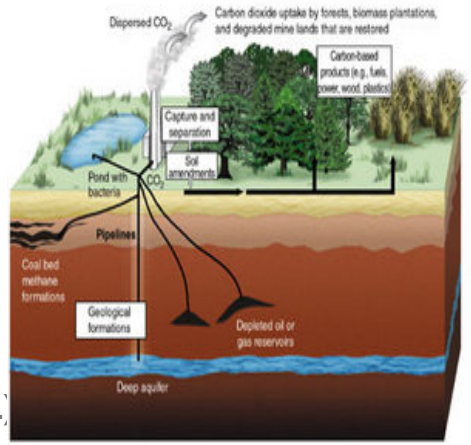
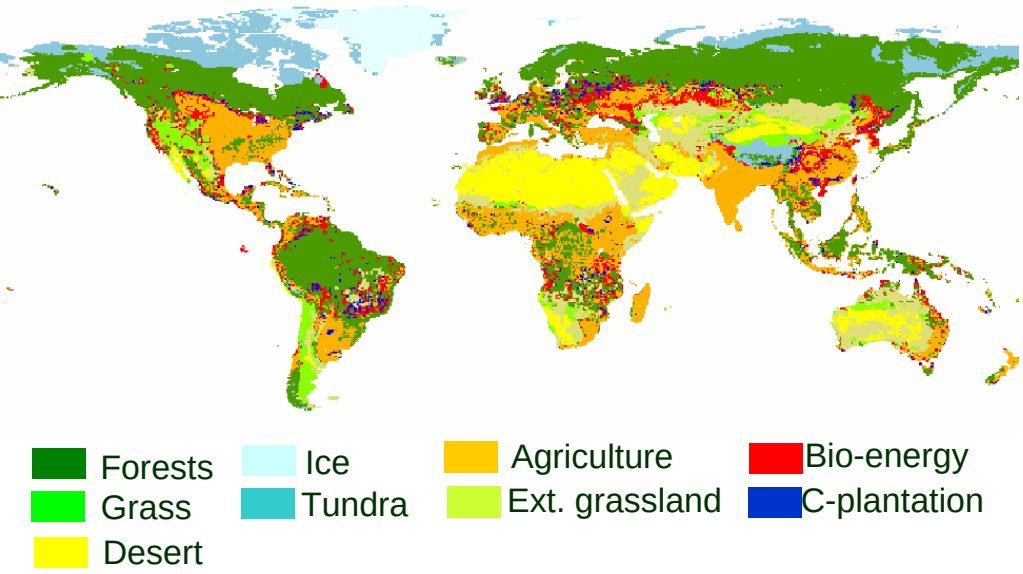


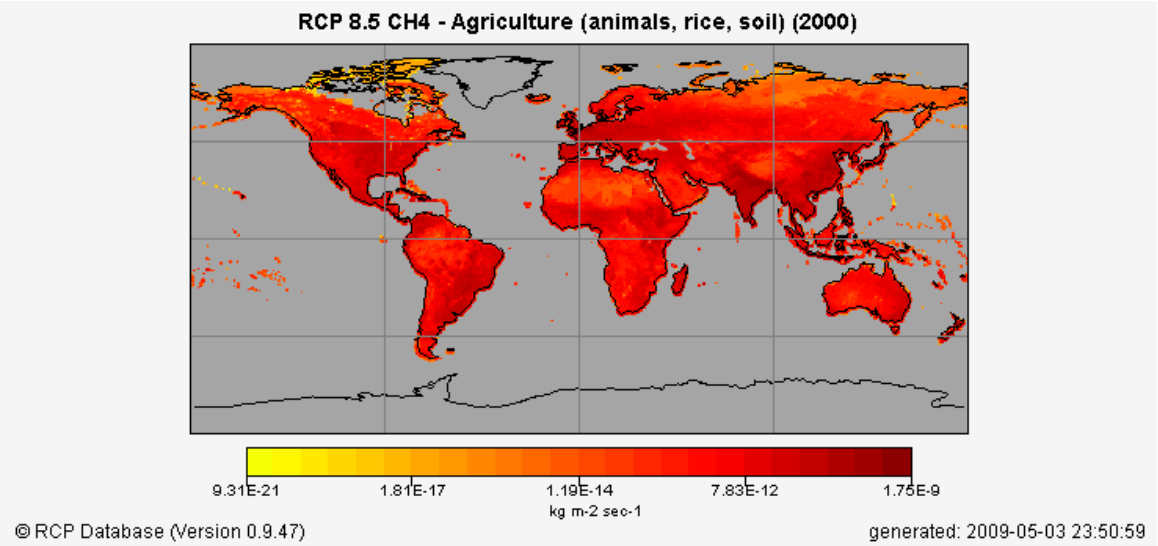
IMAGE 2.6

- Published in Climatic Change (2007), Energy (2007)
- Further review by IAMC

- Implemented in energy system model / physical world oriented IAM by cost-optimisation over time reducing abatement costs (all gases, land use)
- Most important measures include energy efficiency, CCS, bio-energy + CCS… non-CO_2, nuclear, renewables

Most information now available at 0.5x0.5 degree





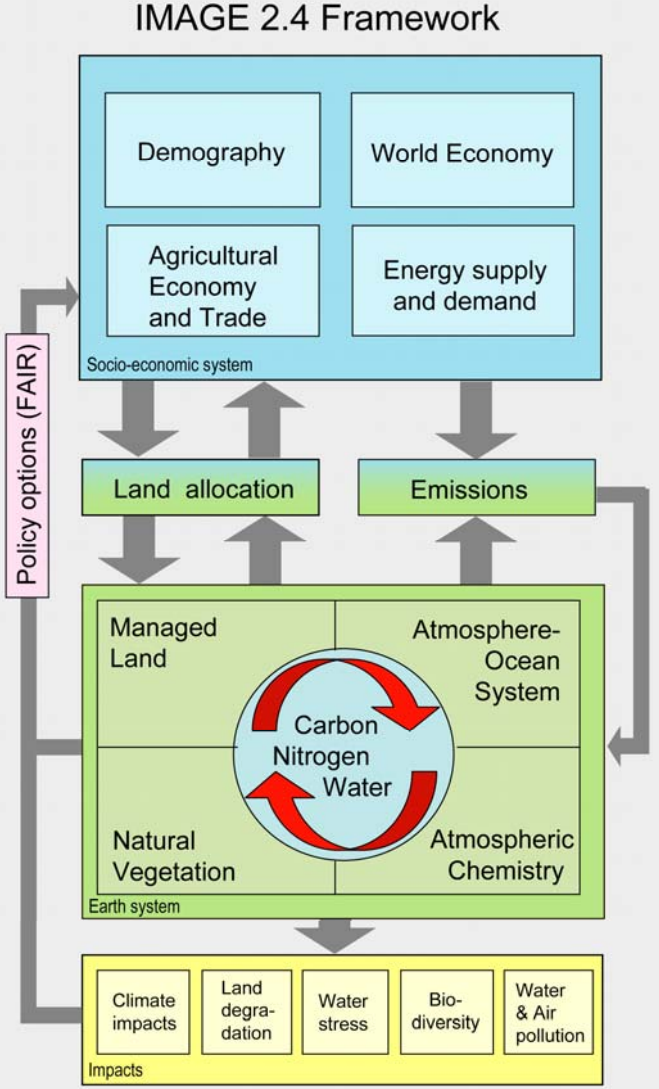


IMAGE 2.6 “inspired” lot of followers…

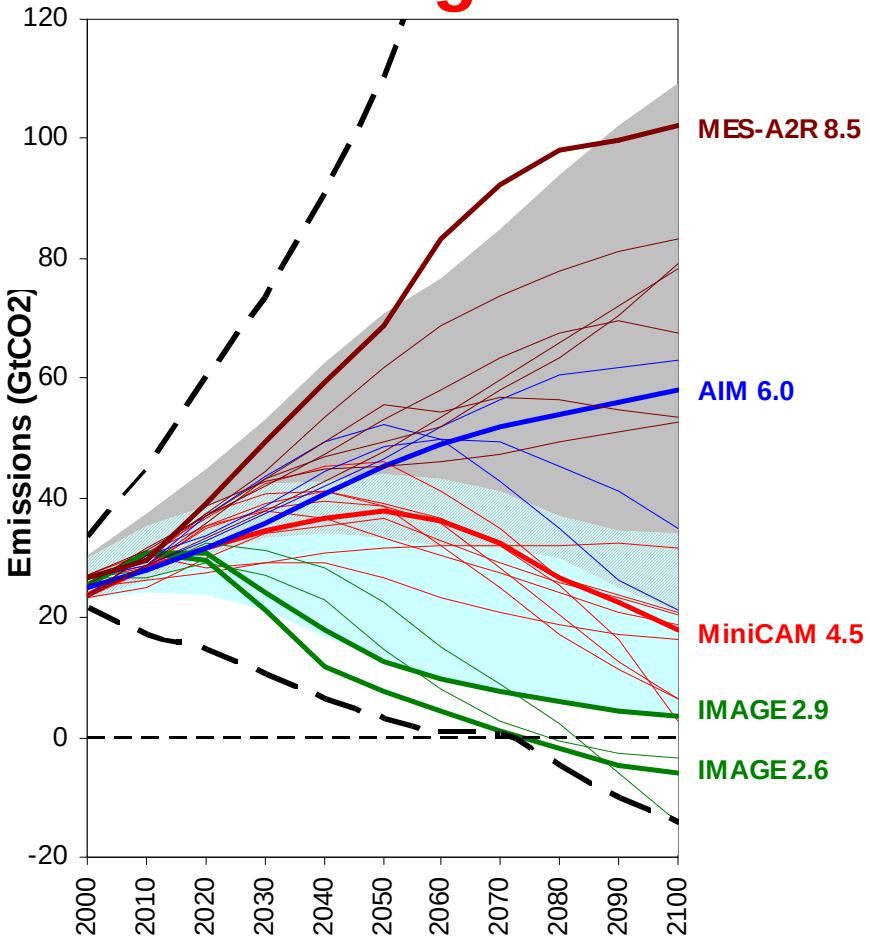
Table: Description of scenario literature on medium to low mitigation scenarios

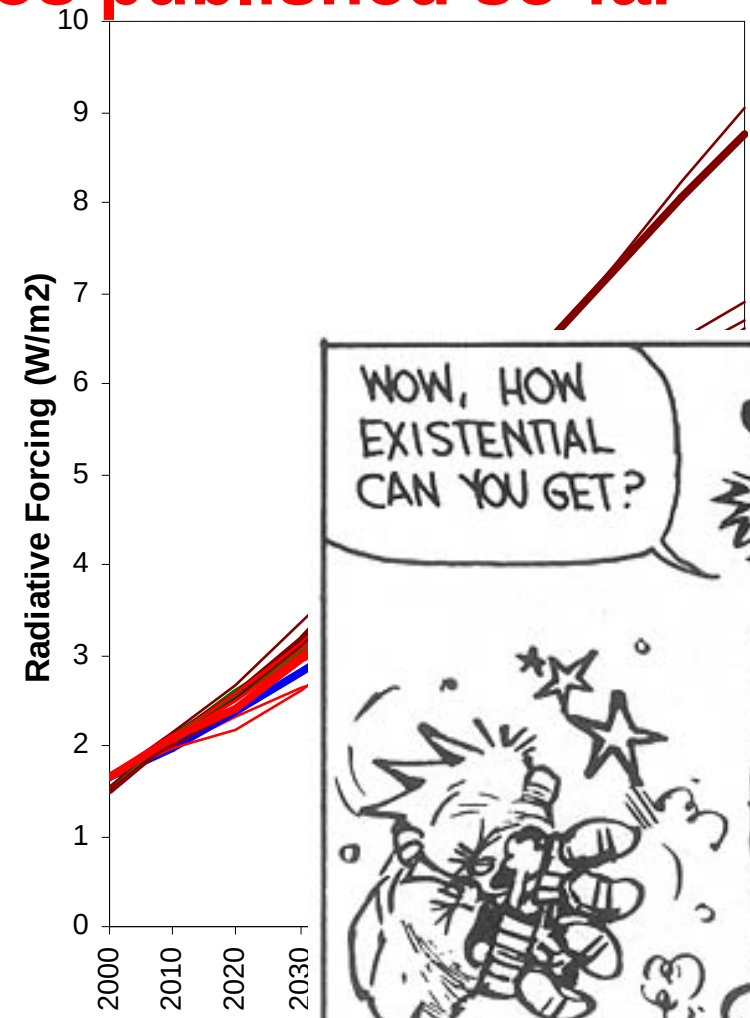
	Peaking year	2050	No. of scenarios	Cumuative emission 2000-2050	Cumulative emissions 2000-2100
I	**<2020** *(<2015)*	-85 to **-40** *(-50)*	**27** *(6)*	220-370	220-415
II	<2020	**-55 to -25** *(-60 to -30)*	**25** *(18)*	280-430	385-485
III	**<2040** *(<2030)*	-30 to 25	**79** *(21)*	355-460	550-655

Note: Table account for the studies included in AR4, EMF-22, the ADAM project and the Rao et al. (2008) study.

Questions based on being the lowest

Range of Scenarios published so-far





Research question based on RCP2.6 (1/7)

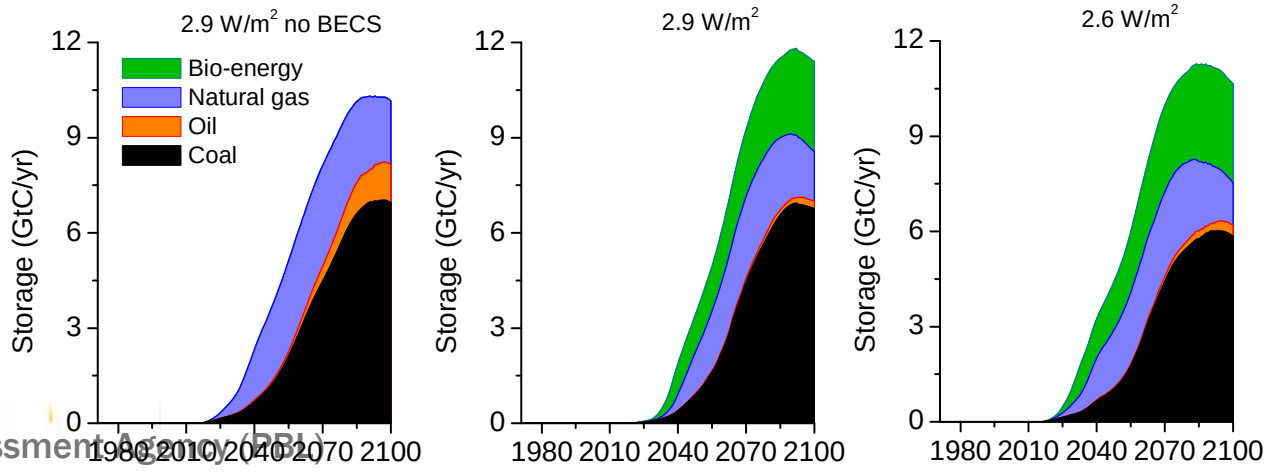
- How many technologies can you loose?
- Amount of CCS feasible??

MESSAGE

	Default	Biomass constraint	Nuclear constraint	No CCS	No Bio-CCS	No sinks	Eff. constraint
	Yes	Yes	Yes	No	No	No	No

IMAGE

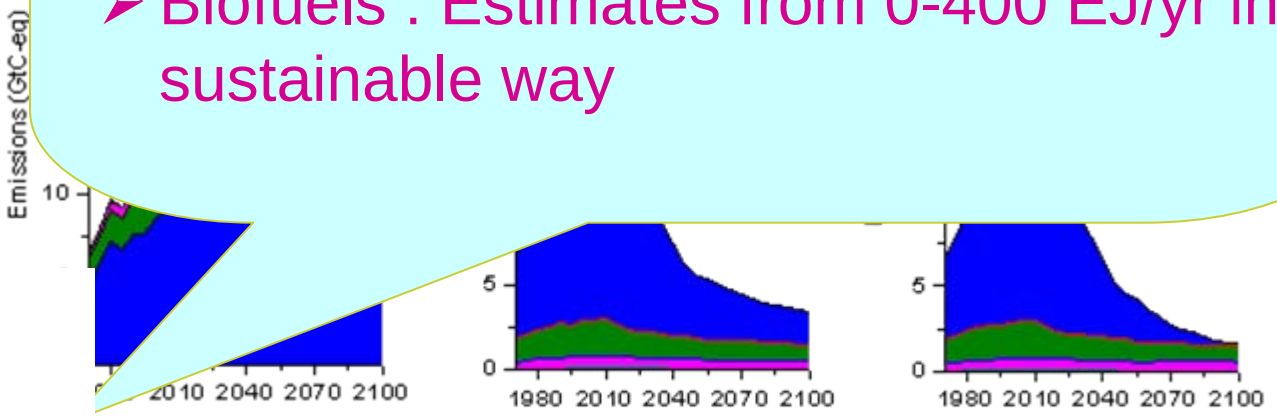
	Default	No Bio-CCS	No-CCS	Eff. constraint	A2 land use
	Yes	2.9	3.5	3.2	3



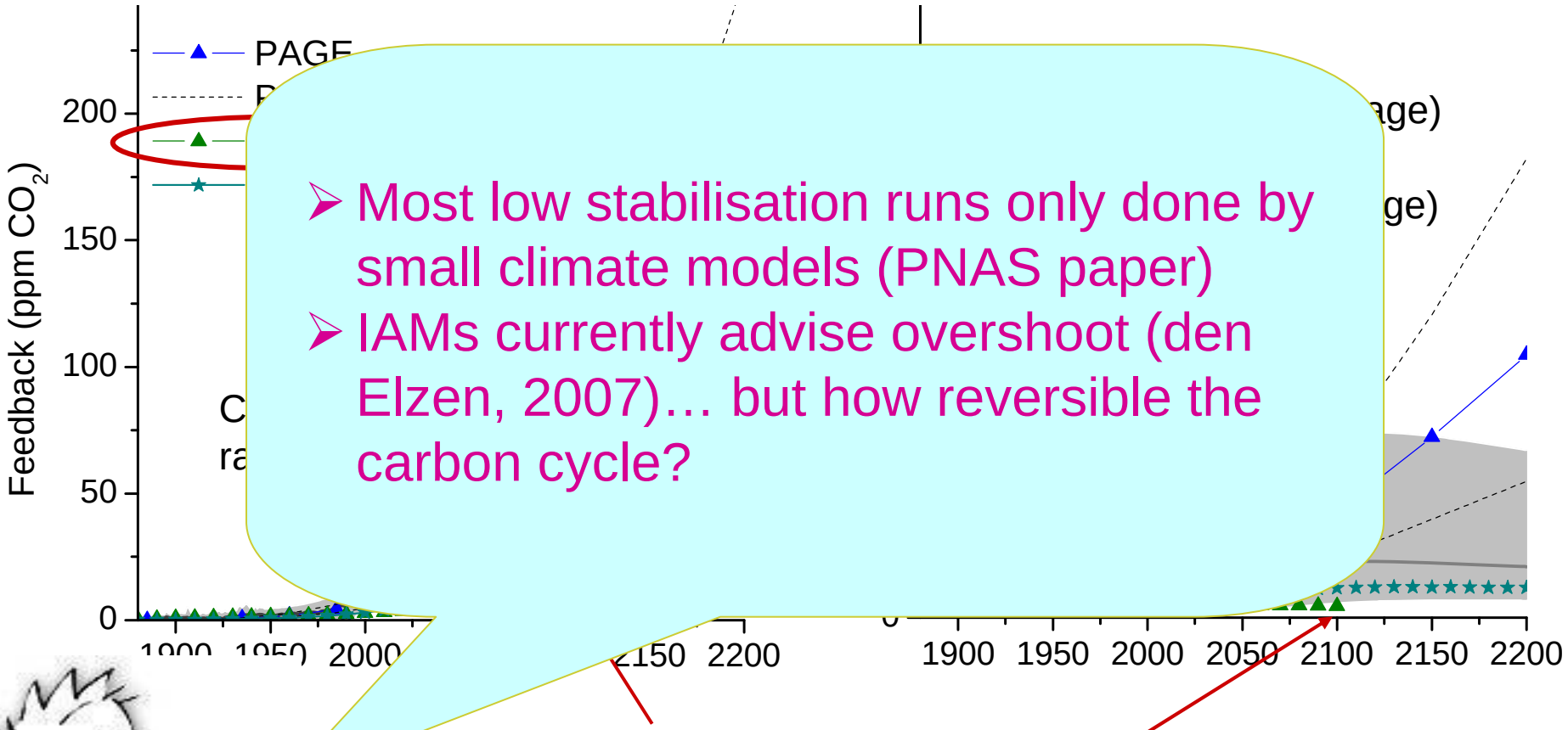
Research question based on RCP2.6 (2/7)

What can be achieved by non-CO_2/for

- Lot of uncertainty for forestry – and little integrated assessment
- For non-CO_2 emissions reduction potential still limited to around 50%.
- Biofuels : Estimates from 0-400 EJ/yr in sustainable way



Is the experiment reproducible under different climate cycle assumptions (3/7)



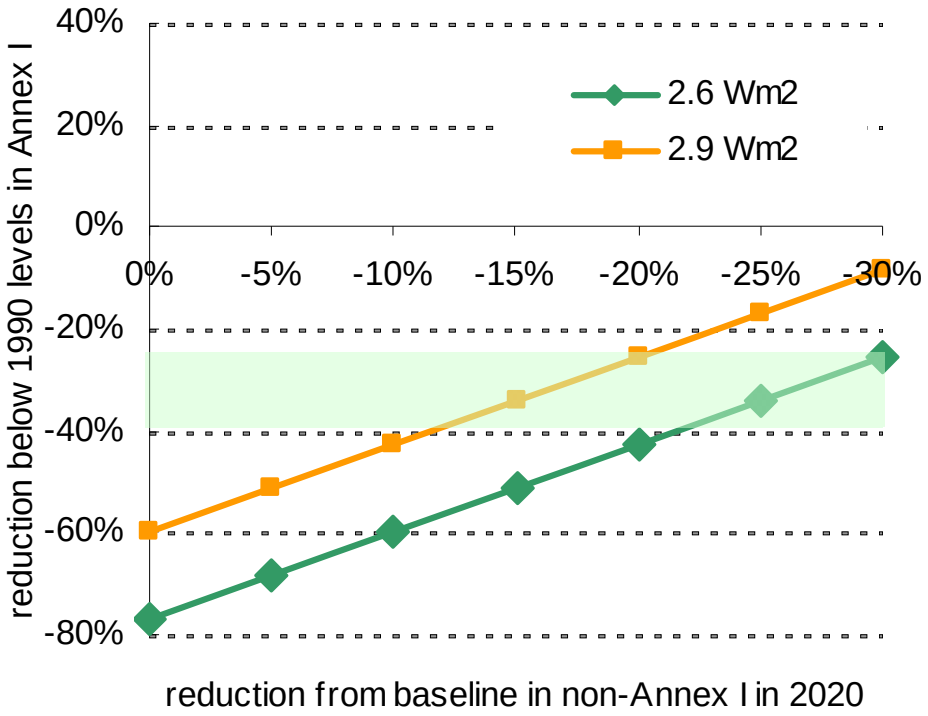
- Most low stabilisation runs only done by small climate models (PNAS paper)
- IAMs currently advise overshoot (den Elzen, 2007)… but how reversible the carbon cycle?

he low end of climate-carbon cycle feedback

backs related to tundra, ecosystem response, artic etc.

When do countries need to reduce emissions (4/7)

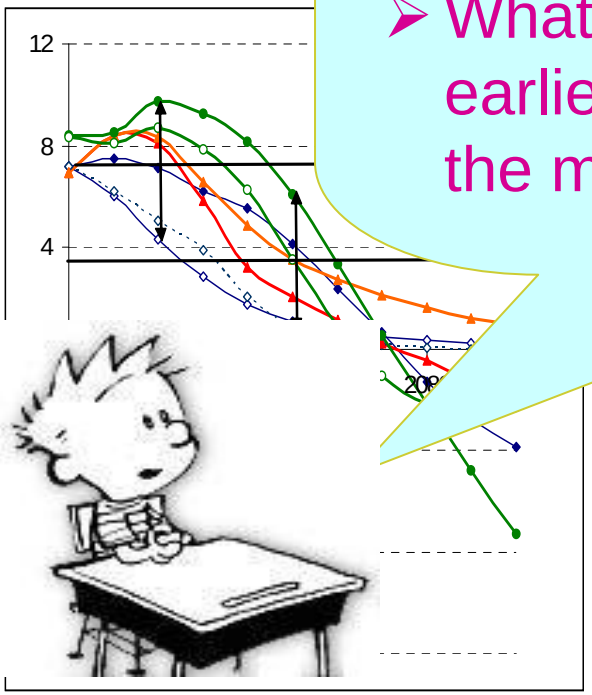
- EMF-22: 2.6 W/m^2 not feasible with strong delay in participation of developing countries (China/India/Brazil/Russia 2030-2050; Rest > 2050)

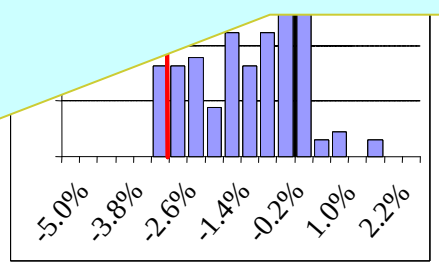


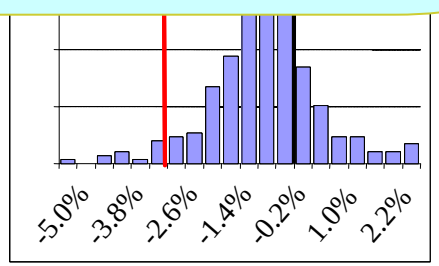
Research question based on RCP2.6 (5/

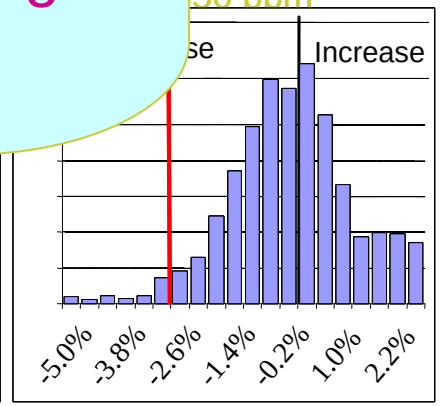
The maximum speed of reduction

- How to achieve this?
- What is the maximum speed of reduction (socially / politically)?
- Building global coalitions?
- What experience do we have from earlier situations (CFCs, WTO, putting the man on the moon…)







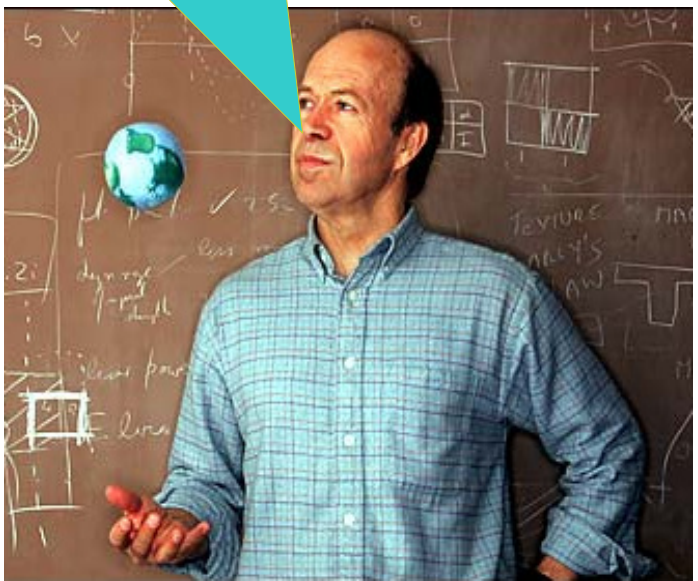


Avg. Max rate:	-2.8%	-2.5%	-2%
Avg. Rate:	-1.1%	-0.6%	-0.2%

Is the IMAGE 2.6 too high or too low (costs and benefits) (6/7)?

Bill Nordhaus (2007)
The optimal policy reduces the global temperature rise relative to 1900 to 2.8 °C in 2100 and to 3.4 °C in 2200.

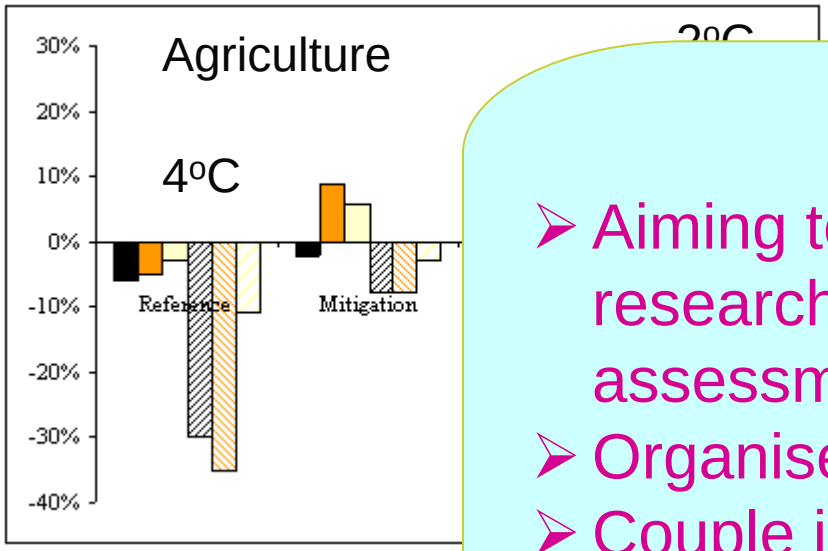
Jim Hansen (2007):
Based on climate model studies and the history of the Earth, the Hansen and Sato conclude that additional global warming of about 1ºC or more, above global temperature in 2000, is likely to be dangerous.

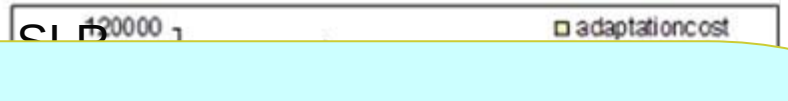


al Assessment A

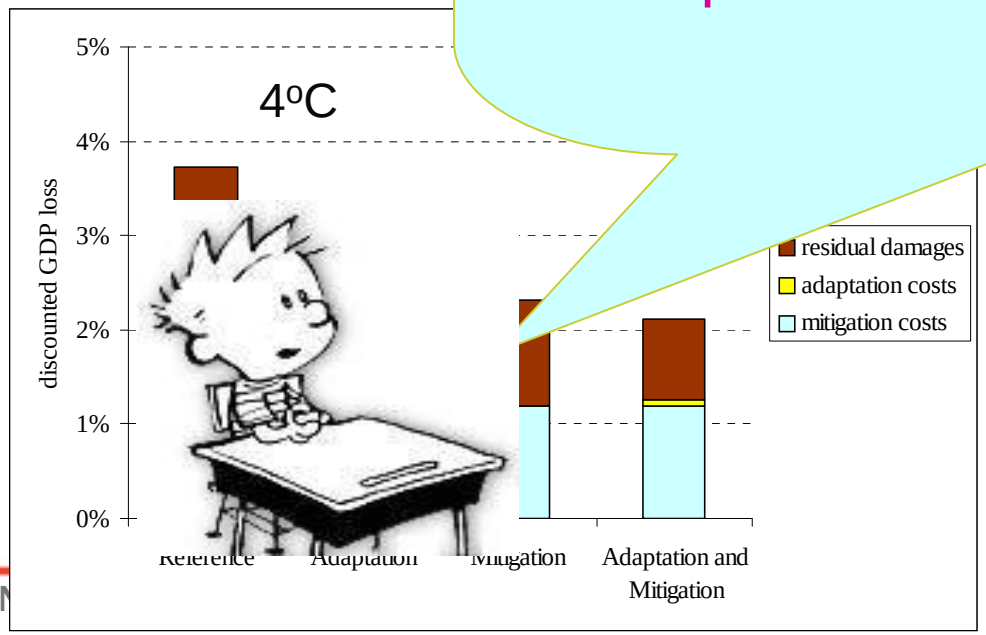
Research question based on RCP2.6 (7/7)

Bringing impacts, adaptation and mitigation together





- Aiming to integrate impact/adaptation research better into the mainstream assessment
- Organise these communities
- Couple it better to IA



(keep risk approach / monetary approach connected)

Make adaptation explicit