Preventing Dangerous Climate Change

Session 10

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Changing Planet Study Group

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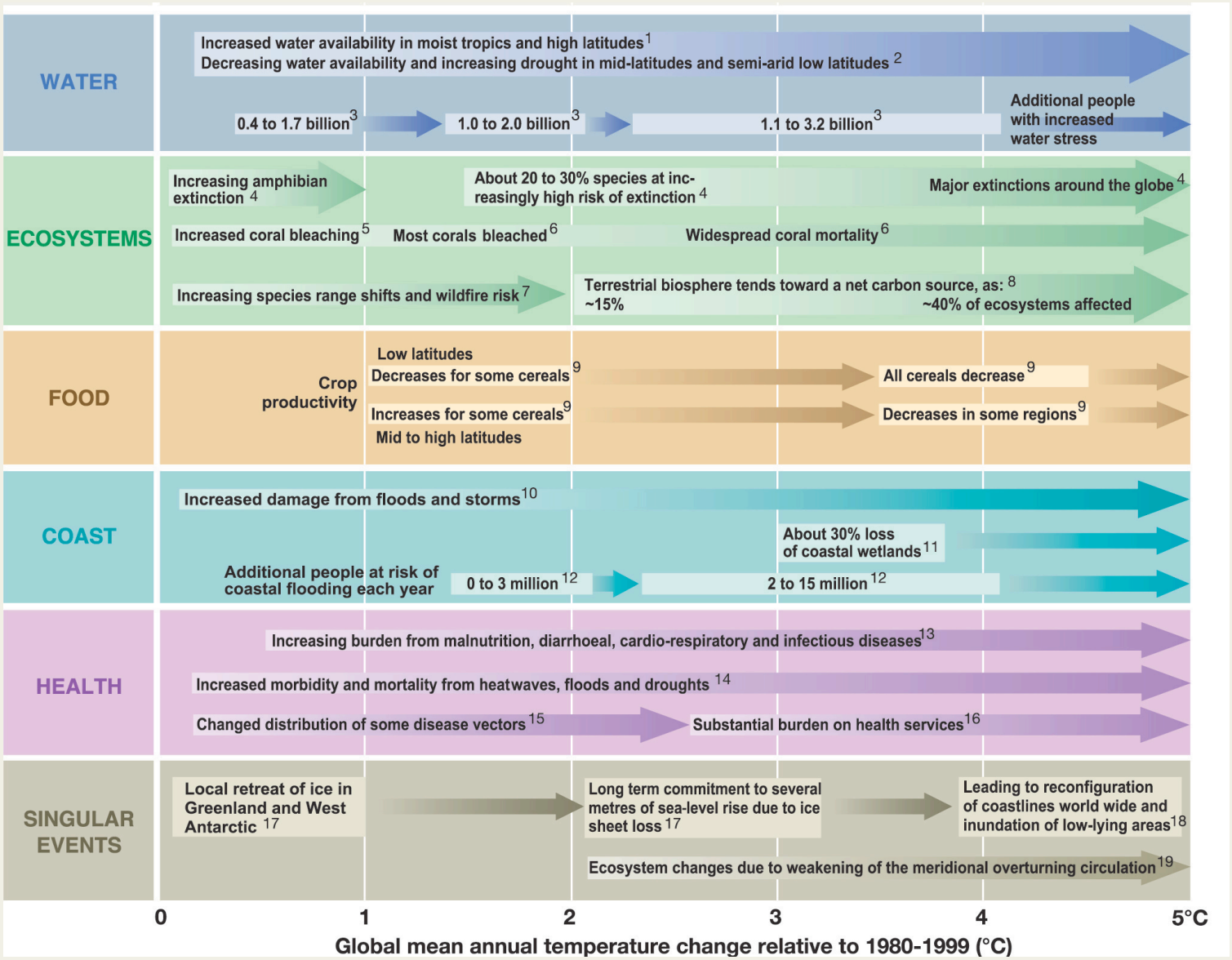
Photo: Roger Braithwaite, University of Manchester

Cooling the Liberal Arts Curriculum
A NASA-GCCE Funded Project

Ultimate objective of UNFCCC

- Article 2: "The ultimate objective of this Convention . . . is to achieve . . .

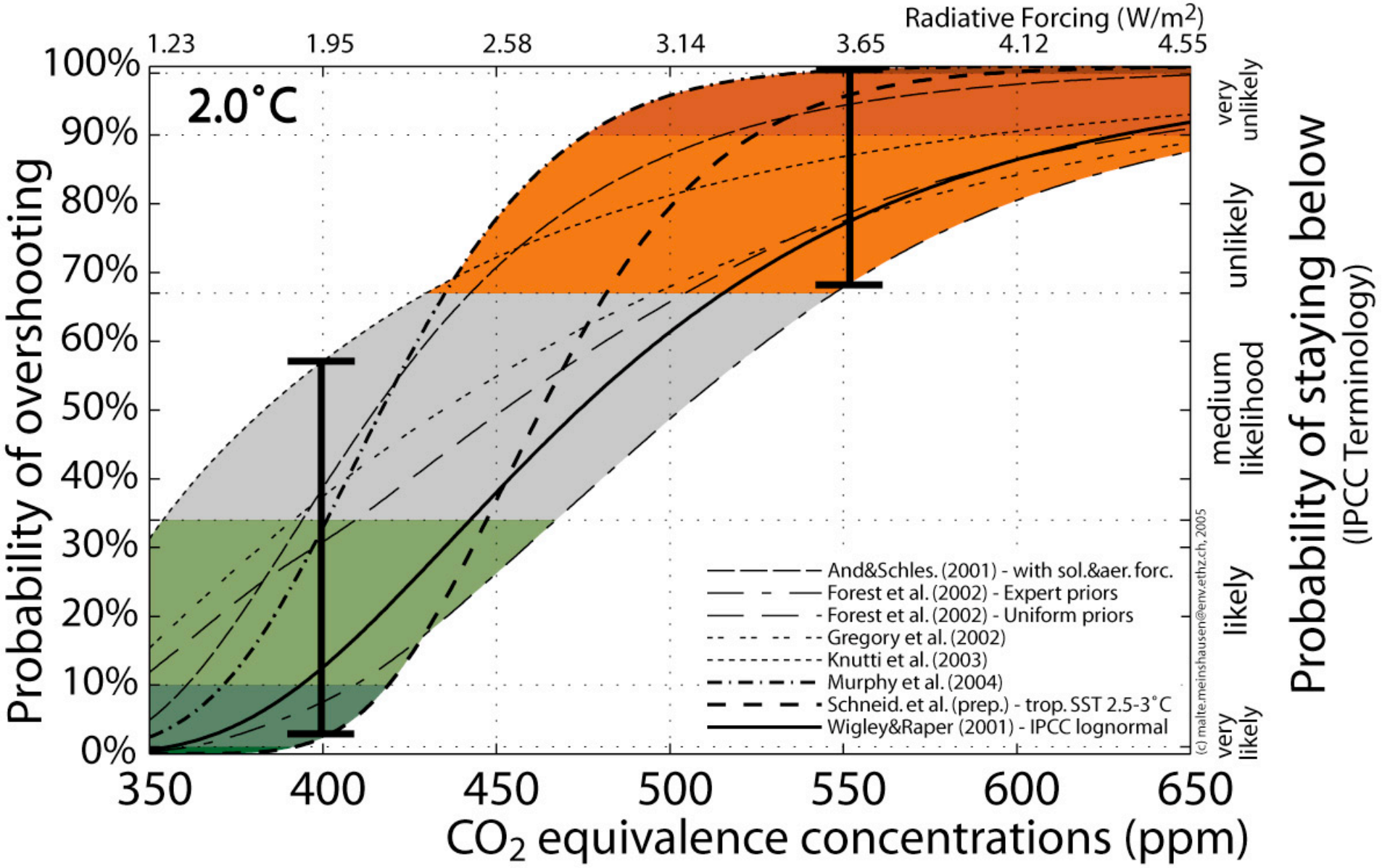
stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."



Source: IPCC 2007 WG2, Table 20.8

Probability of overshooting 2°C (stabilisation)

Meinshausen, 2005, Scientific Symposium on Avoiding Dangerous Climate Change, Exeter, UK



Jim Hansen: must aim lower than 450 ppm

Metrics for "Dangerous" Change

Extermination of Animal & Plant Species

1. Extinction of Polar and Alpine Species
2. Unsustainable Migration Rates

Ice Sheet Disintegration: Global Sea Level

1. Long-Term Change from Paleoclimate Data
2. Ice Sheet Response Time

Regional Climate Disruptions

1. Increase of Extreme Events
2. Shifting Zones/Freshwater Shortages

Slide from J. Hansen's presentation to National Press Club, June 2008

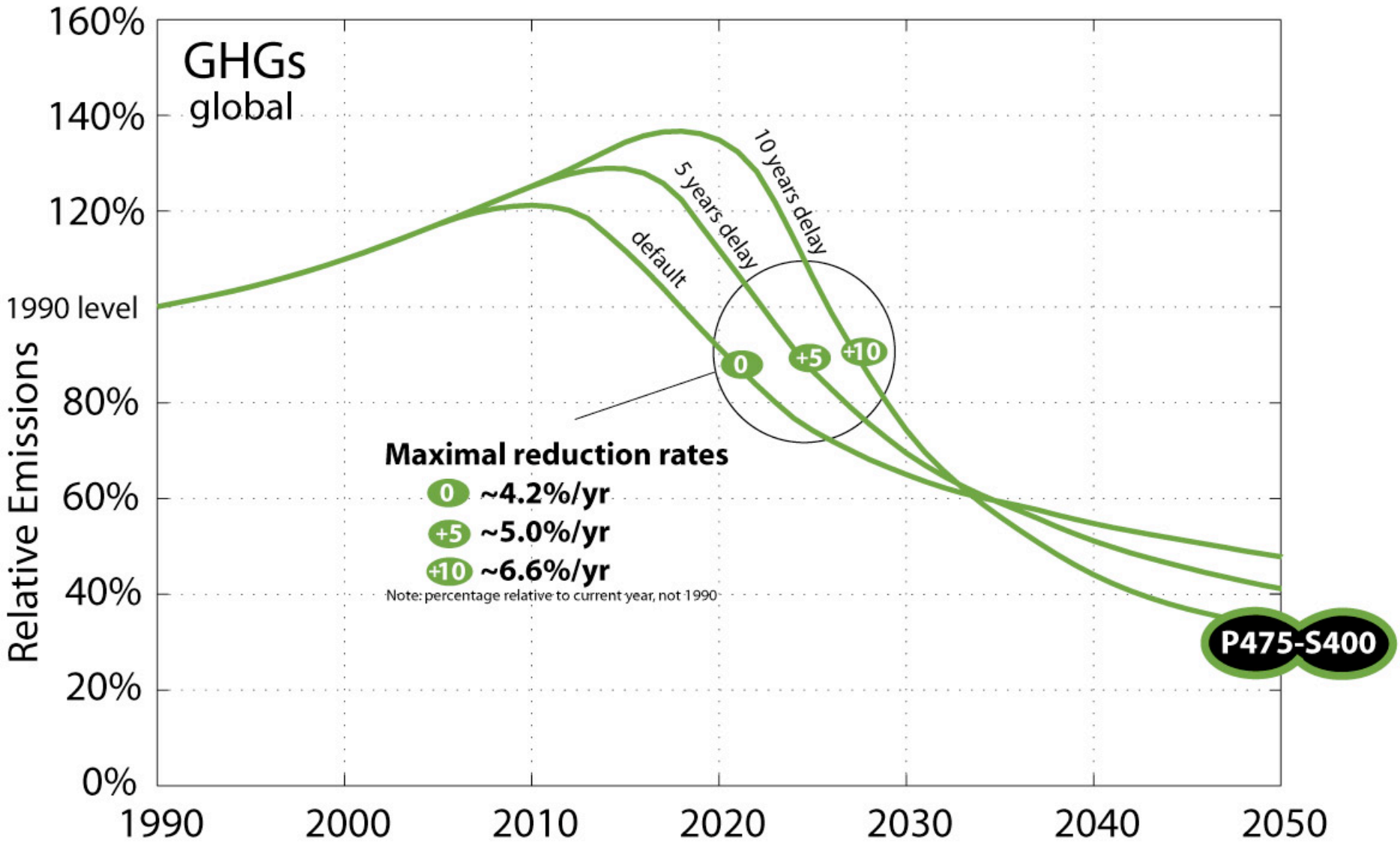
Hansen's prescription for 350 target

1. **Phase Out Coal CO_2 Emissions**
   - by 2025/2030 developed/developing countries
2. **Rising Carbon Price**
   - discourages unconventional fossil fuels & extraction of every last drop of oil (Arctic, etc.)
3. **Soil & Biosphere CO_2 Sequestration**
   - improved farming & forestry practices
4. **Reduce non-CO_2 Forcings**
   - reduce CH_4, O_3, trace gases, black soot

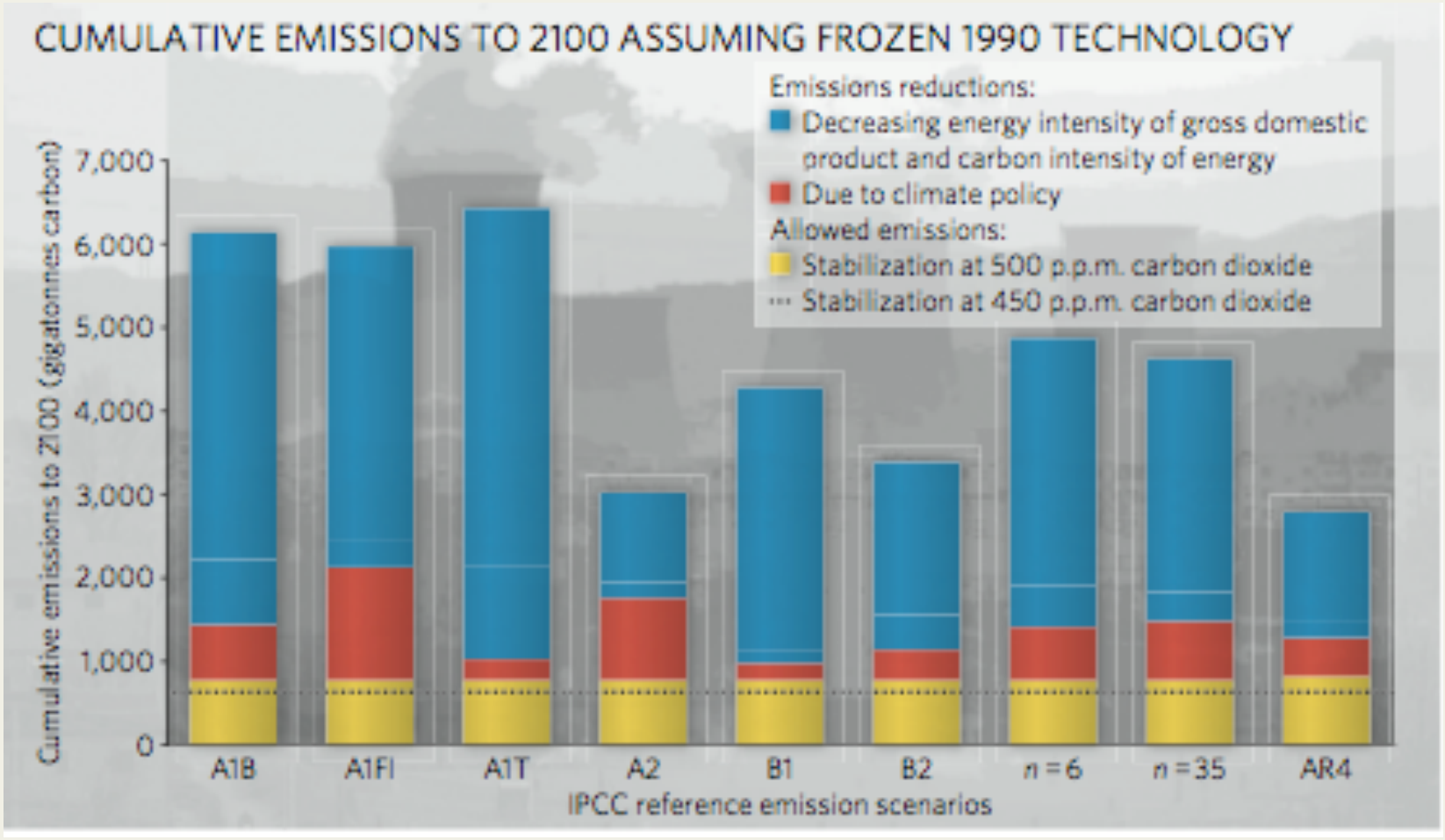
Slide from J. Hansen's presentation to National Press Club, June 2008

The Effect of Delay (same risk of overshooting)

Meinshausen, 2005



How hard will it be?



Climate change a ‘wicked’ problem

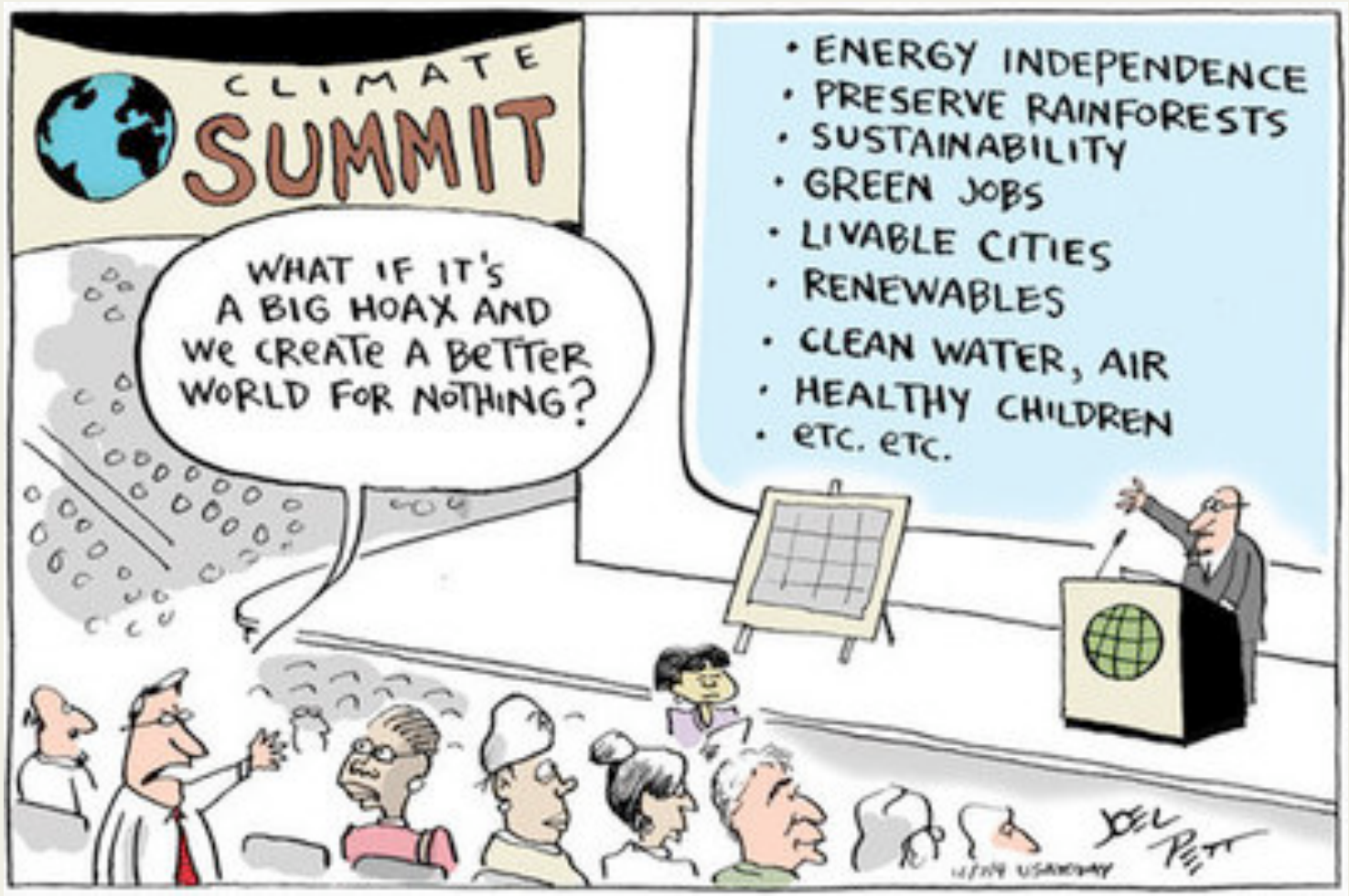
- Wicked problems:
  - Unique, no definitive formulation
  - Incomplete, contradictory information, changing requirements
  - Complex interdependencies; attempts at solutions create other symptoms
- Climate change is a wicked problem according to Hulme
  - We disagree on what the problem is, on what the objectives are
  - Universal, top-down, ‘elegant’ solutions like Kyoto Protocol ineffective
  - Only ‘clumsy’ solutions possible?
  - Maybe no solution is possible?

Small Groups

A. What level of warming is dangerous?
B. Can dangerous climate change be prevented?
C. Is a universal agreement needed to prevent dangerous climate change?
D. Should stabilizing GHG concentrations take precedence over everything else?

Report back:

- 2 things your students need to learn
- How will they learn them?


CLIMATE
SUMMIT
WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?
• ENERGY INDEPENDENCE
• PRESERVE RAINFORESTS
• SUSTAINABILITY
• GREEN JOBS
• LIVABLE CITIES
• RENEWABLES
• CLEAN WATER, AIR
• HEALTHY CHILDREN
• ETC. ETC.
JOEL PETT

Essential principles of preventing dangerous climate change (Or: what should our students learn?)

- Climate change is a wicked problem; we disagree about
  - what is dangerous
  - Objectives & means
  - Responsibilities
- Meanwhile, we are poking a beast w/ a stick
  - Climate system is complex, nonlinear, chaotic
  - Can change abruptly, unpredictably, dangerously
- No amt of human caused climate change is risk free
- Stabilizing GHG concentrations
  - No guarantee of avoiding dangerous warming
  - Requires deep emission cuts
  - is technically feasible, but difficult & costly
  - Inaction and delay are costly too, and dangerous

Useful resources

- "The Copenhagen Diagnosis," Allison et al, 2009. Update of science since IPCC 2007 report, with focus on 'dangerous' climate change
- Jim Hansen's website: www.columbia.edu/~jeh1/. Access his papers and presentations.
- "How to avoid dangerous climate change," Luers et al, 2007, report from UCS.
- Schneider et al, 2010. *Climate Change Science and Policy*. Island Press.