How to Deal with Risk and Uncertainty in WGIII /AR5

IPCC Cross-Working Group Meeting on Consistent Treatment of Uncertainties, 6-7 July 2010, Stanford, California, USA

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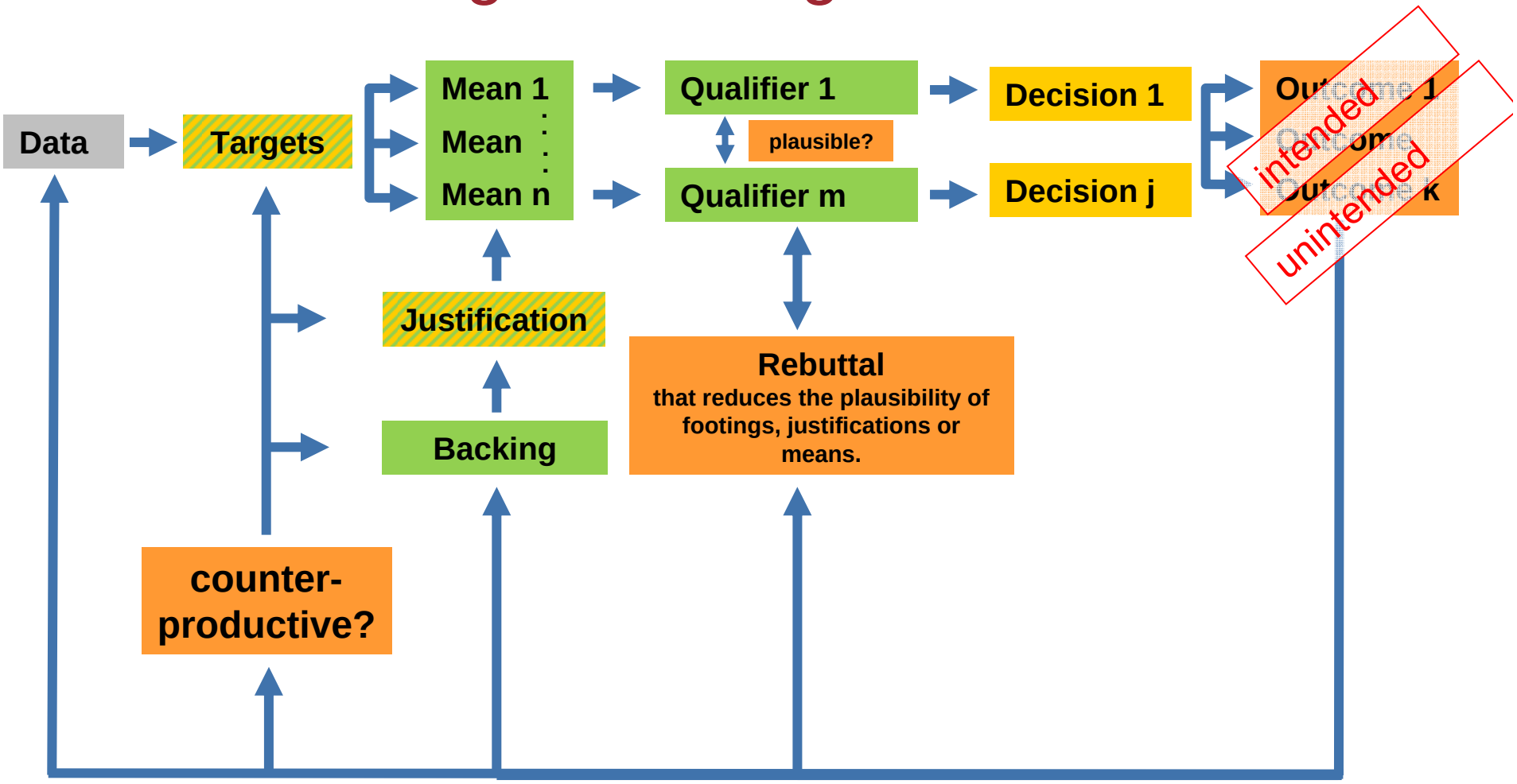
Remarks on the Policy-Science Interface

Three models how to organize the interface:

- Technocratic approach
- Decisionistic approach
- Pragmatic / enlightened approach

The Pragmatic-Enlightened Model



Legend:

- Policy Makers
- Science
- Outcome

The Representative Clients of AR5 in WG III

- International level: Negotiators, NGO‘s
- National Policies: Parliaments, governments, national agencies
- Regions: e.g. EU
- Sub-National Level: Cities

How to Deal with Uncertainty

Types of Uncertainty	Method	Meaning within the Pragmatic Model
Parametric uncertainty	Sensitivity analysis, Monte Carlo Simulation	Exploring the importance of mitigation options/ policy instruments
Model uncertainty/ structural uncertainy	Modelling comparison	How robust are modelling results → getting a sense of robustness
Qualitative risk assessment	Expert judgment/ expert elicitation	Side costs/ benefits Iteration between targest and means
Decision making under uncertainty/ risk management	Stochastic IPAs, IAMs	Risk management

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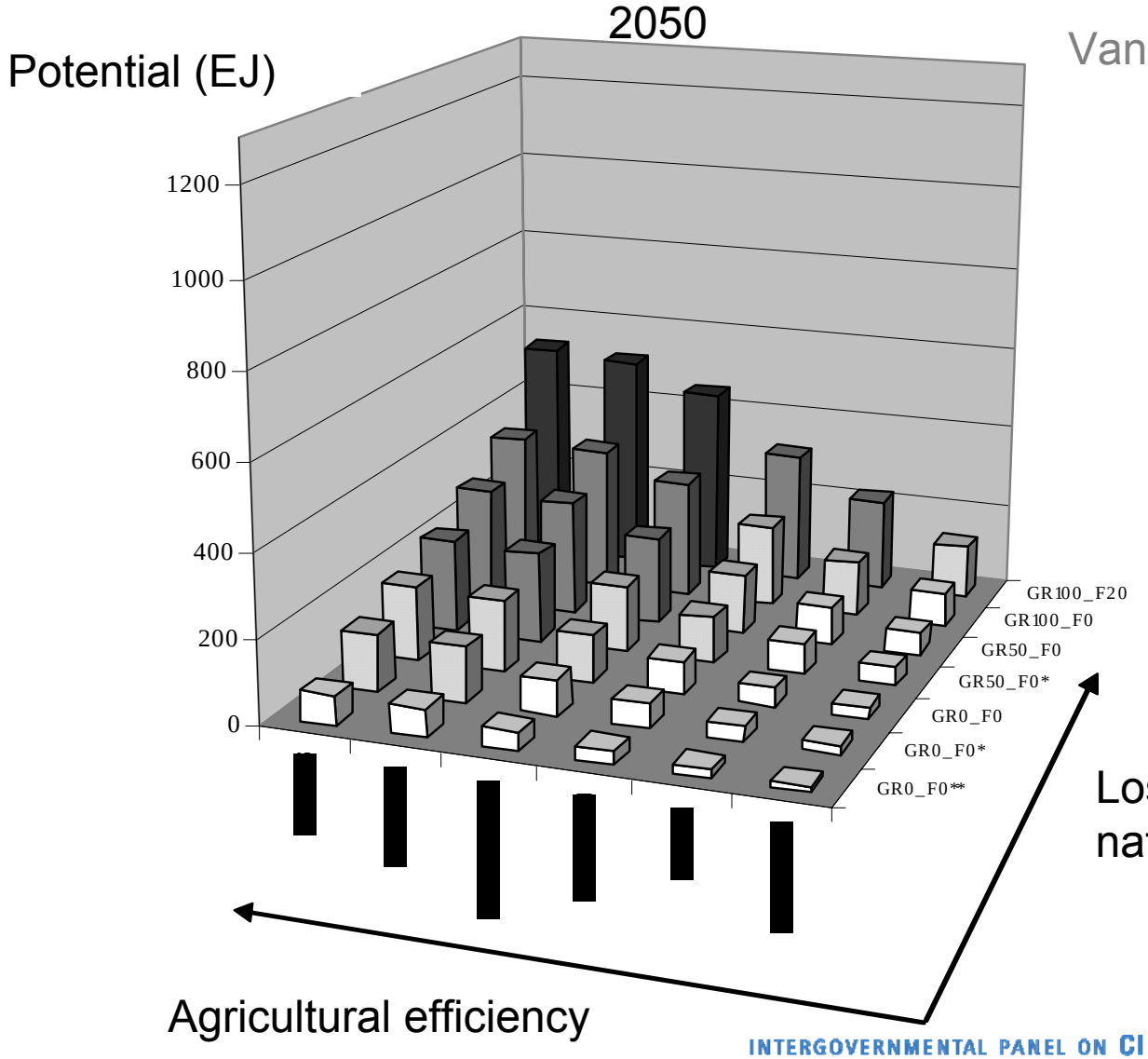
Sensitivity Analysis

Combinations of different factors determining bio-energy potential



Van Vuuren et al. (2010)

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Sensitivity Analysis

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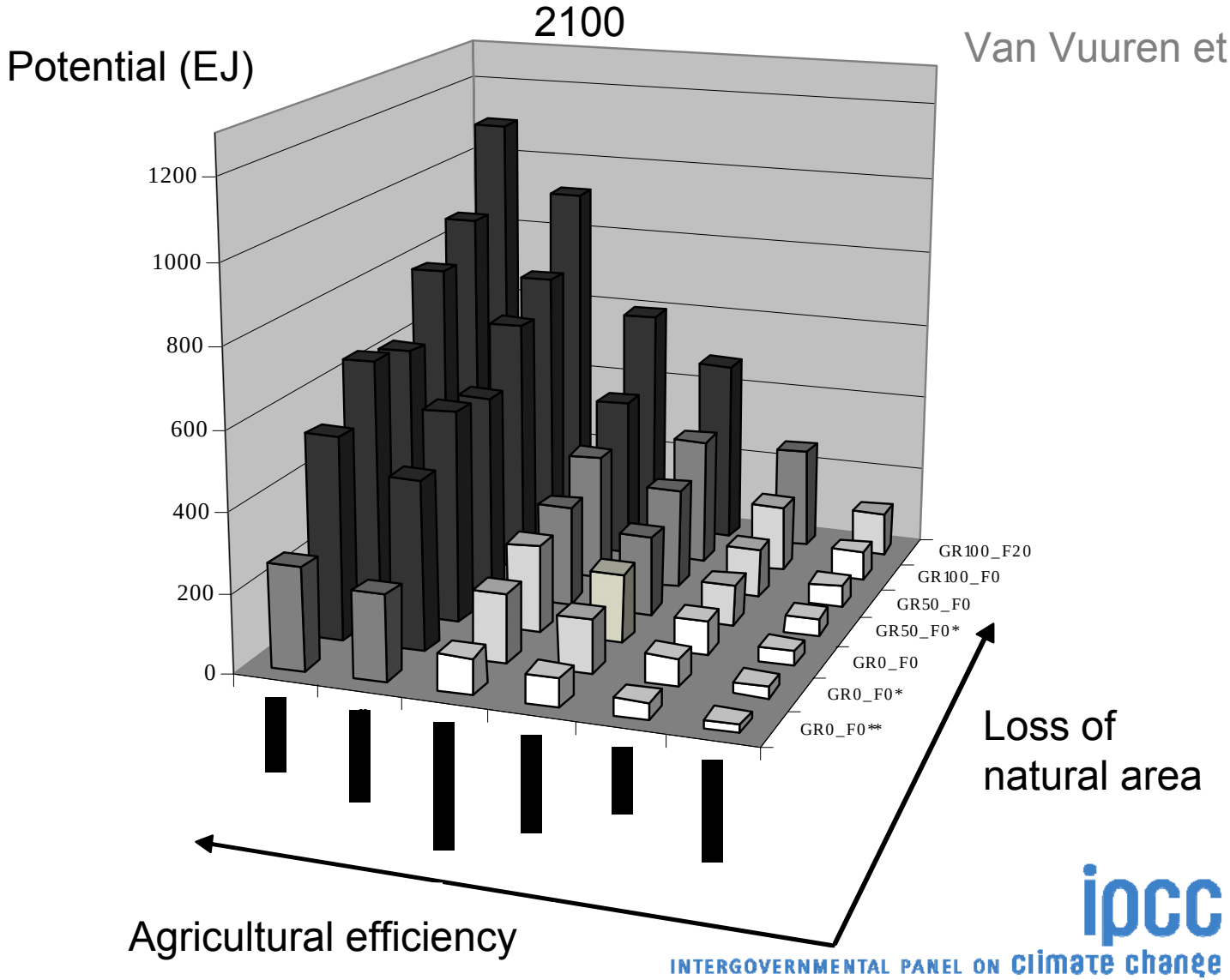

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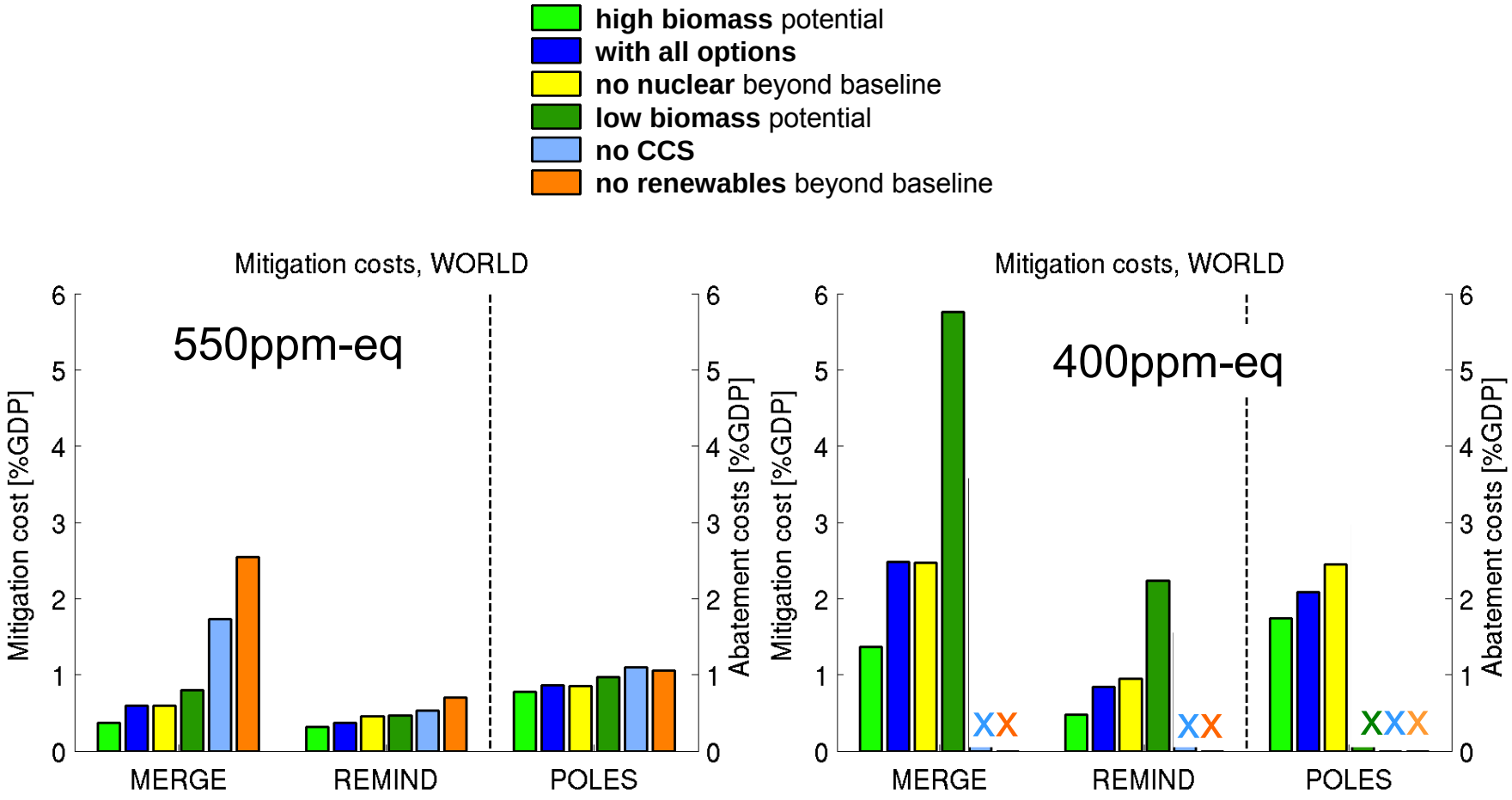
Exploring the Importance of Mitigation Options



➔ Mitigation potential of nuclear is limited (but high use in the baseline)
➔ 400 ppm neither achievable without CCS nor without extension of renew
➔ Biomass potential dominates the mitigation costs of low stabilisation

Knopf, Edenhofer et al. (2009)

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Iteration Between Targets and Means

Science

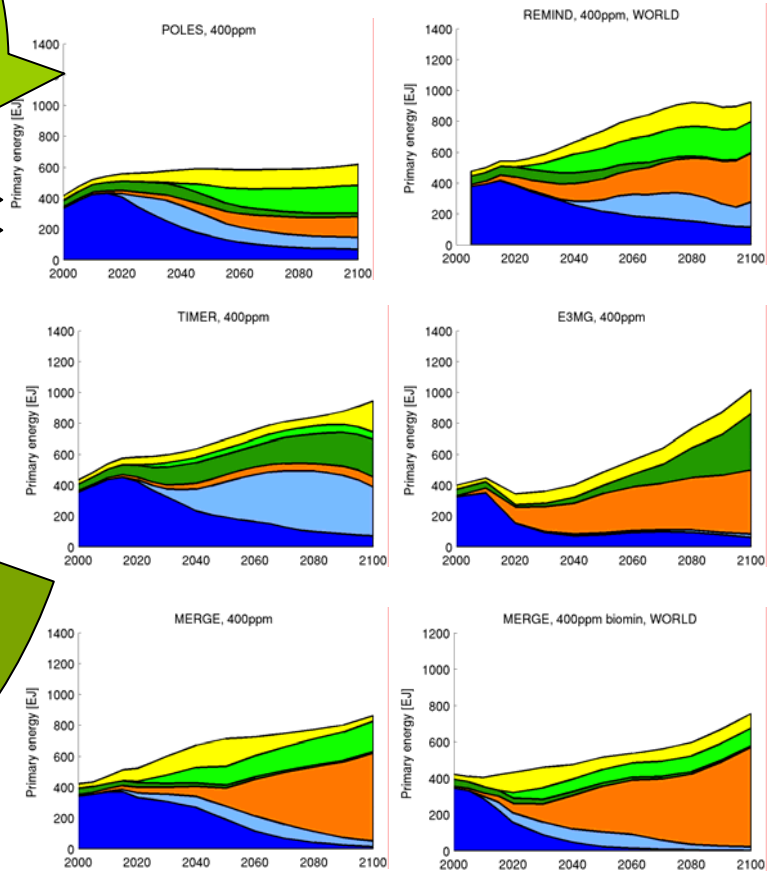
Goal-setting by policy makers

Science: Scope of options

Data

2°C target

Consideration of unintended side-effects



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The Meaning of Risk

Severity of Risk = F[Probability, Scope, Intensity]

Impact = Scope * Intensity

Risk Aversion:

How much would decision-makers invest to eliminate/reduce this risk?

Response/Management:

What kind of institutions are required for eliminating/reducing these risks?

Three Categories of Risk

- **Normal Risks**
  - Scope: Individual, local
  - Intensity: Endurable, reversible
  - Probability: Normal distribution
- **Large Scale but Bounded Risks**
  - Scope: Transnational
  - Intensity: Endurable, reversible/irreversible
  - Probability: Normal distribution
- **Systemic Risks:**
  - Scope: Transnational and transgenerational
  - Intensity: Terminal, irreversible
  - Probability: Fattened tail

The Risk Matrix

Response / Category	Market (Household Failure)	State/Third Sector (Market Failure)	Global Collective Action (State Failure)
Normal Risks	Gradual adaptation within sectors	Regulation of insurance markets	Regulation of reinsurance markets
Large Scale but Bounded Risks	Weather derivatives	Fiscal support to European heatwave/ hurricane Katrina	Regulation of financial markets in 2009
Systemic Risks Catastrophies	No adequate response known	No adequate response known	Provision of global public good with different technologies (e.g. Weakest Link, Best-Shot)

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Consequences for the AR5/ WGIII

- Exploration of the whole solution space
- Development of 2nd best scenarios + evaluation of modeling comparison exercises
- Identifying types of risk management
- A few pragmatic guiding questions
  - What are consistent ways to achieve stabilization goals?
  - What is the relative importance of mitigation options and policy instruments?
  - What are „threshold probabilities“ undermining your policy options?
  - Getting a sense of unmanageable risks
  - What can go wrong along specific transformation pathways?

Thank you for your attention!

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