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INTERGOVERNMENTAL PANEL ON climate change



Integrated Assessment Models for the Policy-Science Interface

An IPCC Perspective on the Challenges for AR5

Snowmass July 29-30 2010

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Table of Content

- Remarks on the Policy-Science Interface
- How to Deal with Uncertainty
- Consequences for AR5

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Remarks on the Policy-Science Interface

Three models how to organize the interface:

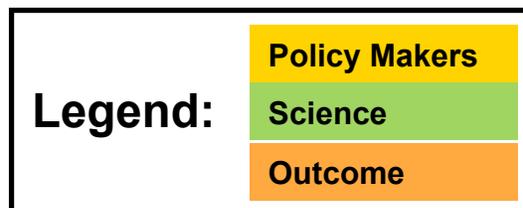
- Technocratic approach
- Decisionistic approach
- Pragmatic / enlightened approach

The Technocratic Model

- The technocratic model:

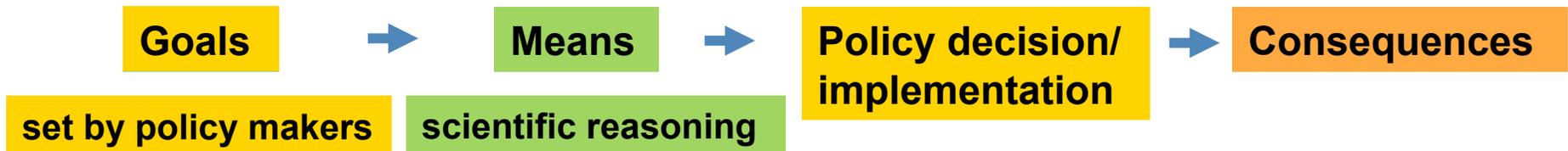


- Max Weber predicts that this model will abolish democratically legitimized policy making. (Policy makers ask for practical constraints, science offers inherent necessities to legitimize policy making.)
- What does consensus among WGI, II, and III relate to respectively?
- Question not answered in technocratic model, consensus is mostly pretended.

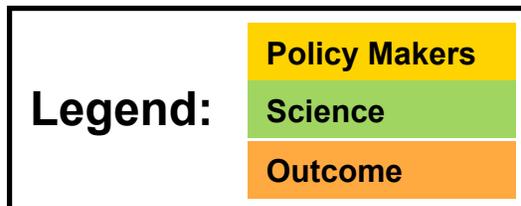


The Decisionistic Model

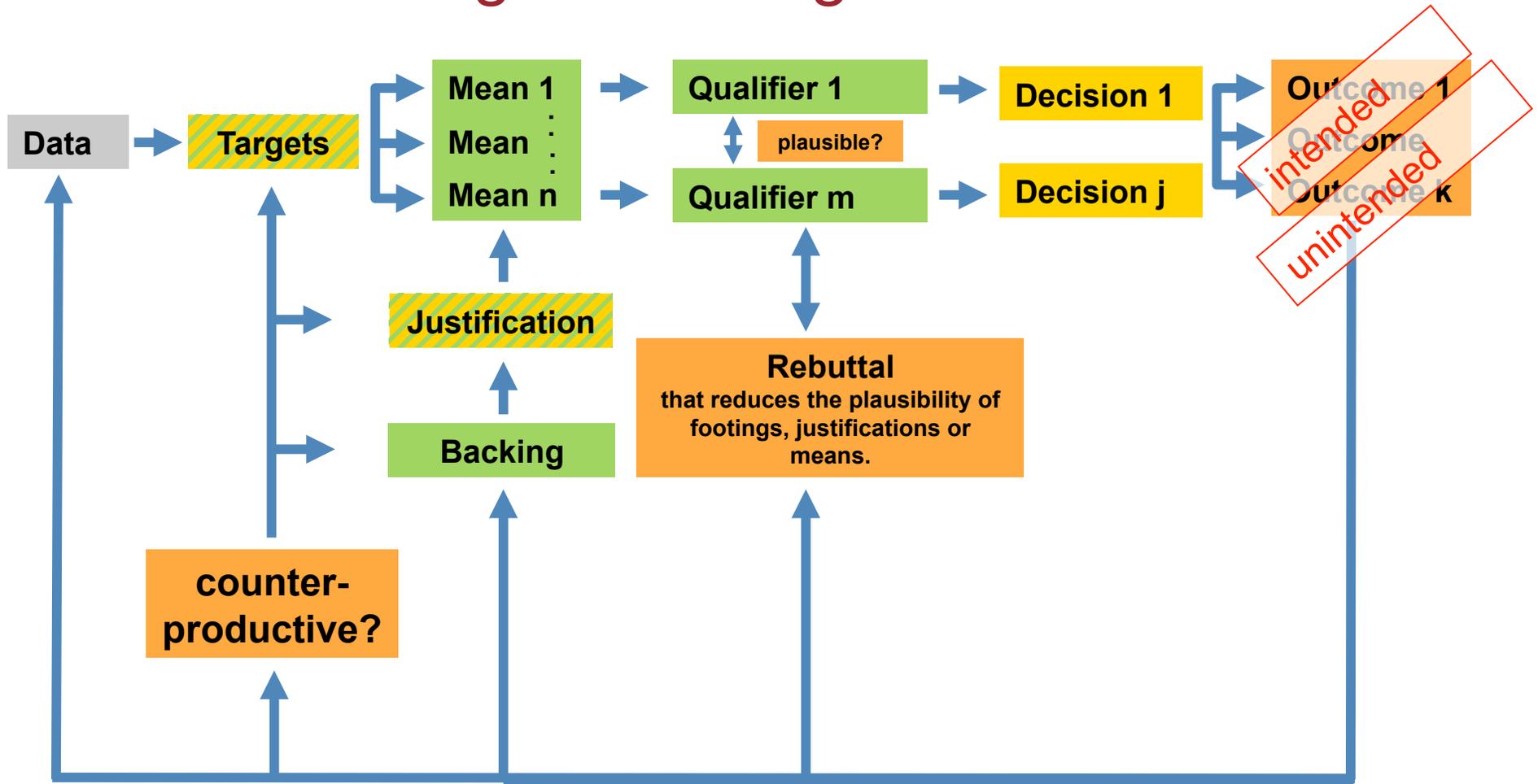
- The decisionistic model:



- This division of labour presumes: *Distinction of facts and values and of targets and means always feasible.*
- Goals and possible conflicts and synergies among them are usually re-assessed ex-post in the light of their intended and unintended consequences. This requires a continued dialogue between science and policy makers.



The Pragmatic-Enlightened Model



Legend:

| |
|---------------|
| Policy Makers |
| Science |
| Outcome |

IAM's and the Policy-Science Interface

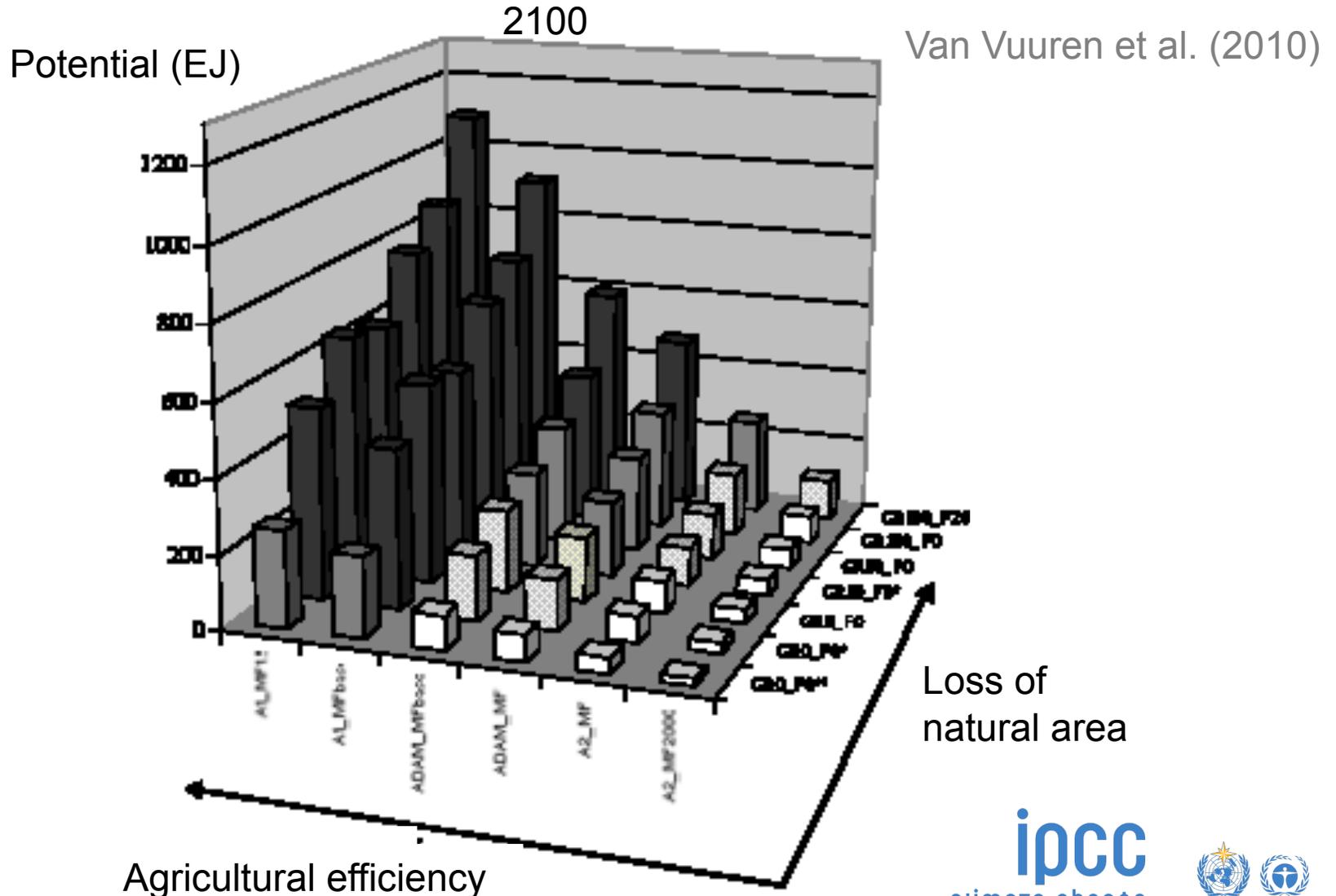
| Types of Uncertainty | Method | Implications for the Policy-Science Interface |
|--|--|---|
| Parametric uncertainty | Sensitivity analysis, Monte Carlo Simulation | Exploring the importance of mitigation options/ policy instruments |
| Model uncertainty/ structural uncertainty | Modelling comparison of 2 nd best scenarios including IPA's | How robust are modelling results → getting a sense of robustness |
| Qualitative risk assessment | Expert judgment/ expert elicitation | Side costs/ benefits Iteration between targets and means |
| Decision making under uncertainty/ risk management | Stochastic IPAs, IAMs | Risk management |

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| | | |
| | | |

Sensitivity Analysis

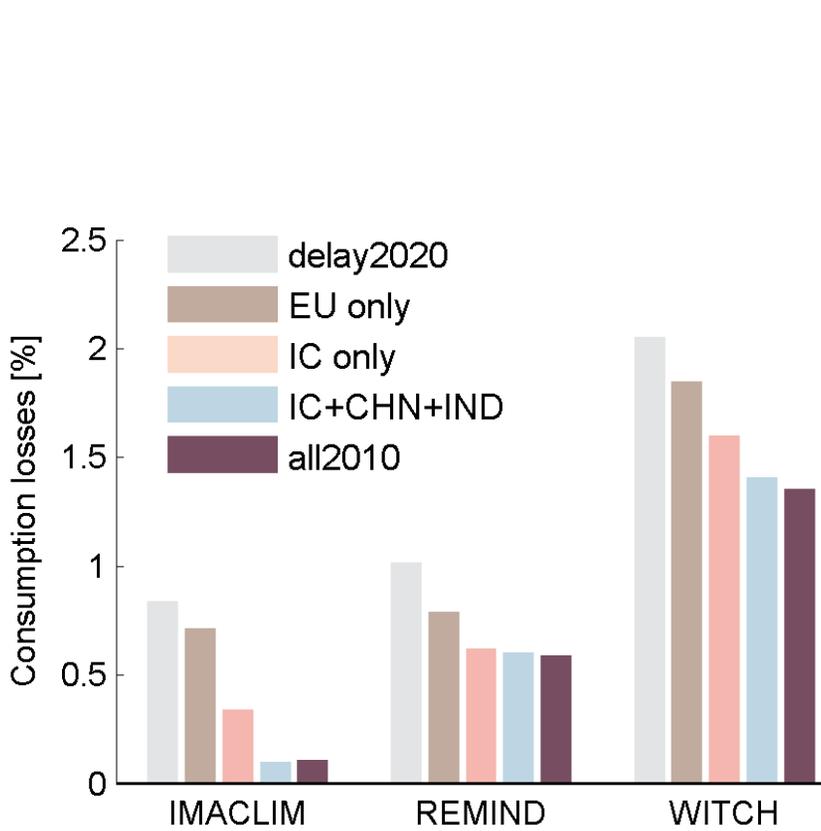
Combinations of different factors determining bio-energy potential



IAM's and Policy-Science Interface

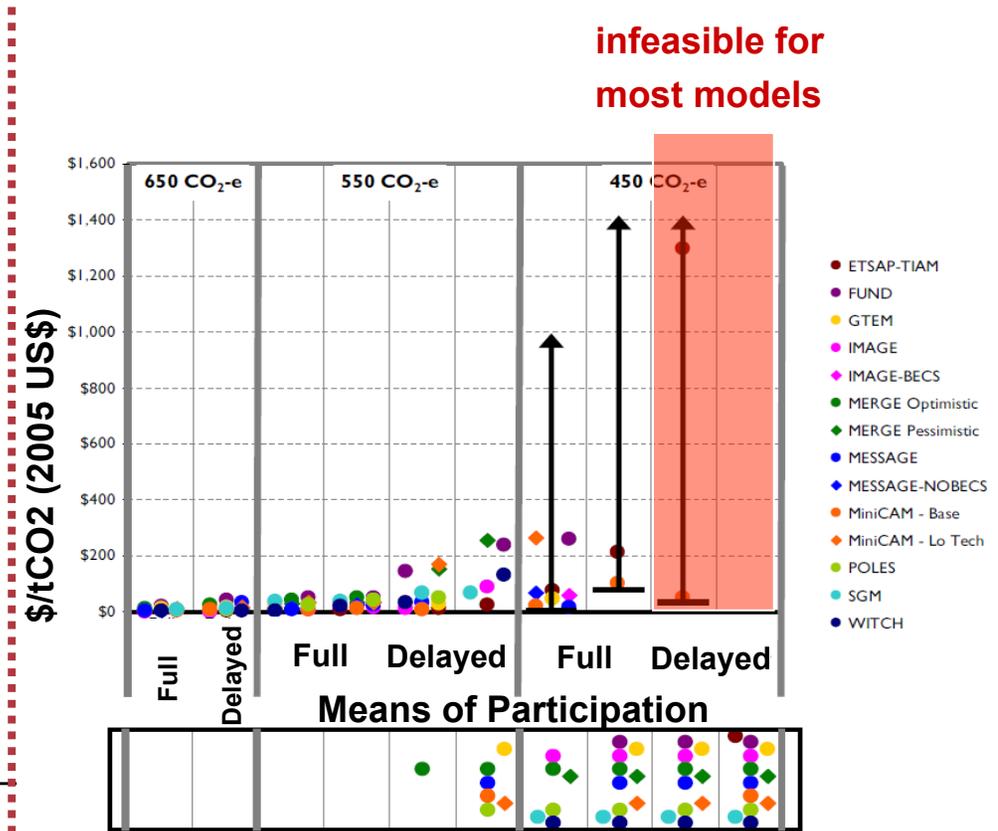
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Getting a Sense of Robustness



Luderer et al. 2009

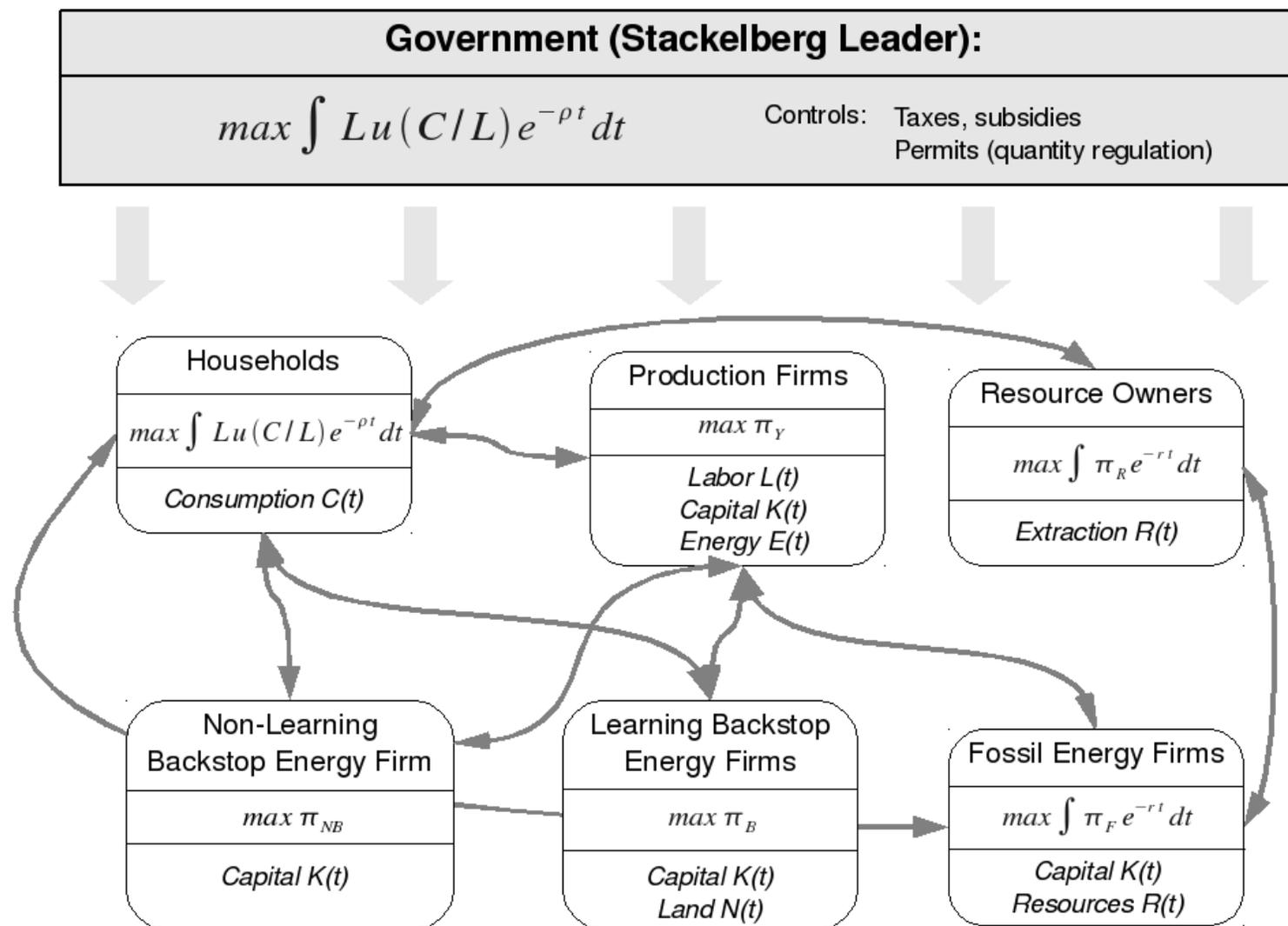
WORLD



Scenarios that could not be modelled under criteria of study

EMF (2009) Overview of EMF 22 International Scenarios

Integrated Policy Assessment Model

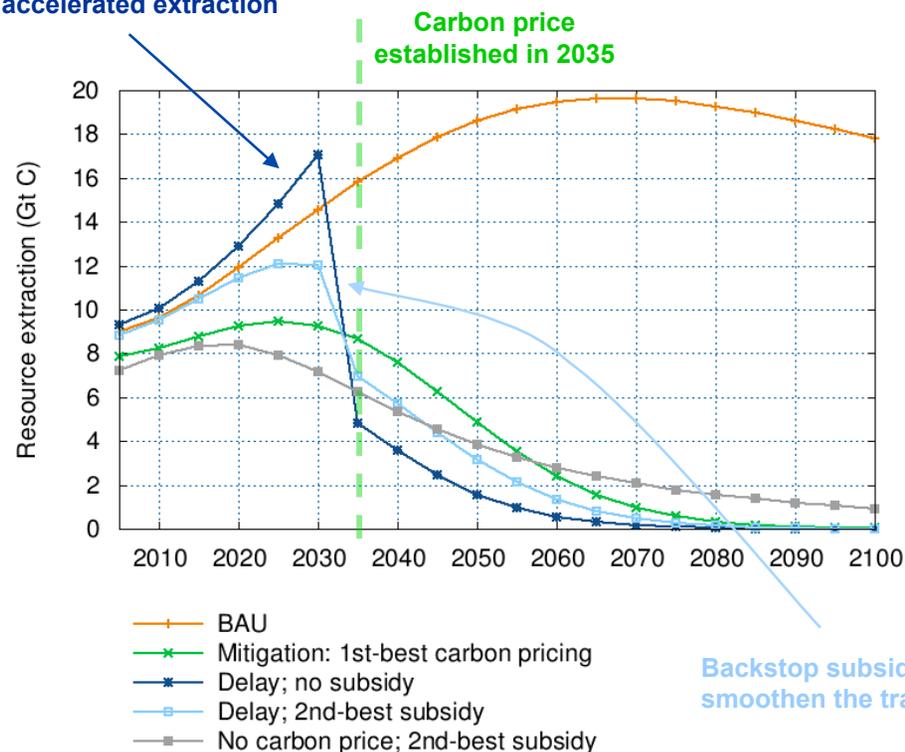


Example: The Impact of Delayed Carbon Pricing

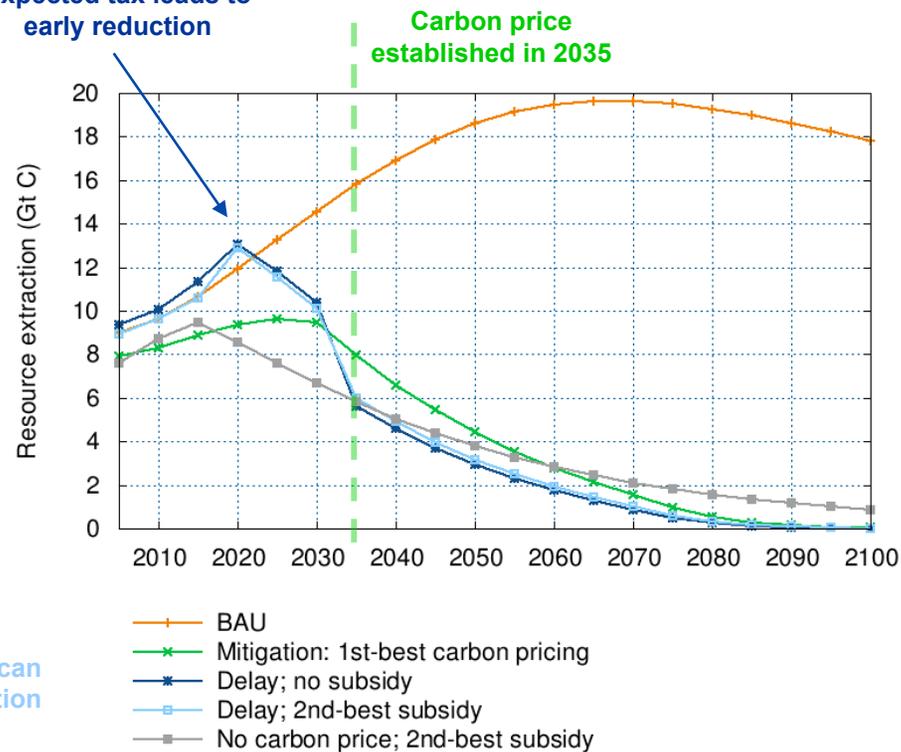
Investments in the fossil energy system are **reversible**

Investments in the fossil energy system are **irreversible**

Expected tax leads to accelerated extraction



Expected tax leads to early reduction



Impact of expectations is ambiguous!

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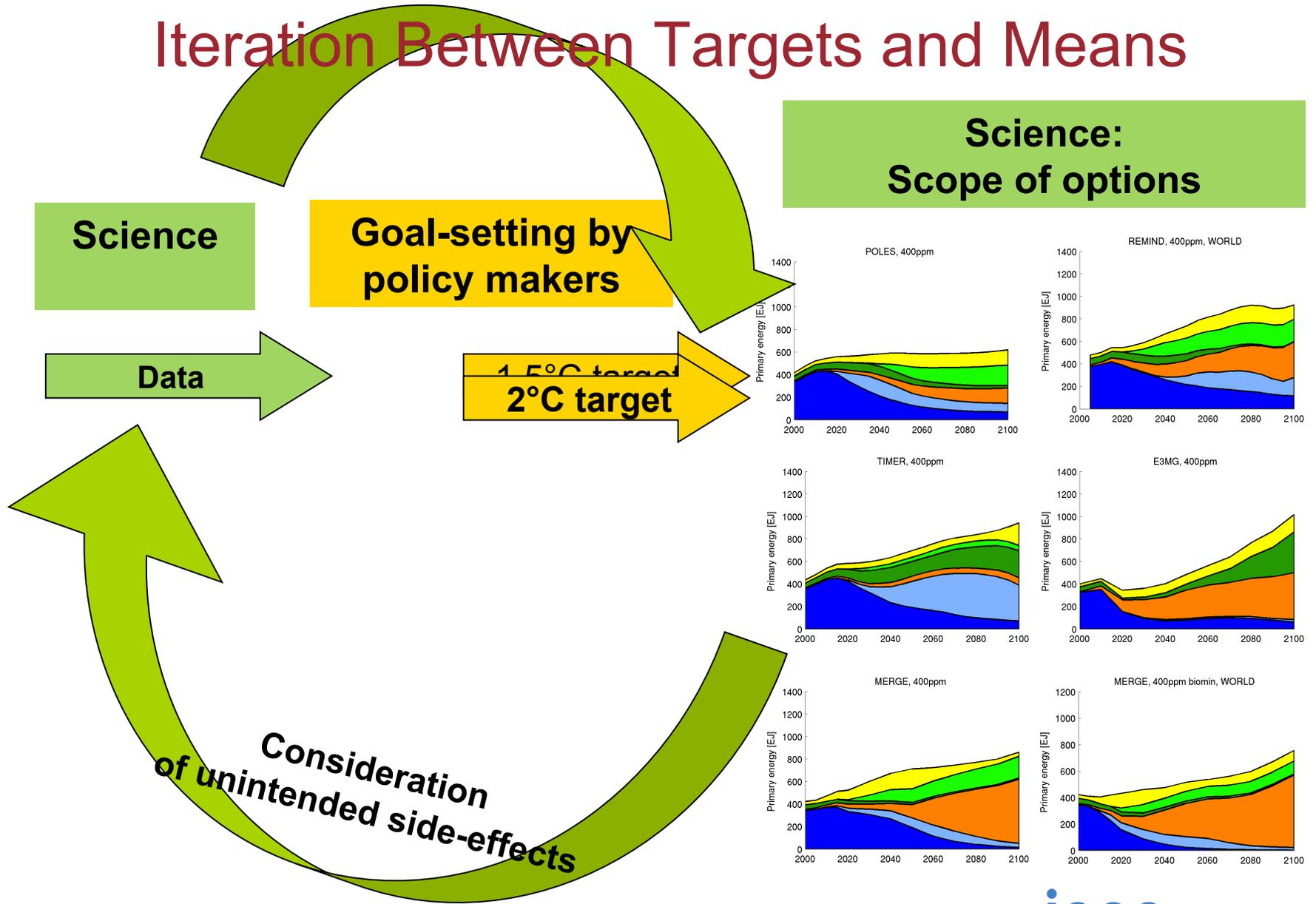
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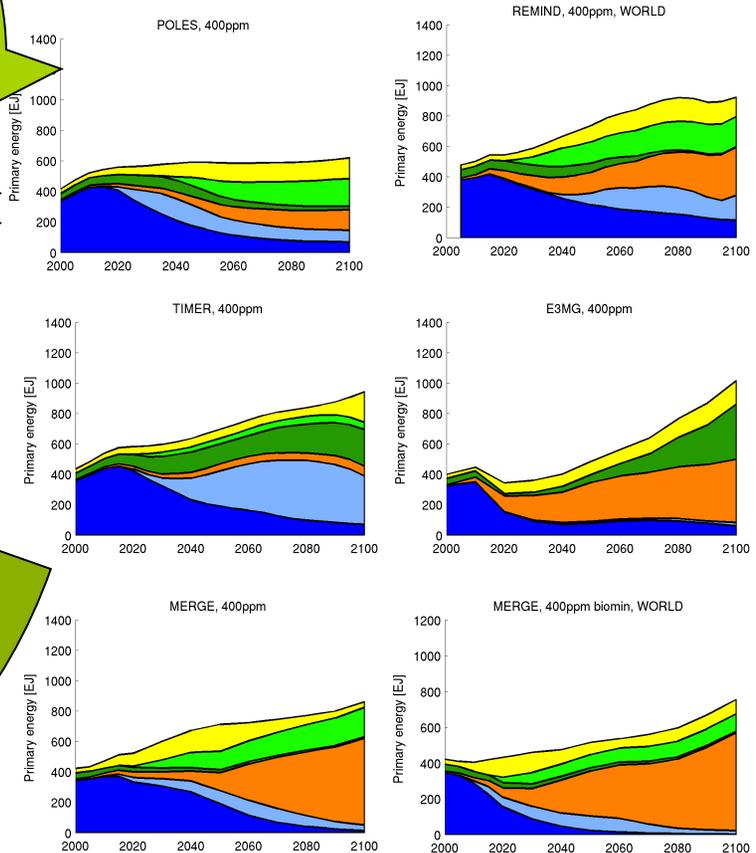
How to Deal with Uncertainty

| Types of Uncertainty | Method | Meaning within the Pragmatic Model |
|--|--|---|
| Parametric uncertainty | Sensitivity analysis, Monte Carlo Simulation | Exploring the importance of mitigation options/ policy instruments |
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Iteration Between Targets and Means



Science: Scope of options



IAM's and the Policy-Science Interface

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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

Risk and the Policy-Science Interface

| 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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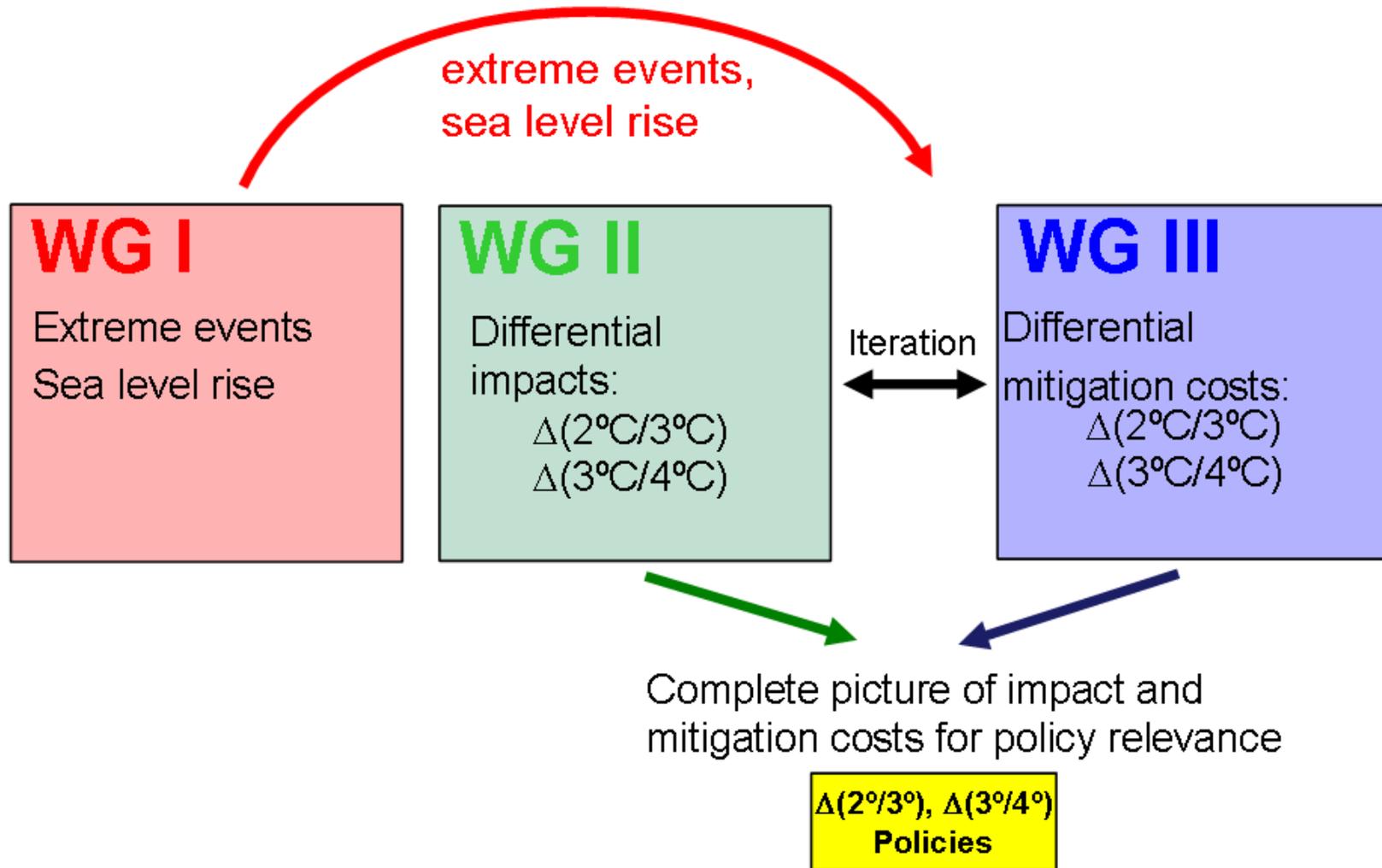
The Representative Clients of AR5 in WG III

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

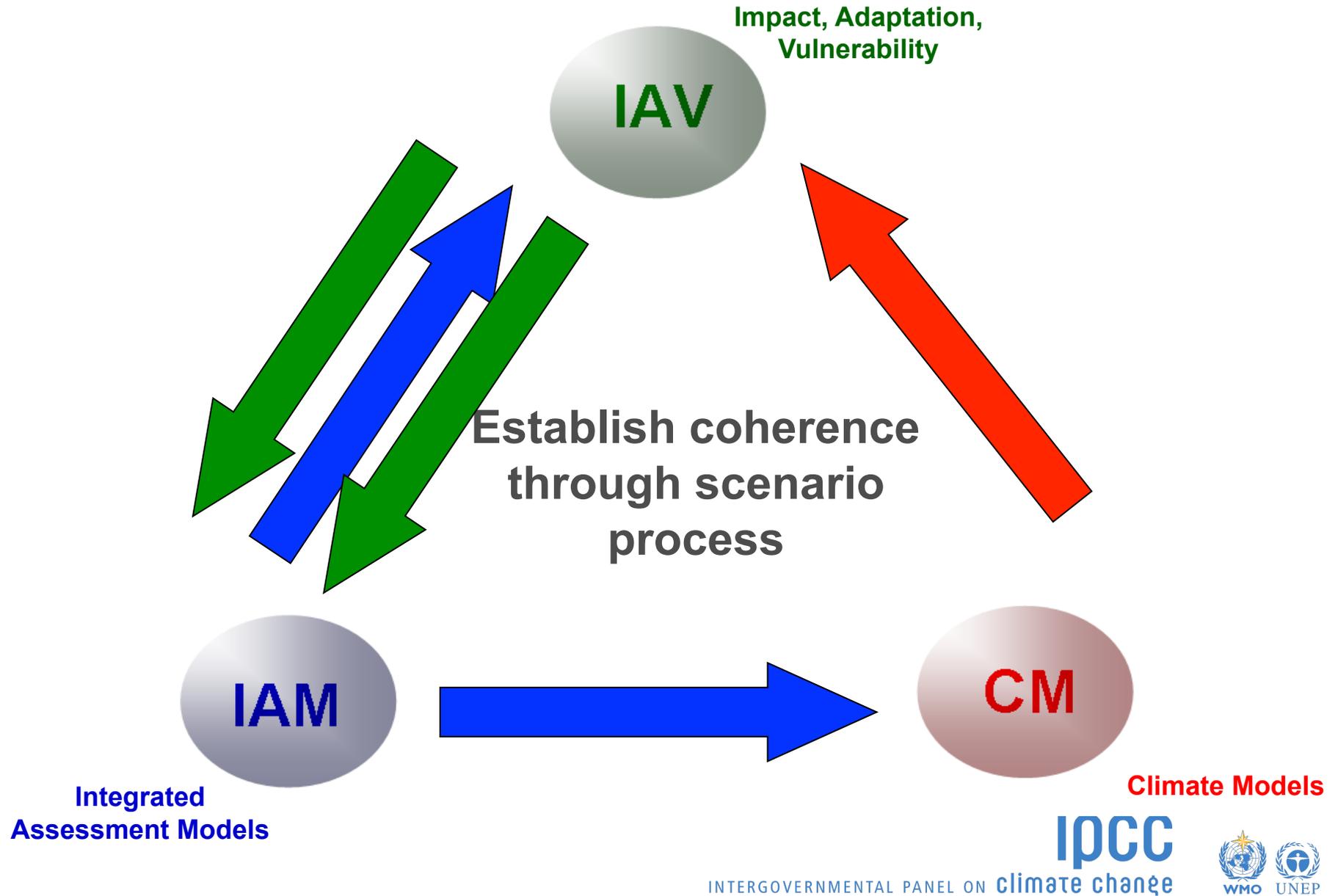
Consequences for the AR5 / WGIII

- Pursuing a pragmatic-enlightened approach for the science-policy interface
- Identifying types of risk management
- A few pragmatic guiding questions
 - What are consistent ways to achieve stabilization goals?
 - What is the relative importance of policy instruments and mitigation options?
 - What are „threshold probabilities“ undermining your policy options?
 - Getting a sense of unmanageable risks
 - What can go wrong along specific transformation pathways?

Implications for the Scenario Process



Implications for the Scenario Process



Thank you for your attention!