Integrated Assessment Models for the Policy-Science Interface

An IPCC Perspective on the Challenges for AR5

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WMO UNEP

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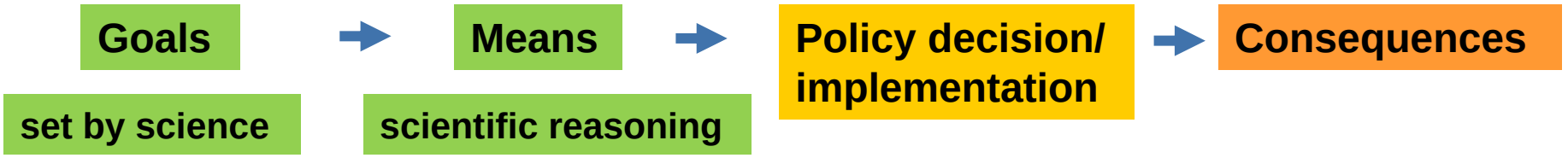
Remarks on the Policy-Science Interface

Three models how to organize the interface:

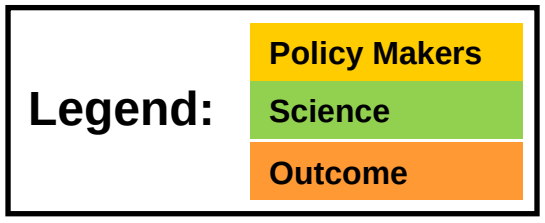
- Technocratic approach
- Decisionistic approach
- Pragmatic / enlightened approach

The Technocratic Model

- The technocratic model:

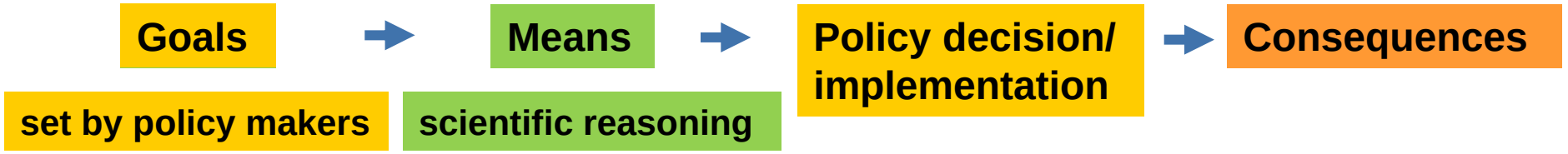


- Max Weber predicts that this model will abolish democratically legitimized policy making. (Policy makers ask for practical constraints, science offers inherent necessities to legitimize policy making.)
- What does consensus among WGI, II, and III relate to respectively?
- Question not answered in technocratic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

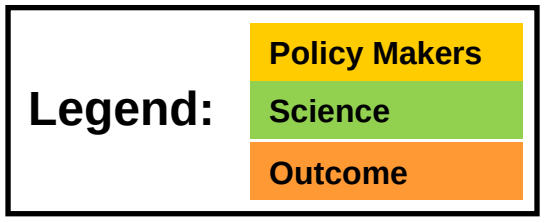


The Decisionistic Model

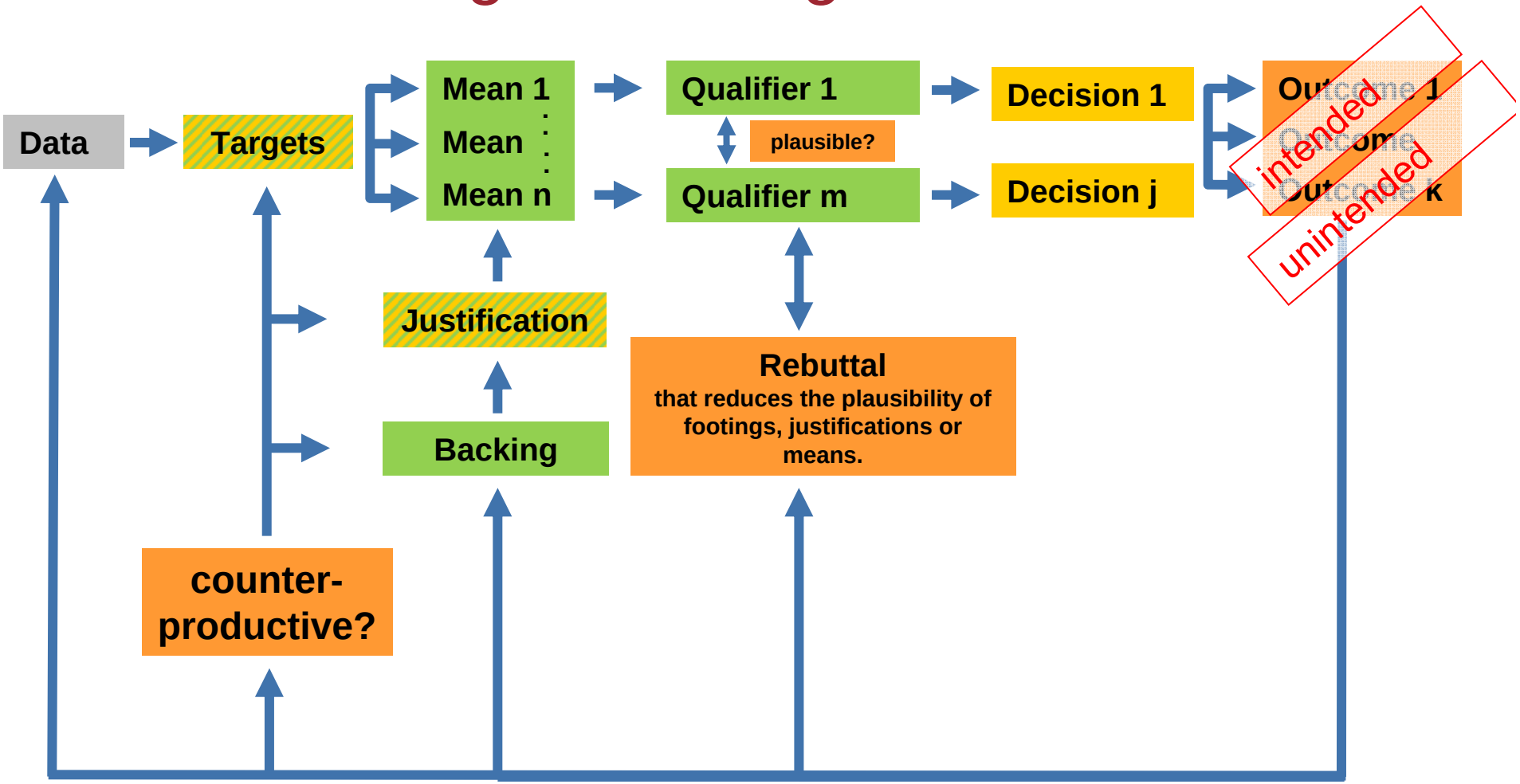
- The decisionistic model:



- This devision 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 Inteface
Parametric uncertainty	Sensitivity analysis, Monte Carlo Simulation	Exploring the importance of mitigation options/ policy instruments
Model uncertainty/ structural uncertainy	Modelling comparison of 2nd 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

IAM‘s and the Policy-Science Interface

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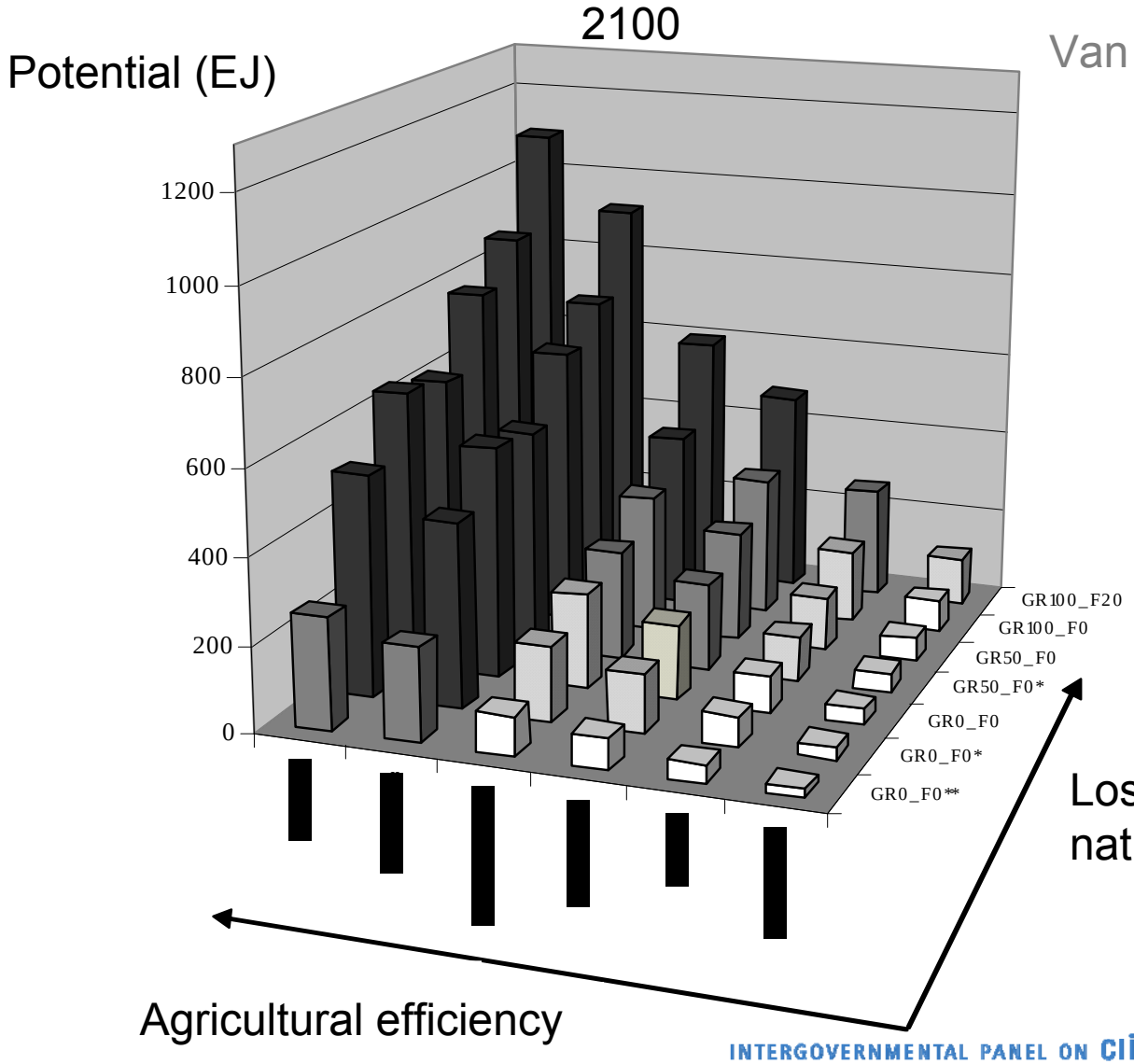
Sensitivity Analysis

Combinations of different factors determining bio-energy potential



Van Vuuren et al. (2010)

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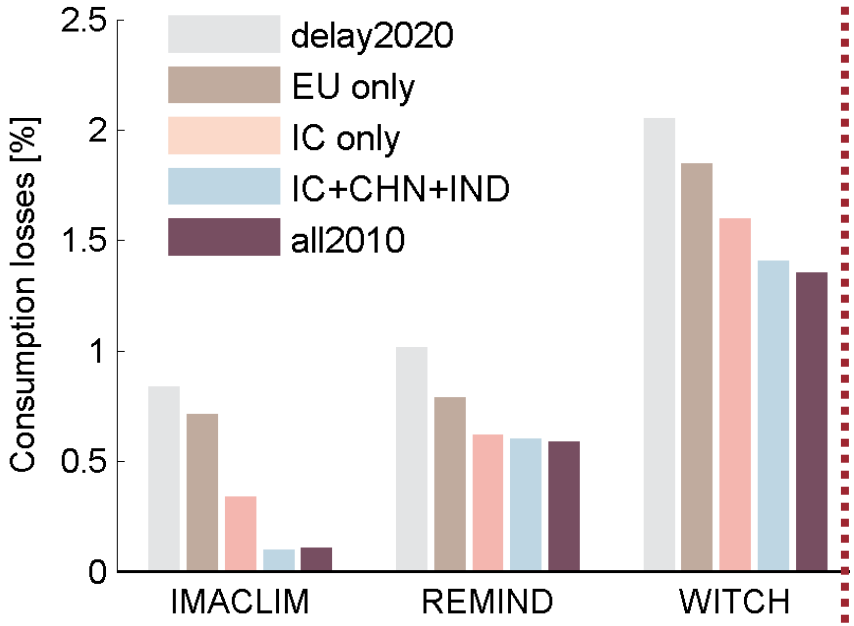
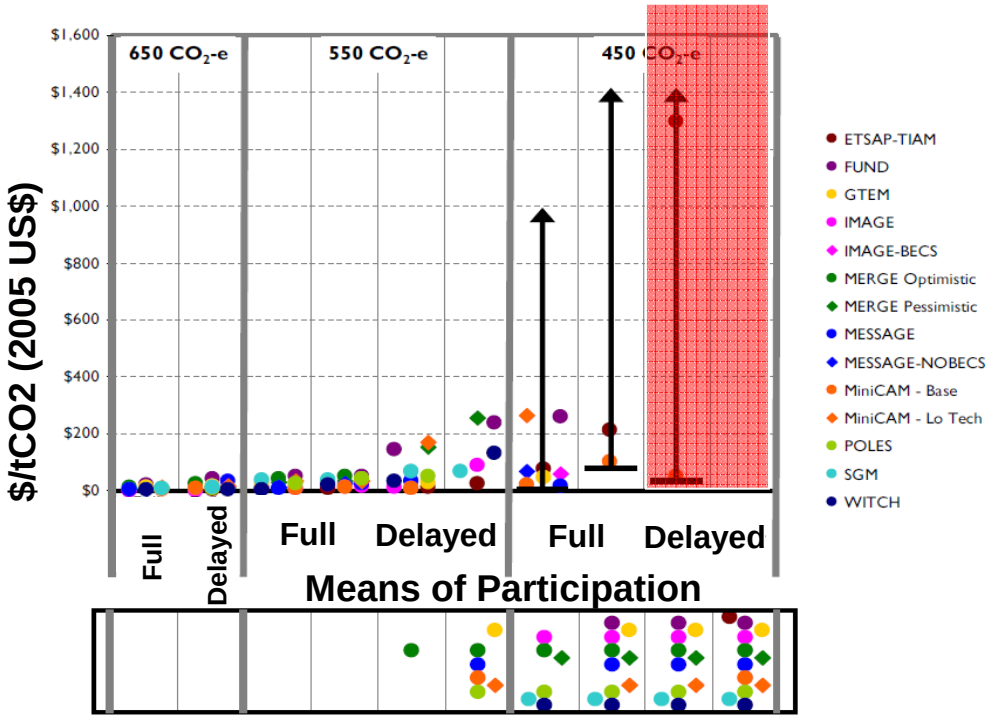
Getting a Sense of Robustness



Luderer et al. 2009

WORLD

infeasible for most models



Scenarios that could not be modelled under criteria of study

EMF (2009) Overview of EMF 22 International Scenarios

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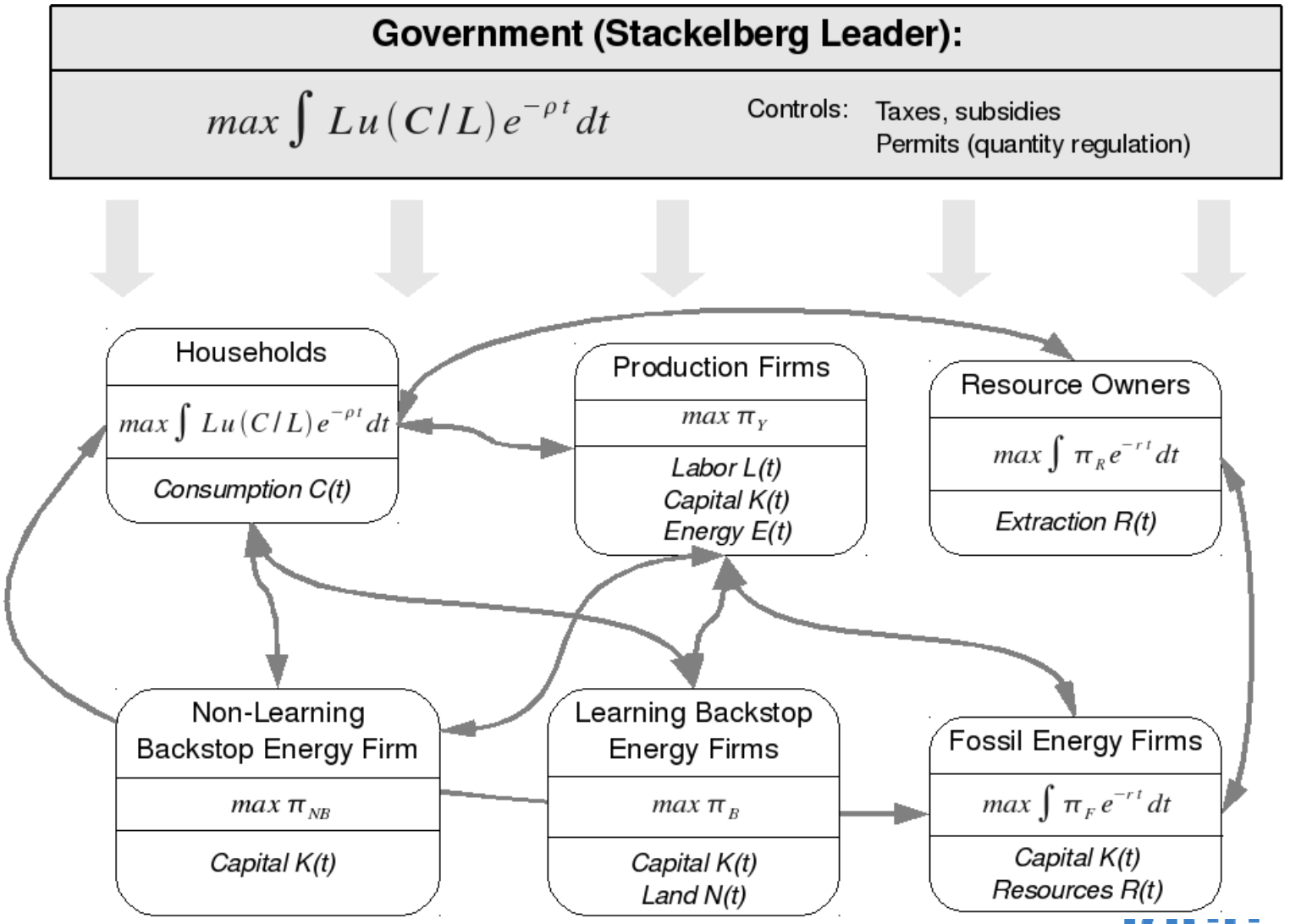
Integrated Policy Assessment Model



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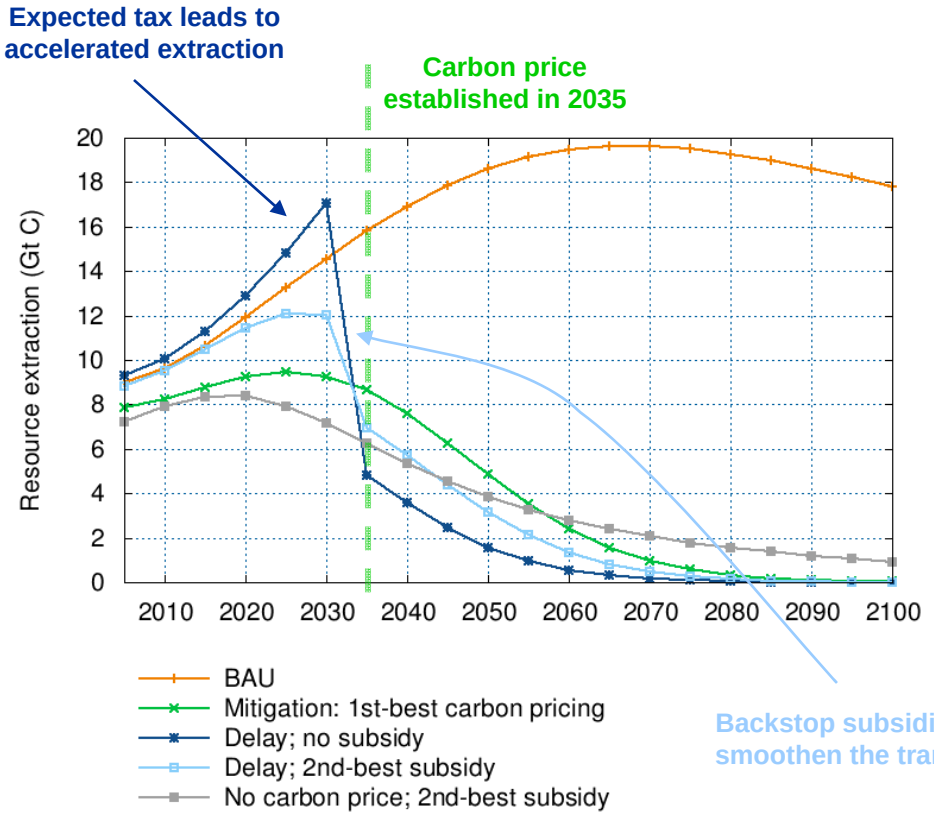
Example: The Impact of Delayed Carbon Pricing

Investments in the fossil energy system are reversible



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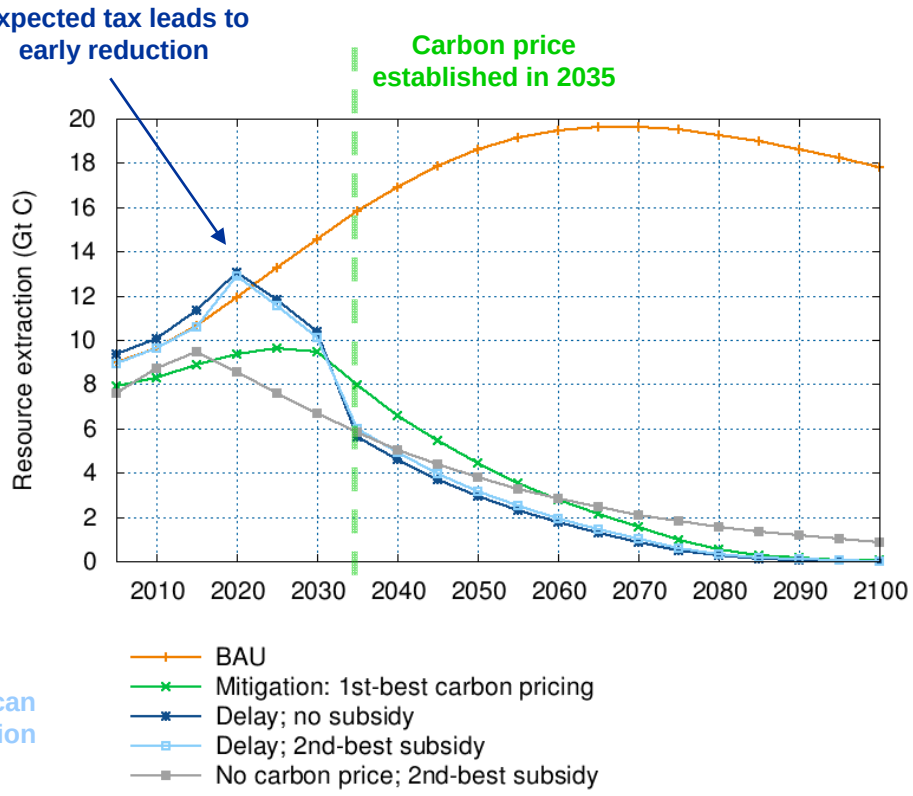

Impact of expectations is ambiguous!

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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
Model uncertainty/ structural uncertainy	Modelling comparison of 2nd 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

Iteration Between Targets and Means

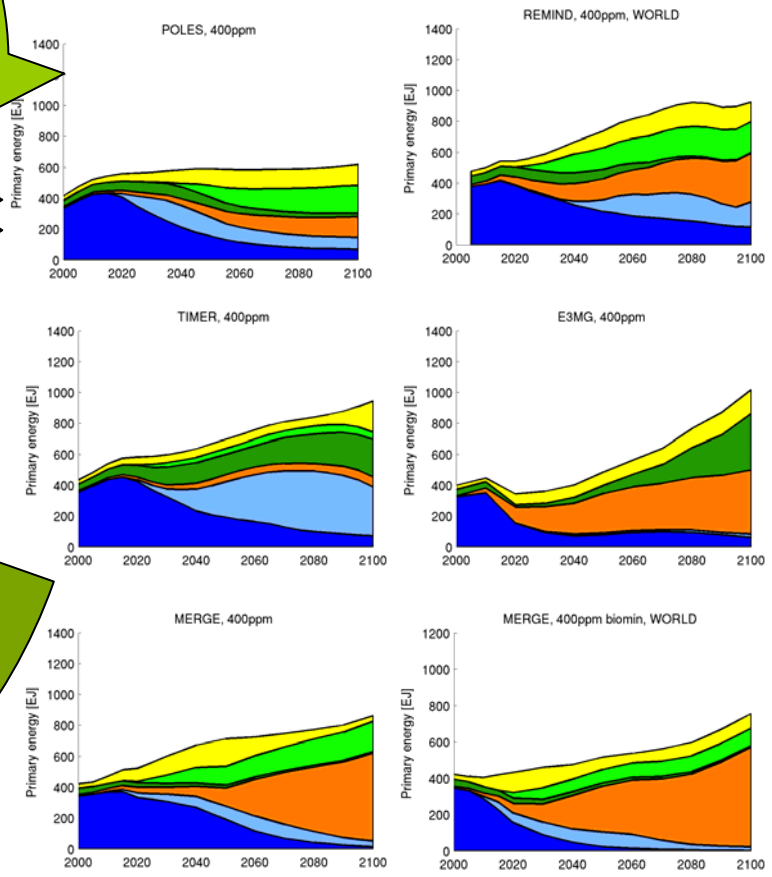
Science

Goal-setting by policy makers

Data

2°C target

Science: Scope of options



Consideration of unintended side-effects

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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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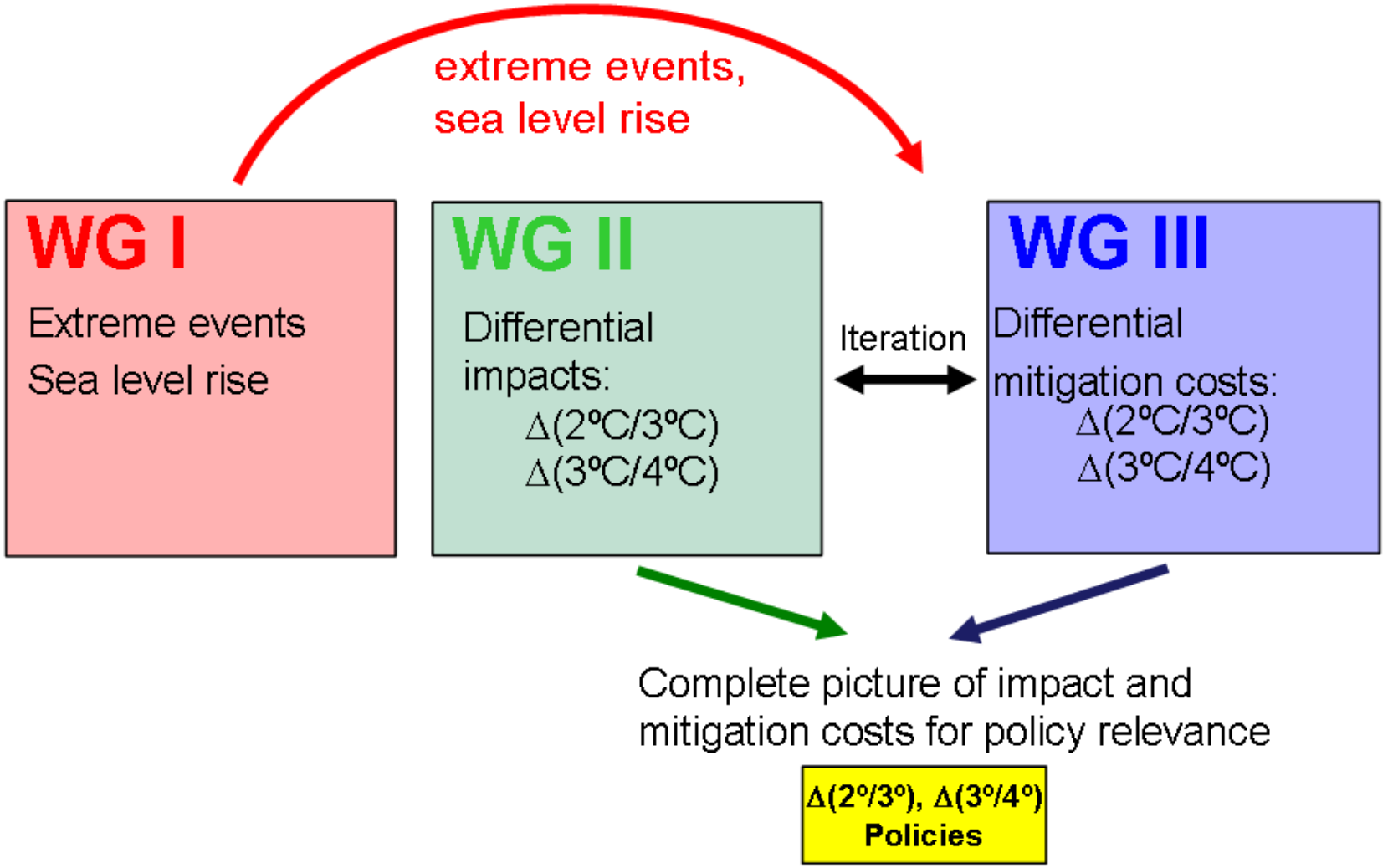
The Representative Clients of AR5 in WG III

- 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



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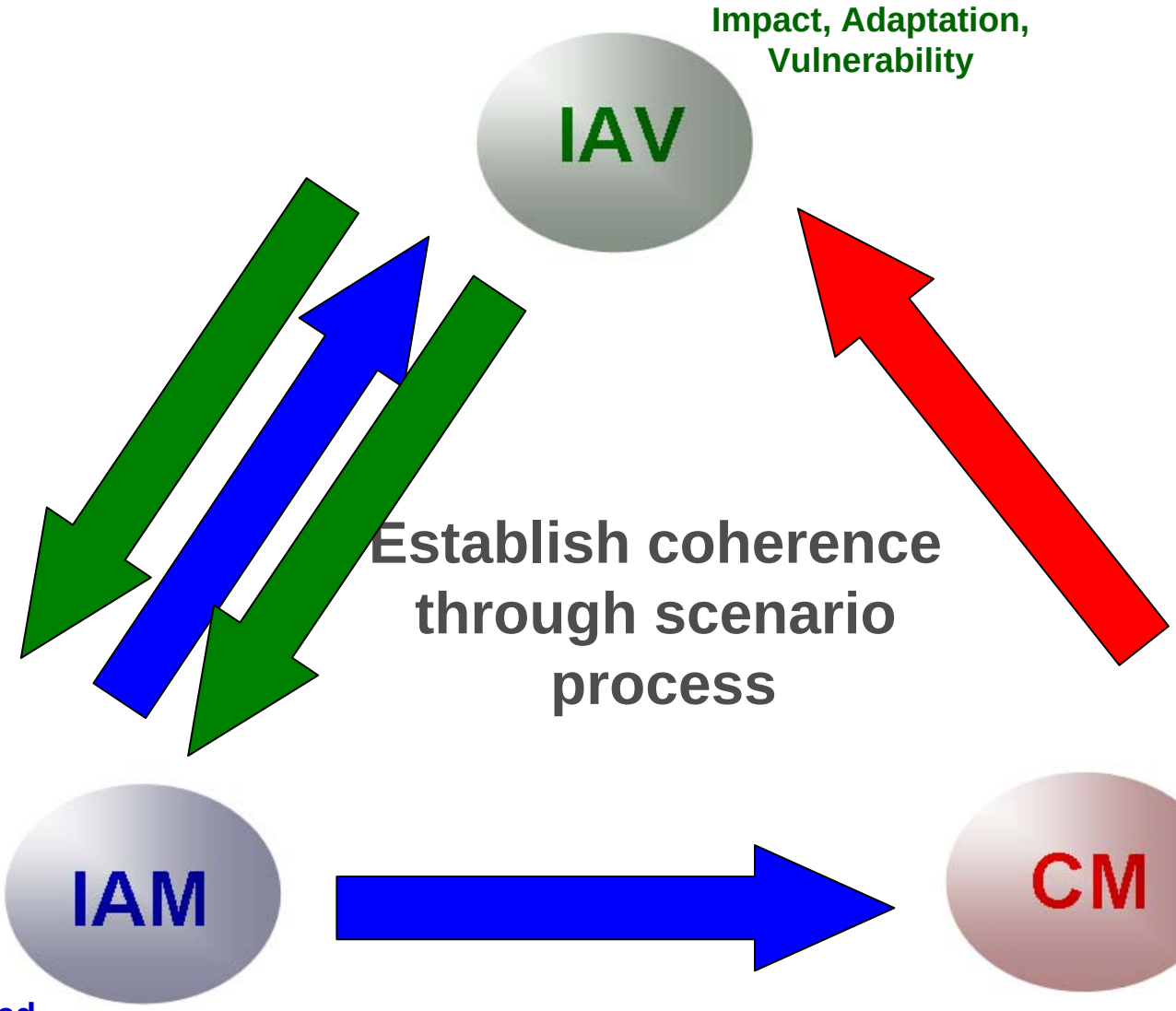

Thank you for your attention!