"Scenarios and Honest Brokerage - An IPCC Perspective"

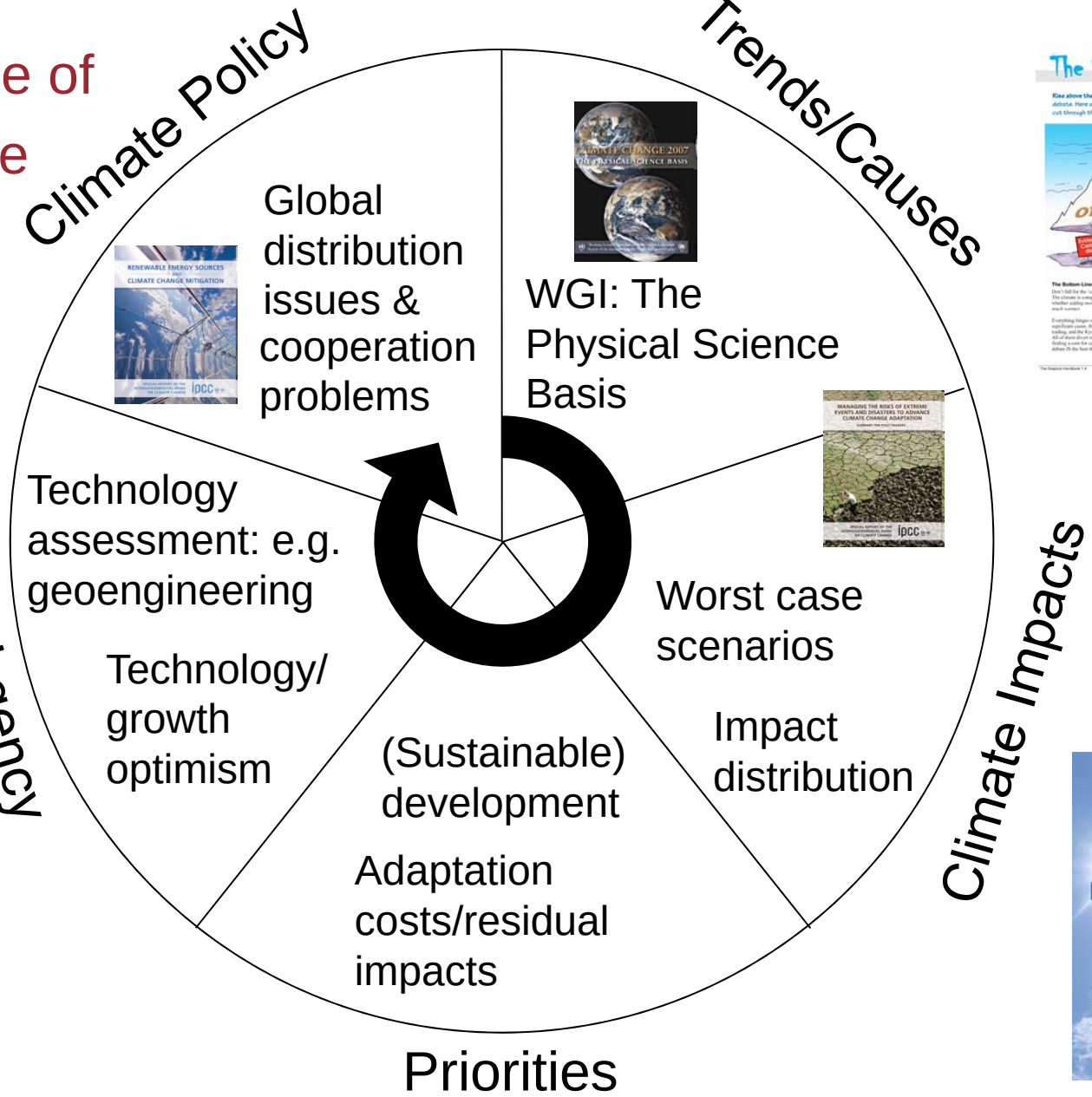
ERMITAGE Workshop, 25-26 September 2012, Potsdam

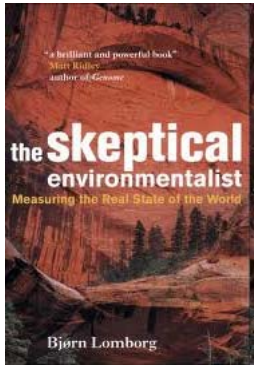
Ottmar Edenhofer, Co-chair WG III

WMO UNEP

Five forms of climate scepticism

„The collapse of the fact/value dichotomy“





The policy arena: the COP16 outcome

Advance unedited version

Draft decision -/CP.16

Outcome of the work of the Ad Hoc Working Group on long-term Cooperative Action under the Convention

The Conference of the Parties

Recalling its decision 1/CP.13 (the Bali Action Plan), and decision 1/CP.15,

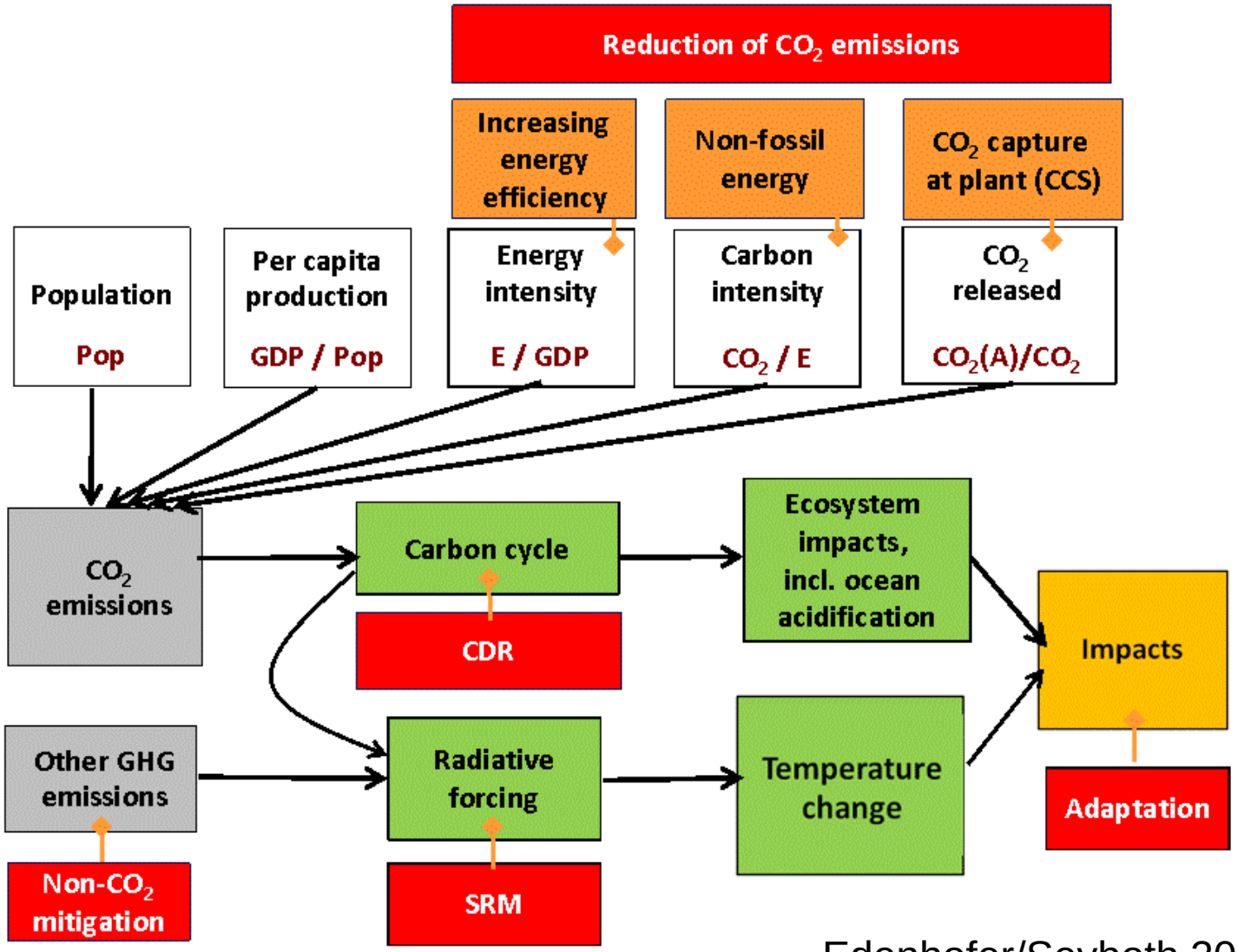
Seeking to secure progress in a balanced manner, in the understanding that, through this decision, not all aspects of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention are concluded, and that nothing in this decision shall prejudge prospects for, or the

The Conference of the Parties…

[…] recognizes that deep cuts in global greenhouse gas emissions are required […] to hold the increase in global average temperature **below 2°C** …

[…] a*lso* recognizes the need to consider, […] strengthening the long-term global goal […], including in relation to a global average temperature rise **of 1.5°C**.

Exploring the solution space



Edenhofer/Seyboth 2012

Exploring and assessing the solution space: ’seven virtues’ of assessment making

1. Reviewing comprehensively the relevant scientific, technical and socio-economic literature
2. Describing consistent transformation pathways
3. Evaluating costs, risks and opportunities of different pathways in a consistent way within and across Chapters and WGs
4. Specifying underlying value judgements and worldviews
5. Communicating quantitative and qualitative uncertainties
6. Using neutral language along good scientific practice
7. Making text, figures and tables accessible

The Scientific Arena

Table 3.10: *Properties of emissions pathways for alternative ranges of CO_2 and CO_2-eq stabilization targets. Post-TAR stabilization scenarios in the scenario database (see also Sections 3.2 and 3.3); data source: after Nakicenovic et al., 2006 and Hanaoka et al., 2006)*

Class	Anthropogenic addition to radiative forcing at stabilization (W/m^2)	Multi-gas concentration level (ppmv CO_2-eq)	Stabilization level for CO_2 only, consistent with multi-gas level (ppmv CO_2)	Number of scenario studies	Global mean temperature C increase above pre-industrial at equilibrium, using best estimate of climate sensitivity[c)]	Likely range of global mean temperature C increase above pre-industrial at equilibrium[a)]	Peaking year for CO_2 emissions[b)]	Change in global emissions in 2050 (% of 2000 emissions)[b)]
I	2.5-3.0	445-490	350-400	6	2.0-2.4	1.4-3.6	2000-2015	-85 to -50
II	3.0-3.5	490-535	400-440	18	2.4-2.8	1.6-4.2	2000-2020	-60 to -30
III	3.5-4.0	535-590	440-485	21	2.8-3.2	1.9-4.9	2010-2030	-30 to +5
IV	4.0-5.0	590-710	485-570	118	3.2-4.0	2.2-6.1	2020-2060	+10 to +60
V	5.0-6.0	710-855	570-660	9	4.0-4.9	2.7-7.3	2050-2080	+25 to +85
VI	6.0-7.5	855-1130	660-790	5	4.9-6.1	3.2-8.5	2060-2090	+90 to +140

Notes:

a. Warming for each stabilization class is calculated based on the variation of climate sensitivity between 2°C –4.5°C, which corresponds to the likely range of climate sensitivity as defined by Meehl *et al.* (2007,Chapter 10).

b. Ranges correspond to the 70% percentile of the post-TAR scenario distribution.

c. 'Best estimate' refers to the most likely value of climate sensitivity, i.e. the mode (see Meehl *et al.* (2007,Chapter 10) and Table 3.9

Fisher et al. (2007), AR4

Only 6 scenarios from 3 models in the lowest category…

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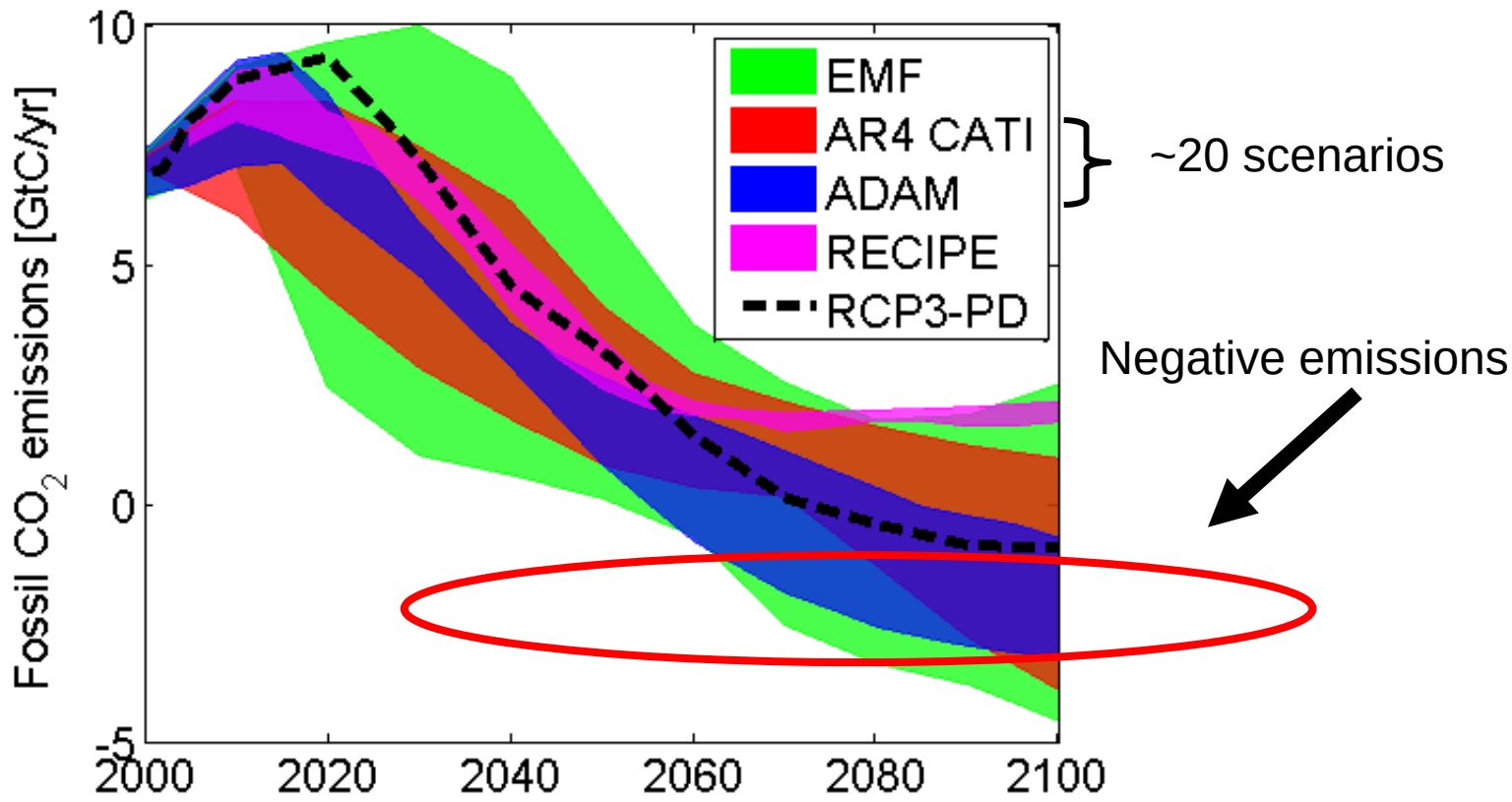
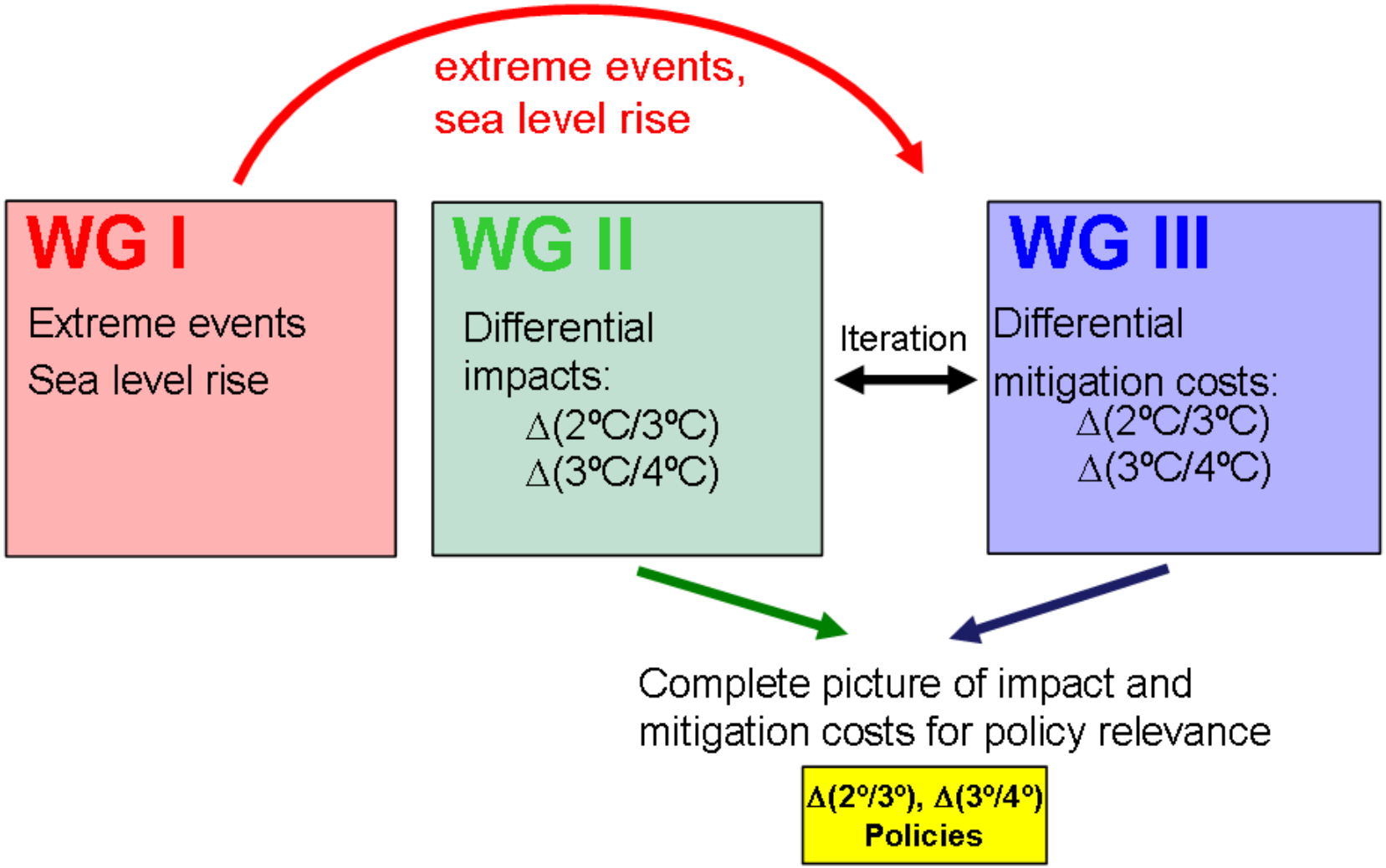
Low Stabilization Scenarios Beyond AR4

- …but already many more available for AR5
- Exploration of RCP3-PD within the scenario process



Knopf/Luderer/Edenhofer (2011).

Implications for the Scenario Process



Scenario Process

Impact, Adaptation, Vulnerability

IAV

Establish coherent scenario process

IAM

Integrated Assessment Models

CM

Climate Models

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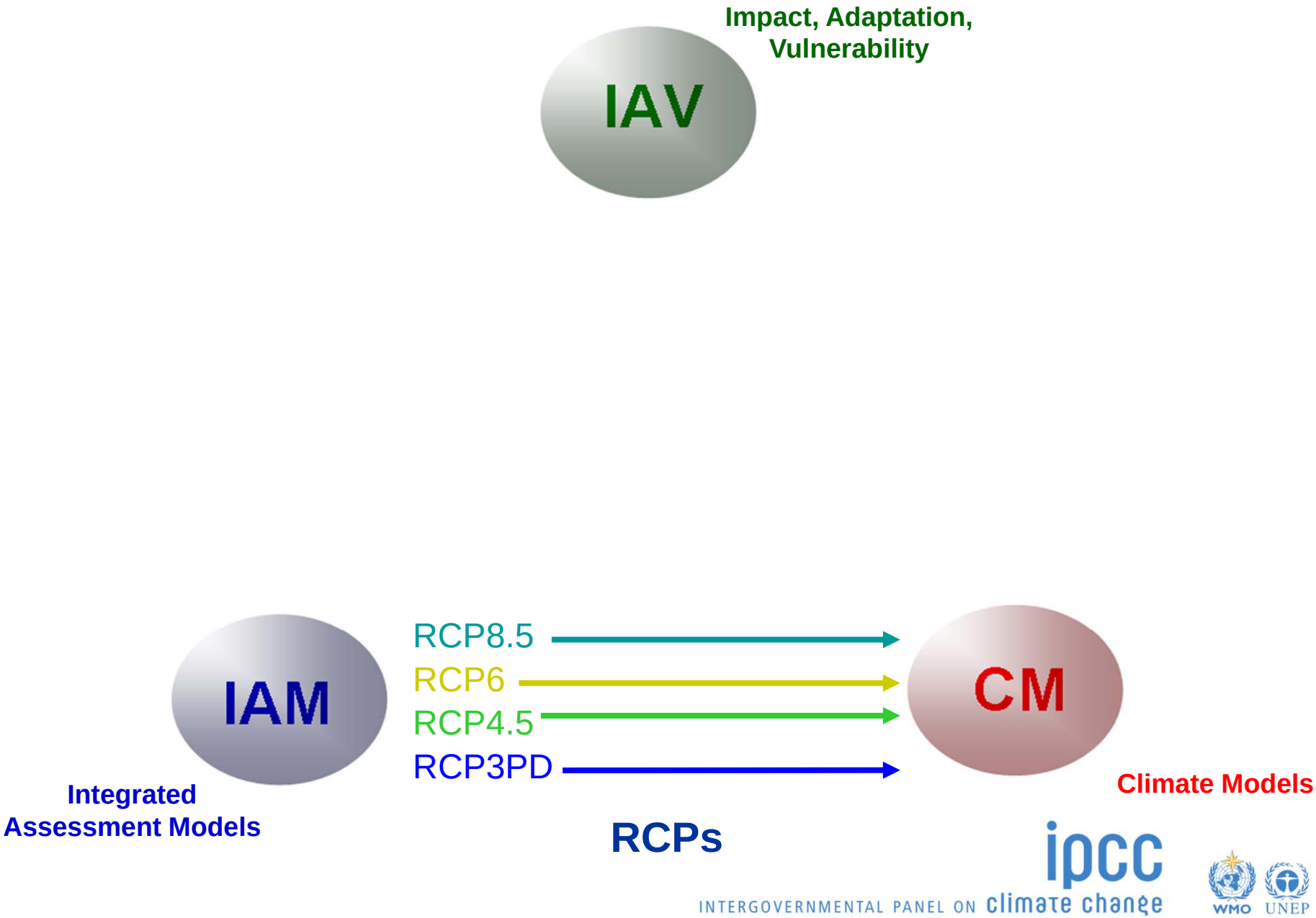
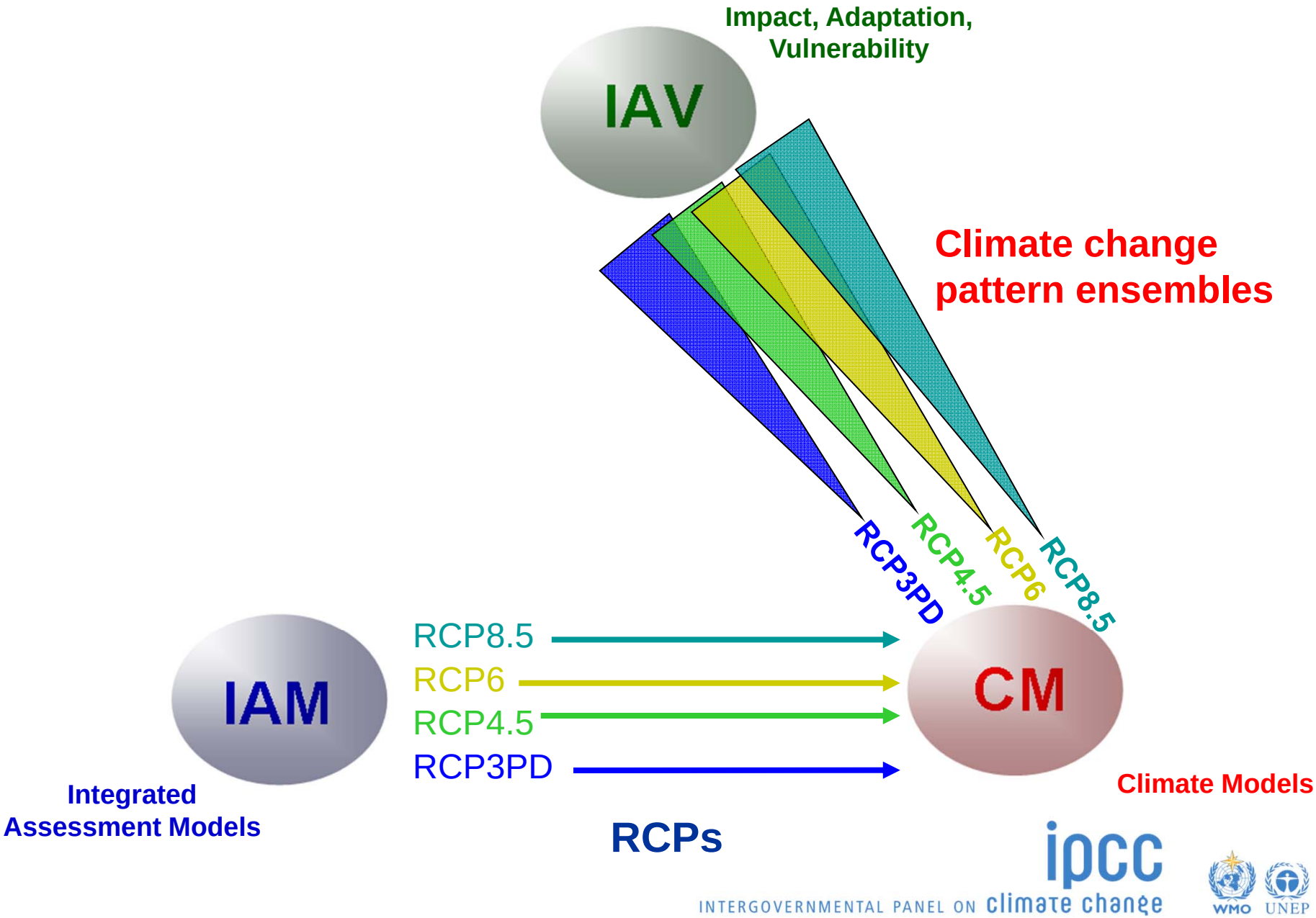
Scenario Process



Scenario Process



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Scenario Process

Impact, Adaptation, Vulnerability

IAV

WoSES Workshop
November 2010 in Berlin

IAM

RCP8.5
RCP6
RCP4.5
RCP3PD

Integrated Assessment Models

CM

Climate Models

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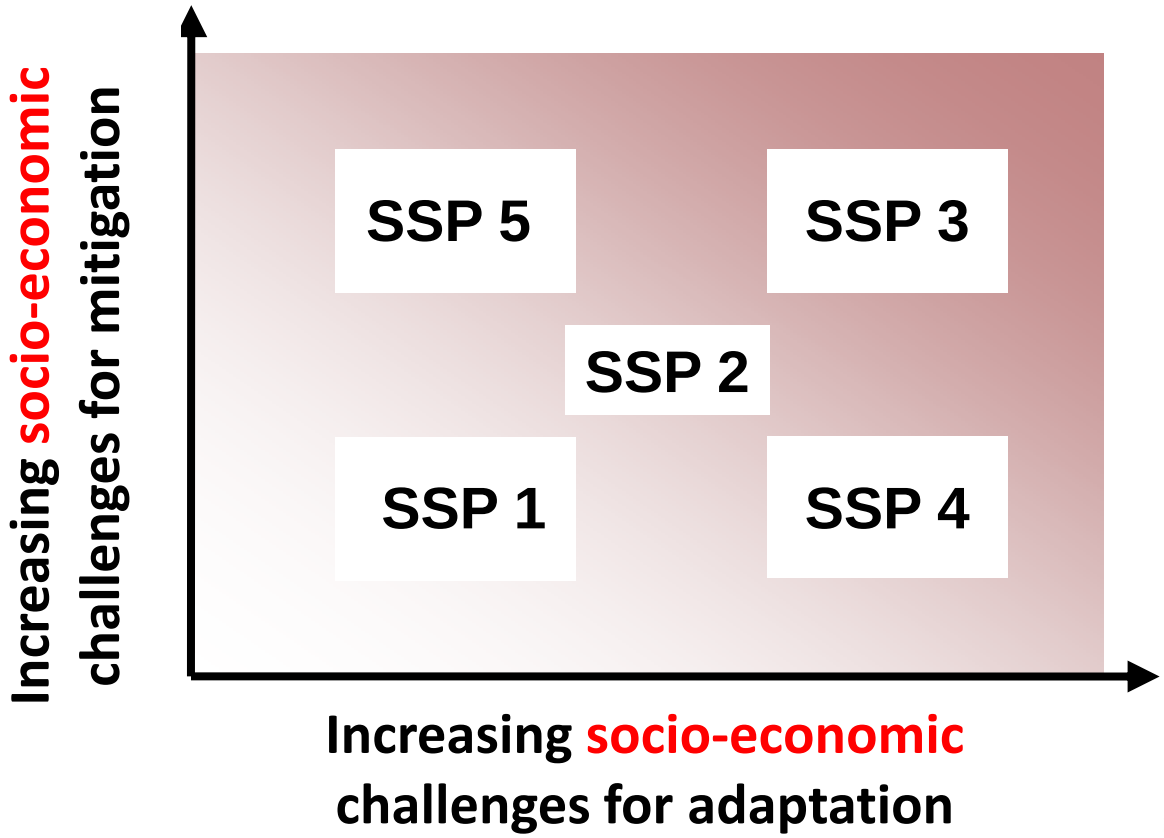
SSP „space“ relevant for climate change

Inverse approach: Cover the range of socio-economic challenges for mitigation & adaptation



Kriegler 2012

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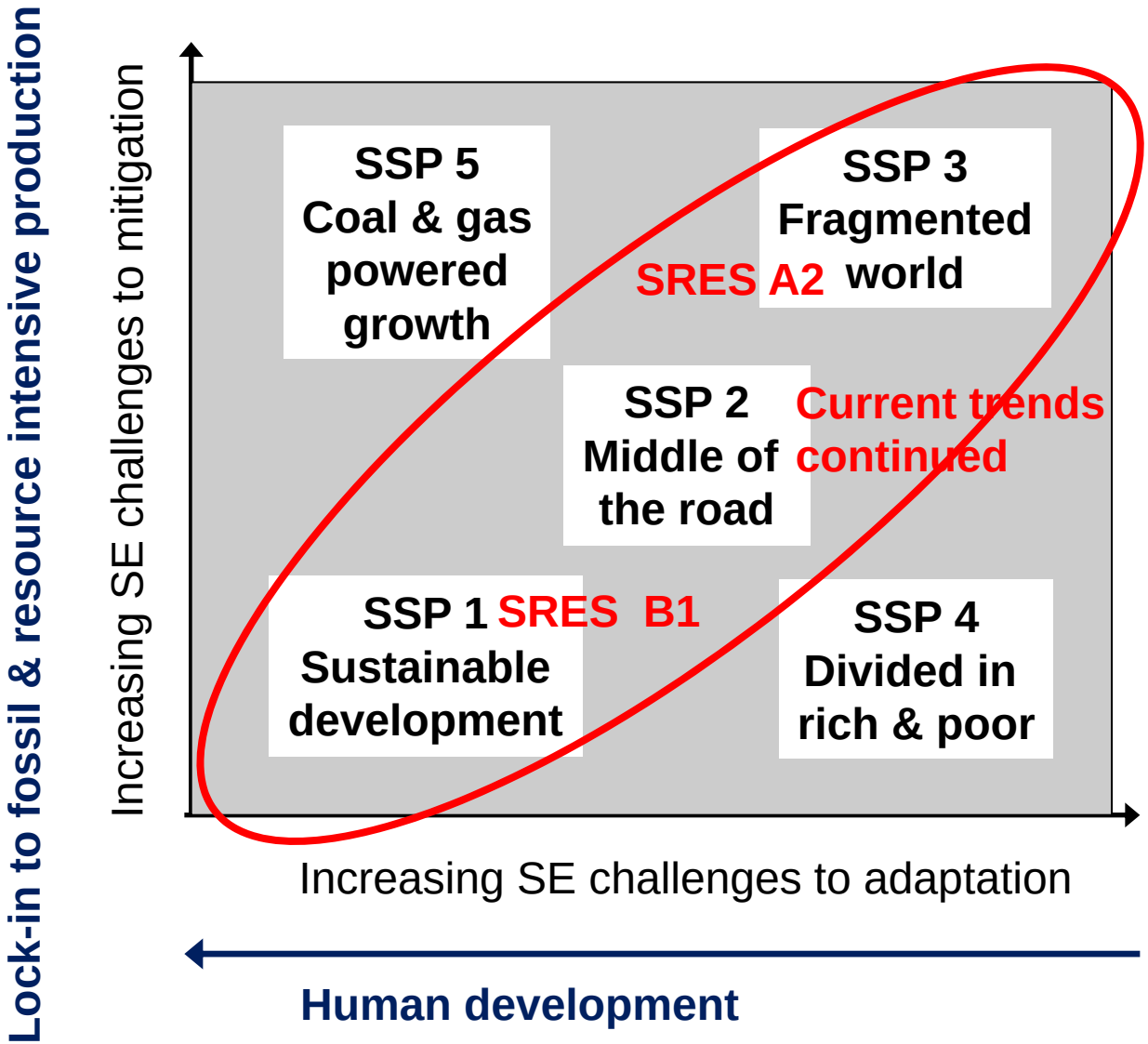
SSP narratives



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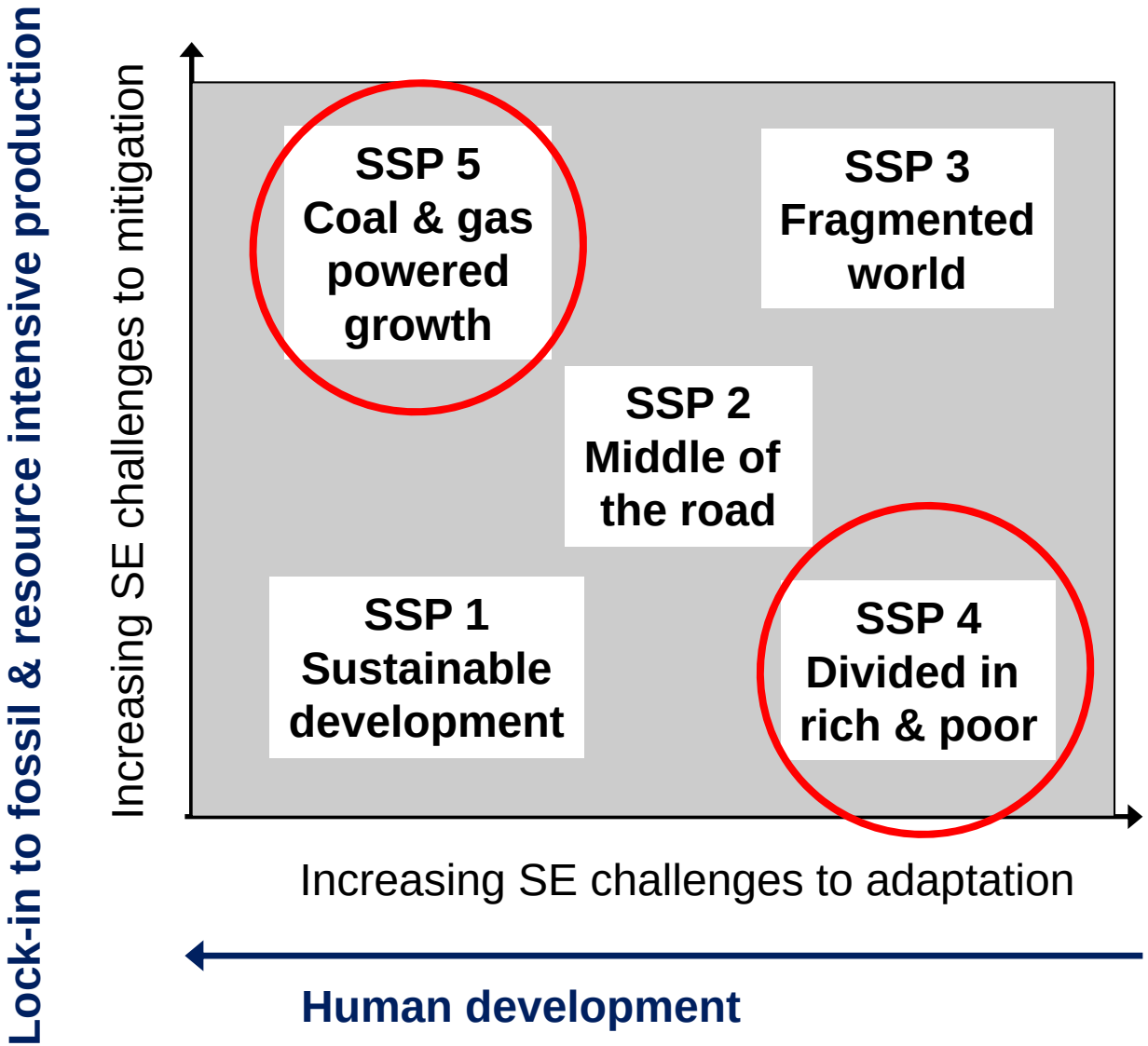
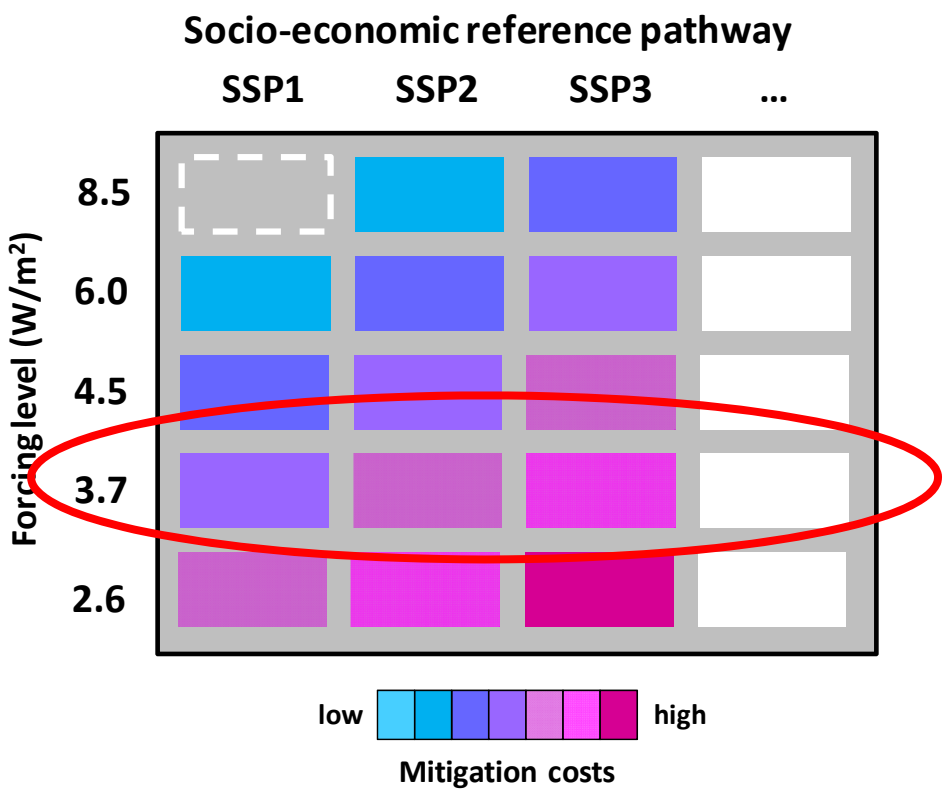
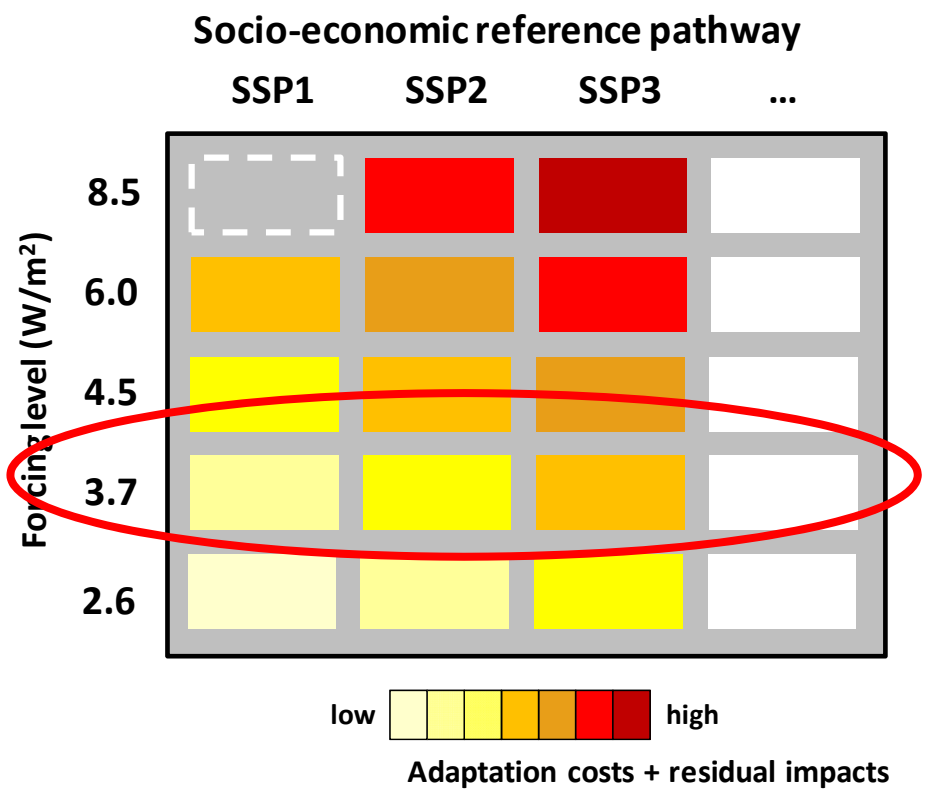
SSP narratives



Kriegler 2012

New scenario architecture





Kriegler 2012

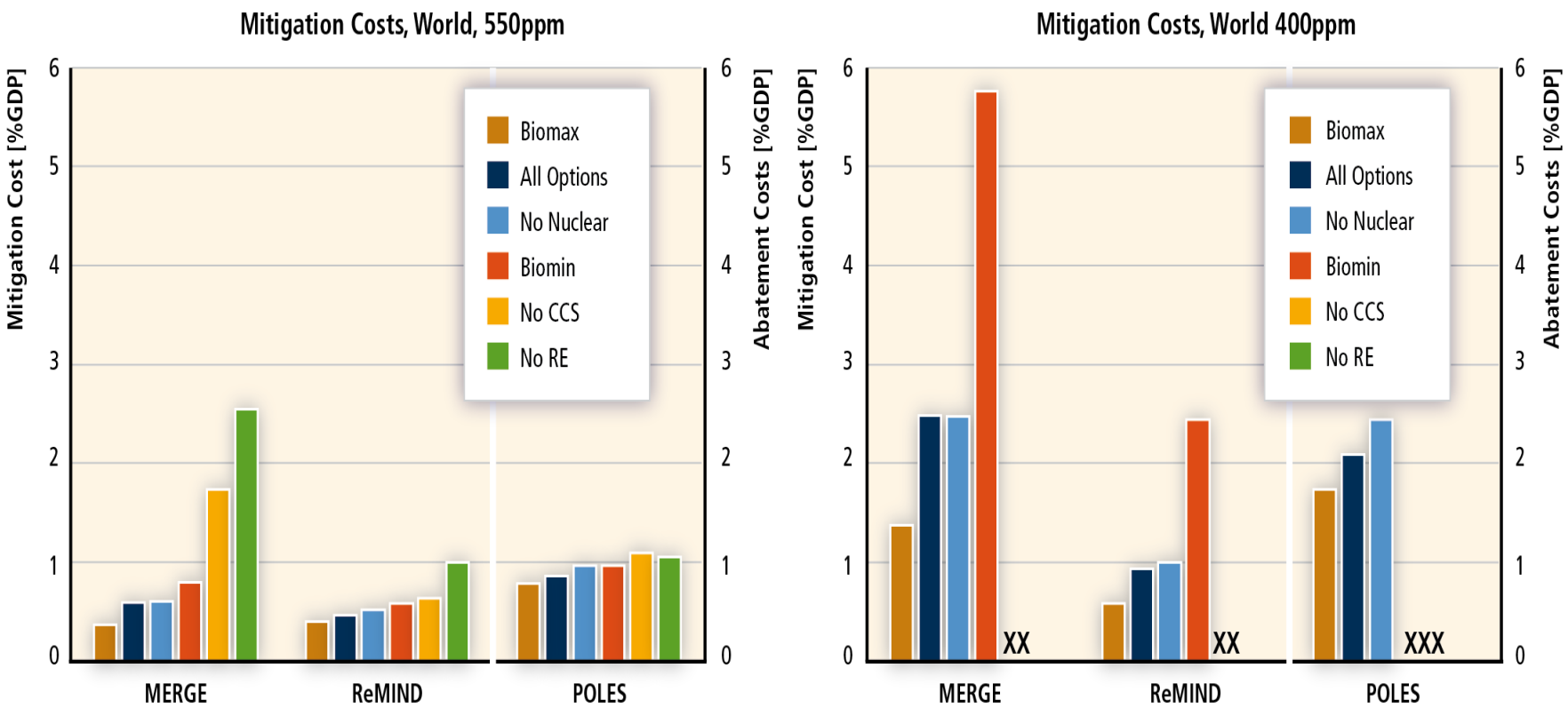
Post-AR4 scenarios in WGIII

- Describe consistent transformation pathways
- Explore the costs, risks and opportunities of different long-term stabilization targets…
- …in perfect and imperfect worlds

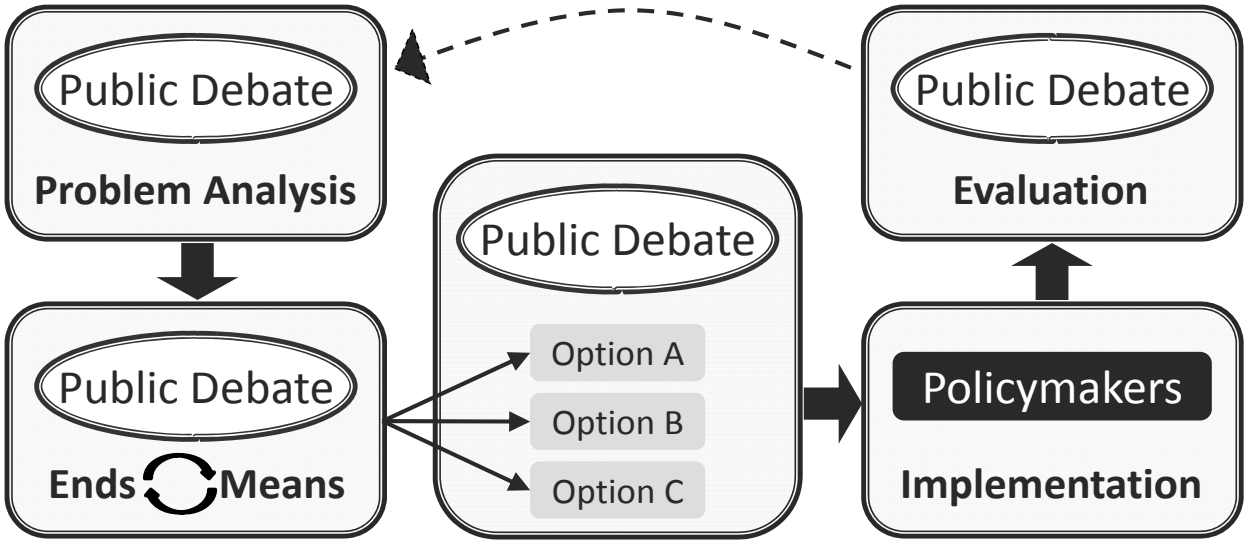
Table 10.2 | Categorization of the 164 scenarios reviewed in this section based on CO_2 concentration levels in 2100, the inclusion of delayed participation in mitigation (second-best policy), and constraints on and/or variations in the deployment of fossil energy with CCS, nuclear energy and RE. The CO_2 concentration categories are defined consistently with those in the IPCC Fourth Assessment Report (AR4), WGIII (Fisher et al., 2007). Note that Categories V and above are not included here and Category IV is extended to 600 ppm from 570 ppm, because all stabilization scenarios lie below 600 ppm CO_2 in 2100 and because the lowest baseline scenarios reach concentration levels of slightly more than 600 ppm by 2100.[1] Data adapted from Krey and Clarke (2011) modified to include two additional scenarios.

	CO_2 concentration by 2100 (ppm)	Number of scenarios	Policy Scenarios			
			First-best	Constrained technology	Second-best policy	Constrained technology & second-best policy
Baselines	>600	27	—	—	—	—
Category IV	485–600	32	11	13	6	2
Category III	440–485	63	20	29	11	3
Category II	400–440	14	7	6	1	0
Category I	<400	28	10	16	2	0

Example from the SRREN: mitigation in a technologically constrained world



The Pragmatic Science/Policy Interface



- While pursuing certain ends, unintended side-effects may require the reevaluation of means and ends
- Relies on continuous iteration between policy and science

Edenhofer/Kowarsch 2012

There is always more than one way…

http://www.trail.ch/gallery/albums/trail/graubunden/fuorcla-surlej/corvatsch-fuorcla-surlej-val-roseg-09_09_2006-img_2598.jpg