

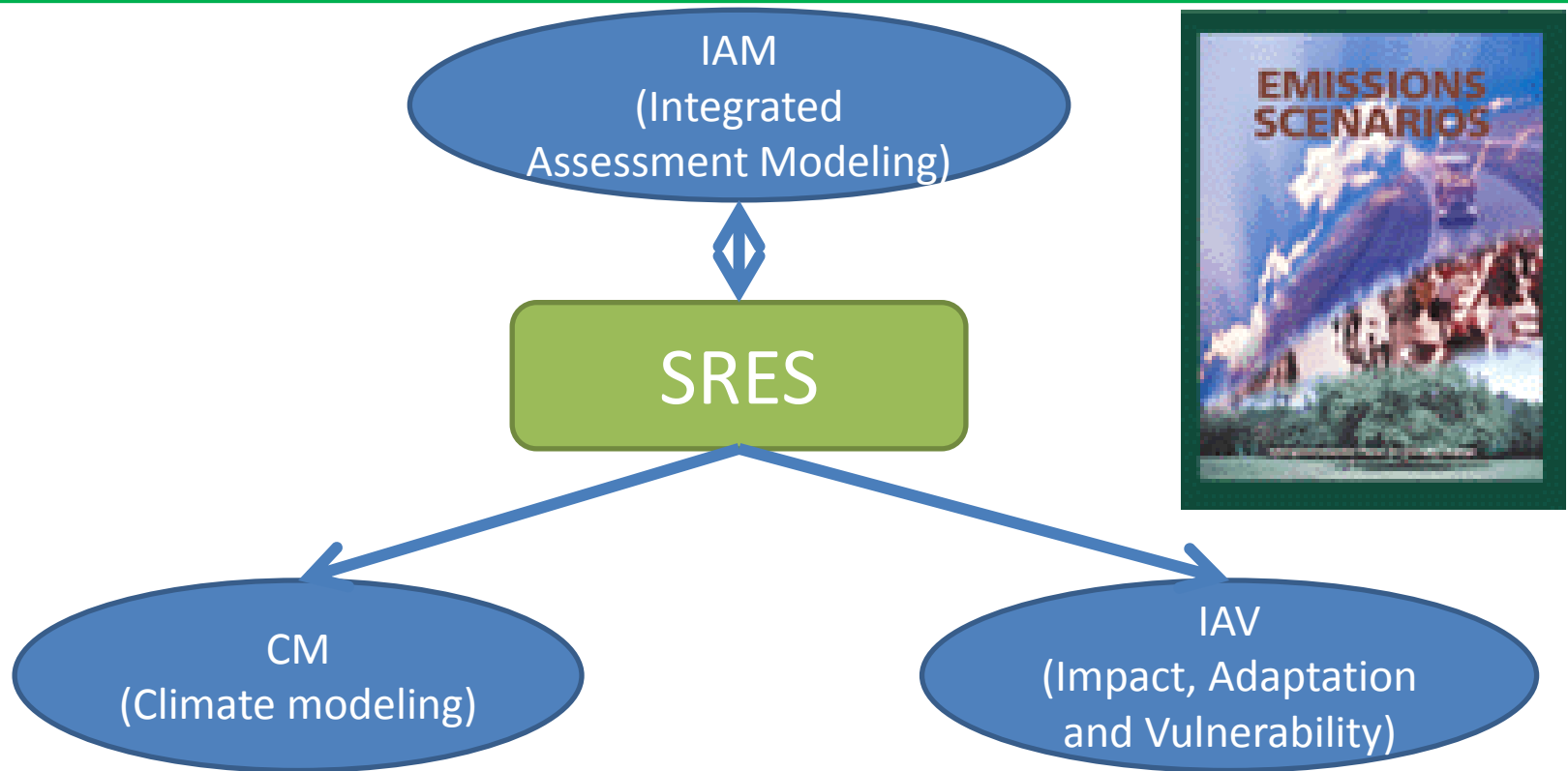
SSPs

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M. Kainuma, Y. Hijioka and N. Hanasaki
National Institute for Environmental Studies
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17th AIM international workshop

Outline

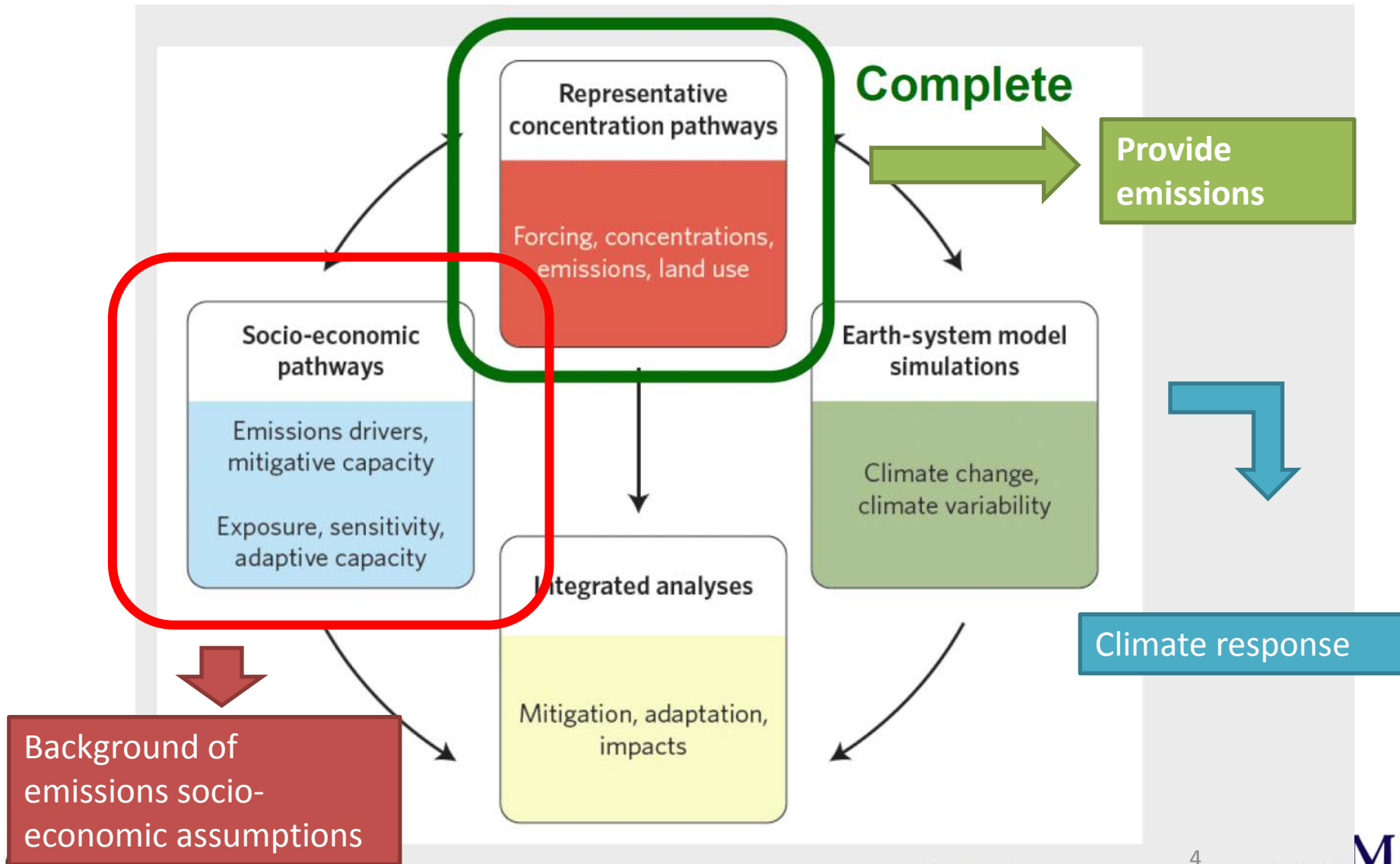
- What are SSPs and for what?
 - Shared Socio-economic Pathways
 - For bridging the background assumptions among IAM, IAV and CM
- Contents of SSPs
 - Challenges to mitigation and adaptation
 - Quantitative and qualitative
- Coupling with climate policy
 - Drastically different world could be drawn

SRES dependent studies



- No climate policy
- No consistency in climate modeling and socio-economic information with climate policy scenarios
- Less description about impact and adaptation capability

New Scenario process



RCP (Representative Concentration Pathways)

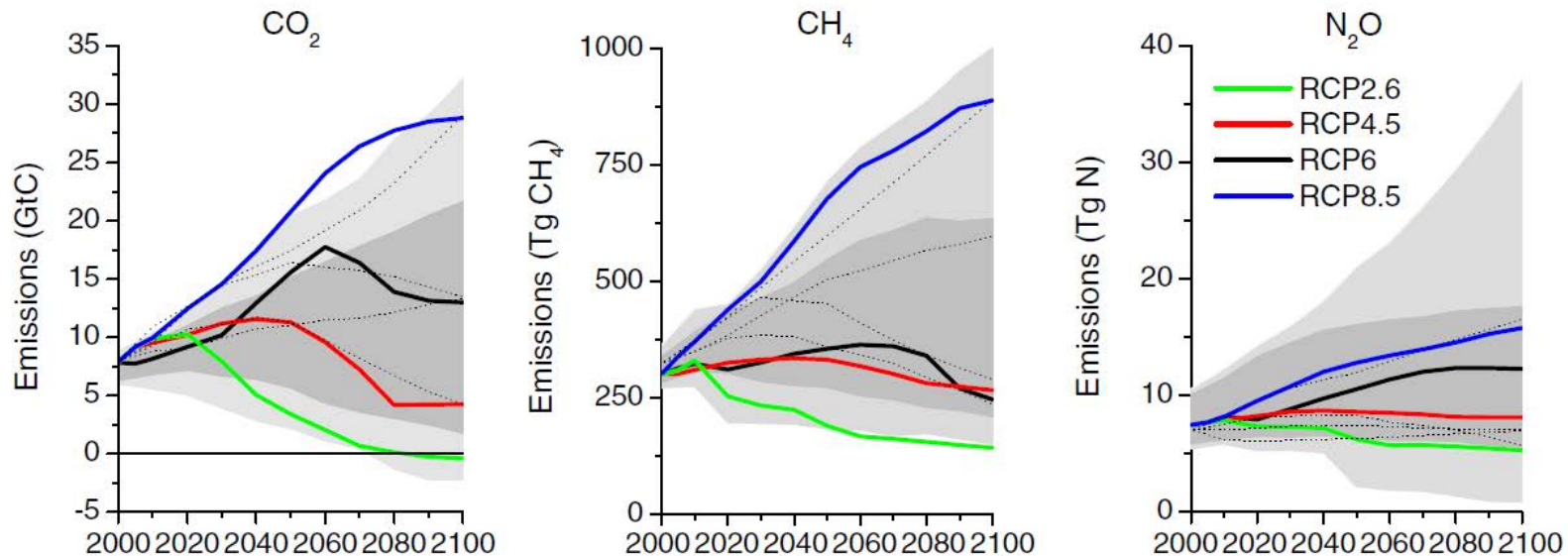


Fig. 6 Emissions of main greenhouse gases across the RCPs. Grey area indicates the 98th and 90th percentiles (*light/dark grey*) of the literature (for references, see Figure 4). The dotted lines indicate four of the SRES marker scenarios. Note that the literature values are obviously not harmonized (see text)

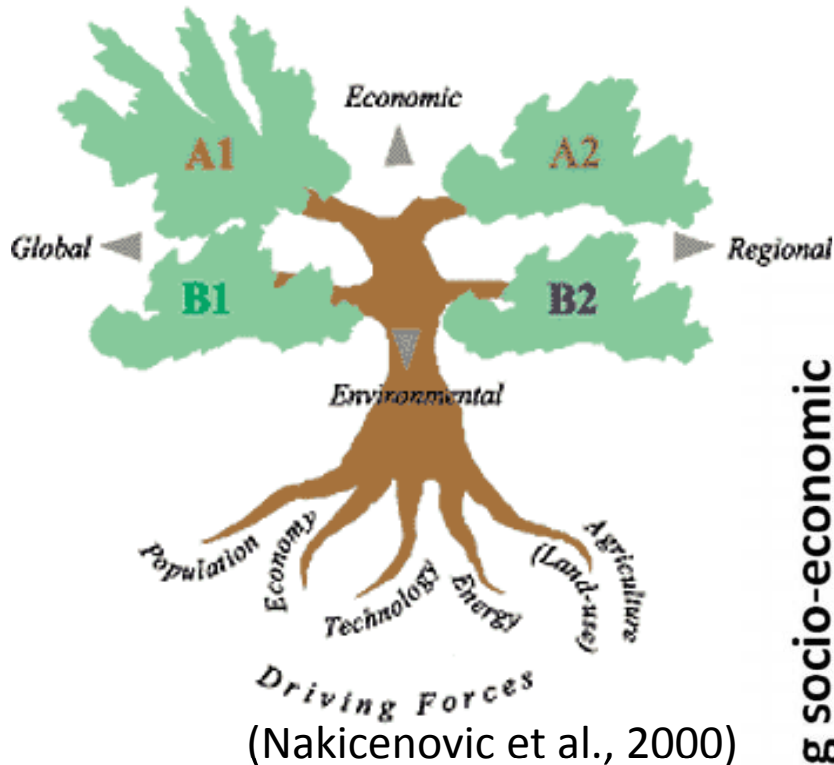
Detlef et al. (2011)

Shared Socio-economic Pathways

- Broad development patterns for major world regions, relevant to adaptation and mitigation
- Provide multiple socio-economic scenarios
 - “Second generation of SRES”
- Shared by IAM (Integrated Assessment Modeling), IAV (Impact, Adaptation and Vulnerability) and CM (Climate Modeling).
- Quantitative and qualitative information
- Baseline scenarios (no climate policy)

Scenario dimensions

SRES Scenarios

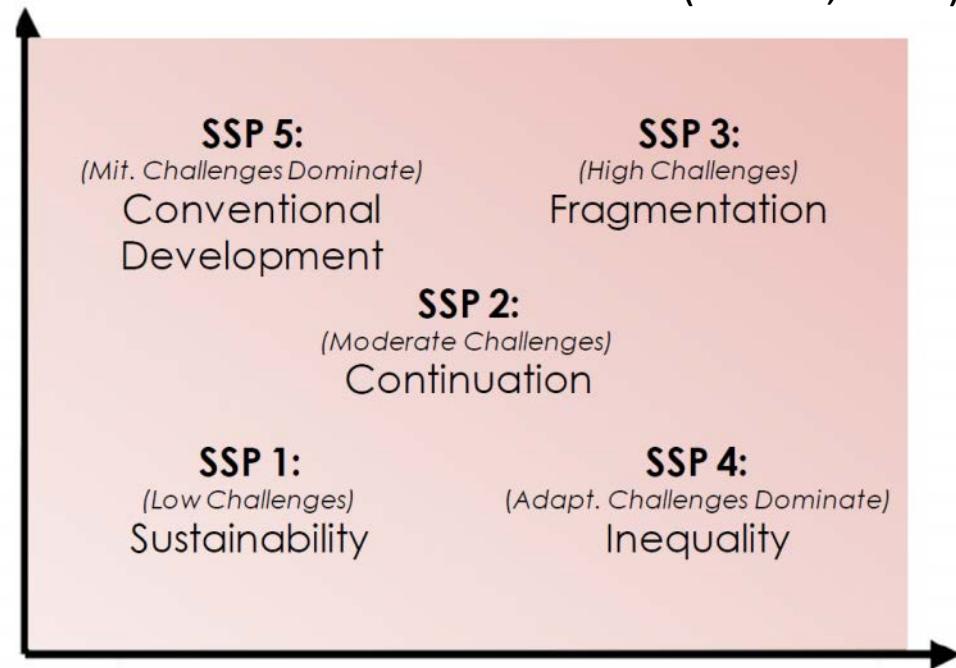


SRES

Increasing socio-economic challenges for mitigation

SSPs

(O'Neill, 2012)



Increasing socio-economic challenges for adaptation

Challenges for mitigation

- Factors tend to lead high reference emissions in the absence of climate policy
- Factors that would tend to reduce the inherent **mitigative capacity**

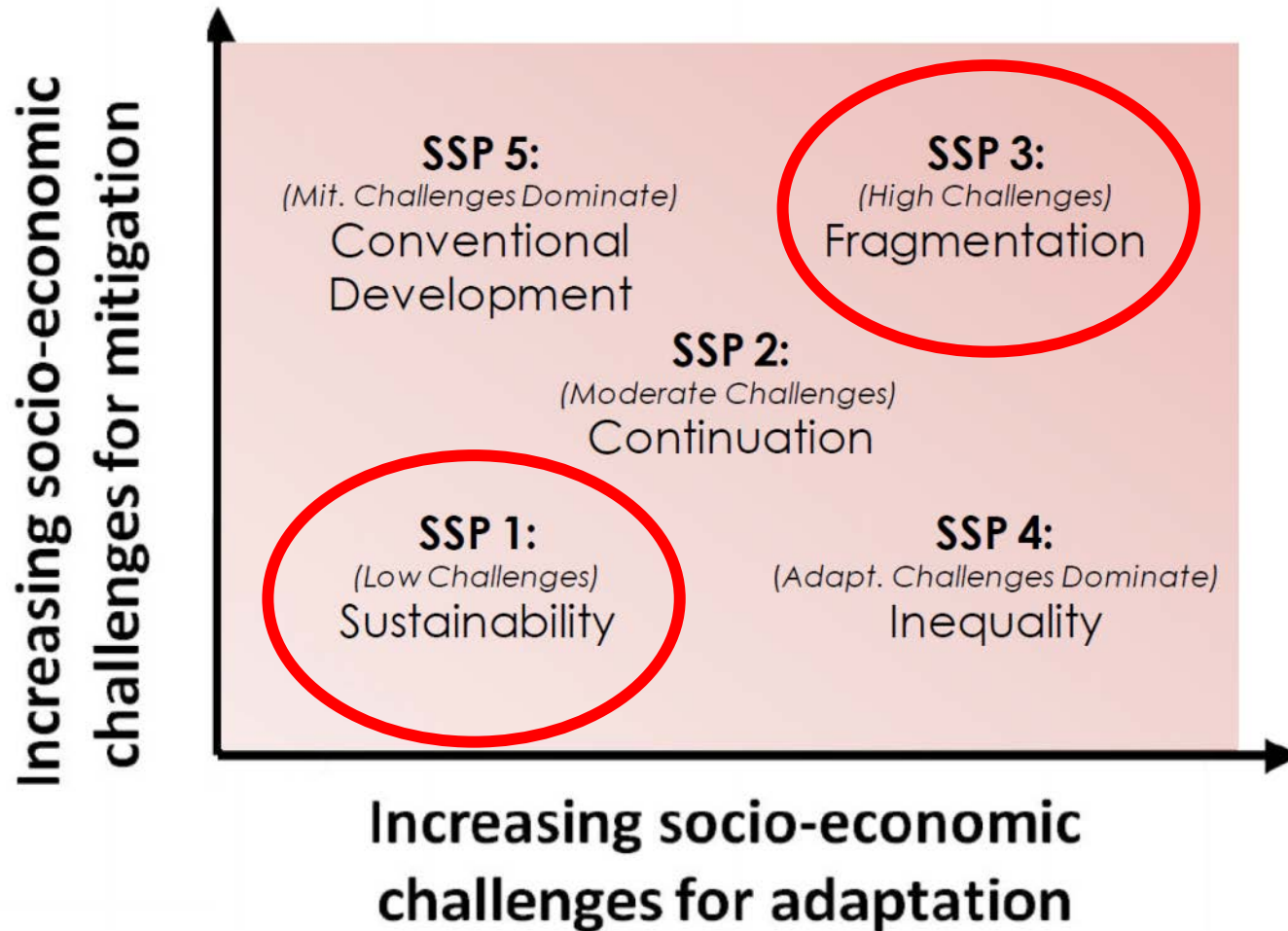
- **Mitigative capacity**
 - Technological options
 - Availability of financial resources
 - Stocks of human and social capital
 - Political will

Challenges for mitigation

- Socio-economic dimensions of exposure to climate change hazard
- Factors that affect the sensitivity of socio-economic or ecological systems to climate change
- Factors influencing **adaptive capacity**

- **Adaptive capacity**
 - Technological options
 - Effectiveness of relevant institutions (agricultural R&D, forest management)
 - Availability of physical, financial and human resources

Scenario concept



(O'Neill, 2012)

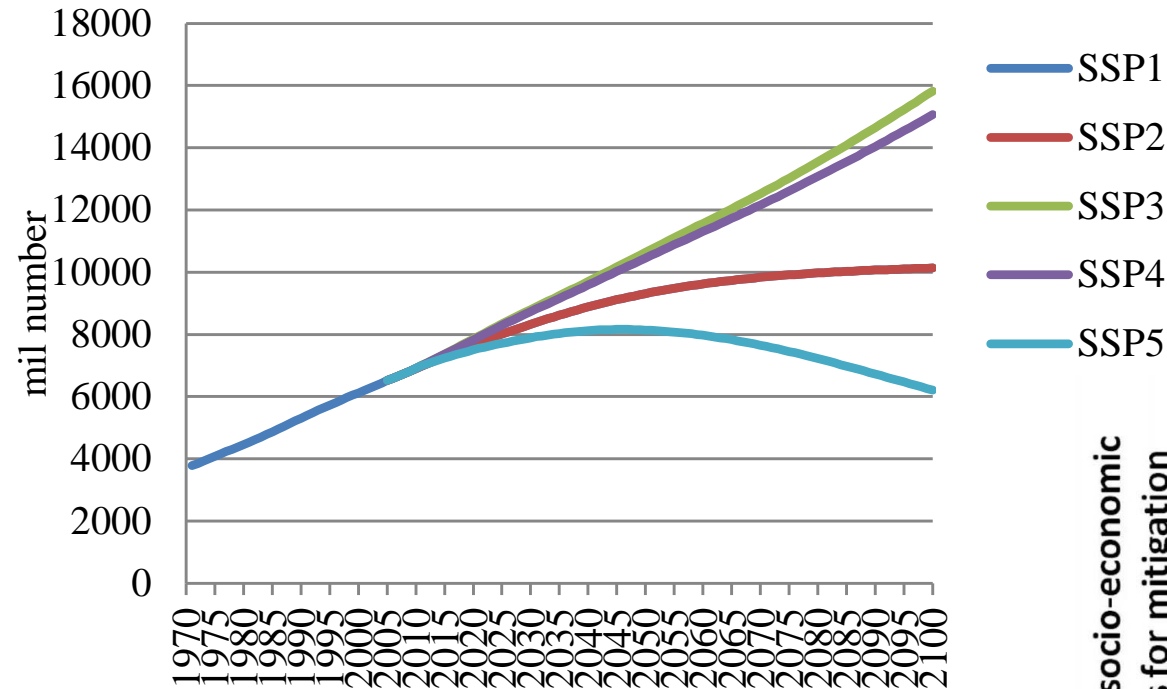
What are supposed to be in SSPs?

- Characterized by
 - Population
 - Share of extreme poverty
 - Urbanization
 - GDP
 - Trade openness
 - Energy technology and resource availability
 - Land use
 - Agricultural productivity
 -

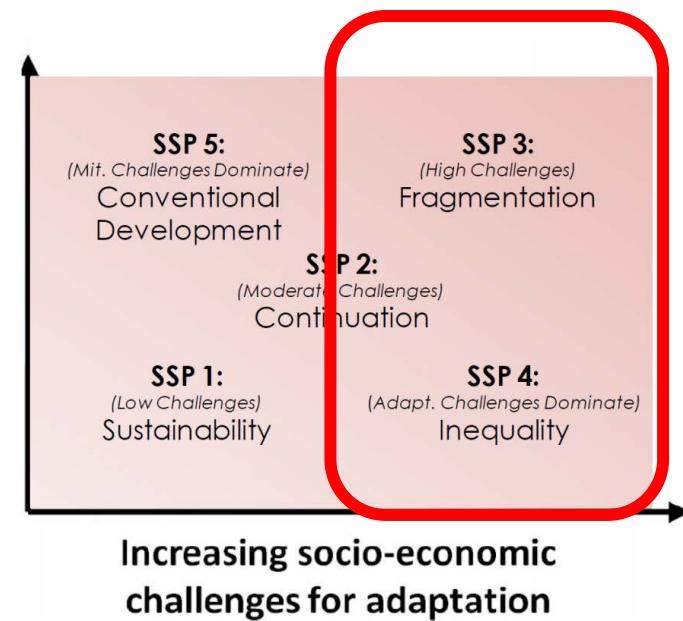
- Results of the IAM model output
 - GHG emissions
 - Energy supply and consumption
 -

AIM's activity and preliminary trials

- World population -



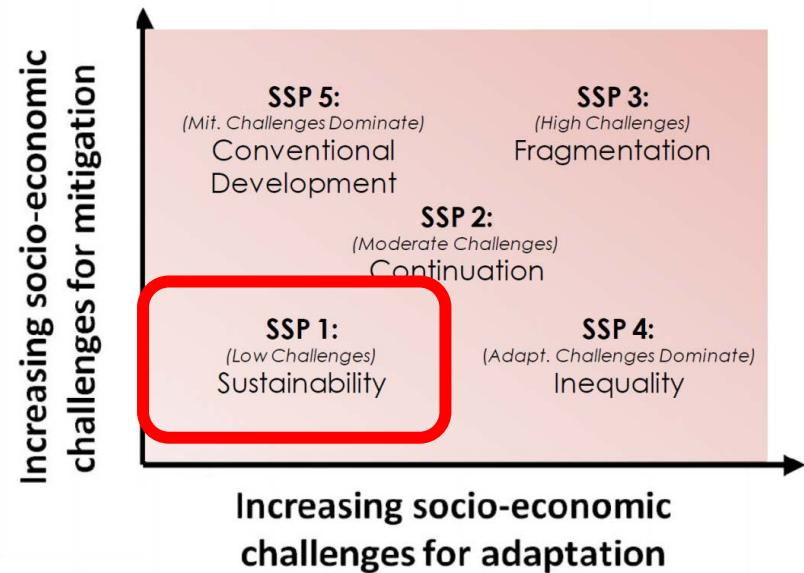
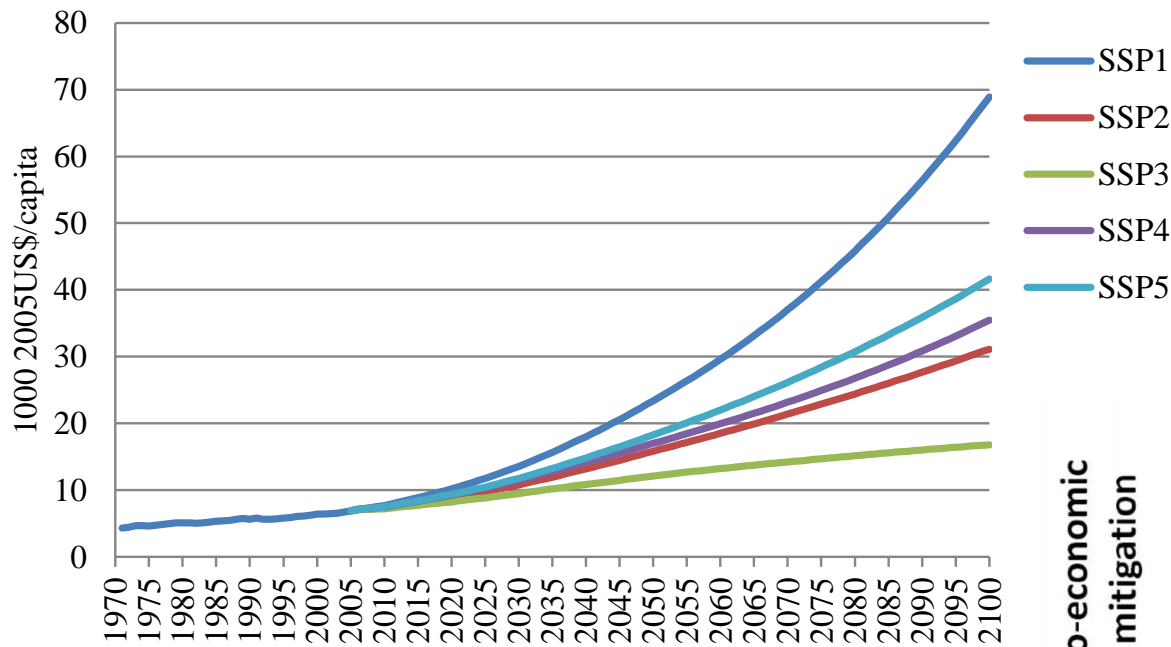
Increasing socio-economic challenges for mitigation



- Wide range at the end of 21 century
- SSP3 and SSP4 are much higher

AIM's activity and preliminary trials

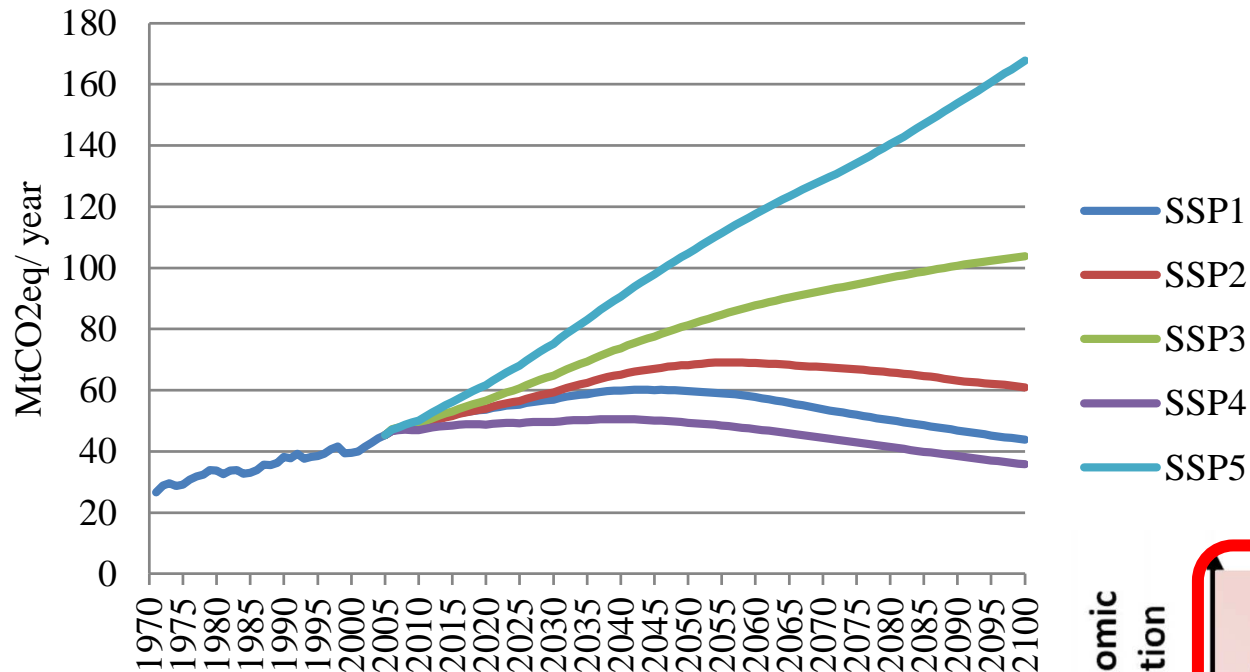
- GDP per capita (AIM/CGE[global])-



- SSP1 would be higher
 - they have much financial resources to adaptive capacity
 - Technological progress

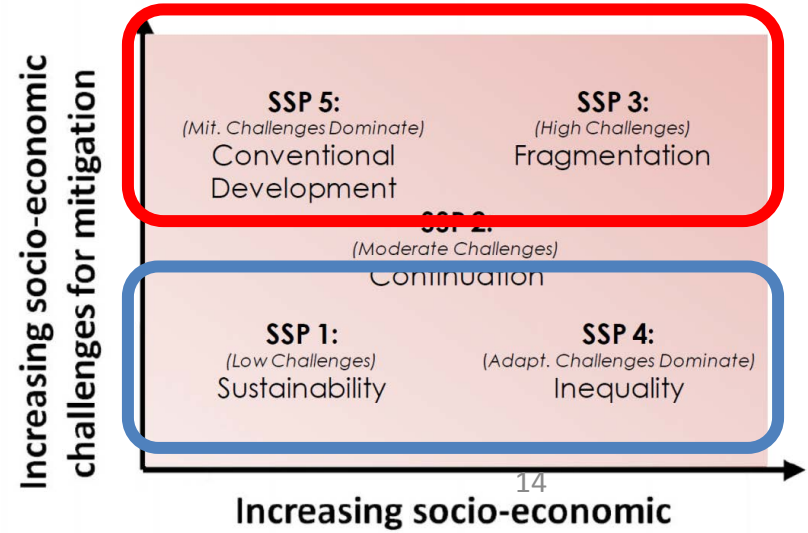
AIM's activity and preliminary trials

- GHG emissions (AIM/CGE[global])-









- SSP1
- SSP2
- SSP3
- SSP4
- SSP5

- SSP5 and SSP3 have large emissions
- SSP1 and SSP4 are less



Shared policy assumptions

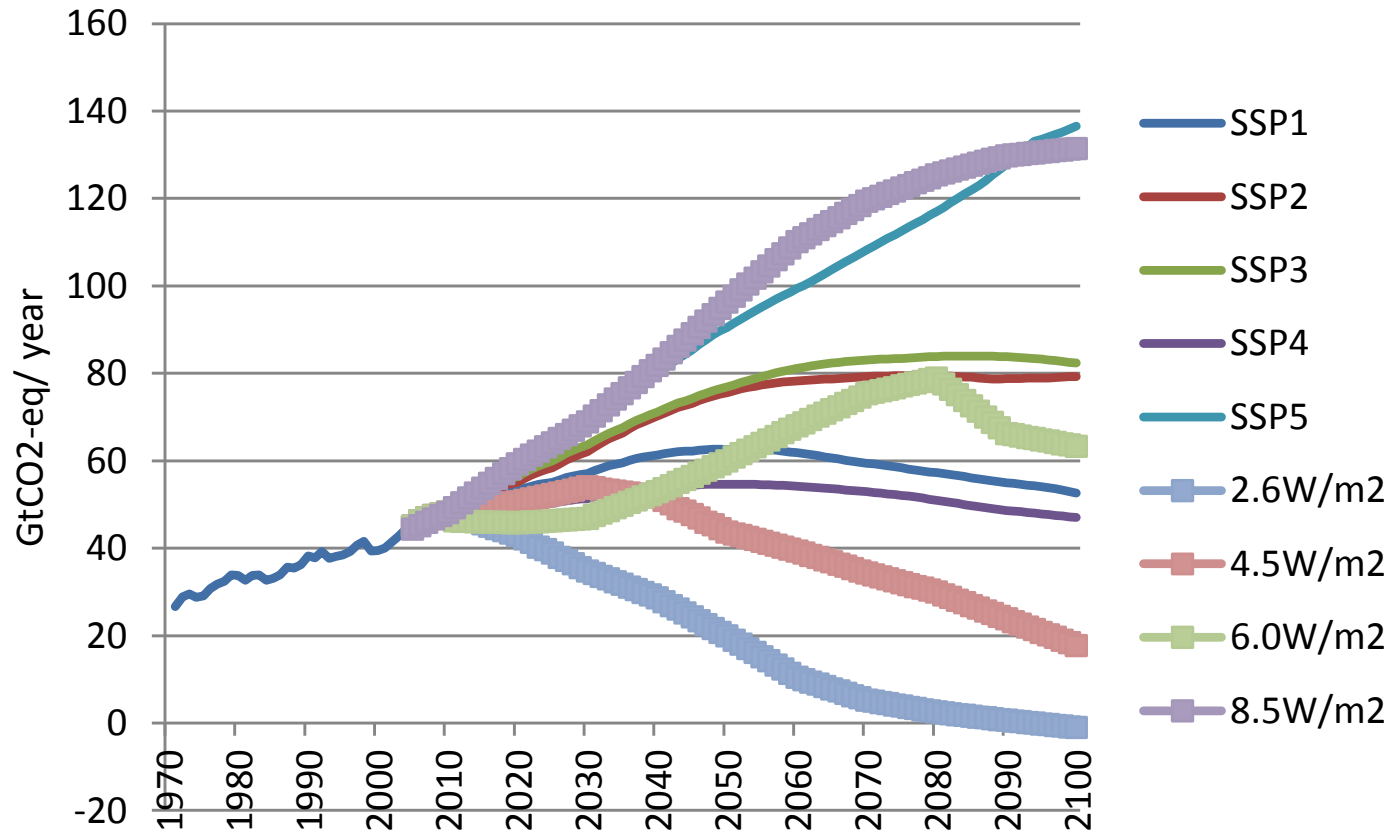
Different baselines

	SSP1	SSP2	SSP3	SSP4	SSP5	
						Emission levels and temperature increase 
Climate forcing						
8.5 W/m ²						
6.0 W/m ²						
4.5 W/m ²						
2.6 W/m ²						

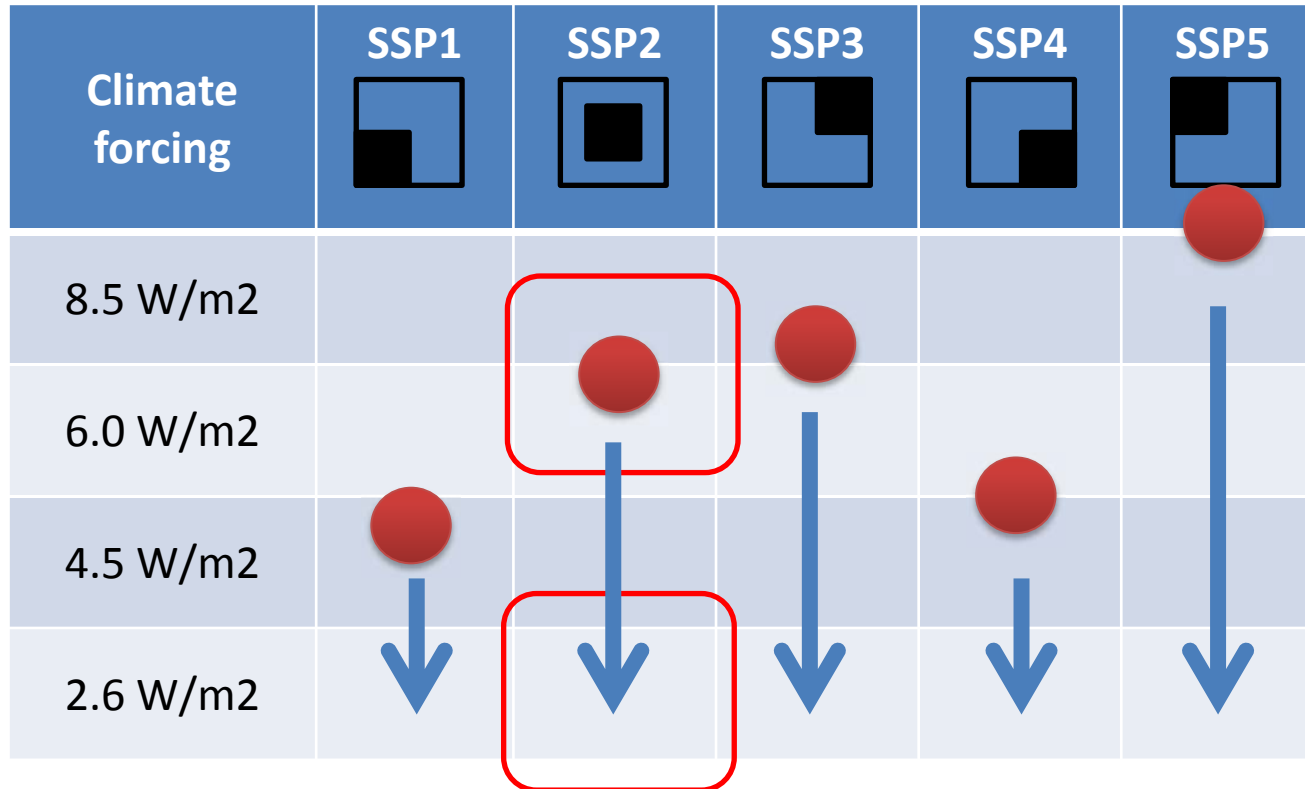
- Strength of climate policy is according to RCP forcing levels
- Difficulties of stabilization are diverse among scenarios

SSP and RCP

- GHG emissions -

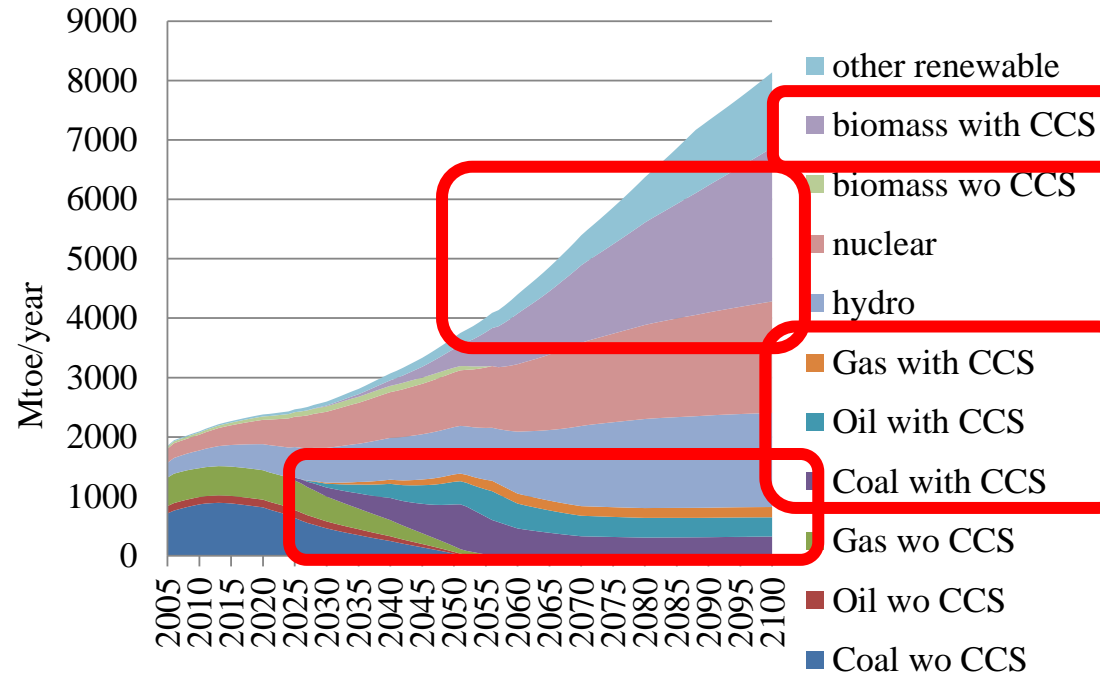
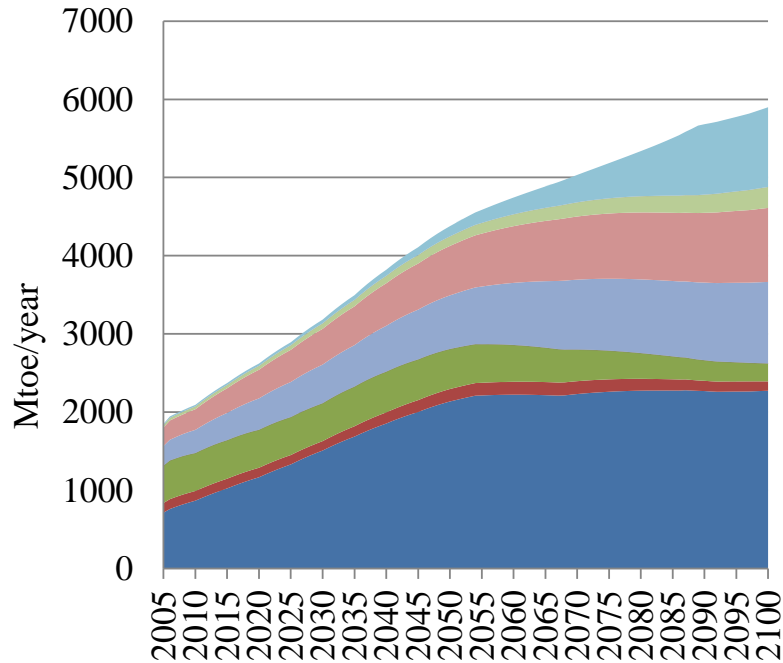


Shared policy assumptions



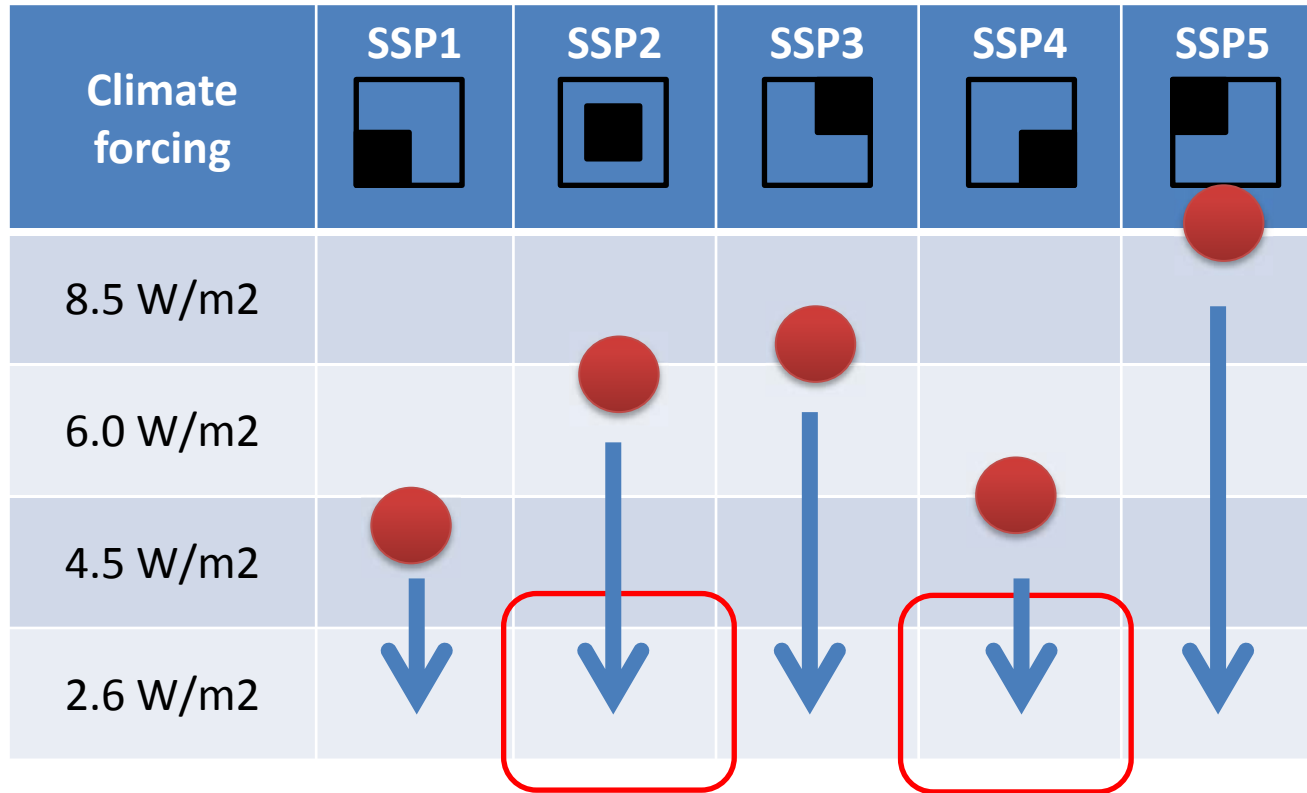
Power supply in SSP2

Climate target and baseline



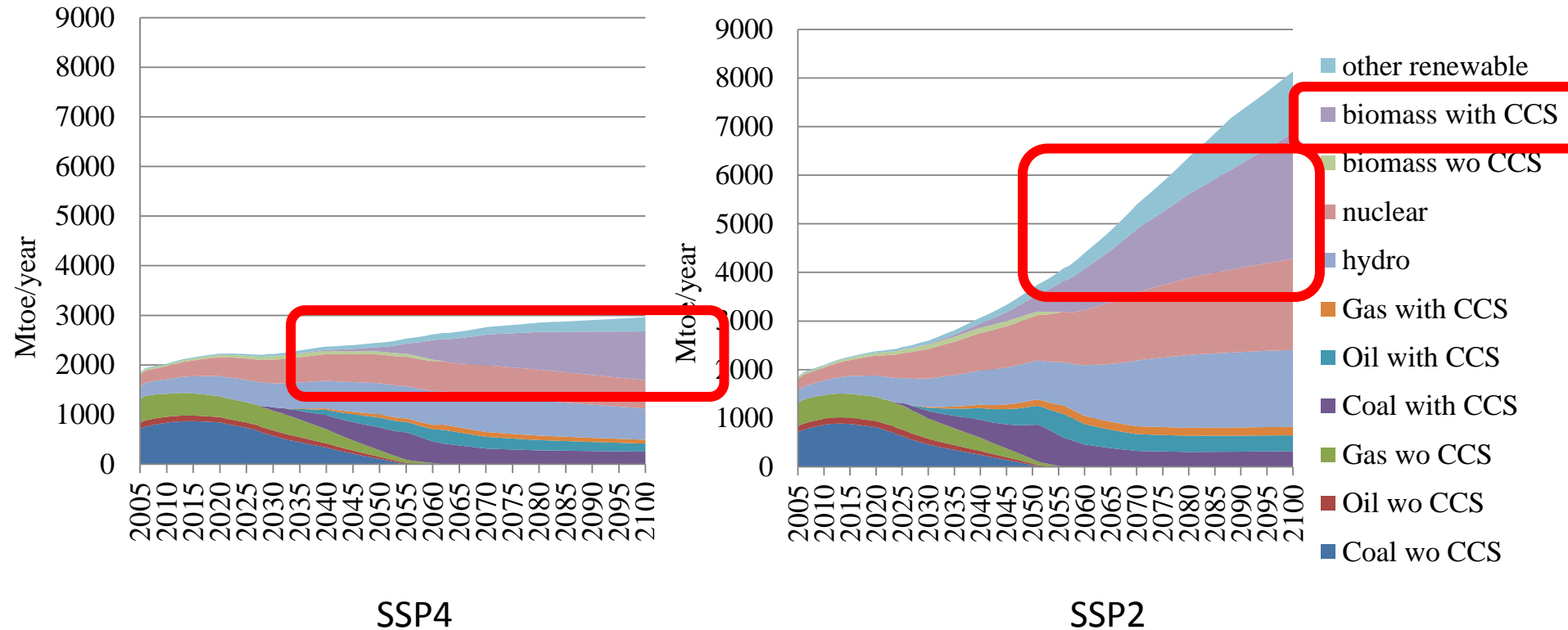
- Fired power plants installs CCS
- Biomass CCS technology expands
 - Negative emission technology
 - Carbon price enhances

Shared policy assumptions



Power supply in 2.6 W/m² stabilization

SSP2 and SSP4



- Totally different!!

Where are we?

- Framework is done
- Qualitative scenario design is done (almost)
- Quantification is going on.
 - It will be finalized within next a few month.

Summary

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