



# Storylines in scenario approaches

Detlef van Vuuren  
Professor Integrated Assessment – Universiteit Utrecht  
PBL Netherlands Environmental Assessment Agency

 @IMAGE\_PBL

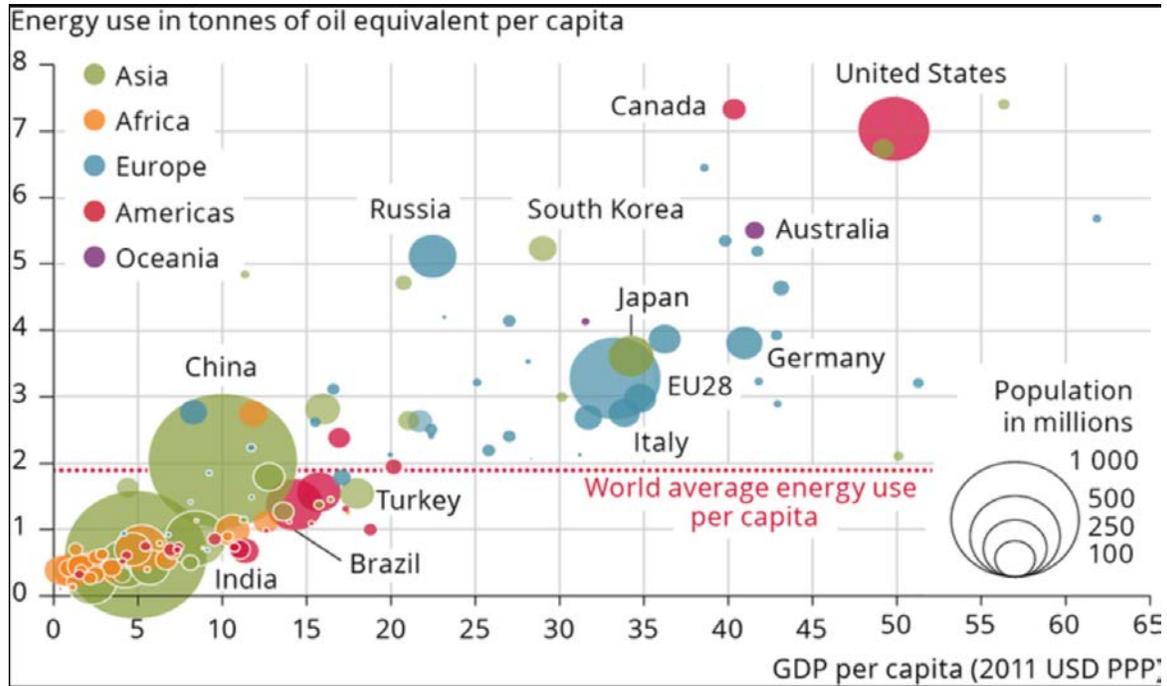


# Scenarios are a key tool in climate research

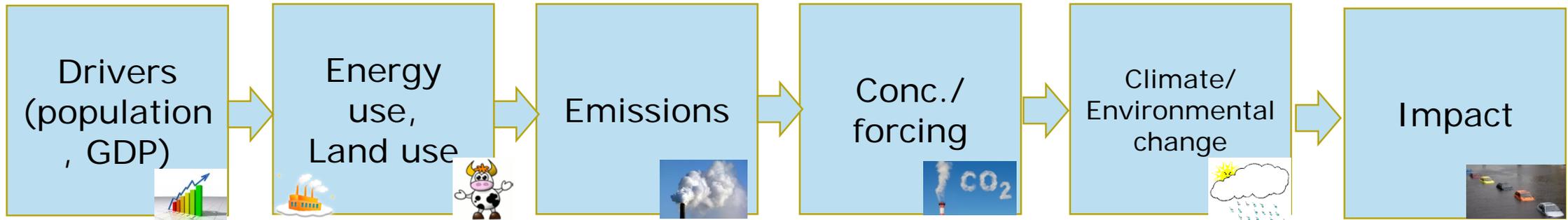
- › Impacts/climate change mostly happens in future
- › Scenarios can help to explore climate policy strategies
- › Scenarios can link different climate research communities
- › Stimulates thinking about the future

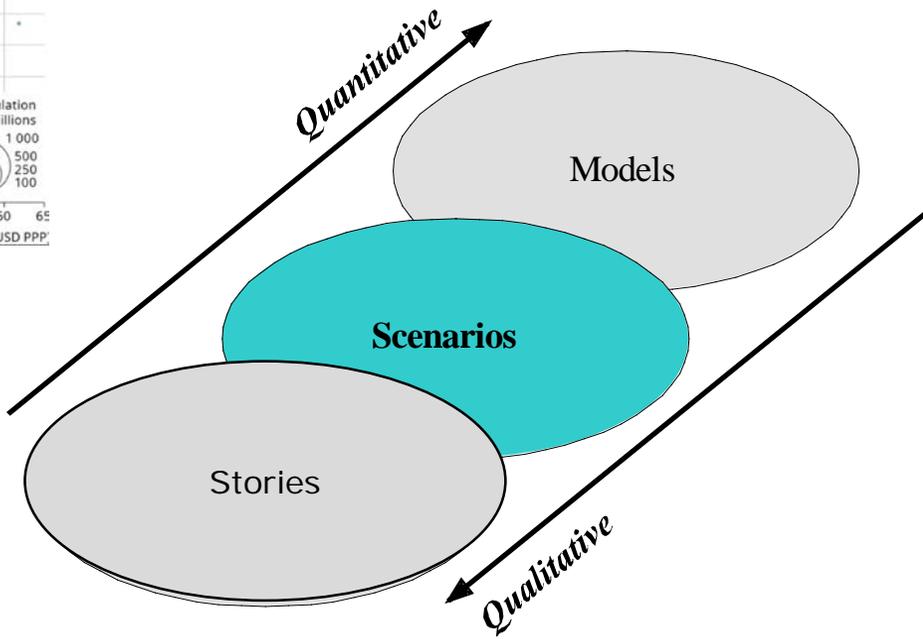
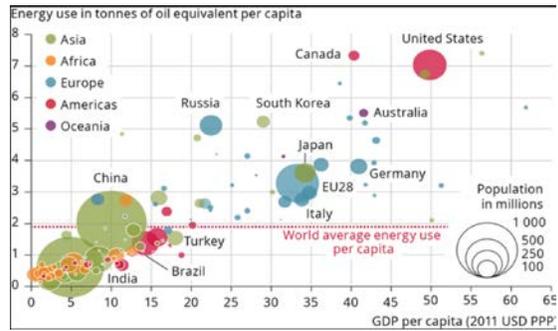
A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships. Note that scenarios are neither predictions nor forecasts, but are used to provide a view of the implications of developments and actions. See also *Baseline scenario*, *Emission scenario*, *Mitigation scenario* and *Pathways*.





Type of development  
Lifestyle  
Technology focus

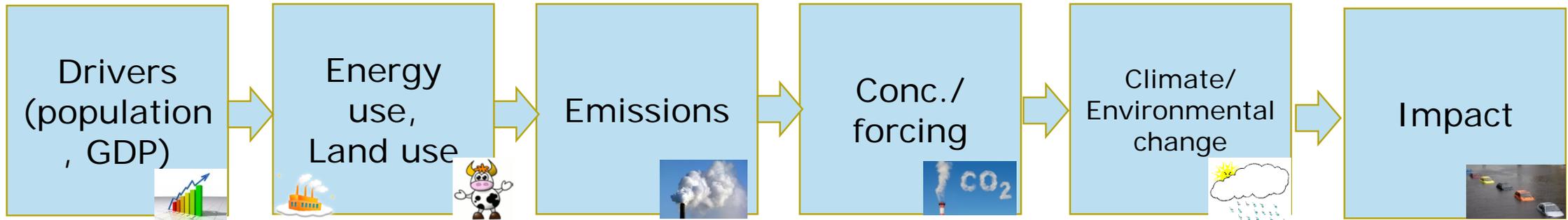




System description (for elements that can be well quantified); bounds development to possible realm; more transparent?

Consistent description of the future

Type of development  
Lifestyle  
Technology focus



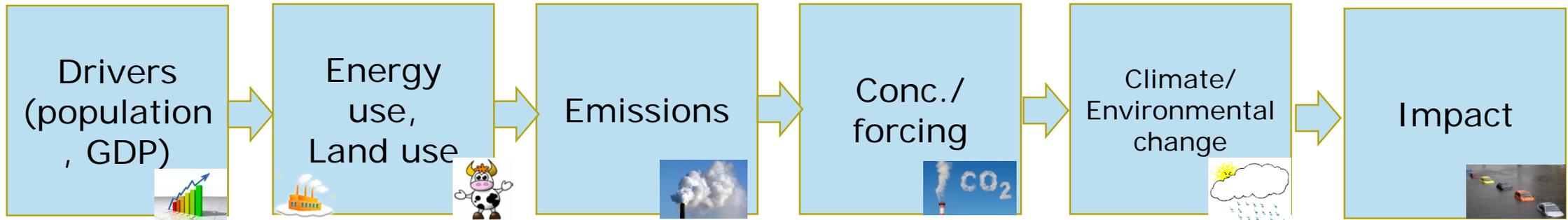


Qualitative descriptions of plausible future world evolutions, describing the characteristics, general logic and developments underlying a particular quantitative set of *scenarios*. Narratives are also referred to in the literature as 'storylines'. See also *Scenario*, *Scenario storyline* and *Pathways*.

Stories

Extremely powerful:

- Fills in complex areas where quantification does not work
- For linking across issues (e.g. rapid technology development)
- Linking across scales
- Allows creativity (beyond formal models)
- Communication



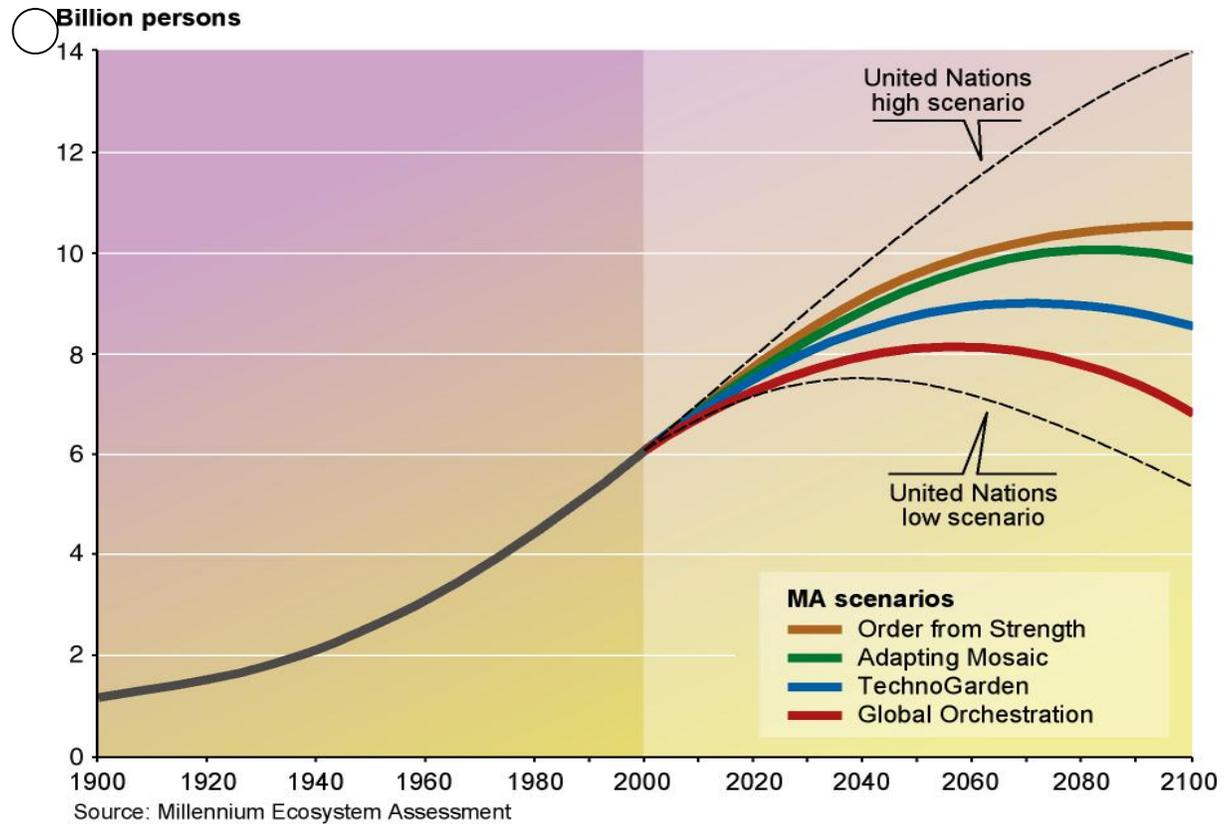
# Qualitative / quantitative (population)

High economic growth and education of women leads to drop of fertility

High economic growth and investment into health services leads to drop of mortality

Globalised world has high migration rates

Variable	Global Orchestration	Order From Strength	Adapting Mosaic	TechnoGarden
Fertility	D: low I: medium	D: high I: low	D: High I: low until 2010, I: medium deviate to medium by 2050	D: medium I: medium
Mortality	D: low I: low	D: high I: high	D: high I: high until 2010, I: medium deviate to medium by 2050	D: medium I: medium
Migration	high	low	low	medium

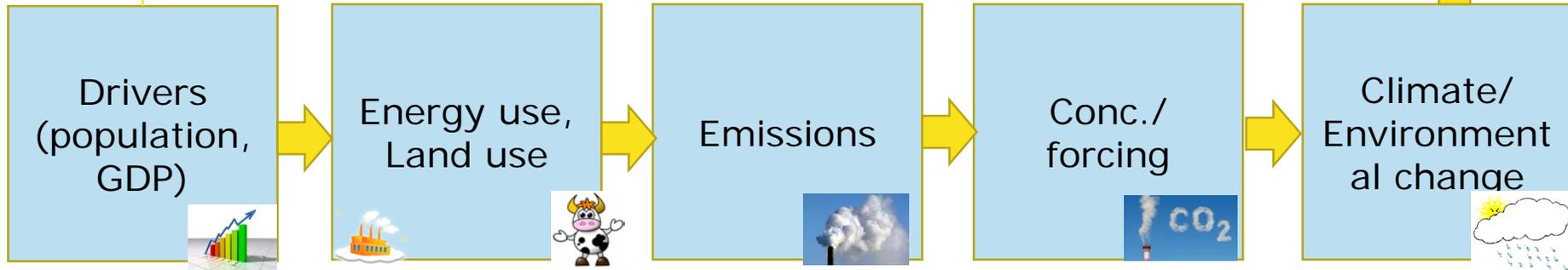


# The Scenario Matrix Architecture for the SSPs

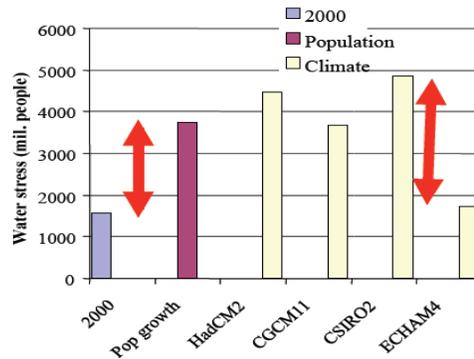
SSPs

Socio-economic circumstances

Exposed population, ability to adapt

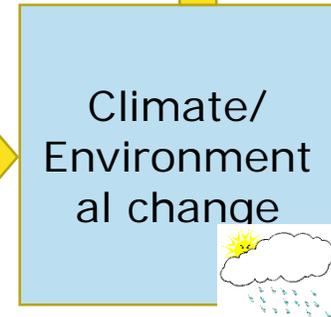


Water stress (people exposed)

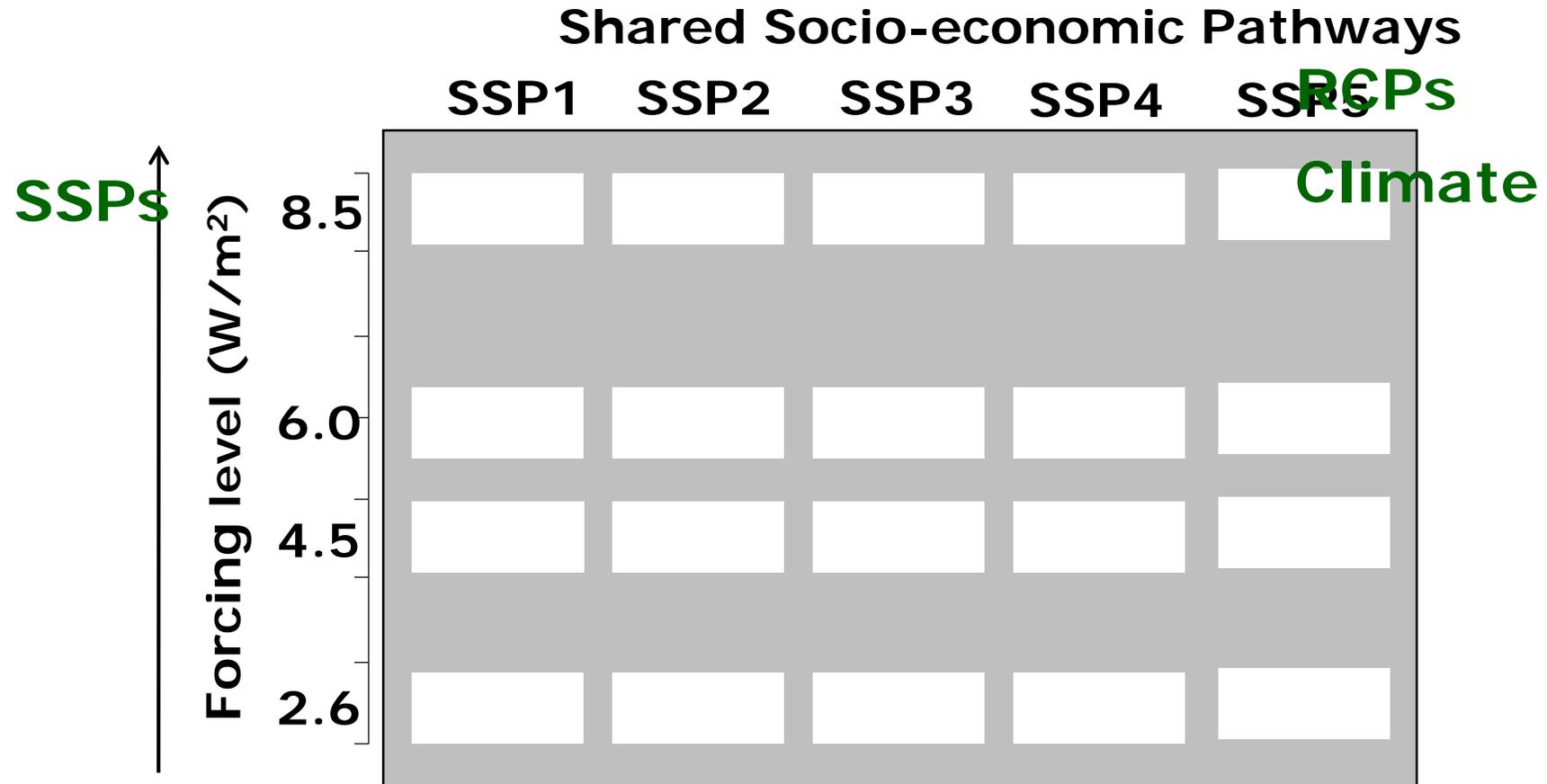


RCPs

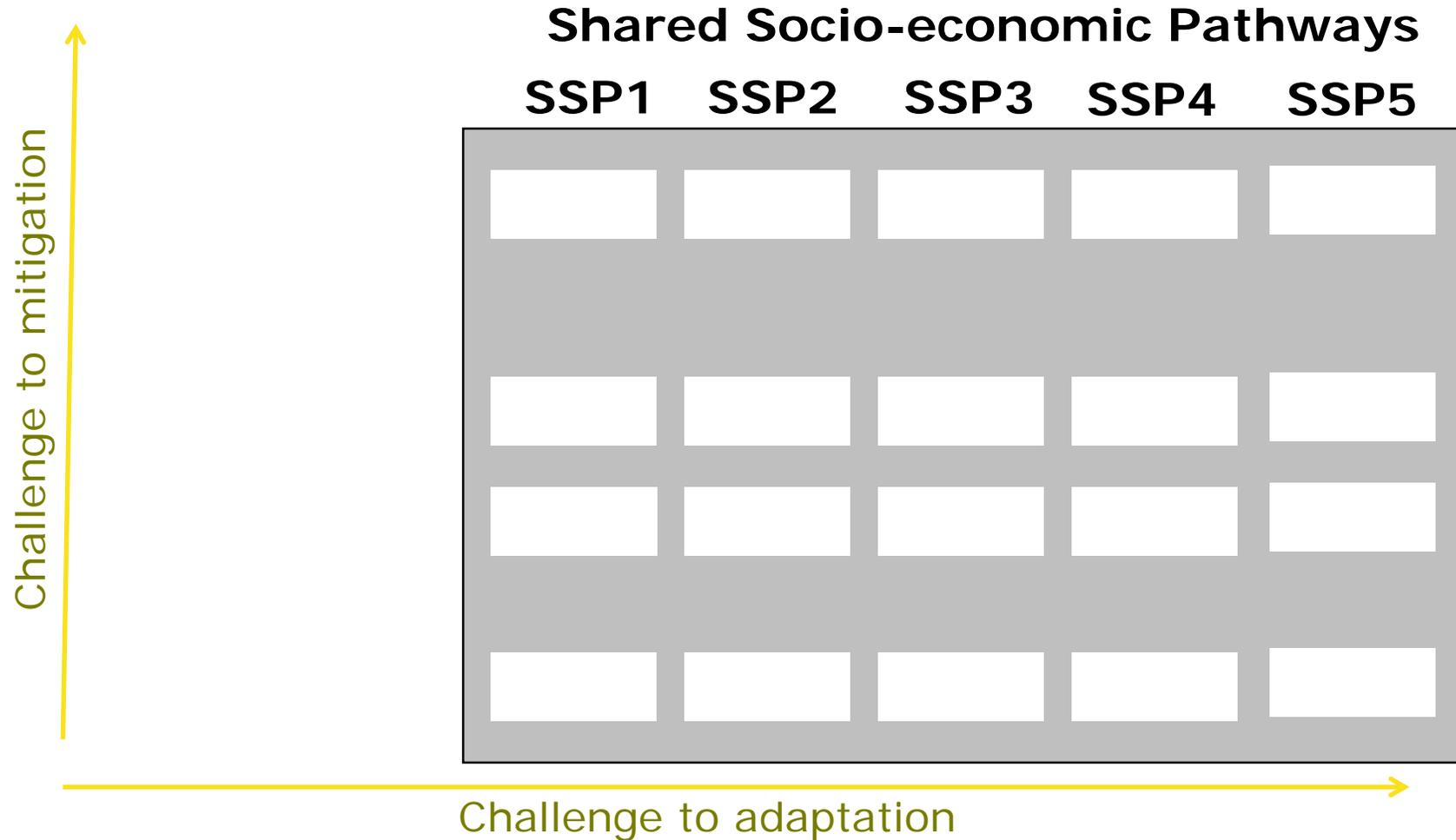
Climate



# The Scenario Matrix Architecture for the SSPs



# The Scenario Matrix Architecture for the SSPs





# Shared Socio-economic Pathways: 5 possible stories about the future

## SSP5: Fossil fuel-ed development

- Rapid growth, free trade
- High technology development,
- Environment and social goals not a priority: adaptive, technology-fix
- Focus on economic growth



Markets first



Clash of civilisations

## SSP3: Regional rivalry

- Competition among regions
- Low technology development
- Environment and social goals not a priority
- Focus on domestic resources
- High population growth
- Slow economic growth dev. countries

## SSP2: Middle of the Road

## SSP1: Green growth

- Global cooperation
- Rapid technology dev.
- Strong env. policy
- Low population growth
- Low inequity
- Focus on renewables and efficiency
- Dietary shifts
- Forest protection



UN world



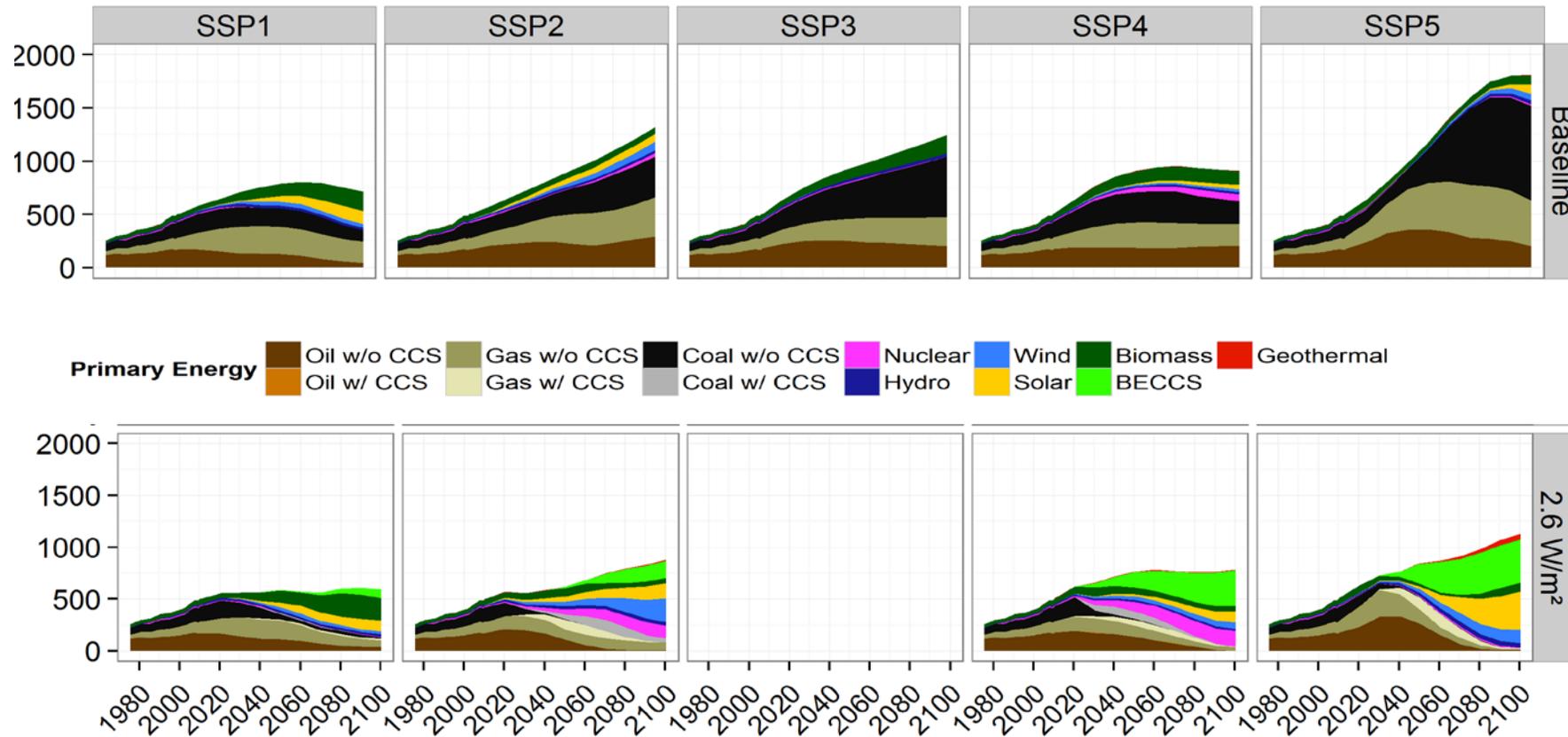
Have's and have not's

## SSP4: Inequality

- Inequality across and within regions
- Low technology development
- Environment priority for those that can afford
- Limited trade



# Shared Socio-economic Pathways: 5 possible stories about the future



# Two main scenario methods (handling uncertainty in different ways)

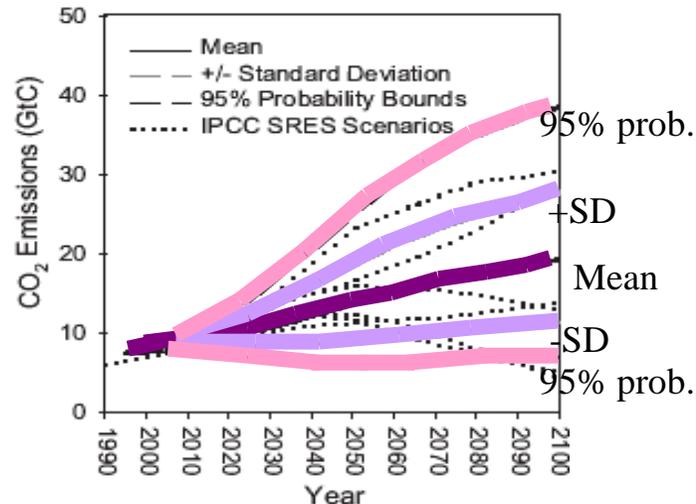


Probabilistic  
Scenario development

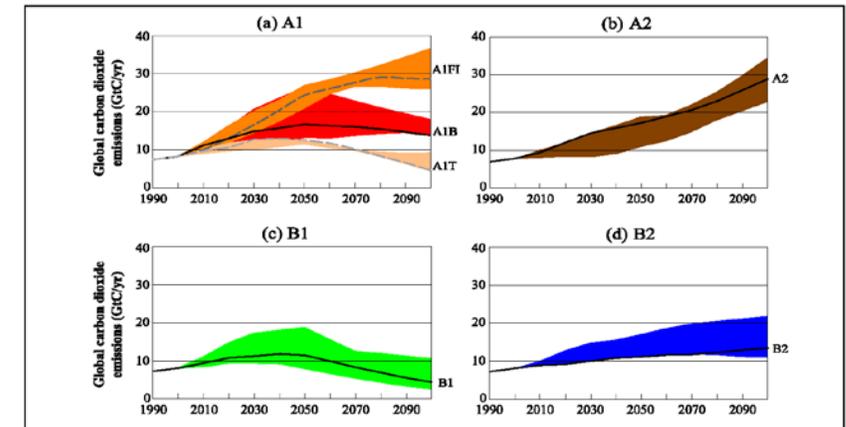
A set of  
storyline based  
scenarios

*Estimate best-guess and uncertainties of all relevant parameter in model; gives best-guess outcome + uncertainty range*

*Develop storylines around major uncertainties – and use storyline to estimate consistent values for other parameters. Explore the future.*



Webster et al. (2001)



Nakicenovic et al (2000)



Probabilistic  
Scenario development

A set of  
storyline based  
scenarios



There is no value in providing users a set of lines that go all over the place. It is the moral task of experts to determine what are the most likely assumptions – and therefore the most likely outcomes. Scientists deal with uncertainty by indicating the most likely outcome – and an uncertainty range.

Future emissions are the product of a large range of very uncertain factors such as population, technology, socio-economic development etc. Storylines are used to define a consistent set of assumptions. Scenarios can help exploring some of these futures; they are not predictions.





Probabilistic  
Scenario development

A set of  
storyline based  
scenarios



Decision-makers need to address risks. Risks are determined by impacts AND probability. For instance, information that an asteroid can destroy the earth can only be properly assessed, if one knows that changes are 1 in a billion.

"The probabilistic approach only attempts to assign subjective probabilities in a situation of ignorance forms a dismissal of uncertainty in favor of spuriously constructed expert opinion".





# Final considerations

- › Scenario storylines vs event storylines
  - Not exactly the same,... more generic, qualitative vs. more specific, including quantitative elements (analogues)
  - Use distinct terms? Ensure that glossary IPCC captures both
- › Still several similarities
  - How to deal with plausibility vs probability
  - Importance of attractive storylines
  - Communication
- › Bring in human factor more in event-storylines