



BONUS Pilot Scenario Workshop

6-7/4 2016

University of Helsinki

Overview, framework and a first step towards Baltic Sea storylines

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Background Material

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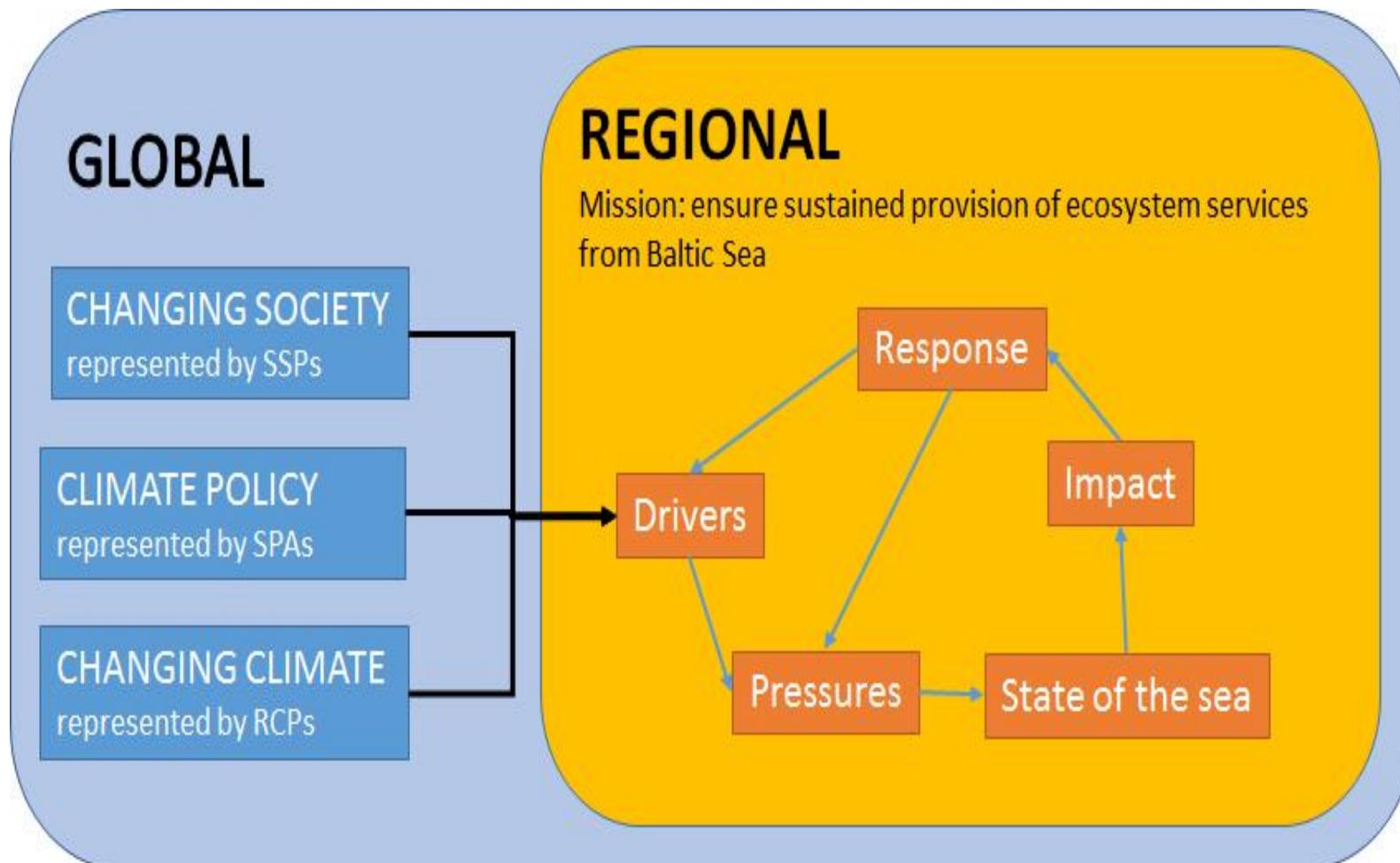
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Conceptual Framework of Workshop

We propose to make use of the scenario matrix structure from climate change research combined with the DPSIR framework to analyse environmental problems at the Baltic Sea under future developments of climate and society.

- The aim of the global scenarios is *not to predict* but to help us *understand* the challenges and uncertainties attributed to alternative futures
- The aim of DPSIR is to better understand the causal framework of interactions between society and the environment

Conceptual Framework (contd.)



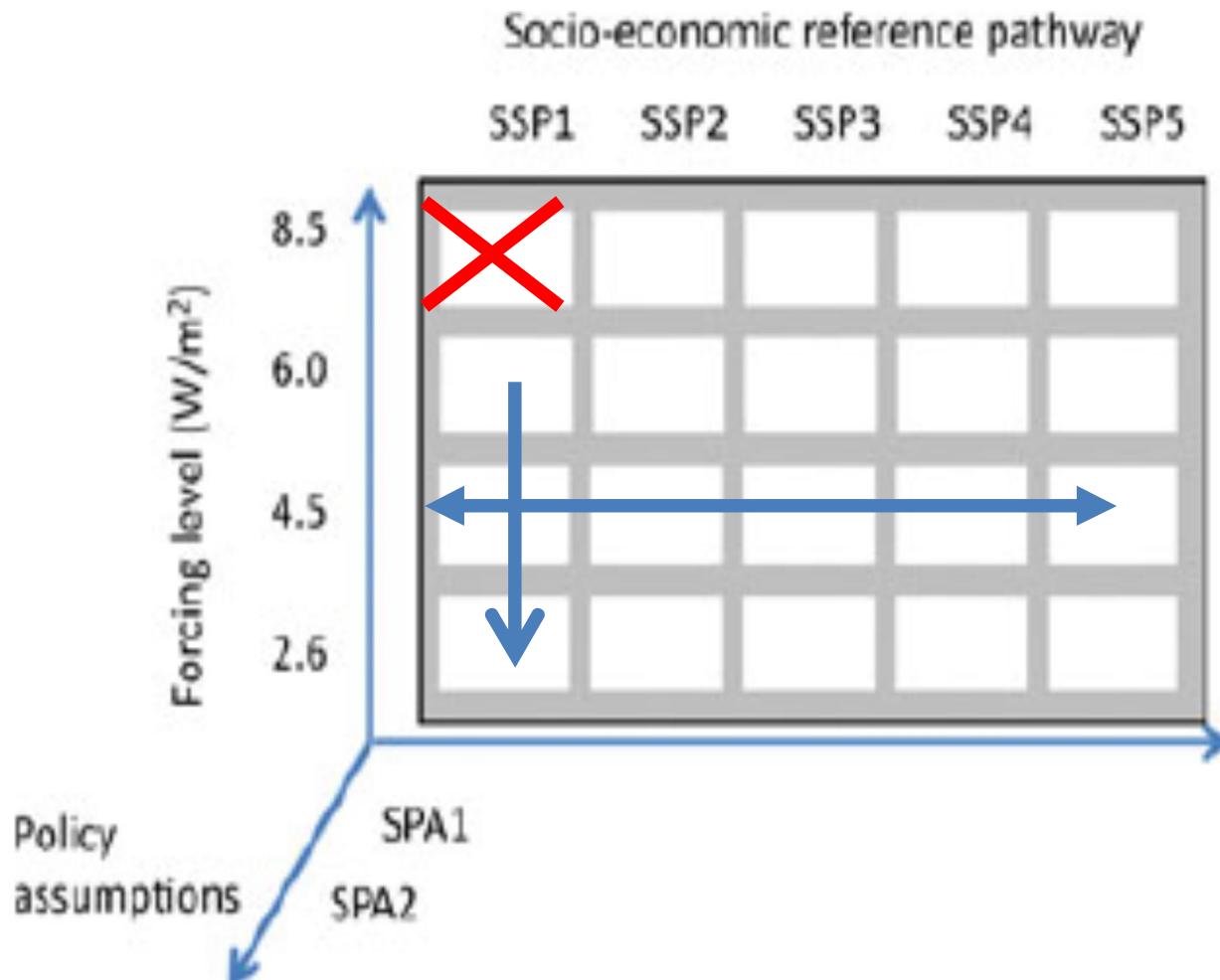
The 3 dimensions in short

RCPs: provide a consistent set of trajectories for future atmospheric composition and land use change up to 2100

SPAs: provide the link that explains *how* socio-economic reference pathways can possibly lead to different climate outcomes

SSPs: provide quantitative and qualitative narratives of possible socio-economic futures, assuming *no* climate change or climate impacts and *no new* climate policies

The 3 dimensions in the scenarios matrix framework



Source: based on van Vuuren et al. (2014)

The interpretation of socio-economics

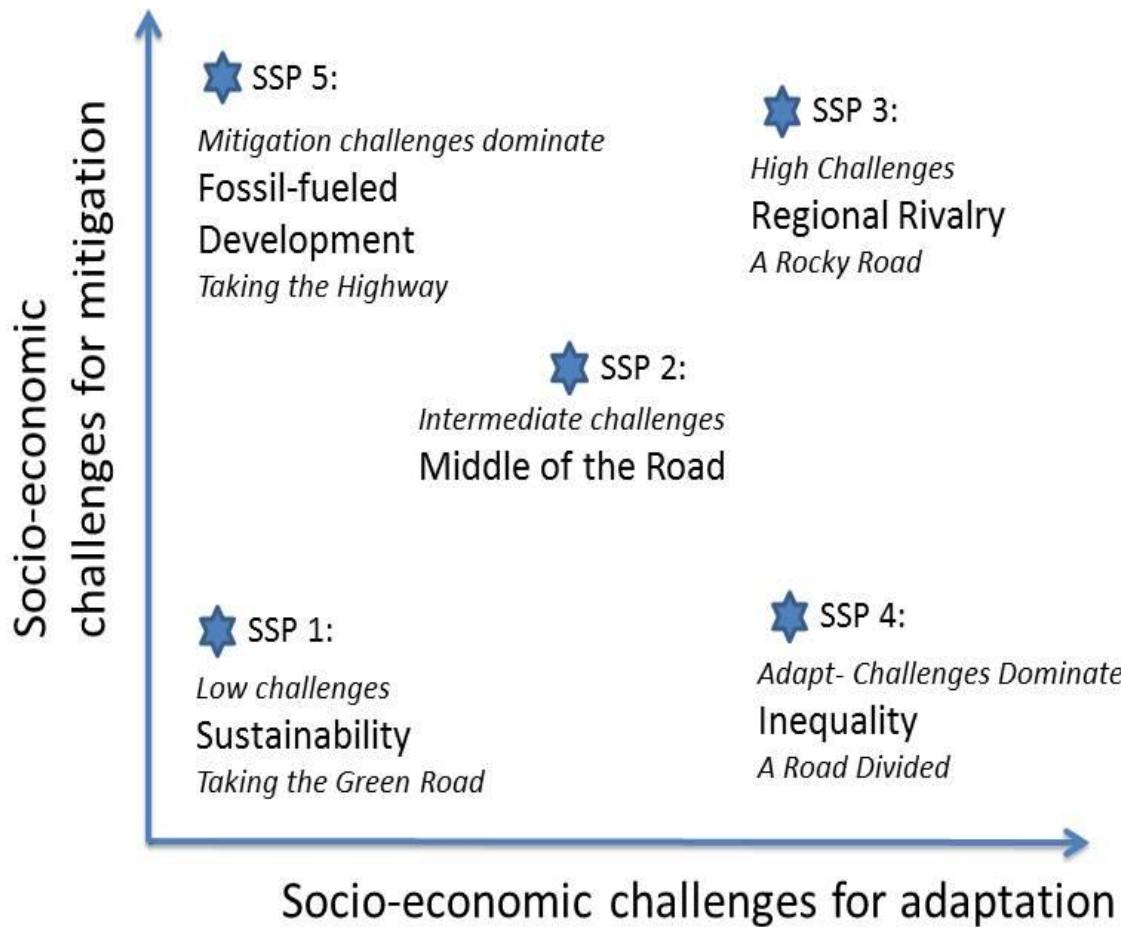
Socio-economic is interpreted in a broad sense as covering socio-ecological systems (O'Neill, 2014), including:

demographics, political, social, cultural, institutional, life-style, economic and technological aspects

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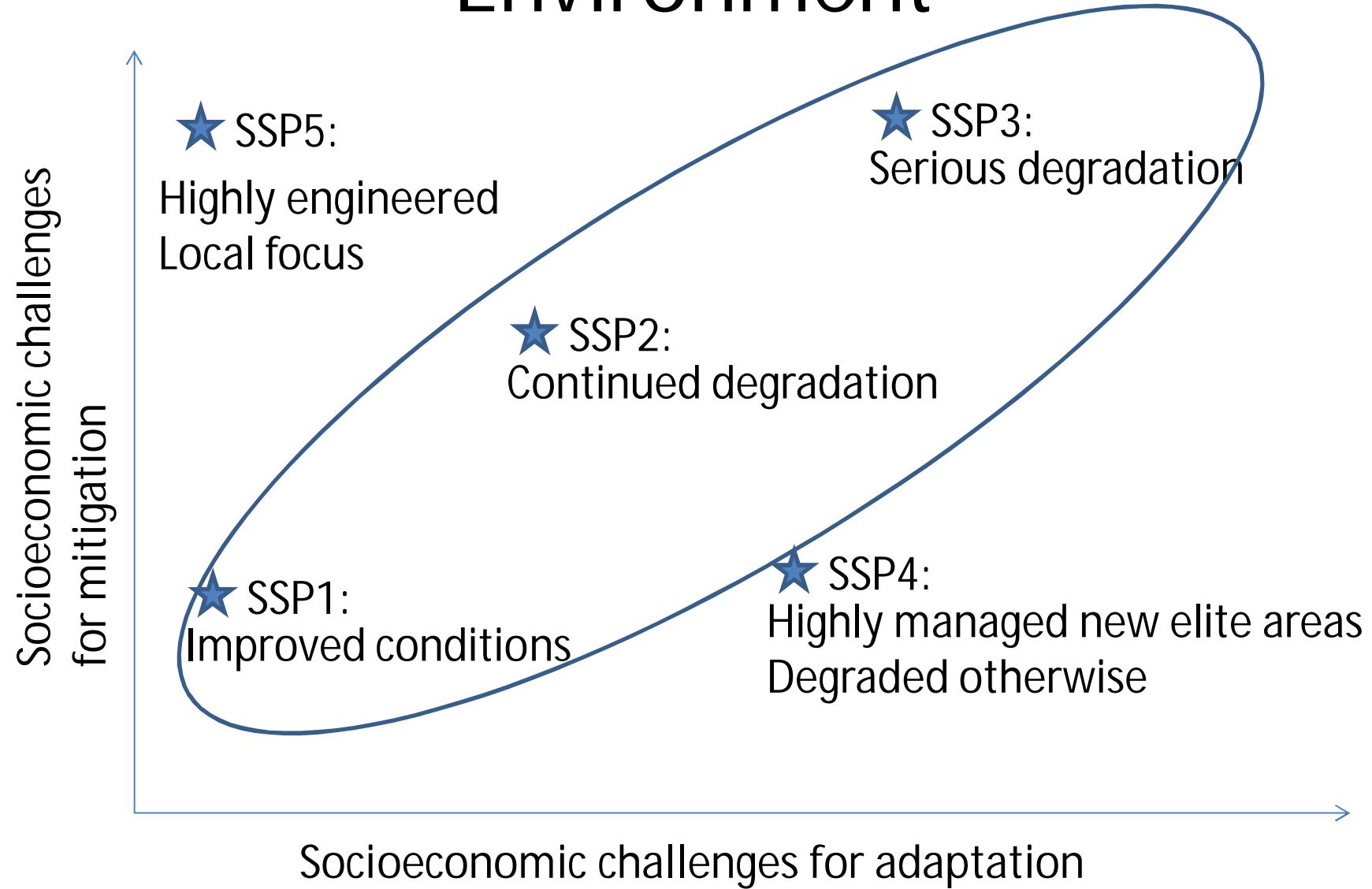
conditions of ecosystems and ecosystem services that have been affected by human activity, e.g. air, water quality, biodiversity and ecosystem form and function

The 5 global SSPs in relation to climate adaptation and mitigation challenges

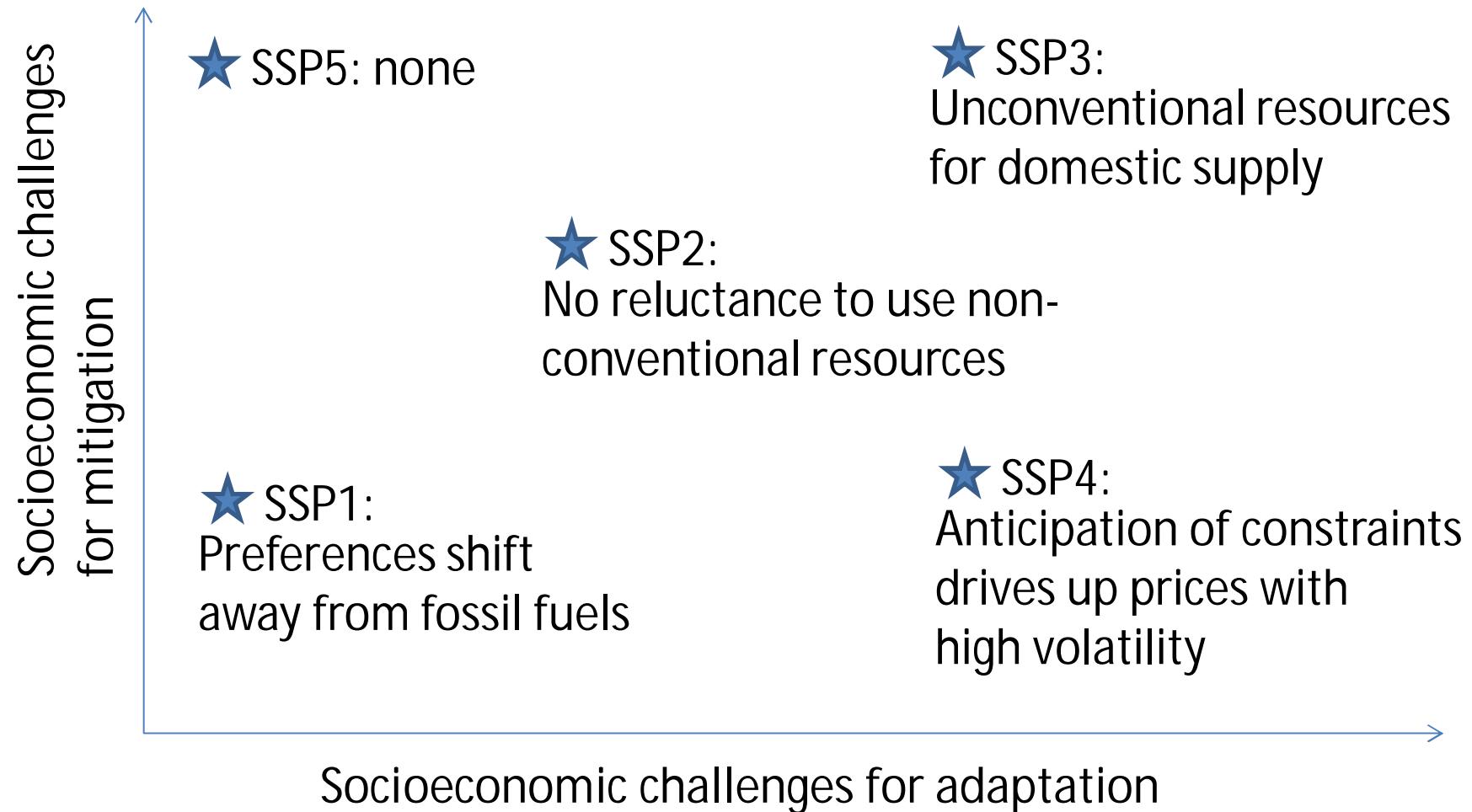


Source: O'Neill, B.C. et al. 2014

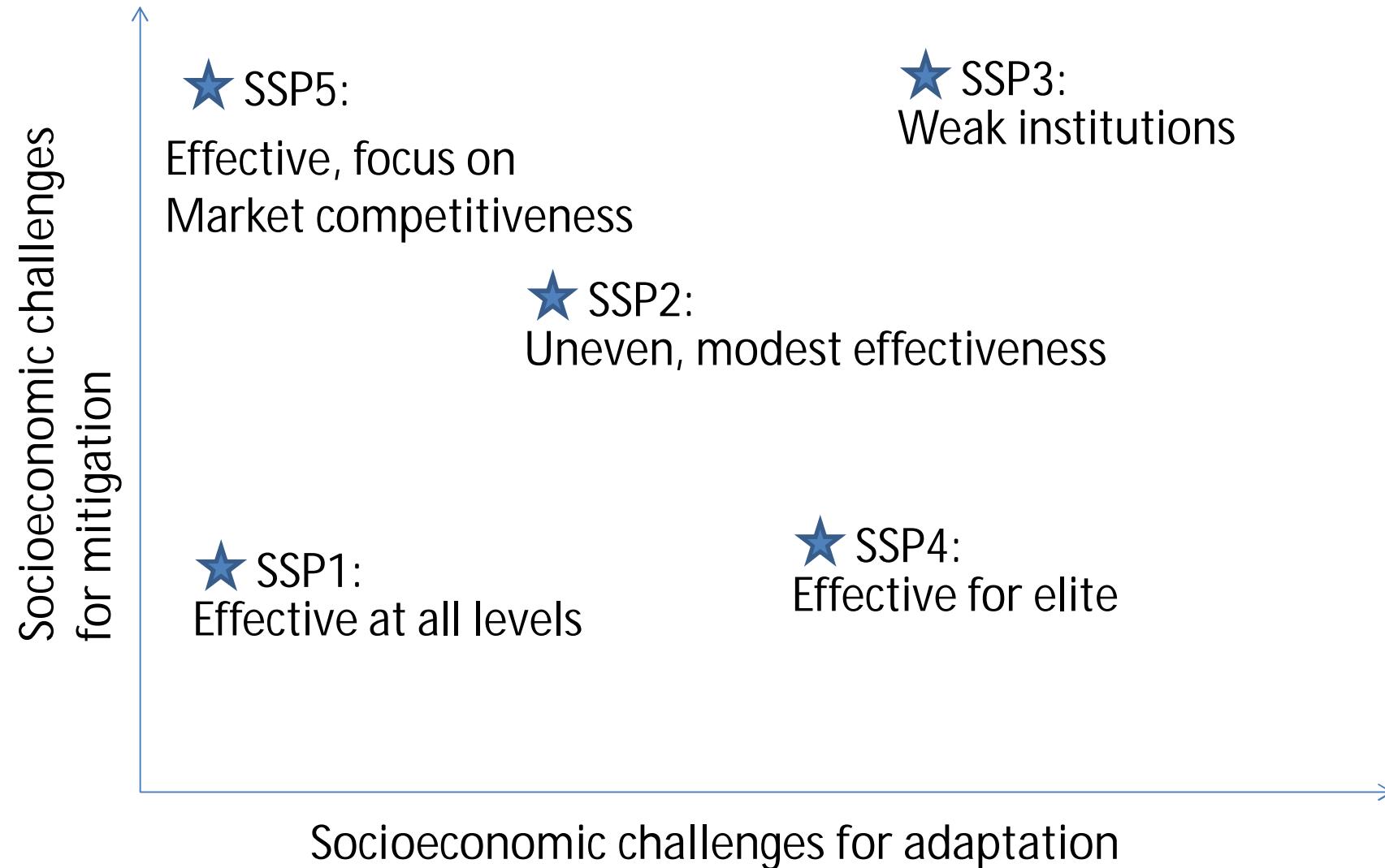
Environment



Fossil fuel constraints



Institutions



Quantitative drivers in the SSPs

Since March 2013:

- Population
- Urbanization
- Rates of technological change
- Income
- Human Development Index
- Income distribution

Since May 2015 :

- energy supply and use
- land-use
- GHG and air pollutant emissions
- Climate
- Mitigation costs

SSP database: <https://secure.iiasa.ac.at/web-apps/ene/SspDb>

SSP Database Version 1.0

Select region(s), scenario(s), and variable to define your query

(1.) Regions:

- World**
- 5 Regions (Scenarios)
 - OECD
 - Reforming Economies
 - Asia
 - Middle East and Africa
 - Latin America
- 5 Regions (Basic Elements)

(2.) Model/Scenarios: [Filter ...](#)

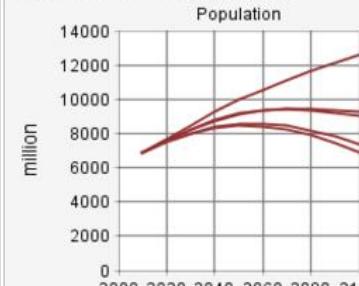
- Basic Elements
 - POP
 - IIASA-WIC Population
 - SSP1
 - SSP2
 - SSP3
 - SSP4d
 - SSP5
 - NCAR Urbanization
 - GDP
 - History
 - Scenarios
 - MARKER

(3.) Variable: [data](#) [data](#)

- GDP
- Population
 - Total
 - Male
 - Female
 - Urban
 - Urban-Population
 - Rural-Population
 - Energy
 - Land Use
 - Emissions
 - Climate
 - IAM Cost

Query Results - Chart Preview:
generated: 2016-04-06 10:04:27

Population



million

© SSP Database (Version 1.0)

Query Results:
generated: 2016-04-06 10:04:27

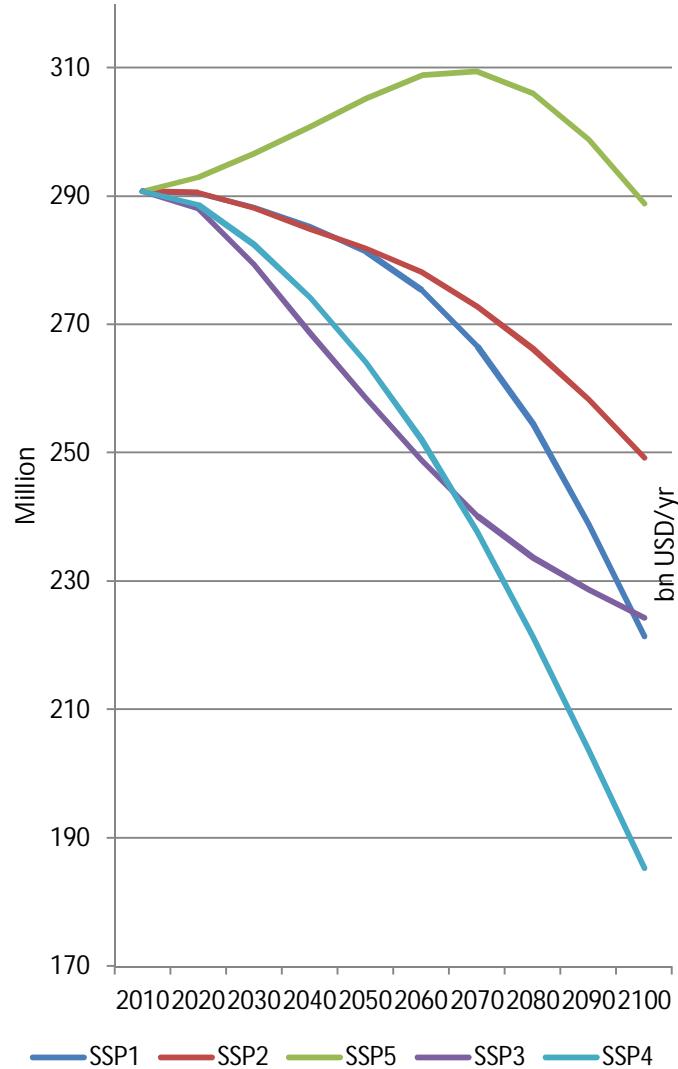
Region	Model - Scenario	Variable	Unit	2005	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
World	IIASA-WIC POP - SSP1_v9_130115	Population	million		6869.324	7518.495	7999.914	8322.060	8459.401	8417.418	8221.442	7888.528	7431.526	6879.927
World	IIASA-WIC POP - SSP2_v9_130115	Population	million		6869.324	7612.729	8262.715	8785.938	9164.231	9374.893	9439.608	9383.135	9224.149	8997.976
World	IIASA-WIC POP - SSP3_v9_130115	Population	million		6869.324	7686.793	8503.464	9247.508	9949.085	10568.707	11114.663	11633.849	12137.546	12624.933
World	IIASA-WIC POP - SSP4d_v9_130115	Population	million		6869.324	7599.733	8231.901	8738.988	9119.837	9350.783	9445.902	9444.867	9375.065	9265.989
World	IIASA-WIC POP - SSP5_v9_130115	Population	million		6869.324	7527.123	8029.438	8379.828	8557.662	8570.527	8440.466	8185.146	7817.383	7362.390

Output Options:
Notes:

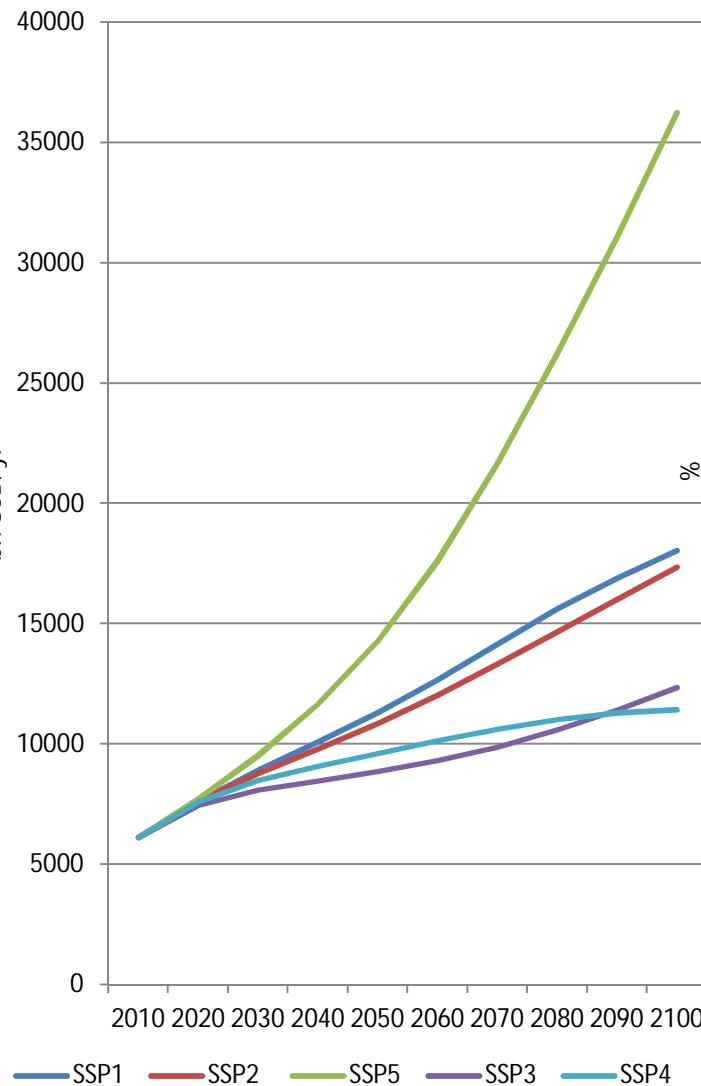
 Microsoft Excel
 Portable Network Graphics
 Scalable Vector Graphics

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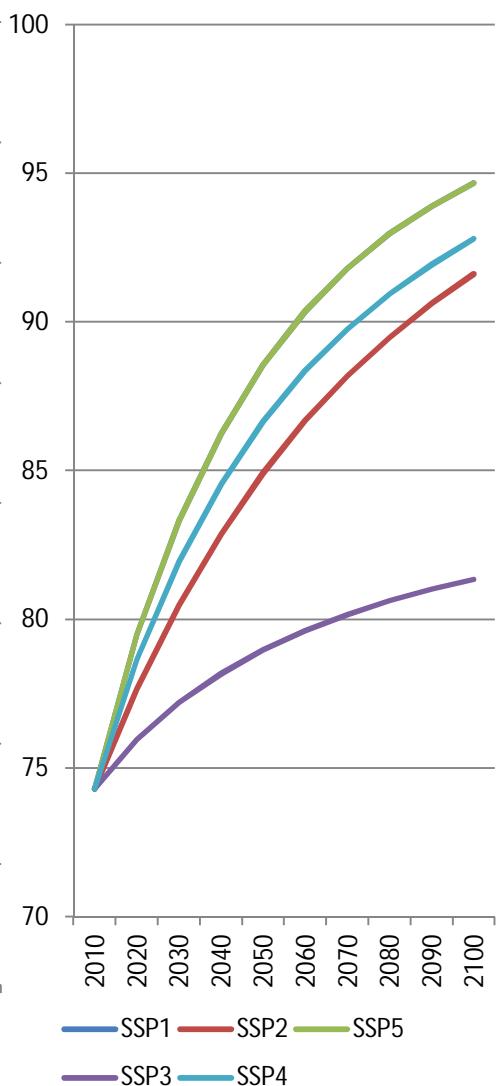
Population by SSP



Total GDP



Average urbanisation



Wrapping up

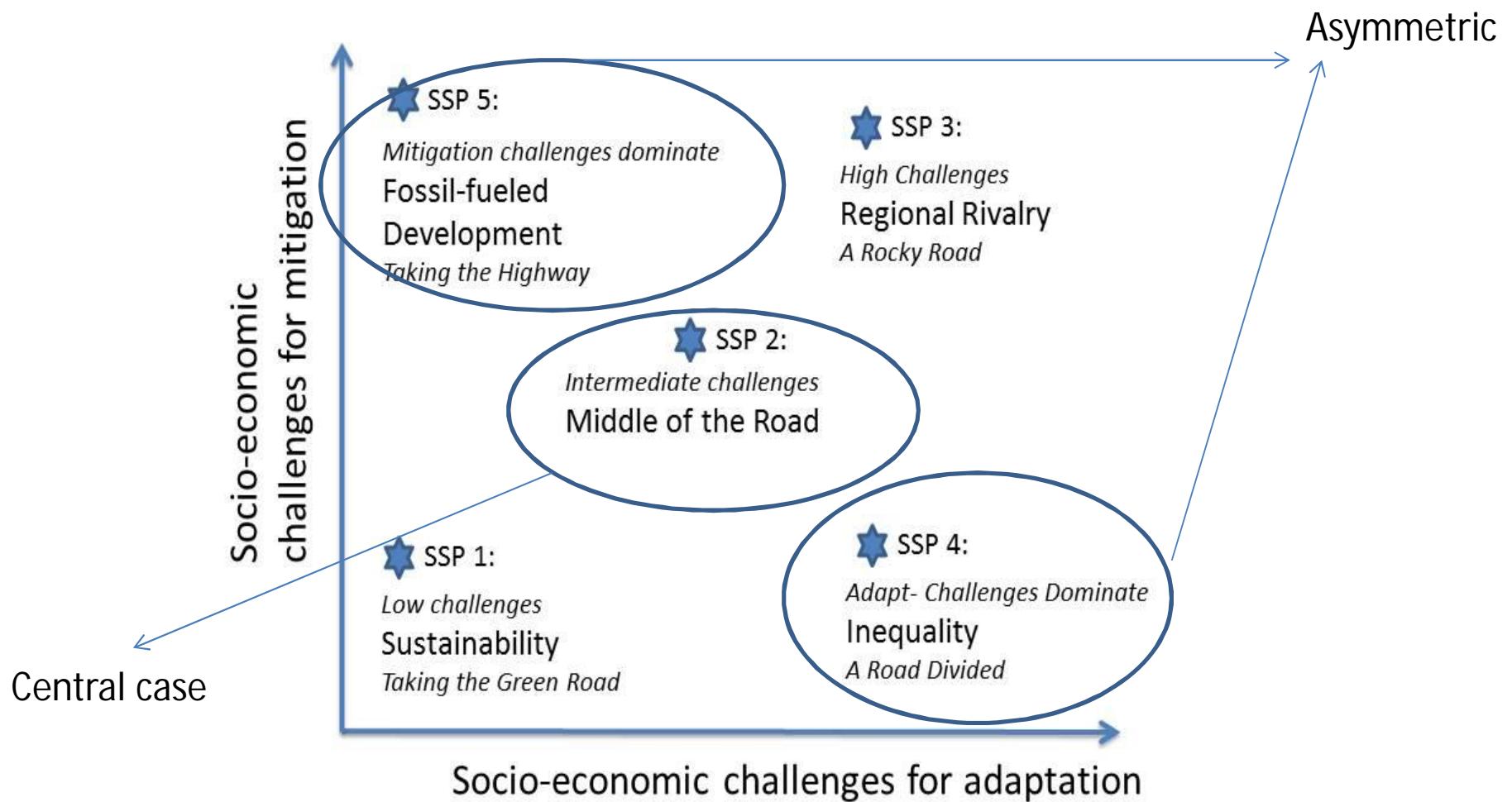
- 5 very different narratives providing consistent descriptions of the range of plausible developments
- Stepping stone towards developing regional & sector narratives and quantifications:
 - How could sector policies (agriculture, fisheries, maritime shipping etc.) develop under each of the SSPs in the Baltic Sea region?
 - How do these policies impact on the drivers and pressures on the Baltic Sea?
 - What analyses/quantifications of drivers and pressures could be included in extended SSPs?
- Possible to have families of policies and sector impacts within one SSP
- Which scenario combinations of SSPs/RCPs are most relevant for the Baltic Sea region?

Thank you for your attention

The Basic SSP storylines

- SSP 1 - Sustainability – taking the green road
- SSP 2 - Middle of the Road – following historical patterns
- SSP 3 – Regional rivalry – focusing on regional identity and security of supply
- SSP 4 – Inequality – across and within countries
- SSP 5 – Fossil Fueled Development – taking the Highway

The 5 global SSPs in relation to climate adaptation and mitigation challenges



Source: O'Neill, B.C. et al. 2014

SSP1 – Sustainability, taking the green road

The world shifts towards a more sustainable path of inclusive development and respecting environmental boundaries

- Management of the global and regional commons improve
 - Effective cooperation at all levels and sectors
- Low population and high education levels
 - Education and health improvements
 - Accelerated demographic transition
- Open & global economy with investments directed towards environmentally friendly processes incl. yield-enhancing technologies
- Consumption oriented towards low material growth and low energy intensity
 - Relatively low level of meat and fish consumption
- Improved resource efficiency, low energy and resource use'
- Medium rate of technological progress (0.8%/yr)

SSP2 – Middle of the road

This world follows typical patterns of past development regarding Social, economic, and technological trends

- Global and regional commons continue to degrade
 - Uneven modest effectiveness of institutions
- Fossil fuel dependency decreases slowly
 - no reluctance to use unconventional fossil resources
 - Technological developments proceed without breakthrough (0.7%/yr)
- Partially functioning and globally connected markets
 - Income inequality persists or improves slowly
 - Reductions in resource and energy intensity follow historic rates
 - Limited number of comparably weak global institutions
- Moderate population growth and medium education level in the OECD
- Meeting the human development goals is delayed by several decades.

SSP3 – Regional rivalry

This world has a growing interest in regional identity. Concerns about competitiveness and security push countries to increasingly focus on domestic or, at most, regional issues

- Weak global institutions; ineffective in addressing environmental concerns
 - Strong environmental degradation; low international priority
 - Little progress in reducing resource intensity and fossil fuel dependency
- de-globalised world with severely restricted international trade -> policies are directed towards security and trade barriers
 - Barriers to trade, particularly in energy, resource and agriculture
 - Achieve energy and food security within own region,
 - Toward more authoritarian forms of government
- Slow economic development, material-intensive consumption:
 - inequalities persist/worsen
 - Lowest technological progress (0.3%/yr)
- Low population and low education level in industrialized countries
 - high population in developing countries and low education level
 - Human development goals are not met

SSP4 – Inequality – a road divided

This world has highly unequal investments in human capital, combined with increasing disparities in economic opportunity and political power, lead to increasing inequalities and stratification both across and within countries

- Economic growth is moderate, low income countries lag behind.
- Environmental policies focus on local issues around middle and high income areas
- Technology development is high in high-tech economies, low otherwise
- Energy system diversifies in the face of uncertain supply
 - Uncertain fossil fuel markets lead to underinvestment in new resources
 - Investments in carbon-intensive fuels and low-carbon energy sources
- Social cohesion degrades & OECD education level is medium
 - Failure to meet the human development goals.

SSP5 – Conventional Development

This world is driven by the economic success of industrialized and emerging economies, this world places increasing faith in competitive markets, innovation and participatory societies to produce rapid technological progress and development of human capital as the path to sustainable development. Fueled by carbon intensive energy

- Integrated global markets
 - Rapid growth of the global economy
 - Highest rate of technological progress (1.1%/yr)
- Strong investments in health, education, and institutions to enhance human and social capital
- Exploitation of abundant fossil fuel resources & consumption oriented towards high material growth and energy intensive lifestyles
- Low population with high mobility
- Highly managed ecosystems, with a focus on maximising provisioning services and a strong focus on engineering solutions to deal with negative impacts of degraded ecosystems and to minimize disruptions from extreme events.