



# Pathways to Sustainable Energy

3<sup>rd</sup> Workshop

Geneva, 19-20 April 2016



**UNECE**

# WELCOME

19 April	20 April
AM	AM
PM	PM

# Hospitality

- **Lunch**
  - Working lunch served at around 12.30 pm
  - Please serve yourself while we continue
- **Dinner 19th April**
  - Options: Chinese, Thai, Italian
  - Please fill out questionnaire list
- **Coffee Break**
  - No coffee break in the agenda
  - Press Bar on the third level

# Overview: Agenda

	19 April	20 April
AM	<p><b>Opening / Introduction</b></p> <hr/> <p><b>Modelling of Scenarios</b> <i>(hearing from modellers)</i></p>	<p><i>(starting at 8am)</i></p> <p><b>Scenario Assumptions building II/II</b> <i>(group work, Plenary presentation)</i></p>
PM	<p><b>Modelling Frame &amp; Scope (Inputs &amp; Outputs)</b></p> <hr/> <p><b>Scenario Assumptions building I/II</b> <i>(group work)</i></p>	<p><b>Quantification of Modelling Inputs</b> <i>(group work, plenary)</i></p> <hr/> <p><b>Framing the Project</b></p>

# INTRODUCING THE PROJECT

19 April	20 April
AM	AM
PM	PM

## **Focal Question**

**How can the UNECE Region  
attain Sustainable Energy in the  
Future (2050)?**

# Project Concept

## ➤ **Overarching Goal**

The capacities of UNECE member states to develop, implement and track national sustainable energy policies aligned with international agreements are increased and contribute to climate change mitigation and sustainable development.

# Project Components

## Output 1: Modelling of Sustainable Energy Pathways

Sustainable Energy Pathways for the UNECE region are identified and modelling results inform national energy strategies of member States.

## Output 2: Conceptualisation of an early-warning system

A mechanism including indicators to track successful implementation of international climate and sustainable development agreements is introduced and made available to member States.

## Output 3: Policy Dialogue

The understanding and capacities of national energy ministries to develop, implement and track national sustainable energy strategies is increased, and a regional dialogue exchange format is established.

# Process: 1st and 2nd Workshop

- **Purpose**
- **Process**

# Summary: Scenario Building 2015

- Scenario A
- Scenario B
- Scenario C
- Scenario D

# Status: Scenario A



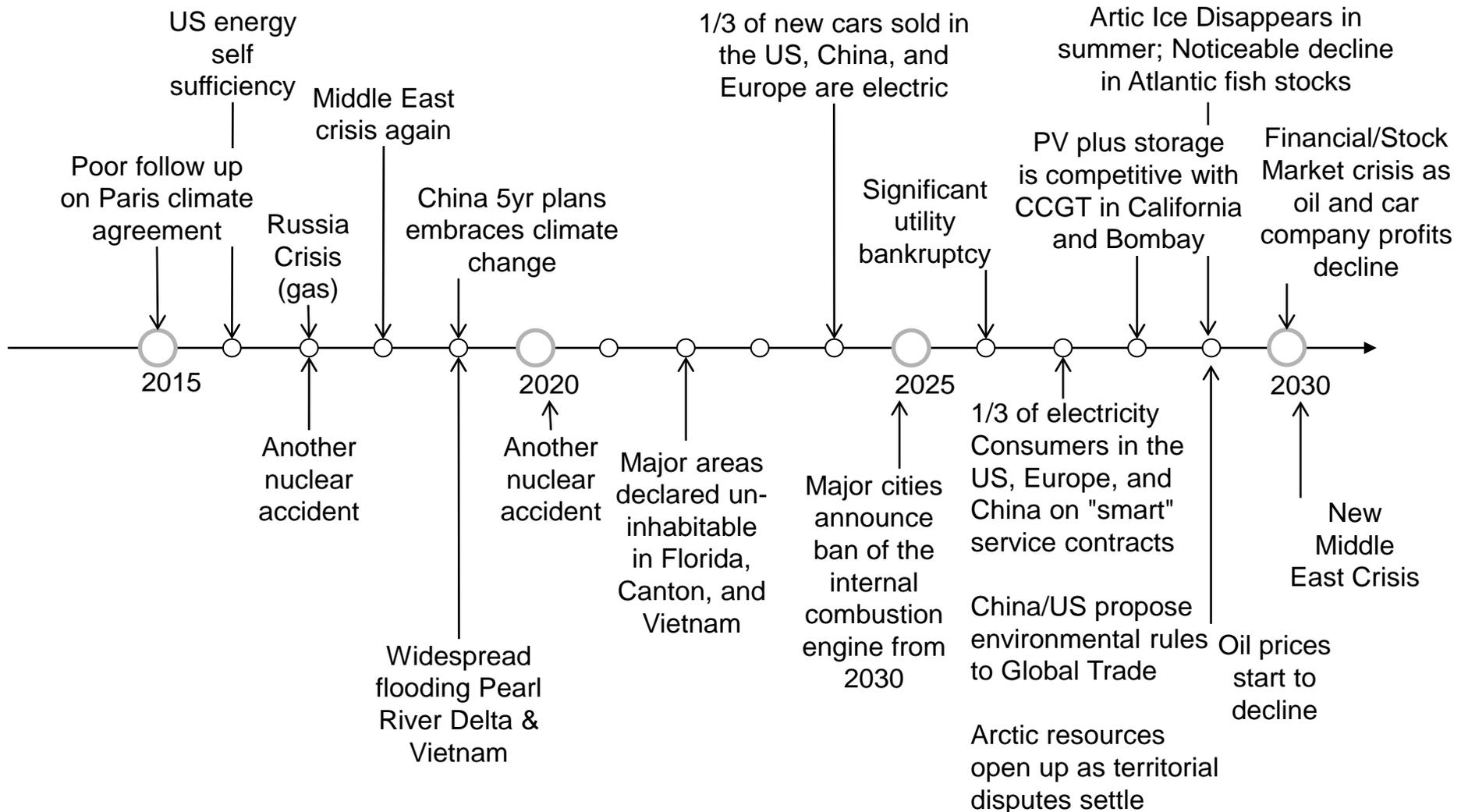
- This scenario is characterized by low cooperation in meeting sustainable development goals, but high innovation in the energy sector with the growth of service-based business models and innovative enabling technologies and integrated solutions
  - **Global Political and Economic Situation**

Failure implement an effective top-down climate agenda although the US, Europe and China show leadership through domestic low carbon policies. While the demand for energy continues to grow and technological innovations expand oil reserves, uninhabitable land areas expand and poor countries get limited support for resource management.
  - **Technological and Market Developments**

There is substational innovation progress across the entire energy value chain of infrastrucure, services, market desing and new business models business. Innovative progress enables much higher resource scarcity management and substitution and resources waste elimination. Innovation enables new market development and economic diversity of supply and demand on the centralized and localized bases (developed vs. developing economies).
  - **Energy Policy and Cost Developments**

Oil prices continue to stay relatively low, exacerbating instability in some oil producing regions. Global energy demand rises and fossil fuels remain competitive in the absence of carbon pricing. Eventually, however, the reduction in costs and market penetration of renewables leads to a sharp decline in fossil fuel prices.

# Status: Scenario A

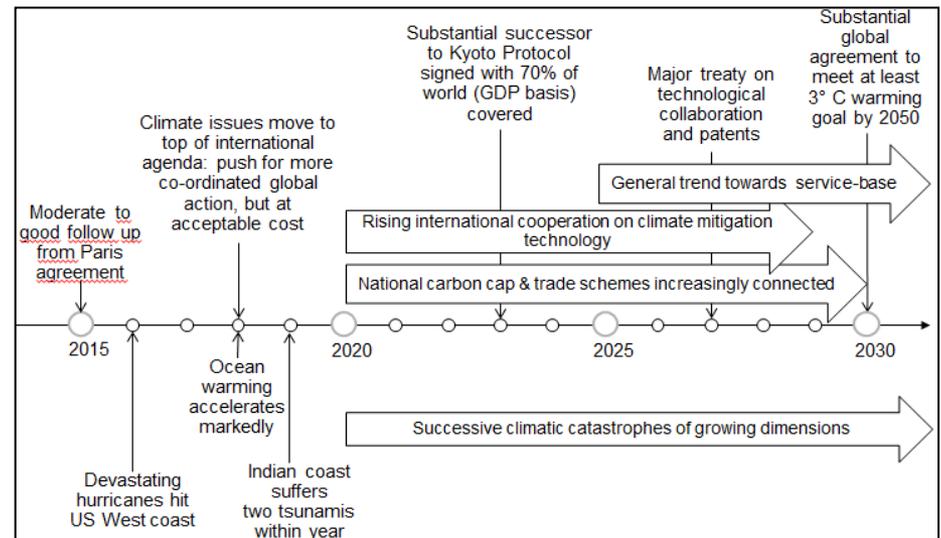


# Status: Scenario B

- In this scenario energy systems develop through energy services-based business models with innovative enabling technology. There is a high degree of international cooperation to achieve sustainable development goals.
  - **Global Political and Economic Situation**
    - There is balanced leadership from the USA, Europe and China supported by a global consensus propelled by a rising number of increasingly intense climate catastrophes. Gas prices decouple from oil prices and there is continued strong supply of gas, while a lack of upstream investment and a rising global population and overall strong economic growth drive oil prices by 2020 to around \$70/bbl. Price of coal remains low.
  - **Technological and Market Developments**
    - By 2025 populations think in terms of the service they use (transport, heat, light) and the focus on climate change leads to unprecedented technological cooperation at international levels. Information and communications technology along with smart grids and smart systems form the backbone of the new energy system. Fossil plants are pressured by the rising cost of their CO<sub>2</sub> emissions; as a result, CCS becomes competitive by 2030 and nuclear power grows in importance.
  - **Energy Policy and Cost Developments**
    - Rational economics broadly underpin energy policy and the current low oil price era provides a convenient opportunity to eliminate the subsidies of fossil fuels. Markets function extremely well and spur innovation. An increasingly integrated global price of carbon is established through cap-and-trade schemes; the price in around 25% of the world (measured by GDP) reaches \$40/t (real) by 2025 and rises to \$60/t by 2030 in 50% of the world.

# Scenario B - Timeline

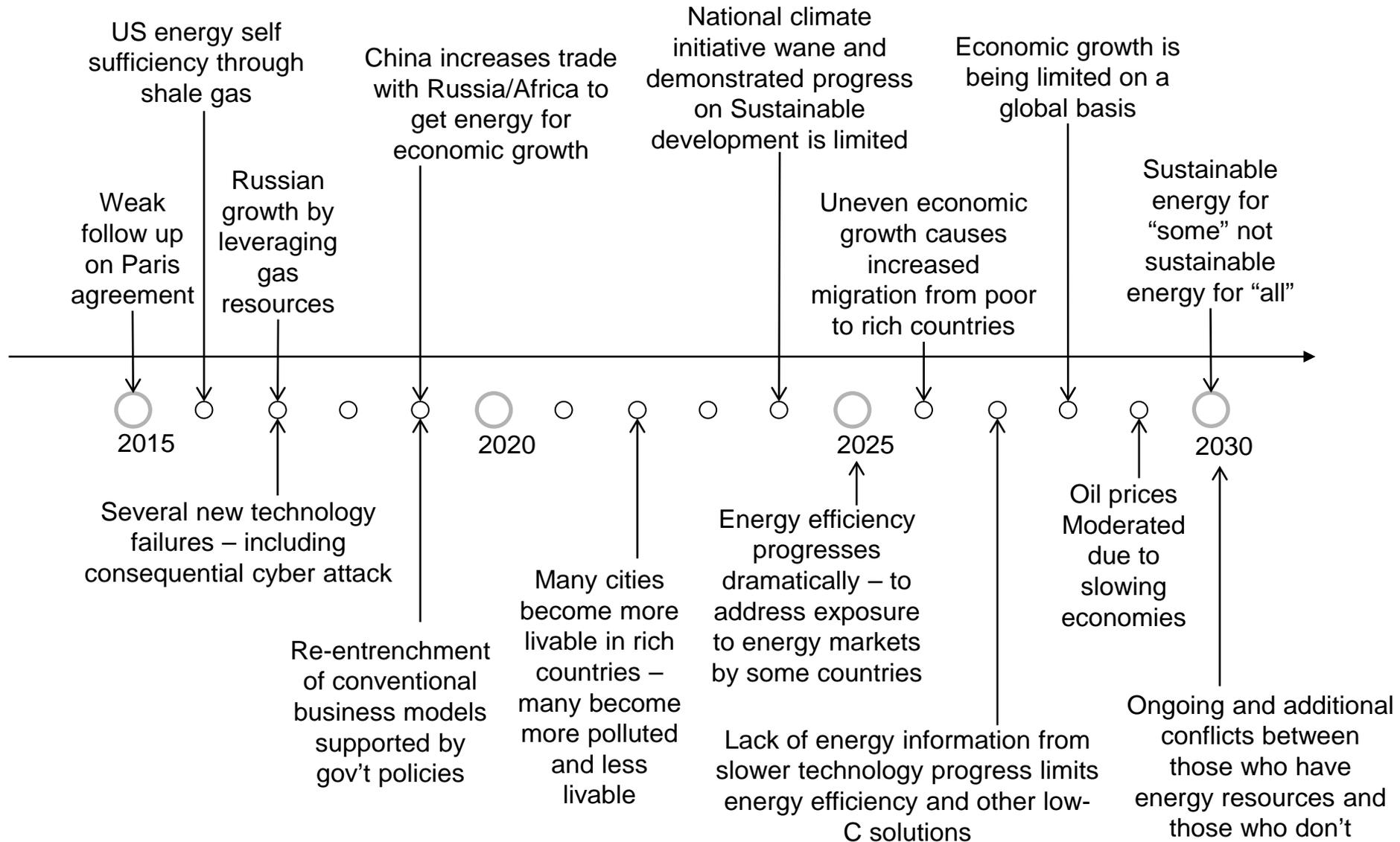
- An initial timeline was drafted highlighting key developments
- The timeline will be refined after the workshop
- Extension to 2050
- Inclusion of key highlights from the assumptions building process



# Status: Scenario C

- In this scenario the energy sector is characterized by slow technological innovation and low cooperation in meeting sustainable development goals.
  - **Global Political and Economic Situation**
    - Leadership across countries will be less about global concerns, but rather re-entrenchment in national priorities. Developed economies will see energy demand remain flat, whereas emerging economies will grow using indigenous resources. Countries highly dependent on energy imports will be exposed to global energy price fluctuations.
  - **Technological and Market Developments**
    - Carbon Capture and Storage will remain uncompetitive, innovation in batteries and electric vehicle is slow, and by 2030 there will not be sufficient cost reductions needed to meet long term climate goals. Advanced business models based on energy services will not progress, but rather managed markets will continue. As such, the use of information and communication technology (ICT) or other advanced systems based approaches will slow, and will result in slower progress to address access to electricity for many regions. Energy efficiency will continue to improve but the net result is that it will not offer the potential productivity gains shown in other scenarios.
  - **Energy Policy and Cost Developments**
    - A global carbon value will not exist and regional prices will decrease. Energy costs will be controlled through improvements in energy efficiency and the limits that higher energy prices put on economic growth. Scarcity will exist for those without indigenous resources, but those with indigenous resources will progress, creating tensions on resource availability.

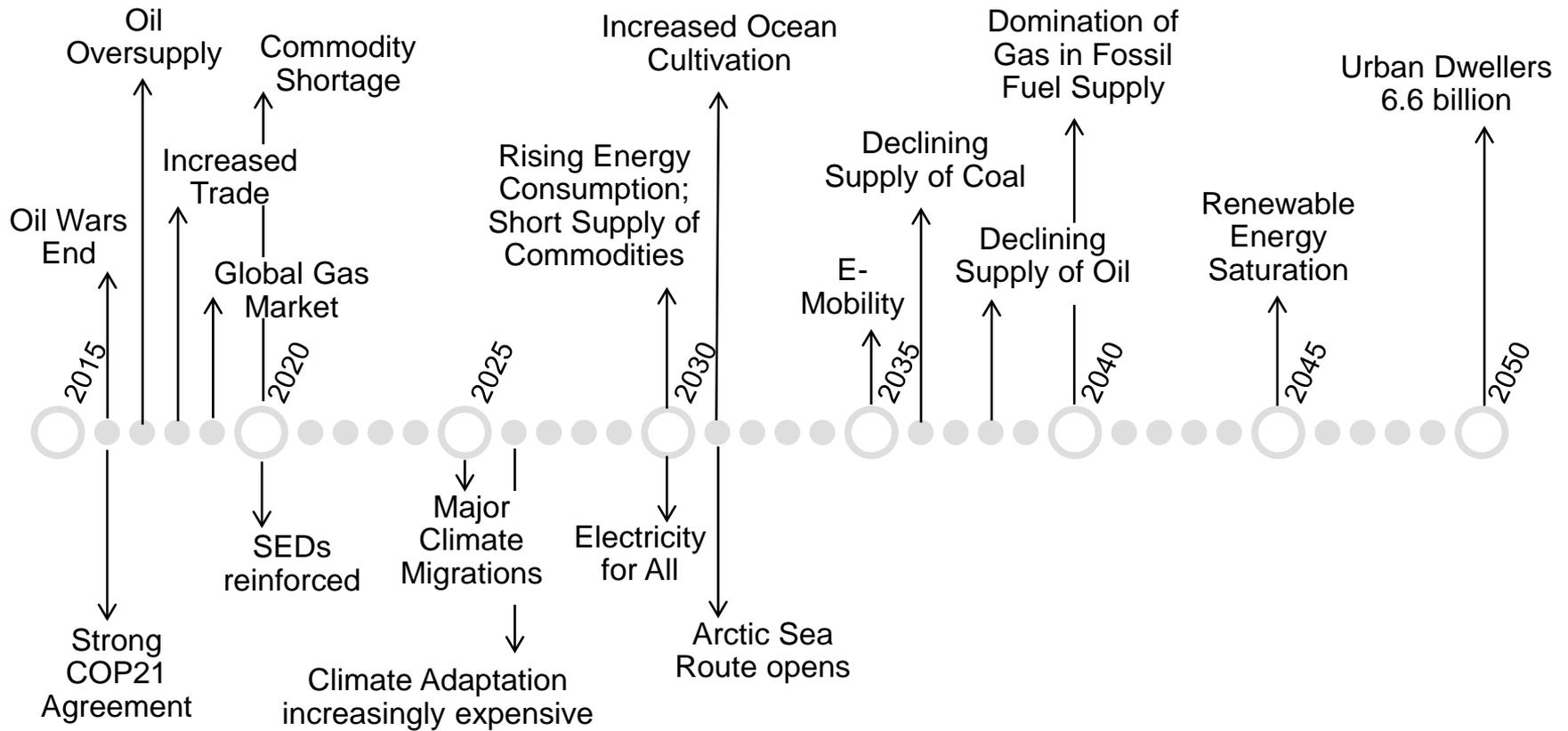
# Scenario C - Timeline



# Status: Scenario D

- This scenario is characterized by high cooperation in meeting sustainable development goals, but low innovation in the energy sector with little development of new enabling technologies.
- **Global Political and Economic Situation**
  - On a global scale, there is general willingness to support the SDGs but with a limited view for their overall effect in achieving the intended goals. The world sees relatively low economic growth and only a modest increase in conventional energy demand growth. It will not be possible to fulfil global ambitions and remain economically efficient without extensive reforms of energy systems.
- **Technological and Market Developments**
  - Technology does not flourish in application. Energy demand is dampened by improving energy efficiency. Significant new resources are brought into play by virtue of technology transfer. The gas-to-oil ratio in the market will increase. Grid scale batteries will not be deployed because of their cost. Information and communication Technology (ICT) will have a limited impact on energy systems. Major Carbon Capture and Storage (CCS) systems do not emerge. Carbon costs will remain a tool for transfer of economic rent from producers to consumers.
- **Energy Policy and Cost Developments**
  - Globally supply will be controlled as before, thus maintaining regional and global energy market regulation. The lack of advanced technologies leads to higher prices for energy resources; as such, renewables, and in particular photovoltaics will continue to come down in price, as will electricity storage. This effect is amplified by the support for a carbon price, and therefore gradual improvement of existing technologies through the subsidy mechanism is an important point to prevent a sharp rise in energy costs.

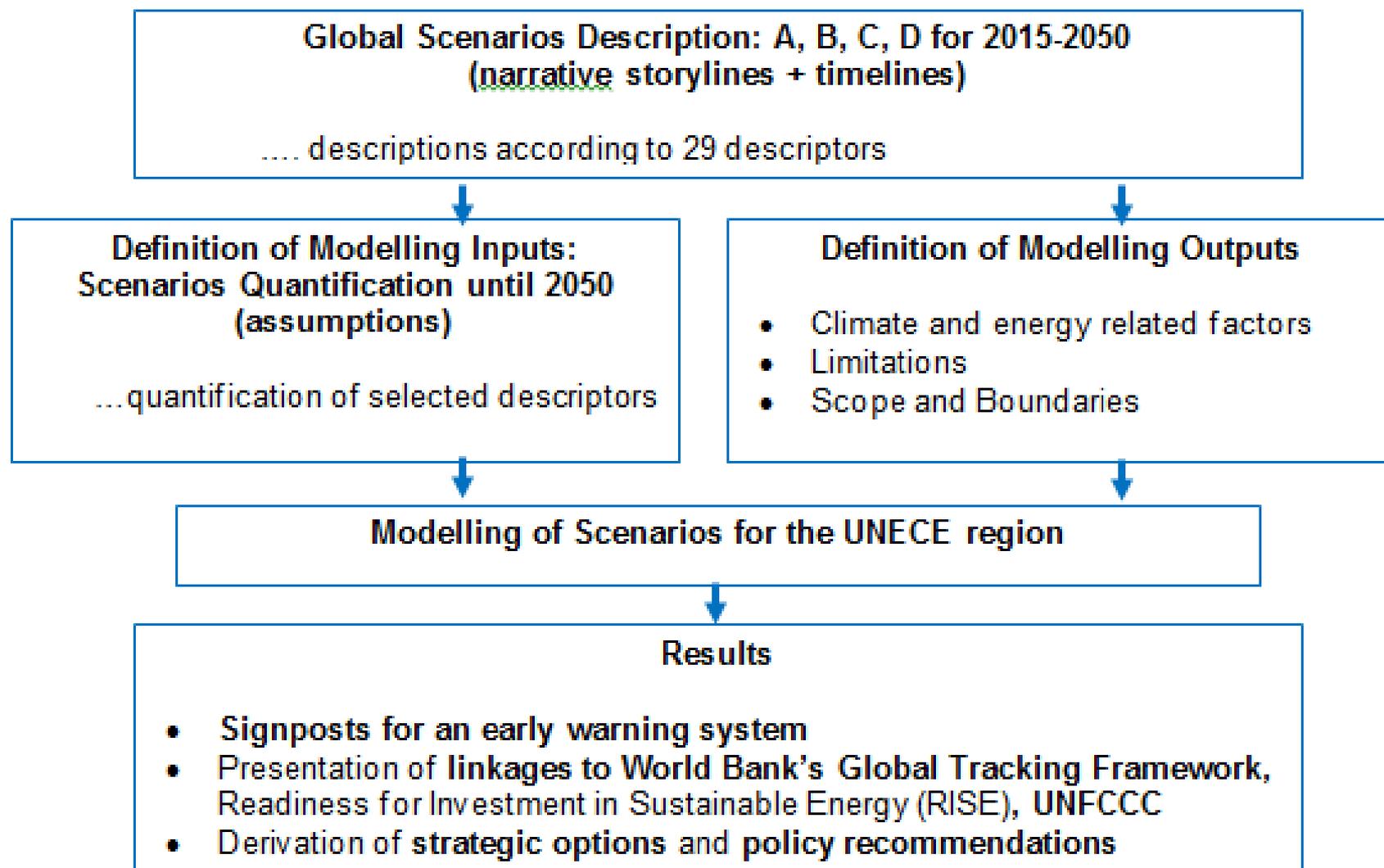
# Scenario D - Timeline



# Process: 3rd Workshop

- To finalize narrative storylines for each scenario based on assumptions
- To define modelling outputs for four scenarios
- To define input parameters for the models with key factors shaping each scenario
- To finalize Terms of References for modelling institutions to initiate the modelling exercise

# Process Chart



# Process: April 2016 – Jun 2017

- May 2016: Finalisation of TOR and circulation to modellers as well as funding organisations
- May – Sep 2016: Fundraising
- Jun – Sep 2016: Modelling exercise
- Sep 2016: Presentation of first results at Committee on Sustainable Energy & member State dialogue  
Definition of indicators („signposts“) as basis for an early-warning system
- Jul – Oct 2016: Development of recommendations for policy makers based on modelling results
- Oct 2016: Dialogue event with the region during the 7<sup>th</sup> Forum on Energy for Sustainable Development in Azerbaijan (18-21 October 2016)

# Process: April 2016 – Jun 2017

- Sep 2016 – Apr 2017: Conceptualisation of an early-warning system
- Jan 2017: Decision about an energy ministerial at the 25th Session of the Committee on Sustainable Energy
- Jun 2017: Political dialogue during the 8th Forum on Energy for Sustainable Development during the Future Energy Expo in Kazakhstan
- Sep 2017: 26th Session of the Committee on Sustainable Energy