Framework for an Early Warning and planning System

With regard to the Pathways to Sustainable Energy project

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Agenda

- Importance and interaction of the Early Warning System
- Early Warning and planning Systems in general
- Early Warning and planning System in the context of the Pathways Project

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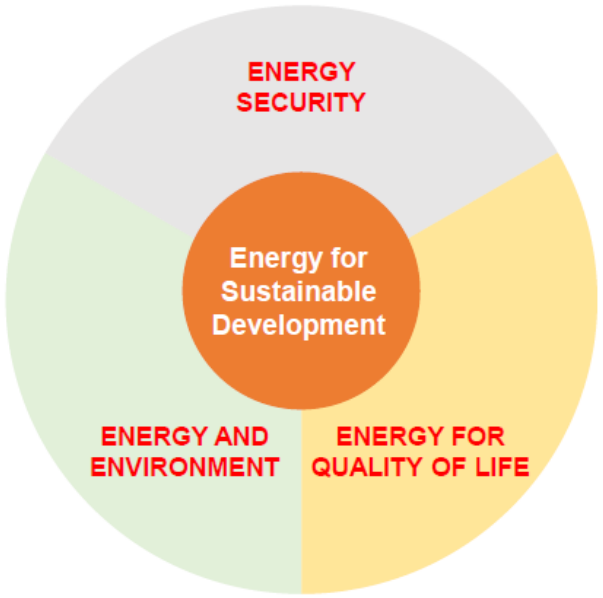
Three pillars of the Pathways project

"Secure the energy needed for economic development"



"Minimize adverse energy system impacts on climate, ecosystems & human health"

"Provide affordable energy that is available for all at all times"

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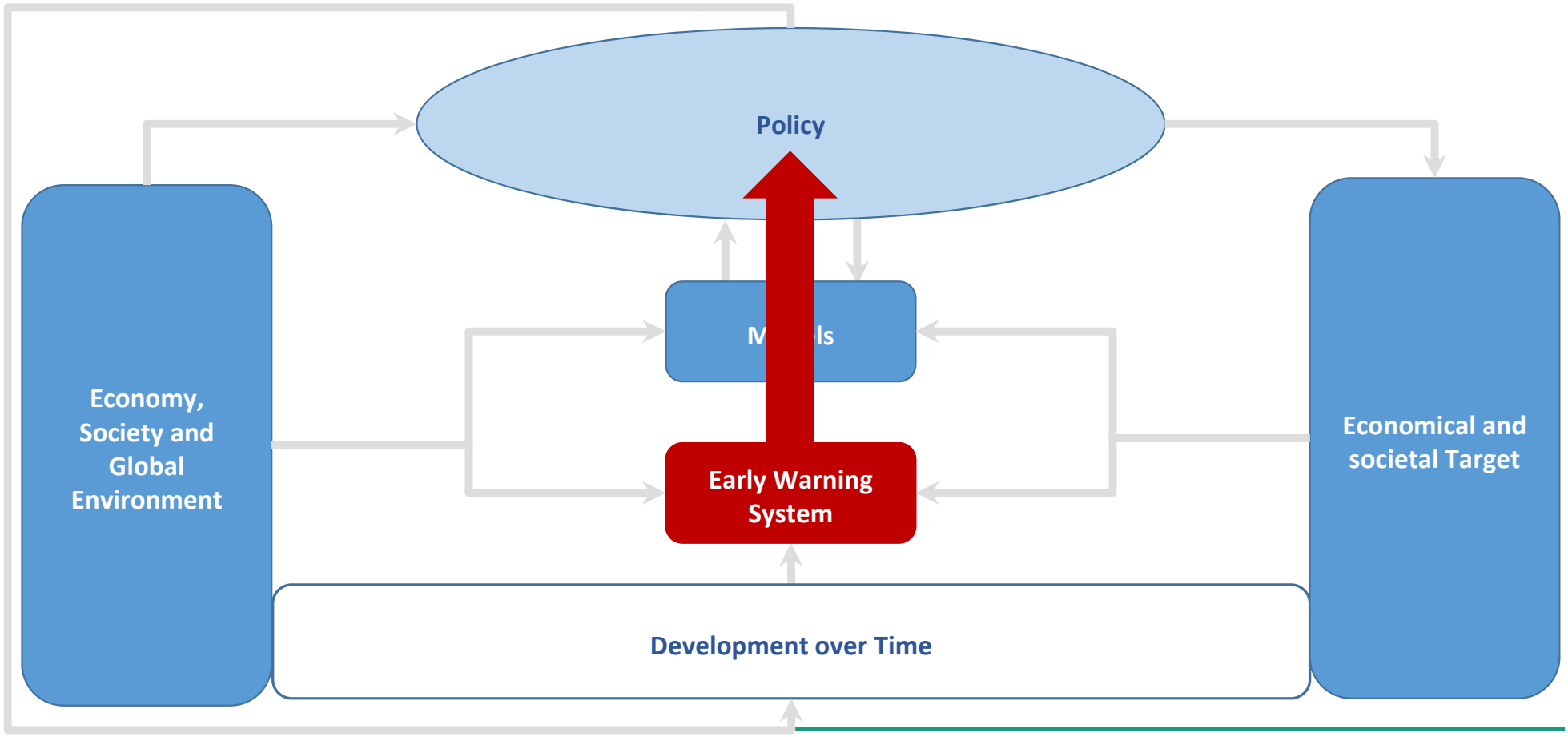
Importance and interaction of the early warning system



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Early Warning & Planning Systems in general

Definition of an Early Warning System

- “Early”: There is still time to react to an incident and reduce the potential damage
- “Warning”: Communication protocol, a statement or event that warns of something
- “System”: Standardized set of principles or procedures according to which something is done

Complete set of components that connects those who need to hear messages to others who compile and track the hazard information

Early Warning & Planning Systems in general

Planning

- Dwight D. Eisenhower: **“Plans are worthless, but planning is everything.”**
- Planning forces an organisation to remain immersed in the character of problems that will, one day, have to be solved.
- Increasing awareness of decision makers
- Better understanding of socially complex systems and make policy responses more appropriate

The more planning that takes place, the more time you have to adapt your policies

Early Warning & Planning Systems: Typical fields of deployment

Natural Disasters

- Earthquakes
- Tsunamis
- Volcanic Eruption

Economic and social affairs

- Financial Crises
- Education

Global Level

- Ozone depleting substances (1987)
- Nuclear non-Proliferation Treaty included an inspection regime that aims to identify attempts to develop nuclear weapons capabilities

Early Warning & Planning Systems: Examples for energy system

Energy systems

- EU: Monitoring system of the progress of the Energy Union
- UK: Monitoring reports on the Climate Change objectives and likelihood that they will be achieved

⇒ Usually **not referred** to as **'early warning and planning systems'**
→ Horizon spans many years or decades
→ Rarely indicate what corrective measures are required

Monitoring forms the basic of an early warning system

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  - Conceptualisation

Requirements for the monitoring system

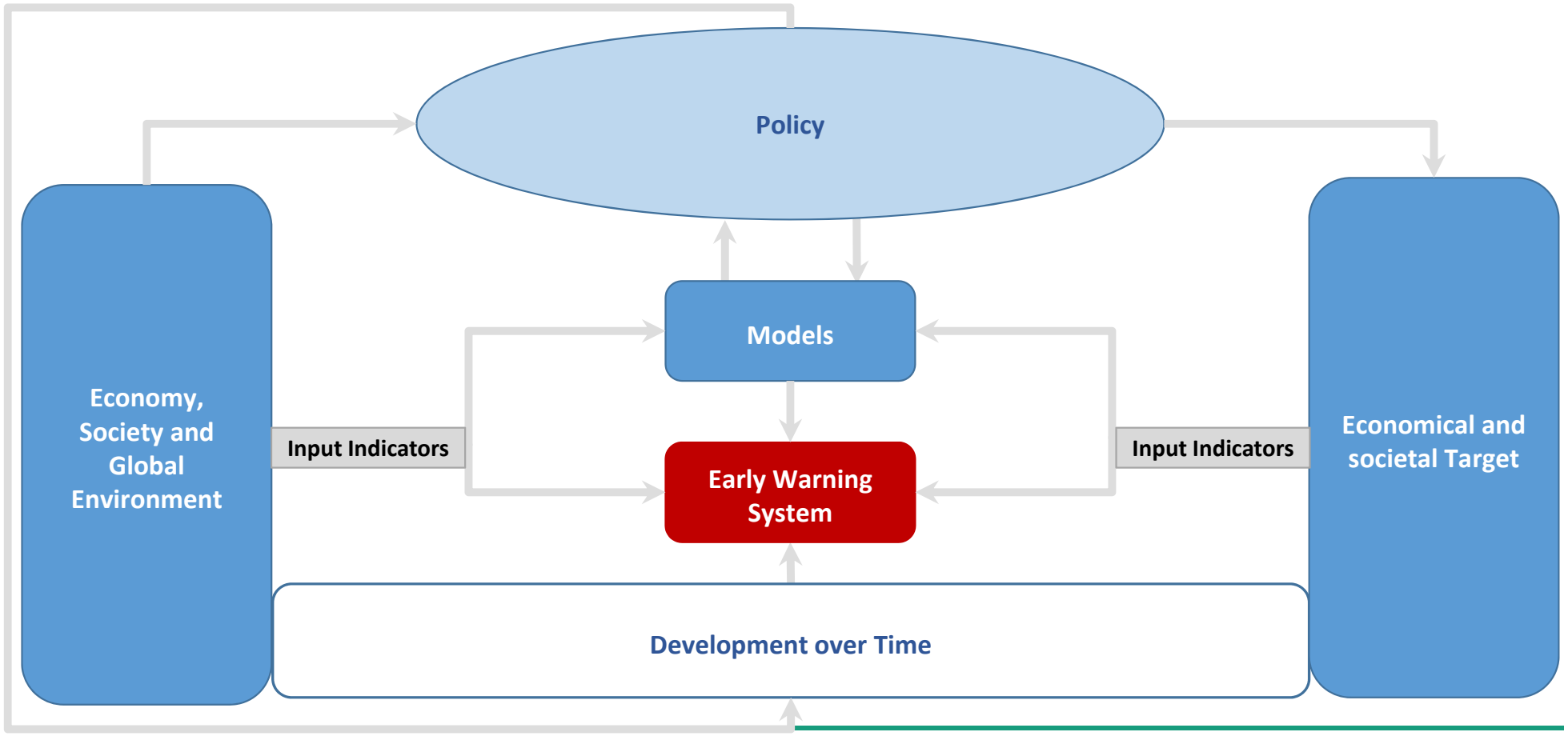
General requirements

- Continuous monitoring of developments
- Evaluation of the implications of sudden events
- Identification of causes of problems and possible solutions
- Enabling control measures

Requirements for indicators

- Relevant → provide information on the degree to which objectives have been achieved
- Data should be readily available and timely
- Compatible with the data in the Models
- Reliable for modelling purposes → what you get out depends very much on what you put in

Two types of Indicators



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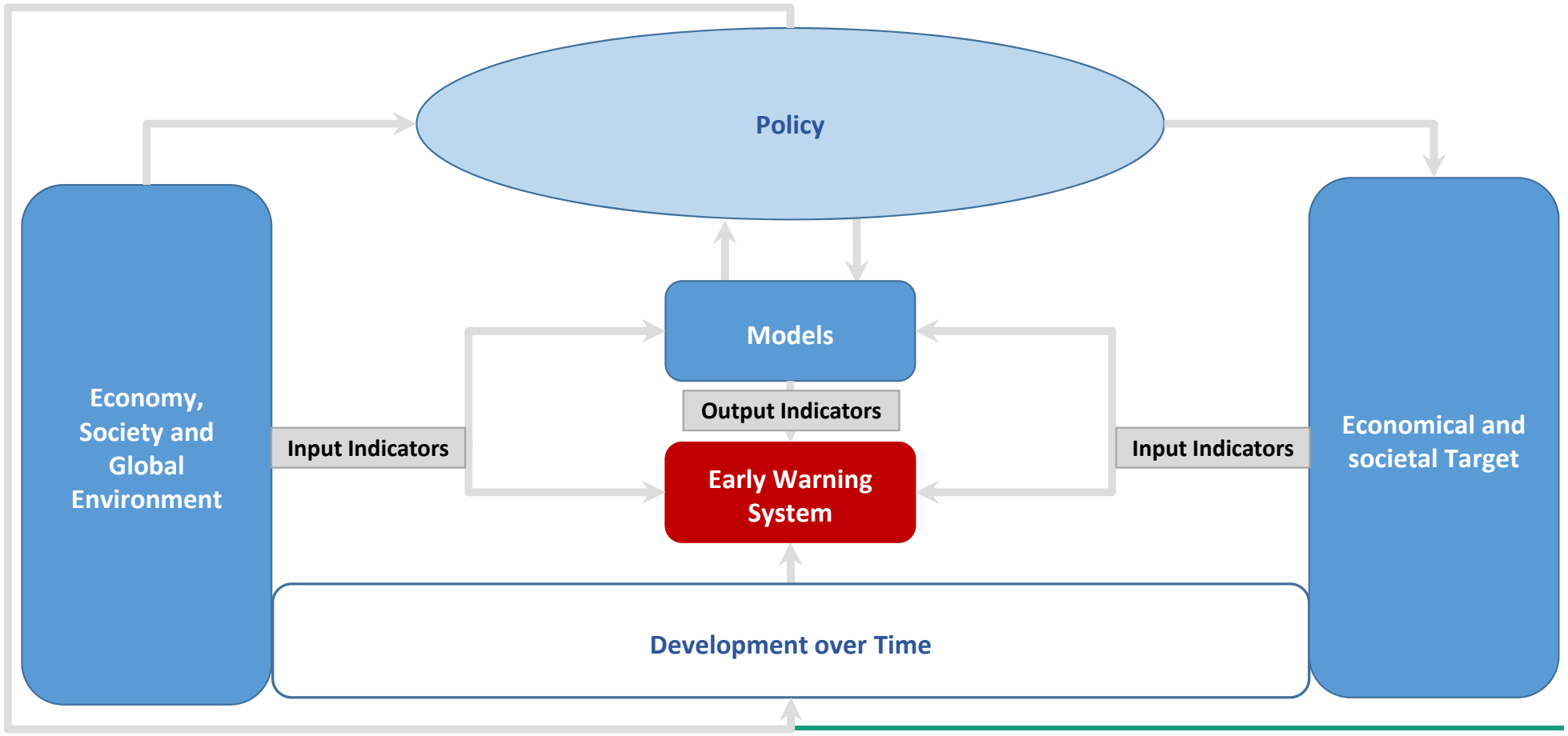
Two types of Indicators

Input Indicators

- Ensures robustness of the models
  → Avoids the risk that a measured deviation is based on incorrect model results
- Allows unexpected developments to be detected very early
  → e.g. Investment volumes and not share of renewables
- Based on officially identified objectives or assumptions about the future
  → e.g. Investment volume in renewable energy per GDP
- Independent of model results

Δ = „input indicator based on officially objectives" – "values actually observed"

Two types of Indicators



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Two types of Indicators

Output Indicators

- Quality of information strongly dependent on model quality
  → Results are dependent on model assumptions
- Intermediate, annual target values are available
  → Continuous monitoring is possible
- Degree of target achievement
  → Allows quantitative statements about necessary measures
- Time lags
  → Only undesirable developments are identified rather than the causes that lead to these developments

Δ = „indicators based on model results" – "indicators based on real data"

List of indicators developed for the Pathways project

Assumption and Input Indicators

- SSP2 related → 5 Indicators
- Technology related → 4 Indicators
- Policy related → 4 Indicators

Output indicators

- Energy security → 15 Indicators
- Energy and Environment → 27 Indicators
- Energy for Quality of Life → 9 Indicators

A total of 64 indicators were selected that are well suited for use in an EWS

Which indicators are used and how they are prioritised varies from region to region and depends on policy objectives and data availability.

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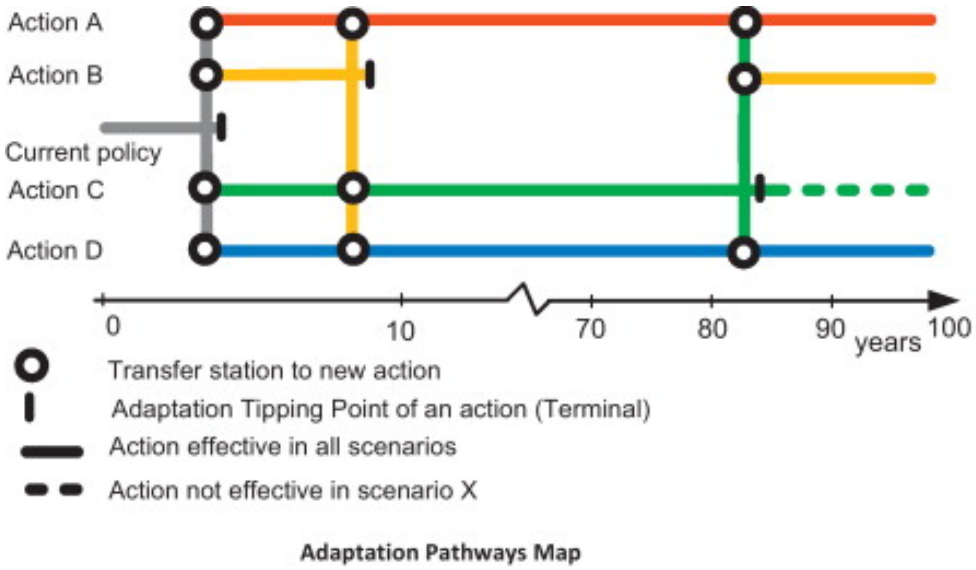
Adaption pathways

- **Different technology or policy scenarios**

- **Trigger/Tipping points**
  → current path must be left in order to reach the goal

- **Crossroad points**
  → crossroads between scenarios that have the potential to reach the target
  → e.g. CCS vs. renewables

⇒ **Pathway map**



Adaptation Pathways Map

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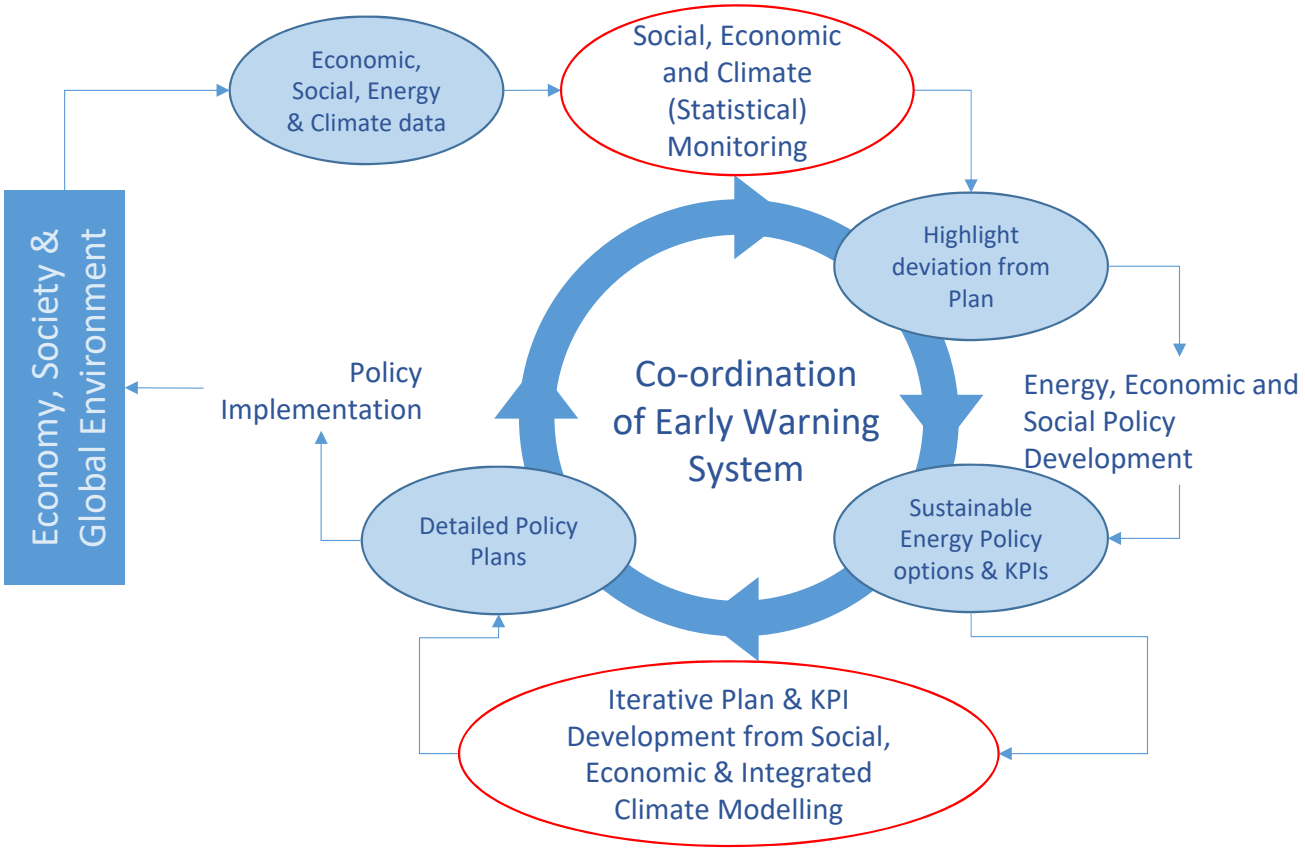
Elements of an Early Warning and Planning System



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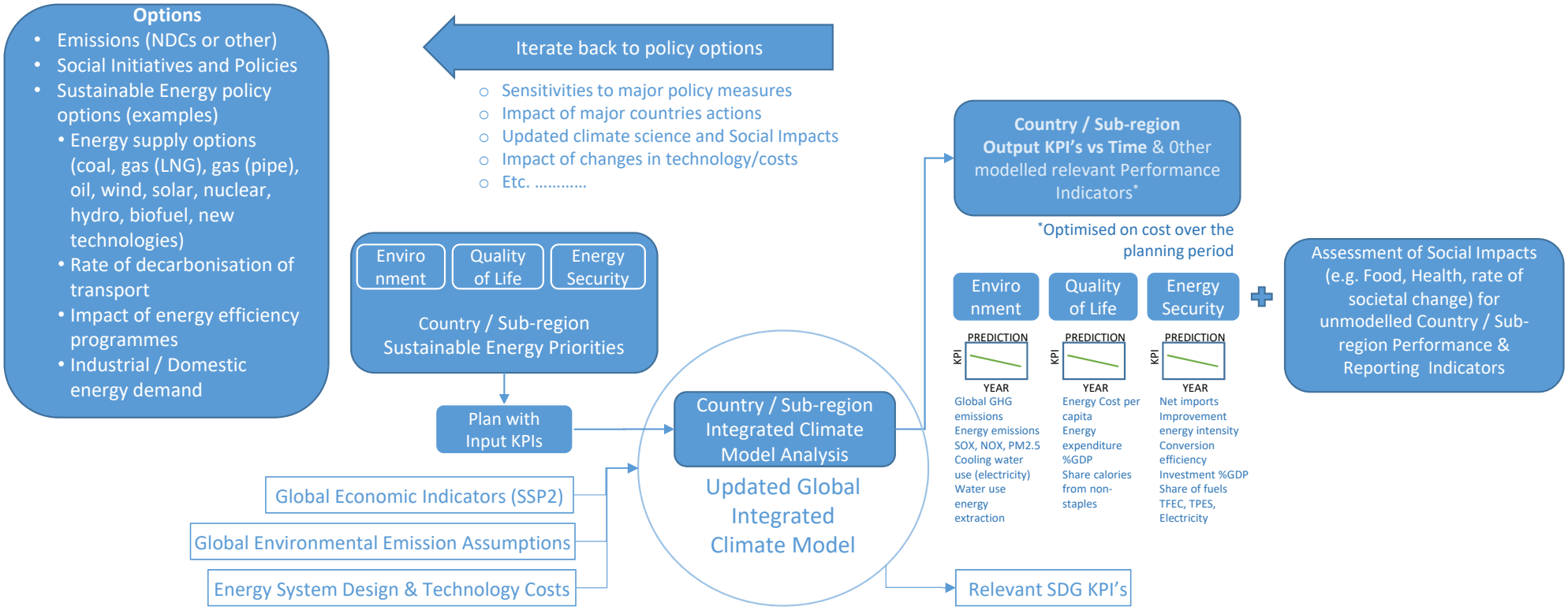
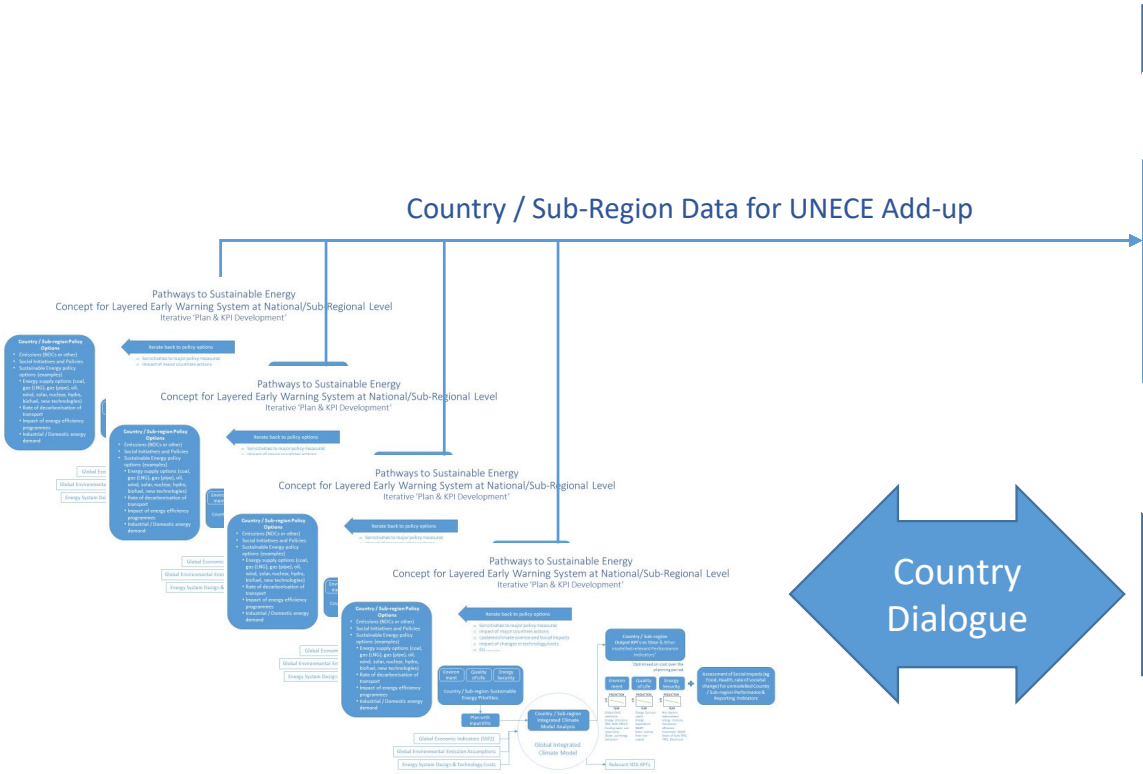
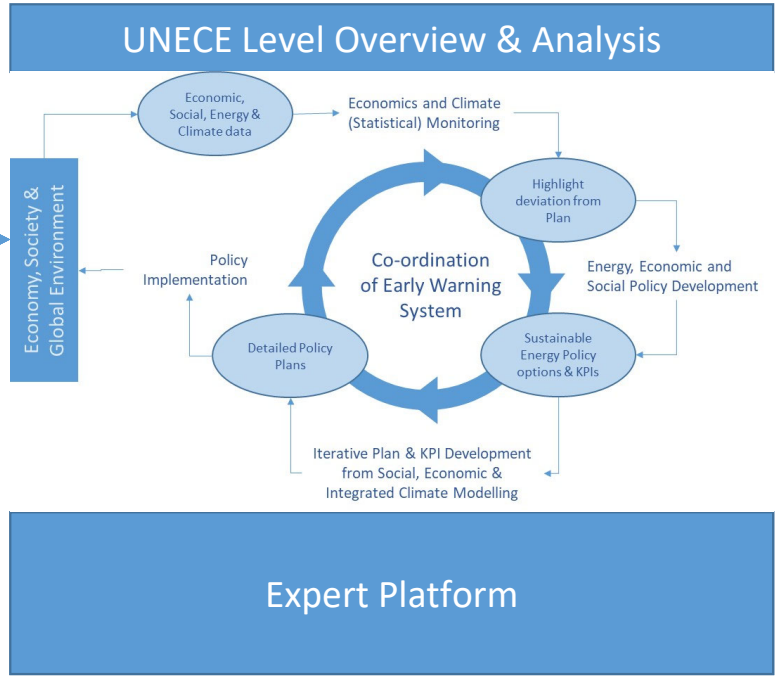
National Level Early Warning System



Concept for Layered Early Warning System



Country Dialogue



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Concept for Layered Early Warning System

Advantages of using the two models also at national level

- Can be tailored to model specific (sub-) regions
- Both models are open source and can be applied by member states
- National models can be ‘summed up’ to compile a UNECE level Early Warning System
- Expert interface to promote a dialogue and help with the execution of the models
  → Encourages co-operation and help identify synergies across the UNECE Region

Advantages of the expert interface

Expert interface can help with design

- Selection of indicators depends on availability of data
  → Depends on objectives of MS
  → Differences between Member States
- When does a measured deviation triggers an alarm?
  → Depends on the selection but also the prioritization of indicators
  → Depends on objectives of MS

Advantages of adopting the methodology

If countries adopt the methodology of using the sustainable energy approach in combination with the developed models, they will have several advantages

- Access to the latest, most refined integrated climate and energy models
- Participation in an expert platform that can be used to model their own country's progress to sustainable energy with relevant information on other countries activities
- Facilitation of a UNECE overview of progress towards Sustainable Energy