



Roadmap for the deployment of large-scale energy balancing from Norwegian hydropower under scenarios for the future energy sector development

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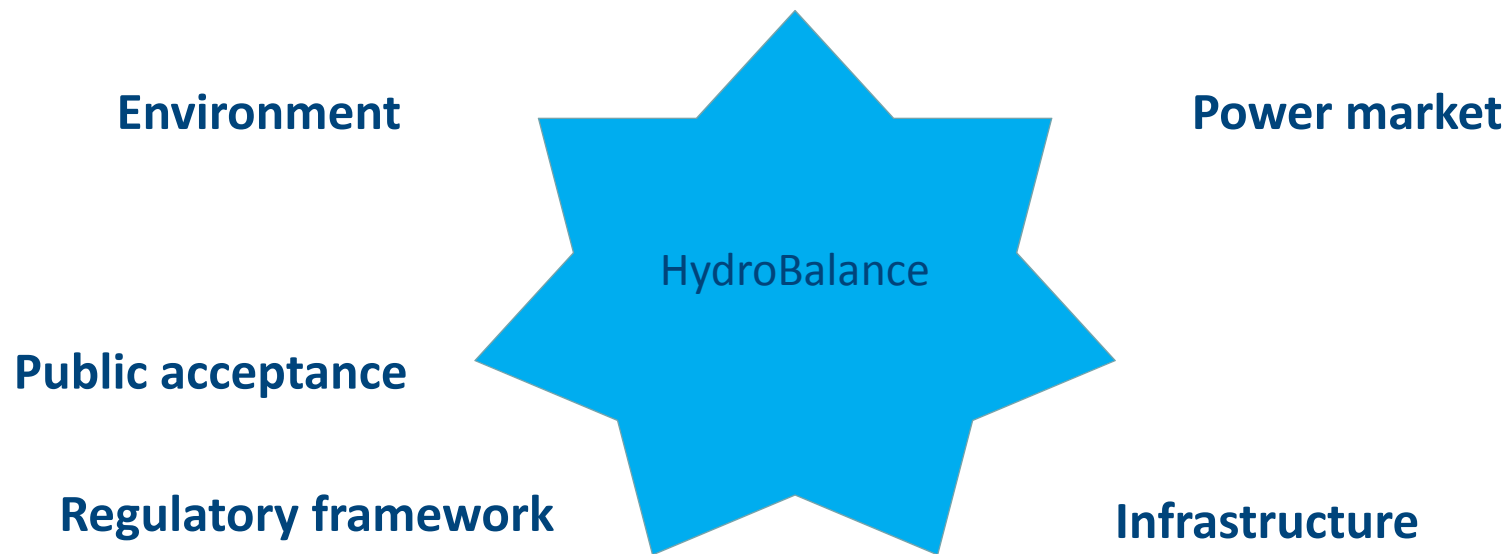
SINTEF Energy Research, Trondheim, Norway

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HydroBalance Project

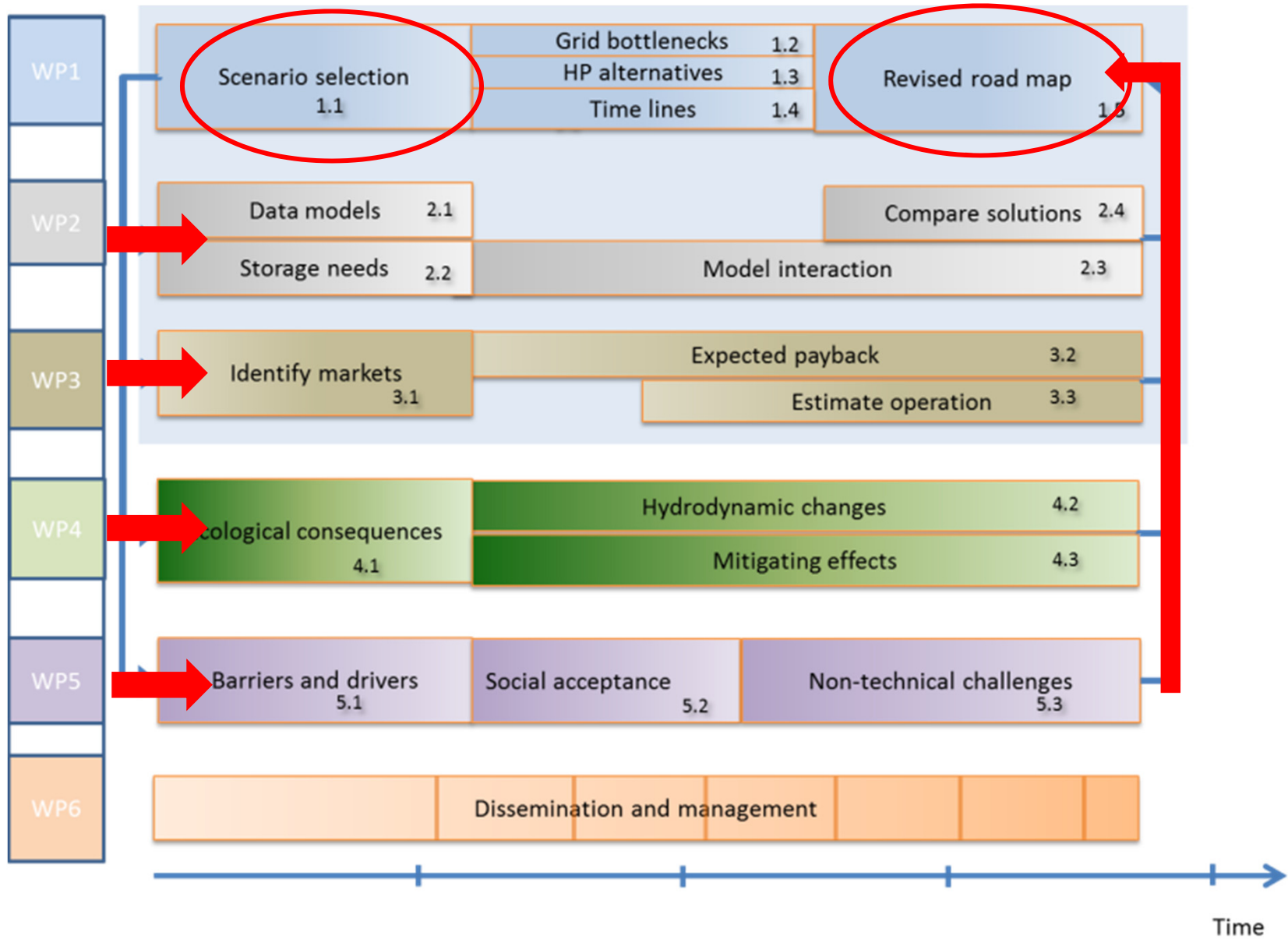
Address key challenges to the use of Norwegian hydropower for **large-scale balancing and storage** related to **technology, economy, environment and society**.



HydroBalance Project

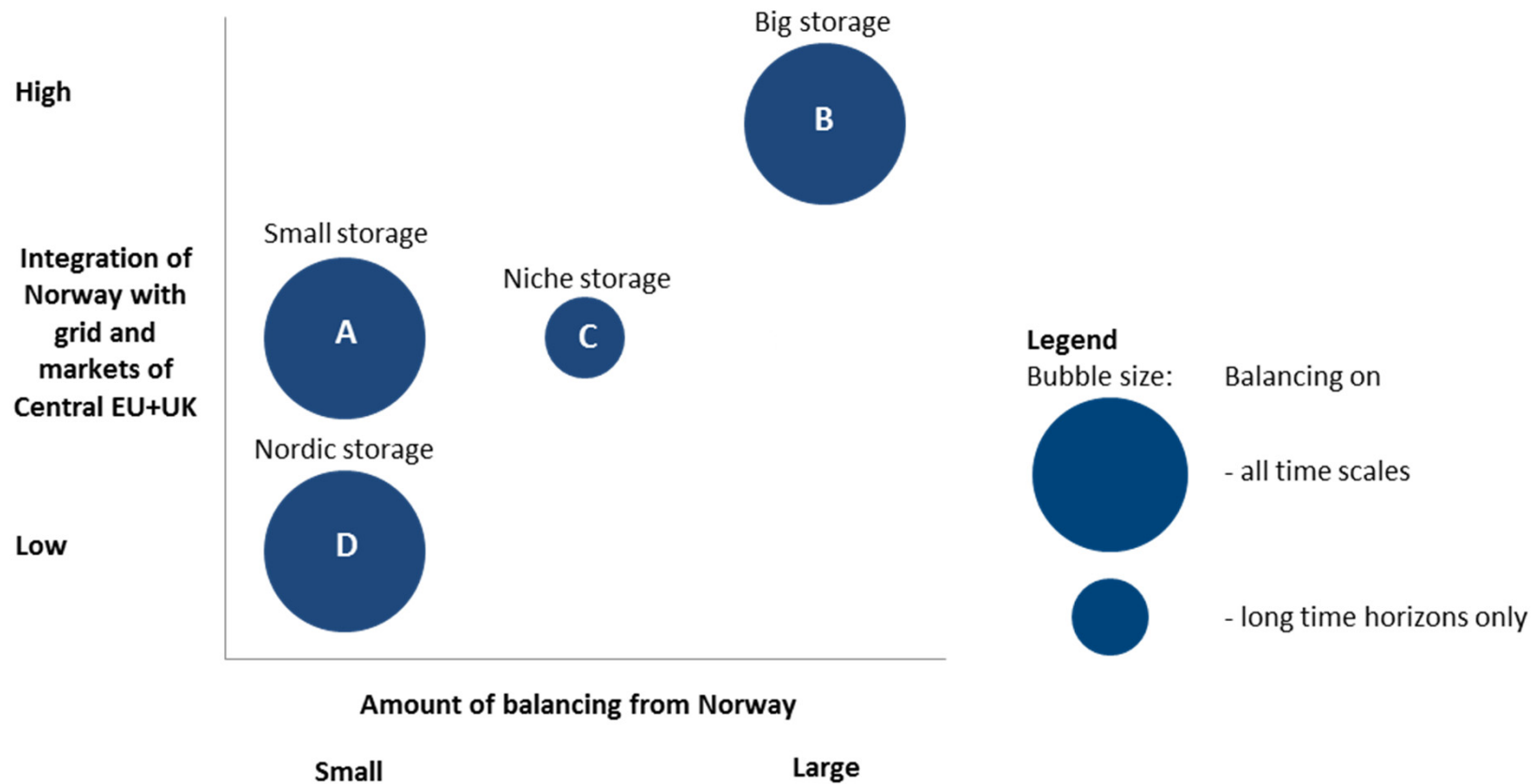


- **Scenarios** for different futures of the Norwegian hydro system
- **Roadmap** for the deployment of large-scale energy balancing
- Analyses, simulations and case studies of
 - energy **system**
 - energy **market**
 - **environmental** impacts
 - **regulatory framework** and **public acceptance**



Scenarios

Main scenario characteristics



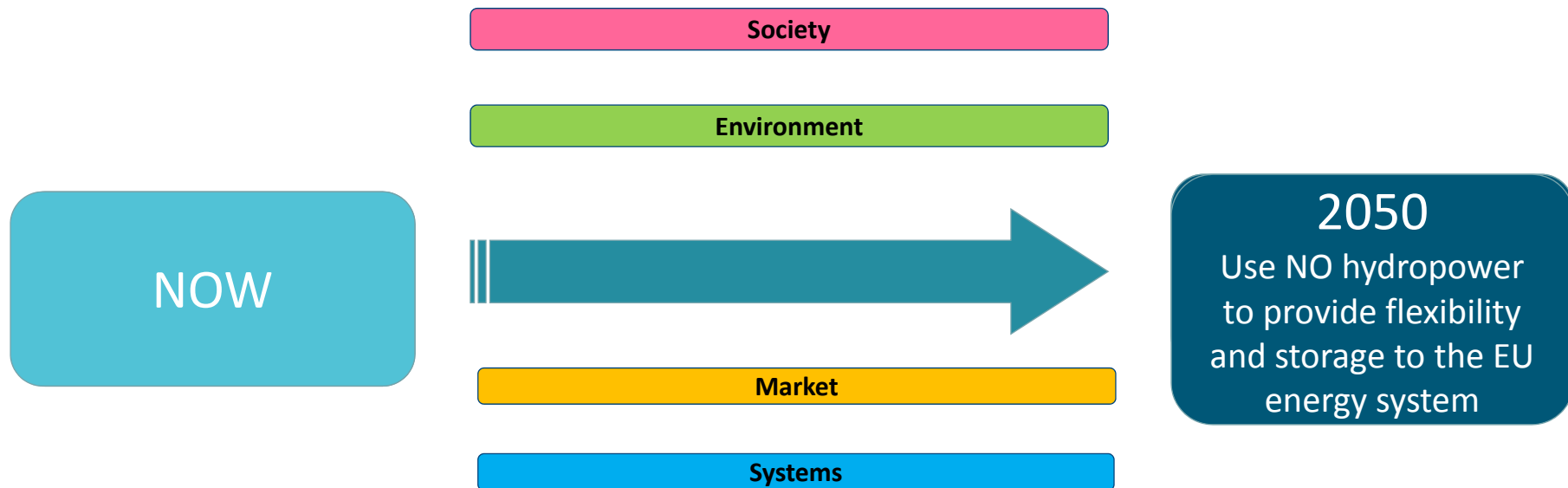
Roadmap

Provide **roadmap for the deployment of large-scale energy balancing** from Norwegian hydropower under scenarios for the future energy sector development

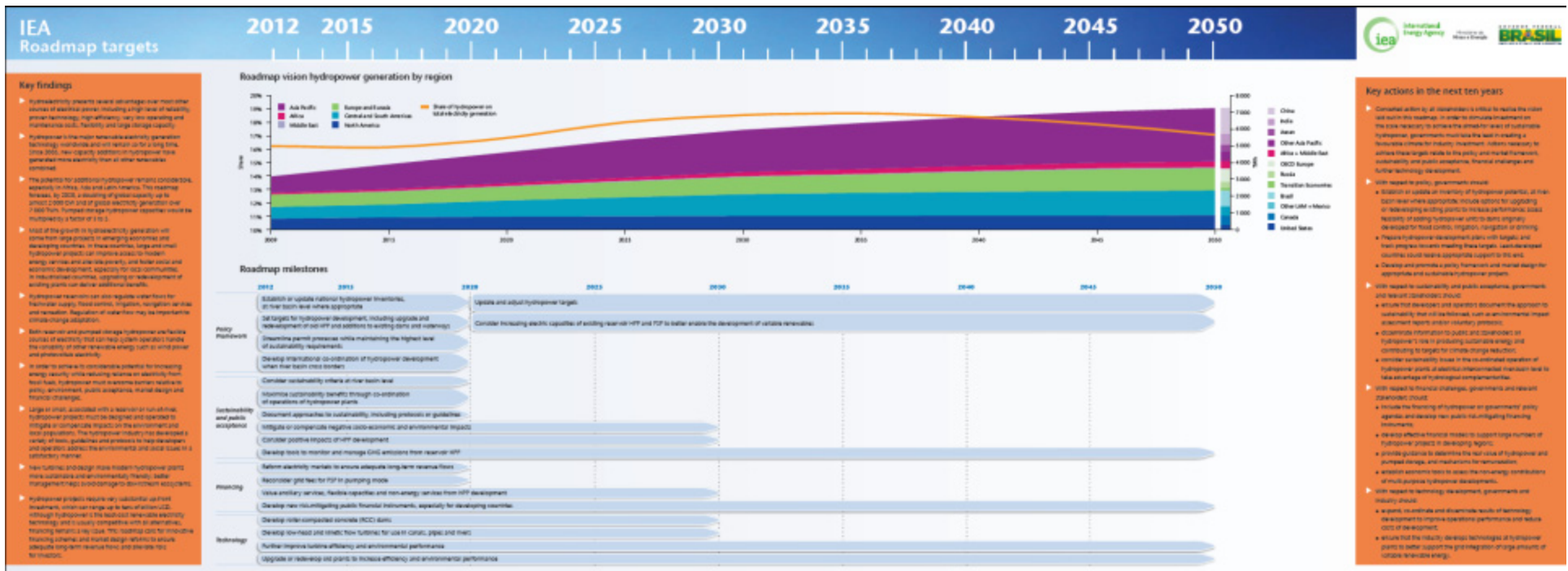
- Point out **steps** for increased flexibility
- Draw **time lines** for such use until 2050
- Adress **drivers and limitations** regarding:
 - Political framework
 - Environmental requirements
 - Public acceptance
 - Buissness models
 - Investments needs

Roadmap

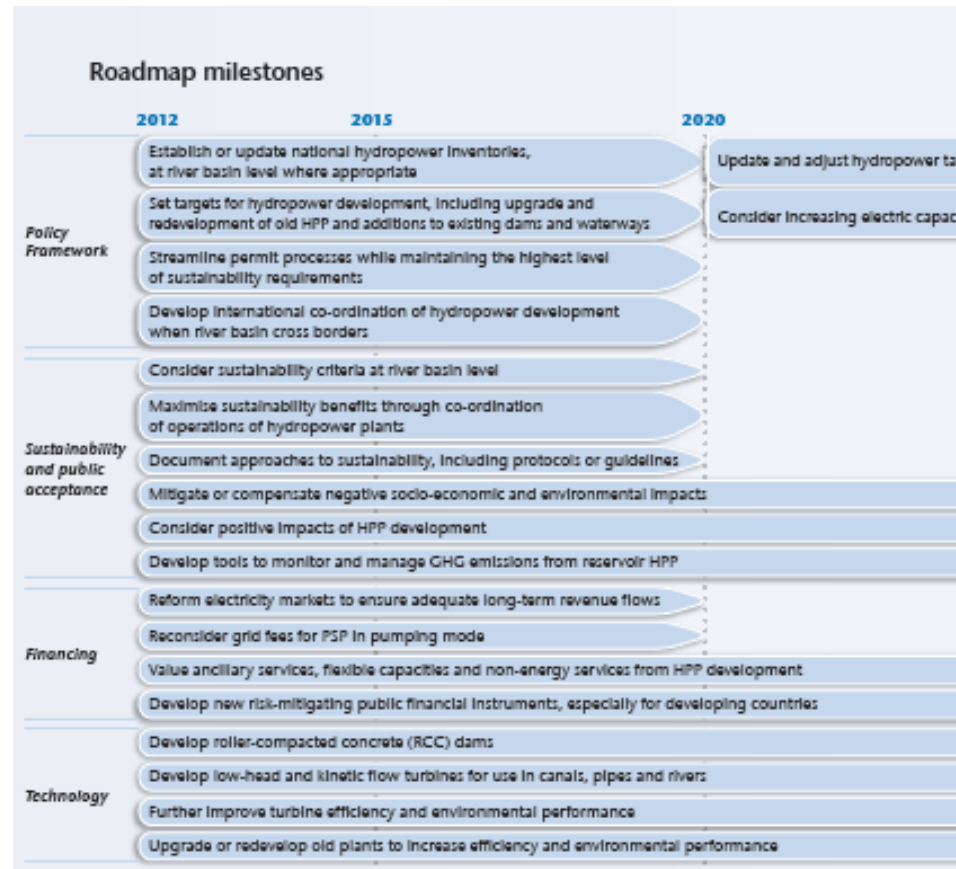
- Detailed plan to guide progress from a defined starting point towards a goal



IEA Hydropower Roadmap



IEA Hydropower Roadmap



Group discussion

1) Where are we now?

2) How can we get to deployment of large-scale energy balancing and storage?