

Joint Programme Hydropower

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EERA - European Energy Research Alliance

- Association of European public research centres and universities active in low-carbon energy research
- EERA is the largest energy research community in Europe and the research pillar in the European Union's Strategic Energy Technology Plan (SET-Plan), which aims to accelerate the development and deployment of low-carbon technologies



50,000 +
researchers



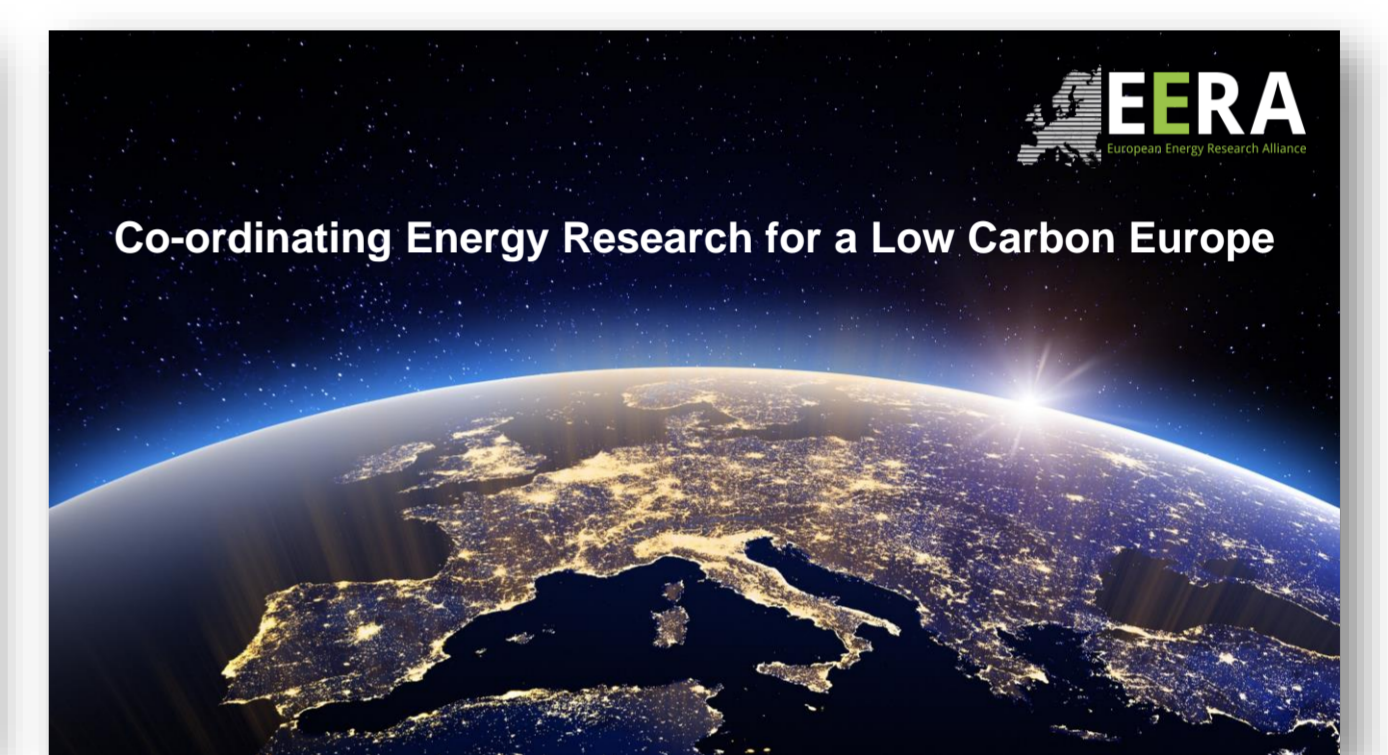
250 +
public research centres
and universities



30
countries

EERA's Mission

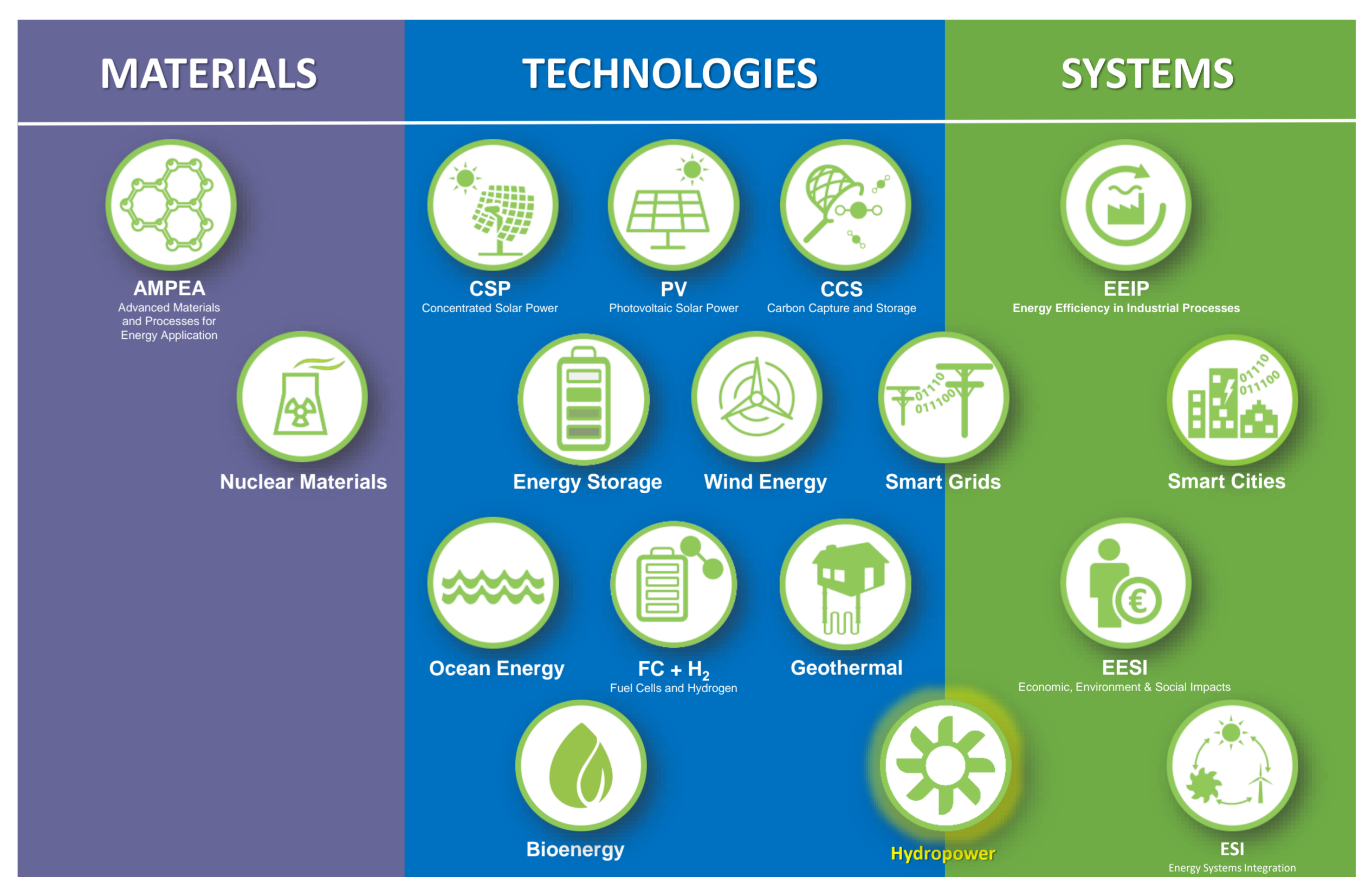
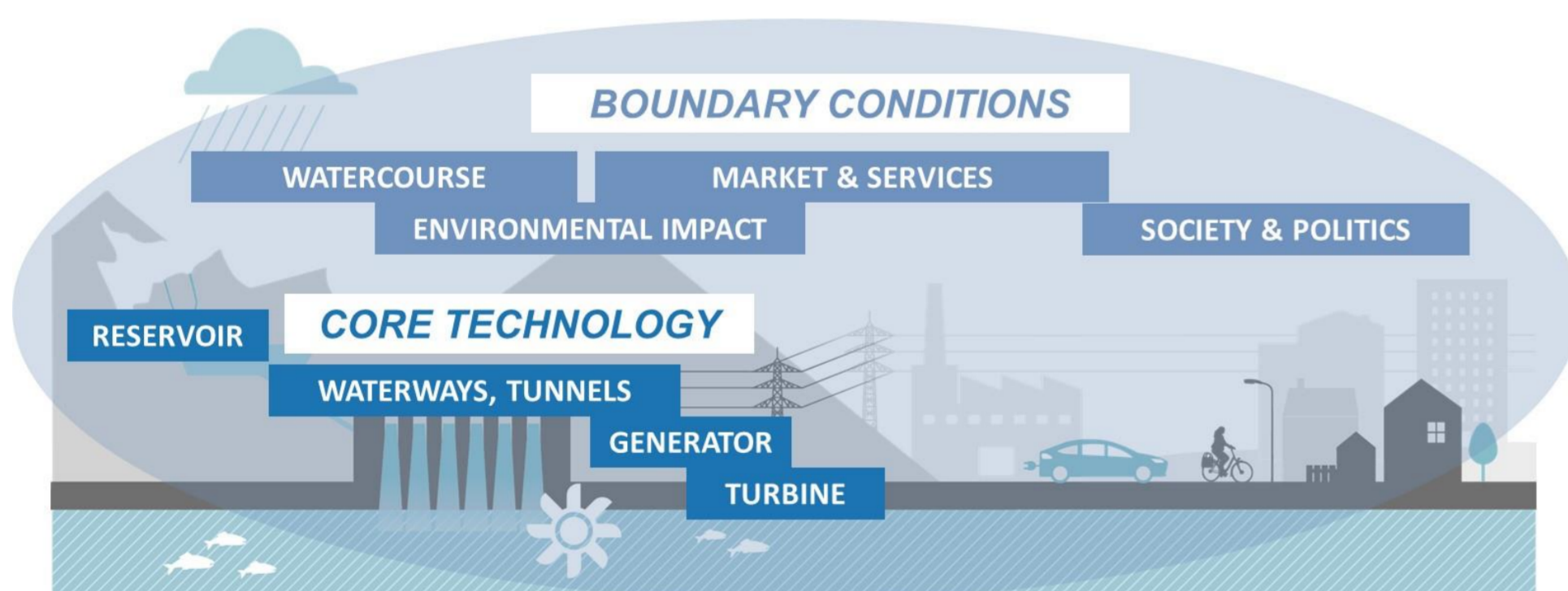
- Catalyze European energy research for achieving the Paris Agreement target:
 - Help streamline regional, national and European research efforts
 - Deliver research results from basic research to the demonstration phase (TRLs 2 to 5) and ensure efficient transfer to industry and market



EERA's Core: Joint Programmes

- EERA's members work together in currently 17 joint research programmes
- The EERA Joint Programmes are aligned with the priorities of the SET-Plan and
 - Develop research activities along shared research agendas
 - Cover the whole range of low-carbon energy technologies
 - Integrate the social and economic aspects of the energy transition
 - Address the systemic nature of the transition to a zero-carbon society

- **Joint Programme Hydropower** - a cross-disciplinary approach

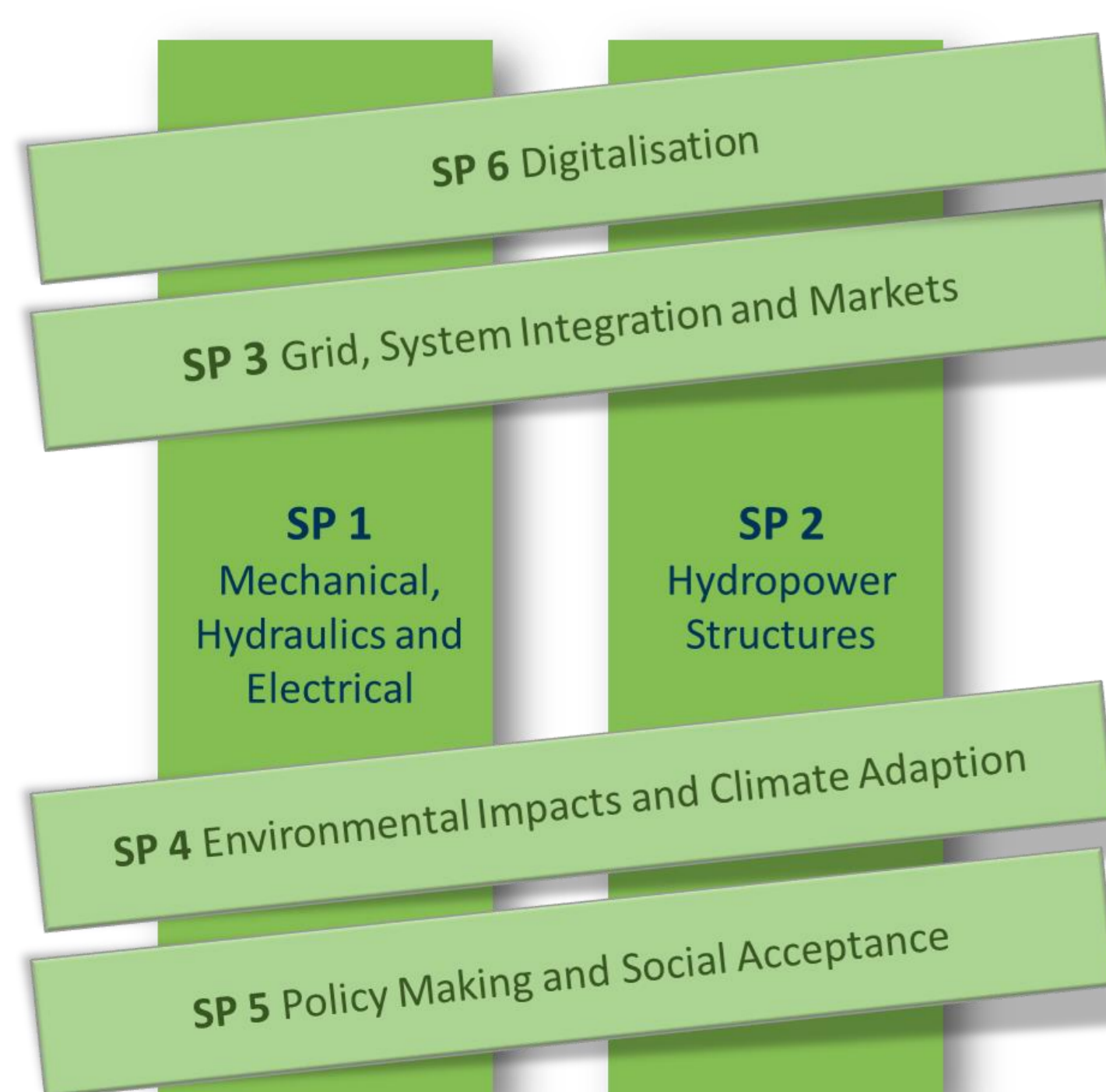
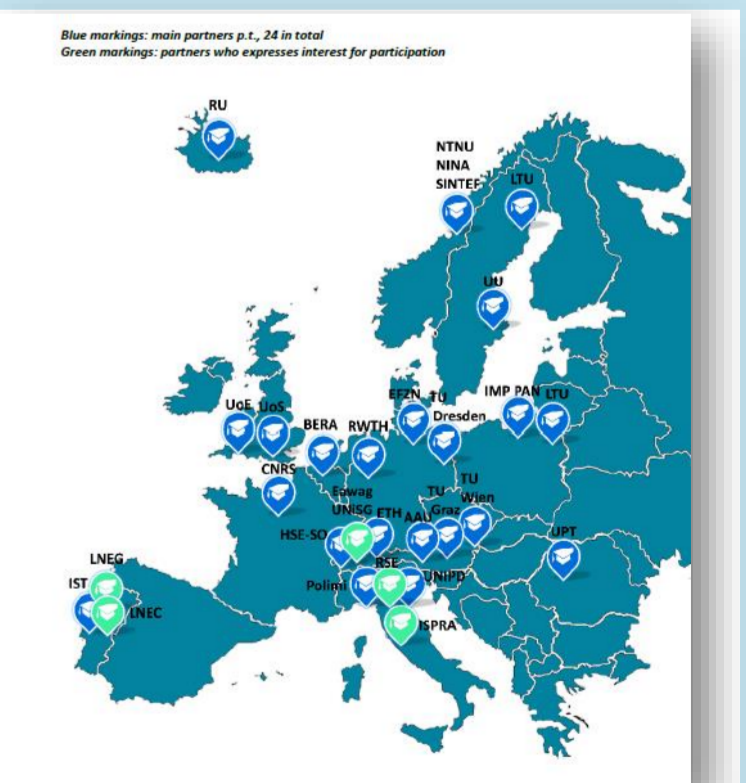


Joint Programme Hydropower

- Established in 2019
- Hydropower generates ~50% of the total renewable electricity supply
- Hydropower can deliver flexibility services to the renewable energy system and be an enabler for the green energy transition



Coordination
 NTNU



6 Sub programmes

SP1: Mechanical, Hydraulic & Electrical

- Operational range limitations and lifetime prediction
- Fluid Structure Interactions
- System dynamics, modelling and governing of turbines
- Variable speed turbines
- New inventions



SP2: Hydropower Structures

- Reliability of hydropower plants
- The efficiency of hydropower plants
- The public safety
- Environmental friendliness



SP3: Grid, System Integration and Markets

- Enable the alignment of supply and demand for flexibility
- Role of hydropower in interoperability of different technologies
- Power ramping and stability support potential
- short-, mid- and long-term energy balancing



SP4: Environmental Impact and Climate Adaptation

- Management of water resources
- Minimizing negative environmental impacts of hydropower
- Hydropower production as climate adaptation



SP5: Policymaking and Social Acceptance

- Transitions to low-carbon energy systems
- Policies
- Planning and deployment of hydropower developments
- Public engagement



SP6: Digitalisation

- New and better O&M of future HPP
- Better decision-making and investments
- Monitoring, data acquisition
- Data management, AI, machine learning, digital twin, modeling

