



**EERA**

# European Energy Research Alliance

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# World-leading research; High Science → High Impact

**IMPELLO**  
Impello Management AS

## Effekter av energiforskningen

Hovedspørsmål

– Vi er stolte over det vi har fått til. Shop er et stjerneeksempel på godt samarbeid mellom SINTEF og NTNU – og hvilke verdier vi kan skape, sier Olav Bjarne Fosso. Han er professor ved Institutt for elkraftteknikk ved NTNU.

– Hva har vært den største utfordringen?

– Hvordan forholder dere seg til utbyggingen av vannkraft? Det har vært en enorm kreftutløst i forhold til tekniske løsninger, for det er alltid noe spesielt som skal løses. Det gjennomføres forberedende hele tiden.

**30 års forskning**  
Det hele startet i 1988, da Statkraftverkene (Statkraft) kontaktet Olav Bjarne Fosso som på...

– Det tar omlag to år å få forskningsresultater ut i drift for alvor. For å lykkes kreves ihvertfall at man gir tid og ressurser til å utvikle en pilot – så er ikke Shop ut i drift, men ikke ville dette prosjektet kanskje ligge i en skuff i dag, sier NTNU-professoren.

Først ute til å bruke Shop var Trøsa og Eget.

– Fra midten av 2005 tok utbyggingen fart i kraftbransjen i Norge og Skandinavia, for teller Midtland (Bjørnås) i SINTEF. Plan ble det å samarbeide på Shop i 2008 og hadde ansvaret for utviklingen av SHOP frem til Skjolden overtok utbyggingen i 2010.

12

The Research Council of Norway

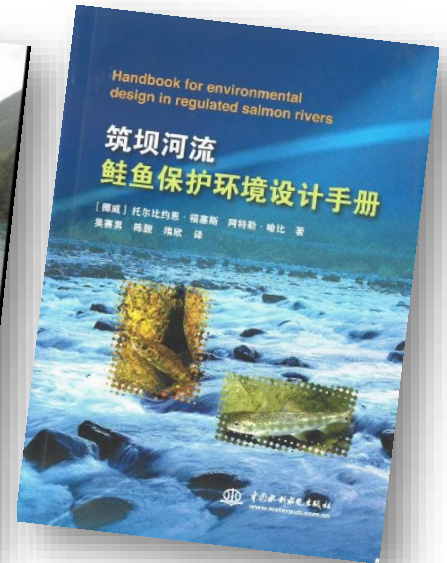
**Description of the research unit:**  
As of the end of 2012, the research group included 4 professors and 7 post-liceal associate professors and 25 additional staff, with core expertise in electric power system engineering, economics and markets. Research activities cover smart Grids, offshore grids, and hydro-power and markets.

<b>Scientific quality and productivity:</b> The group is among the world leaders in its field of activity, although the scientific community in this area is quite small. All results are publishable, with the group having the highest output of research papers among the groups in the department. While the publication rate in general could be improved, the average citation index in the field is high.	<b>Grade: 4</b>
<b>Societal and industrial relevance and impact:</b> The major impact on the scientific community is the development of methodologies and procedures for the utilisation planning and operation of hydropower plants and transmission systems. Most of the PhD students graduating in the group work in these fields. The biggest contribution to society is a method developed for the distribution of hydropower, which is now fully commercialised via a SINTEF spin-out. These methods are used by operators in all Nordic countries. Research results are also used in teaching at advanced level.	<b>Grade: B</b>

- The group should be allocated to facilitate communication.
- More attention should be given to acquiring EU projects.
- The publication strategy should be improved in terms of overall publication rate and publication in peer-reviewed journals.

Source: Research Council of Norway 2015

SINTEF



## ► Public R&D funding in Europe within Energy



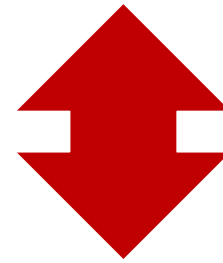
EU Funded 7.5%

Member State Funded 92.5%

## ▶ EERA Strategy: from technology to societal impact



**Catalysing European energy research to achieve a climate neutral society by 2050**

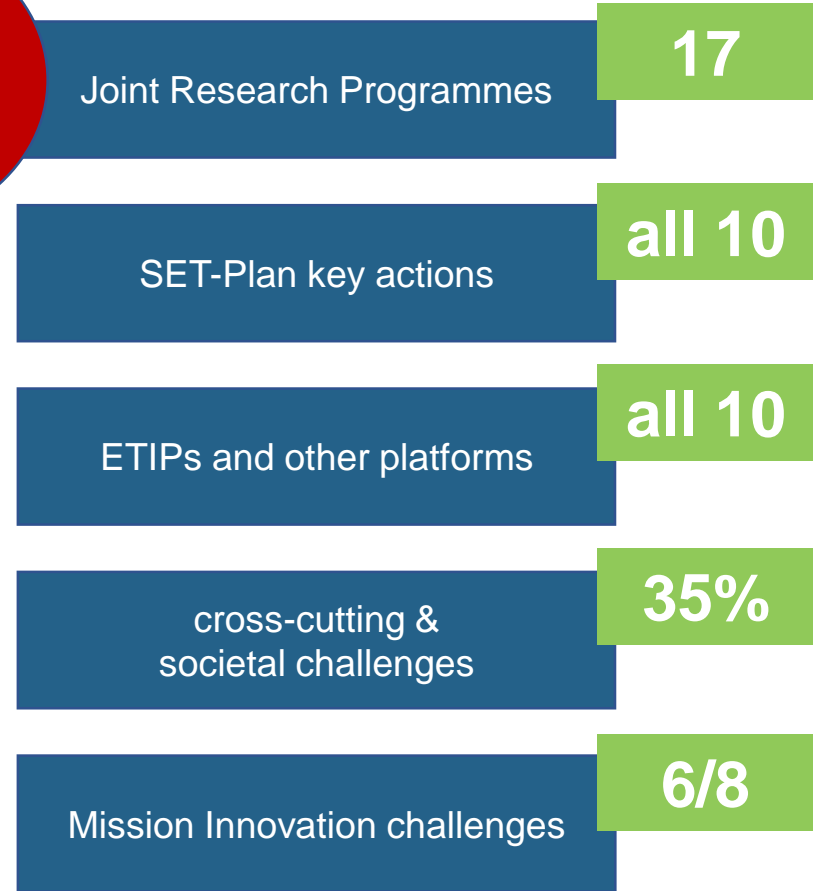


**ALIGNED WITH EU #1 POLITICAL PRIORITY**

# ▶ The most influential Low Carbon energy research community in EU & globally



EERA JPs involve members from 16 SET-Plan countries in average



Greenland

# EERA

European Energy Research Alliance



Iceland

-  Associations (7) >
-  Industries (5) >
-  Research Organisations (107) >
-  Universities (93) >



# ▶ EERA in Mission Innovation

## EERA Joint Programmes

JP Smart Grids



JP Carbon Capture & Storage



JP Biofuels



JP AMPEA



JP AMPEA



JP Fuel Cells & Hydrogen



## Innovation Challenges

1. Smart Grid

2. Off Grid access to electricity

3. Carbon Capture

4. Sustainable Biofuels

5. Converting Sunlight

6. Clean Energy Materials

7. Affordable Heating & Colling of Buildings

8. Hydrogen



AMPEA



Bioenergy



Carbon Capture  
and Storage



Concentrated  
Solar Power



Economic,  
Environmental &  
Social Impacts



Energy Efficiency  
in Industrial  
Processes



Energy Storage



Energy Systems  
Integration



Fuel Cells and  
Hydrogen



Geothermal



Hydropower



Nuclear Materials



Ocean Energy



Photovoltaic  
Solar Energy



Smart Cities



Smart Grids



Wind Energy



Shale Gas  
(discontinued)







# EERA JP HYDROPOWER

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9 September 2019



## OUR OBJECTIVE

The JP Hydropower aims to facilitate a new role for hydropower as enabler for the renewable energy system by aligning and targeting research efforts in Europe.



## JP Hydropower Members: 28 Institutions, 12 Countries

Institution	Country
Alpen-Adria Universität Klagenfurt	Austria
Austrian Institute of Technology	Austria
Belgian Energy Research Alliance (BERA) /ULB	Belgium
Brno University of Technology	Czech Republic
Ecologic	Germany
EFZN Energie-Forschungszentrum Niedersachsen / TU Braunschweig	Germany
EPFL - École polytechnique fédérale de Lausanne	Switzerland
ETH Zürich	Switzerland
HES-SO Valais/Wallis	Switzerland
Institute for Fluid-Flow Machinery, Gdansk	Poland
Luleå University of Technology	Sweden
NINA The Norwegian Institute for Nature Research	Norway
NTNU Norwegian University of Science and Technology	Norway

Institution	Country
Politecnico di Milano	Italy
Politehnica University Timisoara	Romania
Reykjavik University	Iceland
RWTH Aachen University	Germany
SINTEF Energy	Norway
TU Dresden	Germany
TU Graz	Austria
TU München	Germany
TU Wien	Austria
Technical University of Madrid	Spain
Università di Bologna	Italy
University of Padova	Italy
University of Stuttgart	Germany
Uppsala University	Sweden
Warsaw University of Technology	Poland

## ▶ Programme Structure

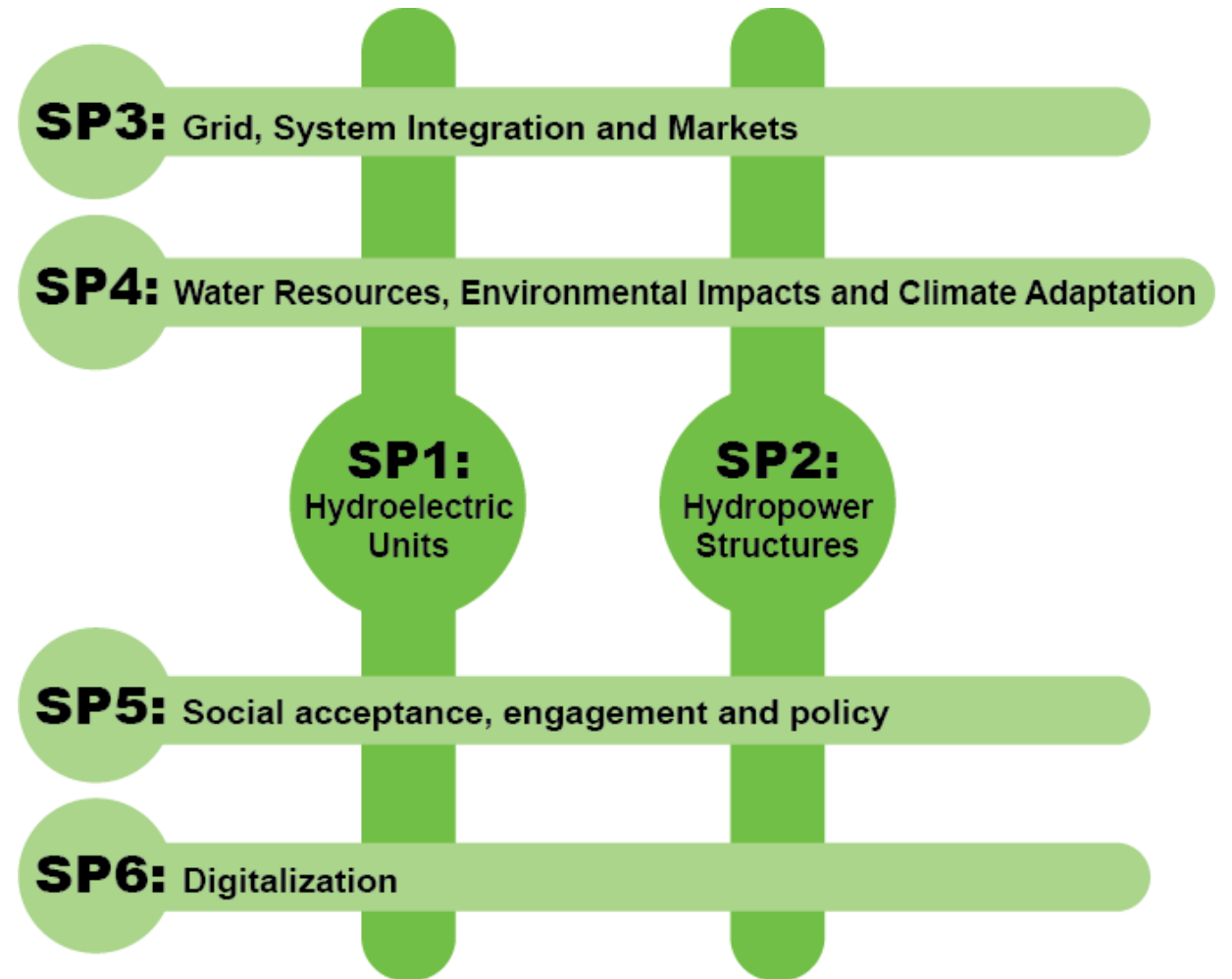
### 6 Sub Programmes (SP1-6)

#### ▶ Two technical SPs

- Hydroelectric Units
- Hydropower Structures

#### ▶ Four cross-cutting SP

- Grid, System Integration and Markets
- Water Resources, Environmental Impacts and Climate Adaptation
- Social Acceptance, Engagement and Policy
- Digitalization





## Strategic Research Agenda

- ▶ Published in Dec. 2019
- ▶ Identification of future priorities for European hydropower research
- ▶ <https://www.eera-set.eu/wp-content/uploads/EERA-JP-Hydropower-SRA.pdf>

### ▶ Strategic Research Agenda of the EERA Joint Programme Hydropower

▶ Thank you for your attention!

