HyFlow – The best of two worlds

hybrid | *sustainable* | *cost effective* | *highly flexible*

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Scientific Director | Project Coordinator HyFlow

University of Applied Sciences Landshut | Technology Centre Energy

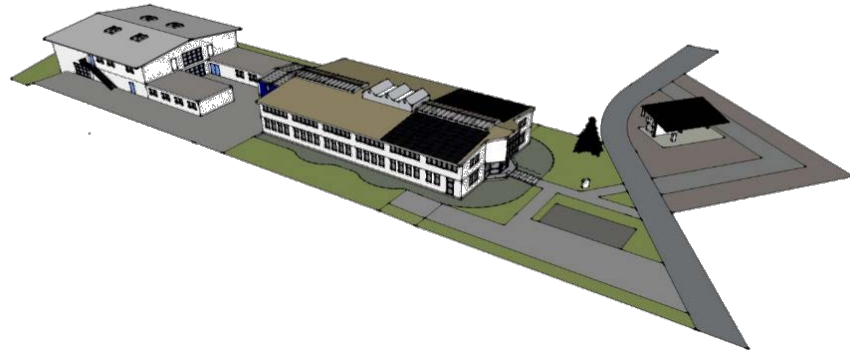
Technology Centre Energy – A research institution of the Landshut University of Applied Sciences

- **Facts:** CEO | Scientific Director | 6 professors | 20 staff members | 5 research assistants | 10 - 15 projects
- **Research Areas:**
  - Electrochemical storage
  - Chemical storage
- **Since 2017:** Platform for Future Storage Technologies – FSTORE
- **Relation to HyFlow:** Coordinator | WP Leader

- **HyFlow Team:**

Prof. Karl-Heinz Pettinger
HyFlow Project Coordinator

M.Eng Christina Zugschwert
HyFlow Project Manager



A short History of HyFlow…

FSTORE **project conference** in Krumau, 2019

Positiv Review from EC in July 2020!

FSTORE Platform for research and development

Proposal preparation

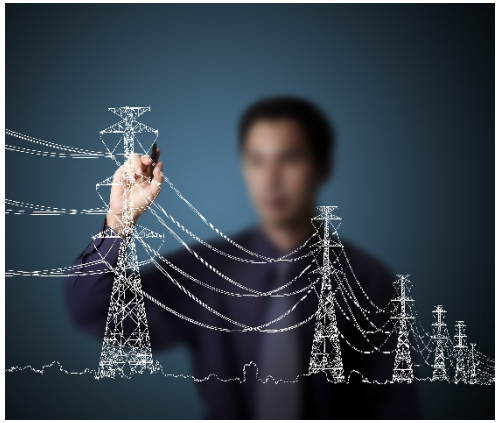
- ULA as CO
- Supervised by BayFor

Grant Agreement

HyFlow HYBRID ENERGY STORAGE SYSTEM

Project Motivation

- Main motivators – **Carbon neutrality** and **climate resilience**.
- **Affordable and clean energy** systems need efficiency improvements and a higher penetration of renewable energies.
- **Batteries and innovative solutions** for energy systems will play an outstanding role in the current and future energy supply.



HyFlow Vision

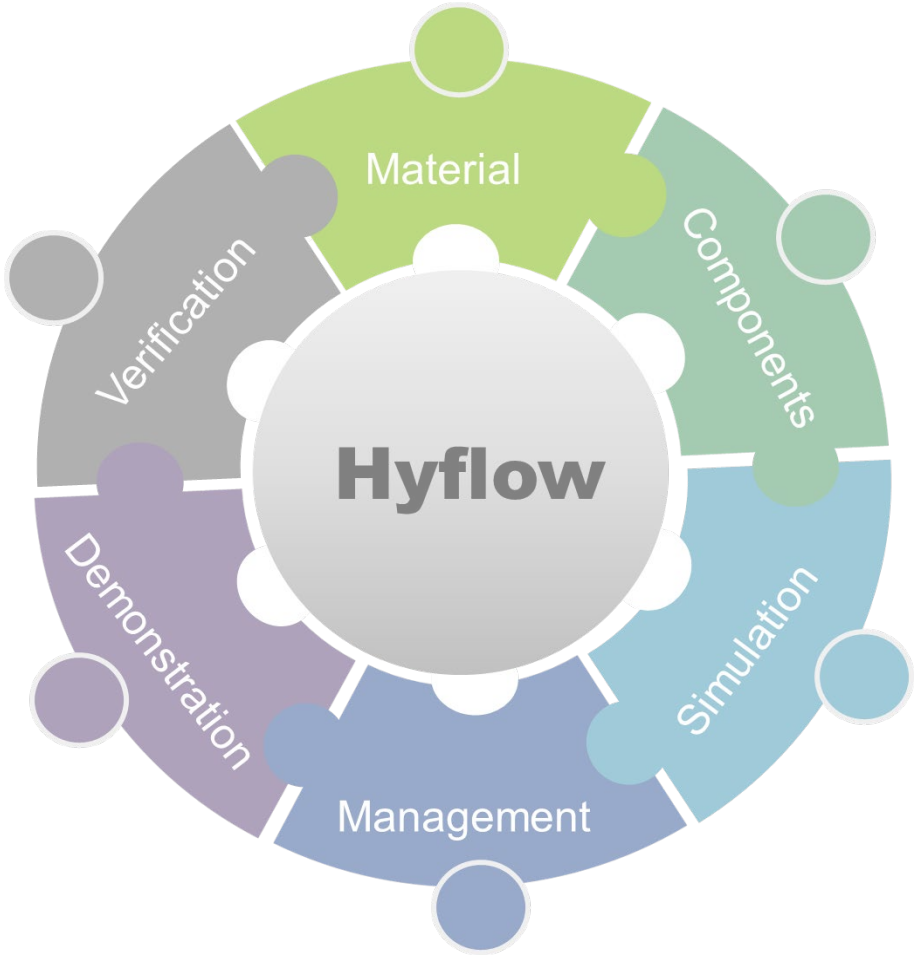
sustainable | cost effective | highly flexible

- HyFlow…
  - …creates a **modern** and **sustainable energy storage system** following the European Union goal to decrease the global environmental impact.
  - …focusses on technological and ecological **improvements** of the **components, their management systems and their interaction through the complete supply chain.**
  - …enhances components for **optimal hybridization**, by improved material utilization and cell design, and develop high-level control algorithms.
  - By bringing the best of both worlds – this solution can unlock different applications in the grid, **boosting the stability** while **decreasing** the **dependency on fossil fuels**.

HyFlow Key Facts

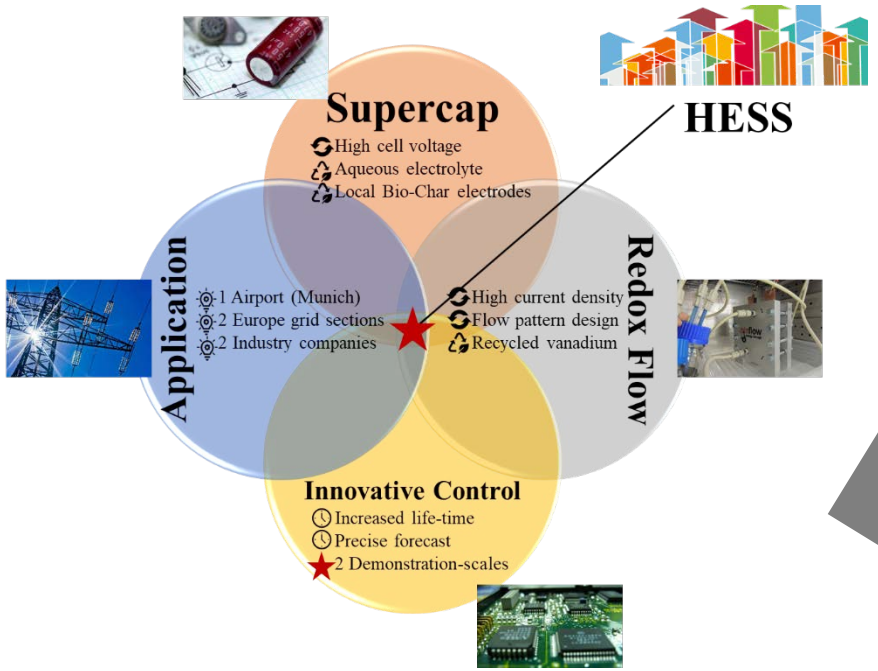
- Key Facts:
  - 11 Partner
  - 7 countries
  - Project duration: 36 month
  - Project start: 01.11.2020

- Highlights:
  - Operating along the entire component portfolio and supply chain.
  - Combining interdisciplinary knowledge and experience of eleven partners.
  - Supported by industrial partners



Project structure

Optimize Power and Energy by Hybridization



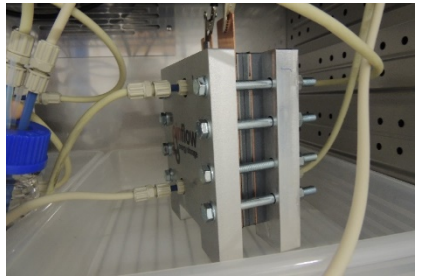
TRL4 → TRL6

Develop material and components	Modeling and management strategies	Verify HESS on demonstration-scale	Verify HESS on industry-scale
Fraunhofer ICT, pinflow energy storage, C2C-NewCap, Skoltech, Alma Mater Studiorum Università di Bologna, epic power	HS Landshut, TZ Energie, C2C-NewCap, Skoltech, pinflow energy storage, epic power	HS Landshut, C2C-NewCap, Skoltech, TZ Energie, e-Energie Institut an der Johannes Kepler Universität Linz, pinflow energy storage, epic power	HS Landshut, TZ Energie, Fraunhofer ICT, KIT Karlsruher Institut für Technologie, FREQCON

Supply chain

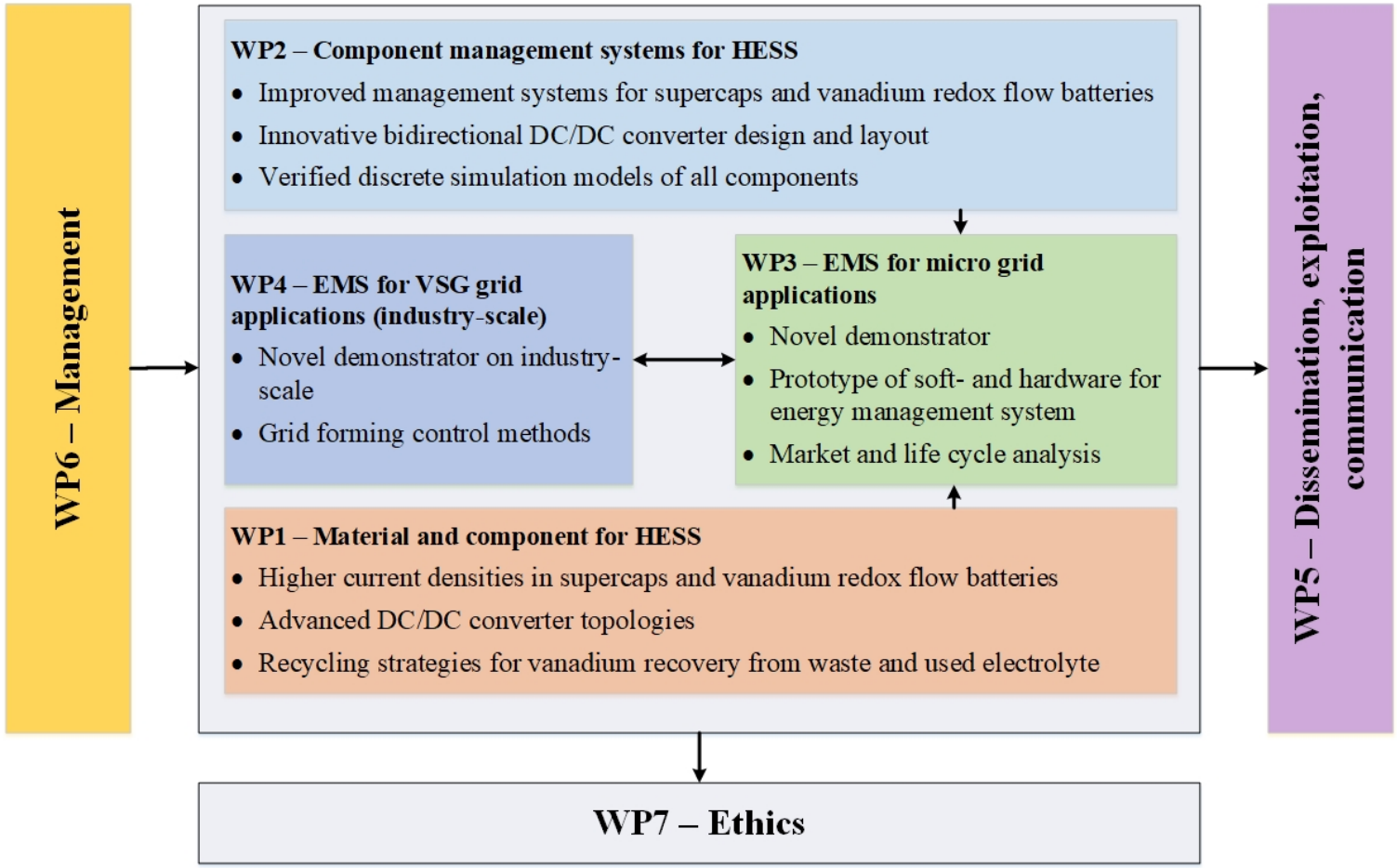
HyFlow Project Objectives

- **Objective 1:** Develop high-power vanadium redox flow batteries
- **Objective 2:** Develop green aqueous based supercapacitors with increased cell voltage
- **Objective 3:** Develop advanced component management systems for HESS
- **Objective 4:** Develop discrete and optimized simulation models for each of the HESS components
- **Objective 5:** Demonstrate of an adaptable EMS for at least four different application scenarios
- **Objective 6**: Improve ecologic sustainability of the HESS





Work Package Structure



Project Application – Key Factors for Success

- **Brilliant idea and scientific enthusiasm!**
- Establish a team leader and get professional support (Research Office HAW, BayFor).
- Clarify call specifications for proposal application (each key word has to be strictly addressed) and use templates to address all parts e.g. Impact of the project.
- Verify consortium and check if the supply chain is completed (include new partners if necessary).
- Establish scientific enthusiasm and collaborative thinking among the consortium.
- Conclude the proposal with a comprehensive management structure (e.g. Executive Board, Data Management Panel, Innovation Manager, Dissemination Manager, Advisory Board, etc.).
- University of Applied Sciences is able mange European proposals with professional support.

Thank you for your attention!

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