



## STORAGE RESEARCH INFRASTRUCTURE ECO-SYSTEM

### RI Information sheet 2022

DTU PowerLabDK (fka. EnSyAn)

Contact person 1:

Per Munch Jakobsen, [pmja@elektro.dtu.dk](mailto:pmja@elektro.dtu.dk)

Contact person 2:

Kai Heussen, [kh@elektro.dtu.dk](mailto:kh@elektro.dtu.dk)

Project Acronym	StoRIES
Call	H2020-LC-GD-2020
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Project Start Date	01-11-2021
Project End Date	31-10-2025
Duration	48 months

## 1. Photo



Picture 1. BES collaboration and testing services at SYSLAB facilities



Picture 2. VRB Storage at SYSLAB Facilities



Picture 3. Flexible Energy System integration at SYSLAB Facilities



Picture 4. Flexible District Heat integration at SYSLAB Facilities



Picture 5. Real Time Digital Simulation environment at PowerLabDK

## 2. Geographical coordinates (°, ′, ... N/S, E/W)

SYSLAB Power System Integration: 55.68762507293586N, 12.097647905559784E

SYSLAB Flow/Lithium/Super Cap BES: 55.69263202951748N, 12.097444057674636E

SYSLAB District Heat System: 55.6857426210059N, 12.101145506115147E

PowerLabDk Real Time Digital Simulator: 55.78386626822484N, 12.515788638979062E

## 3. Description of the research infrastructure for the webpage

DTU provides access to the [PowerLabDK](#) world-class experimental platform for electric power and energy. These facilities relate to energy storage and conversion technologies include several electro-chemical and thermal storage systems in labs, such as lithium-ion batteries, vanadium flow battery, super capacitors, and hot water tanks. A planned PtX test facility will be available in 2023.

The primary focus of this research infrastructure is related to grid-scale characterisation, power grid and energy system integration of energy supply, storage and demand flexibility technologies as well as related system control solutions.

To this end we offer:

- [SYSLAB](#) as a reconfigurable live electric distribution network (400V; 150kW backbone) with *flexible/extension bays* and emulated and >10 off-the-shelf DER, real loads and as well as power amplifiers and programmable loads and sources,
- Our RTDS [real-time simulator](#) and [power hardware in the loop facility](#) with 150kW 4 quadrant linear amplifier, and in the near future,
- SYSLAB's unique reconfigurable district heating network (from 2023) with 5 substations, centralised and distributed infeed, sector coupling and heat storage facilities,
- A new PtX test bay with on-site H<sub>2</sub> storage (from 2023)



SYSLAB can be coupled with a digital real-time simulator (RTDS) for live, simulated and hybrid/simulate electricity and heat distribution networks. This allows for energy storage (at systems/subsystem/device level) to be tested and developed in a live energy system environment wherein operation conditions of ES applications can be fully represented (such as variation of power supply, demand and grid frequency).

PowerLabDK also includes systems operated in living labs and commercial environments, such as the largest grid-connected battery in Denmark (1MW/1MWh) on Bornholm for providing electricity grid services to the power system, another grid-connected utility-scale battery in EnergyLabNordhavn, as well as a fleet of battery electric vehicles.

PowerLabDK facilities are supported by a digital platform providing any relevant data acquisition and management services, including long term time series from real-life operation. In addition, SYSLAB offers user control on all assets via a simple in-house Java or Python API.

#### 4. Availability of the research infrastructure

Some parts of the infrastructure (SYSLAB) are unavailable during Fall 2022 due to a major infrastructure upgrade.

5. Special considerations (confidentiality / NDA agreements, insurance requirement, special training, HSE training)

Safety introduction will be carried out on-site as part of the laboratory access.

6. Energy storage technology that can be analysed/studied by using the research infrastructure

- Electrochemical ☒
- Chemical ☒
- Thermal ☒ (heat network, heat storage)
- Mechanical ☒
- Superconducting Magnetic ☒
- Cross-cutting ☒ (Specifically: Power System Integration (~1kW-100kW) and characterisation; Power to Heat and Power to Gas facilities; heat network )
- Demand Response

7. Key words for the webpage

System Integration, power system integration, sector coupling, energy storage applications, hybrid power plants, hybrid energy systems, thermal networks, thermal storage, characterisation



8. TRL level (if applicable):

- 1-3
- 4-6
- Above

