PowerLab DK

1 Energy System Integration Lab
SYSLAB

Flexible intelligent laboratory for distributed energy resources

Research and testing of control concepts and strategies for power systems with distributed control and integrating a number of decentralized production and consumption components including wind turbines and PV-plant in a systems context.

▸ 400 V grid with flexible configuration; autonomous/isolated operation, public grid connection, and combinations hereof.

▸ Renewable energy units: Wind turbines, PV panels

▸ Back to Back Converter

▸ Controllable dump loads

▸ Vanadium battery for power storage

▸ Embedded computing power and flexible communication platform

▸ Interconnected with the PowerFlexHouse facility

▸ Grid connections and communication lines to the NEVIC; Nordic Electric Vehicle Interoperability Centre at DTU Risø Campus

Application and operation

Analysis, test and demonstration of:

▸ Power components and control systems

▸ Smart Grid communication platforms

▸ Interaction of combined energy systems

▸ Micro Grid systems

▸ Distributed Energy Resources and flexible consumption

▸ Advanced Smart Grid control concepts

▸ Renewable energy integration

▸ Battery aging

TEST AGAINST STANDARDS: PowerLabDK facilities are suitable for R&D related tests of electrical power components and systems against a wide range of relevant standards.

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PowerLabDK partners | **BORNHOLMS ENERGI & FORSYNING** | DTU **Technical University of Denmark**

PowerLab DK

2 Energy System Integration Lab SYSLAB

Infrastructure for measurements and data acquisition

Layout: Distributed energy sources and load are all connected in one distributed control and measurement system that enables a very flexible setup with respect to experimental configuration, grid connected operation, isolated operation, and operation in parallel with wind turbine or PV-plant.

Testing and characterization of measurement devices installed in the switchboards and signals from the battery control system. SYSLAB can be used as part of a Virtual Power Plant or otherwise accessed externally to be part of a large experiment.

Energy sources: 2 wind turbines (10 kW and 11 kW), 3 PV plants (10 kW, 10 kW and 7 kW), Diesel generator set (48 kW / 60 kVa).

Energy storage: 15 kW / 120 kWh vanadium redox flow battery.

Energy loads: Controllable loads (75 kW, 3 x 36 kW). Interconnected to the PowerFlexHouse facility with an intelligent office building, two domestic houses with controllable loads (10-20 kW). Interconnected to the Nordic Electric Vehicle Interoperability Centre (NEVIC).