— www.smagrinet.eu



Planning and Operation in Smart Grids

Module 3 - Introduction

24th November 2020 - Train the Trainers Workshop



Agenda

1. Module Introduction

2. Partnering Universities

- 1. University of Ljubljana
- 2. Technische Universität Berlin

3. Learning Outcomes

4. Module Significance



Module Introduction



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Module Introduction Motivation

Old World:



"supply follows demand"



New World:



"demand follows supply"

Source: Pixabay, https://pixabay.com/



Module Introduction Lecture Topics





Partnering Universities



University of Ljubljana Introduction

Laboratory of Electricity Networks and Devices

- SMAGRINET responsible: Prof. Dr. Boštjan Blažič
- Research focus: analysis of electrical networks, power quality and high voltage engineering
- One of the founders of the *Centre for Distributed Energy Sources*
- Participation in national and international projects
- Educating students 12 different modules





University of Ljubljana Research Interest

- Smart grids:
 - Operation with high penetration of distributed generation
 - Electrical vehicles and flexible loads
- Compensation devices: passive and active devices
- Power quality: sources, propagation and mitigation of disturbances
- Reliability of power systems and power plants
- Modelling and analysis of power system operation as well as devices and control of power converters



University of Ljubljana Selected Projects

INCIT-EV

- Large demonstratIoN user CentrIc urban and long-range charging solutions to boosT an engaging deployment of Electric Vehicles in Europe
- Objective: demonstrate innovative solutions for charging infrastructure and explore the behaviour of EV users
- Approach: five demonstration areas in urban and suburban environment to test seven applications
- Consortium: 33 partners from eight countries





University of Ljubljana Selected Projects

ONE NET

- Objective: new generation of grid services able to fully exploit demand response, storage and distributed generation with fair and transparent conditions for the consumer
- Contribution: investigation of new flexible services
- Consortium: 72 partners from
 - 22 countries





University of Ljubljana Lectures and Content



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University of Ljubljana Lectures and Content





Technische Universität Berlin Introduction

Department of Sustainable Electric Networks and Sources of Energy

- SMAGRINET responsible: Prof. Dr. Kai Strunz
- Research focus: modelling of future-oriented energy concepts
- Smart Grid Lab including HiL real-time simulator and battery test ring
- Participation in national and international projects
- Educating students 8 different modules





Technische Universität Berlin Research Interests





Smart Grid Alliance Adlershof





Supported by:



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SIEMENS





Smart Grid Alliance Adlershof











Optimization of Integrated Operation of Grids





OptNetzE

Gefördert durch:

Bundesministerium für Wirtschaft und Energie

aufgrund eines Beschlusses des Deutschen Bundestages



Optimization of Integrated Operation of Grids



h-t













Associated Partners:







Technische Universität Berlin Lectures and Content



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Technische Universität Berlin Lectures and Content





Learning Outcomes



Learning Outcomes

After successful completion of the course, students should be able to...

- ...describe the distribution network structure and control.
- ...know the fundamentals about generation and planning of renewable energies.
- ...describe the distribution network structure and perform three-phase-power-flow analysis.
- ...explain the approach to modelling of distribution network elements.
- ...develop a distribution network model.
- ...know different demand characteristics and define the terms consumer and prosumer.



Learning Outcomes

After successful completion of the course, students should be able to...

- ...evaluate the impact of energy storage possibilities and multi-energy smart grids.
- ...evaluate the impact of electric vehicles on distribution network operation.
- ...evaluate the impact of renewable sources on distribution network operation.
- ...evaluate the impact of virtual power plants, in particular the day-ahead and intraday operation.
- ...use modern distribution-network control approaches.



Module Significance



Module Significance

- State of the art topics on smart grid
- Modern media: computers, app, video conferences, CAD
- International compatibility: ECTS points, language English
- Integrated Structure: lectures, assignments in class and at home, projects
- Soft skill training: team orientation and cooperation, presentation in oral and in writing, project-orientation with scheduling



Thank you for your attention!

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