

Renewable Energies courses in the (Smart) Grid

Belmet 97 d.o.o. Ivan Ostojić ivan.ostojic@belmet97.hr





000000



1. Introduction

• The move away from coal, oil and nuclear power to renewable forms of energy is gaining momentum. Today, technology has evolved to a point where solar energy and wind power can be exploited as environmentally friendly energy sources

2. Description of the courses

Photovoltaics training content [1]:

- Installation of photovoltaic systems with feed to the power grid
- Measurement of energy generated by photovoltaic systems
- Maximum Power Point (MPP) Tracking
- Limiting the power of the photovoltaic inverter (derating)
- Provision of reactive power
- Determining the efficiency of the power grid inverter

Photovoltaics training objectives:

- Recording of module response over days and years
- Testing optimum alignment of solar modules (to increase energy output)
- Recording characteristics of solar modules

Wind power plants training content [2]:

• Understand the design and operation of wind power stations

3. Smart learning platform

• Interactive Lab Assistant wit practical training systems, allows hands on training, installation and fault finding



Figure 3. Learning methodology

- Explore the physical fundamentals "from wind to wave"
- Operation with fluctuation wind force in off-line operation
- Energy storage, optimisation of the system
- Design of an off-grid system for the generation of AC voltage

Wind power plants training objectives:

- Operate the generator with varying wind force levels
- Determine optimum operating points under changing wind conditions
- Investigate the operating response during mains malfunctions "Fault ride through"
- Generation of a wind profile to analyze the smart grid

SST 2017 Industry Poster Session

4. Conclusion

• Due to the future global energy changes and demands, the only way forward is to use such training systems which prepare students for the challenges in the future with integrated renewable energies in a smart grid

References

 Lucas Nülle "EPH 3 Professional Photovoltaics Trainer PV", www.lucasnuelle.com/316/apg/6965/EPH-3-Professional-Photovoltaics-Trainer-PV-.htm
Lucas Nülle "EWG 2 Small wind power plant trainer", www.lucas-nuelle.com/ 316/apg/1232/EWG-2-Small-wind-power-plant-trainer.htm

Osijek, Croatia October 19, 2017