3DMicroGrid

DESIGN, DEVELOPMENT AND DEMONSTRATION OF A SMART MICRO GRID

Workshop: Design of Smart Microgrids
8th November 2017

Escuela Técnica Superior de Ingeniería (ETSI), Universidad de Sevilla
Camino de los Descubrimientos s/n
41092 Sevilla, Spain

Contact Points:

Prof. Jose L. Martinez-Ramos
E: jl.martinez.ramos@gmail.com
T: +34 954481275

Dr. Alejandro Marano
E: alejandromm@us.es
T: +34 954481281

Timing	Topic
08:45	Gathering
08:45 - 09:00	Welcome and Workshop arrangements
9:00 - 9:30	**Presentation of the ERANET-MED Project** **"3DMicroGrid: Design, Development and Demonstration of a Smart Microgrid"** **Dr. Salem Al-Agtash, Project Coordinator**
9:30 - 10:30	**Lecture 1. Smart Grids and Storage: keys to a decarbonized future** **Antonio Gomez-Exposito, Fellow IEEE, Universidad de Sevilla (UoS)**
10:30 - 11:00	**Coffee break**
11:00 - 14:00	**Lecture 2. Microgrid Stability Analysis and Modeling** **Rodrigo Palma-Behnke, IEEE SM, SERC-Chile, Universidad de Chile**
14:00 - 15:00	**Launch Break**
15:00 - 16:00	**Lecture 3. Power Conversion Systems for Microgrids** **Pedro Rodriguez-Cortes, Fellow IEEE, Universidad Loyola Andalucía**
16:00 – 16:30	**Coffee break**
16:30 – 17:30	**Lecture 4. Lessons learnt from real-world operating microgrids** **Eckehard Tröster, Energynautics, Germany**
17:30 – 18:30	**Visit to UoS Power Group Research Lab**
18:30	**End of Workshop**

The 3DMicroGrid Project

PROJECT ID: ERANETMED_ENERG-11-286

TITLE: Design, Development and Demonstration of a future-proof active smart Micro-grid system

PERIOD: 3 years - start date 1 September 2016

TOTAL BUDGET: 910,521 €

The project will facilitate the design, development and demonstration of a future-proof active smart micro-grid system to integrate and optimise multiple small to medium sized energy sources and loads. The overarching objective is to capitalise on the availability of local and large renewable energy resources and adapting them for solutions to sustainability in terms of electric power demand and supply.

A demo smart micro-grid system will be built integrating all energy components, in an effort to (i) maximise renewable energy utilisation, (ii) reduce the carbon footprint by minimising consumption, (iii) improve the power quality while ensuring economic feasibility, and (iv) replicate similar setups to institutions and commercial and rural sites. 3D-Mgrid shall undertake a detailed campus assessment of existing energy scenarios, including: energy consumption; diesel consumption and generation efficiency; loads and their classification; consumption patterns such as human presence and behaviour; power quality with respect to grid power, switching between various distributed power sources, and techno-commercial assessment. 3D-Mgrid will also assess other studies related to the establishment and justification of a smart micro-grid while utilising various equipment, sensors, meters, hardware, and software for measuring, monitoring and analysing the required data to undertake the study.

Different power saving strategies will be envisaged, including load/demand forecasting; renewable energy generation forecasting, integration with weather sensors; utility grid's power outage pattern identification; prioritizing loads and exercising the option of demand response; identifying the appropriate distributed generator to turn on; and exercising the option of storage technology utilization of appropriate size.

German Jordanian University (GJU) [JORDAN]
Malta College of Arts, Science and Technology (MCAST) [MALTA]
University of Seville, Power Engineering Group (UoS) [SPAIN]
SCAMRE LABORATORY / ENPOran [ALGERIA]
Power System Group, Abdullah Gul University (AGU) [TURKEY]
Energynautics (EN) [GERMANY]
Centre for Research and Technology Hellas
InformationTechnologies Institute (CERTH/ITI) [GREECE]
KIOS Research Center for Intelligent Systems and Networks,
University of Cyprus (UCY) [CYPRUS]
Electronic Systems Design Ltd (ESDL) [MALTA]
GEOSYS [MALTA]

Salem Al-Agtash got his Ph.D. in Electrical Engineering from the University of Colorado at Boulder in 1998. He served as a department chair and a dean at the German-Jordanian University. Dr. Al-Agtash is currently a professor of computer engineering and a senior advisor on ICT and Technology. He has worked on several research and international development projects, mainly with the World bank, European Commission, JIKA, and USAID. He has been very active in developing relevant and quality ICT educational programs, strengthening tri-partite links between university, private sector and government, and building international cooperation in education. His research interests are in the areas of electricity industry, agent based systems, software engineering, and education management.

Antonio Gomez-Exposito is the "Endesa Chair" Professor at the Department of Electrical Engineering, University of Seville, Spain, which he chaired for twelve years. He has coauthored almost 300 publications, including over one hundred papers in high impact journals and a dozen textbooks and monographs about Circuit Theory and Power System Analysis. He is a Fellow of the IEEE and an editor of several journals, including IEEE Transactions on Power Systems. Among the several professional recognitions recently received, the following two stand out: Golden Insignia granted by the Spanish Association for the Development of Electrical Engineering (2013) and Research and Technology Transfer Award, granted by the Government of Andalusia (2011).

Rodrigo Palma-Behnke (Senior Member, IEEE) was born in Antofagasta, Chile. He received his undergraduate and master's degrees in electrical engineering for the Catholic University of Chile, and his doctorate from the University of Dortmund, Germany. He is an associate professor for the Department of Electrical Engineering at the University of Chile. His research interests include operation and planning for electrical systems in competitive energy markets, new technologies, micro-networks, and energy systems education. He is the Director for the Energy Center at SERC Chile.

Pedro Rodríguez received the M.Sc. and Ph.D. degrees in electrical engineering from the Technical University of Catalonia (UPC), Spain. He was a Postdoctoral Researcher at the Center for Power Electronics Systems (CPES), Virginia Tech, Blacksburg, and at the Department of Energy Technology, Aalborg University (AAU). He joined the faculty of UPC as an Assistant Professor in early 90s, where he became the Director of the research center on Renewable Electrical Energy Systems (SEER). He is currently professor in the Loyola University, and has been until recently the Director of Technology in Modern Power Systems in Abengoa. His research interests include integration of distributed generation systems, smart grids, and design and control of power converters. Dr. Rodriguez is a Fellow Member of the IEEE, a member of the administrate committee of the IEEE Industrial Electronics Society (IES), the general chair of IEEE-IES Gold and Student Activities, the vice-chair of the Sustainability and Renewable Energy Committee of the IEEE Industry Application Society and a member of the IEEE-IES Technical Committee on Renewable Energy Systems. He is an Associate Editor of the IEEE Transaction on Power Electronics.

Eckehard Tröster is a power system expert with 15 years of experience in technical design, modeling and operations analysis. He is a well-recognized figure within the European power industry and has experience in teaching courses in renewable energy, grid integration and energy efficiency. Dr. Tröster has been involved in projects commissioned by governmental institutions, NGOs, regulation authorities, transmission and distribution grid operators, and manufacturers of decentralized generation units. He has been working for customers all over Europe (Germany, Denmark, UK, The Netherlands, France, Belgium, Austria, and Switzerland) but also gained experience working in the United States, India and Jordan. He is specialized on grid integration of renewable and decentralized generation units, smart grids, flexibility options, grid operation and energy efficiency.