

SESSION 1.2 - ELECTRICITY FROM RENEWABLE ENERGY

Invited speech - SMART SOLUTIONS FOR BALANCING POWER GRID WITH HIGH PENETRATION OF RENEWABLES

The widespread availability of renewable energy sources is the main pathway towards decarbonization but it is well known how partial unpredictability, uncontrollability and territoriality of renewables make the power grid more and more unstable and unreliable: voltage and frequency fluctuations occur whenever the energy demand is not balanced by energy supply because of unpredicted injection of power into the grid as well as passive power lines that become active and generate power reverse flows through substations towards higher voltage lines. New technologies must be developed and deployed to mitigate the negative effects of renewables on the grid and innovative IT solutions can support this transition by making the grid smarter and smarter. Engineering I.I. S.p.A. is a big Italian IT company, founded 38 years ago, that gets more than one forth of its revenues from the Energy and Utilities domain. Thanks to huge investments in research and development activities (30 million in 2017), Engineering is actually participating to more than 60 research co-funded initiatives, mainly H2020 research projects. A significant number of these projects are focused on the design and development of innovative IT solutions for the power grid, the energy producers and the consumers. In the role of key technology provider, Engineering has taken part of more than 15 research projects concerning the collaboration between power grid and flexible prosumers and this allows the company to offer reliable solutions to big customers like TERNA, ENEL, IREN and many other players in the energy domain. The speech will be a bird's eye view of some of the "smart energy projects" that are currently ongoing in the Engineering Research and Development Laboratory.



Diego Arnone (M) got his Master Degree in Electronics Engineering at the "Università degli Studi di Palermo". His research interest mainly concerns energy efficiency, energy consumption awareness, energy management systems. He has been working as deputy coordinator in FP7 projects like INGRID (High-capacity hydrogen-based green-energy storage solutions for grid balancing) and GEYSER (Green networked Data Centres as Energy Prosumers in smart city environments). He is currently the Scientific Coordinator of the Italian project DEMAND (DistributEd MANagement logics and Devices for electricity savings in active users installations), and project manager/work package leader in many H2020 projects: InteGRIDy (integrated Smart GRID Cross-Functional Solutions for Optimized Synergetic Energy Distribution, Utilization Storage Technologies), HYBUILD (Innovative compact HYbrid electrical/thermal storage systems for low energy BUILDings), STORE&GO (Innovative large-scale energy STOragE technologies AND Power-to-Gas concepts after Optimisation), GREENERNET (Advanced Flow Battery Energy Storage Systems in a Microgrid Network), OSMOSE (Optimal System-Mix Of flexibility Solutions for European electricity), in MAGNITUDE (Bringing flexibility provided by multi energy carrier integration to a new MAGNITUDE). He is deputy coordinator and technical manager in CATALYST (Converting DCs in Energy Flexibility Ecosystems). He has recently been chairman of the Special Session "Energy prosumers flexibility for future smart Grids" for the IEEE 18th International Conference on Environment and Electrical Engineering (EEEIC 2018). He has been serving the European Commission as Scientific Expert in the evaluation of proposals.

(Engineering I.I. S.p.A. – Italy)