

The Energy Web: concepts and challenges to overcome to make large scale Renewable and Distributed Energy Resources a true reality

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Keywords: Energy Web, power ecosystem, real-time metering, real-time pricing, price-smart power node, smart energy, wireless sensor network, smart micro-grid, large scale simulation, resilient control.

Abstract

In this talk I present the so called Energy Web concepts and discuss its related technical challenges to overcome in order to make large scale renewable and distributed energy resources a true reality. Energy Web can be defined as a Power Ecosystem in which, Information and Communication Technology (ICT), pulled up by the Web and the Digital world, is going to revolutionize power markets, power distribution infrastructure and power on demand. The acceleration of ICT development and penetration in household smart electric devices will provide enabling technology for making power on demand paradigm a reality. It will also catalyze more power efficiency applications. The road that leads to such Power Ecosystem is not very far but it has some technical barriers and challenges: a real-time metering standard and infrastructure, a real-time electricity pricing infrastructure, standardized Distributed Energy Resources (DER) control and communication interface to the Energy Web network, price-smart responsive and adaptive power network nodes, "DER ready" power distribution network, resilient control strategy of system of systems. Facing such challenges, new scientific foundation and engineering methodology need to be developed to support the design, the simulation and the verification of expected resilient properties of the Energy Web infrastructure.