

**NA PUTU OD SKORAŠNJIH PROBA I DEMONSTRATORA ‘PAMETNIH MREŽA’ DO POTPUNO
PREGLEDNIH DISTRIBUTIVNIH MREŽA BUDUCNOSTI LAKIH ZA KONTROLISANJE**

**FROM RECENT ‘SMART GRID’ TRIALS AND DEMONSTRATORS TO FULLY OBSERVABLE AND
CONTROLLABLE DISTRIBUTION NETWORKS OF THE FUTURE**

Jovica Milanović, School of Electrical and Electronic Engineering, The University of Manchester, UK

ABSTRACT

The future power systems will be characterised above all by blurred boundaries between and higher flexibility of both transmission and distribution system, by mix of wide range of electricity generating technologies, responsive and highly flexible, typically power electronics interfaced, demand and storage with significant temporal and spatial uncertainty, proliferation of power electronics and significantly higher reliance on monitoring and the use of measurement data either from intelligent metering devices (“Smart Meters”) installed at customer premises or from global (Wide Area Monitoring) signals for system identification, characterization and control and Information and Communication Technology (ICT) embedded within the power system network and its components. At the distribution network level, in particular, there are new types and different operational patterns of load with typically greater flexibility connected at customer premises including heat pumps, PE interfaced loads, efficient lighting as well as growing use of Electric Vehicles (EV) characterised by spatial and temporal uncertainty. The flexibility of these loads as well as that of smaller size dispersed energy storage technologies, will be more and more called upon to enhance overall flexibility of operation not only of the distribution network but also of the hosting transmission network. The requirement for cost effective and efficient energy supply drives increased consideration of different energy carriers while integration of wide range of diverse integrated “intelligent” PE devices and integrated ICT put an emphasis on information security (Cyber security). All these trends have been recognized by utilities, national and international industry, regulatory bodies and governments and a number of industrial trials and demonstrators have been initiated over past several years around the world to demonstrate the impact and opportunities arising from application and deployment of some of them. This talk first gives a brief overview of some of the major industrial trials and demonstrators of general concept and components of “Smart Grid” in the UK and Europe and then discusses the latest trends and advances in distribution network observability (monitoring, state estimation, demand profiling) and controllability (advanced demand side management).

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