**CONSUMPTION MANAGEMENT IN THE ELECTRICITY DISTRIBUTION SYSTEM WITH A PHOTOVOLTAIC POWER PLANT USING SMART SOLUTIONS MEASURMENTS**

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In the last few decades, considerable resources have been invested in the rapid development of renewable energy sources and distributed generation in general in the European Union and worldwide. At the same time, power consumption is continuously increasing and loads are becoming more complex which ultimately requires new investments in the distribution network generally accepting the concept of Smart Grids as a solution. A smart grid is a concept containing many elements where monitoring and control of every element in the chain of production, transmission, distribution and final consumption enable much more efficient delivery and the electricity usage. One of the elements of the smart grid efficiency is the ability of real-time demand and supply balancing. This balancing is carried out by consumption monitoring and redistribution of electricity among individual end users according to their needs.

The project aims at modelling and testing capabilities of real-time balancing using smart metering solutions. The model for real-time balancing consumption at the Faculty of Electrical Engineering Osijek is performed by using the smart measurements of photovoltaic power plants production with 10 kWp (renewable source) and measuring the air conditioning devices consumption (final consumption devices). The expected result regarding real-time air conditioners consumption, depending on the level of electricity production in the photovoltaic power plant, is to decrease the peak-to-peak value of the air conditioning devices. Upon the completion of the measurements, the results will be used to simulate and analyze the demand redispatching influence on Osijek local distribution network. The impact of balancing the production and consumption in real-time using the concept of smart grids on the local distribution system will be analyzed by the software EasyPower. The expected result is to optimize the peak value consumption in the analyzed area and to analyze the photovoltaic power plants integration in the electricity distribution system.