The developed model was tested in the case of prospective WF, to be connected to the 35 kV distribution line SS Zrenjanin 1 – Perlez. On the basis of available annual measured data on wind speed and consumption data, the testing is performed of models, in the way of voltage control and the effects on power losses.
The paper written by Milena Milinkovic and Zeljko Milinkovic, Faculty of Electrical Engineering, University of Belgrade, and Rastko Kostic, from the Nikola Tesla Institute for Electrical Engineering, presents two major debates on consumption and generation diagrams of small power plants, namely: the impact on power losses of and influence on the voltage at the connection point. The impact of small power plants on power losses in the distribution network is usually positive, while the voltage fluctuations has negative effect of small power plant operation. This paper proposes a concept of combined and coordinated voltages control, which involves the installation of FACTS devices on distribution feeders, where small power plants are connected, and reactive power regulation of small power plants. Coordinated control provides optimal reactive power flows on the radial feeder, on which the losses are minimal, and the voltage at the small power plant connection is optimal.
The paper presents the conceptual solution of the system for the coordinated voltages control at the distribution feeder on which SPP is connected. The proposed system requires the installation of FACTS device, type SSSC. Coordinated voltage control on the connections of SSSC devices and reactive power injected by the SPP, can control the voltage at connection point of SPP, while minimizing the losses of the connection line. In this paper, a mathematical model is developed, that implements optimal coordination control of SSSC device and reactive power of generating SPP. The developed model was tested in the case of prospective WF, to be connected to the 35 kV distribution line SS Zrenjanin 1 – Perlez. On the basis of available annual measured data on wind speed and consumption data, the testing is performed of models, in the way of voltage control and the effects on power losses. It is shown that the proposed system can operate very efficiently in voltage control of SPP connection point, with a significant losses reduction. In the analyzed example, loss reduction was 47.7 %, or 4430 MWh per year, which save more than 220 000 EUR per year. This example illustrates that the installation of SSSC device and application of the proposed concept of a coordinated voltage control is very cost-effective and enables: a significant losses reduction in distribution network, voltage conditions improvement, and a greater integration level of renewable energy sources into the distribution system, transmits Serbia-energy.eu