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IDENTIFICATION OF THE PROBLEMS BY CONNECTION OF DISPERSED ENERGY RESOURCES ON THE NETWORK

ABSTRACT

Due to the rapid development of the technologies of the decentralised (dispersed) energy resources (DER) and the political support of the countries in the EU their implementation of the power system becomes more and more evident. This development and implementation of the technologies for the future energy supply in Germany since the release the new law for DER in 1995 is also governmentally supported. For example: it has been achieved that the installed wind power (onshore and offshore type) reaches the value of 13 GW. Due to that Germany became world leading country in this technology. Also the program „100 000 roofs for photovoltaics“ is acknowledged as successful and the Fuel Cell and Photovoltaics technology are seen as a big hope and opportunity for the future energy generation.

The Chair Electric Power Networks and Renewable Energy Sources (LENA) on the Otto-von-Guericke University Magdeburg, offers lectures, exercise and practise courses in the area of dispersed energy resources (DER) as well as in the area of digital protection. The LENA is also involved in a few projects in this area. The possibility of the implementation of the game theory in the network planning enables the economical part of the calculation synchronous to be taken into consideration with the goal of the best network planning solution.

With the implementation of DER on the power network, the electro energy system (EES) becomes a completely different structure. The traditional hierarchy centralised powerflow from the big power plants to the energy consumer changes into a decentralised changeable (according to the ratio of energy demand - offer) powerflow to the/ between the energy customers. The changed EES structure is affecting the installed power system protection. The implementation of DER through power electronic elements on the power system characterises itself with higher amount of injected harmonics that also may affect the protection technique. New concepts for protection systems in sense of selectivity, effectivity and promptness are needed.

In this paper a theoretical analyses of these problems and solutions to them are going to be presented on a few examples. It will be shown that the today criteria do not satisfy the needed requirements of the digital protection. The network is protected with differential, overcurrent and distance protection.

Keywords: Dispersed energy resources, digital protection.