Methods for The Integration of Variabel Renewable Energy into Unit Commitment Scheme in Microgrid System

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Abstract

Renewable energy (RE) sources, such as solar PV and wind power, are becoming important contributors to power systems. With the latest RE technology, many RE power plants were built and operated in many power systems, including microgrid systems on the island. In the operation of microgrid electrical systems, the main points to be considered are the adequacy of power, the reliability of power supplies, and operating costs, and they must be cordially managed and optimal. The unit commitment (UC) method is one of the techniques that can be used to regulate power supply in microgrid systems. UC method may be defined as the determination of generating units to be committed, during each interval of a short-term scheduling period: hours, a day or a week. In preparing the priority list schedule of the generating units in microgrid system, data of supply capability and operating cost of each generating units are required. Because RE power plant output is both variable and uncertain, there are concerns about how its inclusion in system operations that using UC scheme.

This paper discusses methods for the inclusion of RE power generation, which has characteristics of variable and uncertainty of supply, into the UC scheme with the objective to fulfil adequate power and energy supply in the microgrid. The methods used are accurate forecasts of energy source availability, in daily ahead, an hour ahead and real-time stage scheduling, and also optimal operating reserve setup. Efforts to better ensure the power and energy supply of intermittent RE generation are proven to be more secure with more accurate energy source forecasting methods and accurate implementation in a detailed time frame. However, the ability of the system to be more flexible plays a very important role in the provision of the optimal operating reserve. This method is an enrichment of the method of forecasting the availability of RE with reinforced using the artificial neural network for solar and wind energy.

note: **This document will be opened to the participants on IERE website before the Workshop and opened to the public afterward.**