

Abstract

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The Implementation of the Automatic Dispatching System (ADS) as the Smart Grid Control System for to Maintain Power Stability in Sumba Island

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Abstract

To minimize the diesel fuel consumption, in the power generation, PLN has promoted a de-dieselization program which either integrated PV and existing diesel into Hybrid or install PV in the isolated system, to get optimum performance and reliability. However, the intermittent characteristic of PV should be considered since this would impact the frequency instability of the network system itself. To maintain the stability of the system, new system operations should be adopted. Meanwhile, PLN has initiated a pilot project of smart grid by implementing ADS (Automatic Dispatching System) which were installed in the generation to compensate the fluctuation sources from PV. Before ADS was implemented, dispatch combination between Diesel Generator (DG), and Photovoltaic (PV) has triggered unreliable supply since there is no load control center as well as the insufficient communication channel available.

Based on the load profile in East Sumba, when peak-load reached 6.8 MW, the daytime load fluctuated between 3.7 MW to 4.8 MW. Thus, the power plant configuration consisted of 11 MW of DG and 1 MWp PV. Having ADS installed over the grid, it would be capable of interconnecting between east grid and west grid. Integrating them in the ADS system for automatic and sequential dispatching of the generators according to grid load behavior, it would not only guarantee the power quality and grid stability, but also will support the load reduction from the Solar PV. Hence, this allows PLN to minimize fuel consumption and develop the first operational Smart Grid system. Subsequently, ADS has proven capable of maintaining frequency stability in the system that contains intermittent power generation. Based on the simulation study, and actual measurement testing, it can maintain the stability frequency within in its normal range ($49,5 < \text{Hz} < 50,5$).