Antananarivo microgrid operation

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proposing an effective day-ahead scheduling for three-interconnected multi-MGs based on a cutting-edge meta-heuristic technique, OOBO, with the goal of minimizing daily operating costs by calculating the optimal set points of the different energy sources. The optimal set-points for diesel generators and MGT are obtained using the Lagrange multiplier approach.

MG"s operating considerations vary depending on the mode of operation. The most effective system operation strategies prioritize cost-effectiveness, dependability, and low emissions. The optimal dispatch challenge of DG units in MGs is to minimize generation costs and reduce environmental pollution. An MG"s generation expenses include fuel, emissions, operation, maintenance, and purchasing/selling costs. To assess the cost of MG generation, the proposed methodology took into account the power production of renewable energy DGs and the fuel cost of non-renewable energy DGs24,25.

The PV array consists of numerous PV modules connected in parallel and series. This turns the incident solar irradiance into photovoltaic current. The extracted power from PV module is illustrated in the following equation25:

A fuel cell is an electrochemical device that uses chemical energy to produce electrical energy. Fuel cells are very efficient and emit no hazardous gases, making them a possible alternative source to conventional combustion engines. The fuel used in this system is hydrogen with cost can be expressed by the following equation25:

The planned EMS operates on a day-ahead basis, with the goal of meeting the required load demand at the lowest possible operational cost based on 24-hour prediction data. Day-ahead scheduling can be achieved through two phases, the first phase is day-ahead unit commitment, and second phase is day-ahead load management.

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Web: https://sumthingtasty.co.za/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346