Microgrid development solomon islands

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Traditionally, the main supply of electrical energy in the remote small island is imported diesel fuel. The expensive costs of transportation, fuel and operation cause significant financial costs for most utilities. It is evident that a partial replacement of renewable energy on such an island reduces expenses. As the attractive renewable energy is gradually developed and may become the major energy in the island, microgrid technology must be considered to maximize the utilization of renewable energy and maintain power quality.

From an economic analysis, microgrids integrated with renewable energy, energy storage, and information communication technology efficiently achieves fossil fuel energy reductions and peak shaving, as well as reduced numbers of fossil fuel-fired generation units. The budget and ROI (return on investment) on a microgrid on a small island are practically considered and evaluated to decide the preliminary investment, including the installed capacity. The affordable solutions can be divided into only installation of renewable energy without any control, integration of renewable energy and diesel generation, integration of renewable energy and energy storage, and the coordination of renewable energy, energy storage and diesel generation.

Politically, energy independence is highly intertwined with security. One-hundred percent renewable energy is an aggressive long-term goal of energy and environmental policies. In the short term, replacement of fossil-fuel energy with renewables is a sustainable development.

The impact of increasing renewable energy penetration on the power system is a technical challenge, especially for a small island. Renewable energy, diesel generators, energy storage and load consumption are coordinated to maximize fossil fuel savings and operate more efficiently.

Itu Aba Island, also known as Taiping Island, is located 1,900 kilometers southwest of Taipei, Taiwan. It is powered by three 400-kW diesel generators, 160 kW PV, and 612 kWh energy storage. Installing monitoring and control of the diesel generators is not available because it is costly and time-consuming. Itu Aba Island is suitable for the existing diesel generator system with a passive energy storage system that has an important role in maintaining a stable power system.

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