Planning of Installation and Demand Side Management of a Pico Hydro Power Plant in a Rural Area

Small Hydro-power installation in a rural community paves the way to economic development and positive environmental impact of the area. Kuromori Pico Hydro Power Plant (PHPP), a demo-project of 1st Center of Excellence (COE) program of Tokyo University of Agriculture and Technology (TUAT), is capable of generating continuous power of about 515 W. Here, installation of a PHPP in a rural area and its output evaluation is discussed in this study. Different methods are applied to investigate the proper site of installation by field survey. In the future, this type of small source can be increased to some numbers which is possible to be connected with one another working as a micro grid system to supply electricity independently according to the necessary demand. To optimize the plant generation, a proper load management is necessary. The objective of the study is to develop a low cost Pico hydropower and to examine its feasibility in actual field. It is supposed that a barrier of small hydropower is the investment cost. Even very small hydropower of 0.0 kW costs 40 million yen in an example (including the cost of application side). In other words, the unit cost is approximately as high as 7 million yen/kW. It is incredibly high compare with that of conventional co-generation power plants. In order to make a Pico hydropower an alternative, the plant must be designed in an appropriate way for very small scale. It is the aim of this paper to allocate and schedule properly the load or demand using the concept of Demand Side management (DSM). Ways and means of utilizing energy from a dummy load will also be dealt in this study to maximize the usefulness of the generated power from the plant.
کلمات کلیدی:
Decentralized Power Generation, Pico Hydro Power Plant, Micro Grid, Demand Side Management, and Electronic Load Controller

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