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Feasibility of Shifting Non-Critical Loads to Battery Bank in Domestic Sector in Sri Lanka

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With the technological development, people tend to use more electrical equipment to ease their living behavior. As Sri Lanka is not a heavily industrialized country, electricity demand strikes its peak value between 18:30 h to 22:30 h when the majority of the demand is consumed by the household equipment. To provide this peak demand, the utility has to employ thermal power plants or purchase power from Independent Power Producers (IPPs) at a higher price. To reduce this peak demand, a Real Time Energy Management Algorithm integrating with renewable energy and storage for domestic sector has been developed. This research involves an evaluation of the feasibility of shifting non-critical loads to the battery bank for a typical house with selected power intensive non-critical loads. The power consumption data in selected non-critical loads and voltage between the terminals of the battery were considered in the analysis. The analysis was done separately for each selected non-critical load. A data logger was developed to measure and log the power usage of the each load. A current sensor and a voltage transformer were used to sense the current drawn to the loads and the voltage level at the house. An Arduino was used to process data, calculate power and to log the result in a micro SD card. Through the analysis of the collected data, the possible load combinations in shifting the selected non-critical loads to the battery bank were found.

Keywords: algorithm, battery bank, demand management, domestic Sector, non-critical loads