Palestine island microgrids

Renewable energies have become essential sources of electricity when it comes to the construction of microgrids around the world [1]. Several factors like increasing fuel prices of conventional generation, decreasing installation costs of renewable energy [2], and environmental concerns have promoted their use. Even with such drivers, in order to support microgrid deployment, several challenges such as optimal sizing and operation, optimal control strategies, and reliability supply, need to be addressed [3].

The work presented in [23] is similar to the work [22] in the sense that it assumes that the microgrid has already been sized. This constitutes the first key difference w.r.t our work. Second, the work [23] does not allocate reserves to deal with potential generator or storage system outages. And third, authors [23] did not take into account the amount of energy available in the storage system when defining reserves. This could lead the storage system being allocated with upward (downward) reserves that could not be implemented if its current state of charge is low (high).

Table 1 shows a summary of the discussed approaches in the scientific literature in the microgrids field. The table focuses on highlighting the key differences among them and displays the research gaps addressed in this manuscript.

The remainder of this work is organized as follows: Sect. 2 presents the mathematical proposed model for reliability-constrained design and operation of microgrid. Section 3 presents the case study and its results are discussed in Sect. 4. Finally, Sect. 5 presents conclusions for this paper.

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