2023 International Conference on Modern Power Systems (MPS)

21-23 June 2023, Cluj-Napoca, Romania eISBN 979-83-50326-82-6

Identifying the potential of consumer back-up generators to cover the balancing energy caused by wind and photovoltaic sources

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https://doi.org/10.1109/MPS58874.2023.10187571

Abstract

In the absence of its own fossil fuel deposits, the Republic of Moldova intends to cover its electricity demand as much as possible by promoting renewable energy sources, especially after the energy crisis caused by the war in Ukraine. The realization of this idea would contribute not only to achieving decent energy security but also to the fulfillment of the country's commitments regarding greenhouse gas emissions reduction. Due to the lack of traditional sources for balancing the intermittency of energy produced by wind (WF) and photovoltaic (PV) sources, it becomes plausible to identify such capacities for country electricity consumers. The paper determines the potential capacity of the consumers' backup generators (DG) to offset WF and PV intermittence; their competitiveness vis-à-vis other country plausible sources. The results obtained: 1. The identified country's power capacity potential of the backup generators is around 100MW. They may cover around 20% of the balancing energy needed in the 100%RES scenario; 2. For fuel prices recorded in 2020 and 2021, the application of DG to cover the balancing energy demand is more advantageous than the use of a Gas Turbine (GT). For 2022 fuel prices - GT; 3. To diminish needed balancing energy the optimal proportion between wind farms and photovoltaic capacities should be respected.

Keywords: *backup generator, balancing power, renewable sources, wind electricity, solar electricity*

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