عنوان مقاله:

Using Dynamic Thermal Rating and Energy Storage Systems Technologies Simultaneously for Optimal Integration and Utilization of Renewable Energy Sources

محل انتشار:

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خلاصه مقاله:

Nowadays, optimal integration and utilization of renewable energy sources (RES) are of the most challenging issues in power systems. The wind and solar generation units maximum production may or may not occur at peak consumption times resulting in non-optimal utilization of these resources. As a solution to this problem, energy storage systems (ESS) are embedded in networks. However, the power transfer from RES to ESS may lead to network congestion. In this paper, the simultaneous application of dynamic thermal rating (DTR) technology and ESS devices is proposed. The DTR is used to overcome the problem of transmission lines limited capacity and ESS is responsible for mitigating curtailment of RESs energy production by saving their generated energy in non-peak hours. The RESs generation and lines' ratings are calculated based on hourly actual weather elements. For evaluating the proposed method, a linearized formulation of DC-OPF is used in the problem definition and also simulated on a modified IEEE 30-bus test system including a wind farm, solar park, and ESS devices by using MATLAB software. In addition, different comparisons are performed demonstrating the remarkable and better performance of the proposed method compared to previously introduced methods.

کلمات کلیدی:

Dynamic Thermal Rating, Energy storage system, optimization, Renewable Energy Sources, Static Thermal Rating