

Energy storage systems providing primary reserve and peak shaving in small isolated power systems: an economic assessment

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Abstract-

Current technology developments enable energy storage systems (ESSs) to be used within a wide range of system security related applications. This paper assesses the economic benefit that can be achieved employing ESSs in the simultaneous provision of primary frequency regulation reserve and peak-shaving generation in small isolated power systems. An optimization model of the weekly economic operation of isolated systems under centralized operation is developed for this purpose. The power system savings of providing either the primary reserve requirements or peak-shaving generation by ESSs and the savings of combined provision of primary reserve and peak-shaving by ESSs are determined. The approach is successfully applied to two actual isolated Spanish power systems of different size and with different generation portfolios

Index Terms- Energy storage systems; Isolated power systems; Primary reserve; Peak-shaving generation

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