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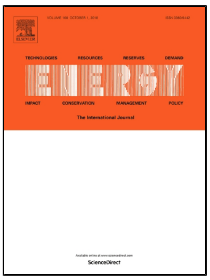

A Medium-Term Analysis of the Reduction in Technical Losses on Distribution Systems with Variable Demand Using Artificial Neural Networks: An Electrical Energy Storage Approach

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ACCEPTED MANUSCRIPT

A Medium-Term Analysis of the Reduction in Technical Losses on Distribution Systems with Variable Demand Using Artificial Neural Networks: An Electrical Energy Storage Approach

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Abstract

In light of recent changes to electric energy sector regulations, themselves motivated through technological advances, an increase has been noted not only in the economic viability but also in the difficulties faced by the Brazilian hydroelectric system. These new regulations allow residential consumers to become micro and mini-generators; this scenario institutes an overall change to the behavior of the energy distribution system (DS). The loads now tend toward a bidirectional flow, producing change in the energy profile, this occurs mainly during the day due to photovoltaic penetration. In this context, one notes the introduction of Electrical Energy Storages (EES), which has as its prime objective to aid distribution systems in their control of these new variables. The goal behind this article is to analyze the use of EES through reducing medium-term technical losses in electrical energy distribution systems. In order to reach this goal, a technical analysis was performed that tested 4 case studies, considering variable demand, with distributed and concentrated EES. The analyses show that the use of EES over the medium-term can significantly avoid technical losses to the electrical energy distribution system.

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