

# **Demand response in an isolated system with high wind integration**

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## **Abstract-**

**Growing load factors in winter and summer peaks are a serious problem faced by the Spanish electric energy system. This has led to the extensive use of peak load plants and thus to higher costs for the whole system. Wind energy represents a strongly increasing percentage of overall electricity production, but wind normally does not follow the typical demand profile. As generation flexibility is limited due to technical restrictions, and in absence of large energy storages, the other side of the equilibrium generation-demand has to react. Demand Side Management measures intend to adapt the demand profile to the situation in the system. In this paper, the operation of an electric system with high wind penetration is modeled by means of a unit commitment problem. Demand shifting and peak shaving are considered in this operation problem. Demand shifting is modeled in two different ways. Firstly the system operator controls the shift of demand; secondly each consumer decides its reaction to prices depending on its elasticity. The model is applied to the isolated power system of Gran Canaria. The impact of an increased installed wind capacity on operation and the cost savings resulting from the introduction of responsive demand are assessed. Furthermore, results from the different implemented demand response options are compared.**

**Index Terms-** Wind power generation, Large-scale integration, Load management, Power system modeling

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## **Citation:**

*Dietrich, K.; Latorre, J.M.; Olmos, L.; Ramos, A. "Demand response in an isolated system with high wind integration", IEEE Transactions on Power Systems, vol.27, no.1, pp.20-29, February, 2012.*