

An estimation of the economic and environmental benefits of a demand-response electricity program for Spain

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Abstract-

The evolution towards a more sustainable electricity system will definitely require a stronger role of demand. For example, Demand Response (DR) programs allow consumers to manage their loads in response to signals that reflect—at least to some extent—the time-varying nature of the cost of electricity, improving thereby the efficiency of electricity markets, and also allowing for larger shares of renewable energy. However, allowing consumers to respond also requires significant investments. Therefore, estimating the potential benefits from DR programs is essential to assess their convenience. This paper presents an integrated assessment of the benefits of a potential DR program in Spanish households, including both supply and demand considerations. For the first time in literature, we estimate together and compare the benefits for both the generation and the distribution network system. Our results show that, under the current conditions (the most important of which are rather low electricity prices, a well-developed network, and overcapacity in the generation system), the benefits are quite low compared to the costs, and most of them come from the generation system. This creates a challenge for policy makers if they desire to promote these programs within highly developed generation systems, as well as a complex situation about the distribution of the costs and benefits which needs to be addressed.

Index Terms- Demand response; Cost–benefit; Electricity

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