

Impact of support schemes and market rules on renewable electricity generation and system operation: the Spanish case

A. Ramos Galán; F. Báñez Chicharro; J.P. Chaves Ávila

Abstract-

This study discusses the impact of market rules on the generation (and curtailment) from intermittent energy sources (IES), such as the design of support schemes, the priority dispatch rule for IES, negative prices and economic compensation for IES curtailment. It also describes the approaches applied in some European countries and alternative designs. An evaluation of these different market rules is assessed for the Spanish 2020 scenario by using a system operation model. The results show that with a feed-in-tariff and the priority dispatch rule, more generation from IES is fed-in into the system, and lower emissions are obtained. With negative prices and demand response, the feed-in-tariff scheme provides lower demand costs. With market remuneration and ex-post remuneration (as implemented in Spain in 2015), IES generation fed-in in the system is reduced and demand costs are increased. Furthermore, the curtailment of IES increases with higher penetration levels of IES. The increase in the curtailment is significantly higher for wind power as generation and demand are less correlated than solar generation and demand. The design of curtailment compensation and support schemes together become crucial to incentivise IES investments with higher value for the system.

Index Terms- power markets; power generation dispatch; solar power stations; pricing; power generation economics; wind power plants; tariffs

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