Market-friendly mechanisms for the development of wind power: a new efficiency criterion

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SUMMARY

This article shows that support mechanisms should rather let the wind power react to the market signals than isolate it from new competitive arrangements. By doing this, we show that even under support mechanisms it is possible to enhance the wind power economic value on competitive market and to integrate it softly and efficiently when competing with conventional units. The support mechanisms are then in adequacy with incentive compatible market rules. Thus, the latter provide incentives to develop technologies able to deal with physical constraints of the electric system (reactive power or ancillary services) in order to react to the market signals.

FULL DESCRIPTION

The development of wind power takes place in a new organizational framework based mostly on competitive mechanisms. **The main objective is to analyze and assess the efficiency of European support mechanisms in regard of the building of competitive electricity markets.**

Approach

We firstly consider the functioning of electricity markets to isolate the relevant submarkets or modules concerned by the integration of wind power: the short-term balancing and congestion modules. We analyze then the implication of wind power integration when supporting by either price-based or quantity-based mechanisms. We show that the feed-in tariff is not an efficient support mechanism since it sets aside wind power from competitive rules and hinders its value enhancement on markets. In competitive markets, an efficient way to upgrade wind power is to consider that wind power can react to market signals since the injection of this kind of energy could not be only defined as “intermittent”. Wind power can be valuable on markets.

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Relevance & Innovation

In most European countries, wind power has been developed through the implementation of support mechanisms. These mechanisms have proven to be effective in terms of developed capacities. Nevertheless, these support mechanisms usually isolate wind power from market rules. By doing this, the wind power is always seen as an "intermittent production" that could not provide services or react to market signals. We state that wind power could not be defined **only** by its intermittency. The relevant topic is then **to consider innovations that the market could provide to enhance the value of wind power production in competitive electricity markets.**

Results & Conclusion

We firstly conclude that the assessment of different support mechanisms must take into account the adequacy between the terms of support mechanisms and the rules and incentives provided by electricity markets. We secondly show that this new efficiency criterion provides a new benchmark of support mechanisms depending on their ability to upgrade the wind power integration. We thirdly demonstrate that even under support mechanisms it is basically possible to enhance wind power economic value on competitive markets if the wind power producer is able to react to market signals. Even if the wind power producer bears the balancing responsibility, the related costs are lower than the advantages of being valuable on competitive markets. We finally conclude that the incentives provided by this scenario can push the more accurate wind power technology to react to markets signals and physical constraints.

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