Impact of RES-E support mechanisms for integrating wind power in electricity markets

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Abstract

Large penetration of wind power is being developed today in Europe. But which is its impact on managing the electrical network and electricity market, how does it work? This research analyses three support mechanisms in detail for developing wind power (Feed-in tariff, premium tariff and Tradable green certificates) with a particular focus on how they work and their relationship with the electrical market and specifically the balancing market. Assuming management of intermittent sources is an important way to promote deployment of renewable energies, the research will look at the experience of managing wind power variability in the operation of the balancing market in four countries (Spain, Germany, France and the United Kingdom).

Context of wind power

Integration of wind power in the electricity market

What happens when the wind doesn’t blow?

Intermittence causes problems when penetration rates are above 10-20%

Additional reserve capacity/

Additional imbalance = what is the cost of system integration?

Balancing Mechanism or Penalties ? …

Impact of RES-Support Mechanism

How do penalties are imposed?

RES-E Support Mechanism → Wind Power → Electricity and Balancing Market

What is the interaction?

The allocation of the balancing costs of wind energy can be done according to two methods: either the costs are managed and supported by the system operator (Feed-in tariff) and transferred to the network tariff, or the costs are managed by the system operator which are then transferred to the parties responsible for the imbalance (RO/Premium). In this case, the operator system manages the adjustments but charges the entities responsible for the imbalance.

Imbalances | Penalties ??

Wind power support schemes

Support mechanisms | Wind Producer revenues
---|---
TGC | Spot price+ Market price (TGC)+Incentive+ Penalties
Premium Tariff | Spot price+ Premium+ Incentive+ Penalty (imbalance)
Feed-in tariff | Feed-in tariff+ Incentive/complement - Penalty

Costs and solutions for each country

RO (Renewable Obligation)

Premium/ Feed-in Tariff

Feed-in tariff

Feed-in tariff

UK, Spain and Germany (and France) use three different support mechanisms and three different balancing markets (no BM in Germany/ France). This interaction is important in order to improve the management of the intermittent production at the 10-20% penetration level.

Conclusions

• UK, Spain and Germany (and France) use three different support mechanisms and three different balancing markets (no BM in Germany/ France). This interaction is important in order to improve the management of the intermittent production at the 10-20% penetration level.

• Premium tariff could perhaps be a solution that combines the benefits of these two systems (RO&FIT). They have the advantages of the FIT mechanism, but, by imposing penalties for imbalances they encourage producers to give greater priority to this essential issue and facilitate the development of the electrical system configuration in which wind power plays an important role.

References