

Electrical Dispatch with High Levels of Renewables

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Importance of Forecasting

- Don't forget forecasting in this discussion!
 - Valuable in:
 - Reduced costs of uncertainty
 - Better optimization of resource commitment and cycling impacts
 - Better fuel supply coordination
 - Important to have:
 - Hourly and Daily volumes of production
 - Weather fronts and cloud "edges"

Dispatch Cycling Impacts

- Wholesale market design can impact cycling
 - Economic window of only 24-hours in most US designs can lead to oversupply conditions and low/negative pricing, which can be a false economic signal
 - US markets (e.g. SPP and MISO) are evaluating a longer economic commit component that may incorporate forecasted wind/solar production
 - In our operations, we have used both self-directed and market-directed de-commit of coal resources during light load/high renewable conditions
- Thermal stress in boilers and predictive failure models
- Pricing the “cost of cycling” in markets with variable cost optimization

Dispatch Ranking

- Will we reach the point where a non-fuel-based optimization target should be established for dispatch?
 - Theoretically, yes
 - But even at 20-30% renewable supply, we are not there yet in the US
 - We are reaching the point in some areas where current methods could be improved (e.g. commit horizon mentioned before)
 - Other optimization criteria in the future?
 - Minimum loss method?
 - Maximum geographic distribution for reliability?
 - Select least volatile forecasted probability for resources?
 - Develop more price-responsive demand options for load increase?

Market Pricing

- Market Monitoring & “reference price”
 - Issues in US with respect to state-regulated rates and federal-regulated market pricing
- Undesirability of administrative price determination
- Incorporating avoided costs in offer reduction
 - Avoided cycling
 - Production Tax Credits

Generation Remuneration

- Potentially biggest issue here is the “missing money” problem
 - See 2012 Brattle study for Texas/ERCOT:
http://www.ercot.com/content/gridinfo/resource/2015/mktanalysis/Brattle_ERCOT_Resource_Adequacy_Review_2012-06-01.pdf
- Regulators must avoid the temptation to think of the market operations as the solution to every problem
- In US there is the tension between state-directed capacity (“integrated resource planning”) that provides investment cost recovery compared with fully deregulated markets where producers must seek full cost recovery at the wholesale level

Regulatory Roles & Responsibilities

- Crucial for regulators to understand the functions of the market, along with the pros/cons of the available levels of complexity based on desired outcomes
- Regulatory “turf” issues are just as real as the mathematics in the dispatch optimization software, but politics are more complex than the software used to dispatch the market! 😊
- Foundation is not changed: Need a good-faith objective to balance the public interests between shareholders of the utility and the consumers of electricity

