



POSITION STATEMENT

Technology Evolution and Electric Market Reform

**Approved by the IEEE-USA
Board of Directors (16 Nov. 2018)**

Many new technologies have been introduced in recent years that have the potential to reduce the cost of electricity to consumers, improve grid reliability and resilience, enhance national security and protect the environment. Integration of these technologies into the existing electric grid and related wholesale and retail electric markets depends a great deal upon a regulatory structure that recognizes both the opportunities and the potential disruptive effects of the technologies.

The current electricity regulatory and market structure in the United States is complex and highly fragmented. Operation of wholesale electric markets is under federal jurisdiction. Retail electric markets are under state jurisdiction. There are local and regional variations in technical requirements, business rules and incentives throughout the United States.

There is a lack of unified oversight or regulation of electric markets in the United States. Regulating authorities include: state Public Utility Commissions (PUC), Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC)¹, and other federal agencies like EPA that have a direct impact on market prices. In addition, much of the United States relies on open regional wholesale markets with bid-based transparent real-time pricing. These markets are run by Regional Transmission Organizations (RTOs). Each RTO sets its own market rules together with stakeholders². These market rules are subject to FERC approval.

¹ NERC was certified by FERC as the nation's Electric Reliability Organization (ERO) under the Energy Policy Act of 2005. These standards, along with the National Electrical Safety Code and local state regulations for local distribution, define the requirements for grid resiliency, reliability, and resistance to unforeseen events.

² Stakeholders are anyone with a stake in operation or financial outcome related to operation of the electric grid. Simply stated they are producers, users, buyers, sellers and grid operators.

Regions serving one quarter to one third of the United States have not established RTOs and maintain more traditional bilateral wholesale markets consisting primarily of regulated utilities and public power cooperatives. Retail market designs are also very diverse. Some states offer consumers options to purchase power from competitive retail suppliers while others retain traditional utility service models.

Recommendations

While no single set of specific recommendations will apply universally across the country, all the markets must nevertheless evolve and adapt. When regulating authorities and rules committees use existing administrative processes but fail to recognize the diversity and complexity of the markets, resulting policies or regulations may have unintended consequences.

Applying certain core principles may be beneficial as new technologies alter the electric landscape. Implementing the core principles presented by the recommendations would involve a great number of players, but the core principles are intended to provide a framework that each regulating authority or rules committee can use to underlie the adaptation of their market rules as the grid technology evolves.

To that end, IEEE-USA provides the following recommended core principles to help improve the reliability and efficiency of the nation's electric energy markets:

- **Harmonize regional wholesale and local retail market rules in a complementary manner to support reliability and innovation:** Regional wholesale electric markets and locally regulated retail markets do not operate in isolation from each other. Market rules at both levels must promote both reliability and economic efficiency to ensure effective and efficient dispatch of generation in real-time and to anticipate and relieve transmission constraints when they arise. Harmonized markets also provide a better framework for identifying and implementing technology opportunities.

Improved and coordinated market rules can also provide incentives on a regional basis to improve resilience against major and long-term outages. This may be especially true with respect to investments in energy storage and advanced control technologies, which may be used to provide continued supply to individual local distribution lines or critical users as well as the grid as a whole.

- **Improve price transparency in both regional wholesale markets and at the retail level:** Without accurate price signals³, markets do not work well, efficiency is not optimized, and technical innovation may be improperly

³ A **price signal** is information conveyed to consumers and producers, via the **price** charged for a product or service that provides a **signal** to increase or decrease supply or demand

valued. Electric markets are no different than others in this respect. Market pricing should provide signals that encourage efficiency, reduce cost and maintain reliability.

Where transparent regional wholesale electric markets do not exist, states should reconsider their formation or create local retail pricing mechanisms to achieve comparable price transparency as currently provided by RTOs using Locational Marginal Pricing.

Consideration must also be given to how price affects consumer behavior at the retail level. Retail rate designs that are decoupled from the time varying prices used by system operators to balance the overall generation mix may inhibit optimal integration of new technologies into the markets. Non-time-differentiated retail rates can also prevent efficient and reliable use of customer owned storage or vehicle charging and usage.

- **Use stakeholder processes⁴ in wholesale markets to evolve market rules. Respect existing reliability standards processes:** Stakeholder processes should continue or expand as needed consistent with national, regional and state requirements. These stakeholder processes can help minimize unintended consequences arising from implementation of new technology and related regulatory actions. Regulators and policymakers should fully utilize and not arbitrarily bypass these stakeholder processes to inform proposed changes in regulations affecting either reliability or market operation.

There is a long history of regulatory and legal proceedings and rulings related to reliability standards and operation of electric markets. Some cases have proceeded all the way to the Supreme Court. Businesses have relied on this body of work to make investment decisions. Customers have similarly relied on these proceedings to protect their interests. It is important to recognize these precedents and seek input widely from stakeholders to avoid disruption in the markets and adverse outcomes for reliability.

- **Explicitly consider unintended market consequences when promulgating not only market rules, but also environmental and other regulations:** While regulations may be based upon good and desirable public policy objectives, they can have unintended consequences in markets. A wide range of regulatory decisions by policy makers affects deployment of new

⁴ Organizations such as NERC and RTOs have defined formal processes for engagement. Stakeholders also participate in regulatory proceedings and litigation. For NERC's process see: <https://www.nerc.com/pa/Stand/Pages/FunctionalModel.aspx>. PJM also has a process; see: <http://www.pjm.com/~media/documents/manuals/m34.ashx>

technology. Regulatory entities should consider how proposed regulations will affect electric price formation, efficiency of grid operation, and the behavior of market participants to help minimize unintended consequences, including adverse reliability, environmental or business outcomes.

This statement was developed by the IEEE-USA Energy Policy Committee and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good and promotes the careers and public policy interests of the nearly 180,000 engineering, computing and allied professionals who are U.S. members of the IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE, or its other organizational units.