WHOLESALE MARKET BARRIERS TO ADVANCED ENERGY – AND HOW TO REMOVE THEM

Case studies of regulations impacting advanced energy technologies in wholesale markets

By Advanced Energy Economy

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EXECUTIVE SUMMARY

Today, advanced energy is an economic engine for America. The advanced energy industry generates $238 billion in annual revenue and supports 3.5 million jobs across the United States. Costs of advanced energy technologies have recently fallen so sharply that investing in new wind and solar energy, often paired with energy storage, can be more cost-effective for consumers than operating some traditional generating resources. For example, a recent utility filing by the Northern Indiana Public Service Co. found customers could save $4 billion by replacing the utility’s entire coal fleet by 2028 with a portfolio of solar, wind, storage, and demand response resources.

Two-thirds of the nation’s wholesale electricity sales occur in a competitive market managed by a Regional Transmission Organization (RTO) or Independent System Operator (ISO), with over 200 million customers in these areas and over $120 billion in annual energy transactions taking place. Under the Federal Power Act, these markets are overseen by the Federal Energy Regulatory Commission (FERC), which ultimately determines the rules for how wholesale electricity is bought and sold in the marketplace. RTOs/ISOs develop the market rules that dictate whether and how energy resources can participate and compete. FERC reviews and approves the RTO/ISO-developed market rules and can also issue its own orders directing the RTOs/ISOs to develop new rules regarding how energy resources participate in each of these markets.

The competitive wholesale markets governed by FERC allow technologies to bid to provide capacity, energy, and ancillary services. Some advanced energy resources – including demand response, energy efficiency, and renewables – have gained increasing market share in competitive wholesale markets, while other technologies, including storage and other distributed energy resources, look to break into these markets. But despite the fact that these resources are technically capable of providing many wholesale services, advanced energy technologies are still a small fraction of the wholesale markets. New market rules that allow these technologies to fully participate would result in gigawatts of energy and billions in dollars of investment, and would facilitate the retirement of older, less efficient, and higher polluting resources. But advanced energy still encounters regulatory barriers that prevent its technologies and services from competing in the wholesale electricity marketplace. Removing these barriers would be steps toward expanding advanced energy market opportunity by $65 billion, according to AEE estimates.

Wholesale electricity markets should be technology-neutral, allowing all resources to compete on price and performance. The Federal Power Act requires that the rates, terms, and conditions of service governing wholesale competitive markets be “just and reasonable” and not grant any “undue preference or advantage.” Many market rules, however, are outdated, having been designed with older technologies in mind. Such rules can prevent new technologies from selling their services on the
open market, which stifles innovation and keeps our electricity system from being modernized for higher performance.

In this paper, AEE has collected 21 case studies of barriers to advanced energy in these markets. The first set of case studies showcases successes in removing or preventing barriers to market entry and participation by advanced energy technologies. These case studies show how proactive FERC policies and focused efforts by RTOs/ISOs and stakeholders can eliminate barriers to market entry and unlock energy technology innovation in the provision of services on the grid. The second set of case studies draws attention to some of the barriers for advanced energy technologies and services that remain.

Taken together, these case studies demonstrate that change is possible – and action is necessary to fully capture the economic and reliability benefits of advanced energy technologies.
SUCCESS STORIES IN REMOVING REGULATORY BARRIERS FOR ADVANCED ENERGY

The following case studies are divided into sections highlighting where the market barriers in question existed and were subsequently resolved, to provide a summary of these issues for policymakers and businesses. For example, the FERC-Driven Reforms section outlines policies undertaken by FERC, whereas the individual RTO/ISO sections describe examples that have occurred in those markets. In some cases, these examples may have occurred or still occur in other RTO/ISOs as well.

FERC-Driven Reforms

1. Ability for demand response to participate in wholesale markets on a basis comparable to generation

Demand response (DR) is a grid management tool through which utilities and grid operators provide information and/or price signals to customers to encourage them to reduce energy use at specific times to relieve stress on the grid. DR can use control technology that automatically responds to prices or other signals, or customers may respond to a DR request manually. Load reduction is typically achieved by temporarily switching off or reducing usage from cooling or lighting or by postponing energy-using activities. The U.S. DR market reached $5.19 billion in 2018, up 18.9% over 2017.

Wholesale markets under FERC jurisdiction have integrated demand response resources due in part to FERC policies that require RTOs/ISOs to allow for demand response to participate in these markets on a basis comparable to generation. FERC Order 719, issued in 2008, ensured DR would have access to these markets, providing numerous benefits including grid reliability and consumer savings.

For example, demand response – along with wind energy – was credited with keeping the lights on during the 2014 Polar Vortex. In that same year, the PJM Internal Market Monitor estimated that DR saved ratepayers in the 13 states that comprise PJM in $11.8 billion. As noted below, additional reforms to more fully integrate DR could unlock massive additional consumer savings and reliability benefits.

2. Existing markets did not adequately account for unique attributes of energy storage

As the cost of advanced energy technologies has been reduced and technologies have increasingly accessed wholesale markets, federal regulators have understood that the rules and regulations governing these markets may impede innovative technologies from participating. In 2016, FERC initiated a formal inquiry into barriers to the participation of energy storage and distributed energy resources (DERs) in the RTO/ISO competitive wholesale markets.

In February 2018, FERC finalized a rule (Order No. 841) requiring that wholesale electricity markets enable energy storage to fairly compete to provide all the energy, capacity,
and ancillary services it can technically provide. In December 2018, the RTOs/ISOs filed their compliance plans to demonstrate how storage can participate in markets without undue barriers. While this is a significant step forward in removing barriers to innovative technologies, the implementation of this rule is key to ensure that artificial barriers do not preclude energy storage from providing cost savings and reliability benefits to consumers and the grid. FERC is currently reviewing the RTO/ISO compliance plans.

3. Reducing barriers to grid interconnection faced by renewable energy resources, especially those paired with energy storage technologies

Over the past 15 years, FERC has made significant strides in improving the grid interconnection process for generators by offering standard agreements, as well as frequently revising rules to address problems arising in these processes and ensure that they accommodate advanced energy technologies like wind and solar. Delayed interconnections (described further in barrier #17) can cause numerous problems, including increased costs to consumers, slow development of new generation, reduced competition, uncertainty in the market for businesses, and discrimination against new and innovative technologies.

In 2018, FERC issued Order 845, a strong step forward for advanced energy resources in wholesale markets. The order puts forth positive reforms for wind, solar, and storage interconnection queue processing, including developer options to self-build network upgrades and the sharing of existing interconnection capacity by both legacy and new generators (termed “supplementary service”). For example, prior to this order, a 50 MW solar project paired with a 10 MW energy storage project would be considered a 60 MW project, potentially resulting in significant additional costs and delay in interconnection. This new order allows for the project to be studied at its level of generation (e.g. 50 MW) as long it does not exceed that number. As the cost of energy storage continues to drop rapidly, companies are increasingly investing in renewable plus storage projects. This rule change by FERC, if fully implemented, could open competitive markets to more innovative paired projects between renewable energy and storage devices. Public utility transmission providers are set to file compliance plans later this year, which FERC will then review.

PJM

4. Distinguishing the value of frequency regulation in the ancillary services market to allow faster responding technologies like energy storage and demand response to provide reliability services to the grid

In wholesale markets, ancillary services are important for ensuring that the lights stay on when there are fluctuations on the grid. Such services include maintaining system frequency at 60 Hertz and balancing generation and demand when a large generator disconnects from the system. The market for ancillary services provides compensation for resources that can adjust supply and demand in response to changes on the grid. Advanced energy technologies typically respond to grid changes
more quickly than traditional resources, making them capable of providing valuable services to the market to enhance grid reliability when these fluctuations occur.

Traditional resources like coal and natural gas generation have provided frequency regulation in these markets, but are more equipped for the slower changes that manage larger and longer fluctuations. Recognizing that new technologies are available that respond more quickly to short-term needs on the grid, the Mid-Atlantic grid operator, PJM Interconnection, created a specific market – known as Regulation D – for resources like energy storage and demand response that can provide those grid services. As advanced energy technologies continue to increase their market share in wholesale markets, rules like Regulation D are important to ensure that fast-responding advanced energy technologies are able to compete to provide grid services on equal footing with traditional resources.

5. Reversing a proposal to prevent energy efficiency resources from participating in capacity markets

In early 2017, a proposal by PJM would have authorized state and local regulators to restrict or prohibit the participation of energy efficiency resources (EER) in PJM’s capacity market. EERs are combinations of energy efficiency measures (such as lighting and process improvements) installed at homes and businesses that reduce the need for new electricity supply. The rule change could have prevented EERs from competing in the capacity market, where they contribute to grid reliability and deliver energy savings that displace the need for more expensive power plant capacity.

In June 2017, AEE filed a petition for a declaratory order with FERC, pointing out that while state commissions have exclusive authority over retail energy decisions, the Federal Power Act grants exclusive jurisdiction to FERC to regulate how resources like EERs participate in RTO/ISO markets.

In December 2017, FERC issued an order confirming that state utility commissions cannot bar particular technologies – in this case, energy efficiency – from participating in wholesale energy markets without FERC’s approval. This important precedent is critical for maintaining free and open competition, with all technologies competing on price and performance, to deliver the best electric power services at the most reasonable cost to businesses and households.

CAISO

6. Allowing metering data from smaller distributed energy resources to be aggregated by an external entity, rather than the ISO metering each individual installation

As described in more detail in barrier #16, some market rules and practices require that advanced energy resources, specifically distributed energy resources (DERs), provide real-time information to regulators similar to generators. These requirements that distributed energy resources “look like” conventional generation can be prohibitively expensive and unnecessary. In contrast, the
California Independent System Operator (CAISO) has developed metering rules that accommodate these new resources.

In CAISO, DERs are required to meet the metering standards of the local regulatory authority and the applicable distribution company tariff. But CAISO does not directly meter the DERs, and instead puts that responsibility on a DER aggregator’s scheduling coordinator, which can bid into the market using generation distribution factors. CAISO has observed that “[t]his approach allows for scheduling coordinators to reflect the dynamic operating nature of some of the distributed energy resources comprising an aggregation.” Because of the large numbers of individual DERs in an aggregation, this approach is sufficiently accurate for dispatch and reliability purposes, and the flexibility allows for marketplace innovation in providing services from aggregated DERs. FERC recently approved this approach to DER metering and telemetry.

**MISO**

7. **Revising the definition of energy storage resource that precluded non-“flywheel” storage from receiving full compensation, effectively blocking battery storage from the market**

In 2016, AES Storage (now Fluence) developed a new 20 MW battery storage system for a utility, Indianapolis Power and Light (IPL). The utility, however, faced difficulties interconnecting the system to the grid, and receiving full payments for all of the reliability benefits that the system provides. These difficulties existed because the Midcontinent Independent System Operator’s (MISO) definition of a “storage” product had been designed for older versions of storage, specifically “flywheel” technology. MISO’s rules had not been updated to allow for new energy storage technologies, such as lithium ion batteries, to participate and be fully compensated. In fact, full operation of the IPL system under the then-prevailing rules could have risked damaging the system.

After nearly a decade of inaction in the stakeholder process, IPL filed a complaint – which AEE supported – with FERC in November 2016. FERC agreed with the complaint in February 2017 and ordered MISO to ensure all storage technologies could compete in its wholesale markets.

**SPP**

8. **Removing high “exit fees” that prevented companies from entering the wholesale market, reducing competition and increasing costs**

Like other RTOs/ISOS, the market rules governing participation in the Southwest Power Pool (SPP) regional market are developed in its stakeholder process by entities who have joined SPP as members. In order to obtain SPP membership, however, companies were previously required to make themselves subject to a significant “exit fee” payment should they eventually choose to withdraw from membership. For example, if a company intended to leave SPP membership for any reason, that company would be subject to an estimated fee of as much as $700,000 to $1
million, with the specific cost not known upon entering the market.

This exit fee structure was a barrier to voting membership and thus market participation for advanced energy technology companies, many of which are new market entrants without the resources of established incumbents. Compared to other regional markets, SPP’s exit fee structure led to unbalanced membership; most members are transmission owners and utilities, while independent power producers and non-transmission owners represent a fraction of the membership. Such hurdles to voting membership also threatened to reduce competition in the market, leading to rates that may be unjust and unreasonable.

FERC resolved this hurdle to SPP membership, finding that the exit fee structure is unjust and unreasonable because it creates a barrier to membership, particularly for “smaller entities or new market entrants that are not transmission owners.” FERC has ordered SPP to remove the exit fee for non-transmission owning members.
EXISTING REGULATORY BARRIERS IN WHOLESALE MARKETS FOR ADVANCED ENERGY

The following case studies are divided into sections based on where the particular barrier to market participation now exists, to provide a summary of these issues for policymakers and businesses. For example, the FERC section outlines broad barriers to entry that exist in many or even all RTOs/ISOs to varying degrees. The individual RTO/ISO sections describe specific examples in these individual markets that AEE is aware of either through our direct engagement or from surveying our membership.

FERC

9. Existing rules preventing distributed energy resource (DER) participation in wholesale markets

In November 2016, FERC proposed a rule to remove barriers to entry for both energy storage and distributed energy resources (DER). FERC finalized Order 841 for energy storage in February 2017, but elected to obtain more information before finalizing a rule on DER. In February 2018, FERC initiated a process to obtain more information on aggregated DER, including conducting a technical conference in April 2018 and soliciting written comments thereafter on a wide range of DER issues.

While still a small portion of the market, DER adoption and renewable energy aggregation continues to grow in the United States, driven not only by state and federal policies, but also by consumer interest in innovative technologies at the grid edge, such as smart thermostats, electric vehicles, and customer-sited energy generation and storage.

This increase in DER adoption underscores the need for FERC to adopt a final rule that gives all DERs that can be aggregated the opportunity to participate in RTO/ISO wholesale markets. Utilizing DERs more fully by allowing them to provide wholesale services through aggregation, in addition to retail or on-site services, will help ensure the reliability and resilience of the bulk power system by providing operators with new local tools to manage unanticipated events, while maximizing consumer investments in DER technology and saving money. In addition, improving access to wholesale markets will empower businesses and consumers to make their own choices about their energy supply and overall energy costs.

Current RTO/ISO market rules, however, do not always accommodate the provision of services by aggregated DERs. Technology-neutral market rules that eliminate barriers to aggregated DERs providing both wholesale and retail services are needed, and FERC should require the RTOs/ISOs to develop such rules.

10. Valuing on-site fuel or other technology-specific fuel-security attributes that harms competition and increases costs for consumers
Recent proposals have been made by federal officials and in some RTOs/ISOs to define “fuel security” as an attribute needed to maintain grid reliability and resilience. Proposals have included using emergency executive authority to provide 100 percent cost-recovery guarantees (funded by customers) to power plants that have 90 days’ worth of fuel onsite, capacity payments for “fuel secure” assets, and various changes to regional market designs apparently geared to just two generating resources with those attributes – coal and nuclear.

While none of these proposals have been approved or adopted (and many rest on specious legal grounds), they represent technology-specific approaches to reliability and resilience rather than letting all resources compete based on price and performance. In some cases, analysis has estimated these proposals would unnecessarily increase costs at least $17 billion per year. If such proposals were adopted, they would provide favored treatment to targeted technologies (e.g., coal and existing nuclear) and push advanced energy technologies out of the market.

11. Interregional transmission planning processes have not yielded adequate buildout of transmission capacity needed for high penetration of renewable energy

Despite progress on transmission planning and expansions of transmission infrastructure in the Midwest and Southwest regions, the United States needs additional long-distance transmission to unlock the full benefits of renewable energy. This problem can be addressed by improving interregional transmission planning processes that have not adequately worked for building transmission capacity across RTO/ISO regions and multiple utility service territories. While each region undertakes a different transmission planning process that reflects its own unique needs, the processes for assessing the need for and benefits of multi-region project has been ineffective. Existing processes have generally stalled over disagreement on the benefits that come from high voltage grid expansion, judging the appropriate scale and configuration of transmission solutions, and allocating costs equitably among customers. Ultimately, these disagreements delay investments in renewable energy projects as new long-distance interregional transmission in needed to allow for low-cost renewable power to flow from high resource areas (e.g. windy areas in the Plains) to more populated areas with higher electricity demand.

In 2011’s Order No. 1000, FERC required RTOs/ISOs and public utility transmission owners to put the interregional planning processes in place. FERC has recently expressed an interest in revisiting some aspects of Order No. 1000. FERC should do so, with the aim of developing stronger policies to promote interregional transmission planning and streamlined development of transmission projects.

12. Existing regulatory incentives favoring large capital investments over lower-cost technologies with significant reliability benefits

As stated in barrier #11, additional long-distance transmission is needed to unlock the
full benefits of renewable energy in the United States, particularly as states and the federal government look to dramatically increase the use of these resources. At the same time, grid operators currently have a diverse set of options available to them that can help to improve the overall reliability, flexibility, and efficiency of the grid that complement traditional transmission investments. All too often, however, additional traditional transmission investment is favored when other competitive solutions can achieve the same results at a lower cost. As a result, in many markets, transmission costs for ratepayers have skyrocketed. For example, transmissions costs in New England are approaching two-and-a-half-times the cost of generation capacity. Alternatives to traditional transmission investments (e.g., “non-wires alternatives”) can often meet the needs of customers and the utility system at a lower cost, but grid operators’ processes for selecting solutions to system needs often do not adequately consider these alternatives.

In the Energy Policy Act of 2005, Congress encouraged the deployment of advanced transmission system technologies. To date, however, these technologies have faced market barriers to adoption, including regulatory incentives that favor large capital investments over low-cost technologies with operational benefits. For example, Dynamic Line Rating (DLR) adjusts the amount of throughput that occurs as a result of temperature changes or seasonal electric demand. While the technology has been shown to provide significant system benefits at a low capital cost, acceptance and adoption of the technology has been scarce.

FERC recently opened a new inquiry to consider changes to its transmission incentives policies. FERC should carefully consider designing incentives to ensure that advanced transmission technologies and non-wires alternatives are considered on a level playing field with traditional transmission investments and have the opportunity to provide benefits to the grid and consumers.

13. Increased participation of flexible advanced energy resources requires new market designs that value discrete grid services

Despite progress in revising legacy wholesale market rules designed around traditional incumbent technologies, the full range of grid services that advanced energy technologies can provide remain undervalued and in many cases uncompensated. Moreover, many of the grid services that will be needed in the future, when low marginal cost variable resources like wind and solar play an even greater role in the resource mix, remain undefined.

Today, grid services are defined as requiring resources to provide a large amount of a product (like bulk power) or to provide it for a long period of time (like year-long capacity commitments). In the future, grid services will need to be defined on a more granular level to address variable resources and more dynamic demands on the grid by consumers.

Existing modeling rules and practices also hamper the ability to forecast how advanced energy technologies can provide new grid services to meet reliability needs. For example, the modeling of system needs for reliability unit commitment (RUC) and other practices take the existing grid and existing technologies as a...
given, and do not necessarily look at future technologies and scenarios. This can mask the need for services like ramping capability and the ability of new advanced energy technologies to provide them.

New and revised modeling rules and practices and market design tools should better recognize operational flexibility. As fast-moving and nimble advanced energy become more available and cost-effective and energy load profiles become more dynamic, advanced energy technologies need the opportunity to provide operational flexibility and be compensated for providing vital grid services.

The federal government, through FERC and the Department of Energy (DOE), has a role to play in addressing these barriers by engaging the industry and stakeholders in exploring new market designs and grid services definitions, and facilitating research in these areas.


Both the federal government and states have important roles to play in overseeing the electric grid and removing barriers to the growth of advanced energy technologies. Increasingly, conflicts between federal and state decisions are threatening to create new barriers to participation in wholesale markets by advanced energy technologies.

For example, recent FERC rulings assert that state policies like renewable portfolio standards (RPS) interfere with the functioning of wholesale capacity markets. Based on these rulings, proposals are under consideration in PJM, ISO New England, and New York ISO to require advanced energy technologies (including wind, solar, and energy storage) that receive revenues under states policy programs to bid and sell capacity at administratively determined minimum prices. These proposals would deny owners of these technologies the right to construct their own bids and instead force them to bid at artificially high prices, and allow other resources (mostly incumbent traditional technologies) not subject to the minimum price requirements to bid lower and force them out of the market. This result would deny customers the capacity value of wind, solar, and energy storage resources, make state policies like RPS more expensive, and diminish their environmental benefits by giving traditional higher-emitting resources an unfair competitive advantage.

In another example, some state regulators and distribution utilities claim that they should have authority to block advanced energy technologies like energy efficiency, demand response, energy storage, and distributed energy resources (DERs) from participating in the wholesale markets. Giving states or distribution utilities the last word on what technologies can participate in wholesale markets, and how they participate, would negatively impact FERC’s ability to ensure robust competition and just and reasonable rates in wholesale markets. It would also diminish the ability to utilize DERs and other advanced energy technologies to provide multiple services in wholesale and retail markets for the benefit of customers and system reliability.

Greater coordination of federal and state policies is needed to ensure that policy goals
are achieved and that advanced energy technologies are able to provide all the services they are capable of in both wholesale and retail markets.

15. **High costs to participate in stakeholder processes preclude advanced energy input in market rule development**

RTO and ISO market rules are developed through complex stakeholder processes. Each RTO/ISO differs in how its stakeholder processes are governed, and these processes can be incredibly costly and difficult to access given their complex, technical, and time intensive nature. One RTO/ISO recently reported that it held 498 stakeholder meetings in the past year alone. The high cost of participating in this process can be a barrier to full participation of the advanced energy industry in rule development, resulting in markets that are either skewed against or that inadvertently fail to account for advanced energy technologies.

Too often, market design proposals put forward in stakeholder processes reflect only the interests of the incumbent generation and transmission owners who are well represented in those processes. With participation in stakeholder processes constrained by high costs and complexity, the voices of new market entrants like advanced energy technology developers, and the consumers who are increasingly choosing to purchase such technologies, are not present to protect their interests. Better governance and stakeholder processes in RTOs/ISOs can produce greater cost savings for consumers and increased deployment of advanced energy technologies.

Wholesale electricity markets depend on the rules that govern them, which are made by FERC and by the RTOs/ISOs themselves. The decision-making processes within the RTOs/ISOs need to be updated to allow wholesale energy markets to capture consumer savings and reflect the market contributions that can be made the advanced energy industry.

16. **High costs associated with certain operating requirements (e.g. metering and telemetry) hinder aggregated DER participation**

Some rules can require that advanced energy resources, specifically distributed energy resources (DER), provide real-time information to market operators, similar to large generators. In some cases, this requirement, understandably, is designed around reliability concerns as a large generator going off-line would cause problems for the system.

However, applying this requirement to make individual distributed energy resources “look like” conventional generation is both prohibitively expensive and unnecessary for smaller-scale DERs when aggregated for market participation. For example, the ERCOT market in Texas (which is not under FERC jurisdiction) requires all resources participating in Response Reserve Service to have real-time telemetry. Similarly, the California ISO requires resources that are 10 MW or greater to have real-time telemetry. In other RTOs/ISOs, generators are required to have telemetry with a six-second, or shorter, interval. This telemetry requirement is prohibitively expensive for DER
aggregators because the aggregator would need to install such telemetry at each DER site (e.g. every home with a smart thermostat) to get an accurate reading.

This requirement is unnecessary for reliability given that DER aggregation involves combining dozens of smaller resources operating independently into a single resource. If a single customer stops performing, the overall resource can still perform at its expected capacity (if allowed to aggregate adequately; see barrier #6). Moreover, requiring six-second interval data from all these small sources, if submitted directly, would swamp the RTO/ISO with data. Requiring unnecessarily granular data from DER aggregators imposes unnecessary costs on both the aggregator and the RTO/ISO and poses a barrier to market entry.

17. High costs and long timelines for interconnection prevent advanced energy resources from participating

Many advanced energy projects (including new large wind and solar plants) that participate in a wholesale market must first interconnect to the grid under a FERC jurisdictional interconnection agreement. In order to ease the process for technologies and ensure timely review, FERC has developed standard interconnection agreements both for large and small generators and is currently reviewing the need for technical requirements for large and small wind generators and other technologies. FERC has also revised interconnection rules to allow for energy storage to pair with existing resources that can increase overall capacity factors for other resources, such as wind and solar projects. Despite these efforts at streamlining, the interconnection process can still take more than a year.

These long delays harm the ability of both large projects, such as wind and solar installations, and small installations, such as energy storage or fuel cells, to participate in these markets. The combined factors of delayed interconnection, increased costs of interconnection, and uncertainty of cost responsibility can be prohibitive, especially for smaller advanced energy companies and installations such as solar plus storage. Regulators should continue work to interconnect advanced energy resources to the grid under a quick and responsible timeframe as well as ensure the costs are not prohibitive to smaller companies and installations.

MISO

18. Some wholesale market rules explicitly prohibit wind and solar from providing certain grid services

Many regulations and market rules implicitly act as barriers to advanced energy technologies. For example, existing rules often assume that all power plants are large-scale, centralized generation facilities, like coal or conventional nuclear plants. This misconception can result in market rules and operational practices that do not account for the technical and operational characteristics of other resources, including wind, solar, energy storage, fuel cells, and other advanced energy technologies.

But there are some instances where advanced energy resources are explicitly prohibited from providing services in the market. For example,
MISO bars wind and solar resources with modern inverters and other control technologies from providing frequency regulation, spinning reserves, and supplemental (non-spinning) reserves into MISO markets, even though they can do so on a comparable basis to traditional power plants.

Other RTOs/ISOs do not explicitly prohibit renewable resources from offering services into the markets but create rules that effectively exclude these resources. For example, some markets require all resources to be able to provide sustained regulation response over an extended period of time, which wind and solar typically cannot provide, even if that extended period of time is not needed in all cases. This barrier is significant; recent market tests in the California Independent System Operator (CAISO) demonstrated that renewable resources can provide operating characteristics, like frequency regulation, similar to conventional resources. FERC, and RTOs/ISOs, should continue to review market rules and operating practices to ensure that these technologies are not excluded from providing valuable wholesale services.

**PJM**

19. Existing RTO/ISO practices can restrict third-party ownership of DERs

Businesses wishing to install behind-the-meter onsite generation often utilize third-party financing. Under this model, a third-party (e.g. a bank or utility) provides the capital to purchase the distributed energy resource (DER) from the manufacturer. The third-party financier owns the system and sells the electrons to the end user.

If the DER generates excess electricity beyond what the customer can consume, the third-party financier may want to sell the excess generation into the wholesale markets. However, in order to sell into PJM, the RTO requires that the owner of the meter (e.g., the business buying the output of a DER) sign a wholesale market participation agreement (WMPA), rather than the owner of the DER. Signing a WMPA can be a deterrent to installing a DER for many businesses, as it potentially triggers federal jurisdiction by FERC, creating an unknown new regulatory obligation. If PJM were to allow the third-party financier or the party responsible for the operation and maintenance of the DER to sign the WMPA, this would streamline the process for consumers, better align the market with common DER financing models, and allow for greater adoption of advanced energy technologies.

**ISO-NE**

20. Prescriptive definition of advanced metering harms certain residential energy efficiency offerings

A key enabling technology for certain energy efficiency projects is advanced metering. In some regional markets, like PJM and MISO, the grid operators recognize that the industry standard for customer data from advanced metering infrastructure (AMI) is typically 15- to 60-minute intervals. In these markets, the grid operators have fashioned market rules and operational practices that recognize this industry standard while allowing energy
efficiency to provide wholesale services, rather than imposing different metering infrastructure requirements.

However, in the New England electricity market, energy efficiency providers that wish to enroll in Active Demand Response are required to have advanced metering that offers data at five-minute intervals, and the resources must be equipped with real-time telemetry. Mass market smart meters do not record data on five-minute intervals and they cannot perform real-time telemetry. This requirement thus effectively excludes residential customers from providing demand response services to the ISO-NE market. As a result, there is virtually no residential demand response in ISO-NE, even in those New England states that have invested in “smart” meters and encouraged greater demand response participation.

PJM and NYISO

21. Proposals would derate the capacity value of technologies based on their technical characteristics without justification

Some RTOs/ISOs, including the New York Independent System Operator (NYISO) and Mid-Atlantic operator PJM, have opened initiatives to integrate distributed energy resources and energy storage into wholesale markets. As part of those initiatives, however, some grid operators have proposed to significantly reduce the capacity value of duration-limited distributed energy resources and storage. These reductions in value (called derates) are based on modeling, not actual performance. For example, a four-hour storage resource – which is the current industry standard – would only receive 75% value in the NYISO markets once there are 1,000 MW of incremental Energy Limited Resources (including storage). This 75% value would apply even if the storage resource performed perfectly during peak conditions or reliability events. By contrast, a traditional generator that did not perform during such periods could still retain close to 100% capacity value.

Competitive markets should equitably compensate and penalize resources for the value they actually deliver. If grid operators have concerns about resource performance during reliability events, these concerns should be reflected in the capacity market design, with penalties for non-performance structured accordingly for all resources. In fact, such non-performance penalties are already in place, and it is unclear As grid operators submit proposals for FERC approval, the Commission should ensure that advanced energy resources receive proper compensation in the market and are not devalued in the market just because they are not traditional, centralized generation.