



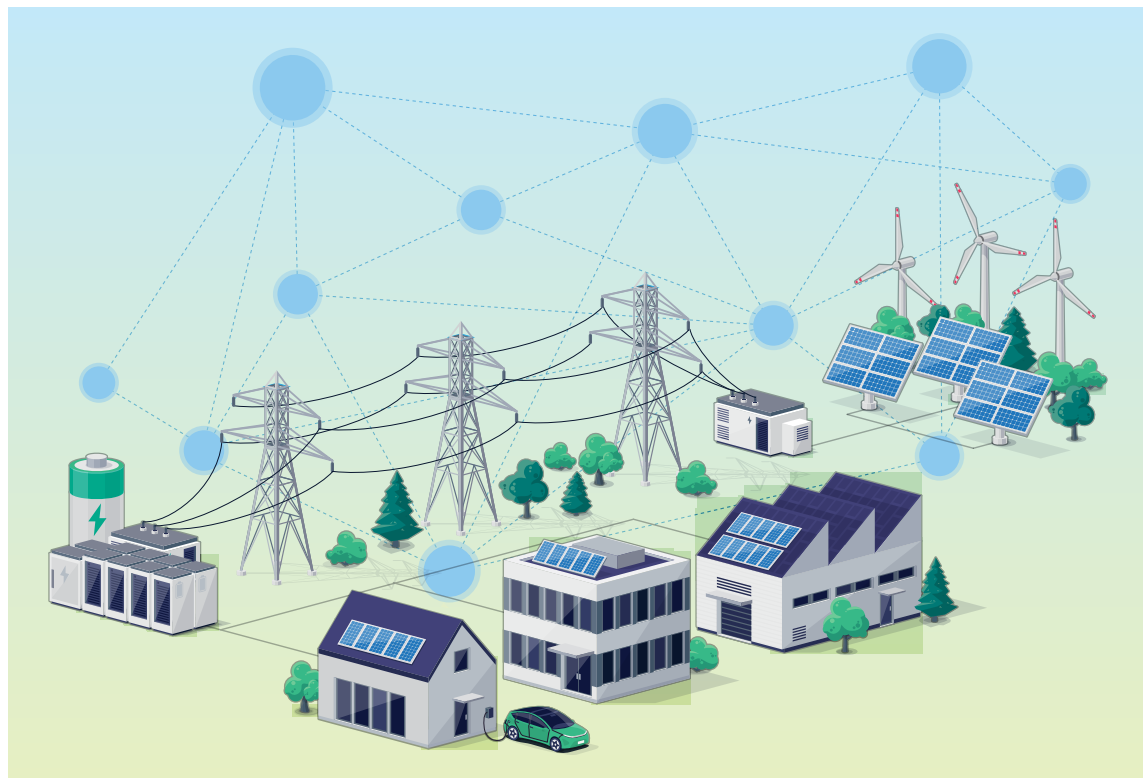
NARUC

National Association of Regulatory Utility Commissioners



National Association of
State Energy Officials

Distributed Energy Resources (DER) Integration and Compensation Initiative



*Summary of Expert Recommendations for Supporting
DER Aggregator Participation in Wholesale Markets
and Operations in Line with FERC Order 2222*

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The [NARUC-NASEO Distributed Energy Resources Integration and Compensation Initiative](#) (DER I and C) convenes and supports the National Association of Regulatory Utility Commissioners (NARUC) and the National Association of State Energy Officials (NASEO) state members in understanding the impact of their decision making related to the connection, operation, and compensation of distributed energy resources (DERs)¹ – within the distribution grid, bulk power system, and wholesale energy markets. Through the initiative, NARUC and NASEO provide information, tools, access to experts, and peer sharing opportunities that assist members with FERC Order 2222 implementation in Regional Transmission Organization/Independent System Operator (RTO/ISO) regions and state oversight of customer-distribution-transmission (TDC) coordination outside of RTO/ISO regions.

The Federal Energy Regulatory Commission (FERC) passed Order 2222 ([RM18-9-000](#)) in September 2020, allowing Distributed Energy Resources (DER) to compete alongside traditional generation resources in wholesale electricity markets through participation via DER Aggregators (DERAs). Order 2222 adds complexity to a system already in the midst of unparalleled change with current and anticipated growth of DER deployment. State and federal policy makers and regulators are evaluating and determining whether and where to establish new rules and requirements as well as enabling policies to bring both DERs and their aggregations onto the electricity system safely, fairly, and reliably.

While RTOs/ISOs are responsible for complying with Order 2222 directives, rules established by RTOs/ISOs may need to be carried out by other entities, such as distribution utilities, DERAs, and relevant electric retail regulatory authorities (RERRAs). This document was prepared to provide state energy decision makers such as Public Utility Commissions and State Energy Offices with a summary of state actions, considerations, and enabling policies related to Order 2222 implementation. The expert recommendations included in this document are compiled from three primary expert sources: Advanced Energy United's (AEU) [FERC Order 2222 Implementation: Preparing the Distribution System for DER Participation in Wholesale Markets](#), Electric Power Research Institute's (EPRI) [DER Aggregation Participation in Wholesale Markets](#), and Energy Systems Integration Group's (ESIG) [DER Integration into Wholesale Markets and Operations](#). In addition, the list of recommendations includes inputs from other reports, webinars, and conversations with industry experts. More information on these recommendations may be found in the above listed reports.

This information is intended as a starting point for exploration of the types of issues that Public Utility Commissions, State Energy Offices, and other state policy makers may face as DER aggregators prepare and begin to participate in wholesale markets. **How** these recommendations will be implemented is still being determined – the intention of the DER I and C Initiative is to update this information as more states develop and implement their own regulations and processes in line with FERC Order 2222.

Recommendations from experts are organized into six categories:

- **Overarching Recommendations.** This category considers alternative models, rules, and frameworks that bolster other sub-category recommendations and foster regulations that can be adapted for future changes.
- **Data and Telemetry.** This category focuses on technology and data-sharing practices that will allow for increased communication and coordination between DERs, DERAs, and utilities, all while focusing on customer protection.

1 For the purposes of this document, DERs are identified according to FERC's definition: DERs are small-scale power generation or storage technologies (typically from 1 kW to 10,000 kW) that can provide an alternative to or an enhancement of the traditional electric power system. These can be located on an electric utility's distribution system, a subsystem of the utility's distribution system or behind a customer meter. They may include electric storage, intermittent generation, distributed generation, demand response, energy efficiency, thermal storage or electric vehicles and their charging equipment.

- **Markets.** This category focuses on aggregators’ interactions with retail and wholesale markets to ensure the value of DERs and DERAs is maximized without compromising reliability of the grid. This category tackles issues such as dual compensation and dual participation as well as accurate valuation of DERs.
- **Utilities and DER Providers.** This category focuses on communication and coordination between DER providers and utilities, guaranteeing robust processes to identify and track DERs within aggregations and ensure fair processes between DERs, DERAs, and utilities.
- **Interconnection.** This category focuses on recommended interconnection standards and rules to facilitate Order 2222 implementation.
- **Planning.** This category focuses on recommendations for planning processes to anticipate the potential benefits and challenges of increased DER deployment and the alignment of state energy policies with planning processes.

Note that the order in which the information is presented is not indicative of any ranking or hierarchy of the importance of the recommendation.

I. Overarching Recommendations

- Consideration of Distribution System Operator (DSO) Model.** Consider the pros and cons of a utility model that is focused on efficient planning and operating of the distribution grid without being the resource provider (like a transmission RTO/ISO).
- Establish Consistent Terminology.** Terminology varies across regions and between transmission and distribution spaces and can cause a variety of challenges. Include terms and definitions from the start when working with working groups, forums, and collective groups of individuals and add meaningful adjectives to terms (i.e., use “behind the customer retail meter” instead of “behind the meter”) to reduce confusion and misunderstandings.
- Incorporate Flexibility to Accommodate Future Changes.** Consider higher degrees of DER deployment and potential for advanced technology in making decisions so that rules and processes do not have to be revisited as the industry evolves.
- Opportunities to Use Rate Authority to Influence Outcomes.** Explore options to facilitate desired policy outcomes through rate-related mechanisms like performance incentives.

II. Data and Telemetry

- Identify Customer Data Tools and Practices All While Protecting Customer Data Access and Privacy.** Identify best practices and tools to capture necessary data, and share tools that are easily accessible, all while protecting customer information.
- Determine Availability of AMI and AMI Capabilities.** Determine where utilities have deployed advanced metering infrastructure (AMI), how relevant AMI capabilities can be leveraged, where AMI is not deployed, and what capabilities are used instead and how utilities can access what is further needed to support DER deployment.
- Explore Technology and Practices that Provide Awareness of and Communications with DER Locations.** Explore technology and practices that provide information necessary to understand and gain insight into where DERs are on the system and communicate with those devices.

- D. **Determine Metering and Submetering Requirements and Interactions.** Include these requirements' interactions with retail billing and state metering requirements, as well as understanding new technology and oversight of tools to ensure they are aligned with DER integration, and specifying data exchange and access in tariffs.
- E. **Implement NARUC Resolution on adoption of IEEE 1547-2018.** The [resolution](#) calls for state commission adoption and implementation of DER Standard IEEE-1547, which is a set of technical standards and testing standards for systems-level DER interconnection into the distribution grid. IEEE 1547-2018 is an update of those technical standards that includes standards and testing of interconnection and interoperability between utility electric power systems and DERs.
 - a. **Develop Distinct Requirements for Controls and Monitoring.** Visibility and control of DERs on the grid should be considered separately; specifically, it may be necessary to identify scenarios where control is and is not automatically defaulted to Electric Distribution Companies (EDCs).
 - b. **Adopt Autonomous Control Features in IEEE 1547-2018.** This encourages DERs to be "good grid citizens" in a cost-effective manner and in one that does not compound utility responsibilities.
- F. **Determine Required Communications between DERs, DERAs, and Electric Distribution Companies.** This requires an understanding of all communication systems, equipment, and protocols needed for utilities to communicate with DERs and DERAs, what data needs to be exchanged, and an understanding of utility investment options and outcomes in communication investments for regulators to determine the validity of utility investments.
- G. **Determine Expectations and Communications on Distribution Overrides.** This will include determining which drivers and conditions will lead to soft versus hard overrides, the processes with which to conduct overrides, the required communication and coordination between EDCs, RTOs/ISOs, and DERAs to communicate expected conditions and adapt behavior, the ways to enable entities other than DERAs to dispatch DERs during system issues, public posting of outage information, and determining liability and dispute provisions.
- H. **Evaluate Existing Software and Determine New Software for DERA Commitment and Dispatch.** Determine whether existing software can handle large numbers of small DERAs for both commitment and dispatch-only, where limitations may arise, and what software or hardware solutions may allow for feasible run times.
- I. **Investigate Systems and Tools to Evaluate Real-Time Conditions Against Dispatch Signals.** Investigate advanced systems and tools that can evaluate real-time conditions against dispatch signals to maximize DER availability throughout the year, while maintaining system safety, reliability, and power quality. The anticipated tools will make it possible to study how often DERA overrides due to distribution constraints may occur during planning processes.
- J. **Demonstrate Effectiveness and Fairness of Alternative Metering/Energy Usage Monitoring/Telemetry with Pilot Programs and Other Demonstrations.** States and utilities can collaborate to run demonstrations of new products and services to catalyze their adoption into core system operations

K. Develop Guidelines and Methodologies to Conduct Private Impact Assessments for DERs.

With increased use and exchange of data, security controls, procedures, and security responsibility frameworks must be developed to prevent cybersecurity and data privacy breaches. Private Impact Assessments should consider both the financial and privacy impacts of adversarial exfiltration of resource registration information, bidding and cost information, individual DER system information, individual DER system performance data, customer energy use and production data, and personal identifiable information to develop needed controls, procedures, and frameworks.

III. Markets

- A. **Measure the Time and Locational Value of DERs and Value of Other DER Benefits.** Includes extending a more granular valuation of resources based on when they operate relative to peak demand and capacity on the grid (i.e., similar to wholesale LMP pricing), as well as other values that DERs bring to the grid (i.e., frequency regulation, resiliency, etc.).
- B. **Quantify and Track DER Benefits.** Identify who receives the benefits of DER services and the value of these benefits.
- C. **Develop Load Forecasting Reconstitution Practices for DERs.** Load forecasting reconstitution practices exist today for wholesale demand response in markets such as NYISO and ISO-NE; other grid operators can leverage these existing practices for DERs.
- D. **Establish Processes to Prevent and Identify Duplicate Compensation.** For example, eligibility criteria in the aggregation enrollment and review, including ways to operationalize those criteria.
- E. **Establish Models and Rules/Processes to Accommodate Dual Participation.** Consideration of, and accounting for, instances of dual participation where a DER's capability may be split to provide more than one distinct wholesale or retail service in a given interval. This includes identification of services and valuation, monitoring, penalties, dispatch, security considerations, and utility optimization.

IV. Utilities and DER Providers

- A. **Determine Aggregation Review/Certification Process.** Establish process, roles, and content for DER aggregators to connect to the distribution system and provide services in the wholesale market; likely intertwined with interconnection standards.
 - a. Consider whether a pre-registration process is necessary to give the regulator sufficient time to meet the FERC 60-day review period for wholesale market participation.
- B. **Establish Dispute Resolution Mechanisms.** Identify gaps in existing jurisdiction to address disputes between customers and DER providers, DER providers and utilities, and DER providers, utilities, and RTOs/ISOs. Include resource options like establishing an ombudsman.
- C. **Explore Authority and Best Practices to Ensure Fairness.** Arbitrate the balance between utility actions to ensure reliability and fair distribution of costs with the potential to create barriers to competition.
- D. **Parse Existing Utility Retail Programs.** Identify and attribute value to the individual components/services included in existing utility retail DER programs.
- E. **Explore Authority and Programs to Ensure Consumer Protection.** Evaluate existing, and the potential need for additional, authority to address consumer protection issues like improper sales tactics, contract issues, etc.

V. Interconnection

- A. **Review and Update Interconnection Standards and Rules.** Incorporate IEEE 1547-2018 standard and improve processes to facilitate DER integration (and eventual wholesale market participation), including distribution override procedures, consideration of existing and potential needed revisions to net metering policies, and utility incentives.
 - a. Clarify distribution override procedures and conditions, performance parameters, creation of DER database.
 - b. Reconsider, if necessary, net metering policies.
 - c. Ensure alignment of utility incentives.
- B. **Develop Hosting Capacity and Transparency for Generation and Load to Support Location Decisions.** Providing more detailed information on constrained areas of the grid can lead to increased understanding of interconnection costs and more efficient siting of DERs.
- C. **Address Potential Asymmetries.** For example, one potential asymmetry is that the cost to connect new load is socialized but the charge for interconnection of generation is not.

VI. Planning

- A. **Establish Consideration of DERs in State Decision Making.** Understand the scope of impacts and considerations that are expected in cases/decision-making venues with increases in DER deployment, including the impact of IJJA/IRA funding and corporate drivers on DER deployment.
- B. **Incorporate State Energy Policies in Planning Processes.** Decide how to include state policy goals and requirements in planning processes.
- C. **Evaluate Impact of DERs in Integrated Distribution Planning.** Incorporate best practices for integrated planning that considers the impacts of different levels of DER deployment, aggregation, and wholesale market participation.
 - a. Determine how to measure costs and benefits to parties (DER aggregators, customers) and the grid overall and how to allocate the costs.
 - b. Consider operational implications of different levels of DER and different use cases to gain insight into how the grid needs to be planned.
- D. **Improve Utility System Visibility/Transparency.** Evaluate and identify data and reporting necessary to provide oversight of utility planning and investment proposals.
- E. **Evaluate DERs for a Variety of Use Cases and Deployment Scenarios.** Create a resource that contains a spectrum of different potential use cases and future DER deployment scenarios (especially scenarios that incorporate state energy policies and/or address private sector demands for DER options) that can be used to explore potential planning outcomes.
- F. **Leverage IJJA/IRA Opportunities to Support Technology Development.** Provide resources to help state decision makers identify support opportunities from the IJJA and IRA and how to access them; include exploration of opportunities to collaborate with the private sector.

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