

# Creating a National DER Integration Initiative for the United States

## FACT SHEET

**D**istributed energy resources (DERs) have the potential to bring a range of benefits to the U.S. electricity system and the customers that it serves. These resources, including generation, storage, electric vehicles, and responsive load connected to the distribution system, can offer demand flexibility, lower emissions of greenhouse gases and criteria pollutants, customer choice, competition, rapid innovation, cybersecurity, and enhanced reliability and resilience of the electricity system. Enabling DERs to provide these benefits will require ongoing changes in multiple areas—DER interconnection to the grid, distribution and transmission planning, data access and communication, distribution system operations, utility regulation, tariffs, electricity markets—that better integrate DERs into electricity systems.

Several initiatives are underway to address DER integration issues, from the Federal Energy Regulatory Commission's (FERC) Order 2222 to California's Rulemaking on a High Distributed Energy Resources Future. However, these initiatives are limited in jurisdictional and geographical scope and have different areas of focus. They reflect a provincial and piecemeal approach to addressing DER integration issues that will lead to limited national progress toward realizing the benefits that DERs can provide. FERC Order 2222, for example, provides only limited guidance on how distribution operators should carry out non-discriminatory overrides of market dispatch instructions—state regulators and utilities will need to develop solutions.

Currently, individual states, such as California and New York, are developing their own distribution-level solutions to DER integration. While these efforts are reflective of the actions of individual, forward-looking states, this approach is inefficient, as each state has to

essentially reinvent the wheel. This situation will lead to a proliferation of disparate standards, terminology, and approaches around DER integration across the United States, which in turn will generate confusion and increase costs among manufacturers, developers, and other DER service providers. It will ultimately result in less access to distribution systems for DER providers, higher DER costs, and lower DER benefits to customers.

### Need for a National Initiative on DER Integration

A U.S. national initiative around DER integration issues could help to accelerate national progress on DER integration. This initiative could address three fundamental gaps around DER integration in the United States:

- The lack of a **common vocabulary, framework, and vision** for thinking about DER integration across different jurisdictions
- The lack of a **common understanding around shorter-term, least-regrets strategies** for DER integration that are consistent across distribution utilities, including strategies for enhancing distribution and transmission planning, data sharing and communication, distribution operations, and DER interconnection and aggregation review
- The lack of a **structured dialogue on solutions to longer-term issues** around DER integration, such as the design of distribution system operator (DSO) operations, markets, and regulation; federal-state jurisdictional overlap; independent system operator (ISO) market design; and incentive frameworks for regulated utilities

**This fact sheet is adapted from ESIG's report [The Transition to a High-DER Electricity System: Creating a National Initiative on DER Integration for the United States](#).**

A national initiative around DER integration could build on recent, related cross-state initiatives in the United States, such as the National Association of Regulatory Utility Commissioners (NARUC) and National Association of State Energy Officials (NASEO) Task Force on Comprehensive Electricity Planning,<sup>1</sup> and could draw from the recent experiences of Australia's OpEN Energy Networks Project and the United Kingdom's Open Networks Project.<sup>2</sup> A U.S. national initiative could also build on related Order 2222 efforts, including the Energy Systems Integration Group's (ESIG's) report *DER Integration into Wholesale Markets and Operations* and related efforts by the Electric Power Research Institute, Advanced Energy Economy, and GridLab.<sup>3</sup> These efforts describe key challenges that must be solved to facilitate Order 2222 in the short term and expand opportunities for integrating DERs into power systems over the longer term. All highlight the need for broader venues that facilitate cross-state knowledge sharing.

## Design of a National Initiative

A national initiative would develop greater consistency and consensus around DER integration in the United States. ESIG's report *The Transition to a High-DER Electricity System: Creating a National Initiative on DER Integration for the United States* outlines a possible design, process, and governance for a structured work effort that would address the three gaps described above, and is intended to be useful for multiple audiences including national-level organizations that may wish to integrate these elements into their ongoing efforts and stakeholders who may be participants in the national initiative.

The national initiative would build on existing efforts such as the NARUC-NASEO Task Force and work by the Electric Power Research Institute on coordination between transmission and distribution system operators. While many of these existing efforts are focused on



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specific topics, a national initiative is intended to be more comprehensive and provide common reference points that enable broader consensus among stakeholders. It would be broadly inclusive, enabling participation by different kinds of utilities (investor-owned, municipal, cooperative) and their associations (the American Public Power Association, Edison Electric Institute, and National Rural Electric Cooperative Association), regulators, NARUC, and NASEO, as well as participation by jurisdictions that are within and outside of regional transmission organizations and ISOs.

The proposed national initiative employs a staged approach. The initial focus would be on technical foundations and developing a common vocabulary, framework, and vision (Track 1); a subsequent focus would identify least-regrets strategies (Track 2); and a final focus would initiate structured dialogue to address issues that will require more time to resolve (Track 3). See Table 1 (p. 3).

1 <https://www.naruc.org/taskforce/resources-for-action>.

2 Energy Systems Integration Group, *Lessons Learned for the U.S. Context: An Assessment of UK and Australian Open Networks Initiatives*, Report of the Distributed Energy Resources Task Force (Reston, VA, 2022), <https://www.esig.energy/der-integration-series-Australia-UK>.

3 Energy Systems Integration Group, *DER Integration into Wholesale Markets and Operations*, Report of the Distributed Energy Resources Task Force (Reston, VA, 2022), <https://www.esig.energy/der-integration-into-wholesale-markets-and-operations>; Electric Power Research Institute, *TSO-DSO Coordination Functions for DER*, Report 3002021985, Technical update, January 2022 (Palo Alto, CA), <https://www.epri.com/research/products/00000003002016174>; Advanced Energy Economy and GridLab, *FERC Order 2222 Implementation: Preparing the Distribution System for DER Participation in Wholesale Markets* (2022), <https://gridlab.org/wp-content/uploads/2022/01/AEE-GridLab-FERC-O.2222-Campaign-Final-Report.pdf>.

## Creating Common Concepts and Vocabulary, Potential Solutions That Can Be Tailored, and More Alignment Across the Industry

The most important value of a U.S. national initiative around DER integration, relative to each jurisdiction developing solutions independently, is the potential to create common concepts and vocabulary, more standardized solutions to nearer-term DER integration challenges, and more alignment across the industry on how to resolve longer-term challenges. Greater national consensus around DER integration would help to provide distribution utilities and their regulators with more visibility on possible paths forward for DER integration, grid technology manufacturers with more clarity on where to focus innovation, DER developers with more consistency in rules across states, and ISOs with a more discrete set of models for nearer-term and future distribution system planning and operations that they would need to accommodate.

This initiative would not seek to produce one-size-fits-all solutions to DER integration issues across the United States. The U.S. electricity sector is too diverse and complex, in terms of both industry structure and its federalist regulatory system, for blanket solutions to be effective. Instead, the national initiative would seek to develop a limited number of potential solutions that different jurisdictions and utilities can choose from and tailor to their own conditions. For instance, in some jurisdictions, distribution system operations might be more passive, with the distribution utility having a minimal role in DER operations, whereas in other jurisdictions the DSO may actively dispatch, control, and run markets for DERs. The concepts and strategies developed in a national initiative would need to be broad enough to accommodate different approaches while at the same time recognizing that different approaches share a common technical foundation in physics, engineering, and economics.

**TABLE 1**  
**Tracks, Workstreams, and Challenges Addressed in a Proposed National Initiative Around DER Integration**

Track	Workstream	Challenges
<b>Track 1: Technical foundations</b>	<b>Workstream A:</b> Common vocabulary, framework, and vision	Regulators, utilities, and other stakeholders lack a common foundation for thinking about the potential models and functions for future distribution system operations.
<b>Track 2: Least-regrets strategies</b>	<b>Workstream B:</b> Coordinated planning	Distribution and transmission planning are often not well coordinated, in terms of inputs (e.g., load and DER forecasts), engineering studies, and investments; distribution planning is often not well integrated across different utility departments; infrastructure planning (e.g., electric vehicle charging networks) is often not coordinated with utility planning.
	<b>Workstream C:</b> Data access and communication	The electricity industry lacks more standardized rules and procedures for sharing and communicating distribution-level data, for instance, on distribution interconnection queues, planning assumptions, and distribution operations.
	<b>Workstream D:</b> Distribution operations	Distribution utilities will need to upgrade their operations to enable new functionality in the nearer term, including non-discriminatory overrides to ISO dispatch of DER aggregations under Order 2222 and dynamic export limits for interconnecting DERs.
	<b>Workstream E:</b> Interconnection and aggregation review	Distribution utilities will need to develop and enhance DER interconnection and aggregation review processes, including technical standards (IEEE 1547-2018 adoption), and transparent procedures for reviewing DER aggregations under Order 2222.
<b>Track 3: Dialogue on longer-term issues</b>		The industry lacks a structured dialogue on DER integration issues that will require several years to address, such as DSO functions and regulation, clarifying federal-state jurisdiction, ISO market design, and utility regulation.



Stakeholder engagement will be a critical and challenging component of a U.S. national initiative around DER integration. The U.S. electricity system is very large and its stakeholders are numerous and diverse. Obtaining stakeholder buy-in will require transparency, broad representation, and many opportunities for meaningful input. At the same time, the organizers of a national DER integration initiative will need to ensure that it is focused enough to produce actionable results. ESIG's report *The Transition to a High-DER Electricity System: Creating a National Initiative on DER Integration for the United States* proposes a potential governance structure and stakeholder engagement model that would balance these two imperatives.

## The Time Is Right

Designing and implementing an impactful national initiative around DER integration will require careful attention to both design and process as well as skilled organizers that can effectively balance trade-offs and bridge gaps among stakeholders. To be successful, the initiative would need to provide regulators, utilities, and other stakeholders with common concepts, frameworks, and strategies they can use, while also providing flexibility to tailor these to local needs. Despite the

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challenges of developing consensus and standardization across such a complex and diverse industry, the potential benefits are significant.

The timing is right for a national initiative. Many jurisdictions are currently struggling with FERC Order 2222 implementation and are beginning to consider how the distribution system should evolve with higher levels of DERs—and they are doing so without the benefit of common technical foundations on nearer-term strategies, a longer-term vision, and transition strategies. A national dialogue could create these common reference points, accelerating progress toward finding solutions to DER integration challenges and ultimately toward realizing the full range of benefits of DERs.

Adapted from *The Transition to a High-DER Electricity System: Creating a National Initiative on DER Integration for the United States*, a report by the Energy Systems Integration Group's Distributed Energy Resources Task Force. This fact sheet and the full report are available at <https://www.esig.energy/der-integration-series-US-initiative>.

To learn more about the recommendations described here, please send an email to [info@esig.energy](mailto:info@esig.energy).

The Energy Systems Integration Group is a nonprofit organization that marshals the expertise of the electricity industry's technical community to support grid transformation and energy systems integration and operation. Additional information is available at <https://www.esig.energy> and [info@esig.energy](mailto:info@esig.energy).

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