DER Integration and Compensation Initiative

Virtual Workshop Report-Out: Aggregated DER Interconnection

Context

On Thursday April 4, 2024, NARUC and NASEO hosted the second workshop of the DER Integration and Compensation Initiative, covering policies and regulations to enable and accelerate aggregated DER interconnection. This report-out offers a brief account of the workshop and provides readers with access to relevant resources.

Objectives

The workshop sought to achieve the following objectives:

1. Learn about potential challenges to DER interconnection across jurisdictions.
2. In interactive breakouts, discuss interconnection with peers and experts, including surfacing key issues and proposed solutions to those issues.

Four speakers supported the workshop with mini talks and breakouts where they provided their perspective on interconnection and discussed potential ways to reduce interconnection barriers.

- **Amy Heart**, Vice President – Public Policy, Sunrun
- **Frank McElvain**, Senior Utilities Engineer, California Public Utilities Commission
- **Sydney Forrester**, Policy Researcher, Lawrence Berkeley National Laboratory
- **Raghusimha Sudhakara**, Vice President – Distributed Resources Integration, Con Edison

Aggregator Perspective (Amy Heart, Sunrun)

Role in the interconnection process

Sunrun is the nation's leading provider and installer of home solar and battery solutions (connections that are less than 25 kW in size). They work across 22 states and manage the interconnection application process on behalf of customers. They stay engaged with both the utility and the customer in managing the permitting and interconnection processes.

Key barriers to interconnection and proposed solutions

Amy heart discussed the following key barriers to interconnection and proposed solutions:
When currently modeling interconnection, utilities may find feeders have constrained capacity, which leads to customers getting their interconnection applications getting turned down completely, or have long costly studies that can result in project being abandoned. Fully utilizing the volt-var and volt-watt functions of smart inverters can help to alleviate some of these concerns, as long as these functionalities come with consumer protections to avoid excessive curtailment. This was successfully demonstrated by a pilot that National Renewable Energy Lab conducted in Hawaii, which has resulted in successful, permanent solutions. The volt-watt smart inverter function was able to autonomously curtail exports based on the capacity of the grid whenever there were capacity constraints at a given feeder.[1] The pilot also was able to provide information to the utility on how often resources were being curtailed, which could inform when the feeder needed to be a part of the utility's upgrade plan. The study initially showed that no autonomous curtailment was actually needed. The permanent solution in Hawaii critically provides consumer protection provisions to avoid excessive long-term curtailment, directing the utility to put constrained

[1] Steven Rymsha, *New York ITWG: Hawaii's Pathway to Leveraging Smart Inverters,* Sunrun, September 15, 2022, https://dps.ny.gov/system/files/documents/2022/11/si-hawaii-smart-inverter-settings.pdf.

feeders that have seen volt-watt activated in their distribution plans for upgrades within a year. Another example is Rule 21 in California, which has a path to fully utilized smart inverter functions.[2]

Small interconnection and large interconnection projects differ in scale and complexity, and trying to write rules that standardize all interconnection does not appropriately address this heterogeneity. Separately standardizing rules for smaller interconnections and larger interconnections can streamline the process while still allowing for the complexity of larger interconnections that can take more time. The small interconnections that Sunrun works with (< 25 kW) can be standardized in costs (e.g. a flat interconnection fee), more instantly activated by turning on smart inverter settings, and can benefit from setting milestones and timelines to help improve the interconnection process for customers.

Utility Perspective (Raghusimha Sudhakara, Con Edison)

Role in the interconnection process

The utility manages the interconnection of power generation equipment to the electric grid, a job that involves design, evaluation, and technical or material problem-solving.

Key barriers to interconnection and proposed solutions

Raghusimha Sudhakara discussed the following key barriers to interconnection and proposed solutions:
The interconnection process is currently too homogenous. Policies for the interconnection process should support and recognize project diversity, grid diversity, and location diversity. In the last four years, 99.7% of ConEd's interconnections ran smoothly and there is a very small number of projects (0.3%) that require additional attention and resources. ConEd's perspective is that it is better to focus the additional attention on the small number of projects that are more complex rather than trying to create a new process that tries to encompass all DER interconnections. Projects that are smaller can be more standard, but larger projects (>50 kW) require more variation.

The interconnection process is complex and can have a high barrier to entry for new developers. Policymakers should support outreach and education for new developers and new technologies. Utilities should also provide clarity around programs and incentives to encourage a smooth process. Utilities need to reach out to both customers and developers, and have transparent and easily communicated initiatives. Providing basic materials to help set expectations, and setting up workshops where developers can hear about the interconnection process from end to end from the utility perspective can both help to set expectations and provide developers with resources.

A compliance framework for interconnection will result in focusing energies on not missing deadlines or other interconnection process metrics rather than improving interconnection far beyond the minimum standard. Based on ConEd's experience in New York, an interconnection process that incentivizes utilities to do better than an established standard can encourage innovation that drives efficiencies in process, timelines, and perhaps even cost. This results in better outcomes for developers and customers. ConEd for example, has a DER Utilization Earnings Adjustment Mechanism (EAM), that in 2022 led ConEd to automate processes for interconnection queue management in 2022.[3]

[2] "Electric Rule 21: Generating Facility Interconnections," California Public Utilities Commission, accessed May 2, 2024, https://www.cpuc.ca.gov/Rule21/.

[3] *2022 Con Edison Earnings Adjustment Mechanism Achievement Report,* State of New York Public Service Commission, March 31, 2023, *https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BB01A3987-0000-C536-B0E9-DD3749159FEA%7D*.

PUC Perspective (Frank McElvain, California Public Utilities Commission)

Role in the interconnection process

The California PUC has jurisdiction for the interconnection process by establishing rules that promote safety, reliability, and resilience in a fair and cost-effective manner.

Key barriers to interconnection and proposed solutions

Frank McElvain discussed the following key barriers to interconnection and proposed solutions:
There are significant gaps in communication between the utilities and the developers. There should be a single entity that represents the developers to deal with interconnection with utilities. Utilities have a lot of specific expertise and not all developers speak the same language as the utilities, which leads to a lot of missed communication that occurs in both directions. The entity could be a DSO or another organization that could speak for developers, negotiate contracts, and speak to technical operations.

Lab Perspective (Sydney Forrester, Lawrence Berkeley National Laboratory)

Role in the interconnection process

Lawrence Berkeley National Laboratory conducts various research projects in the interconnection space. Sydney's group is currently researching the rules and participation models that encourage or discourage ADER participation in wholesale markets. The goal of the research is to encourage aggregated DER operation while maintaining safety and reliability.

Key barriers to interconnection and proposed solutions

Sydney Forrester discussed the following key barriers to interconnection and proposed solutions:
The interconnection process is complex and requires many different entities to participate. It is important to support coordination between multiple parties to identify priorities and planning for the near, mid, and long-term. Prioritization should include both how easy it is to do something, and how important it is to do something.

Interconnection requirements must balance the hardware, software, and operational needs that would allow aggregated DERs to successfully participate in wholesale markets without posing undue cost burden to participants. This can ensure that resources are being better utilized across both wholesale and retail markets while ensuring sufficient data for operational reliability and avoiding double counting.

Potential Actions NARUC and NASEO Policymakers May Consider to Support DER Interconnection

1. Standardize interconnection processes where it is suitable to do so, noting that the process does not need to be standardized for all DER interconnections. Smaller simpler interconnections can be standardized, but larger complex projects are more unique and may be best dealt with on an individual basis to effectively manage resources and project specifics.

   Standardized processes can cover both costs and timelines, and in doing so can enable a consistent customer experience in DER interconnection and set clear expectations for utilities.

2. **Support communication between developers, customers, and utilities.** One option to encourage communication is to encourage and support education efforts such as working groups or requiring that the utility engage with the developer directly. An alternative may be to set up an entity that is able to represent developers and has subject matter experts that can communicate with the utilities on the behalf of developers.

   Policymakers may consider focusing on communication improvements to support DER interconnection and use their position to support constructive engagements.

3. **Support an "excellence framework" for DER interconnection.** Performance Incentive Mechanisms, such as

the DER utilization EAM in New York, can incentivize utilities to innovate and perform above and beyond interconnection standards that are set. Hawaii is another example of a state that has used performance incentive mechanisms to incentivize utilities to improve their interconnection process.

Policymakers may consider implementing a performance incentive mechanism that encourages utility innovation around improving the DER interconnection process.

4. **Support pilots that demonstrate how to fully utilize DERs when interconnected.** To mitigate possible concerns that DER interconnections may cause grid management issues, policymakers may consider the development and integration into utility business practices of pilots such as Sunrun's Hawaii Quick Connect Program. These can demonstrate how to fully utilize the capabilities of DERs and reduce the risk of capacity constraints that can arise from DER interconnection.

   Policymakers may consider focusing efforts on developing demonstrable route to DER interconnection, thereby mitigating against possible barriers to DER interconnection at scale.

Resources

NARUC Grid Data Sharing Framework: https://www.naruc.org/core-sectors/energy-resources-and-the-environment/smart-grid-grid-modernization/grid-data-sharing/

LBL Technical Assistance: https://emp.lbl.gov/projects/state-TA-program

Sunrun Hawaii Quick Connect Program: https://dps.ny.gov/system/files/documents/2022/11/si-hawaii-smart-inverter-settings.pdf

California Electric Rule 21: https://www.cpuc.ca.gov/Rule21/

Summary of Hawaii's DER Interconnection Performance Incentive Mechanism: https://efiling.energy.ca.gov/GetDocument.aspx?tn=250068&DocumentContentId=84786