

GRID CONNECTIONS

CHALLENGES, LEAST-REGRETS SOLUTIONS, AND KEY TAKEAWAYS



Background

In April 2024, the CHARGED Initiative held its Inaugural Convening in Boulder, CO, where 60 participants from across the industry collaborated on potential electrification solutions across five utility-related workstreams: distribution system planning, rates and incentives, targeted and integrated deployment, grid connection, and distribution system operations. This factsheet shares the key outcomes of the Grid Connection working group, who focused on identifying actionable improvements to interconnection processes to help further electrification. These improvements help avoid expensive grid upgrades, speed up the interconnection queue, and unlock unused grid capacity.

Key Takeaways

- ▶ **Grid Connection is becoming a bottleneck for electrification** — The rapid growth of new electric loads and the comparatively slow pace of grid upgrades are creating challenges with high costs and long delays.
- ▶ **Flexible Grid Connection (FlexGC) is a critical and readily available solution** — Static and dynamic methods allow customers to connect to the grid quicker when agreeing to operating limits.
- ▶ **Better sizing methods can avoid unnecessary upgrades** — Updating sizing calculations to reflect real load diversity and electrification patterns can significantly reduce labor and investment costs.
- ▶ **Streamlined, transparent load connection processes are important** — Many utilities need clear, customer-facing load connection processes that emphasize transparency, less back-and-forth, and self-service tools.
- ▶ **Early engagement with customers is essential** — Early engagement with customers improves visibility into future load growth, system planning, and use of flexible or lower-cost connection options.

What are the core challenges?

Core challenges to grid connection can be summed up across three themes:

Traditional Interconnection Processes	Traditional interconnection processes are conservative and need modernization. Studies often underestimate available capacity and formal load connection processes are lacking.
Adaptive Tools Needed	Limited historical data and inaccurate load forecasts can lead to inaccurate upgrade needs and associated cost projections. There is uncertainty with EV load growth and changes to patterns of EV use.
Allocating Costs	Limited data and traditional processes can raise challenges with fair cost allocation across customers.

What immediate, actionable grid connection solutions exist?

Convening participants discussed and prioritized eight potential “least-regrets” solutions, which we define as practices that most or all jurisdictions can implement in the near term with minimal downside. * indicates a prioritized solution.

GRID CONNECTION SOLUTIONS	DESCRIPTIONS
Sizing calculations*	Reviewing transformer sizing calculations and subdivision design calculations and standards to incorporate electrification impacts
Load connection processes*	Exploring the changes needed for more formal load connection processes
Static interconnection limits*	Enabling static interconnection limits for larger customers
Performance and utilization assumptions	Building and refining data-driven methods for determining demand factor, load profile, and energy usage for use in equipment sizing and connection study processes
Hosting capacity maps	Exploring the benefits and costs of hosting capacity maps for loads
Grid readiness standards	Assessing the adequacy of current grid readiness standards and propose new standards or harmonization of existing standards, if needed
Early engagement	Establishing early engagement between fleet owners, municipalities, and utilities to increase visibility of upcoming needs before the formal connection request
Connection cost allocation methods	Reviewing methods for connection cost allocation to ensure they are robust to electrification-driven load growth

For each of the three solutions prioritized by the working group, utilities and other actors can take the following immediate actions to deliver high-impact and achievable electrification outcomes:

PRIORITIZED SOLUTION	ACTIONS
Sizing Calculations	• Improve data-driven methods to model demand factor, load profiles, and energy use for distribution system equipment sizing and connection studies • Update utility calculation tools and approaches for sizing service transformers, subdivisions, and building infrastructure • Promote data sharing and collaboration across utilities and industry on load profiles
Streamlined Load Connection Processes	• Streamline processes to shorten connection timelines, improve customer visibility into the process, and reduce customer-utility back-and-forth • Expand customer self-service tools for applications, status tracking, and disconnect/reconnect requests • Develop fast-track screens to reduce process burdens where practical
Static Flexible Grid Connection	• Deploy load connection options that are based on flexible interconnection limits, rather than nameplate capacity, to enable faster and less expensive connections and avoid distribution system and customer upgrade costs • Build industry adoption and confidence through clear standards and proven use cases • Capture utility process impacts and identify necessary modifications to enable flexible grid connection options

CHARGED has continued working on these issues in subsequent activities. See [Charged Resources](#), in particular, the [Flexible Grid Connections Implementation Guide](#) report and fact sheets.

This fact sheet summarizes the findings from the Grid Connections chapter from the [CHARGED Initiative Inaugural Convening Report \(2024\)](#).