

SUMMARY FROM THE
2024 CHARGED INAUGURAL
CONVENING REPORT

DISTRIBUTION SYSTEM PLANNING

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 distribution system planning working group, who focused on practical forecasting, modeling, and investment strategy improvements to support electrification.

Key Takeaways

- ▶ **Uncertainty in load growth is a central challenge** — Electrification-driven load growth is uncertain in terms of timing, location, and magnitude; improvements to forecasting and planning, including consideration of tools like managed charging can help manage this growth.
- ▶ **Scenario-based, bottom-up forecasting is necessary** — Scenario-based forecasts that incorporate DERs, electric vehicles (EVs), heat pumps, and customer behavior enable more holistic planning.
- ▶ **Planning models must evolve beyond single-peak analysis** — Existing power flow models need to be enhanced to include items like multi-hour analysis, DER impacts, and managed EV charging.
- ▶ **Strategic, proactive investments can reduce long-term costs** — Accounting for risk mitigation methods for cost recovery and asset utilization, upgrading infrastructure proactively can lower total system costs.

What are the core challenges?

Core challenges to distribution system planning can be summed up across three themes:

Load and Resource Forecasting	Accurately predicting when, where, and how much load will grow is difficult, carries high uncertainty, requires transitioning from top-down to bottom-up forecasts, and is complicated by organizational silos.
Planning Models	Existing distribution system planning models may need enhancements to accurately determine investment needs, such as decoupling gross from net load, and accounting for the impact of managed charging.
Strategic, Proactive Investment	Balancing proactive grid upgrades/investments (to ensure the grid is ready to meet anticipated load growth) with concerns about cost, utilization, equity, and regulatory approval can be challenging.

What immediate, actionable grid connection solutions exist?

Convening participants discussed nine potential “least-regrets” solutions, which we define as practices that most or all jurisdictions can implement in the near term with minimal downside. See the solutions below along with voting results on their priority level and whether they are a least-regrets solution (LRS). Participants identified the top 3 solutions that should be prioritized (indicated by a *).

DISTRIBUTION PLANNING SOLUTIONS	IS HIGH PRIORITY	NOT HIGH PRIORITY	IS LRS	TOO OPEN
Consider DSM and managed charging in investment planning	6	1	4	5
Better insight into customer load growth, especially for large customers like fleets	8	1	7	0
Improved forecasting, power flow modeling*	7	0	8	0
AMI data use in forecasting/planning	7	0	3	3
Make proactive upgrades by leveraging routine investment processes like outage restoration*	8	0	6	1
Adoption of power flow modeling	2	4	2	0
Update design standards for load additions	2	0	1	2
Planning for operational flexibility*	6	0	4	0
Resilience and equity assessments	8	1	1	5

* indicates a prioritized solution

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
Improved forecasting, power flow modeling	• Improve regulatory processes to review and approve distribution plans • Adding scenario planning requirements to forecasting
Proactive upgrades with routine investments	• Tools to help regulators understand opportunities • Coordination within utilities among planning, engineering, and supply chain management • IT for developing analysis and management tools
Planning for operational flexibility	• Education and foundational guidance to regulators and policymakers • National funding to enhance workforce • Align departments in utilities • Clear value proposition to and from multiple stakeholders

CHARGED has continued working on these issues in subsequent activities. See [Charged Resources](#), in particular, the Proactive Investment Framework and the 2025 Convening Report Risk Management Tools for Proactive Investment Chapter.

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

