The Role of DERs in a High-Growth, High-Cost Future

PETER FOX-PENNER

SANEM SERGICI

RYAN HLEDIK

AKHILESH RAMAKRISHNAN

NARUC SUMMER POLICY SUMMIT
BRATTLE BREAKFAST DISCUSSION

JULY 21, 2026

Brattle

Agenda

7:45–8:00 a.m. — **Arrival and Breakfast**

8:00–8:15 a.m. — **Welcome Remarks**

Peter Fox-Penner

8:15–9:15 a.m. — **Presentations**

TOPIC 1	TOPIC 2	TOPIC 3
A New Framework for DER Value in the Speed-to-Power Era *Presented by Sanem Sergici*	**Affordability: Benefits of Improved Grid Utilization** *Presented by Ryan Hledik*	**Unlocking Grid Flexibility: How DERs Can Power Smarter Distribution Planning** *Presented by Akhilesh Ramakrishnan*

9:15–10:00 a.m. — **Interactive Discussion**

A NEW FRAMEWORK FOR DER VALUE IN THE SPEED-TO-POWER ERA

SANEM SERGICI

NARUC SUMMER POLICY SUMMIT
BRATTLE BREAKFAST DISCUSSION

JULY 21, 2026

Brattle

DERs Serve a Similar Function Under Both Deferral and Speed-to-Power Paradigms

- By reducing load, shifting load, or injecting power at the right place and time, DERs can **reduce the net peak load** of the grid assets serving the location (Figure A).
- Alternatively, DERs **increase the hosting capacity** of the grid to serve this load (Figure B).

Figure (A)

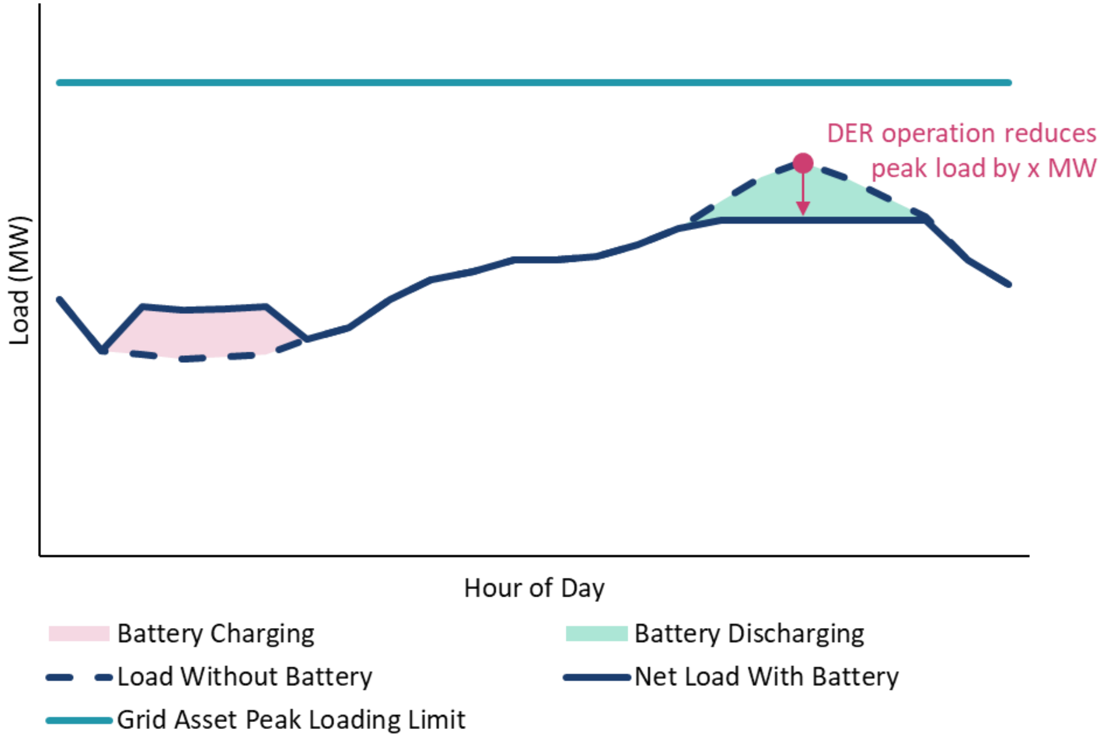
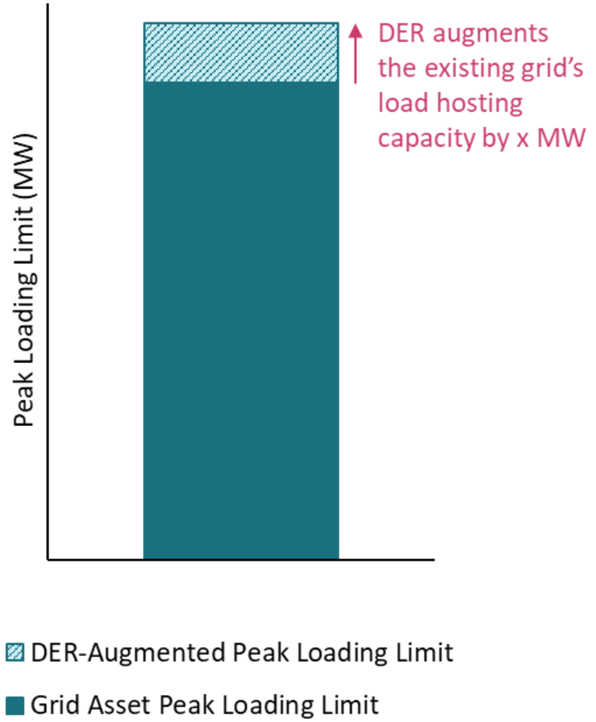


Figure (B)

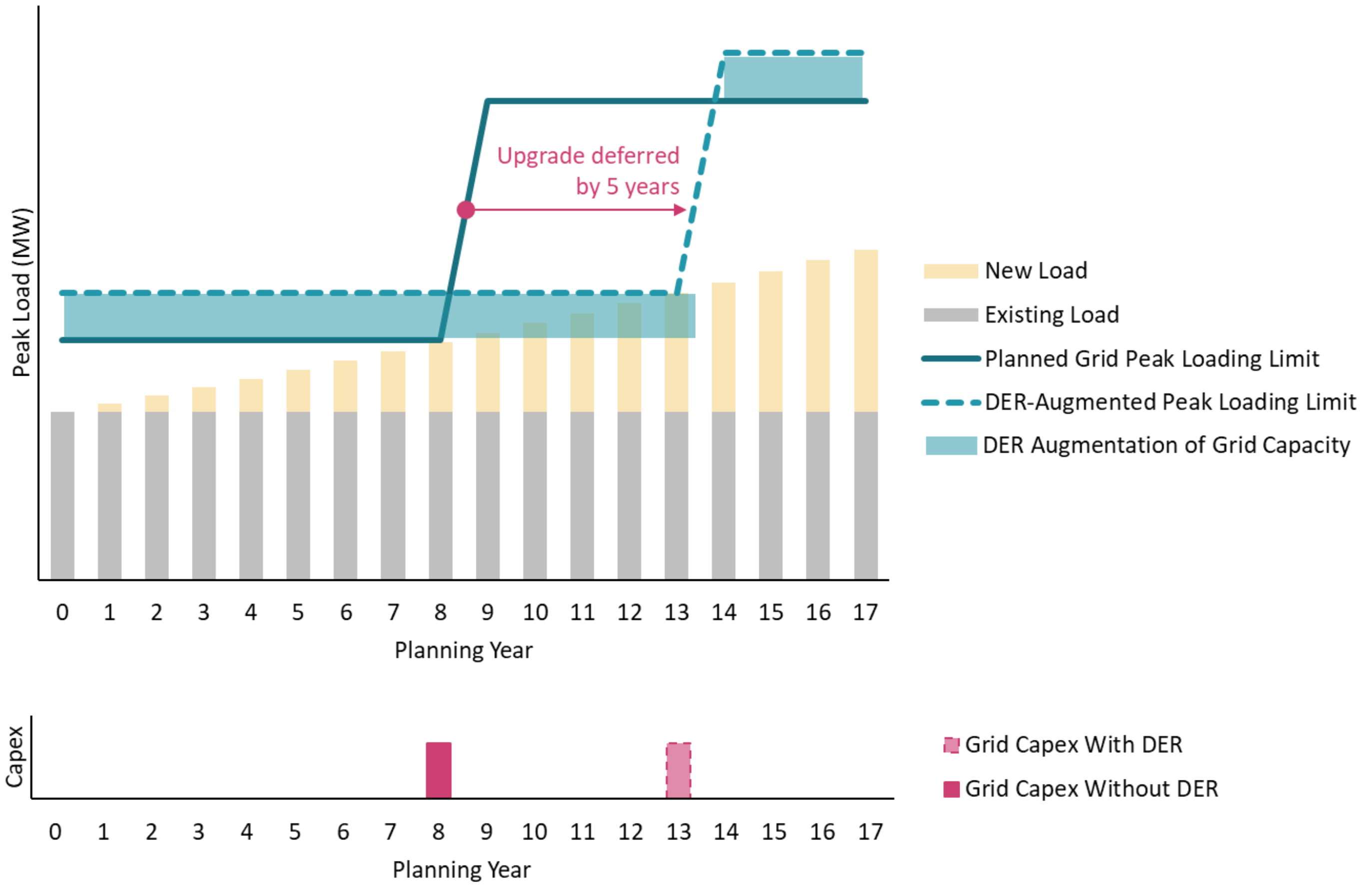


The Traditional "Deferral Paradigm"

The traditional **deferral paradigm** asks whether DERs can avoid or defer generation, transmission, or distribution investments.

If DERs reduce peak load at the right location and time, they can delay a planned grid investment.

- The value is the avoided or deferred cost of that investment, adjusted for timing, reliability, deliverability, and implementation cost.
- This logic underlies most DER compensation frameworks in the US today.



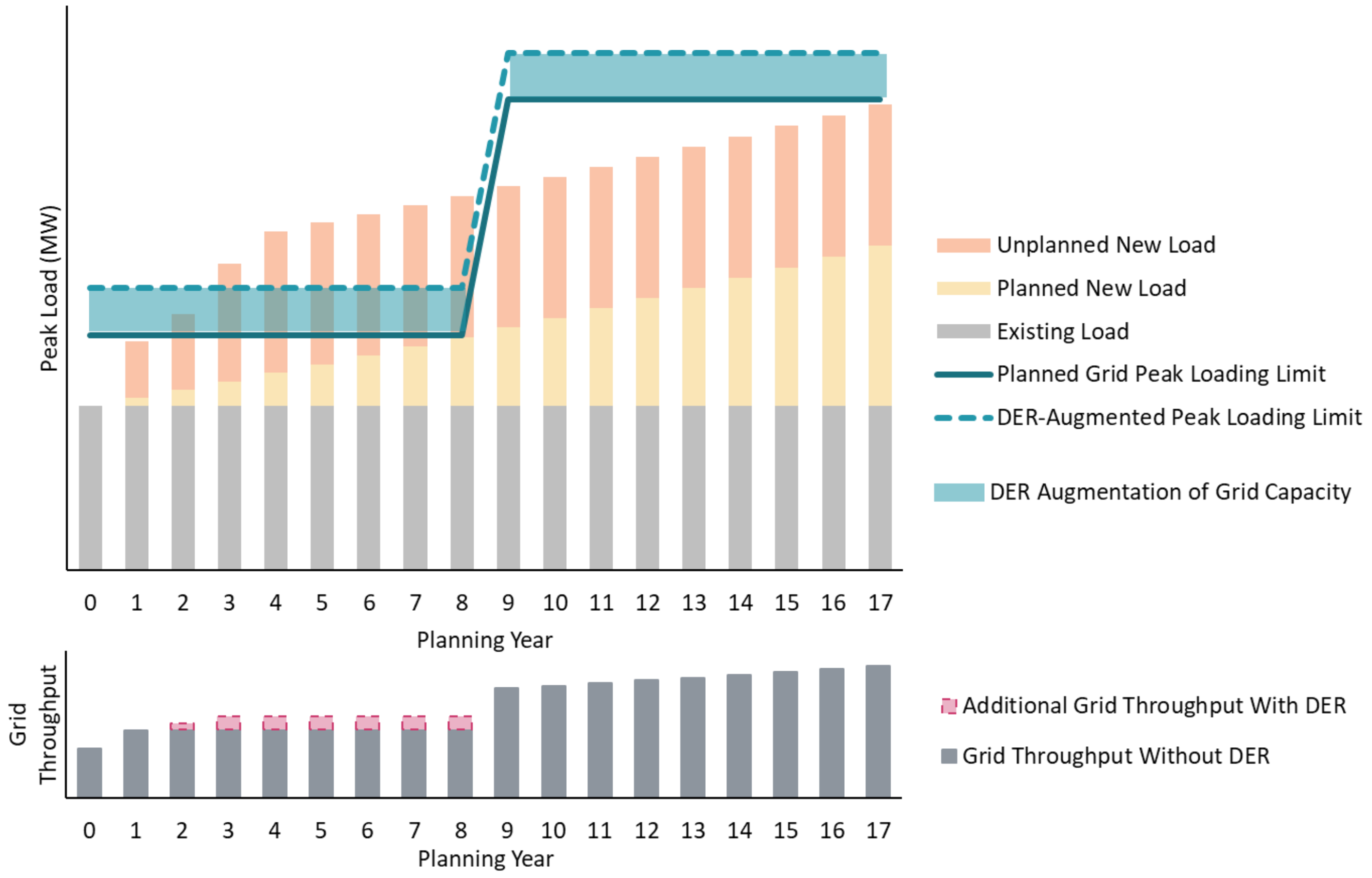
The key need is evolving from "how do we defer building?" to "how do we connect load before planned upgrades are complete?" in some jurisdictions.

The "Speed-to-Power" Paradigm

In the **speed-to-power paradigm**, DERs create value by increasing usable grid headroom and accelerating interconnection of new load.

Deferral and STP paradigms are not necessarily mutually exclusive.

Most DERs will exist in some mix of the two paradigms at any given time or transition between paradigms at different points during their useful lifetime.



This Paradigm Shift Raises Three Key Questions

1. Should the value of DERs be measured differently under the STP Paradigm than under the Deferral Paradigm?

2. Should the cost of DER compensation be allocated differently among ratepayers?

3. Should DER compensation transition between paradigms as system conditions change?

Speed-to-power Creates Value for Four Distinct Beneficiaries

The valuation framework must identify who benefits before deciding who pays.

01 NEW LARGE LOADS

Earlier energization accelerates operations and avoids delay-related costs.

02 EXISTING CUSTOMERS

More sales can spread fixed system costs and create downward rate pressure.

03 THE SYSTEM

Higher utilization may reduce market, capacity, or infrastructure costs.

04 UTILITIES + REGULATORS

A transparent framework improves how scarce grid capacity is managed.

COST ALLOCATION

Regulators must allocate incremental DER costs and any other incremental costs between the large loads receiving faster service AND the broader customer base benefiting from sales-driven rate reductions.

Not Every DER Creates Speed-to-Power Value

A DER portfolio must meet five key requirements before it can substitute for traditional grid capacity.

REQUIRED DER ATTRIBUTES

01	**SUFFICIENT**	Available in the required quantity and on the relevant timeline.
02	**LOCATIONAL**	Sited where the resources relieve the binding grid constraint.
03	**DEPENDABLE**	Dispatchable (or otherwise reliable) during critical hours and contingencies.
04	**MEASURABLE**	Visible through telemetry, baselines, and performance verification.
05	**ENFORCEABLE**	Backed by penalties or replacement obligations when performance falls short.

Regulatory Implementation Requires Coordinated Rule Changes

The framework must define the service, assign costs to beneficiaries, and govern queue impacts transparently.

01 DEFINE + STUDY

- Recognize speed-to-power as a distinct grid service.
- Create a formal study process for DER-enabled headroom.

02 ALLOCATE + FUND

- Allocate costs according to who receives the benefit.
- Allow large loads to fund customer-specific acceleration benefits.

03 GOVERN + PROTECT

- Determine whether headroom benefits one customer, a batch, or the broader queue.
- Preserve non-discrimination and transparency.

A beneficiary-pays framework can accelerate connection while ensuring equal treatment in the queue.

A Revamped DER Compensation Framework is Necessary

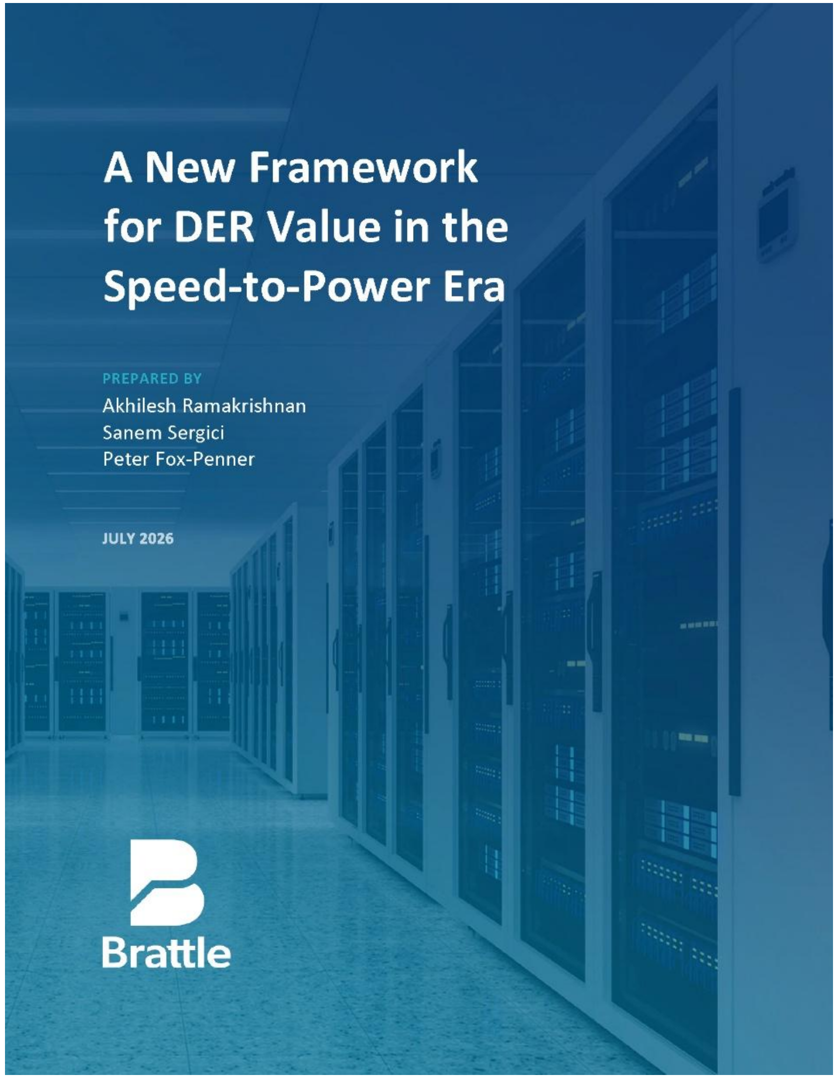
A revamped framework should be dynamic, locational, and tied to the specific grid service being provided. It should be responsive to both deferral and speed-to-power value.

- When DERs defer planned investments, compensation should reflect avoided-cost logic; when DERs create headroom compensation should reflect the value of accelerated service, rate-mitigation benefits, and reliability or market-price effects.

Tariff and interconnection reforms are necessary to make STP a defined testable service rather than an "auxiliary benefit of DERs". Regulators and utilities should establish:

1. A **formal study process** for evaluating whether DER portfolios create dependable capacity under normal and peak risk conditions.
2. **Tariff provisions** that assign DER procurement costs to the large customer (s) and other ratepayers to the extent benefits are shared more broadly.
3. **Operational requirements** for telemetry, dispatchability and performance requirements for DER portfolios.
4. **Queue rules** clarifying when DER-enabled headroom changes energization timing, whether it benefits a single customer or a study batch, and how similar customers will be treated.

For More Information



[Framework for DER Value in the Speed-to-Power Era]

The Untapped Grid:

How Better Utilization of the Power System Can Improve Energy Affordability

PRESENTED BY

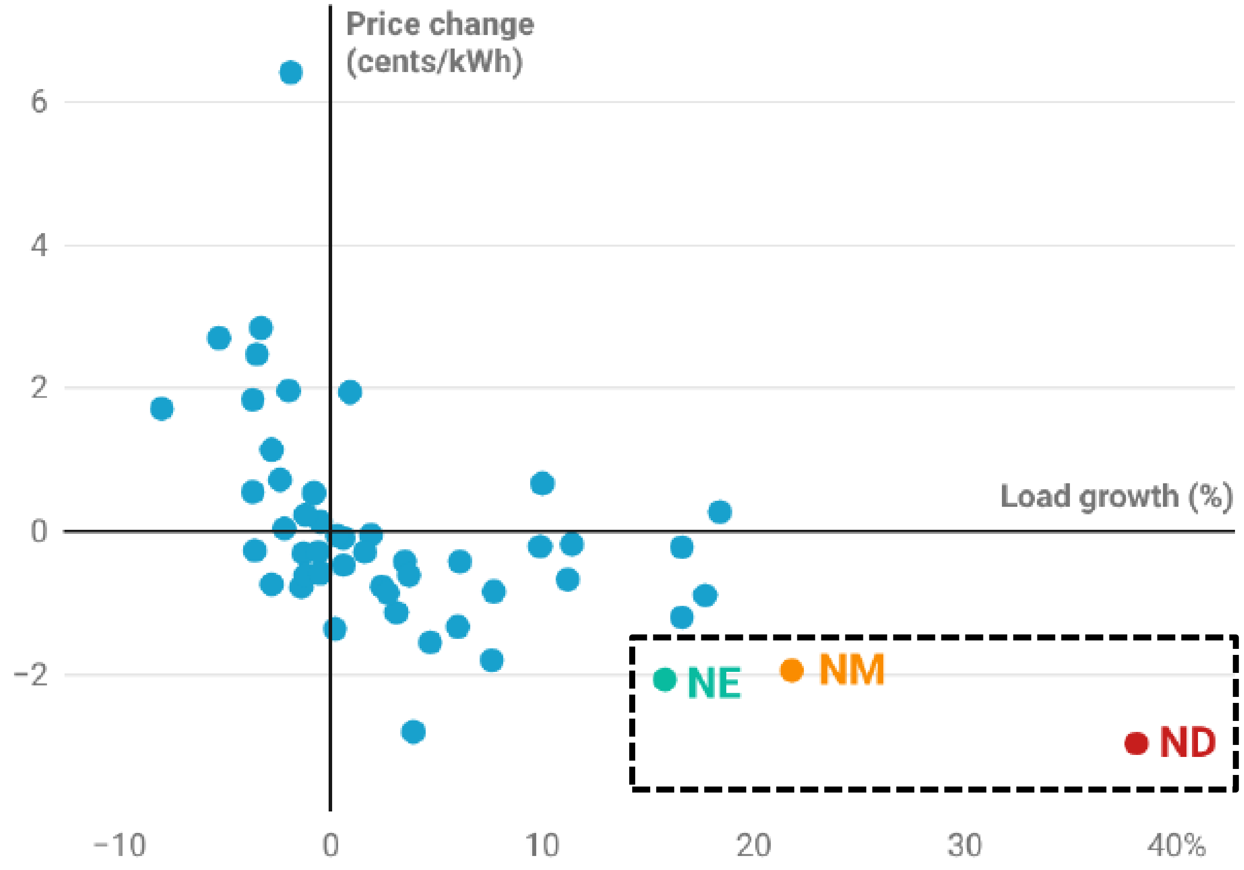
Ryan Hledik

NARUC SUMMER POLICY SUMMIT
MINNEAPOLIS, MN
JULY 21, 2026

Brattle

Load Growth Can Reduce Rates… if There's Available Headroom

Load Growth vs Retail Price Change, 2019 to 2025



Historically, states with highest load growth experienced largest real decline in average retail electricity price.

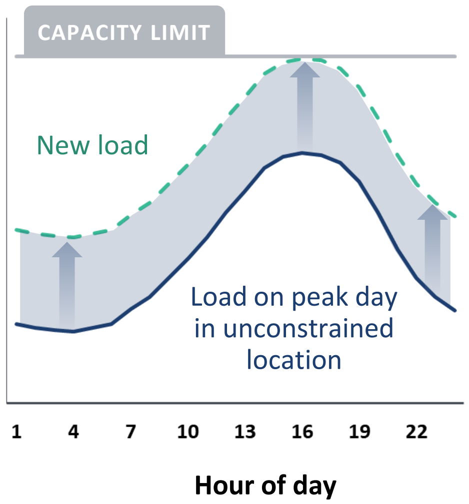
Source: LBNL and The Brattle Group, "Retail Electricity Price Trends and Drivers: Data Update – 2026 Edition," April 2026.

The Three Ways to Improve System Utilization

System utilization can be improved by adding new load when and where there is spare capacity.

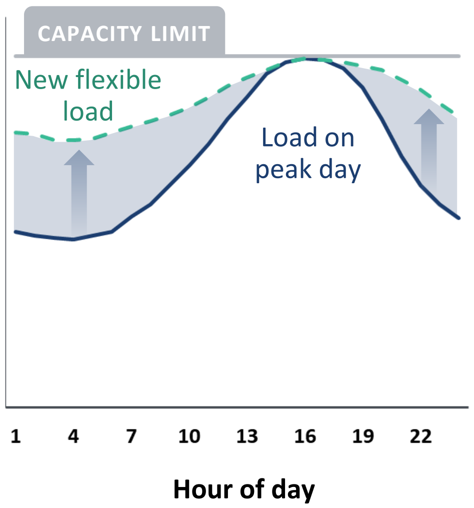
1

Add new load in **locations** where sufficient headroom already exists on the system.



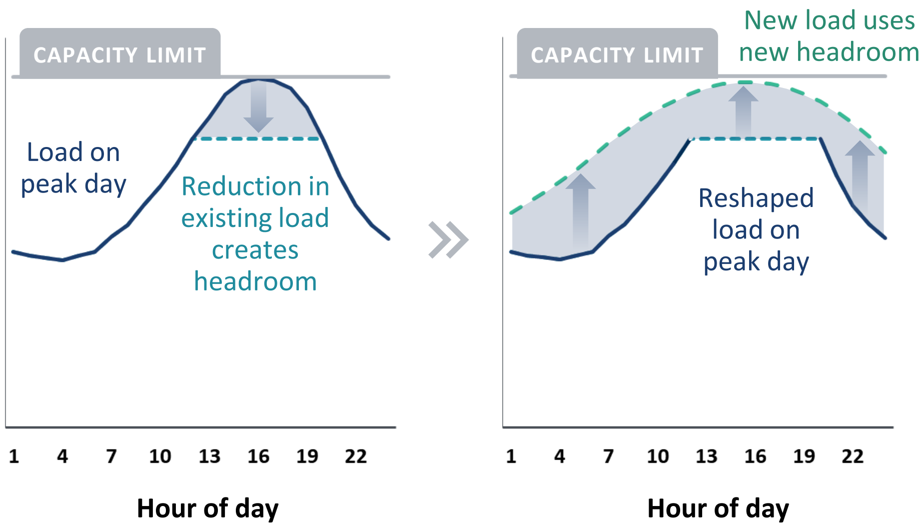
2

Add new load at **times** when there is spare capacity. This is possible if the new customers are flexible and/or can self-supply during peak conditions.



3

Incentivize technologies and behavioral changes that reduce peak demand of existing load. This creates new headroom on the system, which can then accommodate the addition of new load.



Approach Overview

We analyze the rate impacts of adding load to an illustrative utility system for two scenarios: one scenario focuses on improving system utilization, and the other scenario does not.

1

Define illustrative characteristics of utility system and new load.

- Illustrative mid-sized utility.
- 3,000 MW of existing peak demand.
- 14 cents/kWh average all-in retail rate.
- Marginal costs exceed average costs.
- 1,000 MW of new load:
  - 500 MW transmission-connected (e.g., data center).
  - 500 MW distribution-connected (e.g., transportation electrification).

2

Calculate rate impact of adding load *without* improving system utilization (status quo).

- Load growth served entirely through investment in traditional infrastructure.
- Retail rate based on average costs; does not fully recover new incremental costs.
- Costs not recovered from the new load are collected through a uniform rate increase for all customers.

3

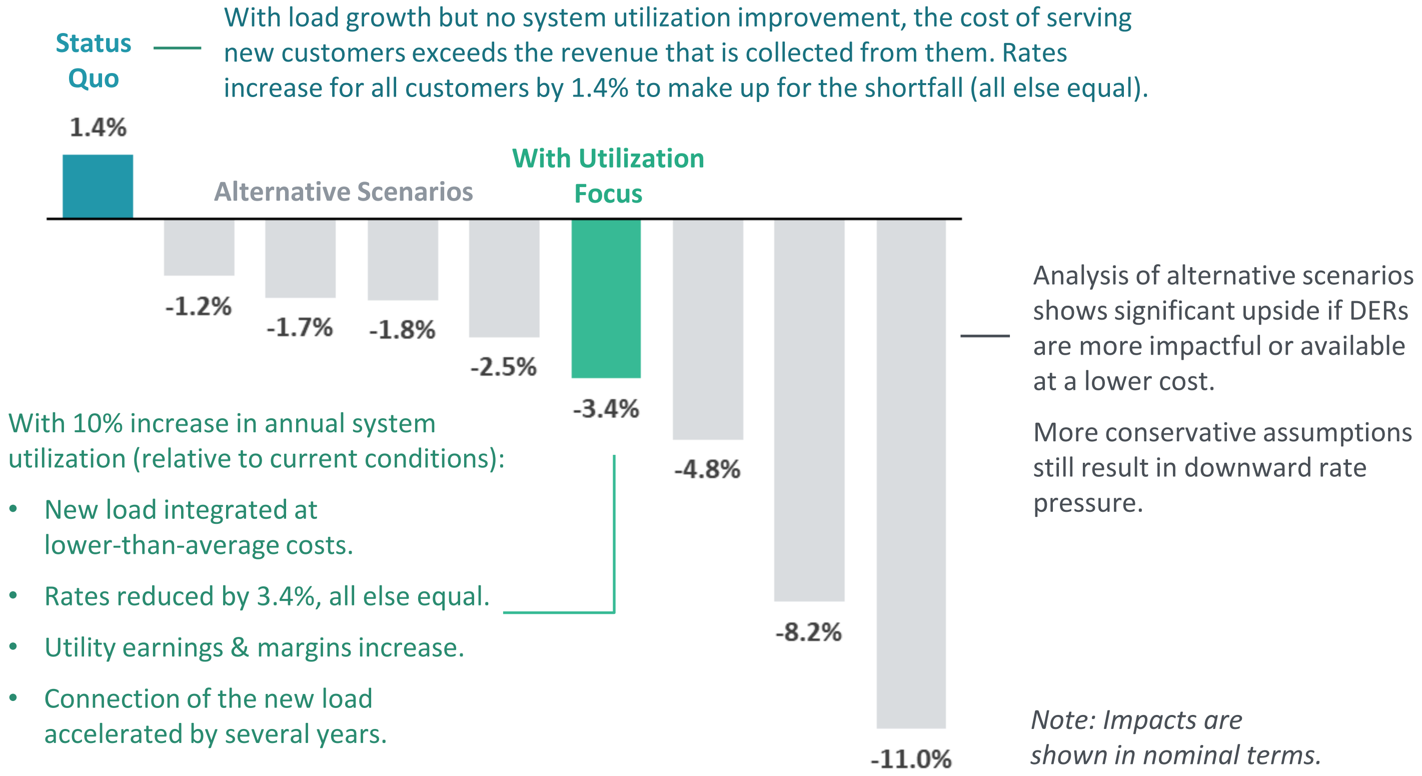
Calculate rate impact of adding load *with* focus on improving system utilization.

- Load accommodated with reduced investment in new infrastructure.
- Half of new transmission-level load connects flexibly.
- 500 MW portfolio of distributed energy resources is developed at average net cost to utility of $50/kW-yr.
- Capacity contribution of DERs is derated to reflect that it offsets only a portion of needed infrastructure.

The Impacts of Improved System Utilization: An Illustrative Example

In this illustrative analysis, improving system utilization can reduce customer bills and accelerate the connection of new load while still allowing utility earnings to grow relative to current levels, all else equal.

All-in Average Rate Impact Due to Load Growth
For various characterizations of the power system



Note: Impacts are shown in nominal terms.

INTERPRETING THE RESULTS

Proof-of-concept. Tailored, jurisdiction-specific analysis is needed to understand the opportunities for any given system.

Other rate impacts. This study does not analyze other factors that could independently drive rate changes, such as the replacement of aging transmission and distribution (T&D) infrastructure or fluctuations in natural gas prices.

Rate design. In practice, rate design can also be an effective tool for mitigating cost shifts from new loads to existing customers.

Policy implications. This paper quantifies the impact of increased system utilization but does not propose specific policies or programs in this area.

National Implications

At a national scale, improving system utilization can be a win for consumers, utilities, and new loads.

Benefits to Consumers

- Scaling the utility-level findings to national load growth: **US consumers could save $110 to $170 billion over 10 years** on their electricity bills due to system utilization improvements.
- Participants in programs or rates earn **additional savings through enrollment incentives**.

Benefits to Utilities

- Improving system utilization lessens but **does not eliminate the need to invest in new infrastructure**.
- **Utility earnings grow relative to current levels**, and margins could increase with the introduction of new regulatory incentives.
- Utilities can focus capital deployment on the most critical infrastructure projects while also **enabling economic development**.

Benefits to New Loads

- New customers to connect to the grid **without shifting costs to other consumers**, addressing an escalating policy concern.
- DERs **mitigate the stranded asset risk of overbuilding the power system** if new load does not materialize as forecasted.
- DERs can be brought online more quickly than other options, **accelerating speed-to-market.**

Ensuring Beneficial Outcomes: Measurement

Every system has its own utilization baseline.

- Rural vs urban
- Customer mix
- Weather
- Network topology
- Etc.

Understand what's feasible.

Ensuring Beneficial Outcomes: Targets

100% utilization is not realistic.

- Reserve margins
- Planned maintenance
- N-1 planning standards
- Equipment cooling during lower-load hours
- Proactive grid buildout
- Etc.

Focus on incremental improvements.

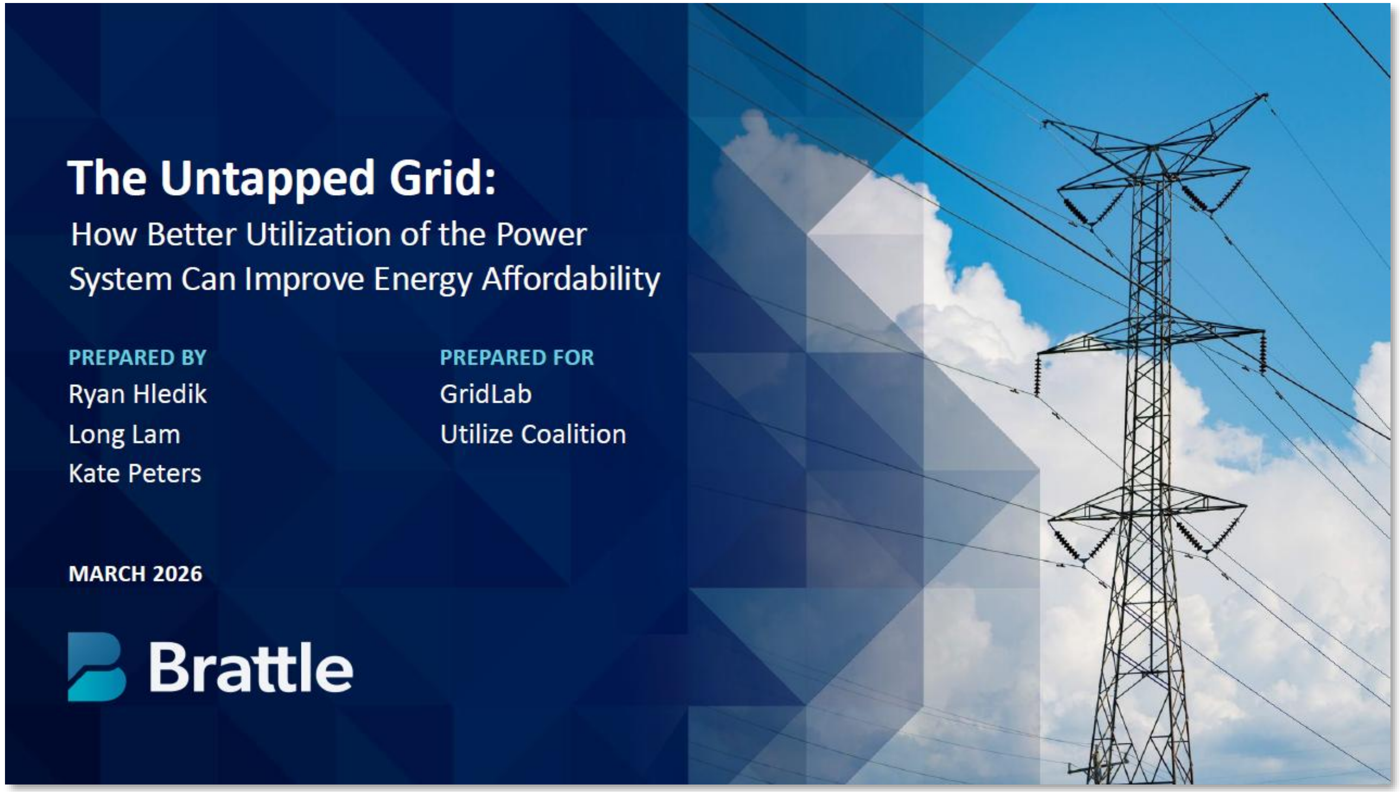
Ensuring Beneficial Outcomes: Implementation

Ultimately, the goal is affordability.

That means a focus on:

- Cost-effective solutions
- Beneficial rate impacts
- Efficient power system expansion
- Interaction with rate design

For More Information



www.brattle.com/the-untapped-grid

Unlocking Grid Flexibility:

How DERs Can Power Smarter Distribution System Planning

PRESENTED BY

AKHILESH RAMAKRISHNAN

PRESENTED TO

NARUC SUMMER POLICY SUMMIT

JULY 21, 2026

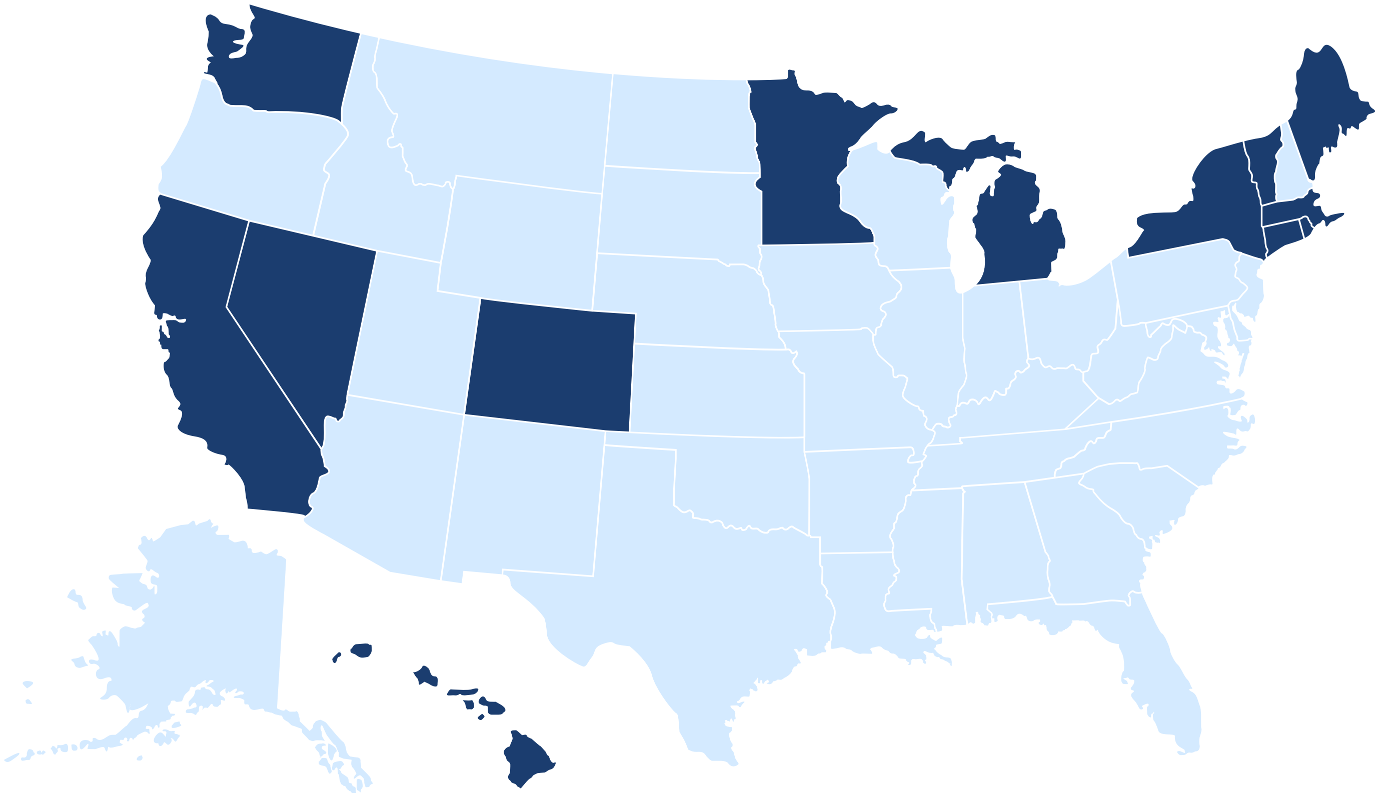
Brattle

NWS Evaluation Required in Several States

Definition of a Non-Wires Solution

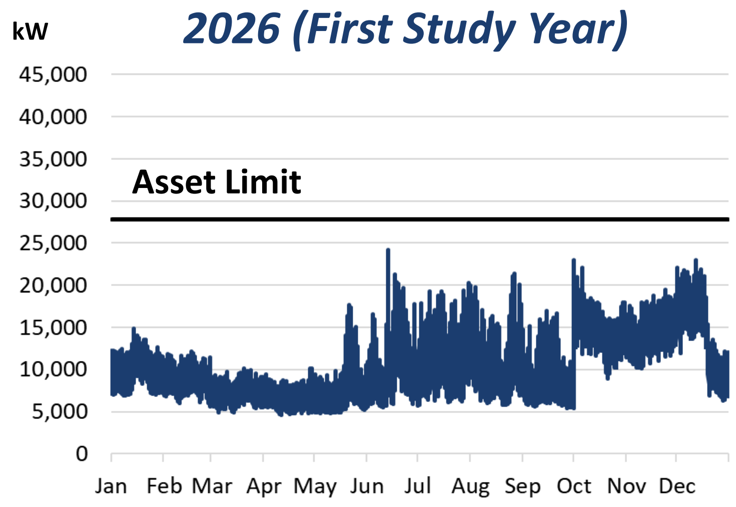
A portfolio of DERs that are coordinated to defer or avoid a specific grid investment by reducing or shifting load at the constrained location. Components of NWS can include energy storage (FTM or BTM), load flexibility (e.g., smart thermostat programs), and non-dispatchable DERs (e.g., solar and energy efficiency measures).

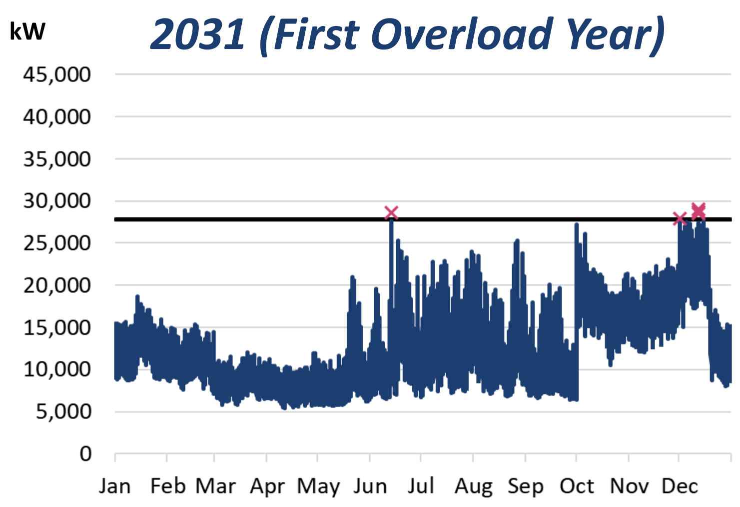
STATES WITH MANDATED NWS PROCESSES (as of June 2025)

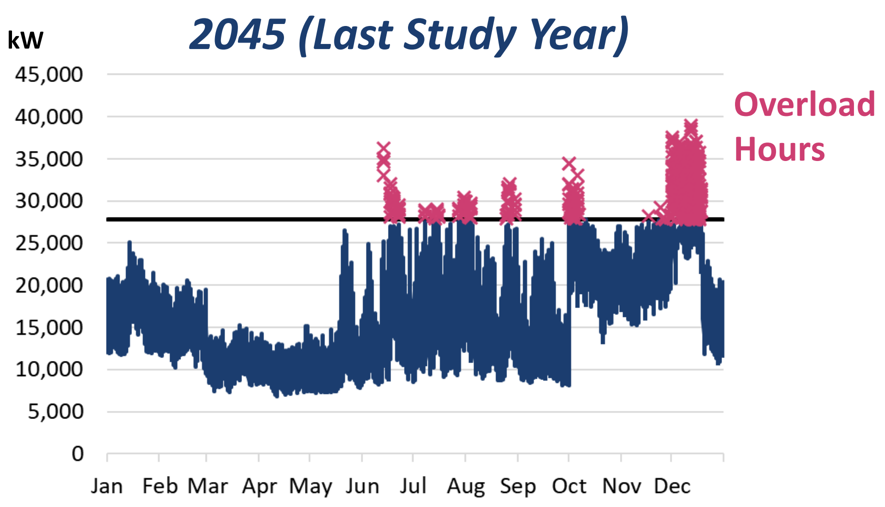


Example Feeder: Characterization of Load Relief Needs

Load Relief Needed	2031 (First Year of Overload)	2045 (End of Study Period)
Max. Magnitude (kW)	1,211 kW	11,196 kW
Max. Duration (hours)	3	20
Frequency (events/yr)	3	55
Season	Early Summer	All except spring
Time of Day	4–7 pm	9 am to midnight







Brattle's DEFER Model For Designing Non-Wire Solutions

The DEFER model simulates optimal deployment and hourly dispatch of DERs over a 20-year time horizon to defer distribution upgrades, while accounting for asset limits, DER technical limitations, and DER deployment constraints.

Inputs

Feeder Load Forecast
Forecasts of hourly load on grid asset

Feeder & Upgrade Parameters
Current asset limits, cost and additional capacity of upgrade

Financial & Scenario Inputs
Discount rate, study time horizon

DER Cost & Operational Params
Net DER cost (utility incentive payment minus lifetime benefits); technology-specific constraints

DER Deployment Limits
Total DER potential in the location and max. annual rate of deployment

Optimization Engine

Objective:
Minimize NPV of Net DER Cost + Grid Upgrade Cost

MILP Optimization

Decision Variables:
- ❑ DER deployment & dispatch
- ❑ Number of deferral years

Constraints:
- ✓ Load limit of asset
- ✓ DER operational constraints (events per year, SOC, load-building, etc.)
- ✓ DER deployment limits

Outputs

Optimal Deferral Length
Determines the year to upgrade that minimizes total net cost; Builds upgrade in first overload year if no cost-effective NWS exists

Cost-Effective DER Deployment
Annual deployment of each DER required for NWS; deploys ahead of need as necessary

Optimized DER Dispatch
Detailed dispatch of each DER technology to ensure load constraints are met in each hour, while respecting operational constraints of each technology

Example Feeder: Optimizing a Cost-Effective Non-Wire Solution

2026:
Begin deploying DERs to ensure sufficient capacity by first year of overload

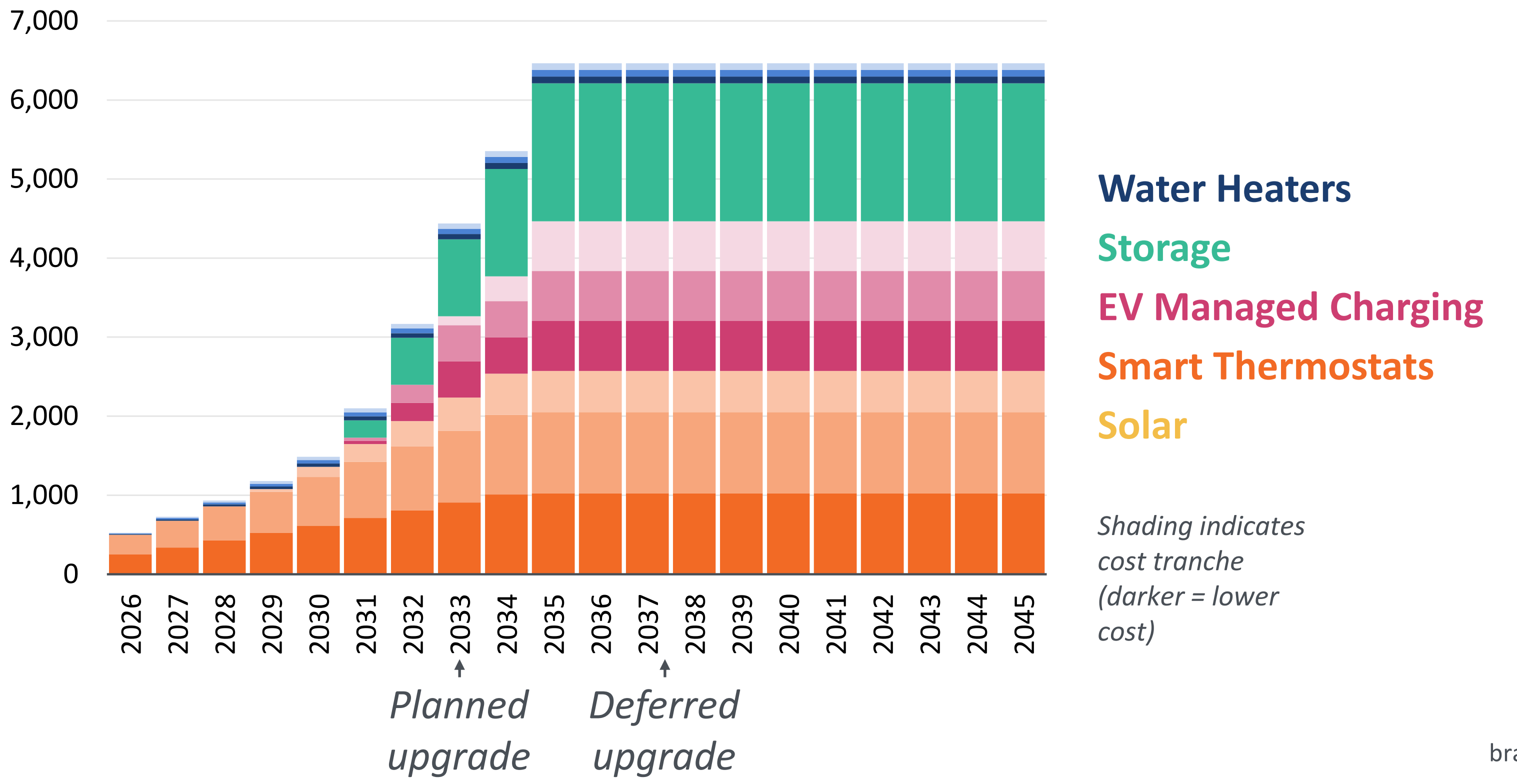
2031:
First year of overload if no DERs – DER operation keeps feeder below load limit

2031–2035:
Deploy additional DERs to meet growing load relief needs

2036:
Load relief needs exceed cost-effective DER potential – build wires solution

2045

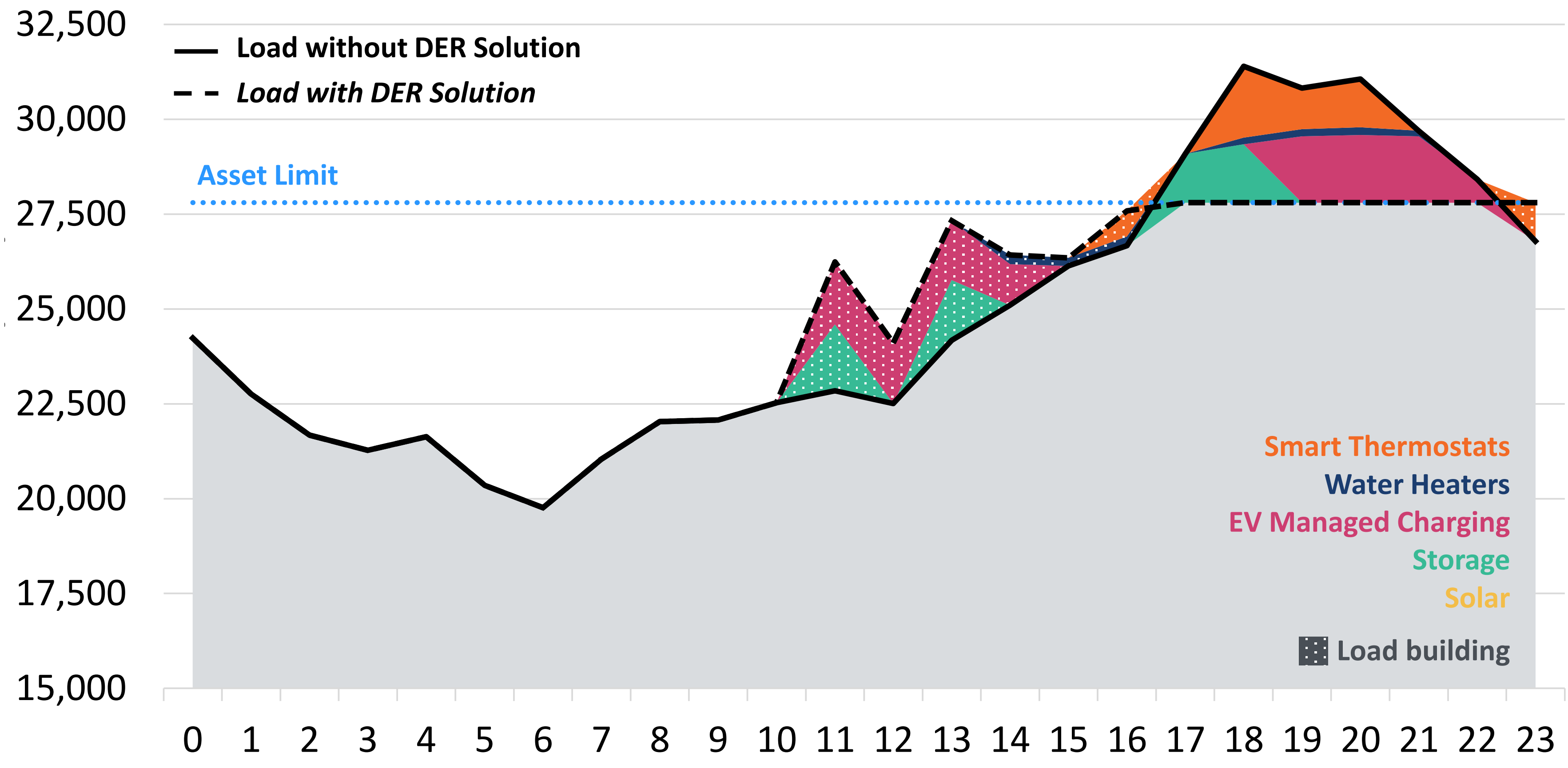
Cumulative DER Deployment, ***Nameplate kW***



Example Feeder: DER Operation for Load Relief

The DEFER model optimizes DER load-shifting to keep load below the feeder's limit, accounting for technology-specific limitations on number of demand-response events per year, duration of load reduction possible during an event, and the hours with room for load to be shifted into.

Modeled Load and DER Dispatch on Peak Day in 2035,
Hourly kWh



Requires Grid/DER Operational Capabilities and New Planning Data

DER OPERATIONAL ATTRIBUTES NEEDED

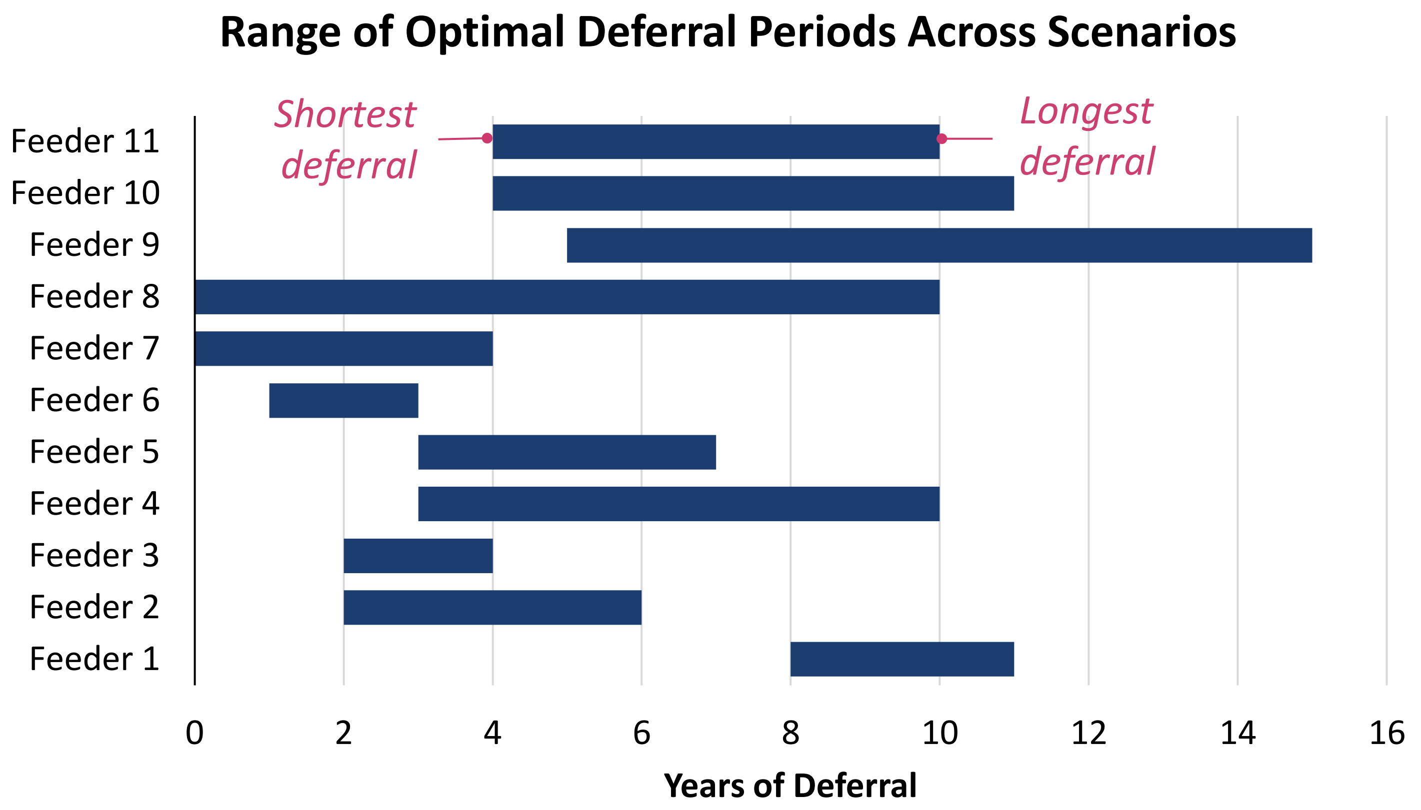
01	**SUFFICIENT**	Available in the required quantity and on the relevant timeline
02	**LOCATIONAL**	Sited where the resources relieve the binding grid constraint
03	**DEPENDABLE**	Dispatchable (or otherwise reliable) during critical hours and contingencies
04	**MEASURABLE**	Visible through telemetry, baselines, and performance verification
05	**ENFORCEABLE**	Backed by penalties or replacement obligations when performance falls short

NEW PLANNING DATA NEEDED

- **DER registry** to track installed DERs, location, and capabilities.
- **DER potential** by location and technology type to enable planning and NWS feasibility assessment.
- **Locational forecasts** of organic DER adoption.
- **Locational forecasts of load** growth and load shape to enable development of a tailored NWS.
- **A platform** for DER owners and aggregators to offer available DER capacity for distribution services.

Flex vs. Build Decisions Across A Range of Scenarios

Modeling a system with 11 feeders shows that optimal build/defer decisions would vary widely across load growth scenarios.



How do we select one distribution system plan under uncertainty?

Scenario-Based Distribution Planning

Old planning question

What is the least-cost upgrade for the forecast?

Better planning question

Which portfolio performs best across plausible futures?

Sample Scenario Planning Decision Matrix

Plans \ Scenarios	Low Load	Median Load	High Load
Delayed Build	Lower rate impact	Some risk of delayed connections	Highest risk of delayed connections
Median Build	Higher rate impact	Balanced	Some risk of delayed connections
Early Build	Highest rate impact	Higher rate impact	Lowest risk of delayed connections

Decision criteria should be explicit, e.g.,:

- Minimize expected cost
- Avoid worst regrets outcomes
- Prioritize connection speed

Presenters

Peter Fox-Penner

PRINCIPAL | WASHINGTON, DC | SAN FRANCISCO

Peter.Fox-Penner@brattle.com

+1.202.955.5050

Dr. Fox-Penner is an expert in energy and climate policy, regulated industries, and sustainable finance.

Specializing in the markets, policies, regulation, and transformation of the electricity industry, he has advised numerous US energy companies, grid operators, and government agencies. He has testified on energy-related matters in more than 100 proceedings, including before federal courts, the Federal Energy Regulatory Commission, state courts, arbitrations, and more than a dozen state public service commissions. He has served as a regulatory and strategic advisor to boards and executives at utilities and energy companies across the country.

With a career that has spanned consulting, senior government roles, and academia, Dr. Fox-Penner was the founding director of Boston University's multidisciplinary Institute for Global Sustainability (IGS) and a professor of the practice at the University's Questrom School of Business. He is a frequent speaker on energy topics and the author of numerous published articles and books, including *Smart Power: Climate Change, the Smart Grid, and the Future of Electric Utilities* (Island Press, 2010). His research – on topics such as electric power strategy, energy affordability, regulation, and governance – has been widely cited, including in a US Supreme Court decision.

Dr. Fox-Penner has served in various roles at Brattle, including office director, board member, and the firm's longest-serving chairman of the board. He previously served as a senior official at the US Department of Energy and the White House Office of Science and Technology Policy.

He serves as the Chairman, Impact & Sustainability at Energy Impact Partners, a clean energy investment platform and was a founding member of the steering committee of Project Frame and the Venture Climate Alliance.

Sanem Sergici

PRINCIPAL | BOSTON

Sanem.Sergici@brattle.com

+1.617.864.7900

Dr. Sergici specializes in matters related to rate design, electrification, grid modernization investments, and alternative ratemaking mechanisms.

She is an energy economist with 20 years of consulting and energy research experience. Her consulting practice is focused on understanding customer adoption of and response to innovative rate designs, distributed energy resources, and emerging technologies. She regularly assists her clients in matters related to rate design, electrification pathways, grid modernization investments, load forecasting, and resource planning.

Dr. Sergici has led numerous studies in these areas that have been instrumental in regulatory approvals of grid modernization investments and smart rate offerings for electricity customers. She has also conducted several studies that explore the impact of electrification on grid investments and investigate the role of distributed energy resources in meeting climate goals. She has been at the forefront of the design and impact analysis of innovative retail pricing, enabling technology, and behavior-based energy efficiency pilots and programs across North America.

Dr. Sergici regularly testifies before regulatory bodies, publishes in academic and industry journals, and presents at industry events.

Ryan Hledik

PRINCIPAL | SAN FRANCISCO

Ryan.Hledik@brattle.com

+1.415.217.1000

Mr. Hledik specializes in regulatory and planning matters related to the emergence of distributed energy technologies.

He has consulted for clients across 35 states and nine countries, supporting them in matters related to load flexibility, energy storage, distributed generation, electricity rate design, electrification, energy efficiency, and grid modernization.

Mr. Hledik's work has been cited in regulatory decisions establishing procurement targets for energy storage and demand response, authorizing billions of dollars in grid modernization investments, and approving the introduction of innovative rate designs. He has authored widely cited studies on the economics of virtual power plants, Saudi Arabia's first demand-side management (DSM) plan, the US Department of Energy's *A National Roadmap for Grid-Interactive Efficient Buildings*, and the Federal Energy Regulatory Commission's *A National Assessment of Demand Response Potential* and *National Action Plan for Demand Response*.

He has published more than 30 articles on electricity matters, presented at industry events in 10 countries, and given lectures on distributed grid economics at Penn, Stanford, and Yale. Mr. Hledik's research on the grid edge has been cited by *Forbes*, *National Geographic*, *The New York Times*, *NPR*, and *The Washington Post*, and he has served on the advisory boards of a clean energy startup and an energy storage trade association.

Mr. Hledik received his MS in Management Science and Engineering from Stanford University, where he concentrated in Energy Economics and Policy. He received his BS in Applied Science from the University of Pennsylvania, with minors in Economics and Mathematics. Prior to joining Brattle, Mr. Hledik was a Research Assistant with Stanford University's Energy Modeling Forum and a Research Analyst at Charles River Associates.

Akhilesh Ramakrishnan

MANAGING ENERGY ASSOCIATE | TORONTO

Akhilesh.Ramakrishnan@brattle.com

+1.416.360.4849

Mr. Ramakrishnan specializes in integrated electric system planning, with a focus on economic, technical, and policy considerations related to distributed energy resource integration and load growth.

He has a decade of experience advising utilities, regulators, renewable energy developers, and technology companies on a range of grid planning, modernization, and electrification challenges. He has led initiatives to modernize distribution system planning processes to support electrification and DER adoption. Mr. Ramakrishnan has worked with utilities to evaluate the impacts of electrification and emerging sources of load growth, conduct cost-benefit analyses of customer programs, design compensation mechanisms for emerging technologies, and develop long-term resource plans. He has also advised technology companies and developers on quantifying the value of DERs and demand flexibility to the electric system.

Mr. Ramakrishnan frequently presents at industry conferences and publishes on topics relating to the grid edge. He contributed a chapter to the book, *Electrification and the Future of Decentralized Electricity Supply*, and his work has been cited by the Department of Energy, *Utility Dive*, and *RTO Insider*.

Prior to joining Brattle, Mr. Ramakrishnan was a member of Exelon’s Utility of the Future Team, where he developed strategies, business models, and policies to support distributed energy resources and electrification.

About Brattle

The Brattle Group answers complex economic, finance, and regulatory questions for corporations, law firms, and governments around the world. We are distinguished by the clarity of our insights and the credibility of our experts, which include leading international academics and industry specialists. Brattle has 500 talented professionals across North America, Europe, and Asia-Pacific. For more information, please visit **brattle.com**.

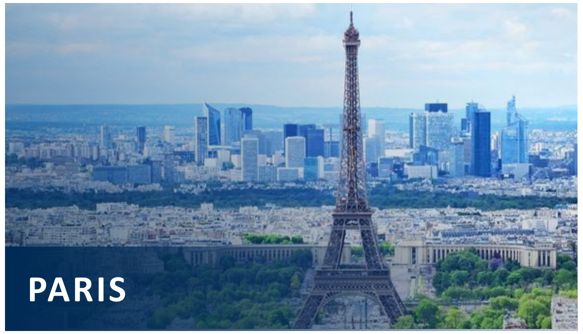
Our Services	Our People	Our Insights
Research and Consulting	Renowned Experts	Thoughtful Analysis
Litigation and Support	Global Teams	Exceptional Quality
Expert Testimony	Intellectual Rigor	Clear Communication

Our Practices and Industries

TOP 24 PRACTICES

- Accounting
- Alternative Investments
- Antitrust & Competition
- Bankruptcy & Restructuring
- Consumer Protection & Product Liability
- Credit, Derivatives & Structured Products
- Cryptocurrency & Digital Assets
- Electricity Litigation & Regulatory Disputes
- Electricity Wholesale Markets & Planning
- Environment & Natural Resources
- Financial Services & Markets
- Healthcare & Life Sciences
- Infrastructure
- Intellectual Property
- International Arbitration
- M&A Litigation
- Oil & Gas
- Regulatory Economics, Finance & Rates
- Regulatory Investigations & Enforcement
- Securities Class Actions
- Tax Controversy & Transfer Pricing
- Technology
- Telecommunications, Media & Entertainment
- White Collar Investigations & Litigation

A Global Firm



Brattle

Clarity in the face of complexity

Brattle