NEW YORK STATE | Department of Public Service

# New York's Approaches to Advance DERs and Provide Distribution-Level Services

## Plans, Experience, Lessons

July 24, 2025

# Topics

- **Flexibility Programs**
  - Flexibility Program Snapshot
  - Distribution-level Demand Response Programs
- **Non-Wire Alternatives (NWAs)**
  - Process and Regulatory Framework
  - Examples of successful NWAs
  - Lessons Learned
- **The Value Stack**

# Flexibility Programs

# Flexibility Programs Snapshot

- **Demand Response Programs**
  - *Wholesale DR Programs*
    - Operated by the New York Independent System Operator
    - Special Case Resources
      - Day-ahead (21-hour) Transmission Reliability
  - *Distribution DR Programs*
    - Operated by each Distribution Utility
    - "Commercial" Programs – based on meter data and baselines
    - Mass Market (Residential and Small Commercial) Programs – technology-specific
  - Careful consideration to ensure ability to simultaneously participate in both Wholesale and Distribution programs

- **EV Managed Charging Programs**
  - Operated by each Distribution Utility
    - Residential programs
    - Commercial programs
  - Currently in flux as programs are developed and under review

# Utility "Commercial" DR Programs

## Commercial System Relief Program (CSRP)

- Day-ahead (21 hour) Peak Shaving
- Specified four-hour Call Windows, location-specific and based on system needs
- All enrolled resources respond when an Event is called
- May through September
- Incentives
  - Reservation Payment = $/kW-month
  - Performance Payment = $/kWh
  - No penalties for non-performance
  - Some locational differences in payment rates
- Can simultaneously participate in DLRP and Wholesale programs
- Participation Requirements
  - Requires advanced metering (e.g. AMI)
  - Any customer can participate through an Aggregator
  - Large customers can enroll directly through utility (50+ kW of load relief)
  - Caveats for Net Energy Metering (NEM) customers

## Term-Dynamic Load Management (DLM) Program

- Day-ahead (21 hour) Peak Shaving
- Specified four-hour Call Windows, location-specific and based on system needs
- All enrolled resources respond when an Event is called
- May through September
- Incentives
  - Established in contracting
  - Reservation Payment = $/kW-month
  - Performance Payment = $/kWh
  - Penalties for non-performance
- Can simultaneously participate in DLRP and Wholesale programs
- Participation Requirements
  - Requires advanced metering
  - Customers must enroll through a contracted Aggregator (or directly participate in solicitation)
  - NEM-customer participation not allowed

# Utility “Commercial” DR Programs

## Distribution Load Relief Program (DLRP)

- Intra-day (2 hour) Reliability
- Events up to 6 hours
- Only available at certain utilities
- Only resources in affected areas must respond
- May through September
- Incentives
  - Reservation Payment = $/kW-month
  - Performance Payment = $/kWh
  - No penalties for non-performance
  - Some locational differences in payment rates
- Can simultaneously participate in CSRP and Wholesale DR Programs
- Participation requirements
  - Requires advanced metering (e.g. AMI)
  - Any customer can participate through an Aggregator
  - Large customers can enroll directly through utility (50+ kW of load relief)
  - Caveats for Net Energy Metering (NEM) customers

## Auto-DLM Program

- Intra-day (5-minute) Peak Shaving or Reliability
- Four-hour Events
- Only available in certain specified areas of each utility service territory
  - Location-specific Reliability Events
  - Peak Shaving Events called for all participants
- May through September
- Incentives
  - Established in contracting
  - Reservation Payment = $/kW-month
  - Performance Payment = $/kWh
  - Non-performance Penalties
- Can simultaneously participate in Wholesale DR programs
- Participation Requirements
  - Requires advanced metering
  - Customers must enroll through a contracted Aggregator (or directly participate in solicitation)
  - NEM-customer participation not allowed

# Utility Mass Market DR Programs

## Bring Your Own Thermostat (BYOT)

- Allows utility to modify Smart thermostat temperature setpoints for central air conditioners
  - Demand reduction based on M&V studies of eligible devices
  - Customer participation measured based on whether thermostat setpoint was overridden
- Can be called for Peak Shaving, Reliability, or wholesale capacity peaks*
- Incentives
  - One-time enrollment incentive: about $50 to $75
  - Annual participation incentive: about $25/year
- No limitations on NEM customer participation

## Bring Your Own Battery (BYO-Battery)

- New program currently being rolled out – likely live for 2026/2027 summer season
- Allows utility to control Residential-scale Battery export
  - Participation measured via battery internal metering
- Can be called for Peak Shaving, Reliability, or wholesale capacity peaks**
- Incentives
  - Pay for performance only
  - (Average kW load relief) x ($50/kW-year**)
- No limitation on NEM customer participation

* Except at Con Edison where Residential customers are allowed to simultaneously participate in BYOT and Wholesale DR programs

** May change based on utility-specific implementation

# Philosophy and Lessons Learned

- **Balance number of programs and Participation options**
  - Relative handful of programs provide meaningful options for customers without overwhelming with too many different programs
    - From: Highly curated and easy to participate, but less lucrative
    - To: More complex and lucrative programs, without non-performance penalties
    - Then: Lucrative, but complex and carry element of risk
  - Some customers move from more curated programs to more lucrative programs when given the opportunity, others do not

- **Direct enrollment through the Utility for curated programs, enrollment through Aggregators for more advanced programs**

- **Opportunities for simultaneous enrollment in different programs should be maximized**
  - Many commercial and industrial customers simultaneously participate in CSRP/Term-DLM, DLRP, and NYISO SCR Program
  - When considering the Residential market, Programs should “play nice” with Net Energy Metering

# Non-Wire Alternatives

# What makes Non-Wire Alternative (NWA) projects successful in New York?

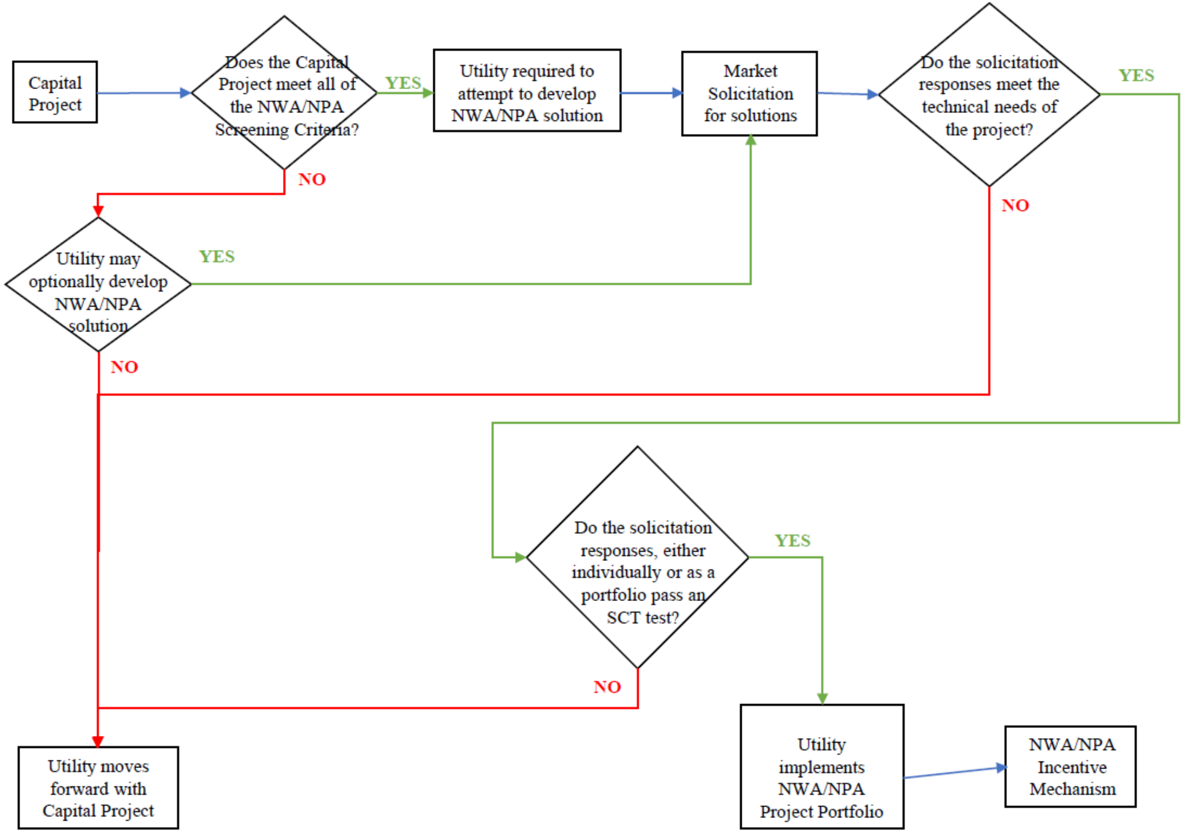
1. Standard process for identifying NWA project opportunities, and requirements that utilities attempt to develop those opportunities.

2. Pre-approval of cost-effective NWA projects, and certainty of recovery of NWA project costs.

3. Level playing field for utility business model incentives for CapEx spending versus NWA Project spending.

4. Shareholder incentives for successfully implementing NWA projects, with enhanced incentives for doing so under-budget.

# Overview of Non-Wire Alternative Process



# NWA Screening Process

- Series of questions that is asked about each CapEx project
  - Questions are differentiated depending on whether the project is considered a Large or Small project

- The utility **must** attempt to develop an NWA project to defer or in lieu of the associated CapEx project if **all** of the answers to the questions are affirmative.
  - The utility **may** attempt to develop an NWA project if **any** of the questions are negative.

- Following NWA screening, NWA Opportunities are identified and brought to the market for solutions.
  - Typically procured through a Request for Proposals (RFP)
  - Can also leverage existing Energy Efficiency, Demand Response, load management, or electrification programs using location-specific “kickers”

# NWA Screening Criteria

- **Project Need Type**
  - *Focus on grid needs which can be most readily provided by customer-sited load reductions and flexibility*
    - Load Relief and/or Reliability Projects are well suited for replacement with an NWA
    - Asset Condition replacements and New Business projects cannot be eliminated
- **Timeline Available**
  - *Focus on projects with enough runway to allow time to procure alternate resources and implement solutions*
    - Need about three years for Large projects
    - Need about a year and a half for Small projects
- **Minimum Cost Threshold**
  - *Focus on projects with enough value to have cost-effective alternatives*
    - About $1 million minimum for Large projects
    - Between $0.3 million to $0.5 million minimum for Small projects, depending on utility

# Successful NWA Projects

- Con Edison
  - **Brooklyn-Queens Demand Management Program (60 MW)** – *deferred the need for a >$1 Billion substation for about 10 years*
  - **Newtown Project (40 MW)** – *currently deferring need for a 40 MW load transfer*
  - **Plymouth Street, Water Street, and Williamsburg (43 MW)** – *Simultaneously met primary feeder load relief needs in Williamsburg while permanently eliminating the need for transformer cooling equipment and sub-transmission feeder upgrades while a new switching station was being built*
- Central Hudson
  - **Targeted Demand Management Program (18 MW)** – *Three NWA projects in one portfolio, designed to defer the need for transmission upgrade projects, distribution feeders, and ease overload conditions at a substation*
- National Grid
  - **Pine Grove Area (10 MW)** – *Provides load relief to two proximate Substations as well as addressing distribution feeder thermal overloads*
- NYSEG
  - **Stillwater Substation Project (0.5 MW)** – *Avoided the need to upgrade and replace an existing transformer bank at a substation, as well as the need to run new distribution circuits*
- Orange and Rockland
  - **Pomona Program (4 MW)** – *Avoided the need to build a new substation.*

# Lessons Learned

- Despite sending the right price signals, NWA projects are difficult to implement
- Small projects are notoriously difficult to implement, especially in networked (as opposed to radial) grids
- Site control is critically important when selecting winning RFP respondents
- NWA project participants are uneasy about taking responsibility for reliability issues

# The Value Stack

# Value Stack Basics

## Net Energy Metering (NEM)

- Volumetric compensation
  - Net exports create kWh offsets against net usage
  - Compelling message – "spin the meter backward"
- Significant potential for unreasonable cost-shifts from participants to non-participants due to volumetric rates
  - Most fixed Customer Charges do not recover the full amount of per-customer fixed costs of the grid
  - Most public policy program costs are recovered through per-kWh surcharges, which NEM avoids
  - Offset by Customer Benefit Contribution charge
    - Small monthly charge based on kW of nameplate capacity
    - Established for new installations as of January 1, 2022
- Available for new eligible customers for a 20-year period
- Who is eligible?
  - Mass market customers (e.g., rooftop solar)
  - Customers that were already participating in a NEM option before the Value Stack was developed (March 2017)

## The Value Stack

- Financial compensation
  - Net exports valued and converted into a $ credit against customer bills
- Five core components
  - Some components only for clean technologies
  - Other components with locational eligibility requirements
  - Additional conditional components for market transition from NEM and other policy goals
- Certain values float with market prices, others are locked in for at least 10 years
- Who is eligible?
  - NEM customers can opt-in (one-time irrevocable choice)
  - Community Distributed Generation
  - Large commercial Solar farms
  - Statewide Solar for All

# Core Value Stack Components

- **Wholesale Energy value**
  - Actual hourly NYISO market prices - Location-Based Marginal Price (LBMP) plus Losses

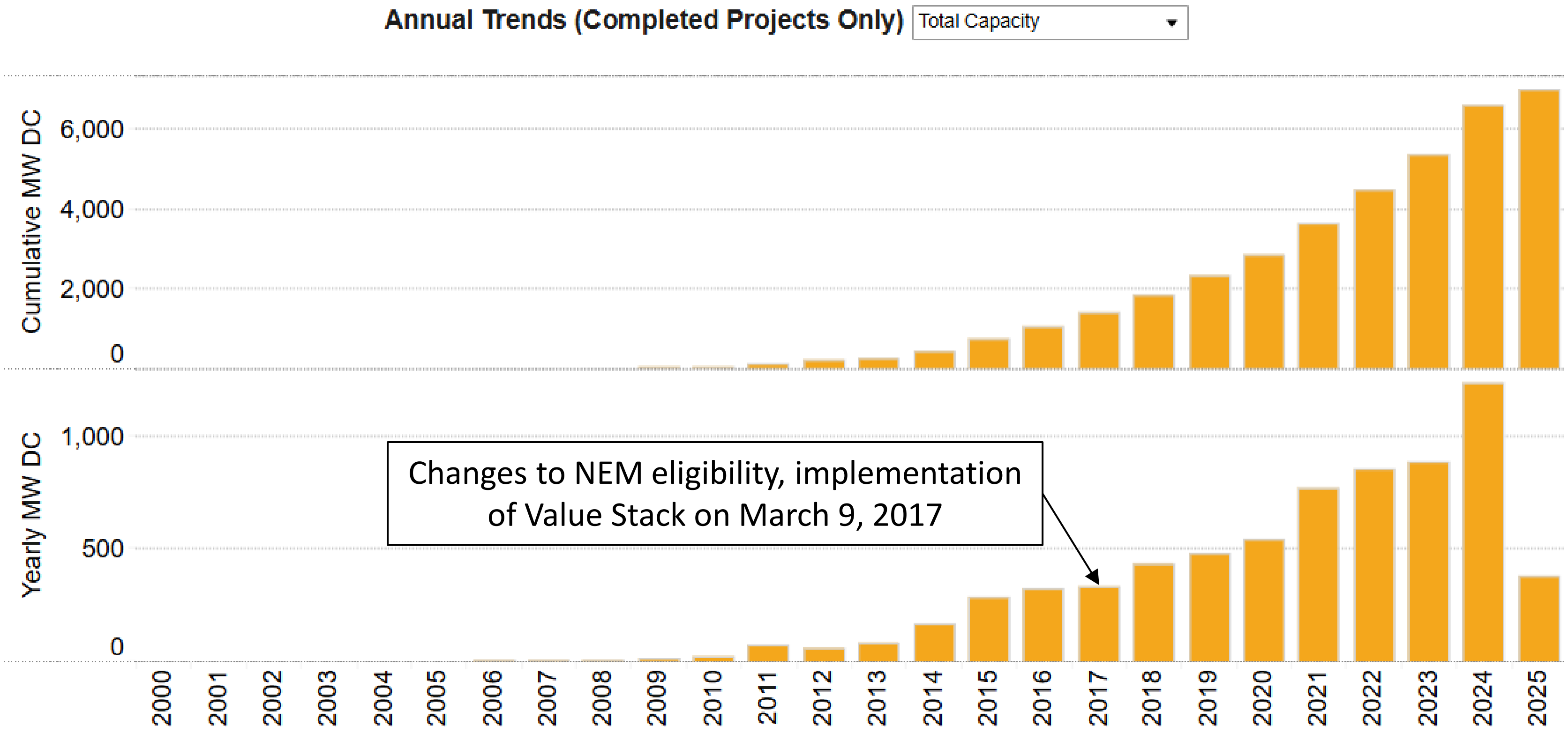
- **Wholesale Capacity value**
  - Three Alternatives
    - **Alternative 1**: Averaged $/kWh value based avoided Installed Capacity (ICAP) value using typical solar generation profile
    - **Alternative 2**: Similar to Alt. 1, but focused on summer afternoon values – 2 PM to 6:59 PM, June 24 through August 31
    - **Alternative 3**: $/kW, matching methodology for how ICAP tags are set – highest non-weekend hour during July or August
  - Eligibility requirements vary by technology
    - Solar can choose from any of the three alternatives
    - Energy Storage and most others must take Alternative 3

- **Environmental value**: based on societal value of avoided carbon emissions – about $0.03/kWh

- **Demand Reduction Value (DRV)**
  - Based on avoided marginal costs of Utility Transmission and Distribution equipment
    - Value varies significantly from utility to utility
  - Only applicable between specified hours – Summer weekdays during 4- or 5-hour peak periods

- **Locational System Relief Value**
  - Only in certain designated high-value areas, and for a specified amount of capacity
  - Event-based compensation
    - Minimum 10 events per year
    - $/kW per event, based on minimum kW of capacity delivered during event

# Value Stack Outcomes




Source: https://www.nyserda.ny.gov/All-Programs/NY-Sun/Solar-Data-Maps/Statewide-Distributed-Solar-Projects (accessed July 17, 2025)

# Thank You

# Using Grid Edge Resources to Provide Distribution-level Services

NASEO-NARUC GEB Working Group

Paul De Martini

July 2025

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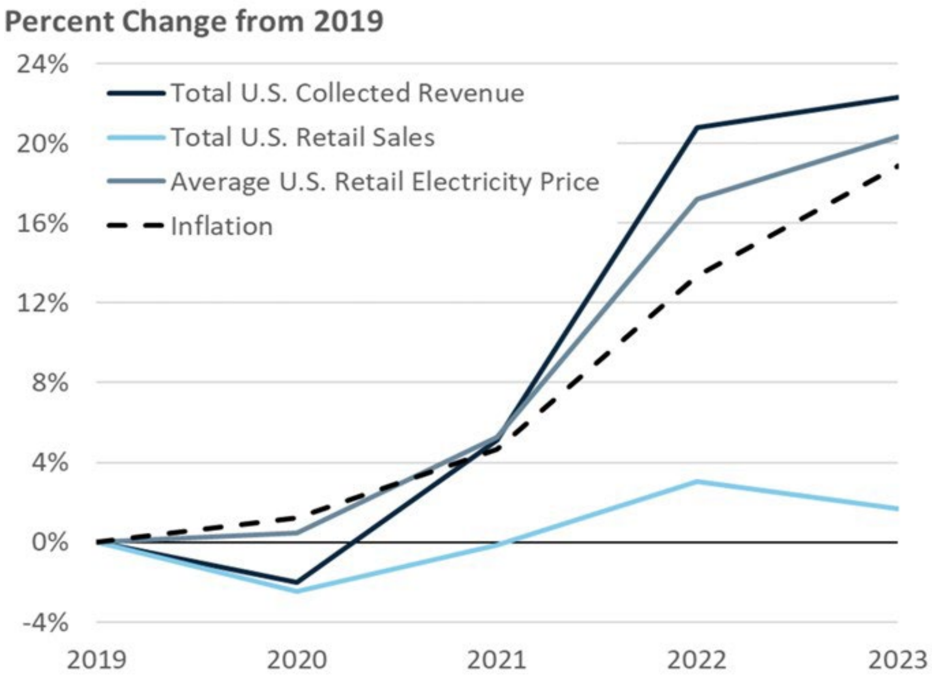
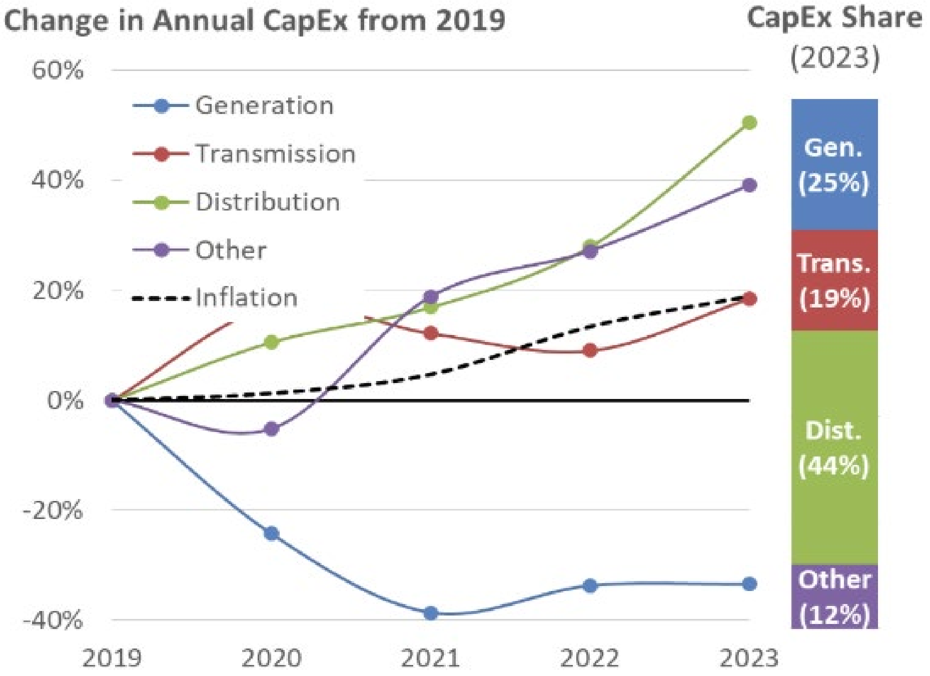
# Distribution Costs Have Risen Dramatically Impacting Rates

**Managing distribution costs has become a key objective for customers, policy makers, regulators and utilities**




Source: Retail Electricity Price and Cost Trends: 2024 Update, Berkeley Lab

Spending on Adaptation, Hardening, and Resilience (AHR) **37%**, Aging Asset Replacement **28%**, Capacity Expansion **28%**, and Other **7%** (EEI)

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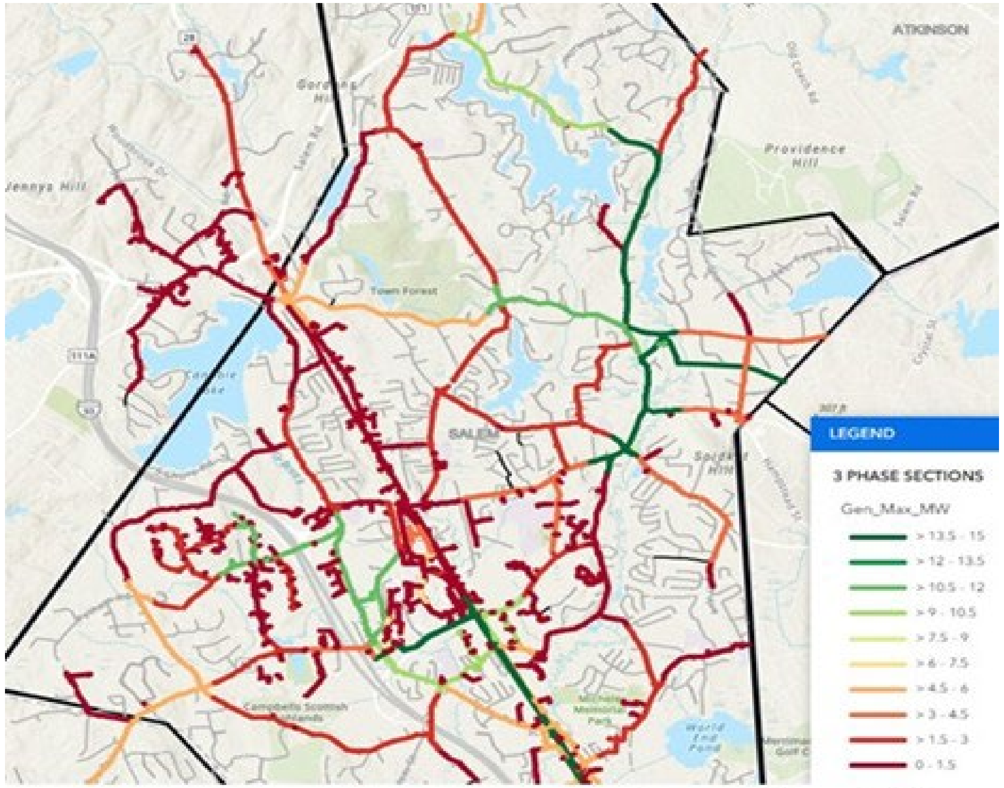
# Distribution Operational Constraints

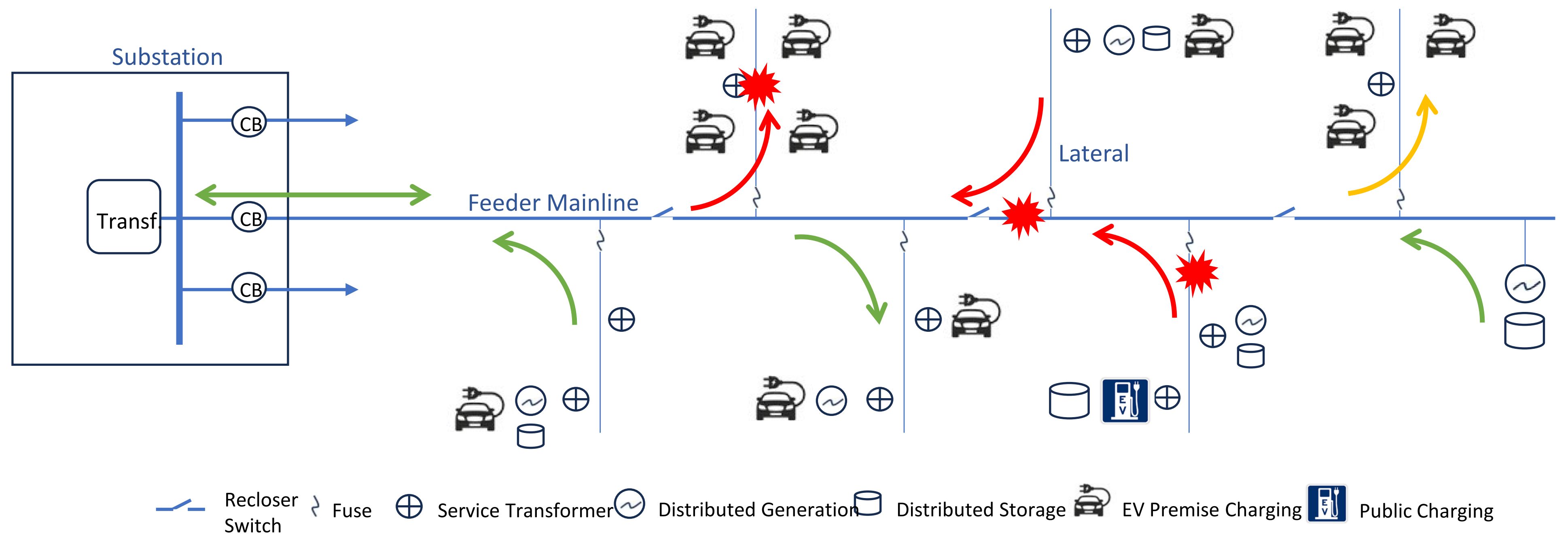
- Hosting Capacity maps highlight feeders and line segments that have limited capacity for additional interconnection.
- This was originally focused on solar PV impacts. However, distribution constraints can emerge from the operation of various DER/EVs.
- Due to the source of the flows, individual constraints can occur in several locations on a single feeder and may occur at non-coincident times.
- Non-coincident refers to individual distribution line segments and equipment that experience peak loading within the same feeder at different times. For example, an individual service transformer may experience peak loading from EV charging while the feeder mainline may not be at a peak.
- These non-coincident constraints also nest with one another depending on the power flow directions, creating further complexity to manage.




Source: Liberty Utilities

# Distribution Feeder Zones for Managing Power Flows within Operating Limits

**Power flow constraints at any point may occur at different times due to the nature of the flows, depending on the direction and magnitude of the power flows**




Source: P. De Martini

Notes:

- The red, yellow, and green arrows in the figure indicate the direction of power flow and whether the flow exceeds an operating limit (red), nears a limit (yellow), or is reliably within a limit (green).
- Each service transformer and associated secondary conductor are also constraints to consider although not illustrated

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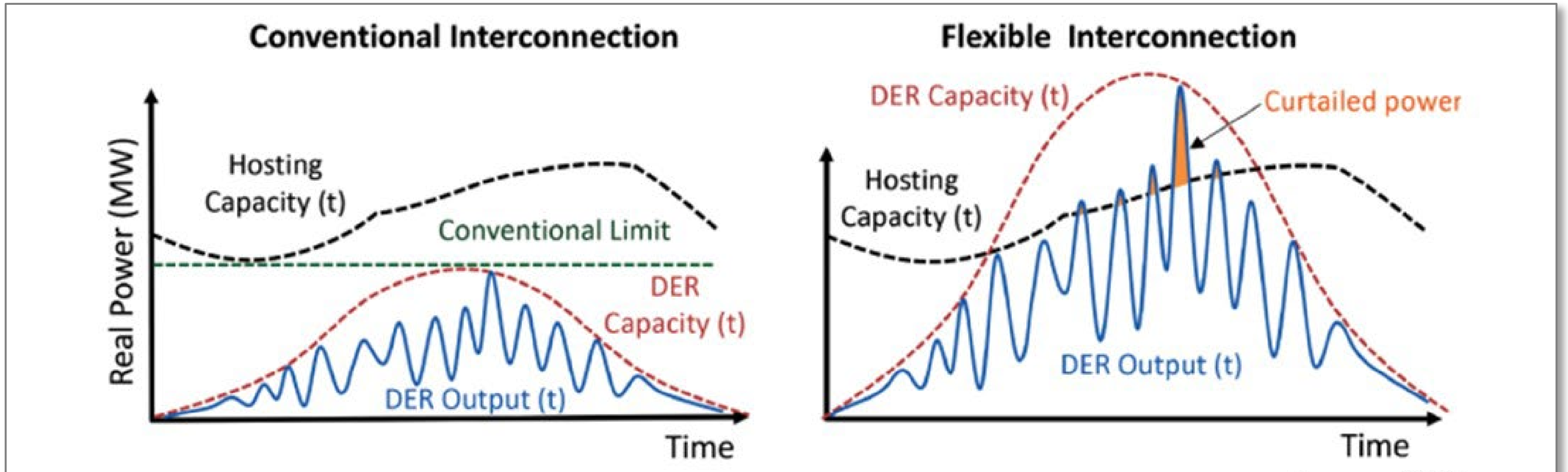
# Flexible GER & EV Charging Connections

# Flexible Distribution Connections

- Flexible connections are methods to improve distribution system utilization allowing more GER interconnections and service connections for EV charging while lowering the cost of integration.
- Flexible connection strategies involve shaping GER and EV charging exports and imports to remain within distribution system operating parameters (e.g., capacity limits, voltage limits) during periods when distribution systems are constrained




Source: EPRI

The potential benefits of flexible connections include facilitating the development of GER and EV charging facilities & other large loads, lowering connection costs, and/or deferring infrastructure upgrades.

R. Yu and P. De Martini, Flexible DER & EV Connections, US Dept. of Electricity, 2024.

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# Flexible Planning and Operating Parameters

**Traditional vs Flexible Connection Studies:**

- Interconnection studies and hosting capacity analysis have traditionally used static analyses of worst-case operating conditions for both grid conditions and GER and loads.
- Conversely, analyses for flexible connections involve identifying granular locational and temporal (e.g., 8760 hours) distribution grid constraints over an annual or shorter (e.g., seasonal, day-ahead) horizon.
- ***Dynamic operating envelope*** methods reflect a more granular, time-sensitive representation of grid conditions. Dynamic operating envelopes offer a more effective understanding of distribution capacity availability due to variations in export energy, customer demand, and grid conditions (including circuit reconfigurations).
- A dynamic operating envelope establishes the upper and lower bounds (operating parameters) for a given time interval for allowable import or export power at a point of interconnection/service connection. These upper and lower bounds can change from one time interval to the next, based on distribution conditions and anticipated constraints.
- Operating envelopes for distribution systems in the US are currently forecasted hourly over a year. This results in seasonal, monthly, or daily time-specific operating limits for GER/Large Loads based on available distribution capacity at each time interval. These variable operating limits for GER export and large load demand define the dynamic operating envelope.

# Flexible Interconnections/Service Connection Approaches

## Customer Controlled Solutions

- **Advanced Inverter Settings:** Advanced inverters can provide the capability to modulate power output dynamically. These inverters can adjust the electricity export and import for distributed generation and battery storage based on grid conditions, ensuring that DER systems operate within safe and allowable system parameters.
- **Export/Import Limits:** Customers can utilize dynamic operating envelope export/import limits to manage the flow of electricity between their DER systems and the grid. By adhering to variable limits that reflect the grid's capacity at different times, customers can ensure that their energy exports and imports are optimized to avoid overloading the grid.

***CPUC Flexible GER Interconnection Example***

An example of customer-controlled export limits for solar and battery storage is California's Limited Generation Profiles (LGP). LGP is a dynamic operating envelope that specifies the maximum amount of electric generation a system will export to the grid at different times throughout the year, ensuring that the project is responsive to fluctuating grid constraints at different times." Under LGP, a customer will alter their grid injections by selecting one of three options to respond to grid conditions.

***SCE Flexible EV Fleet Charging/Large Load Service Connections***

Southern California Edison (SCE) has implemented a two-year Automated LCMS Pilot, designed to allow customers to receive electrical service connections based on the currently available grid capacity, rather than delaying the customer's EV charging interconnection until required grid upgrades are completed to support full-capacity charging. The customer's LCMS can reduce charging levels, disconnect specific devices, or stop charging at specific chargers to remain within distribution grid operating limits. Customers are responsible for purchasing, installing, and operating their LCMS.

# Flexible Interconnections/Service Connection Approaches

## Utility Direct Control Solutions

- Utility-controlled flexible GER interconnection and EV/Large Load flexible service connections involve the use of utility operational system analytics and control capability to interface with customers' smart inverters, PCS systems, EV telematics, smart chargers, or facility energy management systems to initiate curtailment based on specific grid operating limits.
- **Curtailment Allocation**: For utility-controlled approaches, this requires the utility to determine how much reduction is needed and from which GER/Load that is under utility control. There are several allocation methods in development - most common curtailment decision methods employed today are Last-in-First-Out (LIFO) and Pro Rata.

  The LIFO method refers to the first GER interconnection/load service connection is curtailed last. The Pro Rata method involves all GER or large loads under a utility's flexible control in a constrained area experiencing a proportionate reduction in their grid export/demand.

***Commonwealth Edison's (ComEd) Mendota Demonstration***

ComEd has implemented a utility-controlled solution in its Mendota demonstration to enable flexible GER interconnection. This utility-controlled solution leveraged ComEd's DERMS and ADMS to assess grid conditions and dispatch DER for real and/or reactive power control. Smart inverter dispatches are coordinated with ComEd's existing Volt-Var Optimization (VVO) implementation.

***National Grid EV Charge Smart Plan***

National Grid's program employs both active and passive managed charging strategies. Active managed charging involves real-time utility control over charging activities, while passive managed charging relies on time-of-use rates and customer behavior to shift charging to off-peak periods. The actively managed charging approach uses the telematics from EV manufacturers and networked Electric Vehicle Supply Equipment (EVSE) to provide real-time data and control over EV charging activities.

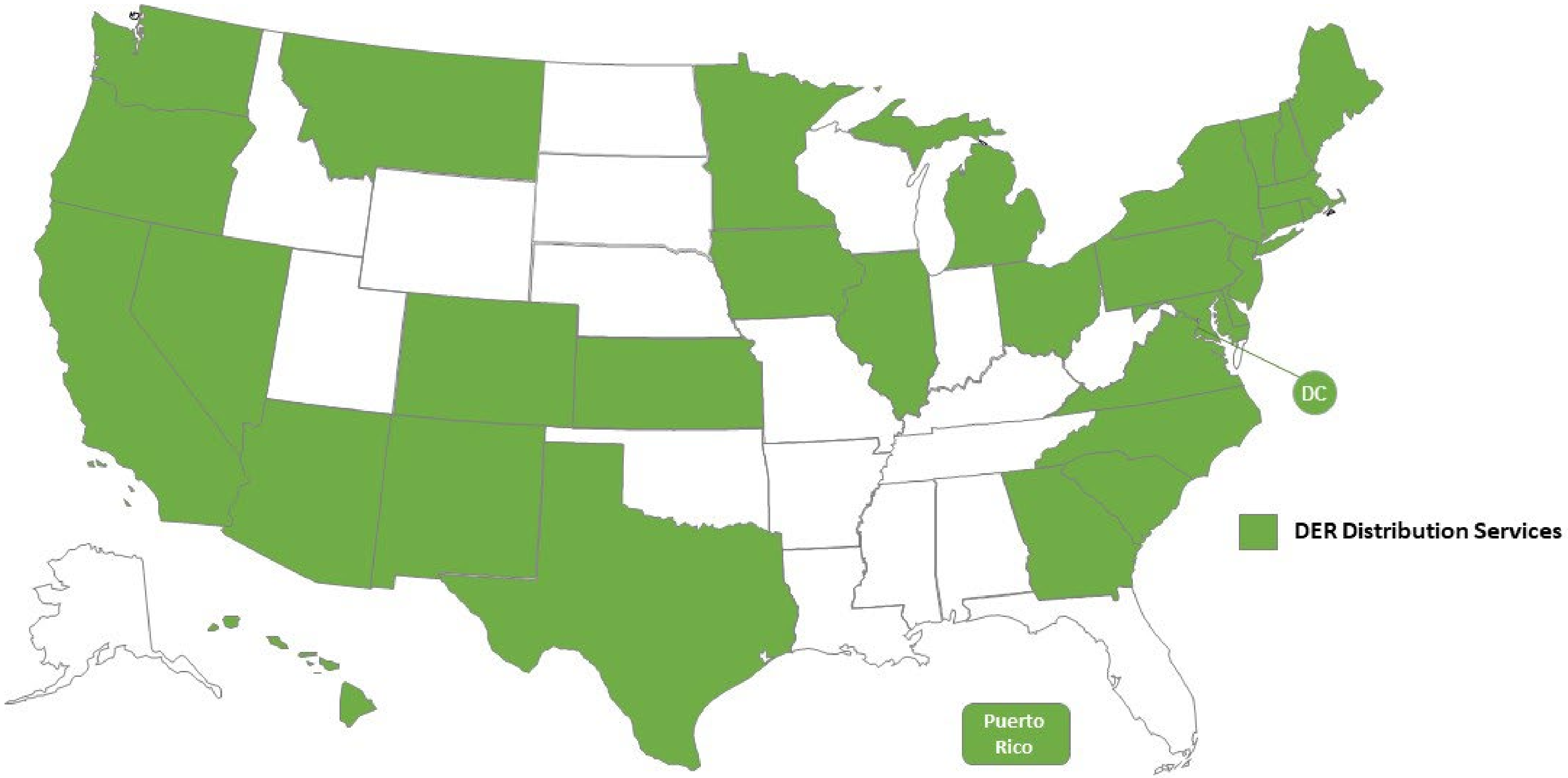
# Key Considerations

- **Policy & Regulatory:**
  - Establishing clear policy and guidelines for the adoption of flexible connection methods, including customer–controlled and utility-controlled approaches
  - Curtailment allocation methods require stakeholder engagement to determine an acceptable approach. Any approach selected will require ongoing monitoring and assessment of non-discriminatory implementation.
  - Determining the role that flexible connections play within a broader flexibility services strategy for mitigating distribution capacity investments
- **Customer Engagement:**
  - Educating and empowering customers to participate in managed charging and energy export schemes to optimize their flexible connection for improved grid utilization.
- **Data and Forecasting:**
  - Detailed grid data and forecasting analytics are required to determine dynamic operating envelopes for distribution systems at a granular location and temporal detail.
- **Technology Integration:**
  - Technologies like ADMS, Grid DERMS, smart inverters, and related interoperability standards may be required depending on the flexible approach used. The cost, performance, and other implementation considerations should be evaluated.

# Distribution Flexibility Services from GER

# Distribution Grid Flexibility Services

## State Policy, Regulation & Utility Pursuit of GER Services* for Distribution Grid Needs

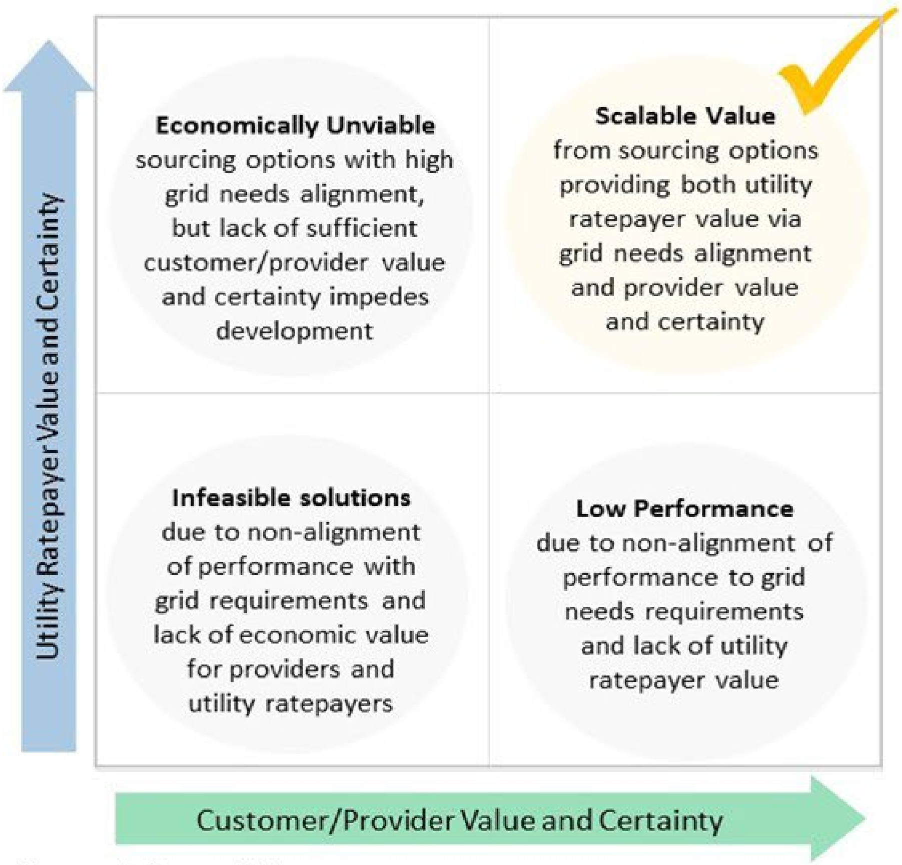



Sources: Newport Consulting and North Carolina DSIRE Program

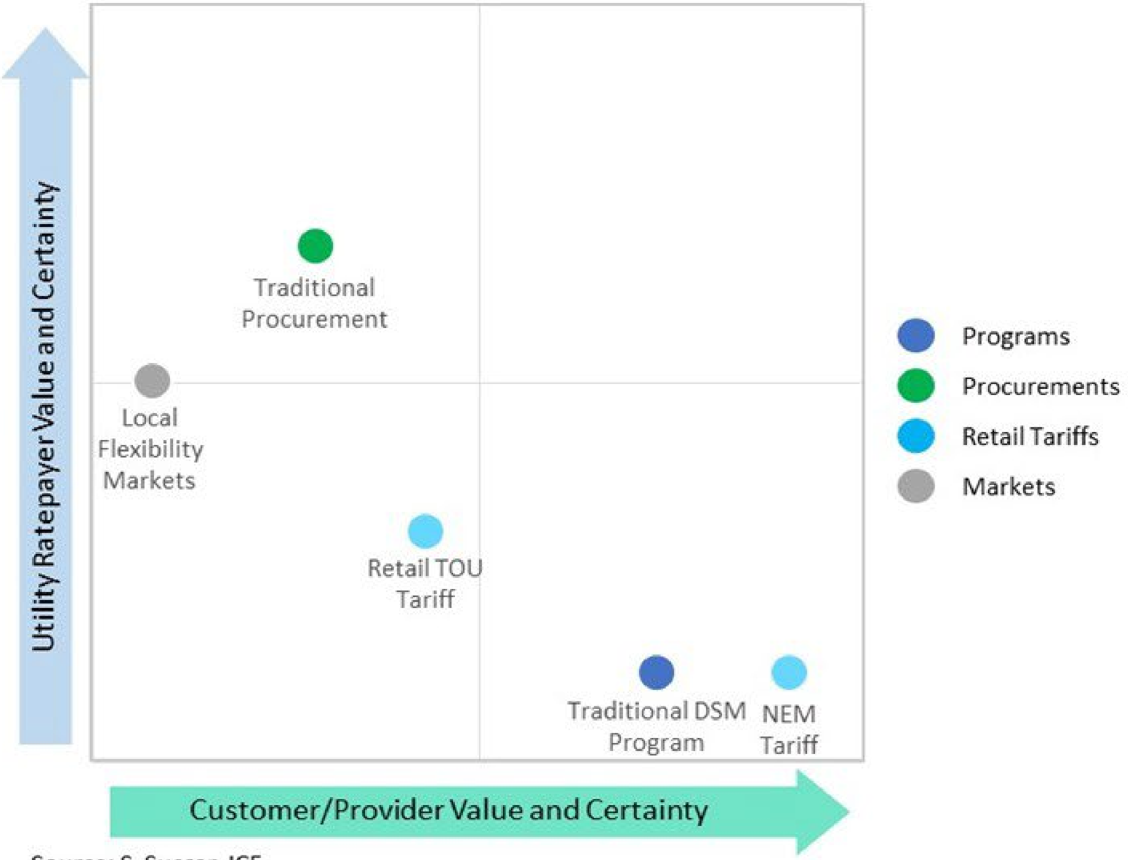
*Includes utility geotargeted DSM programs, NWS procurements, and utility-owned grid storage

# Sourcing Methods for Distribution Grid Services

## Current Application of Pricing, Programs, Procurements & Markets for Distribution Needs




Source: S. Succar, ICF




Source: S. Succar, ICF

Reference:
P. De Martini, S. Succar, and P. Cook, Evolution of Sourcing Distribution Grid Services, U.S. DOE, December 2024

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# Sourcing Methods Have Different Incremental Costs for Ratepayers

- The incremental cost of adding an EV TOU rate is relatively low if a general TOU rate is in place. Also, DER tariff rates, such as the value of DER tariffs that align pricing to avoided costs, could have minimal cost impacts on customer rates.
- Similarly, realigning existing DSM budgets to include geo-targeted programs may not involve incremental costs to ratepayers.
- By contrast, flexibility services procurements add material incremental costs for ratepayers regarding the specific NWA evaluation and procurement processes and the compensation for the service(s) provided.
- Additionally, the cost recovery mechanism employed for NWA services compensation (e.g., utility operating expense) can have a greater near-term rate impact than the avoided utility distribution capital expense typically amortized over the asset's life.

| Sourcing Method | Incremental Ratepayer Cost |
|---|---|
| **Tariffs/Price Signal (DER, TOU)** | Relatively low cost for billing changes and customer communications |
| **DSM/Demand Flexibility Programs (Geo-targeted and temporal)**[62] | None if the existing authorized program funding is redirected to geo-targeted /temporal needs |
| **Procurement/Bi-lateral Contract** | Cost is based on competitive proposals but typically capped at the deferred/avoided distribution value. |
| **Local Flexibility Market** | Market implementation cost + cost of purchased flexibility service at market prices |

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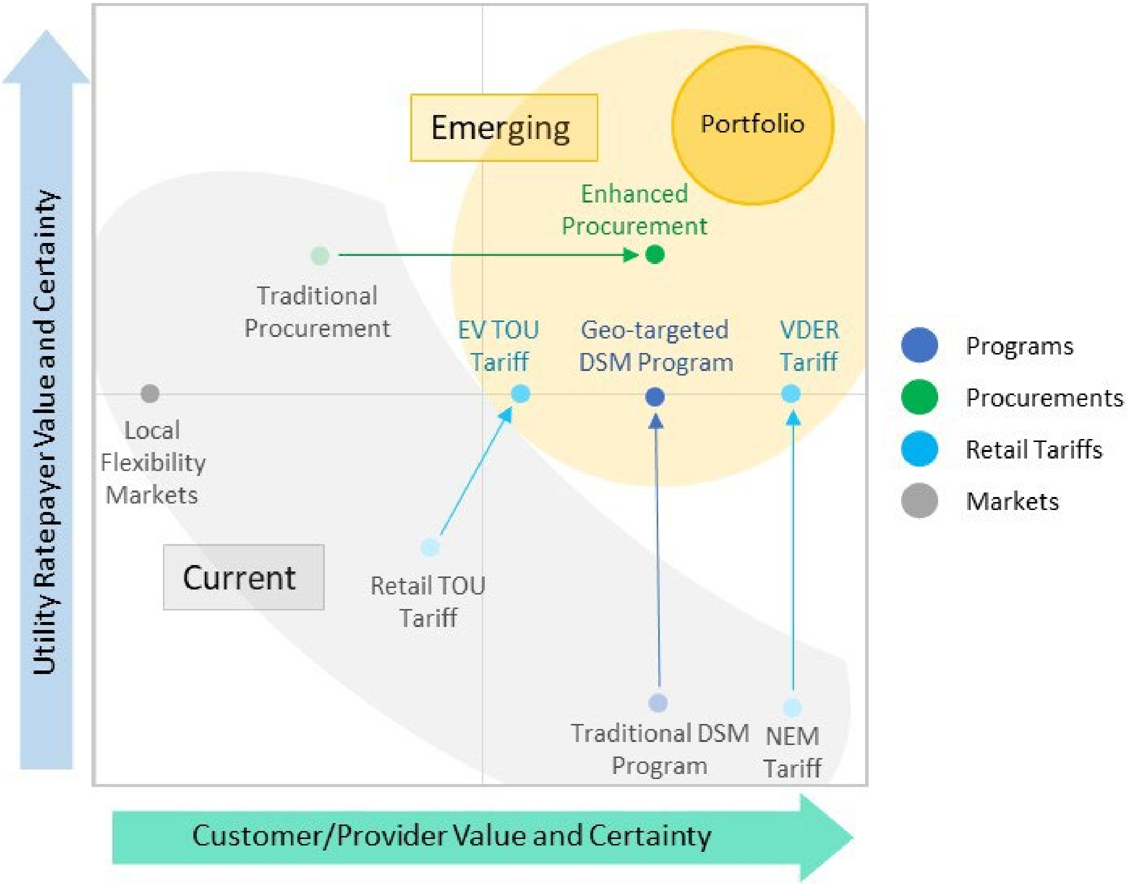
# Evolution Needed in Sourcing Methods for Distribution Services

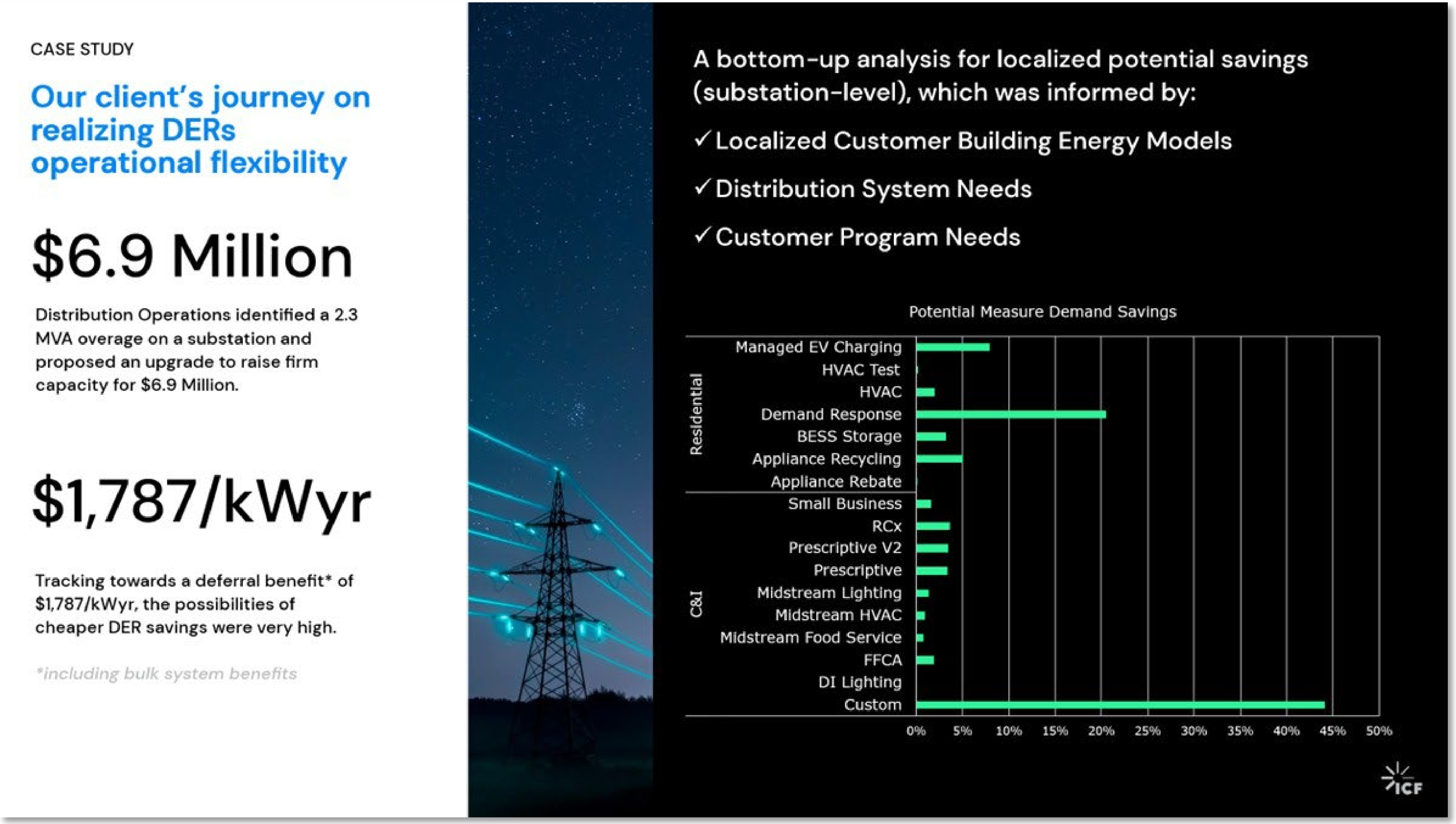
## No sourcing method alone can address the evolving distribution grid – a portfolio is needed

- Evolving distribution grid needs necessitate evolving sourcing methods toward the top-right quadrant of high alignment and scalability.
- DER solutions must reliably meet the variability and hyper-locality of emerging distribution constraints. Note: Average distribution reliability is 99.86%
- This means moving "up" toward a greater alignment with distribution grid needs and improving DER service provider financial and value certainty that moves toward the "right."
- To find options in the top-right quadrant of these alignment-scalability axes, we can explore a two-fold evolution in DER sourcing that involves:
    - Improving DER sourcing options toward distribution needs alignment and sustained viability for providers, and
    - Combining sourcing options into integrated portfolios that consider each option's relative contributions and cost to address distribution grid needs.




Source: S. Succar, ICF

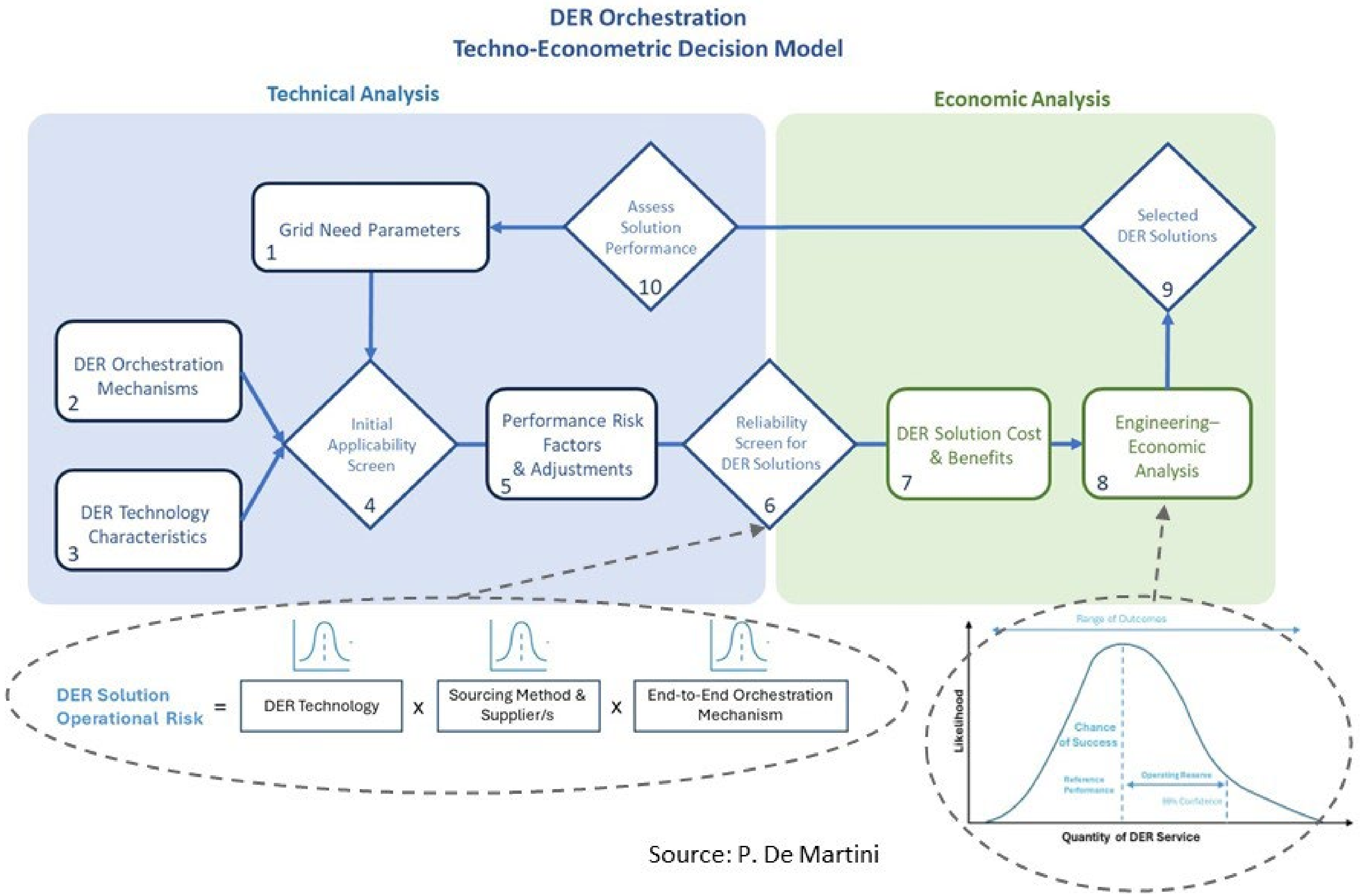
# Utility Distribution NWA - Flexible DER/DSM Case Example:



# Techno-Econometric Model to Evaluate Flexibility Service Provision

## A gap exists between distribution flexibility services' value potential & Distribution Operator confidence

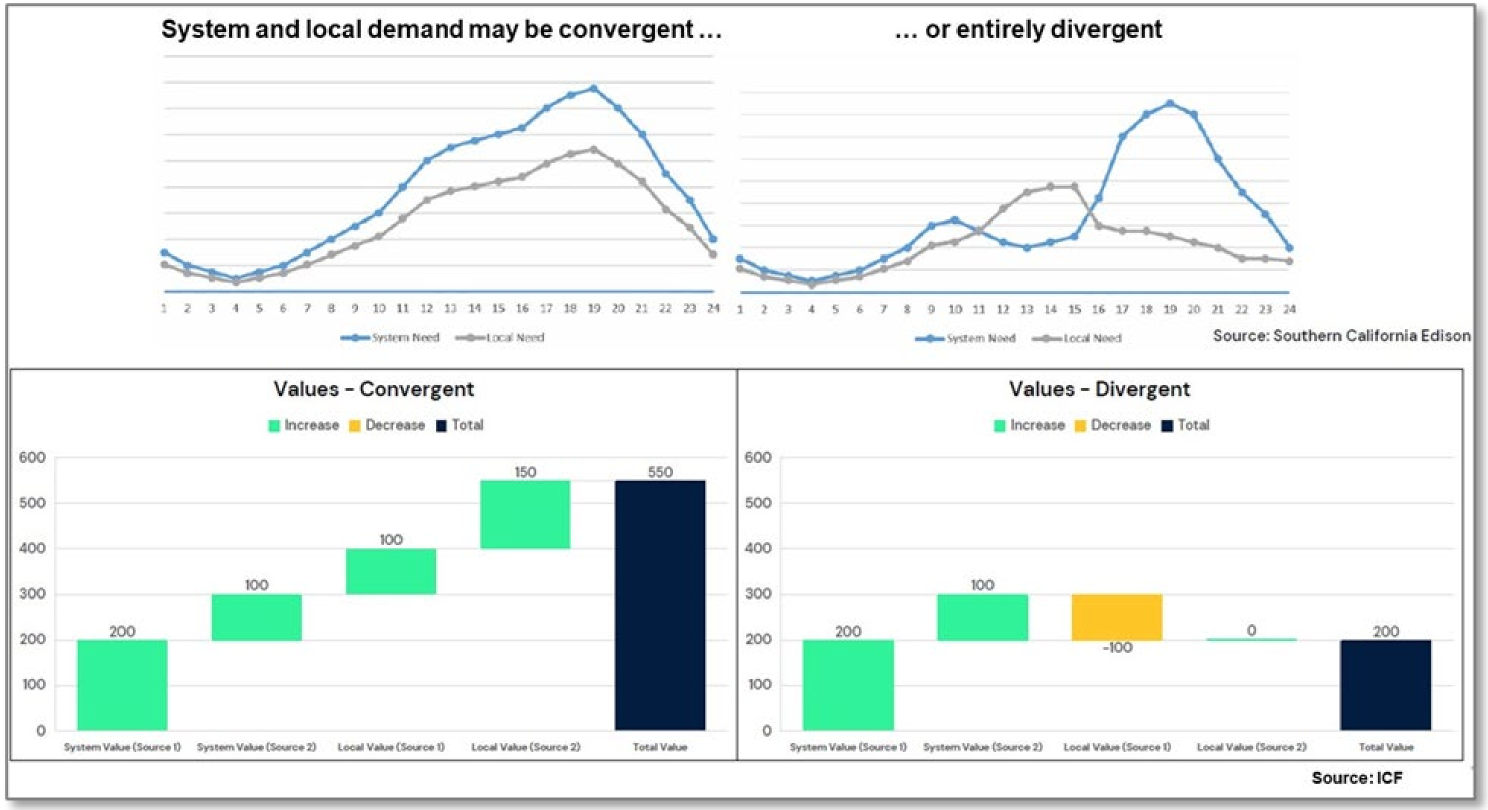
- A reliability risk-based methodology for systematically evaluating DER solutions individually and in a portfolio against distribution grid performance requirements.
- Employing a value-at-risk type analytic methodology for determining the appropriate level of distribution operating reserves to achieve a desired level of confidence in operational performance from a portfolio of DER solutions
- Incorporate a techno-econometric methodology into planning tools for use by utilities to develop DER distribution services sourcing strategies required in a growing number of states as part of Integrated Distribution System Planning.




Source: P. De Martini

# BPS & Distribution Needs Are Not Always Aligned

**Existing policies and practices often prioritize BPS needs independent of distribution impact – need for coordination**




**Ensure GER services & DSM programs are coordinated to avoid them canceling each other out or creating worse outcomes**

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# Key Considerations: Flexibility Services

- Integrate flexibility sourcing approaches to holistically consider the use of flexible connection, pricing, programs, and procurements:
  - Explore integration/coordination of regulatory dockets to examine retail rate designs, geo-targeted/temporal demand flexibility programs, and NWA procurement processes that may yield more effective utilization of flexibility services for distribution.
  - Consider flexible connections as part of a holistic flexible services portfolio and roadmap, including development of a flexibility resource stack and consideration of a preferred order of GER/flexible connection dispatch.
  - Examine geo-targeting GER/DSM programs to address distribution needs by considering temporal and locational needs, including performance requirements, to provide cost-effective grid solutions.
- Revisit NWA procurement approaches to consider enhancements that address service provider cost and risk factors to improve participation and viability.
- Consider a bottom-up approach to assess GER optimization first at the distribution level before use for bulk power systems to better assess the convergent and divergent values.
- Consider employing a techno-econometric planning and portfolio development methodology for reliable distribution flexibility services.

# Thank you

Paul De Martini
paul@newportcg.com

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