ELECTRON

Operationalizing DER flexibility

An introduction to local flexibility markets, the UK DSO model, and what this means for US utilities

In collaboration with:

ESIG

EPE ELECTRIC POWER ENGINEERS

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Agenda

1. Introduction to the DSO model
2. Introduction to flexibility markets
3. Getting started - and scaling - flexibility
4. The DER value methodology
5. Q&A

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Energy Systems Integration Group (ESIG)

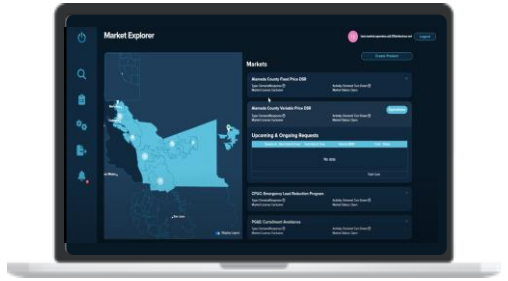
- ESIG is a member-driven organization that addresses technical challenges for transforming energy systems. We do this through collaboration, education and knowledge sharing.
- >250 members worldwide broadly focused on decarbonization and integration of energy systems
- Workshops, webinars, reports available freely on our website (https://www.esig.energy/) and on YouTube (@EnergySystemsIntegrationGroup). Join our mailing list!
- We create task forces to address topics such as multi-value transmission benefits or grid-forming technology or electrification and these task forces do analysis, run simulations, synthesize best practices, etc.

About Electron

Working with system operators to orchestrate the full value of distributed energy resources with our flexibility market platform, ElectronConnect.

ElectronConnect Features:

- Long term tenders
- Real-time markets
- 3rd party enrolment portals
- Bid matching & dispatch
- Multi-market co-ordination
- IT/OT integrations
- M&V, reporting & analytics
- Open API's & integrations



6.6 GW/h

Cumulative reserved flexibility **volume** on ElectronConnect

£1.2 million

Cumulative reserved flexibility **value** on ElectronConnect

Bloomberg
Top 25 startups to watch

sifted / backed by FT
Top 16 energy software startups to watch

Trusted by utilities worldwide

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nationalgrid

Scottish & Southern Electricity Networks

SILICON VALLEY CLEAN ENERGY

About EPE

Developing and Designing the Grid of the Future

Value-Added Solutions for Complex Engineering & Grid Modeling Challenges.

350+
Clients

15,000+
Projects Executed

1968
Founded

HQ
Austin, TX

420+
Employees

05
North American Locations

Business Units:

Shaping & Supporting the Grid of the Future

Guidance for Every Stage of a Project's Lifecycle

Who We Serve:

- Power Delivery
- Manufacturing
- Power Generation & Renewables
- Commercial & Industrial
- Investment Stakeholders
- EPCs

5/17/2025

About ENWL

We expertly operate £13bn of critical infrastructure

We deliver a reliable essential service for everyone in the North West, 24/7.

- 92% customer satisfaction
- £123 per household per year
- Free Extra Care Register for those in need
- Most digital network operator
- 99.99% reliability
- Leading the North West to net zero

We're the North West's power network.

Our overhead lines, underground cables and substations bring power to 5 million people in 2.4m homes and businesses.

We invest billions of pounds in the region focusing on key areas of **safety, reliability, customer service** and **net zero.**

2.4m
customers

12,519km
Overhead lines

44,872km
Underground cables

23m
Submarine cables

57,415km
Total network length

Introducing DSOs and flexibility markets

Evolving towards a DSO future

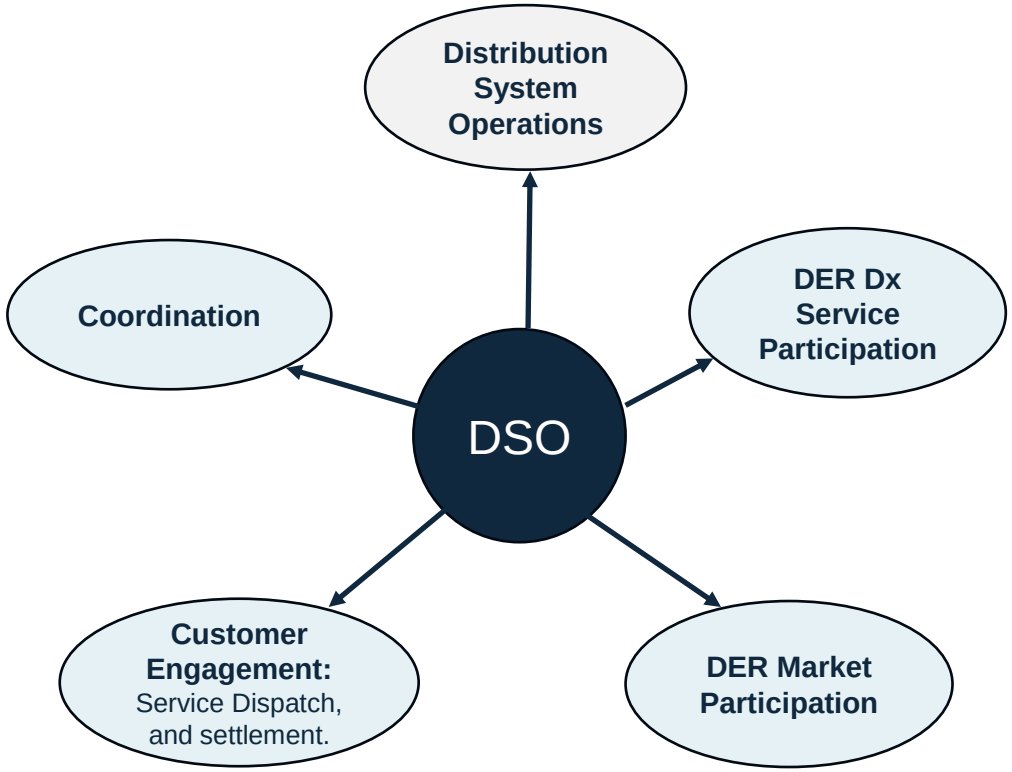
The DSO concept is a natural progression of a utility role and operating model with the goal of optimally leveraging DERs to solve grid needs (Grid Services) and energy needs (Market Function)

The DSO Operating Concept is:

- Evolution of core utility functions
- Opportunity for utilities to manage the grid more optimally
- System & DER Orchestrator: Grid services and market facilitation
- A spectrum of various operating model
- A gradual progression
- Customer value engine

The DSO is ***not***:

- A transition away from utility functions
- A threat to utility functions and operations
- Just a set of software tools to manager DERs
- A one size fits all global model
- An overnight leap to a new operating model
- Unachievable – It is practical, achievable and already underway in many jurisdictions



Introduction to a distribution system operator function

UK DSOs have evolved from separate operators, to part of network operations

- Initially seen as a separate/ potentially conflicted function (e.g. legal separation)
- Focused on **optimization of digital system**

- Not flex ***or*** build – it's **both**
- From DS "**Operator**" to DS "***Operations***" (one team)

Introduction to flexibility markets

A flexibility market enables utilities to incentivize Distributed Energy Resources (DERs) to sell excess energy or adjust consumption, while increasing visibility into DERs that utilities don't directly control.

Improved network visibility and a more reliable grid

Where the value comes from

Preventing asset damage, reducing risk of faults and power cuts, and aiding in network planning .

Deferred grid build out for a more affordable grid

Where the value comes from

Reducing load-related expenditure and saving costs for consumers.

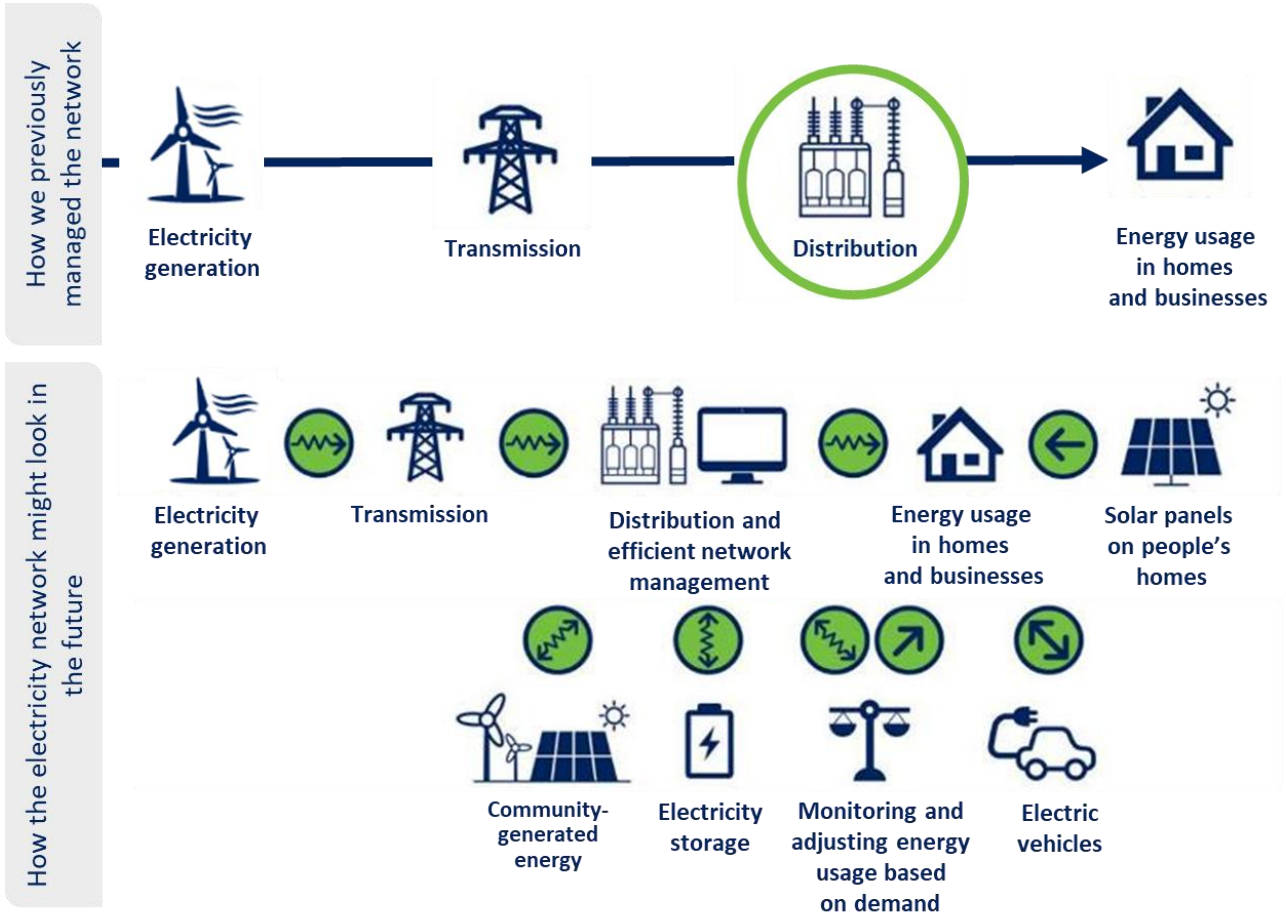
Granting flexible connections and deploying smart solutions

Where the value comes from

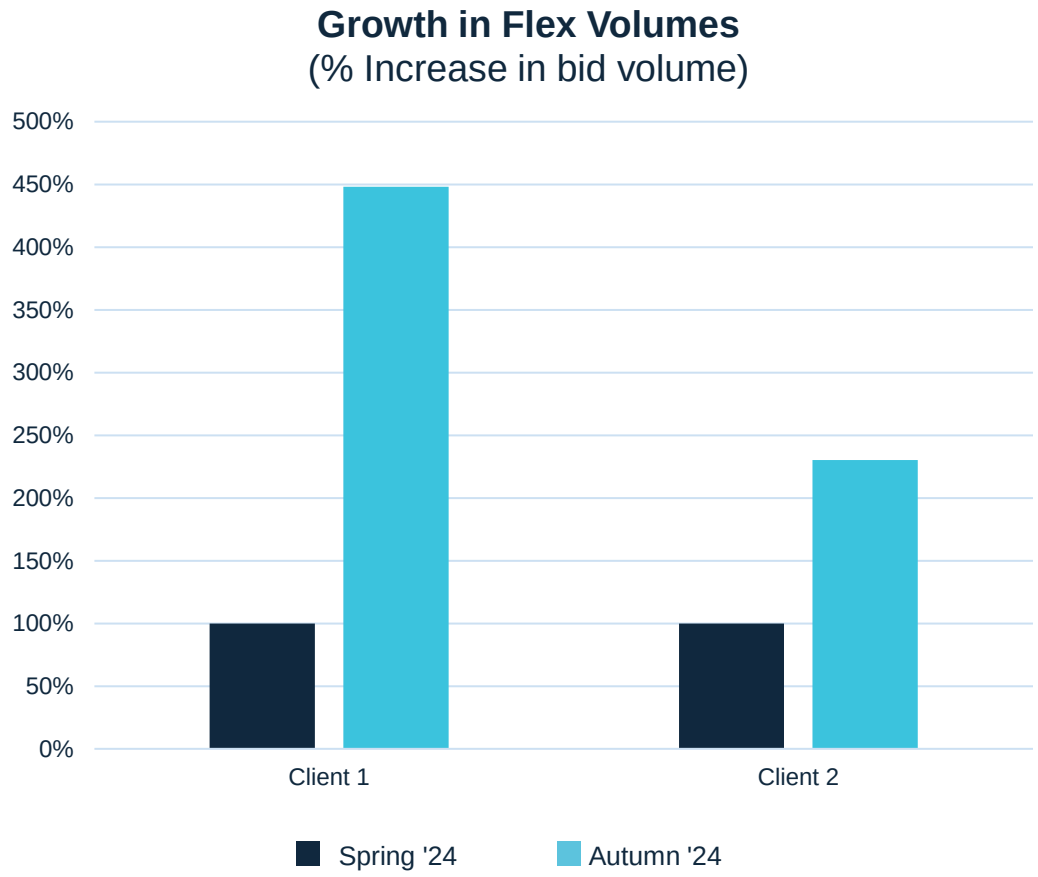
Accelerating the rate at which low-carbon assets are connected to the grid.

ENWL: Taking a flexibility-first approach to become the most digital DSO

We are entering a period of big change in the way electricity is generated, stored, transported and traded



Growth in flexibility volumes on ElectronConnect



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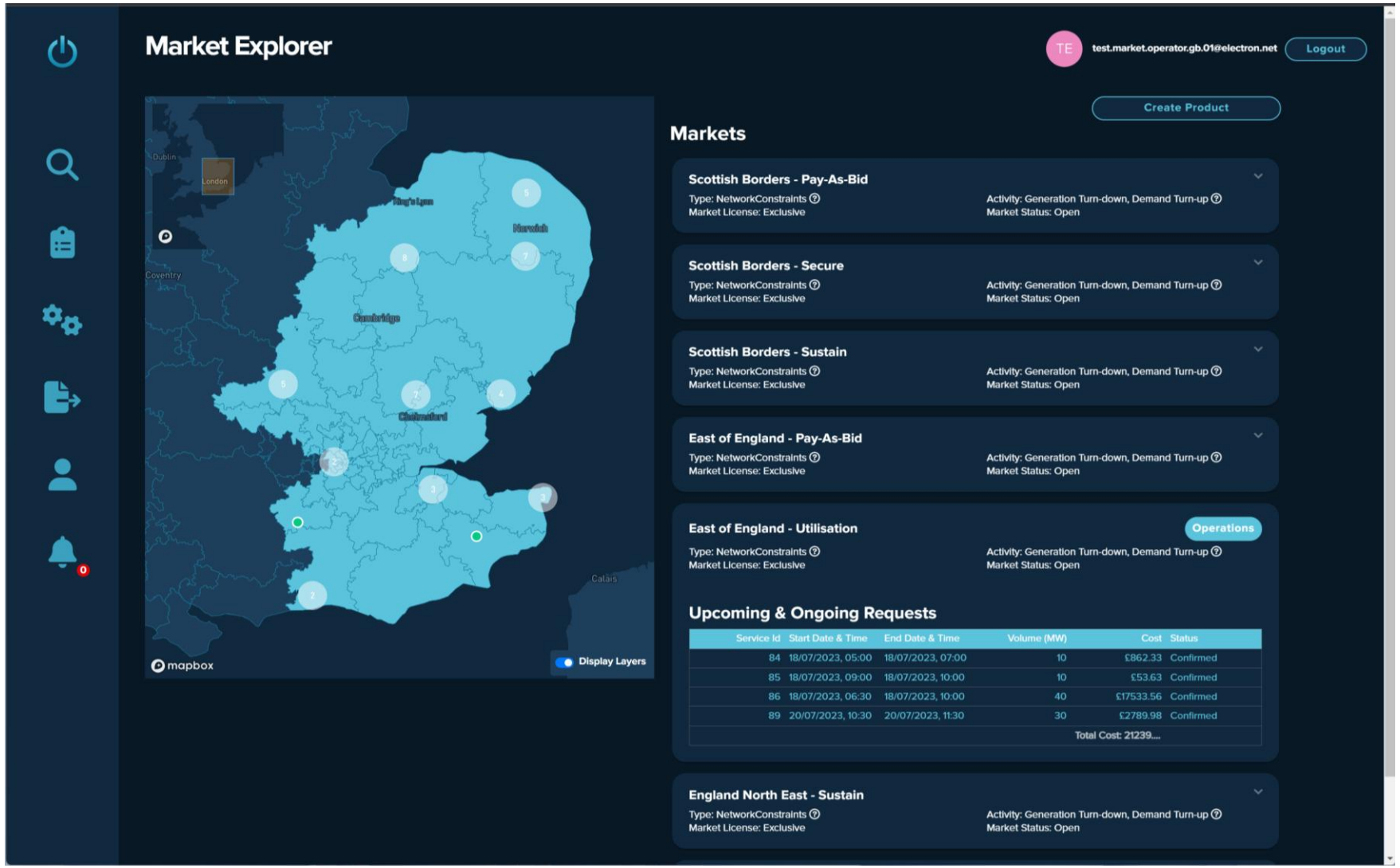
ElectronConnect: Flexibility markets in action



Take a look at ElectronConnect

ENWL operational dispatch: Simplifying real-time operations

Real-time management of grid congestion with operational dispatch from the control room.

BEFORE: **Disconnected programs and products**	*AFTER:* **Holistic procurement and dispatch**
Simple to launch and use at low scale	Focus on MWs reserved and activated
Exponential effort ramp with scale	DER capabilities can be matched to system needs

CHARGE MY STREET

Public EV charging and V2G

axle energy

Aggregated residential EV charging

uenergy

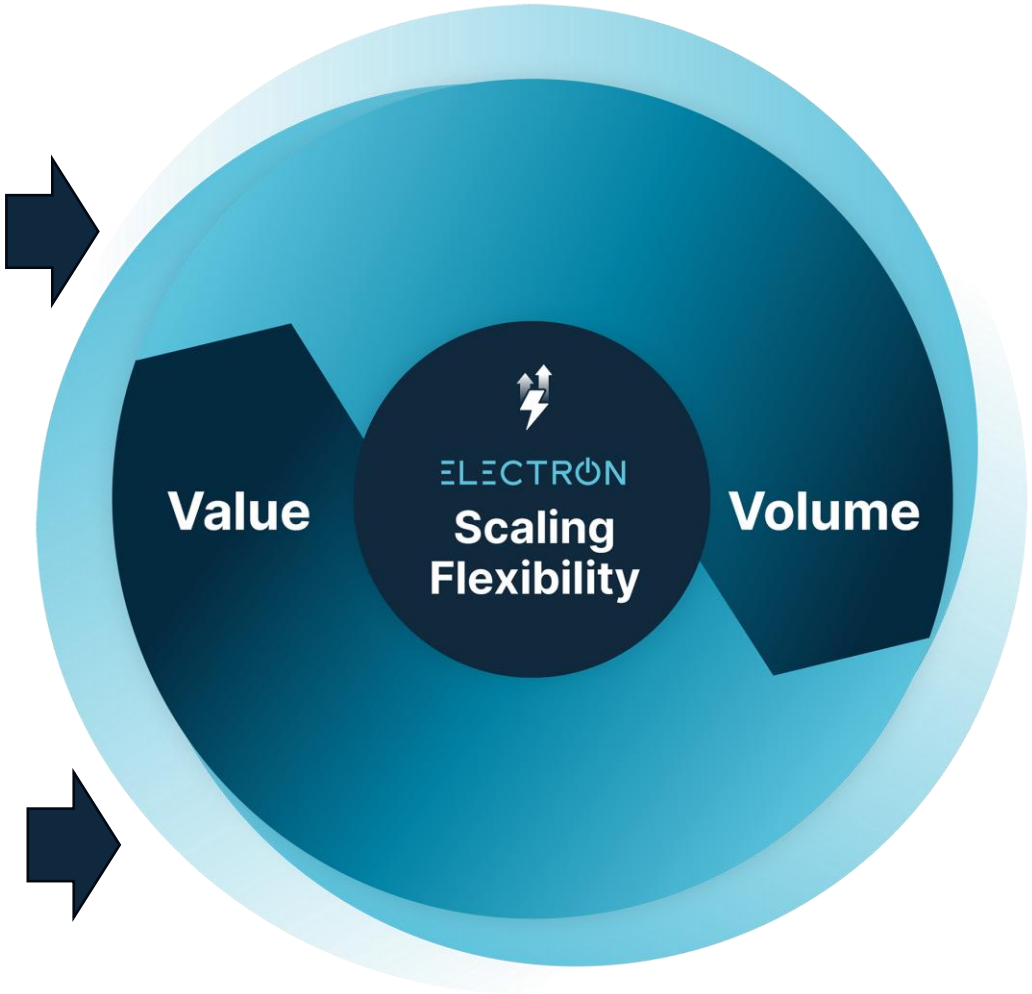
C&I batteries

How to get started

There is a huge opportunity for US utilities: you are uniquely positioned to realize the whole system value of flexibility

The Value/Volume thesis

Accelerant 1: **More Markets**
Meeting the differing needs of system operators and flexibility service providers with multiple products and services



Accelerant 2: More Connected
Integrating with multiple asset datasets, markets, and sign-up portals to lower barriers to entry and enable whole system value stacking & system wide co-ordination

Accelerant 3: **More Often**
Facilitating day-ahead and integrated near real-time trading, to offer flexibility service providers more options when they participate.

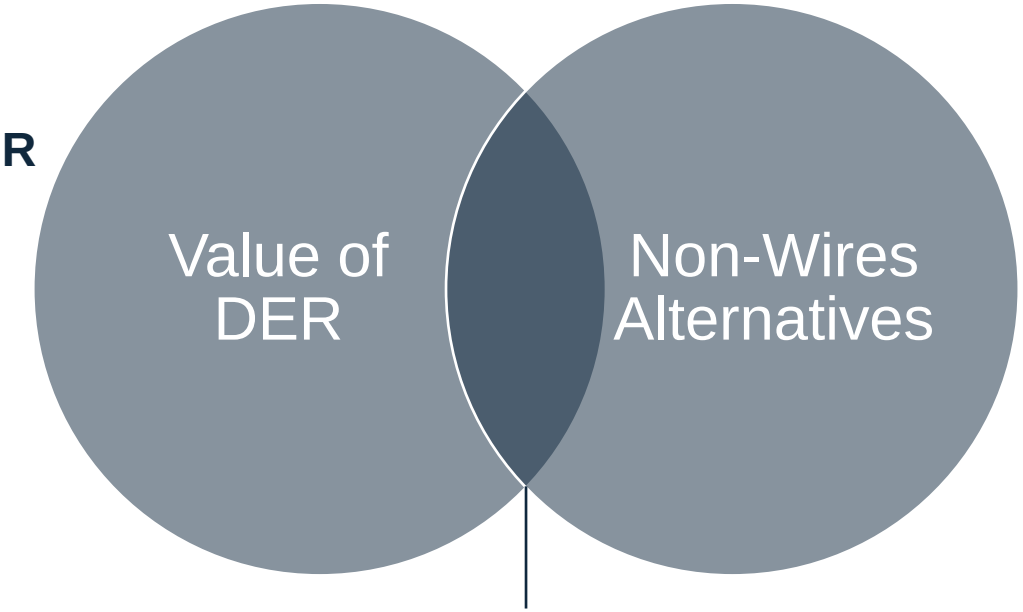
Value of DER – Concept Overview

What Makes DER More Valuable?

Imagine you are a distribution planning engineer

Imagine you get to control the size, location, and type of DER

- **Where do you want to put it?**
  - Areas with load capacity needs, especially where:
    - DER has higher degree of reduction of peak load (e.g., solar)
    - The need occurs relatively sooner in the forecast
    - There is high confidence that load growth will occur
    - The traditional upgrade is more expensive
    - The traditional upgrade is to a relatively healthy asset
  - Areas that need more hosting capacity (applicable for BESS / EVs)

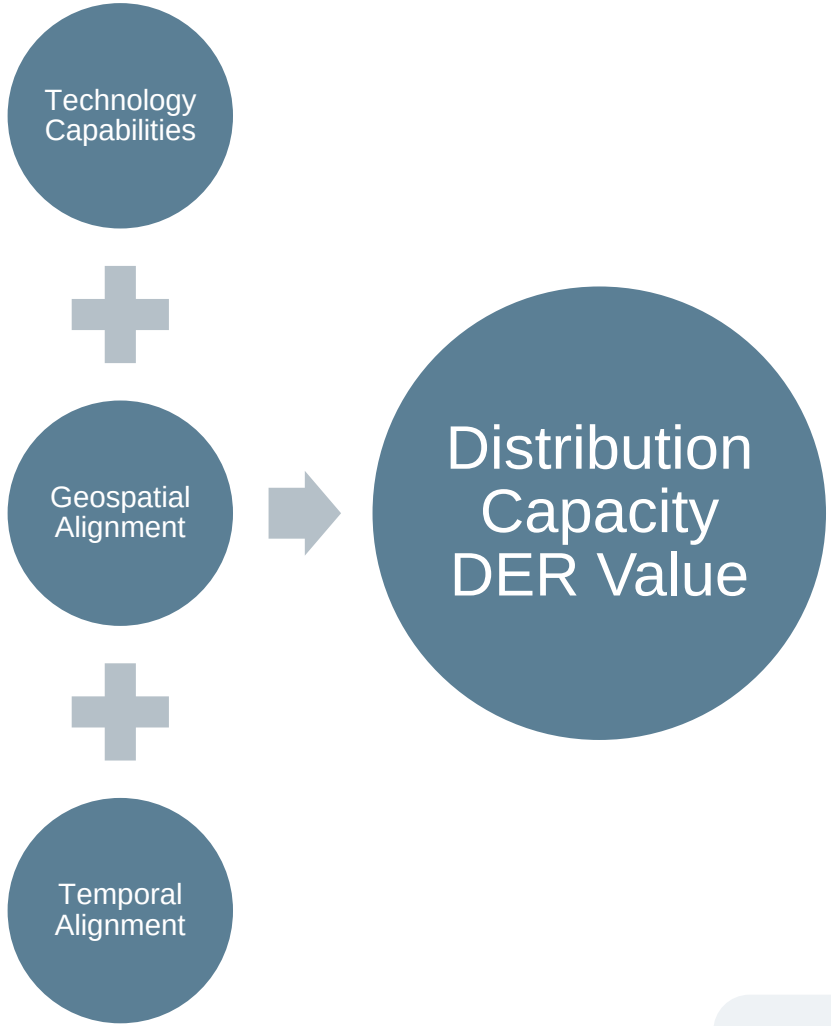


Procurement of DER-Derived Distribution Capacity

Aligning DER with Distribution Capacity Needs

Overview

- Distribution capacity is the ability of distribution equipment to carry current without sustaining damage
- DER Generation or Demand Reduction can reduce equipment thermal loads and improve capacity depending on:
  - Technology Capabilities
    - Predictability
    - Controllability (where not predictable)
  - Geospatial Alignment with system needs
  - Temporal Alignment with system needs
    - Load and Generation Profiles
    - Future Year Capacity Needs
- Ideal Result: **Deferred Capital Investment**



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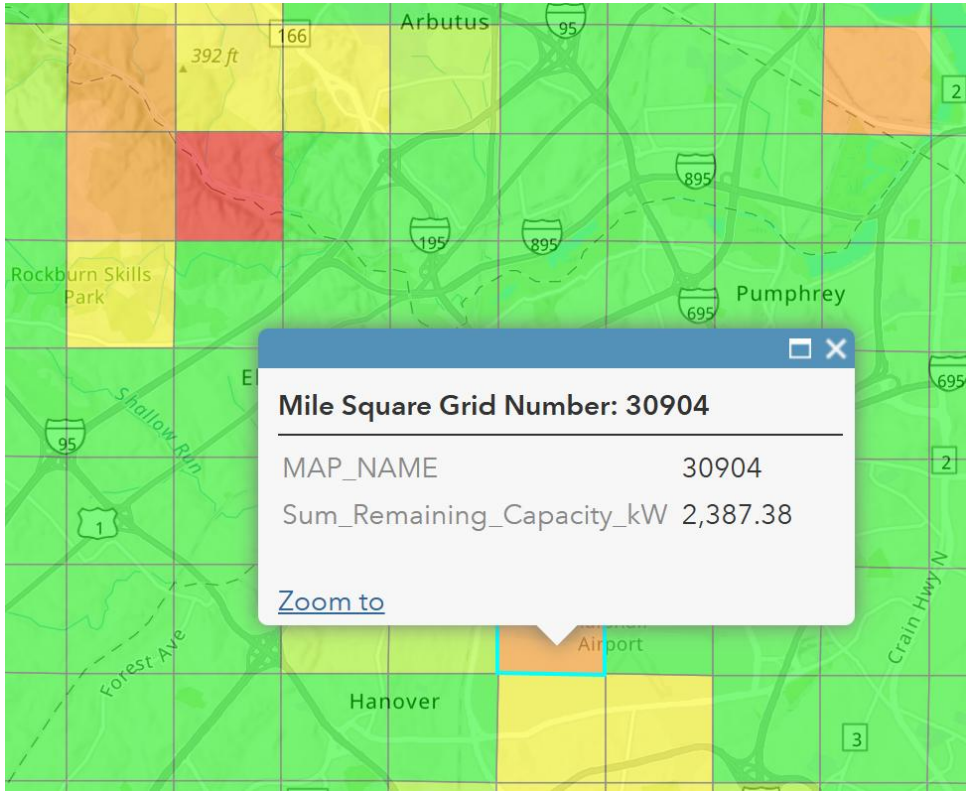
VDER - Input Data

Align with Existing Practices and Available Data

Leverage Existing Planning Processes to Align Needs, Minimize Duplicative Efforts

- Load Growth Forecasts
- Substation Equipment Loading (SCADA)
- Circuit Equipment Loading -> Existing Power Flow Models, AMI
- Voltage Support Areas -> Existing Power Flow Models, AMI
- Upgrade Project Cost Estimates



Locational Value stack for DERs

Time Horizon

DER Type

Location

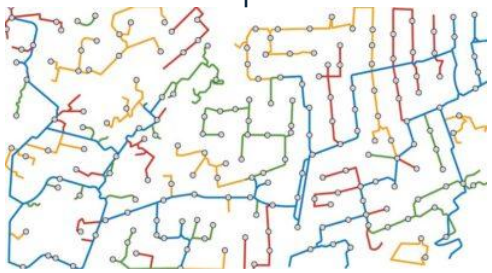
Bulk Generation

Value Stack: Generation

Value Stack: Transmission

Distribution Substation

Aggregated Value Stack: Transmission + Generation



Locational Value Stack: Distribution

Potential Value Stream	Level of Reasonableness	Key Challenges
Distribution Capacity	High	Locationality, Time Horizon
Voltage Support	Medium	Locationality, Timing
Loss Reduction	Medium	Self-Consumption, Net Effect Size
O&M Reduction	Low	How?
Reliability Improvement	Low	How?
Asset Health	Low	Net Effect Size

Jurisdictional Agnostic

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Q&A

Thank you for listening

Get in touch if you have any questions

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