

Operationalizing DER flexibility

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

In collaboration with:



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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Speakers



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Electric Power Engineers

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.

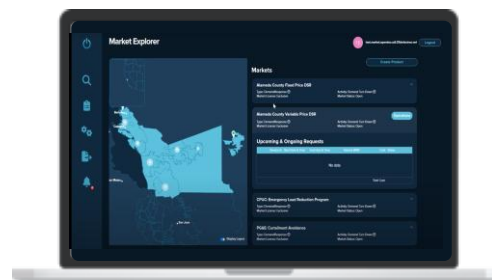


About Electron

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

**electricity
north west**
Bringing energy to your door

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

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

electricity
north west
Bringing energy to your door



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

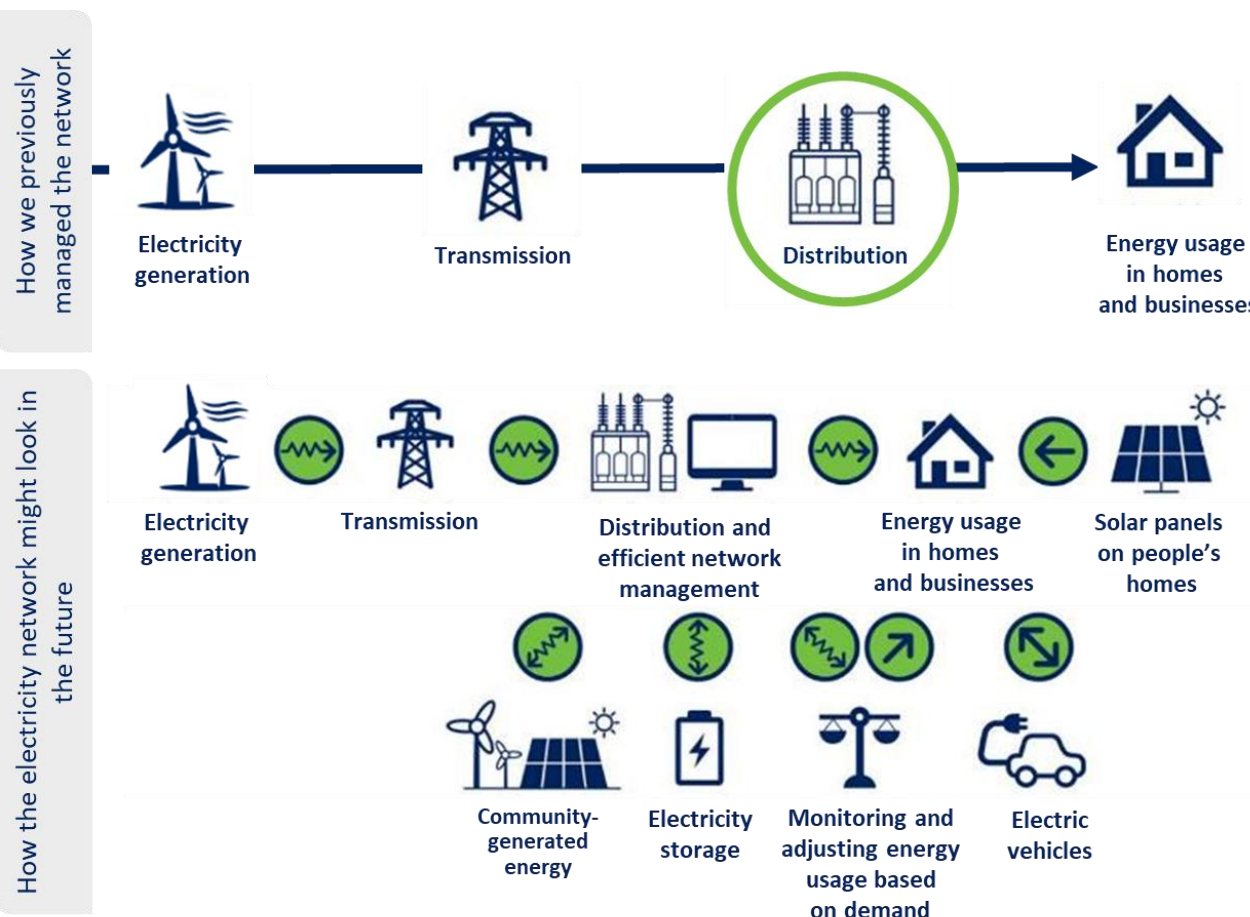
Where the value comes from



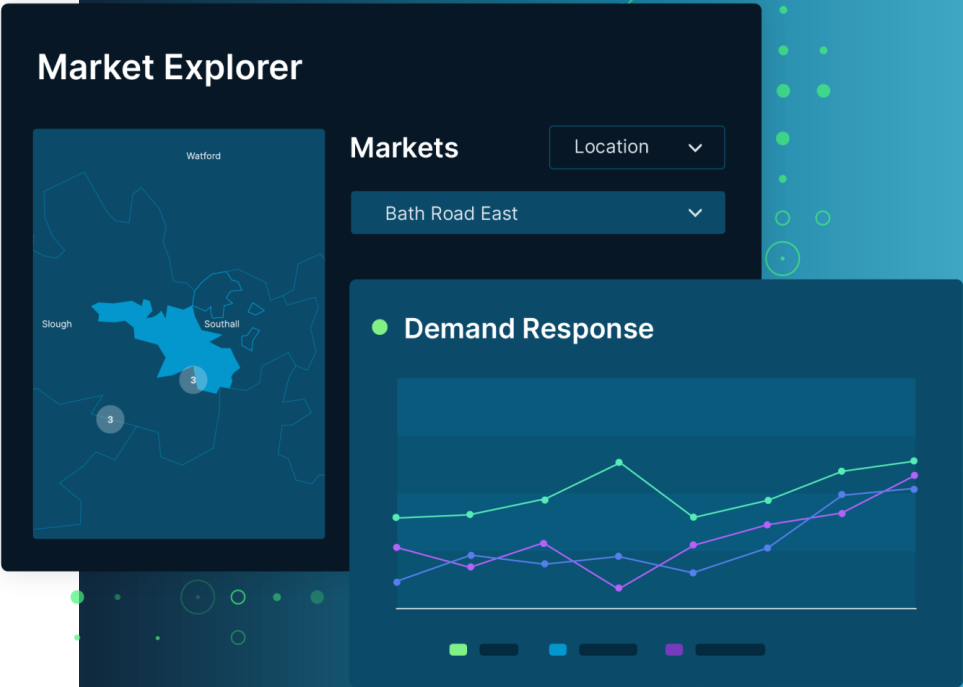
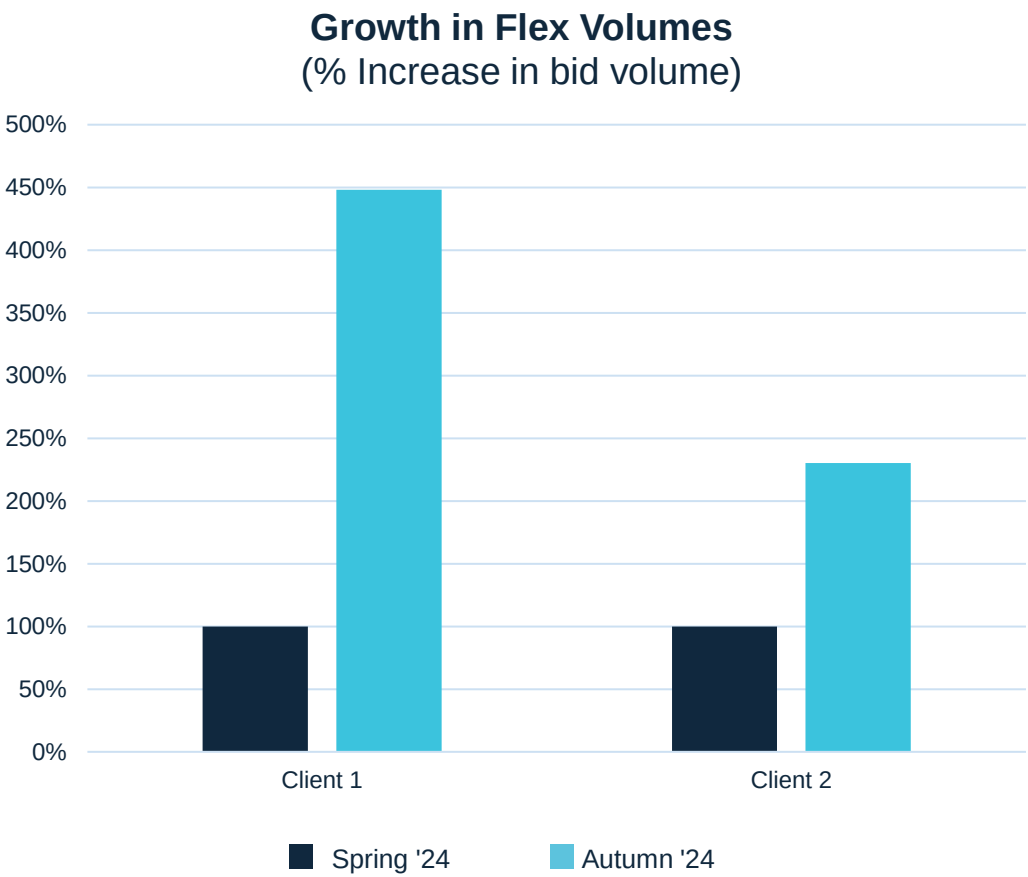
Accelerating the rate at which low-carbon assets are connected to the grid.

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

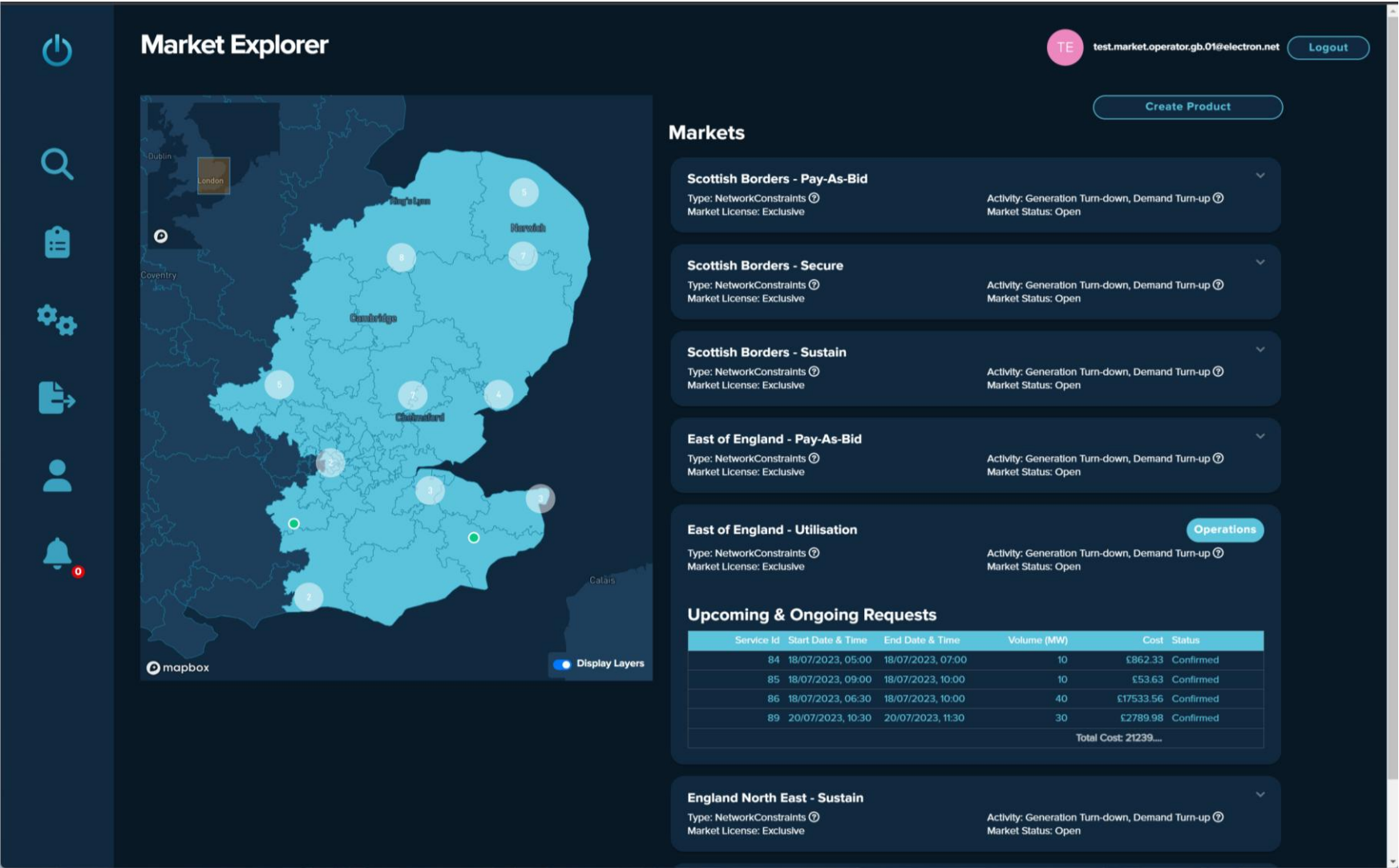
We are entering a period of big change in the way electricity is generated, stored, transported and traded



Growth in flexibility volumes on ElectronConnect



ElectronConnect: Flexibility markets in action

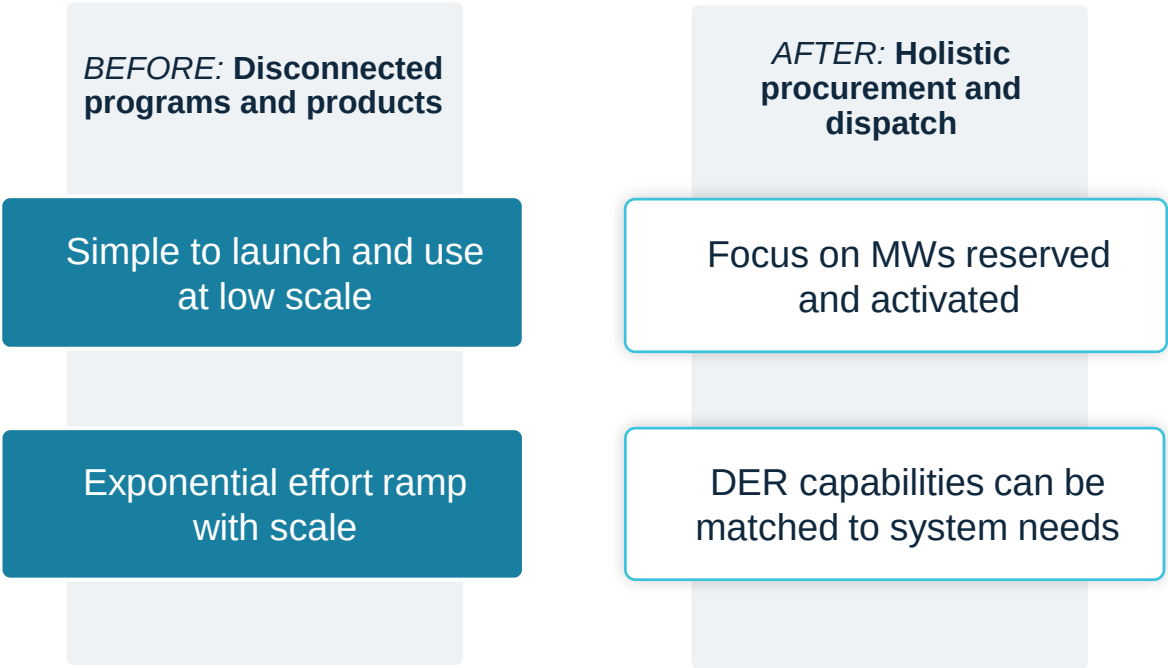


Take a look at
ElectronConnect



ENWL operational dispatch: Simplifying real-time operations

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



This section features the logos and descriptions for three partner companies. On the left is 'CHARGE MY STREET' with a car icon, described as 'Public EV charging and V2G'. In the center is 'axle energy' in red text, described as 'Aggregated residential EV charging'. On the right is 'uenergy' with a leaf icon, described as 'C&I batteries'.

CHARGE MY STREET	axle energy	uenergy
Public EV charging and V2G	Aggregated residential EV charging	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

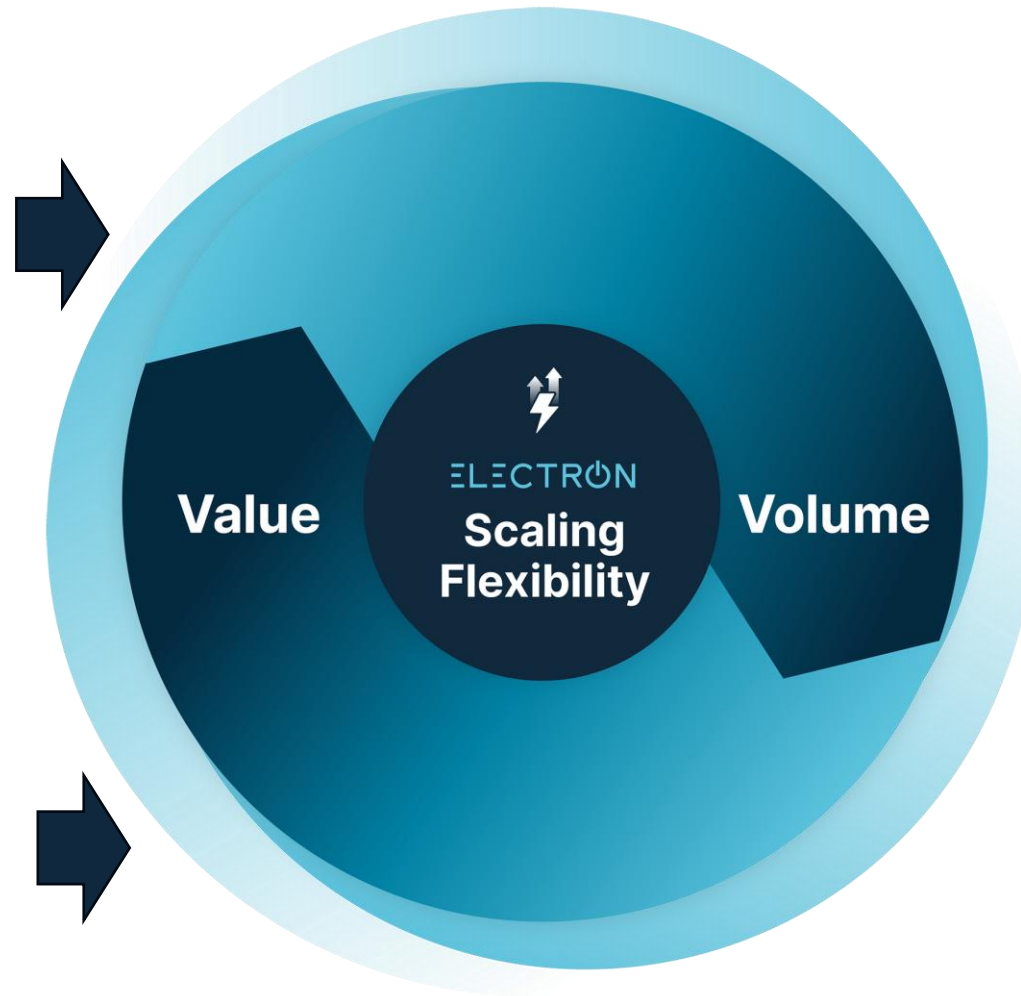
The Value/Volume thesis

Accelerant 1: More Markets

Meeting the differing needs of system operators and flexibility service providers with multiple products and services

Accelerant 3: More Often

Facilitating day-ahead and integrated near real-time trading, to offer flexibility service providers more options when they participate.



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

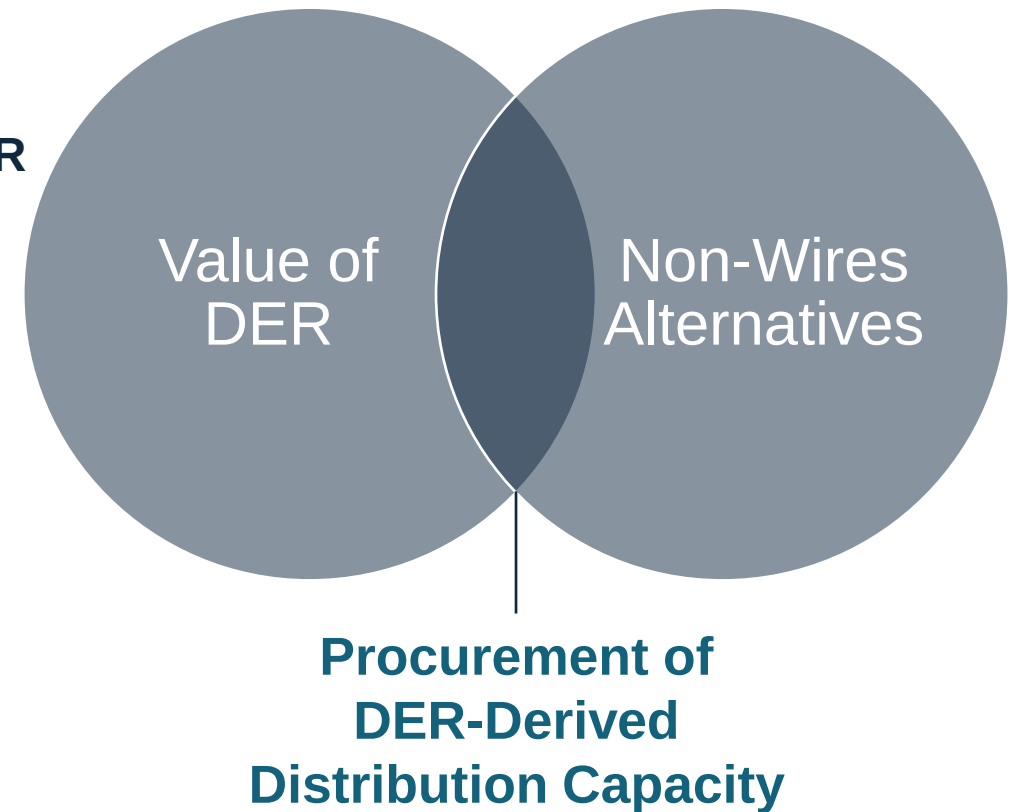
Value of DER – Concept Overview

What Makes DER More Valuable?

Imagine you are a distribution planning engineer

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

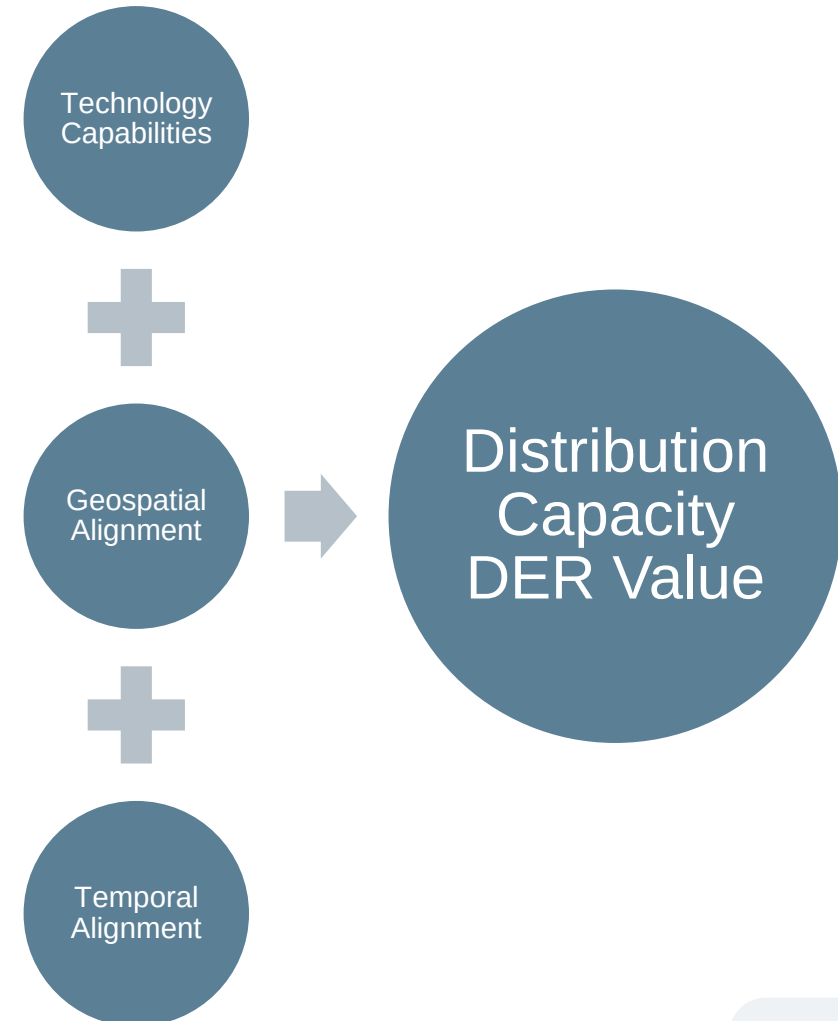
- **Where do you want to put it?**
 - Areas with load capacity needs, especially where:
 - DER has higher degree of reduction of peak load (e.g., solar)
 - The need occurs relatively sooner in the forecast
 - There is high confidence that load growth will occur
 - The traditional upgrade is more expensive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



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**

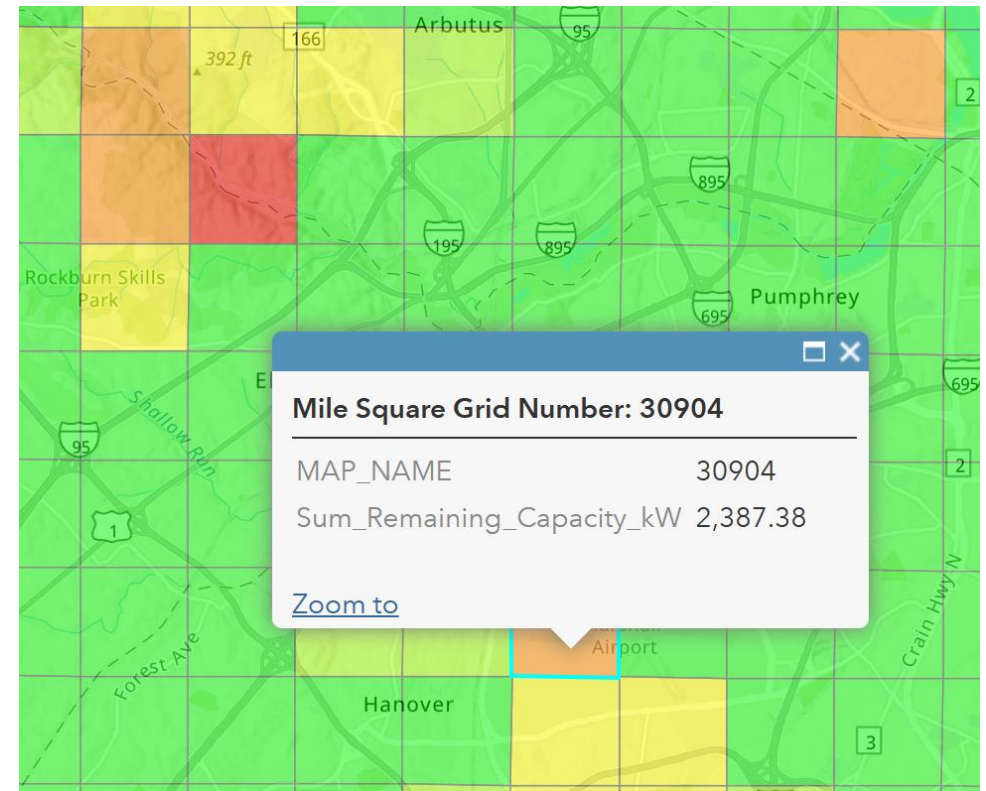


VDER - Input Data

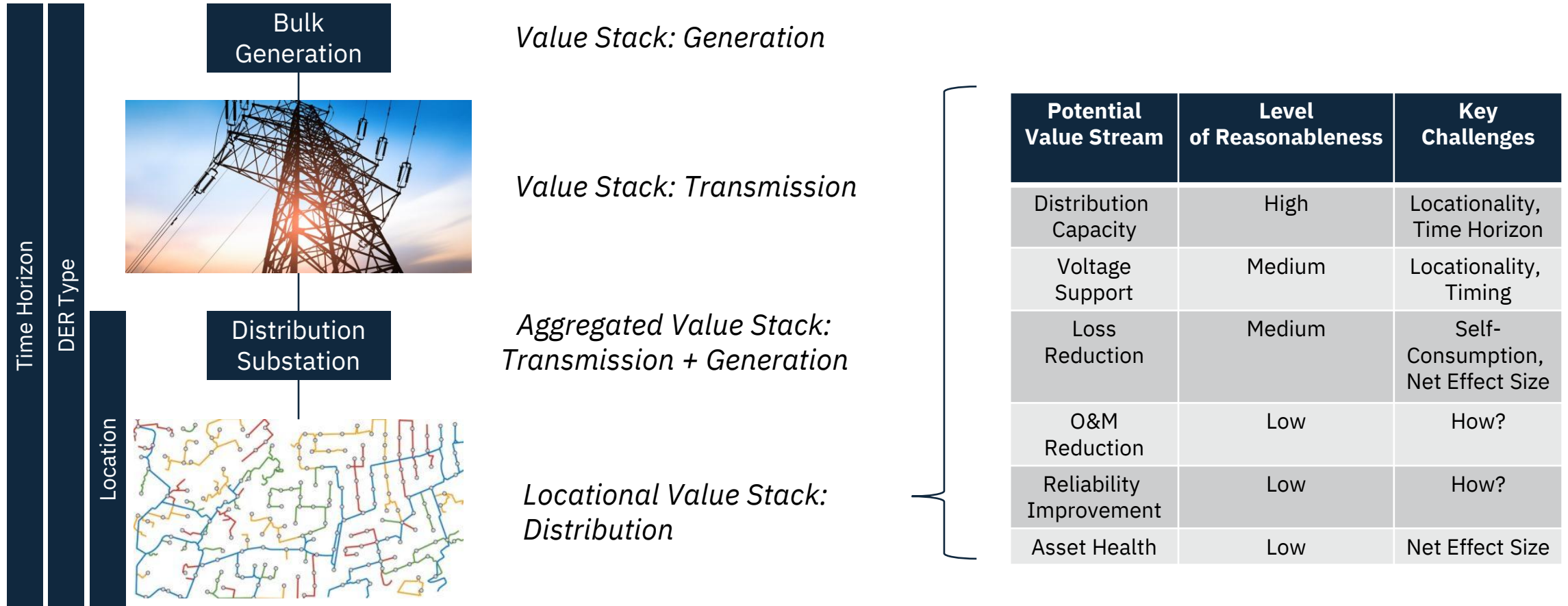
Align with Existing Practices and Available Data

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



Jurisdictional Agnostic

Q&A

Thank you for listening

Get in touch if you have any questions

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