INTERCONNECTION INNOVATION e-XCHANGE
U.S. DEPARTMENT OF ENERGY

Distribution-Level Queue Management Cost Allocation Solution e-Xchange

FLEXIBLE INTERCONNECTION

5/24/23

An initiative spearheaded by the Solar Energy Technologies Office and the Wind Energy Technologies Office

Meeting Notes

Notes synthesizing keys points, insights and questions from the meeting can be found here: Box Link

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The first half of this Teams call is being recorded and may be posted on DOE's website or used internally. If you do not wish to have your voice recorded, please do not speak during the call. If you do not wish to have your image recorded, please turn off your camera or participate by phone. If you speak during the call or use a video connection, you are presumed consent to recording and use of your voice or image.

Virtual Meetings Code of Conduct

1. *Assume good faith and respect differences*
2. *Listen actively and respectfully*
3. *Use "Yes and" to build on others' ideas*
4. *Please self-edit and encourage others to speak up*
5. *Seek to learn from others*

Mutual Respect . Collaboration . Openness

Interconnection Innovation e-Xchange (i2X)

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Mission: To enable a **simpler**, **faster**, and **fairer** interconnection of clean energy resources while enhancing the **reliability**, **resiliency**, and **security** of our **distribution and bulk-power electric grids**

Stakeholder Engagement

Nation-wide engagement platform and collaborative working groups

Data & Analytics

Collect and analyze interconnection data to inform solutions development

Strategic Roadmap

Create roadmap to inform interconnection process improvements

Technical Assistance

Leverage DOE laboratory expertise to support stakeholder roadmap implementation

Key Outcomes from i2X e-Xchange Meetings

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- Inform and formulate a ***publicly available***, strategic roadmap for interconnection
  - Topical challenges and issues
  - Practical solutions to implement and scale
  - Knowledge and data gaps and new solutions to pilot
  - Success goals and measures of success

- Summary documentation for each meeting regarding ideas discussed and opportunities for targeted stakeholder action

- Provide platform for ongoing engagement before and after meetings

- **Longer term vision** → Solution e-Xchanges to continue building a national forum for all stakeholders as a community of practice, excellence, and innovation

i2X Solution e-Xchange Topic Areas

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- **Queue Management and Cost Allocation**
  - Technology, regulation, administration, and organizational change focus
  - *What* innovative interconnection solutions exist?
- **Grid Engineering Practices and Standards**
  - Engineering and technology focus
  - *How* can proposed solutions be executed?
- **Equity and Energy Justice**
  - Multidisciplinary
  - *Who* is impacted by and benefits from proposed solutions?
- **Data Transparency**
  - Multidisciplinary
  - *What* transparency concerns must be addressed?
- **Interconnection Workforce and Training**
  - Multidisciplinary

Additional subjects, like capacity maps, cross these topics and will be addressed from these different perspectives. Follow the schedule of events on the i2X website.

Upcoming 2023 Partner Events

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- 5/25 NARUC Grid Data Sharing Collaborative Workshop. Washington, DC
- 6/13-15 NW Tribal Clean Energy Summit. Tulalip Resort Casino, WA
- 6/12-14 Transmission and Interconnection Summit. Arlington, VA
- 9/11-13 RE+ Workshop. Las Vegas, NV
- 10/23-25 GridTECH Connect NE. Newport, RI
- 10/23-26 ESIG Fall Workshop. San Diego, CA
- 11/8-9 IREC Vision Summit 2023. Minneapolis, MN

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Agenda

- **Flexible Interconnection Introduction (60 min)**
    - EPRI: **Principles of Access for Flexible Interconnection Solutions: Rules of Curtailment**
        - Tanguy Hubert, Senior Technical Lead
    - Smarter Grid Solutions: International Perspective
        - Robert MacDonald, Executive VP
- **Interactive Discussion (60 min)**

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U.S. DEPARTMENT OF ENERGY

Instructions

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Your answers will appear ANONYMOUS to other participants. Only i2X leaders will see your contact information.

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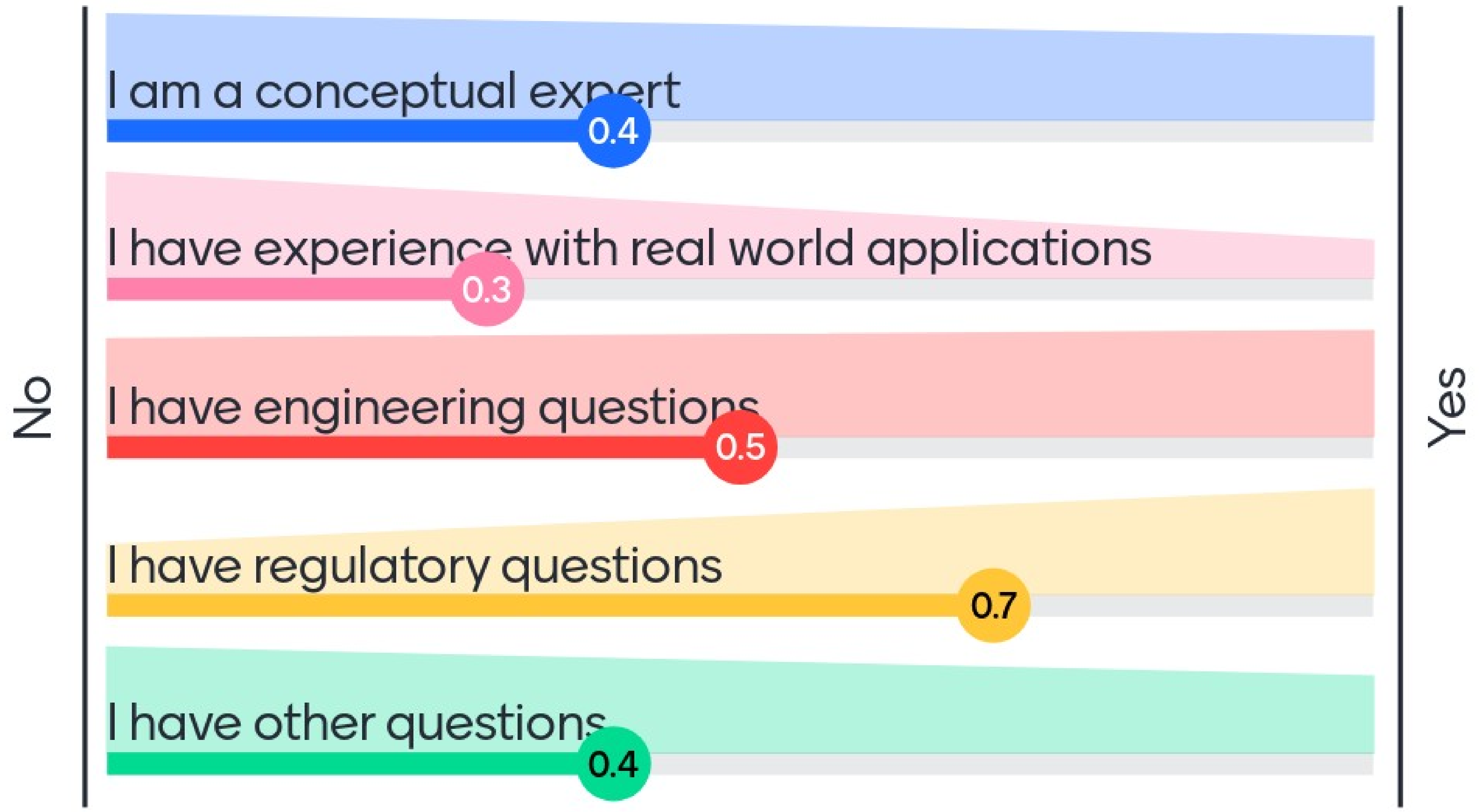
What is your familiarity with flexible interconnection?



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What is 'flexible interconnection' compared to 'conventional interconnection'?

52 Answers

Don't know	I would like to know	i dont know
Idk	What can I connect for free?	I have no idea
Not sure, here to learn!	flexible is time variant where conventional is a fixed quantity	time of day hosting capacity assessment

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What is 'flexible interconnection' compared to 'conventional interconnection'?

52 Answers

i dont know

Allows greater DG penetration

dynamically controlling DER in real-time using software

On the DER side - more about demand response?

Allowed power output is not constant

Takes Social Justice issues into account.

Dynamic Curtailment

Utility can limit export curtail

I don't know

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What is 'flexible interconnection' compared to 'conventional interconnection'?

52 Answers

Assist to transmit more VRE

Avoids costly upgrades

Allows for the curtailment of distributed generation to minimize costly infrastructure upgrades

Customer agrees upfront to get curtailed at times when the grid is constrained in exchange for faster and cheaper interconnection.

Use of active communications to mitigate system constraints to reduce reliability risks or reduce traditional costs

"static" vs "dynamic"? based on interconnection capacity? curtailment?

DER control

Easy ability to add energy to the grid

The ability to inject a certain capacity is not guaranteed. Rather, it is dependent on system conditions.

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What is 'flexible interconnection' compared to 'conventional interconnection'?

52 Answers

No idea

Access rights: how to allocate stakeholder access to a constrained resource

I don't know - that's why I am here.

It is channel of storing and transferring energy from one place to another.

FIC includes constraints on the DER (by time and/or by capacity)!from injecting power onto the grid.

An approach that moves away from static, rigid, “rule of thumb” limitations to how much can IX and instead focuses on determine how much can be IX

interconnection that does not require major infrastructure upgrades

Active (real-time) Management of DER assets in response to prevailing network conditions, increasing the DER hosting capacity of the network beyond traditional 'firm' limits

interconnected generation or load that can be altered based on system conditions.

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What is 'flexible interconnection' compared to 'conventional interconnection'?

52 Answers

rather than modeling resources as static export, modeling them as controlable with varying output based on dynamic grid conditions

Agreement between utility and DER owner/operator to reduce output at times of day/year for the benefit of the grid but maintaining reasonable compensation.

Connect to the grid when you want to without having to wait in the queue.

Allowance for more variable resources and hopefully breaks down some barriers between the bulk power side and distribution side...

Flexible interconnection requires the interconnecting device to respond to real system conditions, either forecasted/estimated or actual

A curtailment arrangement that is important for enabling projects to interconnect at a lower export level while we wait for necessary grid upgrades

Flexible is good for distribution, not for networked transmission where conventional interconnection should be used.

allows smarter and more accurate grid planning but questions on how it can still create certainty for investors

It's a special agreement between operations and the generation source to decrease the infrastructure upgrades

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What is 'flexible interconnection' compared to 'conventional interconnection'?

52 Answers

Assessment of hoating capacity

greater grid utilization. the ability to more quickly grid integrate DER via selective curtailment.

drive grid resilience while ensuring sustainability

variable capacity vs fixed/guaranteed capcity

Extremely rapid interconnection and disconnection without consequence

Non-wires alternatives

I am here to learn

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Guest Presentations

Instructions

REVISIT: What is 'flexible interconnection' compared to 'conventional interconnection'?

19 Answers

nothing new, good examples

Flexible interconnection

Interconnection Process approaches

Nuanced and sophisticated, with an eye toward deploying decarbonized energy faster

last in is dominant methodology

Didn't realize how widely real-time control based flexible interconnection was deployed already

Flexible Interconnection works on the distribution but is NOT transferable to the transmission system.

FIFO vs Pro Rata

Learnt a lot about how we could incrementally bring on more DER with flexible interconnection. What is holding this back from being leveraged broadly?

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REVISIT: What is 'flexible interconnection' compared to 'conventional interconnection'?

19 Answers

Last In First Out

Ability to then share the upgrade cost later to switch to conventional interconnection.

Flexible interconnections allow for time and gives utility curtailment data to make more informed upgrades.

similar conceptual understanding as before presentations, but have a better grasp on how flexible interconnection is implemented in reality

Great discussion of curtailment, EPRI particularly helpful. Flexible interconnection requires ability of developers to address issues unique to them.

Opportunity to add more capacity without as much steel and copper.

system to control of DER that allows cheaper or quicker interconnection

Yes, my understanding changed. Main learnings are key principles associated with flexible interconnection, appreciate the real-life example.

Demand response in both directions, i.e. charging an electric vehicle for free when a signal calls for it to avoid curtailing a flexible connected generating DER

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REVISIT: What is 'flexible interconnection' compared to 'conventional interconnection'?

19 Answers

Tariffs may prevent flexibility, unless regulators make room for it.

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What new grid services and capabilities are possible if flex IX is allowed?

7 Answers

The key risks are reliability and persistence of utilizing DERs to address grid constraints. From the perspective of the distribution planning and operations engineers it has to be there when called.

How does DER flex IX interact with RTO markets? Should a DER flex IX qualify for capacity? Should it be able to set price in a market that is filled with conventionally connected generation?

Increased visibility of DER operation and ability to control can provide technical platform to facilitate wider DER market/service participation (e.g. FERC2222)

Voltage response, sort of like demand response but anticipating and curtailing DER when likely to induce overvoltage

Flex IX can work when studies are serial where impact is only on a couple lines. Harder to implement in cluster based studies when the generation is broadly dispersed across a network.

How do flex IX interact across distribution/transmission boundaries?

How do you deal with displacement of BES generation, connected through conventional methods, by flex IX? Lost revenue and when it greats non-local congestion.

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What are open concerns and questions about flex IX in the US?

7 Answers

Are flexIX too susceptible to communication issues and challenges especially if there's a high saturation of flexIX

Hiring qualified candidates to work on regulation. The technology is well understood, translating it to policy is critical.

Definitely regulatory and engineering concerns. Not every utility has DERMS and we are still some time away from operational readiness.

Is anyone building software solutions for IX application that work across utilities in a standard fashion to onboard DER's for flex IX?

Knowing the right balance between system upgrades and flexIX

Concern: tariffs could restrict or eliminate flexibility.

Can the i2X program help advance Plug-In PV deployment to enable and advance UL-Standard and Code modifications?

6

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Which approaches to conventional (export limits) and flexible interconnection (managed curtailment, economic dispatch) are feasible where and why?

9 Answers

It would be interesting to see someone use this approach at the service transformer level. Many residential projects are looking at multiyear delays for interconnection.

All RTO markets dispatch generation based on price and not interconnection service (NRIS/ERIS). Yet, markets have mechanisms to ensure NRIS can hedge congestion (ARRs/FTRs). How would flex IX impact?

Flexible IX may require investments in technology capabilities to send signals and observe responses that utilities may not be able to make including where flexible IX may be most beneficial

A spectrum of available solutions with escalating complexity (but also escalating/improving level of capacity release): from Smart Inverter, Single-Constraint Solution, Full Multi-DER Flex Connect

Where we see more DERs being combined into single projects (e.g. solar, batteries, demand response), F-IX will probably be an important tool.

We may need a LIFO for existing DER under static limits overlaid with a pro rata for new projects using flexible interconnection

There should only be a few flex IX in an area where they share a common constraint. Pro Rata would be easiest and most equitable to implement. Do not want to consider transmission based congestion.

Flex IX makes economic sense for Developers as soon as the cost of IX is high. But to implement the solution the utility needs the capacity to do specific studies and control DER in new ways.

Regulatory issues = Safety, cost allocation; customer concerns=curtailment

6

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What flexible interconnection strategies (last-in-first-out, pro-rata, bidding, EEJ-based priority) are most suitable, under what conditions?

5 Answers

pro-rata is probably easiest for DER owner/operators to accept, but may not avoid locational grid issues

Pro-rata for future cost allocation. LIFO for when a traditional upgrade is not planned. Curious to learn how type of constraints were managed in UK to reduce complexity.

If a software solution was developed for standardizing IX application (as mentioned before), DAC could be considered in the GRID queue and be prioritized.

LIFO encourages multiple applications to get first in the queue with few moving forward. Pro-rata or other strategies may not have the same issue.

There should only a few Flex IX in an area and share a common constraint. Pro Rata would be easiest and most equitable to implement. Want to avoid dispatch based on transmission congestion.

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What will it take to make flexible interconnection a norm? What technical, regulatory, and customer concerns must be overcome?

7 Answers

State incentives to distribution utilities to encourage flex IX.

It shouldn't make the interconnection process more complicated!

State-level incentives and PRC mandates

Utility confidence, so we don't get stuck in a long cycle of pilot programs.

Strict rules to limit where flex IX can connect such that it does not impact other conventional IX policies in terms of constraints/cost allocation out of those other processes.

A change in the regulations, the technology is already available and used. Acceptance of a certain percentage of curtailment from the developers, and owners.

Sharing the pilot results and updating technical requirements (IEEE?) to help utilities be more confident in implementing these solutions.

6

What elements must be considered in a flex IX agreement/contract with utilities?

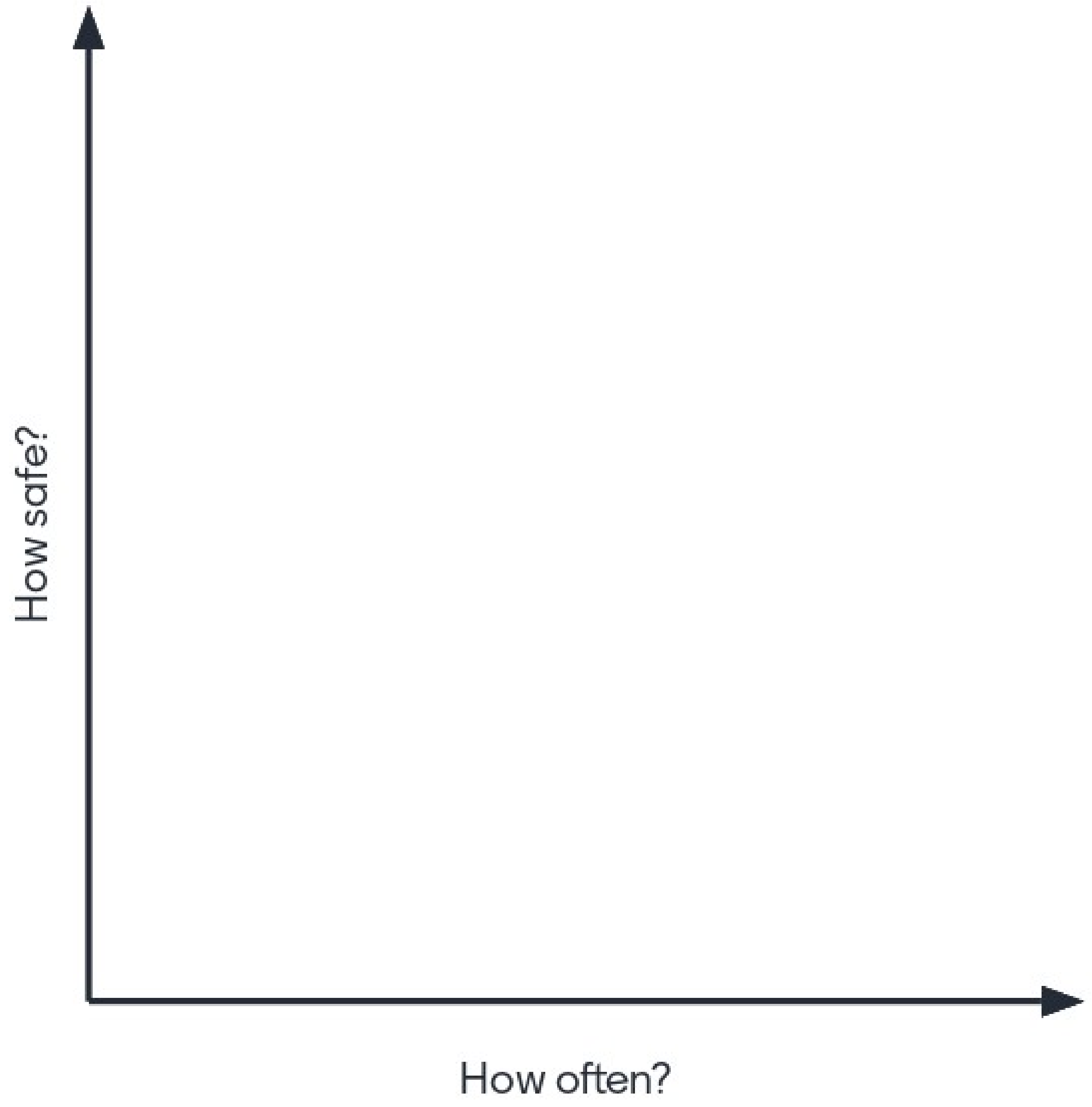
2 Answers

Curtailment agreements

Along with the EPRI principles, need rules for interactions with the RTO networks they feed into.

2

What common upgrades COULD be deferred or avoided by flex IX?



1. Distribution Transformer
2. Main Panel
3. Conductoring
4. Substation
5. Line Protection & Control
6. Communications

Flexible Interconnection

Principles of Access

Tanguy Hubert, PhD
thubert@epri.com

Interconnection Innovation eXchange (i2X)
May 24th, 2023

What is Flexible Interconnection?

Approach: *DER control strategy used to defer or avoid system upgrades and/or increase distribution system utilization.*

Opportunity: *Offer DER customers* ***faster*** *and* ***cheaper*** *interconnection to integrate* ***more DER*** *in areas with limited hosting capacity*

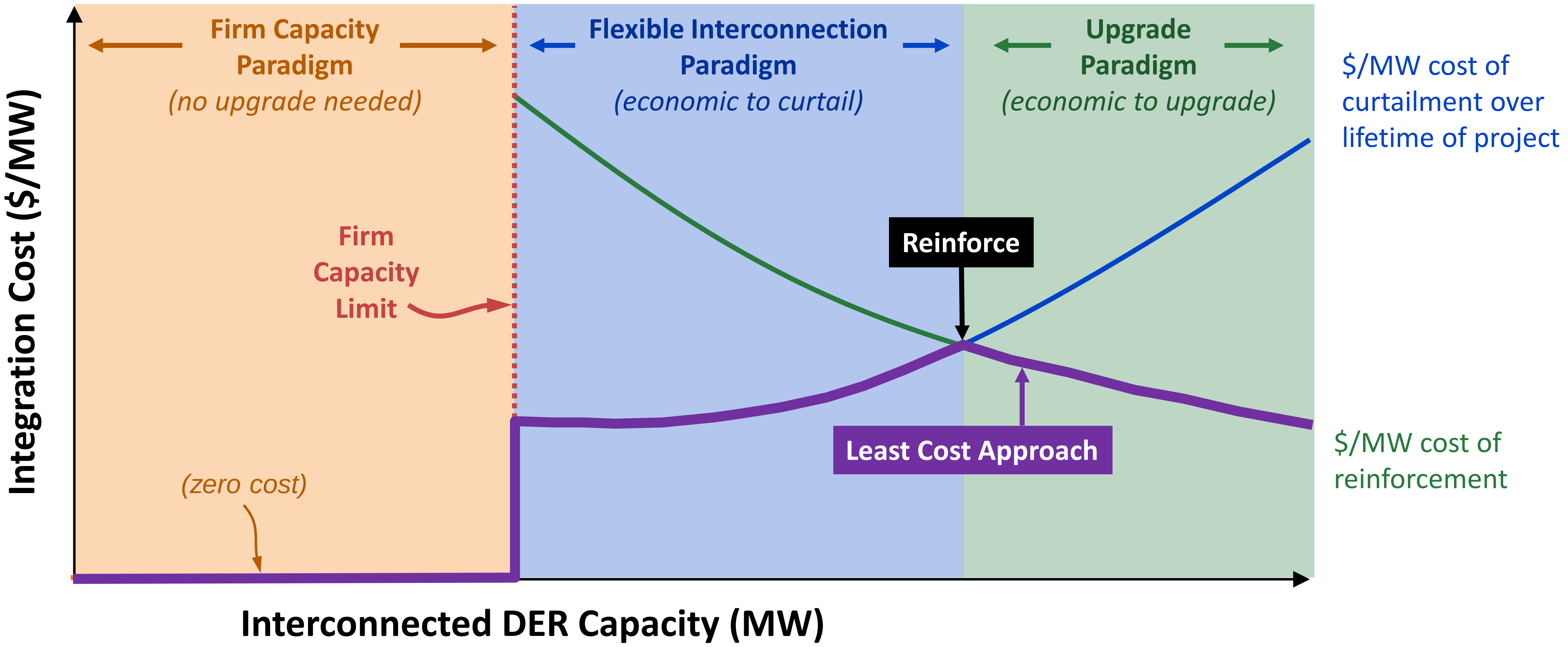
Drivers

- Low resource costs
  - i.e. cheap/available land
- Expensive grid-side mitigation measures
- Infrequent need to curtail

Benefits

- **DER customers:** faster, cheaper connection; can be temporary
- **Ratepayers:** reduce socialized portion of upgrade costs; improved network utilization
- **Policy objectives:** Accelerate progress towards DER penetration goals and/or emissions targets

Economic Opportunity for Flexible Interconnection



Key Challenges for Flexible Interconnection

Focus of today's conversation → Regulators: Contractual agreements and "principles of access"

Utility	Developer	Regulators
• Revision to interconnection analysis methodologies • Visibility, communication, and control • Cyber security • Additional field demonstrations in the U.S. to increase confidence	• Forecast curtailment based on historical data • Understanding financial risk ✓ Important for getting flexible interconnection projects financed! • Additional field demonstrations in the U.S. to increase confidence	• Contractual agreements and "principles of access" • Rules on payment, compensation, and tariffs • Utility obligations to accommodate exports beyond hosting capacity

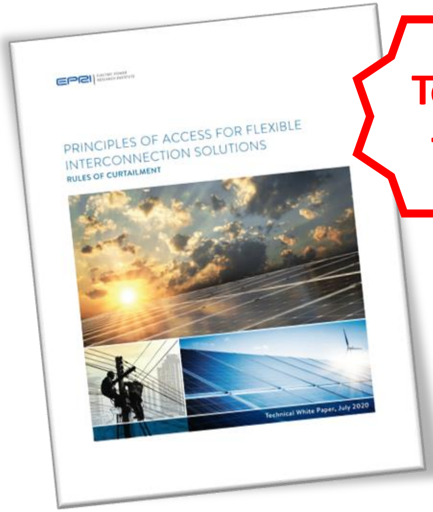
General

- Stakeholder education and engagement
- Stop-gap measure vs. enduring solution
- Low data resolution and quality for many distribution systems, loads, and PV

“Principles of Access” for Flexible Interconnection

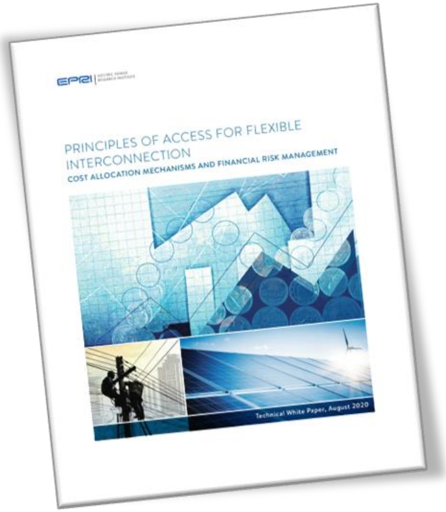
An Umbrella Term…

Can refer to:	Description
High-level guiding principles	Objectives such as: Network efficiency, fairness, simplicity, visibility, certainty
Rules for eligibility	Specific geographic areas, size thresholds, stipulations for transitioning in or out
Rules for curtailment	Control logic governing the order and degree of curtailment to alleviate grid constraints
Define how future upgrades affect flexible customers	Establish if and how any required contributions to upgrade costs are done
Financial risk management	Establish appropriate amounts of transparency, stakeholder education, and methods (if desired) to mitigate financial risk
Technical requirements	Communications and interoperability requirements for eligible customers



Today’s focus

EPRI Report 3002018506



EPRI Report 3002019635

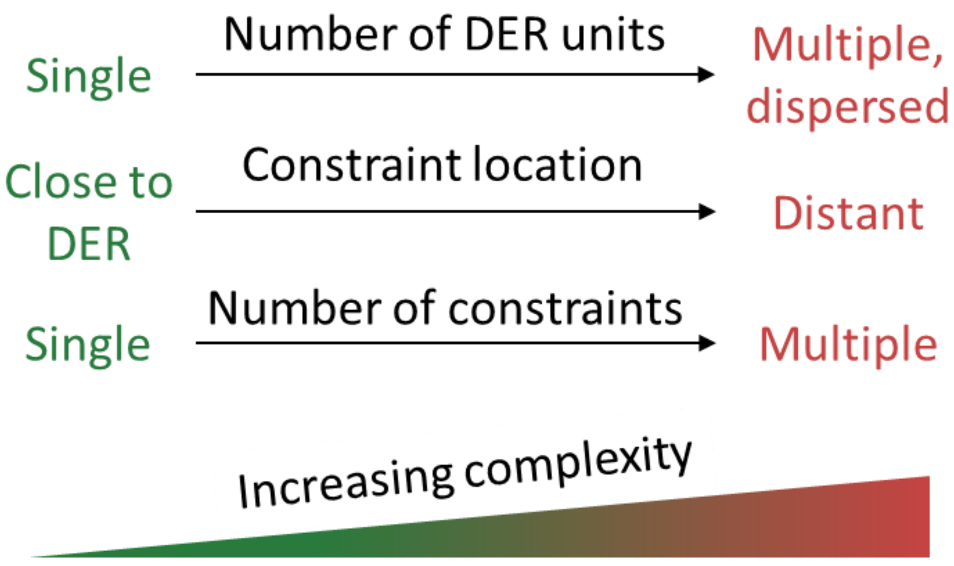
Rules of Curtailment

Basic Strategies

- Time-differentiated maximum export schedules
- Binary logic (export / no-export)

Advanced Curtailment Strategies

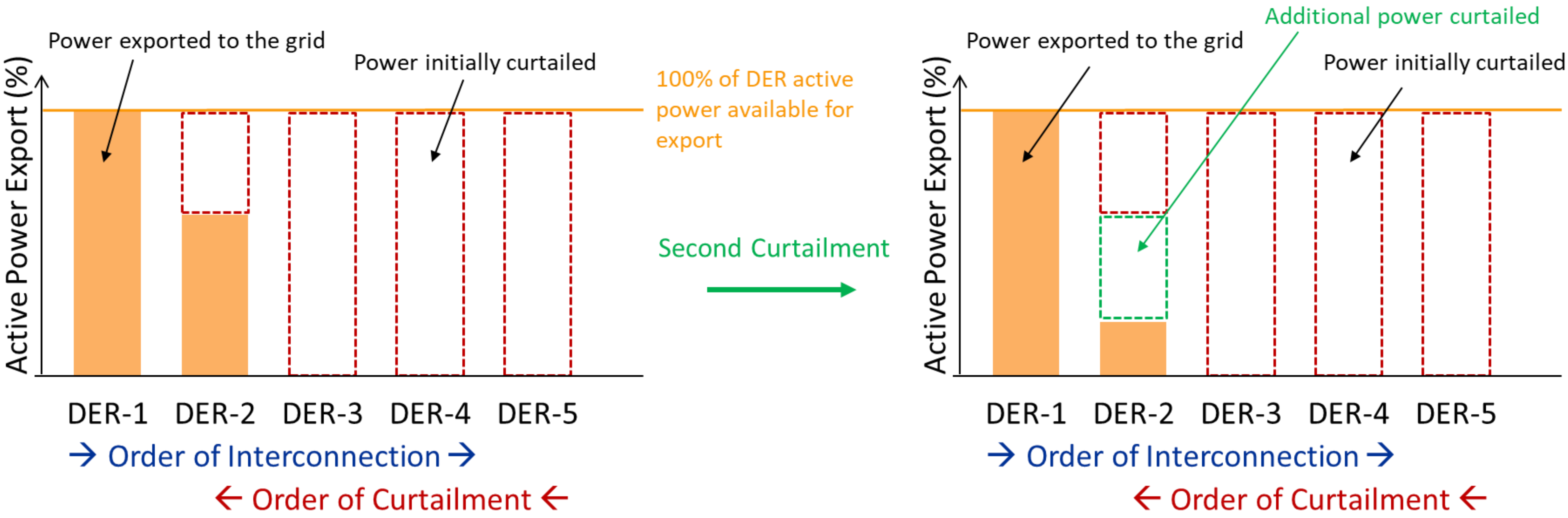
- Minimize and distribute curtailment equitably across multiple DERs
- LIFO and Pro-rata are most common strategies used by early adopter utilities to date.



Curtailment Logic	Description
Last-in-first-out (LIFO)	DER units are curtailed in the reverse order in which they applied for connection to the network.
Pro-rata	DER units are equally curtailed in proportion to each DER's contribution to network constraints.
Competitive bidding	DER units with the lowest bids to use network capacity are required to curtail.
Emissions-based priority	DER units with the highest emissions are curtailed first.

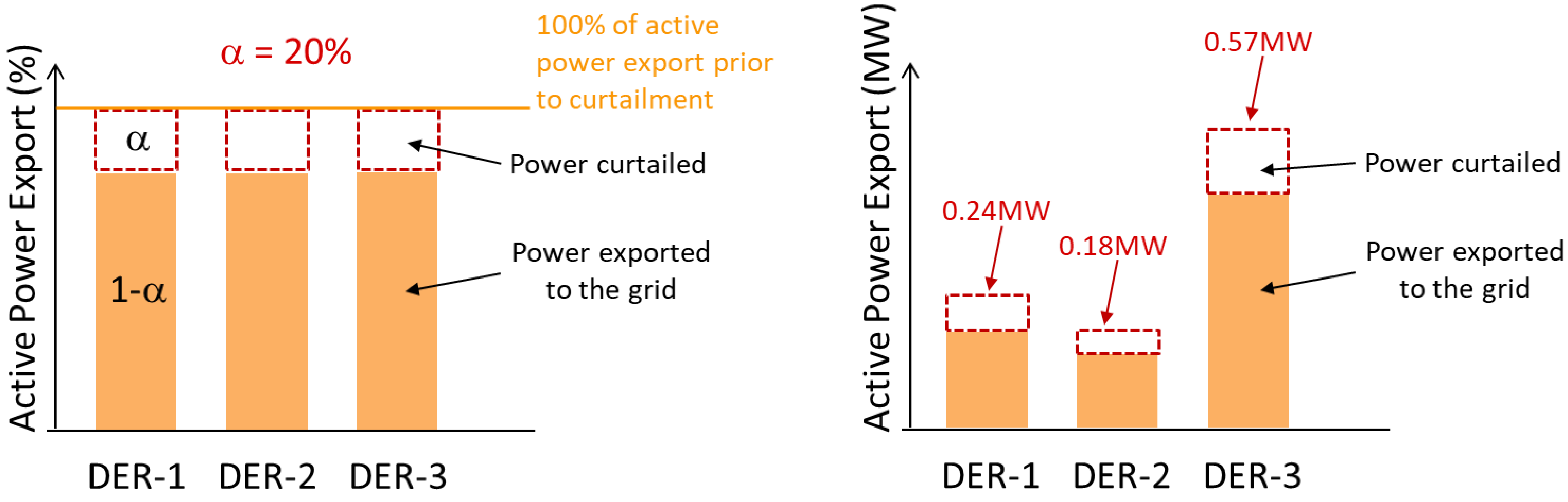
Last-In-First-Out (LIFO)

DER customers contributing to a specified constraint are curtailed in the **reverse order in which they applied for connection** to the network.



Pro-Rata

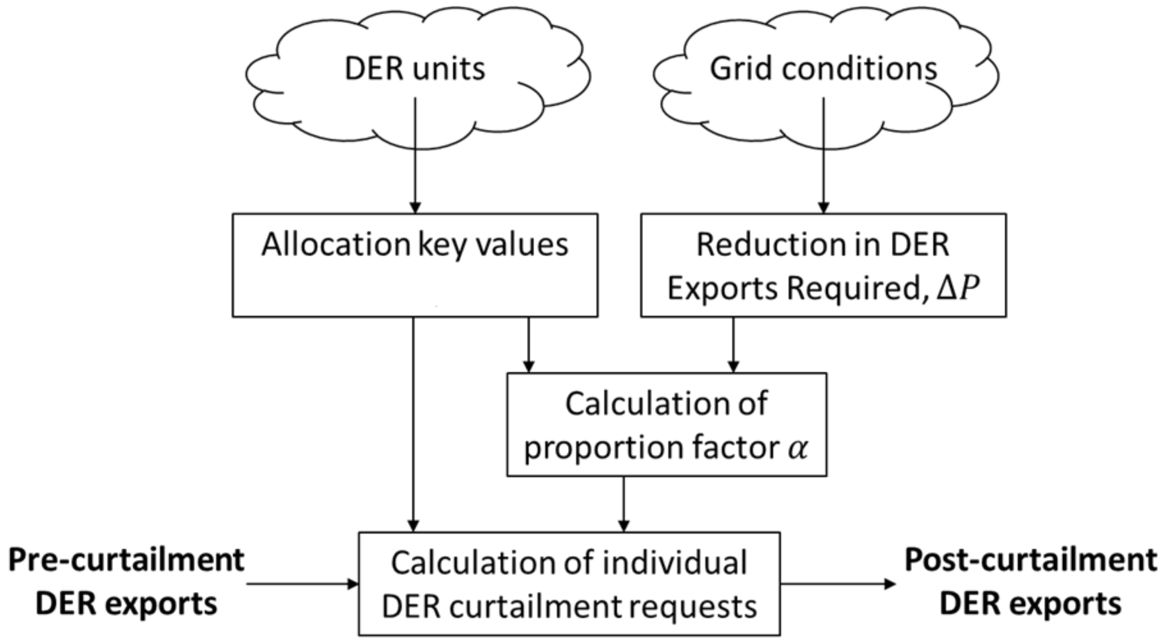
DER customers contributing to a specified constraint are curtailed **proportionally to a reference parameter** *(for example: active power export right before curtailment)*



Pro-Rata – *Curtailment Calculations*

DER Active Power Curtailed = Proportion Factor α *(same for all DERs)* x Allocation Key Value *(specific to each DER)*

- Examples of **allocation keys**:
  - Active power export
  - Maximum active power available for export
  - DER nameplate
  - *Combination of multiple factors*
- **Proportion factor α**
  - Updated every time a curtailment event occurs, to ensure total export reduction needed is met



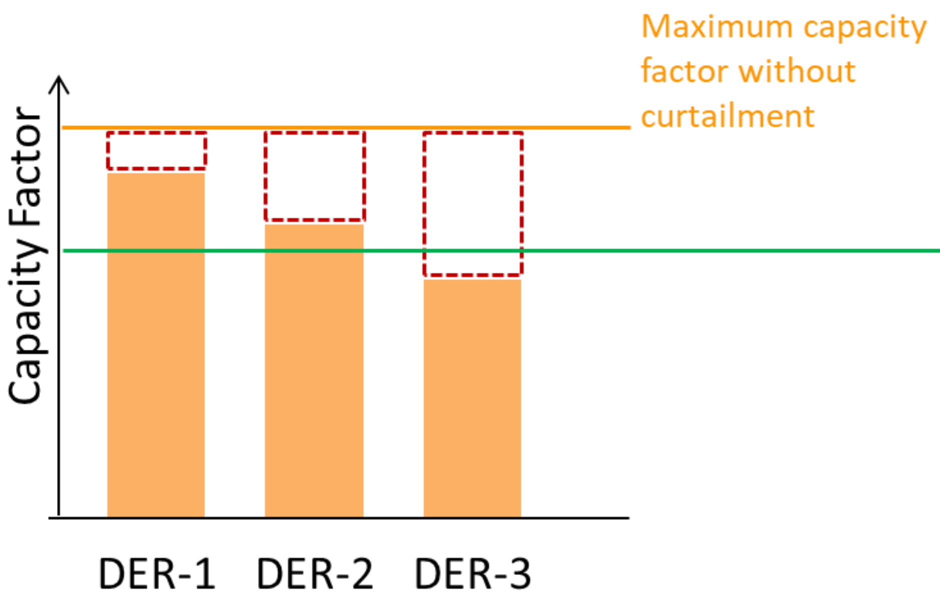
Comparison: *LIFO vs. Pro-Rata*

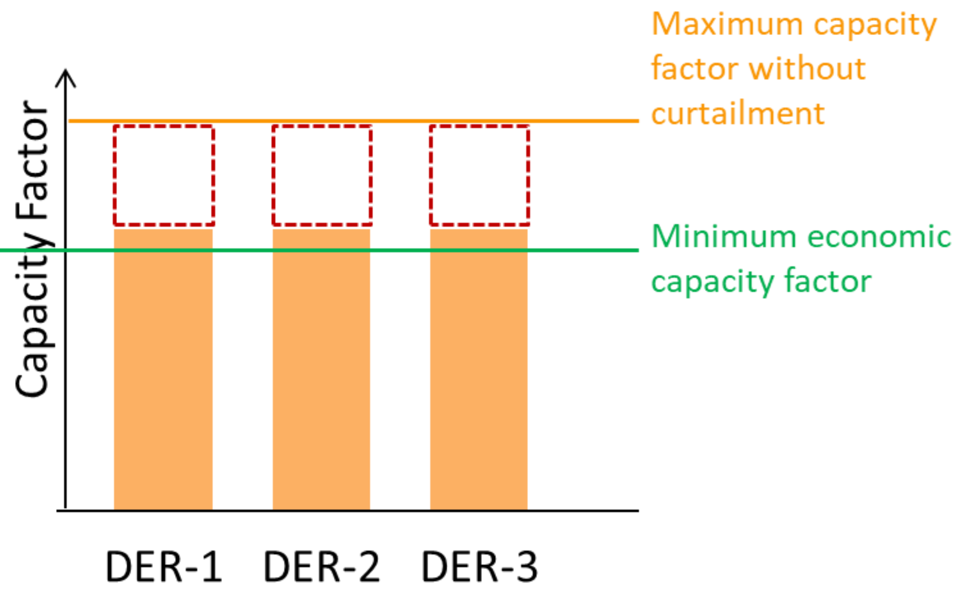
LIFO

- Higher financial certainty for developers
- Potential for gaming of priority rules

Pro-rata

- Potential for higher network utilization
- Similar incentives to co-finance upgrades



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Achievements and Results

500+ MW Clean Energy Asset Capacity managed by SGS ANM/DERMS

1,500+ GWh Annual Energy Produced by managed DER

300,000+ tCO_2e Annual Emissions Avoided by managed DER

30+ Operational DERMS systems (UK/US/Other)

>$500M Grid Upgrade Investments Avoided

smarter grid solutions

MITSUBISHI ELECTRIC

Reference Projects

STRATA GRID

UK Power Networks — Delivering your electricity

- "among the most advanced in the world" (Wood MacKenzie).
- Multi-use case DERMS as strategic investment to become a leading DSO.

AVANGRID

- Inverter-tied grid edge control managing grid hosting capacity.
- Integrated to Utility DERMS for wide area control and management.

Cirrus FLEX

sse Enterprise

- Multi-DER VPP platform to enable EaaS business model with access to wholesale, ancillary service and balancing markets.
- Microgrid DERMS option for campuses.

conEdison; geothermal international

- Multiple utility scale batteries for peak load management (non-wires alternative) with residual capacity traded in the NYISO.
- Cyber secure control room interface from the cloud.

STRATA RESILIENCE

Hydro Québec

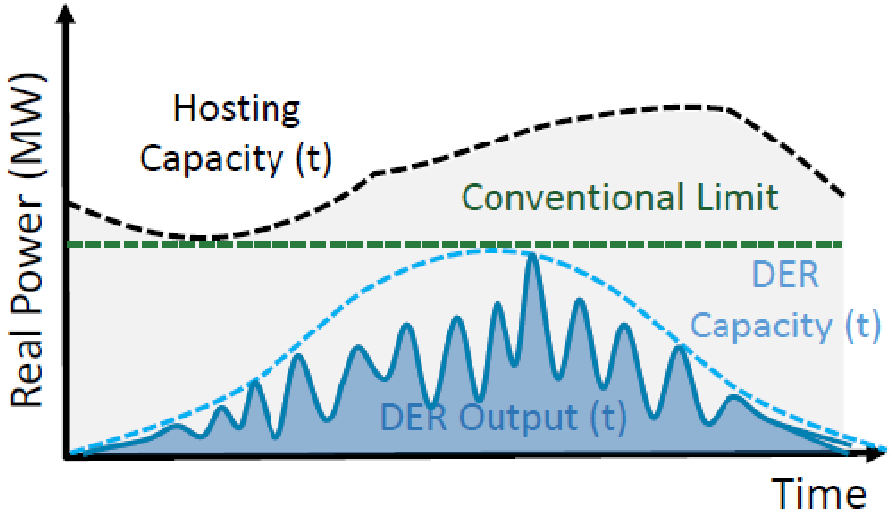
- Complete renewable-resource powered electrical micro-grid for an entire township
- Integrated with host utility.
- Reference case for province-wide adoption.

Scottish & Southern Electricity Networks

- Optimization of residential load and utility-scale battery.
- Real-time control of renewable generation around thermal generation limits on an electrical island.

Flexible Interconnection: Proven Enhancement of DER Hosting Capacity

Static Capacity



Flexible Capacity

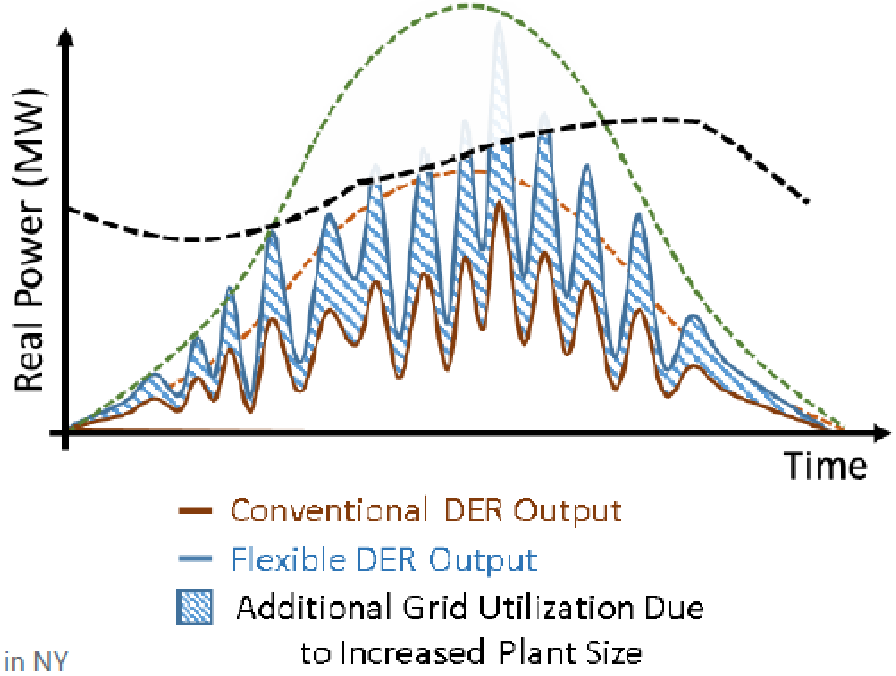
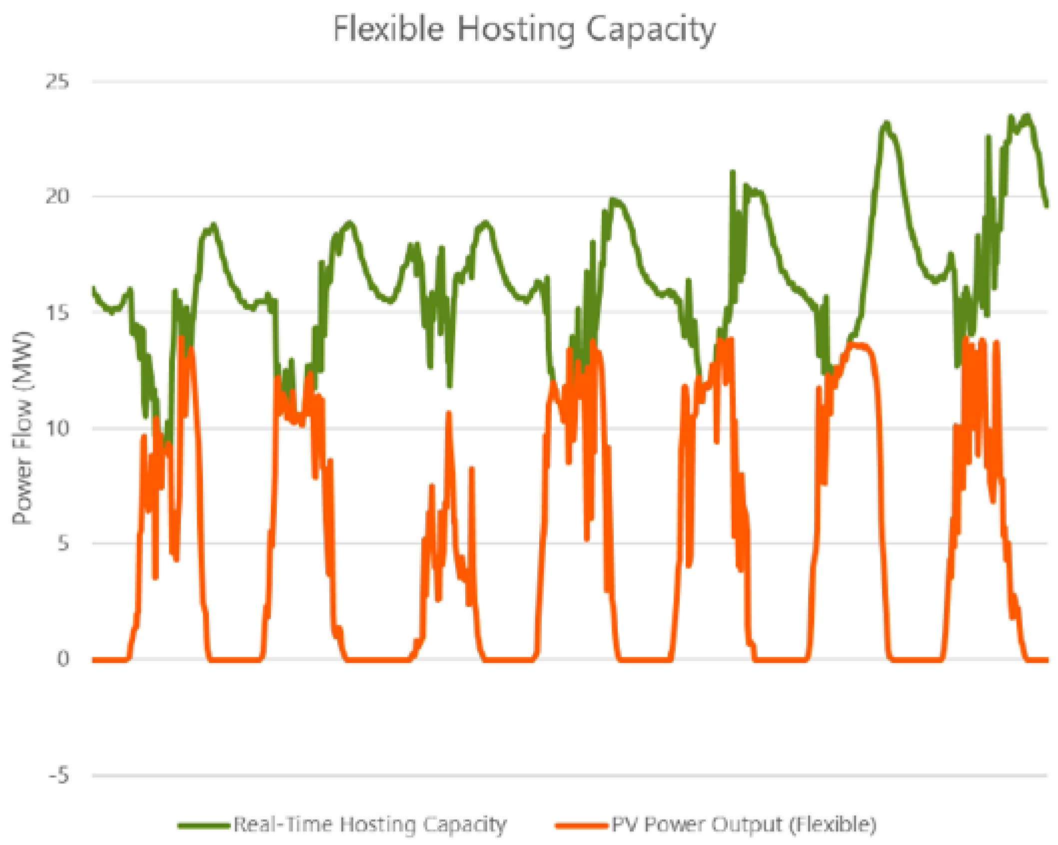


Chart Credit: EPRI PON 3770 Quantifying the Value of DERMS for Flexible Interconnection in NY

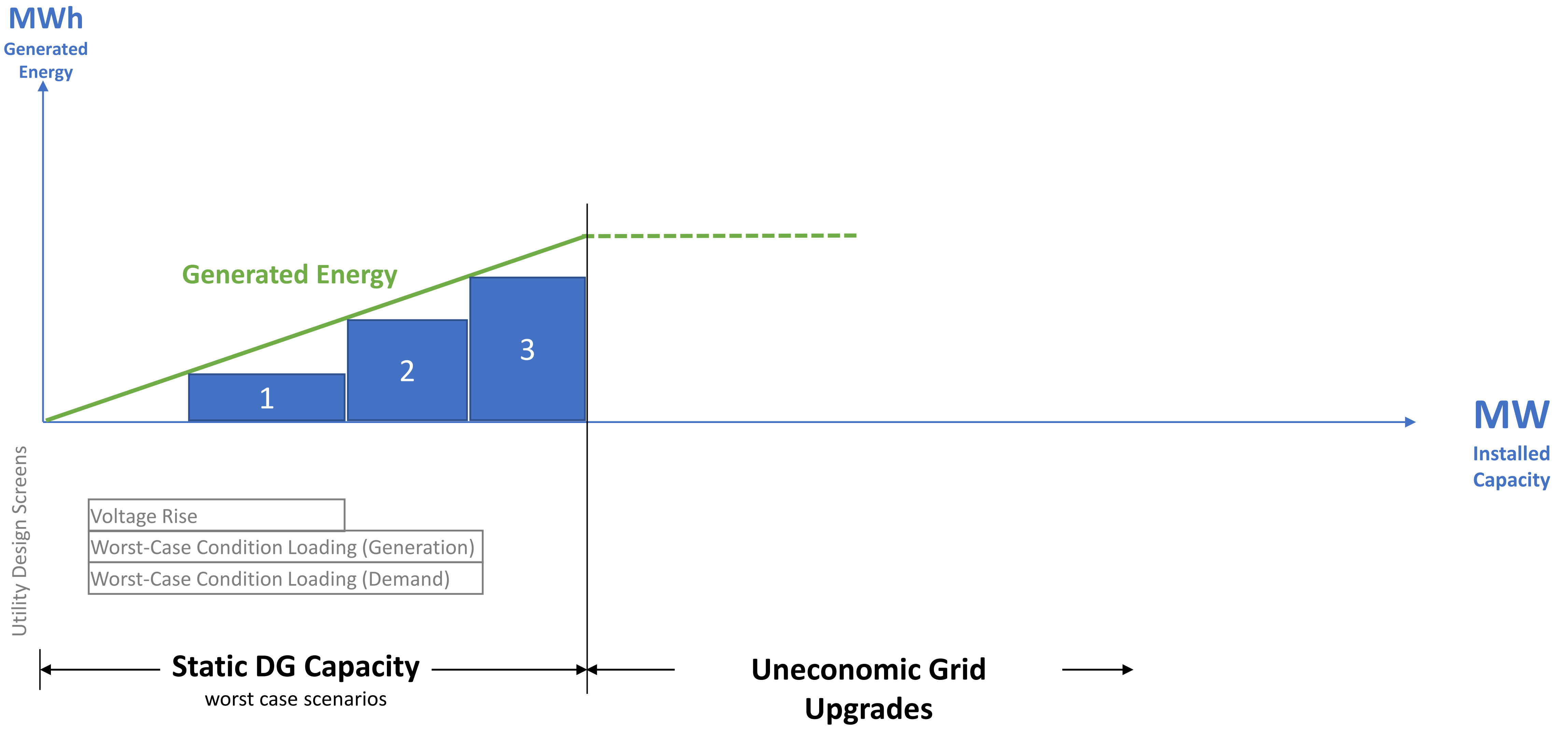
Flexible Interconnection: Proven Enhancement of DER Hosting Capacity

- In exchange for avoiding grid upgrading expenses, developers agree to enable curtailment to overcome grid constraints.
- The curtailment is automatically managed based on real-time hosting capacity; this curtailment is dynamic as opposed to tripping.
- Allows for system upgrade planning and cost-sharing based on observed DER capacity installed rather than predicted DER capacity.

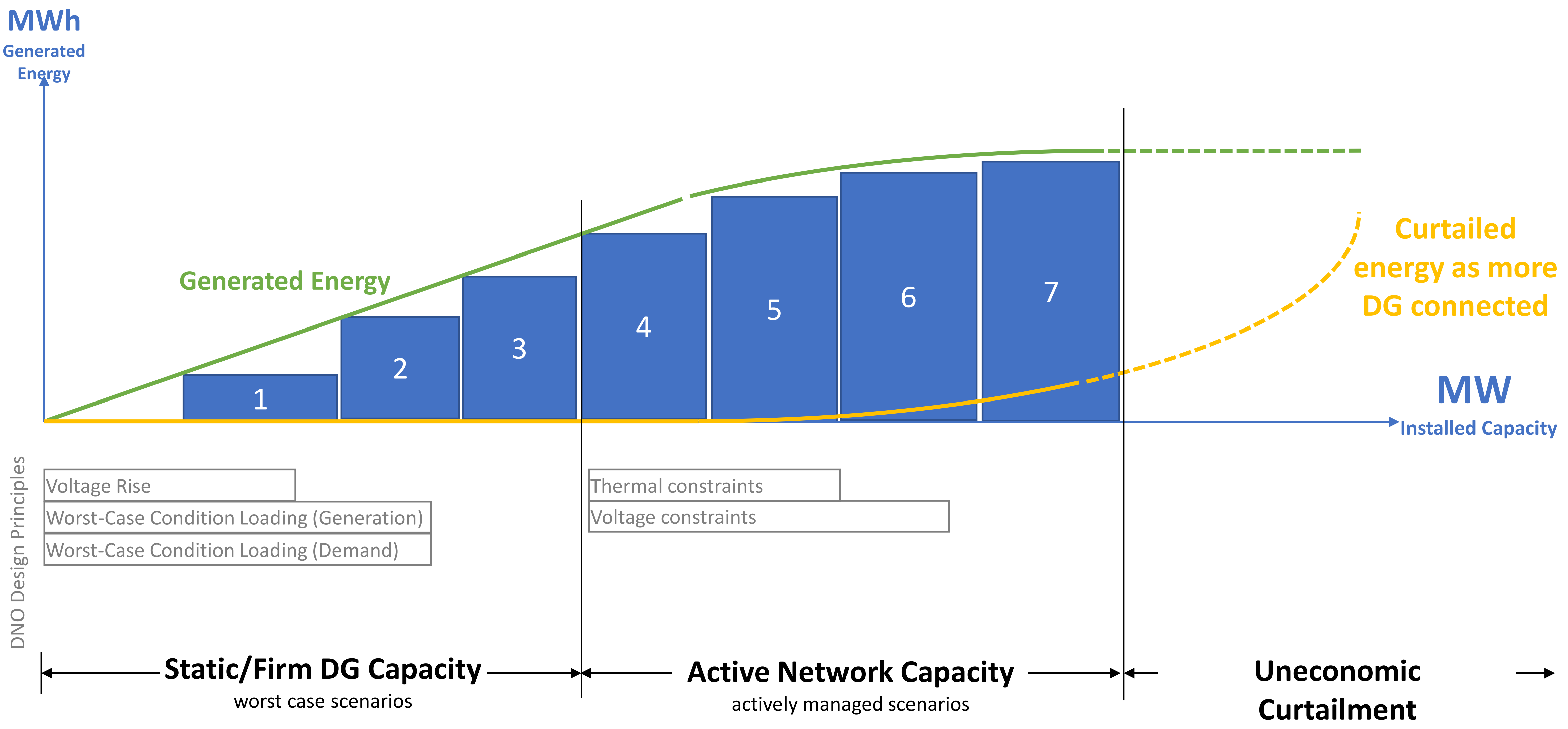


NYSEG RG&E | AVANGRID

Unlocking Grid Capacity through *Flexible Interconnections*



Unlocking Grid Capacity through *Flexible Interconnections*



What Becomes Important for Implementing Flexible Connections?

Fast-acting	Time-bounded	Predictable
Repeatable	Fail safe	Easy to integrate
Automated	Secure	Flexible

Commercial Innovations in Grid Access Arrangements

Principle of Access Selection:

- Last In First Out
- Vintaging
- Capacity Quota

UK Power Networks

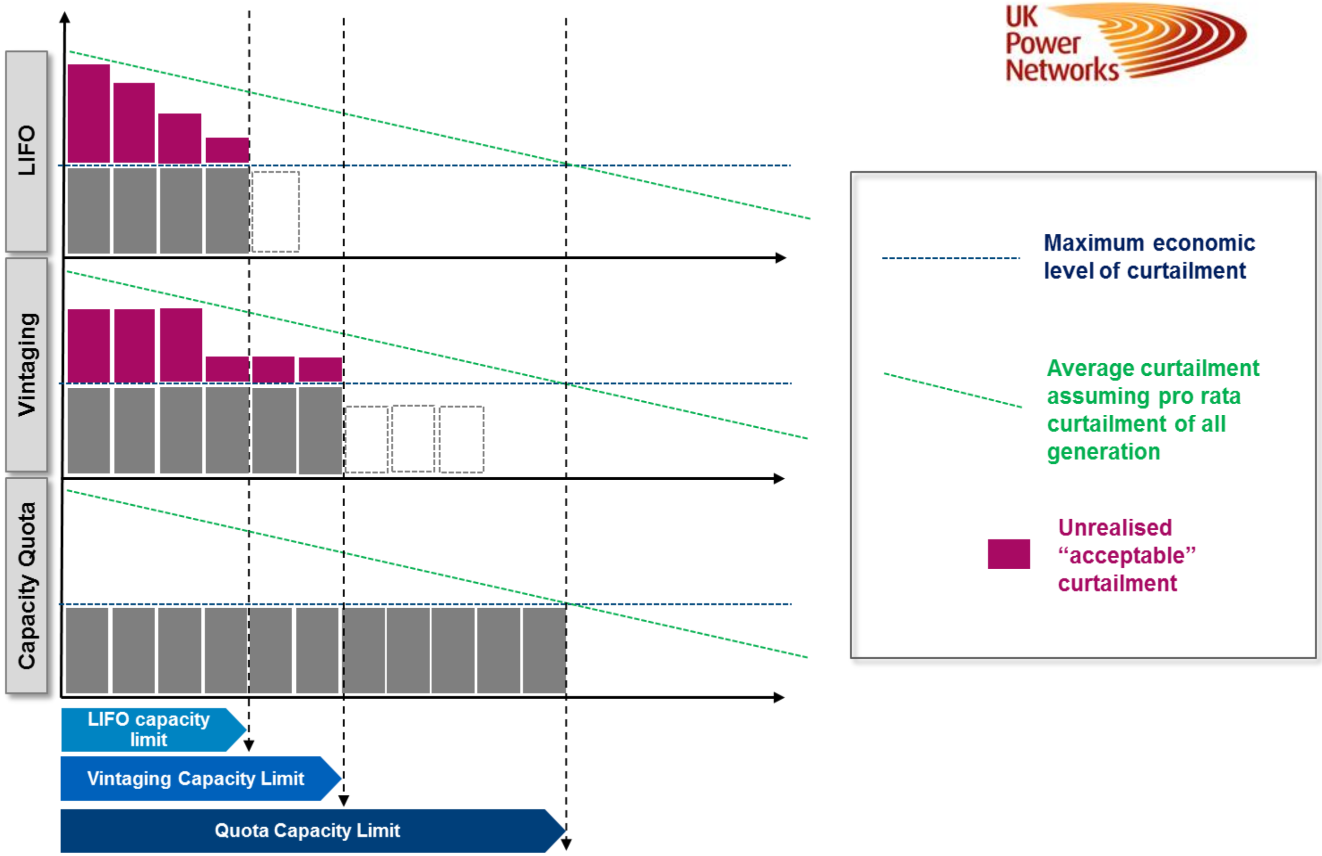


*Figure: UK Power Networks – "**Flexible Plug and Play**" Project*

Importance of Real-Time Control

Real-Time Monitoring

- DERMS monitors grid parameters (voltage, power flow, current) in **real-time** for breach of preconfigured constraint thresholds

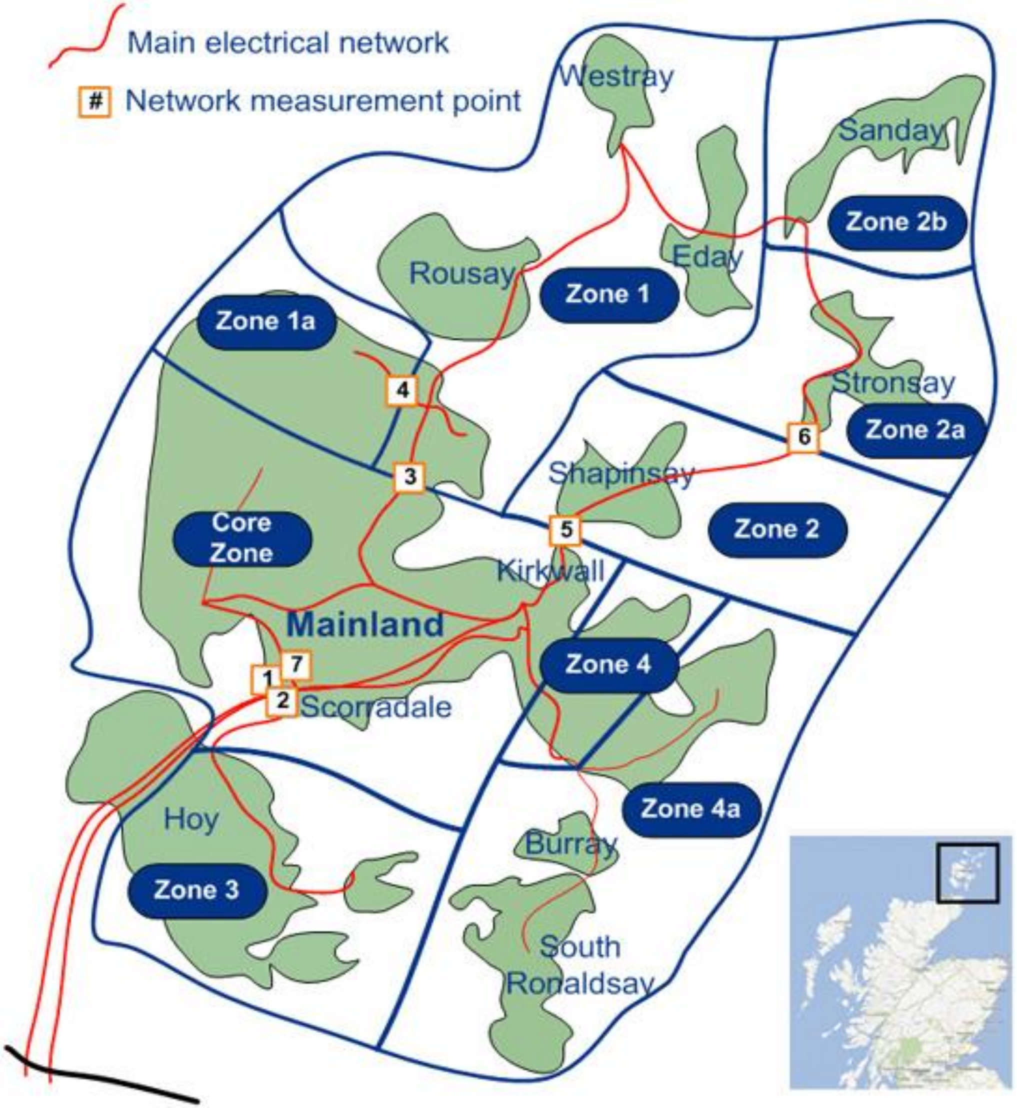
Real-Time Control

- Upon breach of a threshold, control set-points are calculated and issued to the relevant managed DER (granularly curtailed or tripped) to protect the system
- Calculated set-points reflect the DER export/import at time of constraint emergence

Fail-Safes

- DER controller/gateway enters failsafe mode on loss of comms to centralized DERMS
- DER controller trips the DER for non-compliance with requested control actions

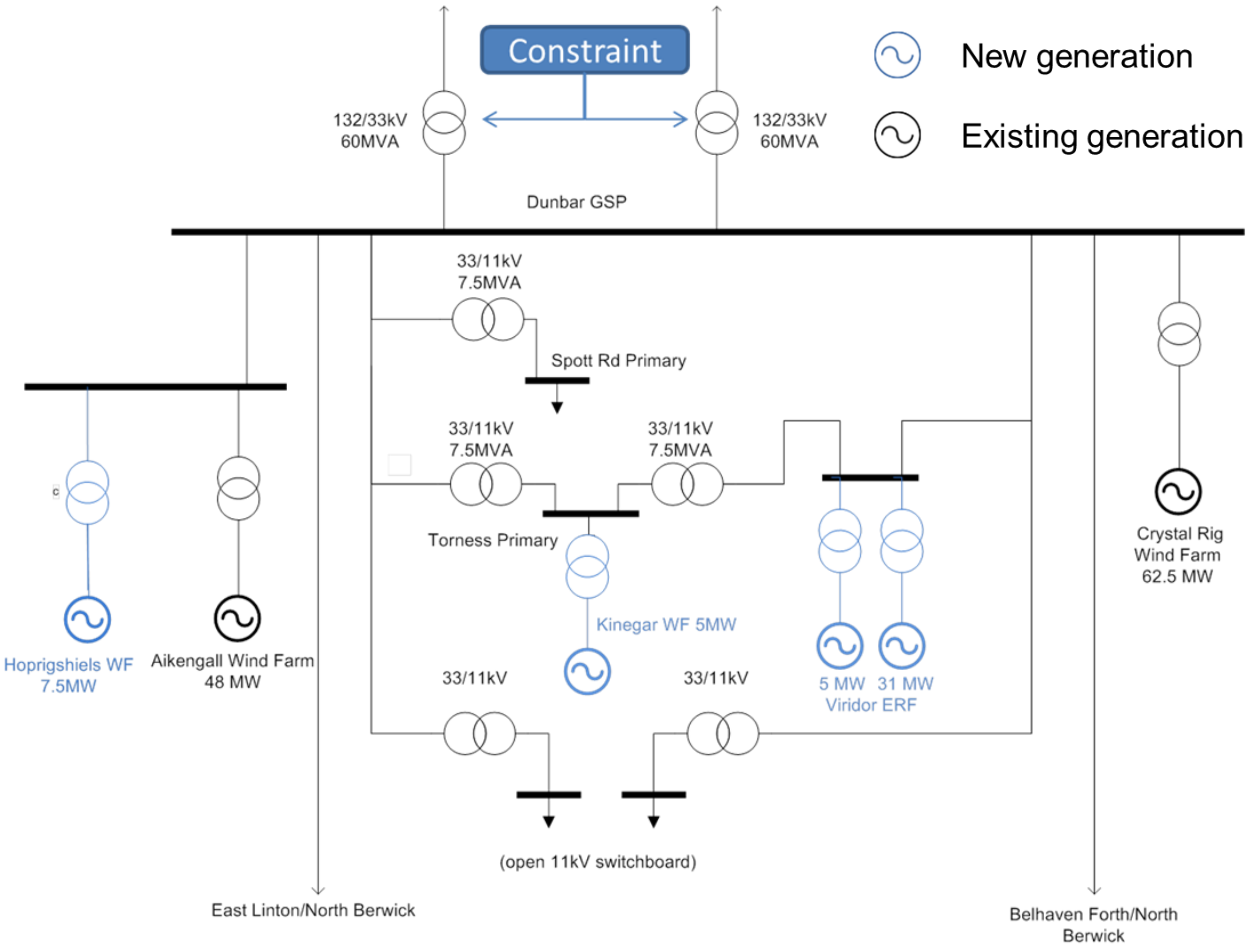
Case Studies: Orkney Flexible Interconnection DERMS



- Orkney distribution network is connected to Scottish mainland by 2 x 33 kV submarine cables with combined capacity of 40 MW.
- Islands' load demand is between 8 and 32 MW.
- Conventional approaches to network planning limited hosting capacity to 28 MW.
- An additional subsea cable need to connect > 28 MW estimated to cost £30m.
- Flexible connection enabled an additional 24 MW of wind power to connect, avoiding grid upgrade costs and time delays.

Scottish & Southern Electricity Networks

Case Studies: SP Energy Networks Flexible Interconnection DERMS

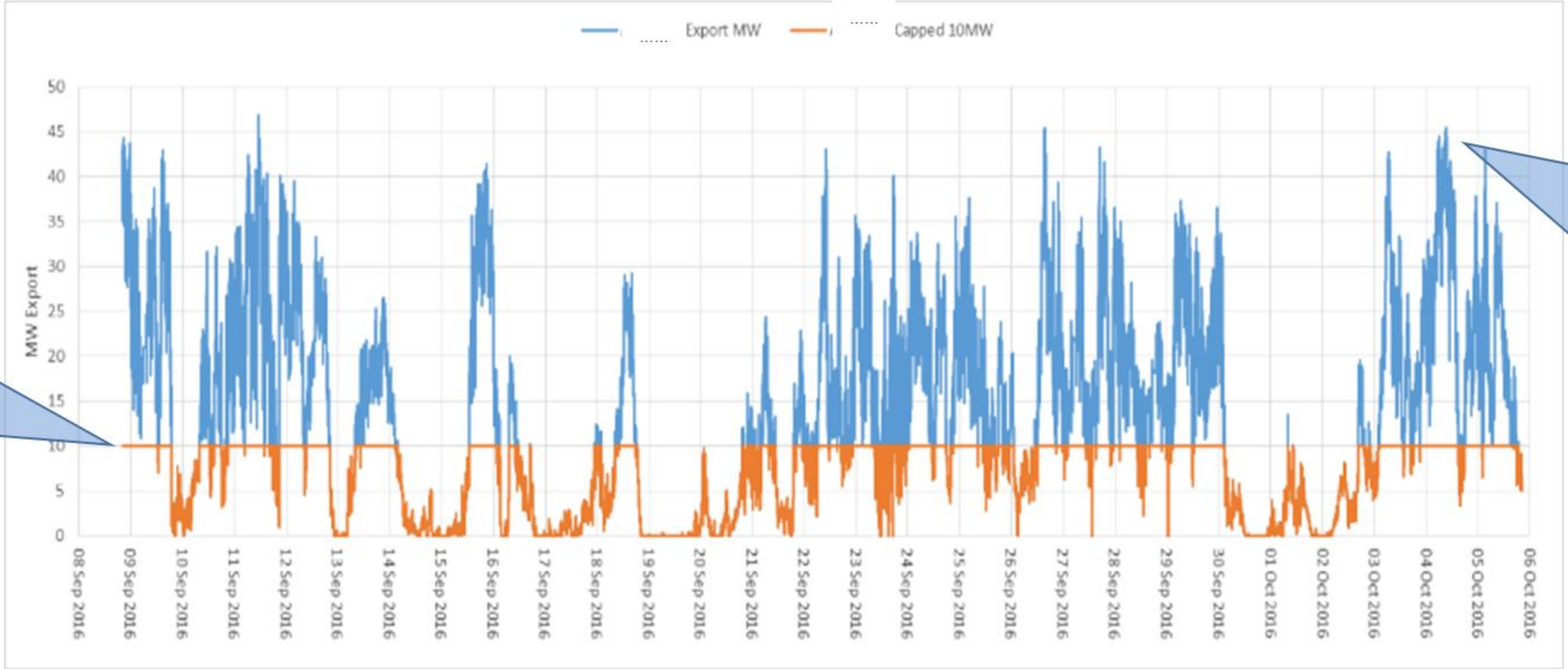


- SP Energy Networks' distribution and transmission network had run out of generation hosting capacity.
- Two *Grid Transformers* at the Distribution-Transmission interface provide 120MVA capacity (60MVA *Firm* Capacity)
- *Aikengall* Site is on a Load Management Scheme (protection intertrip) for N-1 Conditions
- Through the ARC project, Aikengall moved to a managed connection to reduce curtailment and avoid tripping
- •Dunbar: **48.1 MW renewable generation capacity connected.**
- •Berwick: **28.7 MW renewable generation capacity connected.**

SP ENERGY NETWORKS

Case Studies: SP Energy Networks Flexible Interconnection DERMS

Existing firm generator had 10 MW cap under N-1 conditions at GSP transformer



ANM deployed retrospectively to actively manage generator under N-1 contingency conditions → increased energy yield.

SP ENERGY NETWORKS

Flexible Connections: Grid Capex Savings and Clean Energy Additions

- 7 implementations of DER Flexible Connections managed by DERMS have avoided or deferred grid upgrade capital investment savings of $297 million.
- ***SPEN Dunbar*** scheme analysed by Regen for additional local economic impact, including:
  - $75m Gross Value Add economic contribution
  - $100k annual community benefit

Utility	Flexible Connection Zone	Grid Upgrade Saving ($m)	MW Added
SSEN	Orkney	36	47
SPEN	Berwick & Dunbar	26	50
SPEN	Dumfries & Galloway	47	90
UKPN	Cambridgeshire	53	52
UKPN	Norwich	83	77
WPD	Lincolnshire	50	49
AVANGRID	Spencerport & Robinson	2	17
TOTAL		**$297M**	**382MW**

Case Studies: Flexible Interconnections in North America

Robinson PV (NYSEG)

- ✓ 2 MW
- ✓ Champlain, NY
- ✓ **Constraint:** Overvoltage and Undervoltage*
- ✓ **Commissioned:** Sept. 2021

Spencerport PV (RG&E)

- ✓ 15 MW (3 sites @ 5 MW each)
- ✓ Spencerport, NY
- ✓ **Constraint:** Substation Transformer Thermal
- ✓ **Commissioned:** April 2021

Source: Zach Caruso, AVANGRID, Mar 2022.

NYSEG
RG&E
AVANGRID

Case Studies: Flexible Interconnections in North America

Flexible Interconnection Project – Spencerport PVs

Static Capacity Interconnection Not Viable

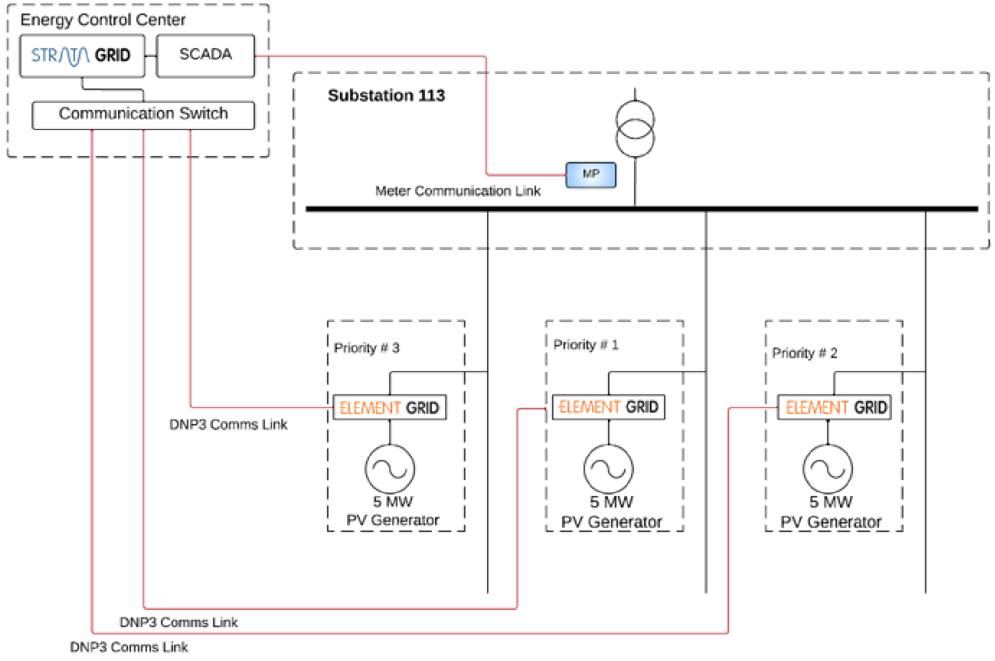
3 Sites	5 MW Per Site	2.6 MW Remaining Thermal Capacity	$3M+ Static Capacity Upgrade Cost

Flexibility Enables Interconnection

1 STRATA Centralized ANM Platform	3 ELEMENT Local DER Gateways	0.3% Projected Curtailment	1 DTT Scheme for back-up protection

Layered Controls Protect System

75% NTL Trim Threshold	90% NTL ANM Sequential Trip Threshold	2.6 MW Fail-Safe Max Export Capacity	100% NTL DTT Sequential Trip Threshold



NYSEG RG&E AVANGRID

Case Studies: Flexible Interconnections in North America - What's Next?

AVANGRID successfully demonstrated the value of Flexible Interconnections and the supporting ANM technology in-situ and will continue to operate the demonstration sites while continuing to explore future opportunities to leverage the experience gained to enable DER integration

Lessons Learned and Next Steps

Flexible Interconnections

Communications

Non-Network Curtailment

- Curtailment due to loss of communications within the scheme must be considered alongside curtailment due to grid constraints

Technology

DER Gateway – LCS Interface

- While IEEE 1547-2018 lays the groundwork for utility-to-DER communications, there remains limited experience with implementing such interfaces

Operations

Operational Engagement

- A greater level of utility engagement in DER operations is required to manage a Flexible Interconnection site

Scalability

Flexible Capacity

- The Spencerport PVs demonstrated that Flexible Interconnections are a viable and cost-effective way of increasing the amount of DER capacity that can interconnect to a constrained portion of the grid

Avangrid Networks – "Flexible Interconnect Through DERMS-Learning from Practical Deployment", CIGRE Grid of the Future (2022)

Discussion

About Us

Smarter Grid Solutions (SGS) is an enterprise energy software company with a unique end-to-end approach to DERMS to deliver net zero energy systems. Our unique autonomous, distributed control system technology has been developed to provide the specific capabilities and necessary flexibility to deliver cost-effective solutions that are tailored to our customers' needs. Our solutions provide specialized distributed asset monitoring and control, building up from real-time data to advanced look ahead DER management and optimization to secure grid and market revenues and value streams.

With over a decade of continuous 'on grid' operation experience, our solution suite is used by leading companies, government authorities, C&I customers, and battery fleet, grid and market operators across the globe, managing DER assets of all sizes and shapes. Our customers have chosen to work with SGS because of the architecture and integration flexibility and the ability to provide systems that work. Recognizing there are diverse customer needs, our solutions address flexible interconnections, delivery of flexibility including demand response and non-wires alternatives, aggregated DER market participation and microgrids, allowing flexible energy system operation, the ability to exploit new market opportunities, and implement new business models. From a few to millions of devices simultaneously, our software is in live operation, managing these assets efficiently, effectively and most importantly, securely.

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