Flexible Interconnection Overview, Progress Thus Far & Next Steps

"Flexible Generation for a Cost Effective & Smart Grid"

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A Joint Presentation by NYSEIA & Smarter Grid Solutions for the Interconnection Working Group (IWG)

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- 1. Intro: <u>Why FlexIX</u>? (Why Industry is so supportive?)
- 2. SGS: DERMS Overview (What is a DERMS?)
- 3. SGS: What is a **FlexIX? (a "Use Case" of DERMS)**
- 4. Illustration of **FlexIX Process** (aka. "endgame" vision)
- 5. Progress Thus Far ITWG Q&A & "Key Concerns"
- SGS: DERMS & FlexIX <u>Phased Rollout</u>, Princ & Recom (Why full DERMS is not required)
- 7. Suggested "<u>Next Steps</u>" Utility & Industry
- 8. Suggested "<u>Next Steps</u>" IPWG & ITWG
- 9. Summary of **Key Takeaways** (from Industry Perspective)



Industry's Core Beliefs Regarding Flexible IX:

- CLCPA is focused on long term DER connections & hosting capacity increases through capital upgrades (5 to 10 years). Flexible IX can provide NT benefits to "bridge the gap".
- Flexible IX provides the greatest near term hosting capacity increases per dollar invested than capital upgrades (50% to 100%+ Increases with no major upgrades)
- 3. Flexible IX technology is critical and central to realizing ESS goals and capabilities (along with PV and other DER)



Intro: Why FlexIX? (Why Industry is so supportive?)

Industry's Core Beliefs Regarding Flexible IX:

- Flexible IX will always be required (regardless of upgrades) to achieve maximum grid utilization
- 5. Flexible IX costs can be primarily covered by the developer
- 6. Flexible IX (& DERMS) technology is essential to enabling a new era of flexibility, visibility, reliability, expansion & control
- 7. Flex IX capabilities allows for smarter & more accurate Grid Planning
- 8. Flexible IX capabilities enable new market-based upgrades



DERMS Overview



Constraint of DERs Participating in Wholesale Markets for Distribution Grid Reliability

DER Flexible Interconnection

- Distribution Grid Upgrade Deferral
- Distribution Grid Voltage Support
- >Economic Optimization
- Fault Restoration Support

Load reduction to extend maintenance window

- >Load Shifting & Duck Curve Management
- Peak Load Reduction

Scheduled Dispatch

Wholesale Energy Price Response

Backup Power

- Microgrid Control
- Self-Consumption of Renewable DER

Contingency Frequency Response (Primary Control)

Contingency Voltage Response (Primary Control)

ISO Market Products – Day Ahead or Real-Time Energy

Regulation Reserve

Spinning Contingency Reserve

Transmission System Voltage Support



DERMS Overview



What is Flexible Interconnection?

- A Flexible Interconnection is a DER control strategy used to defer or avoid system upgrades and/or increase distribution system utilization
- Flexible interconnection monitor the network where constraints are identified in the interconnection studies and curtail the export of the generator as the constraint is approached
- Flexible Interconnections can also be used to add flexible load, energy storage, and electric vehicles
- Flexible Interconnection increase viable hosting capacity between 50-100%



Illustration of FlexIX Process ("Endgame" vision)

There are MANY iterations and variations. The essential aspect is that at some point the developer has a choice given best guess information. For example:

- Developer submits an full application package for a 5 MW DER system; expresses interest in Flexible IX option.
- 2. Utility performs a CESIR & Curtailment Analysis and presents the following results (see table).
- 3. Developer has <mark># months to decide how to proceed</mark>, and may commission an independent analysis.

Opt #	Мах Сар	Туре	% Curtail	Est Cost	Timeframe	Comments
1	5 MW	Firm	0%	\$X (<mark>most</mark>)	A mo's (<mark>most</mark>)	Cost includes <mark>capital upgrades</mark> .
2	5 MW (w/ pot options between 2 and 5)	Flexible	R% (<mark>or provide</mark> table)	\$Y	B mo's	Cost includes FlexIX implementation costs.
3	2 MW	Firm	0%	\$Z (<mark>typ</mark>)	C mo's	Cost is standard for no major upgrades.



Progress Thus Far - ITWG Q&A & "Key Concerns"

Flex-IX Roadmap Questions to Joint Utilities & Industry Response (link)

Questions asked by DPS:

- 1. Pilot Proj & Timeframes
- 2. FlexIX Implementation Pro's & Con's
- 3. DERMS Status
- 4. **DERMS Necessity for Flexible IX**
- 5. Alternatives to DERMS for Flex-IX
- 6. Curtailment Methodology Preference
- 7. Data Availability Concerns
- 8. Priority Technical Challenges & Industry Input Desired
- 9. Other Topics for IPWG & ITWG

Key Highlights & Concerns regarding "near term" deployment:

- What realistically can be done without "full DERMS" in place? (note: see previous on DERMS vs FlexIX)
- Clear differences in utility perspectives on DERMS necessity. (What are reasons? Are we looking at the same endgame?)

Highly encourage a detailed read of the document. Significant content within.



DERMs Phased Rollout



- Each utility may have a different starting point when implementing a DERMS solution based on its specific needs
- A phased rollout helps the utility gain confidence in the solution, design the solution for scalability, and tackle needed use cases first



Flexible Interconnection Phased Rollout





Suggested "Next Steps" - Utility & Industry

Utility Led (w/Industry)

- Pilot Projects & Planning (see also <u>Q1 Pilot Proj & Timeframes</u>)
 - Full review other pilot projects (DERMS used?, curtailment method, etc)
 - ** Network review and identify pilot projects as soon as possible (essential to gain baseline experience)
 - ** Proactive grid planning with focus on "business as usual" implementation
- DERMS vs FlexIX (see also <u>Q5 Alternatives to DERMS for Flex-IX</u>)
 - Fully understand available solutions (SGS, GridEdge, etc)
 - Presentation on current DERMS platform, status, etc, and how it can support FlexIX

Industry Led (w/Utility)

- Curtailment Methodology & Data
 - Provide guidance on preferred curtailment methodologies (LIFO, ProRata, etc)
 - Research various curtailment analysis outputs in other regions, present on hypotheticals
 - Provide guidance on essential data needed for utility or 3rd party curtailment analysis

(overlaps with next slide, except different perspective)



Suggested "Next Steps" - IPWG & ITWG

IPWG

- Pilot Project Review (see previous)
- What are typical Flexible IX application processes? How might the SIR be updated?
- Review pro's & con's of various curtailment strategies (w/ITWG). Use to inform updates to contractual and operational agreements.
- Review how Flexible IX costs are covered by developer vs utility, cost sharing, etc.
- Share experience from FlexIX rollout to "business as usual" in other territories

ITWG

- Summarize vital synergy of Flexible IX capabilities for ESS projects ("phase 2 & 3")
- Deep dive into curtailment data requirements for curtailment analysis
- For circuits/substations without interval data, Identify modeling assumptions enabling FlexIX

(overlaps with previous slide, except different perspective)

See also: Flexible IX Topical Review, Roadmap & Research



Summary of Key Takeaways (from Industry Perspective)

- Flexible IX provides <u>foundational capabilities</u> for unlocking future grid capabilities, and is inevitably required regardless of upgrades.
 a. see full list of why we are so excited
- 2. Flexible IX capabilities are synergistic & fully overlap with ESS goals
- 3. Flexible IX can "bridge the gap" pending major capital upgrades
- 4. Comprehensive **DERMS is not required** for phased rollout of FlexIX projects, but some consideration is necessary.
 - a. Flex IX is simply one "use case".
- Lots of work has been done so far, let's build on that! (& in other regions.)
- Lots of work to do, but there are <u>no good reasons</u> to wait any longer. Please, let's proceed together.
- 7. Flexible IX **pilot projects** are an essential next step for all utilities.





Thank you.

Questions & Discussion Welcome.

