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OF NEW YORK

Hosting Capacity Stakeholder Webinar

(August 26, 2021)

Engagement Group Ground Rules*

- All stakeholder engagement (Advisory Group and Engagement Group) meetings, webinars and information exchange are designed solely to provide an open forum or means for the expression of various points of view in compliance with antitrust laws.
- Under no circumstances shall stakeholder engagement activities be used as a means for competing companies to reach any understanding, expressed or implied, which tends to restrict competition, or in any way, to impair the ability of participating members to exercise independent business judgment regarding matters affecting competition or regulatory positions.
- Proprietary information shall not be disclosed by any participant during any stakeholder engagement meeting or its subgroups. In addition, no information of a secret or proprietary nature shall be made available to stakeholder engagement members.
- All proprietary information which may nonetheless be publicly disclosed by any participant during any stakeholder engagement meeting or its subgroups shall be deemed to have been disclosed on a non-confidential basis, without any restrictions on use by anyone, except that no valid copyright or patent right shall be deemed to have been waived by such disclosure.
- AG & EG discussions will be open forums without attribution and no public documents by the AG or EG will be produced unless publication is agreed upon by the group.

**Ground Rules adapted from the JU Advisory Group*

Agenda

Agenda Item	Time Slot
Introductions and Meeting Goals	~5 minutes
Discuss Initial JU Hosting Capacity Roadmap for Storage	~15 minutes
Discuss Analysis Criteria and Approach	~10 minutes
Discuss Cost Sharing Order	~10 minutes
Open Discussion / Q&A	~25 minutes

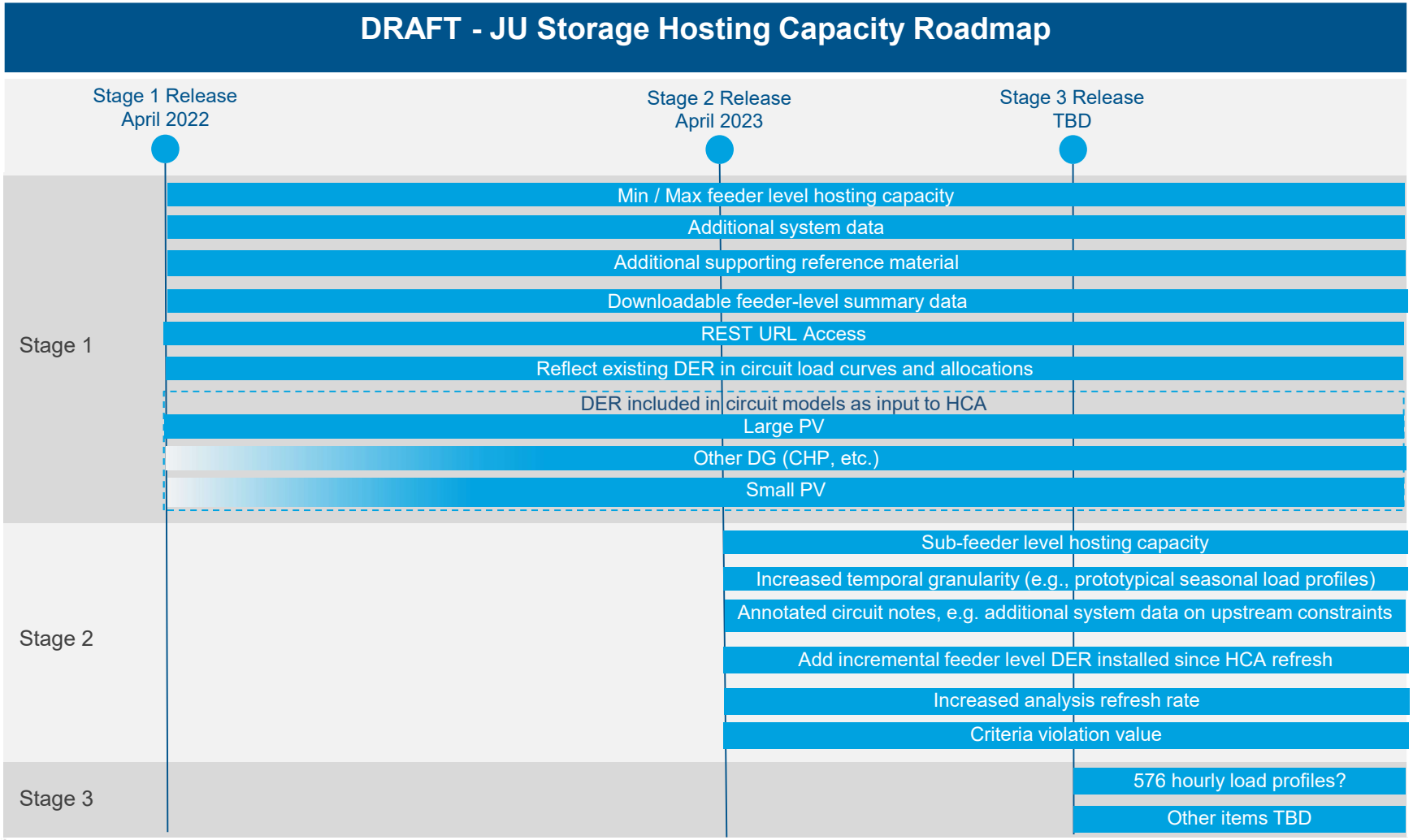
Meeting Goals

- Provide an update on the JU's most recent thinking towards the draft storage hosting capacity roadmap.
- Solicit input from energy storage stakeholders on the latest draft roadmap.
- Discuss preliminary timelines and expectations for each release of the energy storage hosting capacity maps.

Storage Hosting Capacity Maps Overview

- The initial storage hosting capacity map will be at a feeder-level and will be updated on an annual basis.
- The JU are targeting an April 2022 release date for the first storage hosting capacity map
- The storage hosting capacity map will allow for toggling between load and generation hosting capacity.
- The storage hosting capacity maps are for non-wholesale market participatory interconnection.
- Important to have interconnection processes and requirements inform the hosting capacity analysis.

DRAFT Straw Proposal - Storage Hosting Capacity Roadmap



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Stage 1 Items – April 2022

- **Feeder-level Hosting Capacity (min / max)** - Amount of load/generation that can be installed at that circuit, without significant circuit upgrades, at the time the hosting capacity analysis was performed.
- **Additional System Data** – Applicable system data already included in the solar PV hosting capacity maps (more on next slide).
- **Additional Supporting Reference Material** – Supporting reference slide deck with release notes, analysis criteria, definitions, FAQs, and more.
- **Downloadable Feeder-level Summary Data** – Ability to download feeder-level data through the attribute table.
- **REST URL Access** – Ability to overlay hosting capacity data info within user's own GIS systems.
- **Reflect Existing DER in Circuit Load Curves and Allocations** – DER such as solar PV, CHP and EVs will be reflected in circuit load curves and allocations.

Stage 2 Items – April 2023

- **Sub Feeder-level Hosting Capacity (min / max) -** Amount of load/generation that can be installed at that line section, without significant circuit upgrades, at the time the hosting capacity analysis was performed.
- **Increased Temporal Granularity –** Prototypical seasonal load profiles incorporated into hosting capacity analysis.
- **Annotated Circuit Notes –** Additional info on potential constraints not captured in the analysis, e.g. additional info on substation and transmission-level constraints.
- **Incremental DER Installed Since Last HCA Refresh –** The aggregated DG that has been connected on the selected feeder since the listed HCA refresh date.
- **Increased Analysis Refresh Rate –** Semi-annual hosting capacity refresh for circuits experiencing greater than 500 kW of load since the last refresh.
- **Criteria Violation Value –** Min and max hosting capacity by analysis criteria

EPRI DRIVE Tool

- For consistency, the utilities conduct their hosting capacity analysis using EPRI's DRIVE tool and present their results in the ESRI mapping environment.

- DRIVE allows each utility to calculate the hosting capacity for their distribution system using EPRI's streamlined methodology.

- DRIVE's streamlined methodology is an accurate means for calculating hosting capacity and includes the functionality for evaluating storage.

- DRIVE continues to be updated with input from the DRIVE User's Group comprised of a broader group of utilities and EPRI.

Comparing DER Assumptions and Modelling

Existing Solar PV Stage 3 HCA Spec:

Reflected in circuit load curves / load allocations	
Large PV	Yes
Small PV	Yes
Storage	Yes
Other DG	Yes

Included in Stage 3 Circuit Models as an input to HCA	
Large PV	Yes
Small PV	Yes, if possible
Storage	No
Other DG	Yes

Stage 3 HCA outputs provided	
Large PV	Yes
Small PV	No
Storage	No
Other DG	No

DRAFT Storage HCA Spec:

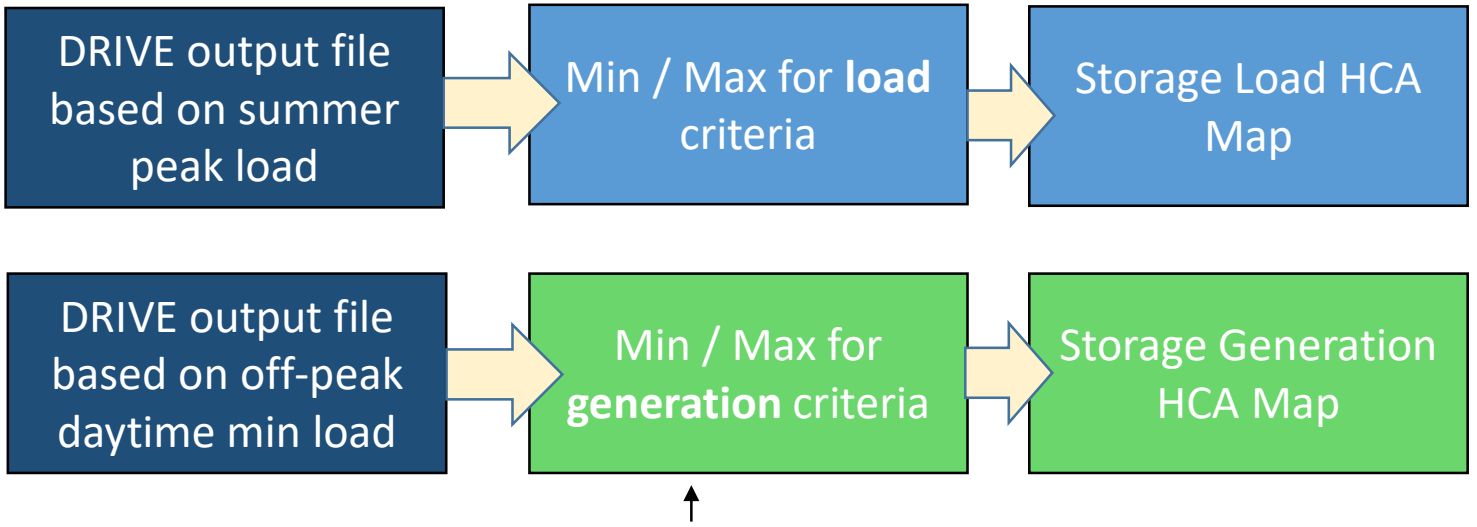
Reflected in circuit load curves / load allocations	
Large PV	Yes
Small PV	Yes
Storage	Yes
Other DG	Yes

Included in Stage 3 Circuit Models as an input to HCA	
Large PV	Yes
Small PV	Yes, if possible
Storage	Yes
Other DG	Yes

Stage 3 HCA outputs provided	
Large PV	No
Small PV	No
Storage	Yes
Other DG	No

Approach to Creating Separate Displays for Load and Generation

- Providing separate displays for load and generation hosting capacity should help initially address requests for greater transparency on the analysis criteria violation.



Example Storage Feeder HCA

Min: 800 kW
Max: 1200 kW

Min: 200 kW
Max: 600 kW

Note: The min/max generation criteria will be specific to storage and not solar PV. This includes changes in fault current contribution and potential voltage changes.

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WORKING DRAFT FOR STAKEHOLDER DISCUSSION

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Load HCA - JU DRIVE Criteria and Settings Assumptions

DRIVE Tool Settings by Utility with Recommended EPRI Threshold Settings							
Category	**Criteria**	**Central Hudson**	**Con Edison**	**National Grid**	**NYSEG & RG&E**	**Orange and Rockland**	**Hosting Capacity Threshold**
Voltage	Primary Over-Voltage	No	No	No	No	No	1.05 Vpu voltage magnitude
	Primary Under-Voltage	Yes	Yes	Yes	Yes	Yes	0.95 Vpu voltage magnitude
	Primary Voltage Deviation	Yes	Yes	Yes	Yes	Yes	3% voltage change
	Regulator Voltage Deviation	Yes	No	Yes	Yes	Yes	50% of bandwidth at regulators
Loading	Thermal for Charging (Demand)	Yes	Yes	Yes	Yes	Yes	100% normal rating
	Thermal for Discharging (Generation)	No	No	No	No	No	100% normal rating
Protection	Unintentional Islanding*	No	No	No	No	No	67% minimum loading

**To be evaluated in DRIVE at the feeder head only, but not to be included in the results affecting the heat mapping. The minimum hosting capacity as determined by the unintentional islanding criteria is to be added as a separate item in the data pop-up. The 67% minimum loading threshold is to be used as a proxy for the Sandia screens.*

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Generation HCA - JU DRIVE Criteria and Settings Assumptions

DRIVE Tool Settings by Utility with Recommended EPRI Threshold Settings							
Category	**Criteria**	**Central Hudson**	**Con Edison**	**National Grid**	**NYSEG & RG&E**	**Orange and Rockland**	**Hosting Capacity Threshold**
Voltage	Primary Over-Voltage	Yes	Yes	Yes	Yes	Yes	1.05 Vpu voltage magnitude
	Primary Under-Voltage	No	No	No	No	No	0.95 Vpu voltage magnitude
	Primary Voltage Deviation	Yes	Yes	Yes	Yes	Yes	3% voltage change
	Regulator Voltage Deviation	Yes	No	Yes	Yes	Yes	50% of bandwidth at regulators
Loading	Thermal for Charging (Demand)	No	No	No	No	No	100% normal rating
	Thermal for Discharging (Generation)	Yes	Yes	Yes	Yes	Yes	100% normal rating
Protection	Unintentional Islanding*	Yes	Yes	Yes	Yes	Yes	67% minimum loading

**To be evaluated in DRIVE at the feeder head only, but not to be included in the results affecting the heat mapping. The minimum hosting capacity as determined by the unintentional islanding criteria is to be added as a separate item in the data pop-up. The 67% minimum loading threshold is to be used as a proxy for the Sandia screens.*

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Requested Items Requiring Further Discussion

- Hosting capacity for circuits between 13 kV and 69 kV
  - The JU recognize this items is a higher priority for stakeholders
  - The existing approach and tools will not be applicable to sub-transmission networked circuits
  - The JU will explore the types of additional info that can be included for radial circuits in this voltage class
- Information to evaluate specific operational modes, e.g., VDER
- Locations where energy storage is helpful to the grid
- Dynamic hosting capacity

Recent Cost Sharing Order

- The recent “Order Approving Cost-sharing Mechanism And Making Other Findings” or “Cost Sharing Order” was filed on July 16, 2021.

- The JU have 90 days to determine how the following information will be included in the hosting capacity maps:
  - Location
  - Incremental hosting capacity
  - In service date
  - Cost

- Any comments will be presented to the Interconnection Policy Working Group.

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Order Approving Cost-sharing Mechanism And Making Other Findings

Q&A

Appendix

Longer-term Items Requiring Further Discussion

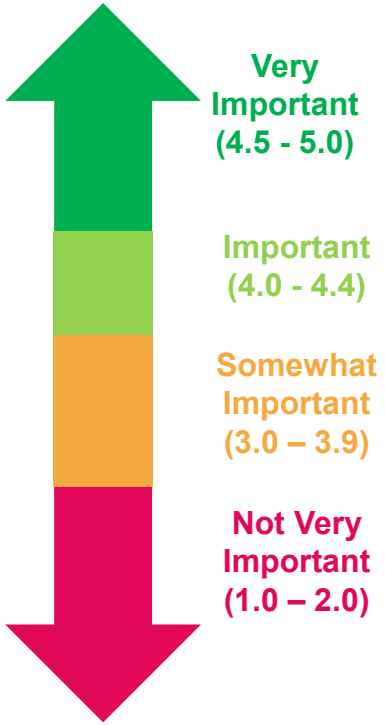
- The following items are viewed as longer-term items to continue considering in the context of the broader hosting capacity roadmap:
  - Hosting Capacity for Energy Storage
  - Hosting Capacity for Hybrid Solar + Storage
  - Upstream Substation/Bank-Level Constraints **(Progress made in Stage 3.1)**
  - Forecasted Hosting Capacity
  - Circuit Equipment Ratings
  - Hosting Capacity - Data Validation Efforts **(Progress made in Stage 3.1)**
  - Dynamic Hosting Capacity

Stage 3.X Survey Prioritization (1/2)

- **Stakeholders were asked to rate the level of importance of each of the following proposed enhancements to your business, using a five-point scale where 1 is "not at all important," and 5 is "very important."**

- **Very Important 4.5 - 5**
  - Additional Map functionality (e.g. downloadability/filterability, API) – **Progress made in Stage 3.1**
  - Hosting Capacity Analysis for Energy Storage
  - Hosting Capacity for Hybrid Solar + Storage
  - Upstream Substation/Bank-Level Constraints – **Progress made in Stage 3.1**
  - Forecasted Hosting Capacity

- **Important 4.0 – 4.4**
  - Increased Analysis Refresh Rate
  - Circuit Equipment Ratings
  - Hosting Capacity - Data Validation Efforts – **Progress made in Stage 3.1**
  - Dynamic Hosting Capacity



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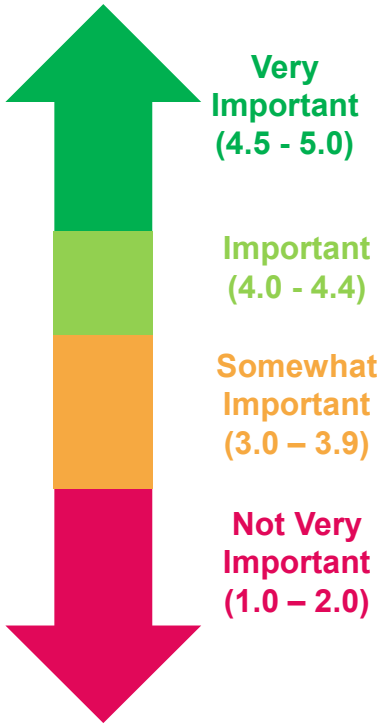
Stage 3.X Survey Prioritization (2/2)

- **Stakeholders were asked to rate the level of importance of each of the following proposed enhancements to your business, using a five-point scale where 1 is "not at all important," and 5 is "very important."**

- **Mid 3.0 – 3.9**
  - Better Communication of Available Reference Materials and Supporting Documentation – **Progress made in Stage 3.1**
  - Time-Varying Hosting Capacity (increased temporal granularity)
  - Hosting Capacity Analysis Criteria Violation Transparency
  - EPRI DRIVE Utility Inputs, Analyses Used, and Study Parameters Transparency – **Progress made in Stage 3.1**

- **Low 1.0 – 2.9**
  - Hosting Capacity for Electric Vehicles*
  - Hosting Capacity for Combined Heat & Power**



*Survey did not include EV stakeholders

**Survey did not include CHP advocates

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August 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
Granularity	Some developers stated that providing data at the feeder level is insufficient due to variation in capacity. They requested nodal, sub-feeder data. The JU noted that they intend to phase into providing more granular temporal data. The phased-rollout best enables the JU to refine models and verify input assumptions; Data will be collected from phase I and used to improve the following analyses.	The WG understands the benefits of providing sub-feeder data in a timelier manner and is reviewing this request. Due to data validation and resource concerns, further internal discussion and time is needed to conclude on this matter. The JU will prioritize this for the next stakeholder meeting.
Update Cycle Timing	It is requested that the map show monthly updates incorporating model and load changes. This request has previously been made for the PV map.	The JU will commit to showing and updating the additional storage interconnected and in queue on a monthly basis consistent with how additional PV is now presented monthly.

August 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
Display, Sub-transmission lines	Some stakeholders inquired about analysis for larger circuits thar are radial and if it would be possible to display these sub-transmission lines.	The JU will plan to show sub-transmission lines that are available for customer interconnection. Those that do not have availability to connect will not be shown. Details for this plan will be shared during the next stakeholder meeting.
Integrating Maps	The topic of integrating the PV and storage maps was broached so that developers could see how the DERs interact on a constrained feeder. It was noted that while this may be possible, it could result in data-overload. Storage typically does not input while solar generates; instead, it's more likely to absorb and input at night. Thus, integrating the maps could make capacity appear lower than feasible.	The WG will review this request and its implication before providing a decision at the next stakeholder meeting.

August 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
576-Hour Modeling	576-hour modeling was requested.	The JU is reviewing the resource requirements and assumptions necessary to provide 576-hour modeling. An update will be provided in the next stakeholder session. It is likely that this request will require significant time.
Voltage Variability	It was asked how the WG will study voltage variability during Phase I. The answer is that changes at the regulator which represent 50% of the bandwidth will be flagged. EPRI's White Papers on this analysis were requested.	The WG reached out to EPRI to procure the White Papers. However, they are not publicly available. However, The JU will organize an event for EPRI to share information on this topic. Stay tuned for more logistical meeting information on the Stakeholder Calendar. In the meantime, if stakeholders would like to procure a copy, they can enroll in EPRI.

August 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
Constraints	One developer asked for the WG to provide all criteria violations that are input into the JU analysis so that developers can download and run their own power-flow simulations.	The JU will not commit to showing the constraints at this time. The purpose of the hosting capacity map is intended to show the amount one can interconnect without increasing costs. The current parameters satisfy this.
Cost-Sharing	Given the recent cost-sharing order, one member asked if there was a way this map could flag developers about potentially triggering projects so that they can assess potential costs. It was noted that this map is for utility planned updates and not developer cost-sharing projects. Other stakeholders requested more details about the cost-sharing order.	Cost-sharing is housed under the IPWG, and the order can be found **here**. The JU is preparing a mock-up menu to show the requested information. The JU will be presenting the 4 items identified on slide 16: (1) Location, (2) Incremental Hosting Capacity, (3) In service date, (4) cost.

August 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
General	Greg Sachs from NYSEIA requested information on the JU working groups, charters, prioritization processes and leaders.	This request falls outside of the integrated planning WG domain.