JOINT UTILITIES OF NEW YORK

Hosting Capacity Stakeholder Webinar

(May 13, 2021)

Audio DIN: +1 929-232-3340;
Code: 861 291 937#

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.

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- 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*

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Agenda

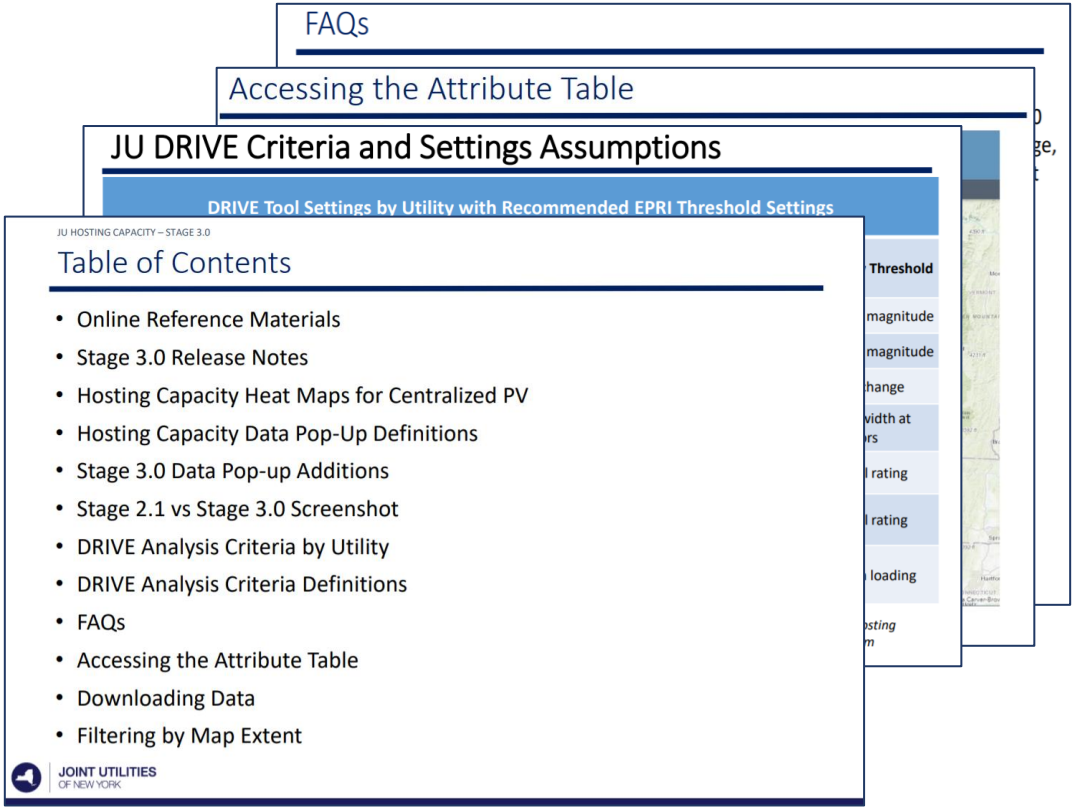
Agenda Item	Time Slot
Introductions and Meeting Goals	10:00 AM – 10:10 AM
Reminder of Available Reference Materials	10:10 AM – 10:20 AM
Recap Recent Activities	10:20 AM – 10:35 AM
Battery Storage Stakeholder Presentation (NY-BEST)	10:35 AM – 10:50 AM
Discuss Initial JU Hosting Capacity Roadmap for Storage	10:50 AM – 11:05 AM
State of DER Dashboard (ITWG Industry Liaison)	11:05 AM – 11:30 AM
Open Discussion / Q&A a. IEDR Touchpoints b. New Items	11:30 AM – 12:00 PM

Meeting Goals

- Recap recent activities to advance stakeholder interests.
- Provide energy storage stakeholders an opportunity to discuss their priorities for a hosting capacity map for energy storage.
- Begin to discuss the initial JU roadmap for releasing hosting capacity maps for energy storage.
- Solicit feedback on additional data items and functionality to consider as part of the JU roadmap.

Hosting Capacity User Reference Materials

Reminder that more information on the analysis criteria, assumptions, FAQs and relevant background [can be found here](#).



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Source: https://jointutilitiesofny.org/utility-specific-pages/hosting-capacity

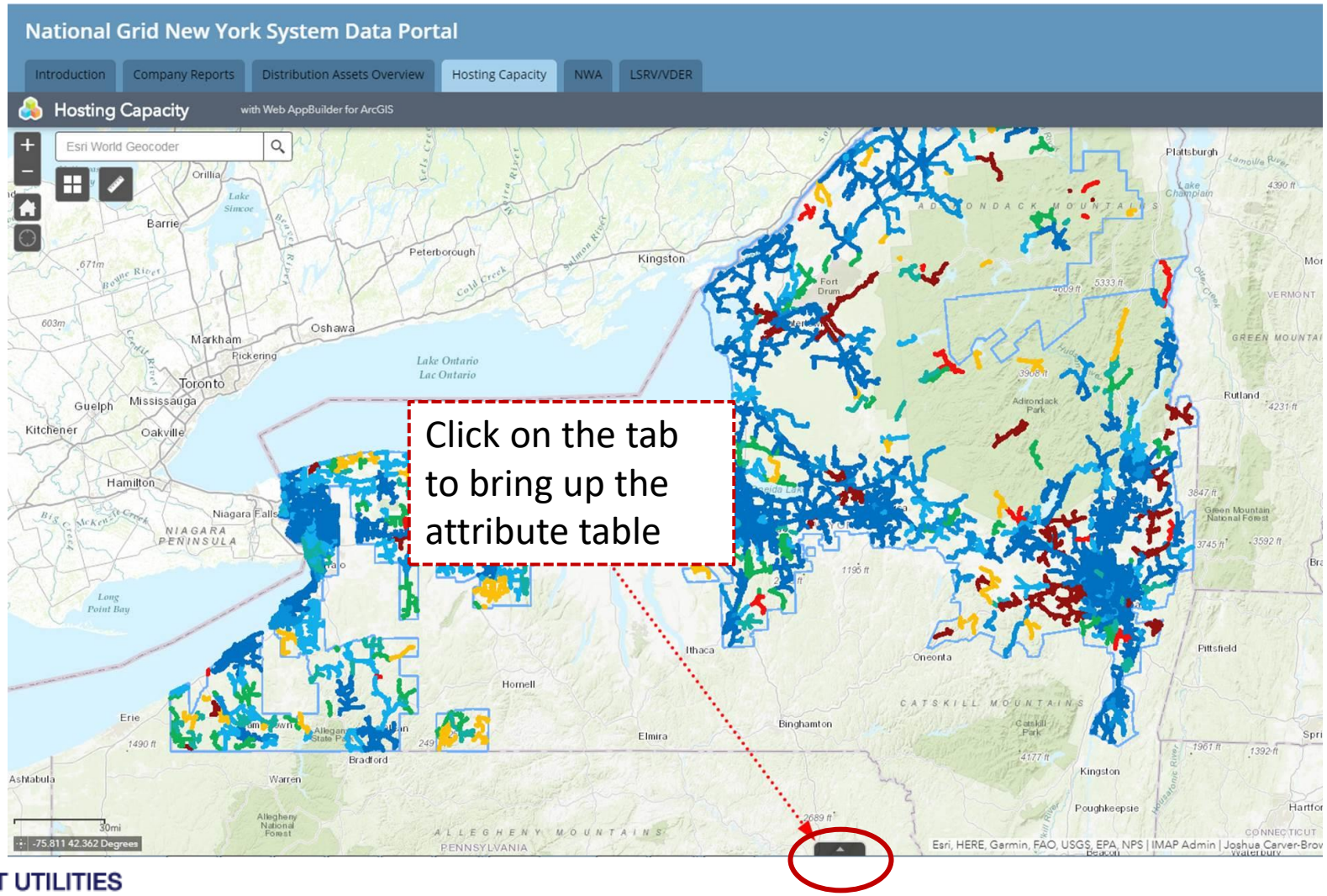
NYSEG nationalgrid Orange & Rockland Rockland Electric Company conEdison People. Power. Possibilities. Central Hudson A FORTIS COMPANY RG&E

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.*

Accessing the Attribute Table



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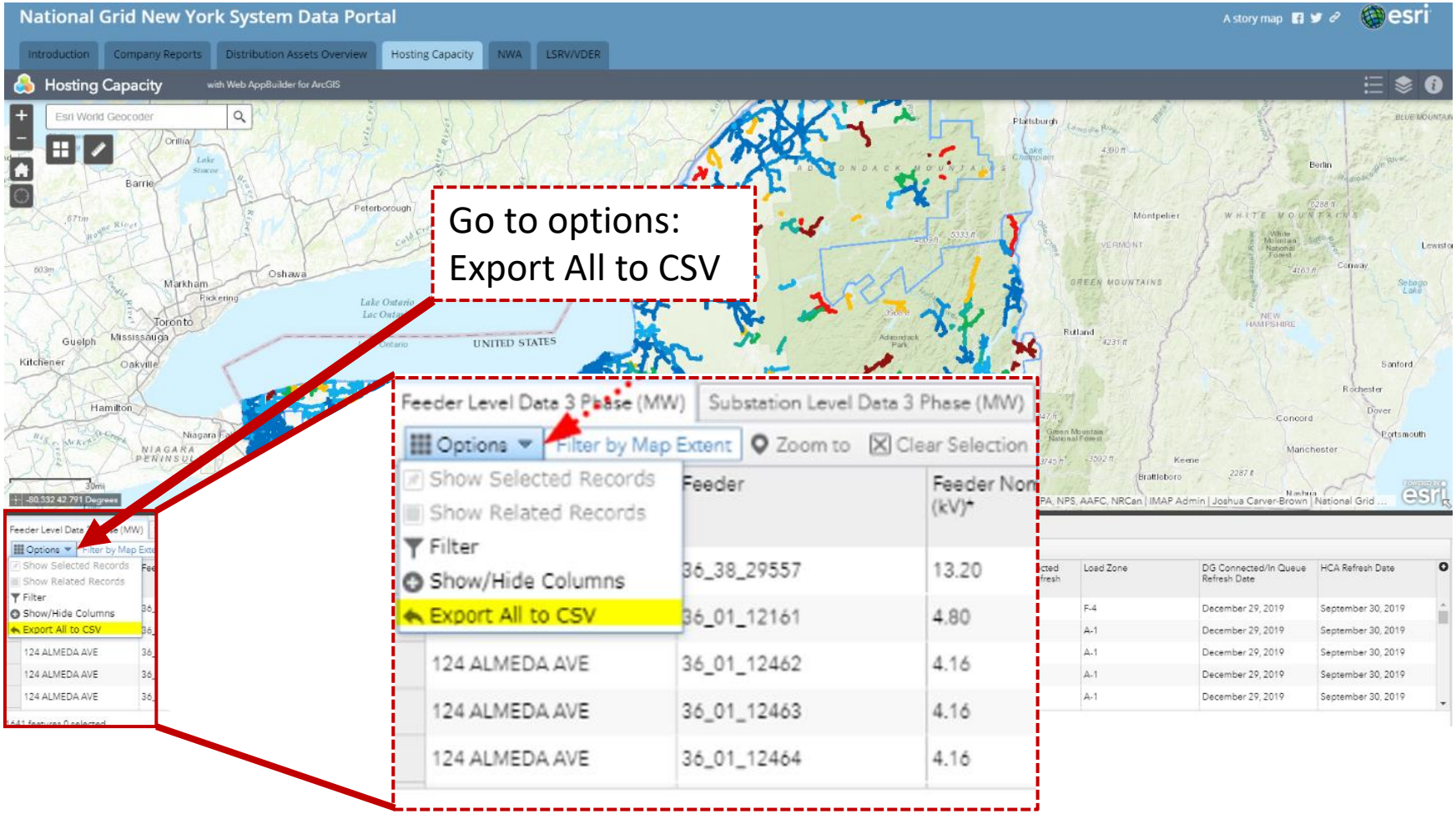
Downloading Data



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Online Reference Materials

- Previous stakeholder engagement presentation slides and information on upcoming engagement sessions can be found at:
  https://jointutilitiesofny.org/joint-utilities-of-new-york-engagement-groups/

- Links to each utility's hosting capacity displays and common JU reference materials, such as descriptions of the analysis methodology and assumptions, as well as a tutorial of the Stage 3.0 displays, can be found at:
  https://jointutilitiesofny.org/utility-specific-pages/hosting-capacity/

- A user demo and tutorial of the Stage 3.0 Maps can be found here:
  - https://jointutilitiesofny.org/utility-specific-pages/hosting-capacity/

- More information on the ERPI DRIVE tool can be found as part of a multi-part video series here: https://www.youtube.com/channel/UC4J6uTXtCGLkuNK8Xn_BQhA

- The original white paper EPRI wrote on hosting capacity in New York State can be found here: https://www.epri.com/#/pages/product/000000003002008848/?lang=en-US

*For additional information and questions, please email **info@jointutilitiesofny.org***

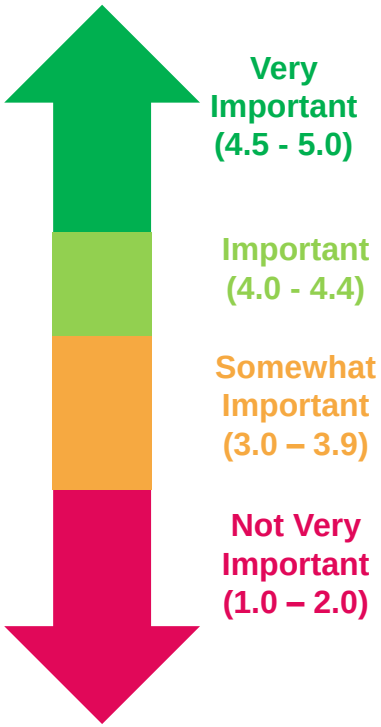
Recent Activities

Near-to-Medium Term Priorities

- Consistent with the stakeholder survey results, the JU have focused on the following high priority and value-added enhancements.

- **Very Important 4.5 - 5**
  - Additional Map functionality (e.g. downloadability/filterability, API) – **In-progress**
  - Hosting Capacity Analysis for Energy Storage – **Partial progress per the EV Order**
  - 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 – **In-progress**
  - Circuit Equipment Ratings
  - Hosting Capacity - Data Validation Efforts – **Progress made in Stage 3.1**
  - Dynamic Hosting Capacity



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A summary of the stakeholder survey results can be found in the May 2020 Stakeholder slides.

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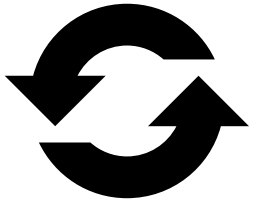
Recent Activities

Updated data pop-up notes section to alert developers to unique situations and potentially significant upgrades.

Began expanding REST URL access to all third-parties on **March 1, 2021.**



Analysis refresh completed on **April 1, 2021** for circuits with a total increase of connected DG above 500 kW over the prior 6 months.

Example Notes

- "Fed from neighboring utility"
- "Substation configuration requires 3V0 / DTT"
- "Pending upgrades eligible for cost-sharing"

Local Feeder Level Hosting Capacity for PV

Substation	CHITTENANGO
Feeder	36_11_1673
Local Voltage (kV)	4.80
Local Maximum Hosting Capacity (MW)	2.80
Local Minimum Hosting Capacity (MW)	2.00
Anti-Islanding Hosting Capacity Limit (MW)	0.2879
Feeder DG Connected (MW)	0.07
Feeder DG in Queue (MW)	0.00
Feeder DG Connected Since Last HCA Refresh Date (MW)	0.01
Load Zone	C-2
DG Connected/In Queue Refresh Date	October 29, 2020
HCA Refresh Date	September 30, 2020
Notes:	Fed from NYSEG/RG&E

*Please see Hosting Capacity Pop-Up Definitions PDF on the welcome screen for definitions and more details

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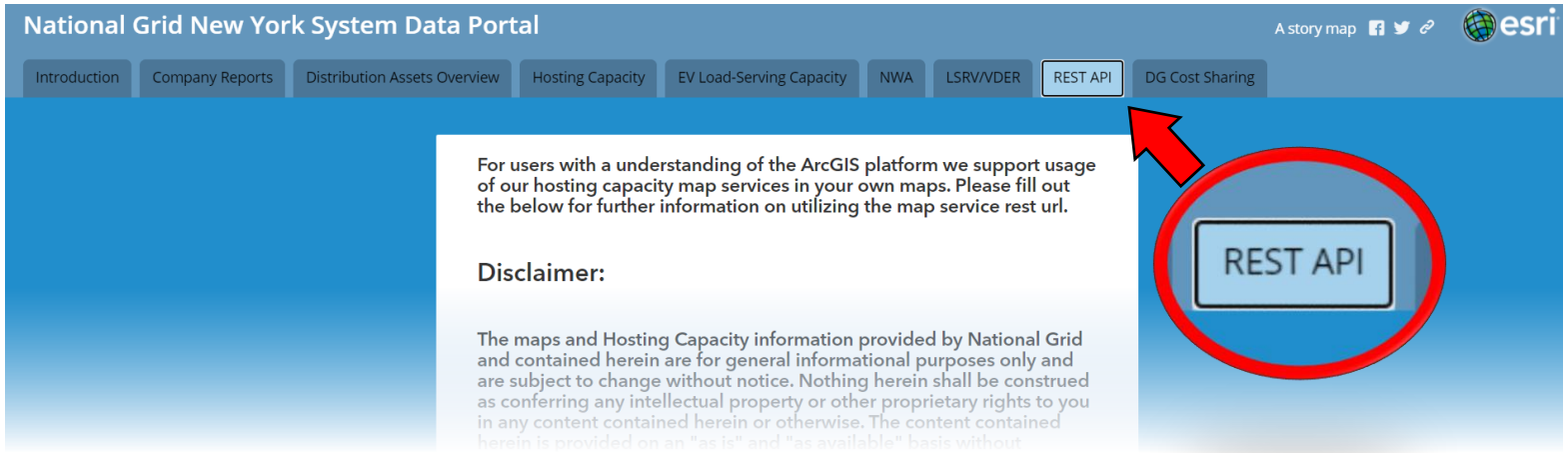
Identifying Currently Encumbered Substations / Assets

- **Some substations / assets increasingly require significant interconnections upgrades to accommodate further DER.**
- **The cost sharing petition under discussion may help make these upgrades economical for projects to interconnect at these locations.**
- **The JU are working to identify additional mapping solutions to help identify these areas for developers.**
- **Examples of why significant upgrades may be required include:**
  - When the amount of DER in queue exceeds the rating of the station transformer bank
  - Additional DER creates potential overvoltage on the transmission system
  - Backfeed begins to exceed acceptable protection limits

REST URL Access

- Third parties can now overlay JU hosting capacity data within their own GIS systems and mapping tools.

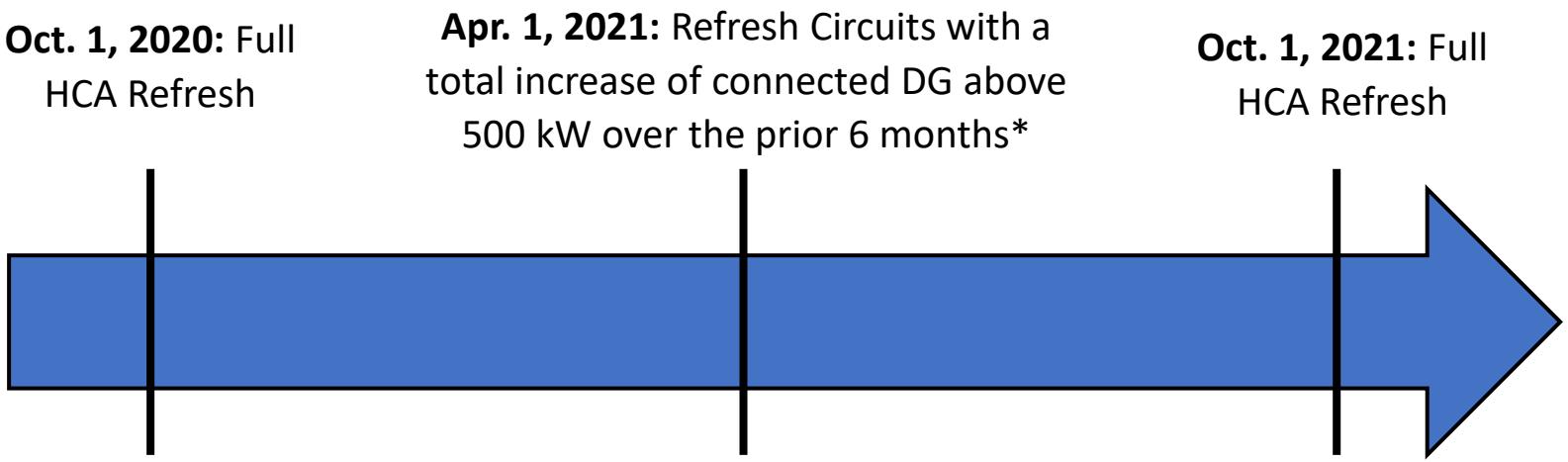
- REST URL access provides a live version of the current hosting capacity maps enabling access to the most up to date information.



Example of National Grid's REST URL

Increasing Analysis Refresh Rate

- The semi-annual refresh balances resource constraints with the need for providing relevant, up-to-date information.
- The JU will review and update the criteria for significant circuit changes each refresh cycle as necessary to help capture major changes in hosting capacity throughout the year.



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**Additional criteria may be applied at the utility's discretion*

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Considerations for Hosting Capacity Maps for Energy Storage Resources

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William Acker

JU Hosting Capacity Stakeholder Meeting

May 13th, 2021

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High Level Considerations

Energy Storage is a controllable asset

- It can consume hosting capacity, be neutral with respect to hosting capacity, or even increase hosting capacity for other assets.
- Because of the flexibility of the asset, further information is required to optimize.

Need to consider both power injection and load

- Presently have unconstrained and constrained operation
- In the future may have dynamic control to increase hosting capacity

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Specific Considerations

Include mid-voltage level on maps

- Maps show up to 13kV and occasionally some higher voltage feeders
- There is a gap in information between 13kV and 69kV
- Larger storage projects (5MW – 20MW) may bypass some of the constraints on maps, but need to understand primary distribution feeders, i.e. 27kV or 33kV.

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Specific Considerations

Developers are interested in information that supports decisions on different operating modes

- Baseline information on unconstrained operation
- Information to evaluate specific operational modes, for example VDER profile operation
- Information to identify locations where energy storage would be helpful to the grid

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Specific Considerations

Need for more temporal granularity of data

- Example: Low load times in the spring might limit solar hosting capacity whereas an energy storage device may not be affected by that time.
- Increased temporal information for both load and injected power.
- Granularity should be sufficient to allow evaluation and optimization of operating modes.

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Specific Considerations

Need to provide data on limiting factors

- The properties of Energy Storage can be quite different from solar. For example, flicker or voltage violations can be significantly different.
- Providing more granularity of information will both catalyze more deployment and potentially more efficient solutions.
- In addition to storage, this information will be useful as we begin to deploy more smart inverters.

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SoCal Edison Example

Provides significant temporal and limitation criteria information

- 576 hours analyzed (lowest and highest load days for each month).
- Provide Criteria Violation Value for each criteria examined.
- Updated monthly (as needed).

Thank You

NY-BEST Capture the Energy
2021Conference
June 22-24, 2021

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www.ny-best.org

Storage Hosting Capacity Maps

- 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.
- The JU will schedule a second stakeholder meeting in the Fall as part of the roadmap development process.
- Similar to the solar PV hosting capacity maps, data validation and QA/QC are a major priority.
- Important to have interconnection processes and requirements inform the hosting capacity analysis.

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.

Draft Storage Hosting Capacity Roadmap Priorities

Initial Release ~ April 2022

- Feeder-level analysis (Min / Max)
- Focused on large, centralized systems (> 300 kW)
- All applicable system data already provided
- Rest URL access

Future Releases 2023 +

- Sub-feeder-level analysis
- Increased temporal granularity
- Additional roadmap items to be determined

Increasing effectiveness, complexity, and data requirements

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"State of DER Dashboard" Industry Initiative

Ver 2021-05-13
Overview by Industry & NYSEIA for the 13 May 2021
JU Hosting Capacity Working Group Meeting

Note: This is a summary presentation; please see original source whitepaper & more information here or on JU HCWG website.

A. Industry Position Summary

1. It is becoming increasingly challenging to connect DER to the grid, which will only increase at an increasing rate. Evidenced by closed substations and other factors.
2. Industry is concerned that we are going to effectively run out of hosting capacity far sooner than any meaningful upgrades can be made via the CLCPA processes, putting thousands of jobs and hundreds of companies at risk.
3. Baseline public metrics are essential to understanding the fundamental state of affairs and making informed decisions. Presently no NYS regional/global benchmarks are available.
4. Presently there is no ability to assess the rate of change or trending over time; we cannot even predict if/when we will run out of hosting capacity. Using rates and trending we can create a timeline and estimates for when we expect major issues to arise, and can respond accordingly.
5. We request a collaborative joint effort to produce a "State of DER Dashboard" as soon as possible. Industry requests data collection the start of Q4, 1 October 2021, published on 1 November 2021.
6. The dashboard will provide critical data to inform all stakeholders of key areas of concern, trends, rates of change, and indications whether current or planned efforts are having any objective positive benefits.

NYSEIA

B. Analogy: The current state of affairs is like a business without metrics

Imagine we are a large manufacturing company.

Management has a goal of increasing new widget production

There are many locations

And yet general management is blind to the general state of their equipment.

1. There is no public location to go to see total production across all factories
2. While you zoom in on each individual piece of equipment, of which there are literally thousands, there may be some additional capacity on each, but there is no way to know how much overall additional capacity may exist at a factory or regional level
3. Each piece of equipment is slowly losing its ability to produce widgets, but nobody is tracking how long it will be until widget production goes to zero
4. Some equipment is already shut down(!); it is unclear how many are shutdown and why
5. We are considering investment in upgrading equipment, but we cannot really tell what are the common trends
6. Existing activity is reactive, and not in a preventive/proactive

C. Key Dashboard Characteristics

1. Contains critical DER & grid metrics and benchmarks focused on hosting capacity.
2. Does not require login, allowing for ease of access for all types of stakeholders.
3. Provides "snapshots" of metrics recorded on exact dates with same interval between dates, thus allowing for tracking over time.
4. By ensuring detailed feeder/substation level data is downloadable from each utility's hosting capacity map
    a. Values can be independently verified by 3rd parties, and
    b. Advanced numerical analysis can be performed by stakeholders.
    c. (Note that this only shows current information, not trending over time, hence the need for snapshot data.)

D. Sample "State of DER Dashboard" Website

Following is a sample webpage, hosted at a central location (ex the JU or DPS website), with the following data.
Note that blue text below is explanation text and would not be on the actual webpage.

Introduction, Narrative, Definitions

- [Mathematical definition of penetration ratio]
- [Simple/clear definition of "hosting capacity" & links to same for how it is calculated]
- [Simple/clear definition of what it means to have a "closed" feeder or substation]
- [Link to definition of of standard deviation]
- [etc.]

D. Sample "State of DER Dashboard" Website

Following is a sample webpage, hosted at a central location (ex the JU or DPS website), with the following data.
Note that blue text below is explanation text and would not be on the actual webpage.

Summarized, Quarterly, Snapshot Data

DER State of the Grid as of 1 October 2021

(a new table is produced based on data as of the first day of every quarter)

(Note this is not real data)

(Continue table with other metrics as listed on the next pages)

Category	Metric	NYS Avg or Total	[Utility / Region 1]	[Utility / Region #...]
Feeder Data	Quantity of feeders	16,384	256	1,024
	Average feeder penetration ratio [& SD]	25% [9%]	13% [10%]	47% [5%]
	Average feeder hoisting capacity [& SD]	150 MW [21 MW]	108 MW [5 MW]	250 MW [13 MW]
	Percentage of feeders with PR > 90%	7%	3%	15%
	Quantity of feeders with special "closed" to DER conditions	5	0	3
	...etc	...	...	...
Substation Data	Quantity of substations	...	...	...
	...etc	...	...	...
Aggregate Data	Total Hosting Capacity	560 GW	450 GW	600 GW
	Total Solar Connected	11024 GW	160 GW	240 GW

D. Sample "State of DER Dashboard" Website

Following is a sample webpage, hosted at a central location (ex the JU or DPS website), with the following data.
Note that blue text below is explanation text and would not be on the actual webpage.

See discussion and notes regarding each value calculation, etc, in the master whitepaper or on the JU website.

Feeder Data

- Quantity of feeders
- Average penetration ratio & SD
- Average hosting capacity & SD
- Percentage of feeders with PR > 90%
- Quantity of feeders with special "closed" to DER conditions

Substation Data

- Quantity of substations
- Average penetration ratio & SD
- Average hosting capacity & SD
- Percentage of substations with PR > 90%
- Quantity of substations with special "closed" to DER conditions

D. Sample "State of DER Dashboard" Website

Following is a sample webpage, hosted at a central location (ex the JU or DPS website), with the following data.
Note that blue text below is explanation text and would not be on the actual webpage.

See discussion and notes regarding each value calculation, etc, in the master whitepaper or on the JU website.

Aggregate

- Total Hosting Capacity Avail
- Total Solar Connected

Solar by Bucket

- 0kW to 50kW
- >50kW to 5MW
- >5MW to 10MW
- >10 MW

Non-Solar

- Total Non-Solar
- ESS, Wind, Etc

Note: This is one of other related but separate data to possibly include on the dashboard. See whitepaper for more info.

IA & CESIR Fail Data
Solar or Solar+ESS

- Quantity of new applications in quarter
- Quantity of CESIR complete in quarter
- CESIR Analysis Failure Percentage for each

Select app data for other

- ESS only
- Wind
- etc.

D. Sample "State of DER Dashboard" Website

Following is a sample webpage, hosted at a central location (ex the JU or DPS website), with the following data.
Note that blue text below is explanation text and would not be on the actual webpage.

Utility/Region Narrative (if submitted)

Utility / Region 1 Notes & Commentary

(If submitted, utility would provide the latest commentary to help describe any key metrics, reasons for closed substations, or anything else that would provide meaningful insight to their data.)

Utility / Region # Notes & Commentary

(same)

D. Sample "State of DER Dashboard" Website

Following is a sample webpage, hosted at a central location (ex the JU or DPS website), with the following data.
Note that blue text below is explanation text and would not be on the actual webpage.

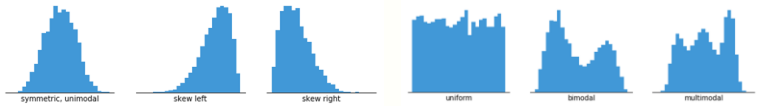
Detailed Data (available from queue & HCM's)

Please proceed to the hosting capacity map (HCM) for each utility to download complete feeder or substation data. Much of this data can be used to reproduce various metrics above using spreadsheet analytical methods. Links to each utility HCM can be found here:
https://www3.dps.ny.gov/W/PSCWeb.nsf/All/6143542BD0775DEC85257FF10056479C?OpenDocument

Additionally, master interconnection queue data can be downloaded from the DPS website here:
https://www3.dps.ny.gov/W/PSCWeb.nsf/All/286D2C179E9A5A8385257FBF003F1F7E?OpenDocument

(Ideally all of the feeder and substation data can be reproduced by downloading the full dataset from each utility's hosting capacity map. Beyond averages and standard devion, developers and others can produce advanced population analysis. Ex.)

(Note that just providing access to this data is not the same as the snapshot summarized data. Among other reasons, this data will only provide information based on the last HCM refresh, and does not show trending over time.)



E. Additional Information Available on Whitepaper

More information on the below topics is available on the source whitepaper & more information here or on JU HCWG website.

1. Additional "use case" information
2. Comparison of this initiative with the NYSERDA IEDR initiative, and why they should be pursued separately.
3. Discussion about why it may be good to incorporate CESIR Analysis Fail Data, and other items, that are not directly derived from hosting capacity map data.
4. Reference information on existing/currently "Closed Substations".
5. Sample/Reference analysis following a download of National Grid substation information.

F. Implementation & Requested "Next Steps"

1. **Start date** - Industry requests a 1 November 2021 launching of the website, using 1 October 2021 data.
2. **Focus Group** - Start a focus group as soon as possible that meets every other week to make decisions and track progress.
3. **Hosting location** - What is the preferred location to host the dashboard? Note that queue data is already published on the DPS website. What entity will take responsibility for (a) collection, (b) webmaster services.
4. **Frequency** - Industry believes quarterly is the appropriate frequency for this information.
5. **Metrics review** - Detailed discussion about each of the individual metrics, how they would be calculated, and which will be in this initial launch, vs rolled out at future dates.
6. etc.

Q&A

Appendix

Longer-term Items Requiring Further Discussion

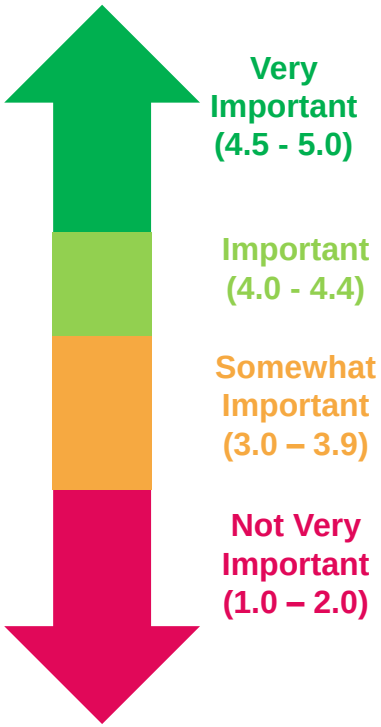
- The following items are viewed as longer-term items to continue considering in the context of the broader hosting capacity roadmap:
  - Hosting Capacity for Energy Storage
  - Hosting Capacity for Hybrid Solar + Storage
  - Upstream Substation/Bank-Level Constraints **(Progress made in Stage 3.1)**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

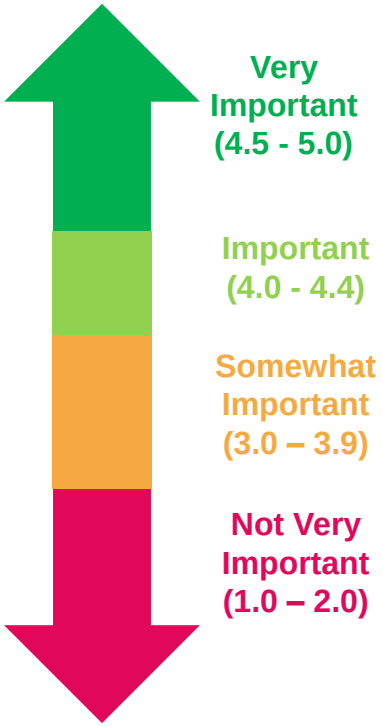


Stage 3.X Survey Prioritization (2/2)

- **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

Meeting Notes

May 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
Available Reference Materials	Stakeholders requested confirmation if there was a single location where certain policies or updates are captured.	The JU confirmed the existing "Reference Materials" slide deck is where this information is captured. The JU will update the current version with the latest policy announcements and updates, such as the REST URL functionality and analysis refresh rate changes.

May 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
ESRI Map Environment	Stakeholders raised the question if the JU are aware of any inconsistencies, between utilities, in the available system data and the ability to export that data.	The JU confirmed that each utility is providing the same feeder and substation-level data within the maps. Any differences between utilities in available data was a known, limited issue, as a result of map updates and has since been resolved. The JU are aware that the ESRI map environment has limitations with exportability, e.g., 1000 lines of data. The JU will review if that can be resolved within the ESRI map environment or if they can make that data more accessible by other means.
REST URL Access	Stakeholders requested clarification on when the REST URL functionality would be common to each utility, and that the JU note specific dates when referencing timelines for new functionality.	The JU confirmed that each utility will provide REST URL access by June 1. The JU will be more mindful of messaging when certain functionality is available when referencing specific dates.

May 2021 Stakeholder Webinar Overview

Topic	Discussion Points	Follow-ups
Energy Storage Hosting Capacity Roadmap	Stakeholders requested that any future meetings, focused on the energy storage roadmap, be held sooner rather than later. Stakeholders expressed their interest in providing input to JU roadmap as part of that process.	The JU currently are planning to hold another stakeholder meeting, later this year in the Fall. The JU will review if this meeting should be moved up to the July/August timeframe, or if a separate additional stakeholder meeting focused on this topic is warranted.
State of DER Dashboard	Stakeholders requested the JU review their presentation on a potential "Dashboard" to include as part of the hosting capacity maps. Stakeholders requested a sub-group focused on this effort be set up to meet the requested November 2021 timeline.	The JU will review stakeholders' request for the proposed dashboard and will follow-up with the lead stakeholders on this effort. As part of that determination, the JU will review the need for a sub-group or if this request can be addressed via the existing process/forum.