



# JOINT UTILITIES OF NEW YORK

## Hosting Capacity User Reference Materials

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March 2020

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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](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](mailto:info@jointutilitiesofny.org)*



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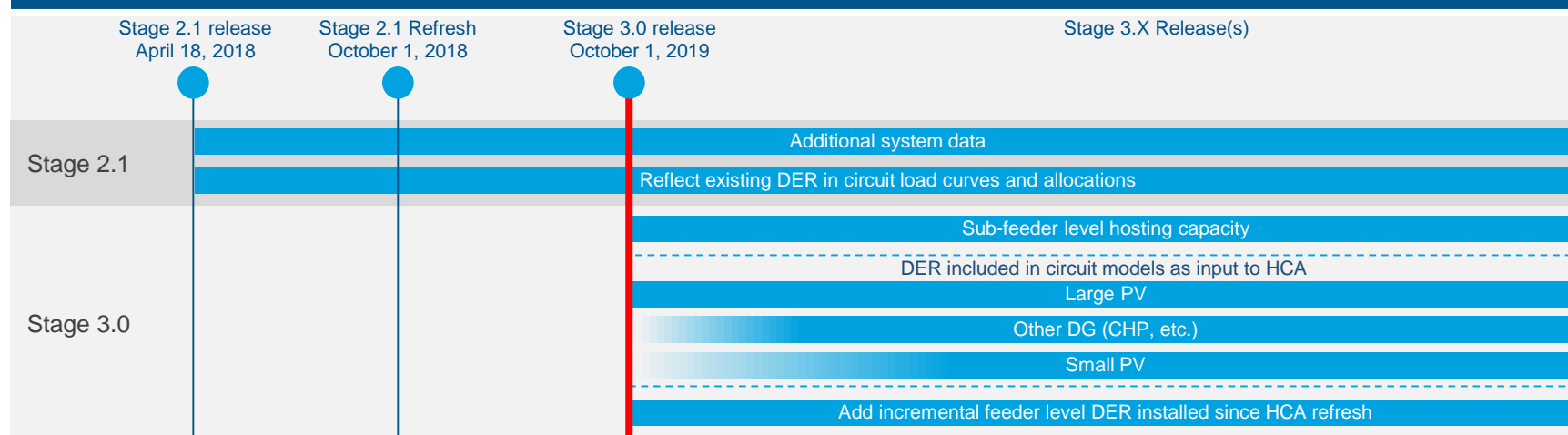
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# Stage 3.0 Release Notes

- The major enhancements made in Stage 3 are focused on including existing DER in the analysis and providing sub-feeder level hosting capacity.
  - Existing DER are reflected in the circuit load curves and load allocations. Stage 3 will now include solar PV and other installed DG as an explicit input into the hosting capacity analysis.
  - The hosting capacity displays will now include sub-feeder level hosting capacity. The new sub-feeder level granularity will be based on the heat mapping breakpoints and will be referred to as the “Local Hosting Capacity for PV” when line segments are selected in the displays.
  - The data pop-ups will be updated to include a “Local Hosting Capacity for PV” tab for the sub-feeder level line segments, as well as add the “DG Installed Since HCA” at the substation/bank level.

## JU Hosting Capacity Analysis Roadmap

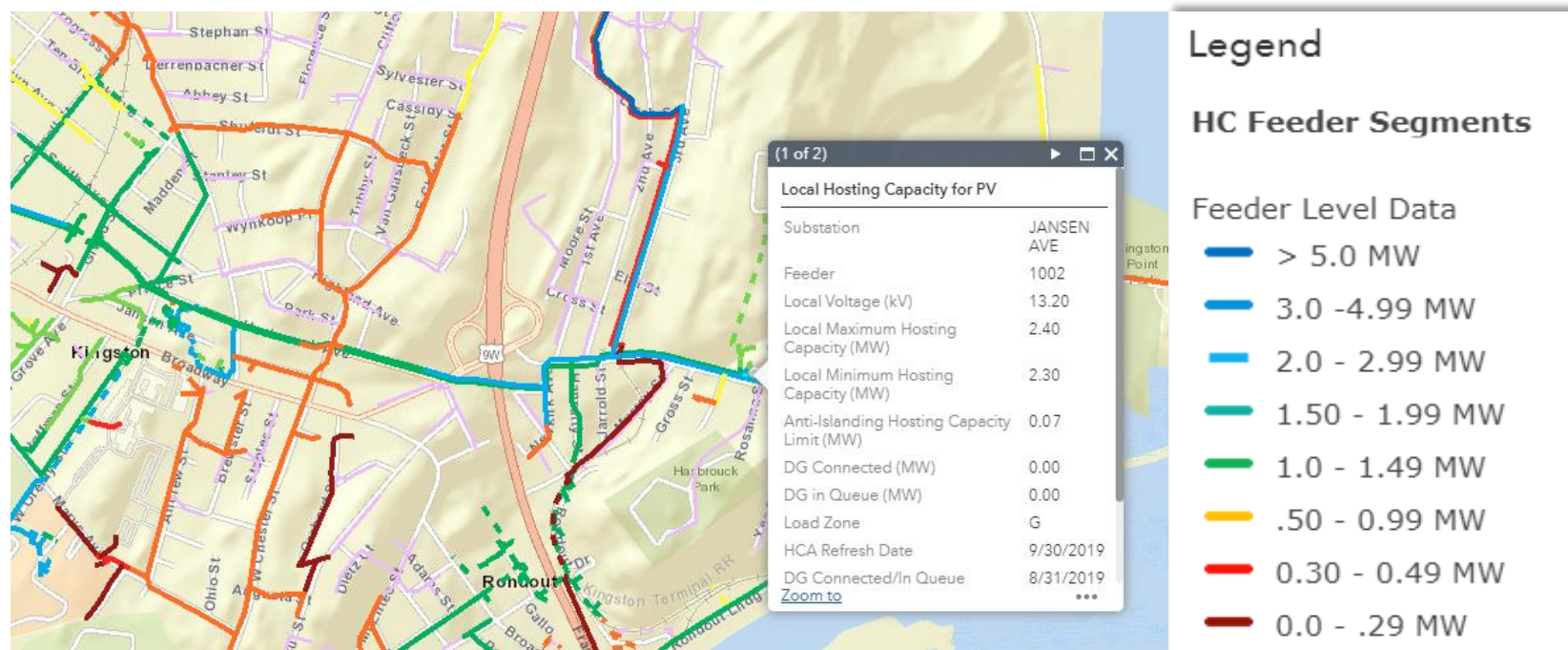


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# Hosting Capacity Heat Maps for Centralized PV

- Heat maps of the gross hosting capacity by feeder calculated using large centralized solar PV scenarios. Stage 3.0 provides more location-specific sub-feeder level information by displaying the local hosting capacity across a feeder.



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# Hosting Capacity Feeder Level Pop-up Definitions

**Substation/Bank:** The substation that the selected feeder is connected to. Substations with a normally open bus tie include an additional qualifier to note each transformer bank e.g. Substation-1, Substation-2.

**Feeder:** The number that National Grid uses to identify the selected circuit.

**Local Voltage kV:** Voltage level of the selected line segment.

**Local Maximum Hosting Capacity:** Maximum Hosting Capacity value of the selected line segment.

**Local Minimum Hosting Capacity:** Minimum Hosting Capacity value of the selected line segment.

**Load Zone:** NYISO Load zone and/or utility load zone when applicable.

**Anti-Islanding Hosting Capacity Limit (MW):** Circuit hosting capacity according to the anti-islanding hosting capacity criteria used (67% of the light load recorded at the feeder head).

**Feeder DG Connected (MW):** The aggregated DG that is currently connected on the selected feeder.

**Feeder DG in Queue (MW):** The aggregated DG that is currently in the interconnection process on the selected feeder.

**Feeder DG Connected Since Last HCA Refresh (MW):** The aggregated DG that has been connected on the selected feeder since the listed HCA refresh date.



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# Hosting Capacity Substation Level Pop-up Definitions

**Substation/Bank:** The substation that the selected feeder is connected to. Substations with a normally open bus tie include an additional qualifier to note each transformer bank e.g. Substation-1, Substation-2.

**Substation/Bank – Installed and Queued DG:** This value separately represents the installed and queued DG at the substation level.

**Substation/Bank – Total DG:** This value represents total installed and queued DG at the substation level.

**DG Connected/In Queue Refresh Date:** “MM/DD/YYYY” formatted date of last DG data refresh.

**Substation DG Connected Since Last HCA Refresh (MW):** The aggregated DG that has been connected on the selected feeder since the listed HCA refresh date.

**Substation/Bank – Peak Load:** Substation peak load will be based on a historic year and that the year for which the data is provided will be annotated in data entry identifier for that line (e.g. “2017 Substation Peak (MW)”)

**Substation Backfeed Protection :** This value is to note if the substation has 3V0 protection:

- **Yes** - An interconnection study and the required upgrades (3V0) has been completed or constructed such that 3V0 is not needed.
- **Pending** - An interconnection study has been completed and the required upgrades are scheduled for construction
- **No** - An interconnection study has NOT been completed; An interconnection study has been completed; 3V0 was required for that installation but was not implemented (developer dropped the proposal); Current status unknown (e.g. records incomplete, etc.)



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# Stage 3.0 Data Pop-up Additions

(1 of 2)

Feeder Level Data	
Substation	ELSMERE
Master CDF	36_30_40771
Anti-Islanding Hosting Capacity Limit (MW)	0.48
Local Voltage (kV)	4.80
Local Maximum Hosting Capacity (MW)	3.67
Local Minimum Hosting Capacity (MW)	3.05
DG Connected (MW)	0.12
DG in Queue (MW)	0.01
LOAD ZONE	F-4
HCA Refresh Date	September 9, 2019
DG Connected/In Queue Refresh Date	September 9, 2019
DG Installed Since Last HCA Refresh (MW)	0.50

Zoom to

(1 of 2)

Substation Level Data: ELSMERE	
Substation/Bank Name	ELSMERE
Substation/Bank Installed DG (MW)	0.17
Substation/Bank Queued DG (MW)	0.01
Substation/Bank Total DG (MW)	0.18
2018 Substation/Bank Peak (MW)	4.90
Substation Backfeed Protection	No
DG Connected/In Queue Refresh Date	September 9, 2019
HCA Refresh Date	September 9, 2019

Zoom to



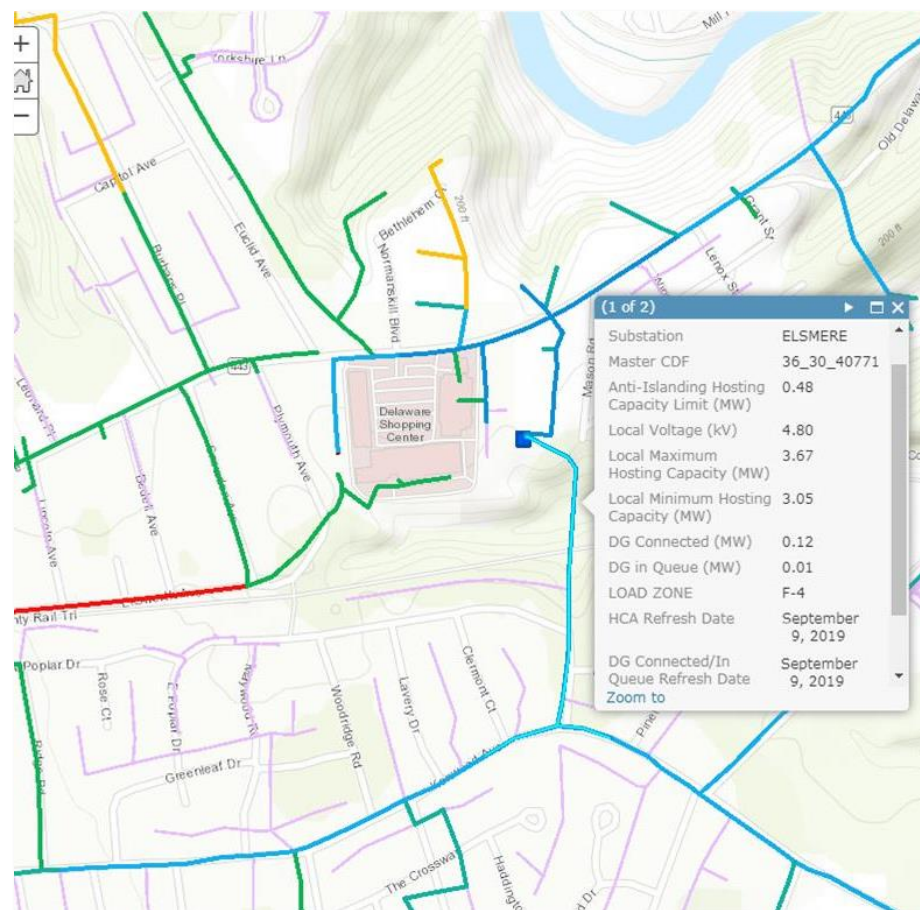
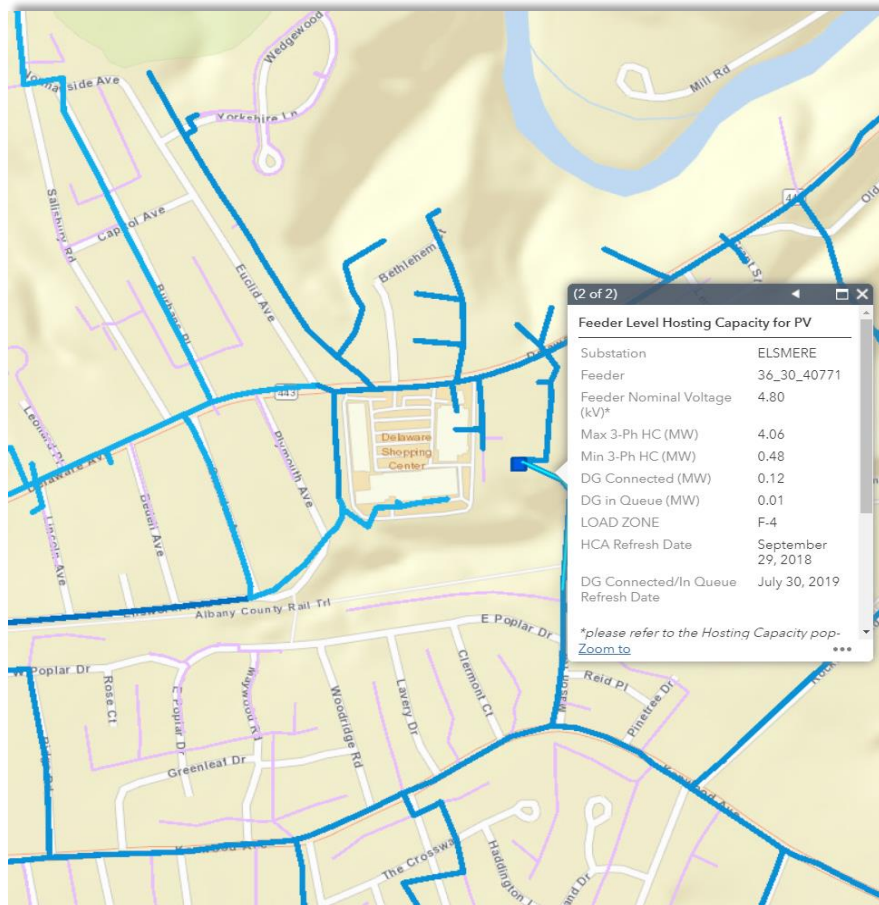
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Stage 3.0 Data Item

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# Hosting Capacity Maps – Stage 2 VS. Stage 3



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# 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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# Voltage Evaluation Criteria Settings and Thresholds

**Primary Over-Voltage** – Used to identify potential over-voltage conditions during light load conditions as a result of excess distributed generation. Feeder voltage limit at any node to be evaluated at the recommended threshold consistent with the ANSI C84.1 limits for over-voltage violations (1.05 Vpu voltage magnitude).

**Primary Under-Voltage** – Used to identify potential under-voltage conditions during peak load conditions as result of DER increasing the distribution load. Feeder voltage limit to be evaluated at the recommended threshold consistent with the ANSI limits for under-voltage violations (.95 voltage magnitude).

**Primary Voltage Deviation** – Used to identify power system criteria violations as a result of fluctuating DER generation or demand. Change in voltage from no DER to full DER at any node to be evaluated with the recommended allowable fluctuation of 3% voltage change.

**Regulator Voltage Deviation** – Used to identify power system criteria violations as a result of fluctuating DER generation or demand in conjunction with the operation of voltage regulation equipment. Change in voltage from no DER to full DER at a regulated node to be evaluated on voltage fluctuation within 50% of the set bandwidth at regulators.



# Thermal Evaluation Criteria Settings and Thresholds

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**Thermal for Charging (Demand)** – Used to identify thermal violations as a result of an increase in loading from DER. This criteria was excluded from Stage 3, as it is only applicable to DER that increase the system loading e.g. energy storage during charging and therefore is not be applicable to solar PV. The remaining capacity at peak loading for any element should be evaluated at the recommended threshold of not to exceed 100% of the normal rating.

**Thermal for Discharging (Generation)** – Used to identify thermal violations as a result of an increase in generation from DER. The minimum loading any element plus the additional generation should be evaluated at the recommended threshold of not to exceed 100% of the normal rating.



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# Protection Evaluation Criteria Settings and Thresholds

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**Unintentional Islanding\*** - Used to identify protection violations caused by DER sustaining an island on the distribution system in the event of a service interruption. This criteria provides a more conservative approach to minimum daytime loading than the reverse power flow criterion. The element minimum loading should be evaluated in relation to DER size to not exceed 67% of minimum loading as a proxy for the Sandia screens in the SIR. This criteria is only to be evaluated at the feeder head, and only to be applied in the minimum hosting capacity value calculations. See Differences of Approach between Utilities for more details.



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# FAQs

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## **What is hosting capacity and how can I use the displays in that context?**

Hosting capacity is an estimate of the amount of DER that may be accommodated without adversely impacting power quality or reliability under current configurations and without requiring infrastructure upgrades. The analyses presented in these displays provide the sub-feeder level hosting capacity for the distribution circuits evaluated. The displays can be used to help solar PV project development by giving an indication of each circuit's hosting capacity and its relevant characteristics.

## **Is the hosting capacity analysis performed for both radial and network feeders?**

The feeders represented in the hosting capacity maps for NYSEG/RG&E, National Grid, Orange and Rockland, and Central Hudson are for radial feeders only. Con Edison provides hosting capacity maps for both radial and network feeders.



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# FAQs

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## **Which DER types are included in the analysis?**

The analysis criteria are focused on large solar PV systems with an AC nameplate of 300 kW or greater. Existing interconnected DER (including other technologies such as storage, CHP, and smaller solar interconnection), are included as inputs to the underlying circuit models the analysis was conducted for.

## **How can I determine how much DER has been interconnected after the analysis has been performed and thus is not included?**

Within the pop-up, the line item “DG Installed Since Last HCA Refresh” provides the megawatt value of DG installed since the hosting capacity was conducted.



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# FAQs

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## **What is the difference between the maximum and minimum hosting capacity?**

The maximum and minimum hosting capacity is representing the range of available hosting capacity on each line section. The maximum hosting capacity is typically at the most upstream location of the highlighted line section (the section closest to the substation). The minimum hosting capacity is typically at the most downstream location of the highlighted line section (the section closest to the end of the circuit).

## **How often is the data refreshed?**

Data on the installed and queued DER located in the pop-ups is refreshed on a monthly basis. The hosting capacity analysis and corresponding maximum and minimum hosting capacity values are currently refreshed on an annual basis. The corresponding refresh date for each of the aforementioned items is included in the data pop-ups for reference.



# FAQs

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## **What is meant by Load Zone within the pop-up display?**

This represents the load zone for the NYISO. A map of the NYISO's load zones can be found by clicking [here](#). Depending on the utility, the geographic areas may be further broken apart by sub-zone which are sub-territories of the NYISO load zones.

## **What granularity are the maps displayed at?**

The circuit's (or feeder's) hosting capacity is being displayed at a sub-feeder level. The sub-feeder line sections are delineated according the heat mapping breakpoints. For example, a circuit with a max hosting capacity of 5 MW and minimum hosting capacity of 1.50 MW will be displayed in four separate line sections according the heat mapping breakpoints. Whereas, a circuit with a max hosting capacity of 5 MW and a minimum hosting capacity of 50 kW will be displayed in six separate line sections according the heat mapping breakpoints.



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# FAQs

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## **Why does the local voltage not match with the reported substation distribution voltage?**

It can be common to have step-down banks on distribution feeders that decrease the voltage from one-line section to another. For example, the voltage at the substation and initial run of the circuit may be 12 kV whereas after the step-down bank the circuit operates at 4 kV. The local voltage was added to help provide that additional clarity when circuit characteristics change along a feeder.

## **What is anti-islanding hosting capacity?**

The circuit hosting capacity according to the anti-islanding hosting capacity criteria used which represents 67% of the light load recorded at the feeder head. This criterion is used in the analysis but is ultimately not used in the heat mapping displays, hence it's inclusion as a separate item in the data pop-ups.



# FAQs

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## How can I identify the attribute table in the displays?

The attribute table can be accessed by clicking on the tab at the bottom of the display. Once the attribute table is open, the user can export the results as a .csv for the entire system or only for those locations currently being displayed. Screenshots are included in the following slides to help provide additional context.



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# Accessing the Attribute Table

National Grid New York System Data Portal

Introduction Company Reports Distribution Assets Overview **Hosting Capacity** NWA LSRV/VDER

Hosting Capacity with Web AppBuilder for ArcGIS

Esri World Geocoder

Click on the tab to bring up the attribute table

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Esri, HERE, Garmin, FAO, USGS, EPA, NPS | IMAP Admin | Joshua Carver-Brown

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# Downloading Data

**National Grid New York System Data Portal**

Introduction Company Reports Distribution Assets Overview **Hosting Capacity** NWA LSRV/VDER

Hosting Capacity with Web AppBuilder for ArcGIS

Esri World Geocoder

Go to options:  
Export All to CSV

Feeder Level Data 3 Phase (MW) Substation Level Data 3 Phase (MW)

Options Filter by Map Extent Zoom to Clear Selection

Show Selected Records  
Show Related Records  
Filter  
Show/Hide Columns  
**Export All to CSV**

Feeder	Feeder Non (kW)*
36_38_29557	13.20
36_01_12161	4.80
124 ALMEDA AVE 36_01_12462	4.16
124 ALMEDA AVE 36_01_12463	4.16
124 ALMEDA AVE 36_01_12464	4.16

Load Zone	DG Connected/In Queue Refresh Date	HCA Refresh Date
F-4	December 29, 2019	September 30, 2019
A-1	December 29, 2019	September 30, 2019
A-1	December 29, 2019	September 30, 2019
A-1	December 29, 2019	September 30, 2019



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# Filtering by Map Extent

National Grid New York System Data Portal

Introduction Company Reports Distribution Assets Overview **Hosting Capacity** NWA LSRV/VDER

Hosting Capacity with Web AppBuilder for ArcGIS

Esri World Geocoder

“Filter by Map Extent” will make the attribute table display only the data currently geographically visible to the user

Feeder Level Data 3 Phase (MW) Substation Level

Options Filter by Map Extent Zoom

Substation	Feeder
TULLY CENTER	36_12_27851
TULLY CENTER	36_12_27852
TULLY CENTER	36_12_27853

Feeder DG Connected Since Last HCA Refresh (MW)

Feeder DG Connected Since Last HCA Refresh (MW)	Load Zone	DG Connected/In Queue Refresh Date	HCA Refresh Date
0.00	C-2	December 29, 2019	September 30, 2019
0.00	C-2	December 29, 2019	September 30, 2019
0.00	C-2	December 29, 2019	September 30, 2019



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