DER Interconnection Workshop

Welcome

Thursday September 5, 2019

Orange & Rockland

DER Interconnection Workshop

- **Welcome and Introduction** - Aaron Anaya, Section Manager
- **PowerClerk and Interconnection Application** – Meghan Carrero, Specialist
- **Let's Get Technical** – Ori Shmul, Principal Engineer and Doug Savino, Senior Engineer
- **Non Wires Alternative (NWA)** – MD Nazmus Sakib, Section Manager
- **New Business and Construction Upgrades** – Jonathan Escobar, Major Accounts Engineer
- **DG Protection** – Renjini Joseph, Principal Engineer
- **Hosting Capacity Maps** – Brandon Peifer, Engineer
- **Rates and Value Stack** – Debbie Sassoon, Project Specialist
- **Closing Remarks** – Kristen Barone, Section Manager

DER Interconnection Workshop

- PowerClerk and Interconnection Application

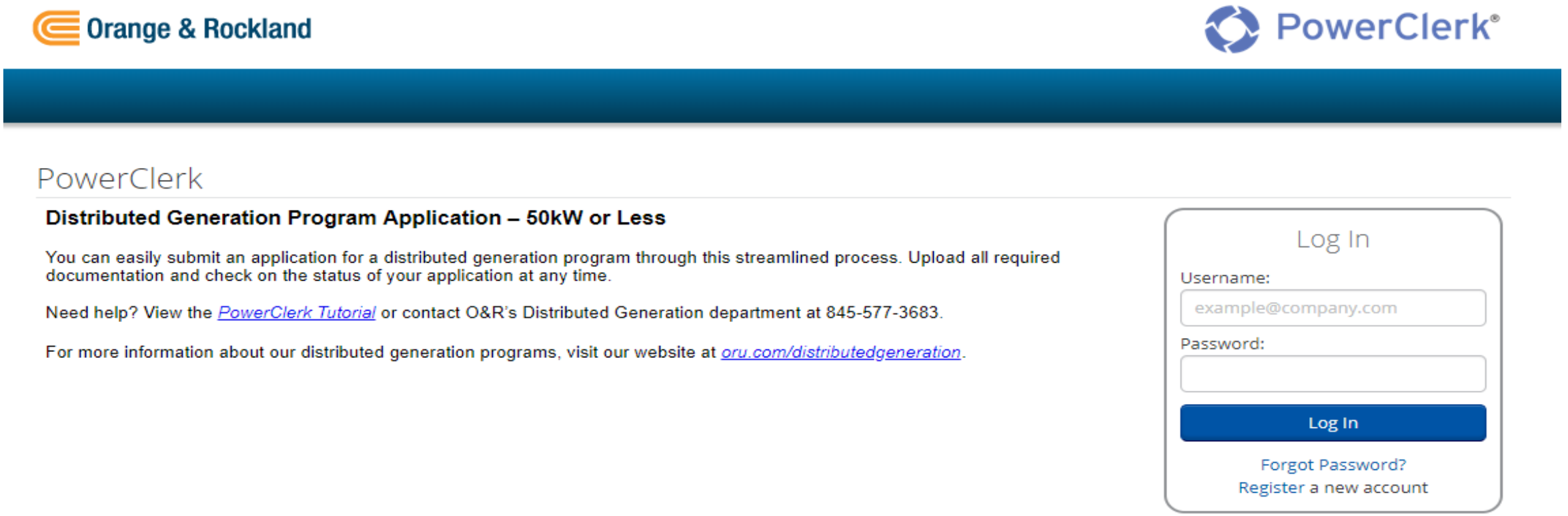
- Meghan Carrero
- Specialist
- Technology Engineering Department

Number of PV Installations by State			
8/31/2019	NY	NJ	Total
Total # of installations	7534	717	8251
Total # proposed	535	137	672
Grand Total of Active Projects	8069	854	8923

PV Installations MW capacity by State			
8/31/2019	NY	NJ	Total
Total MW's installed	92.4	22.8	115.2
Total MW's proposed	110.2	5.0	115.2
Grand Total of Active Projects	202.6	27.9	230.5

O & R Energy Storage System (ESS)						
8/31/2019	New York		New Jersey		Total	
	#	MW	#	MW	#	MW
Total Installations	56	.46	6	.08	62	.53
Total Installations in Queue	45	146.46	7	.13	52	146.59

Interconnection Application Process



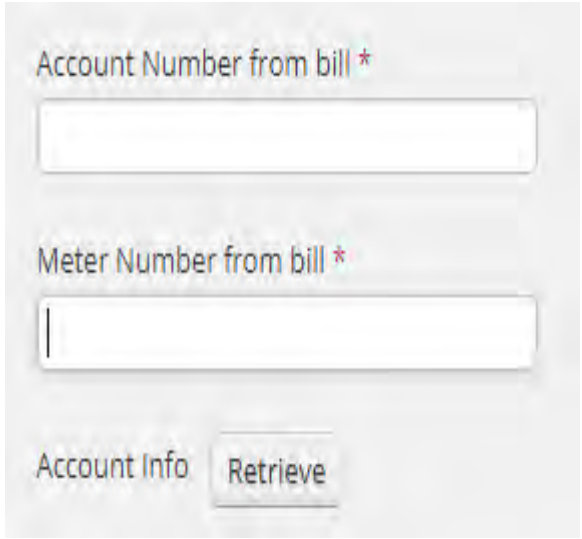
- Orange and Rockland – Community DG
- Rockland Electric Company – DG Interconnection

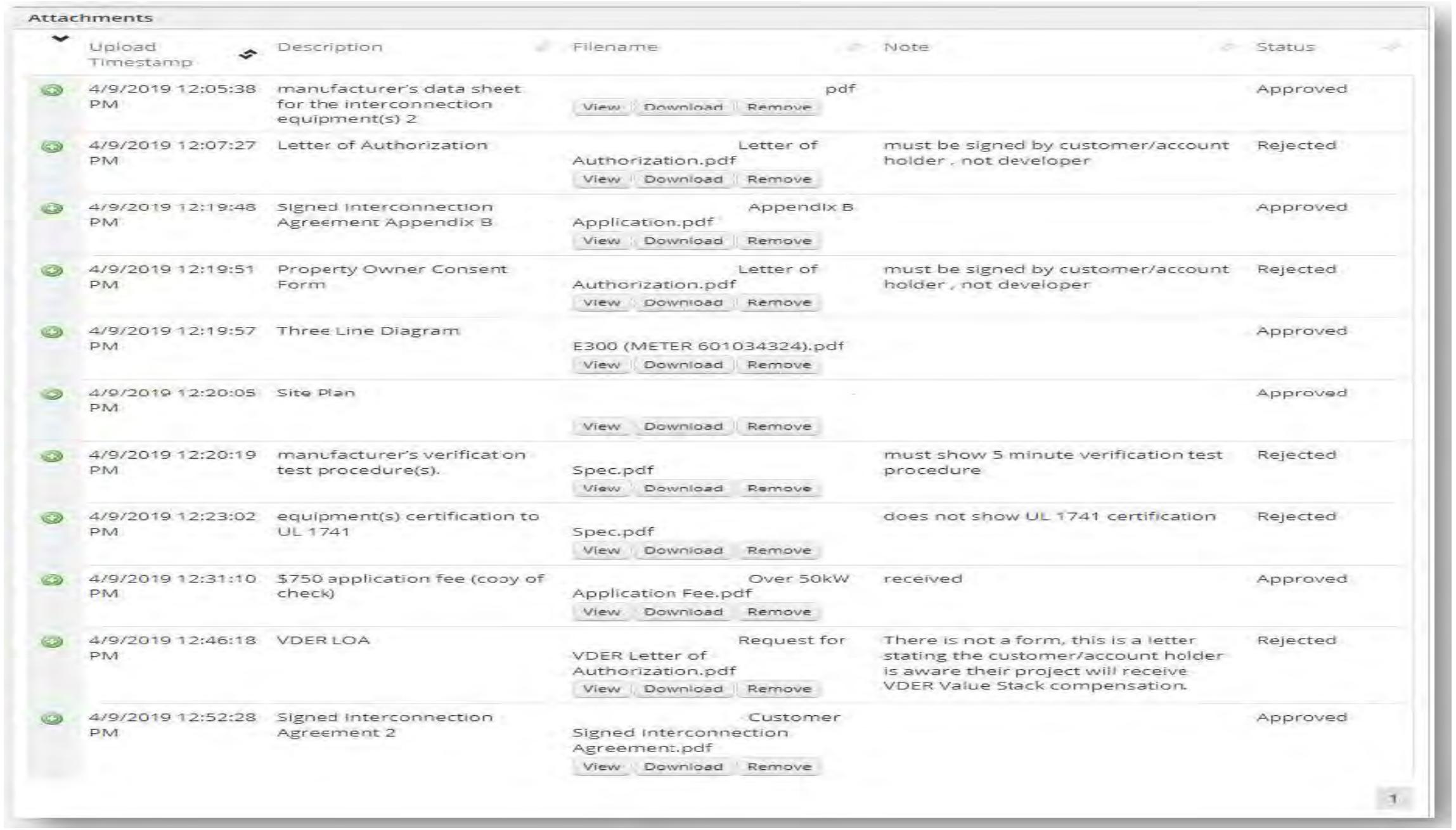
Submit Your Application

- Required documents are listed in Appendix F in the Standardized Interconnection Requirements (SIR)
- Separate Applications required for each technology/energy source
- Greater than 50kW and CDG programs require $750.00 fee
- Rockland Electric Company (NJ)
    - Level 2 - $50.00 + $1.00 x AC kW
    - Level 3 - $100.00 + $2.00 x AC kW

Review Process

- 10 business days for processing
- All documents must match account holder information
- All documents must match online application





Attachments

Upload Timestamp	Description	Filename	Note	Status
4/9/2019 12:05:38 PM	manufacturer's data sheet for the interconnection equipment(s) 2	pdf View Download Remove		Approved
4/9/2019 12:07:27 PM	Letter of Authorization	Letter of Authorization.pdf View Download Remove	must be signed by customer/account holder , not developer	Rejected
4/9/2019 12:19:48 PM	Signed Interconnection Agreement Appendix B	Appendix B Application.pdf View Download Remove		Approved
4/9/2019 12:19:51 PM	Property Owner Consent Form	Letter of Authorization.pdf View Download Remove	must be signed by customer/account holder , not developer	Rejected
4/9/2019 12:19:57 PM	Three Line Diagram	E300 (METER 601034324).pdf View Download Remove		Approved
4/9/2019 12:20:05 PM	Site Plan	View Download Remove		Approved
4/9/2019 12:20:19 PM	manufacturer's verification test procedure(s).	Spec.pdf View Download Remove	must show 5 minute verification test procedure	Rejected
4/9/2019 12:23:02 PM	equipment(s) certification to UL 1741	Spec.pdf View Download Remove	does not show UL 1741 certification	Rejected
4/9/2019 12:31:10 PM	$750 application fee (copy of check)	Over 50kW Application Fee.pdf View Download Remove	received	Approved
4/9/2019 12:46:18 PM	VDER LOA	Request for VDER Letter of Authorization.pdf View Download Remove	There is not a form, this is a letter stating the customer/account holder is aware their project will receive VDER Value Stack compensation.	Rejected
4/9/2019 12:52:28 PM	Signed Interconnection Agreement 2	Customer Signed Interconnection Agreement.pdf View Download Remove		Approved

1

Net Meter

- Net meter request submitted at time of Conditional Approval
- Any meter condition issues must be resolved through New Business – require a service upgrade application and cut-in card
- AMI meters do not need to be changed, will be reprogrammed at PTO
- Net meter status in PowerClerk updated within 10 business days of request

Payments

Application Fees, Engineering Studies, Construction Costs, Refunds

- Payments must be made via check or wire
- Must reference PowerClerk project number
- Due dates are based on SIR guidelines, no exceptions
    - CESIR Study – 30 business days from date of quote
    - 25% construction payment – 90 business days from date of CESIR Study results
    - 75% construction payment – 120 business days from date of 25% payment
- Invoices take 4-6 business days to be issued
- Refund requests take 4-6 weeks to be issued

Material Modifications

- Final guidelines should be issued in September 2019
- Will require new form to be submitted for an application/project and processing time
- If change is deemed material, will require new application

Website and Contact Information

Technology Engineering Department

www.ORU.com/solar

ORU_DG@oru.com

845-577-3683

DER Interconnection Workshop

Let's Get Technical

Discussion of Studies for the Connection of Distributed Energy Resources

Ori Shmul – Principal Engineer

Doug Savino – Senior Engineer

Technology Engineering Department

Key Points

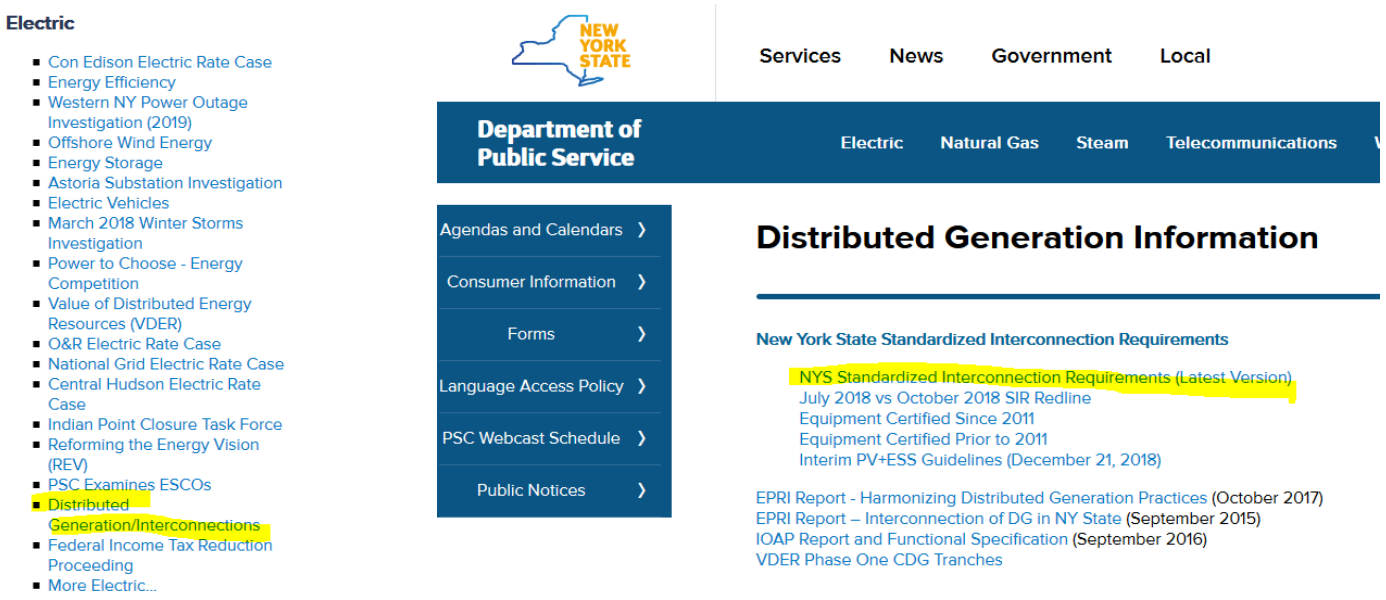
- What are Distributed Energy Resources
- Our Guides: the New York State Standardized Interconnection Requirements (NYSIR) & N.J.A.C 14:8-5.1 (New Jersey Administrative Code: Interconnection of Class 1 Renewable Energy Systems)
- Focus on project size > 50kW(AC) for NY and > 10kW(DC) for NJ
- Why we need analyses and studies
- Description of NYSIR Preliminary & Supplemental Screening Analysis
- Description of NJAC Level 2 Initial Interconnection Review (C-K)
- Description of Coordinated Electric System Interconnection Review (CESIR)
- Review NYSIR Section II Interconnection Requirements
- Review Deadlines for NY
- Provide some useful links

What Are Distributed Energy Resources (DERs) ?

- Also referred to as Distributed Generation (DG)
- Examples of Distributed Generation
  - Photovoltaic (PV) = Solar Electric
  - Battery Energy Storage Systems (BESS)
  - Combined Heat & Power (CHP)
  - Electric Vehicles (discharging)
  - Wind Generators
  - Hybrid Solar & Battery

What Is The NYSIR ?

- Guidebook = NYS Standardized Interconnection Requirements
- http://www.dps.ny.gov/



What Is N.J.A.C 14:8-5.1 ?

- New Jersey Administrative Code for Public Utilities “interconnection requirements” of Class 1 Renewable Energy Systems (Solar, Wind, Biomass)
- Level 2 (>10kWdc) Initial Review screening process is similar to the NYSIR >50kWAC
- Different timelines
- “Additional Review” = CESIR

Focus Of This Presentation—NY DG Applications between 50kW & 5MW

TABLE OF CONTENTS

NY Applications:
Systems between 50kWac-5MWac (NY)

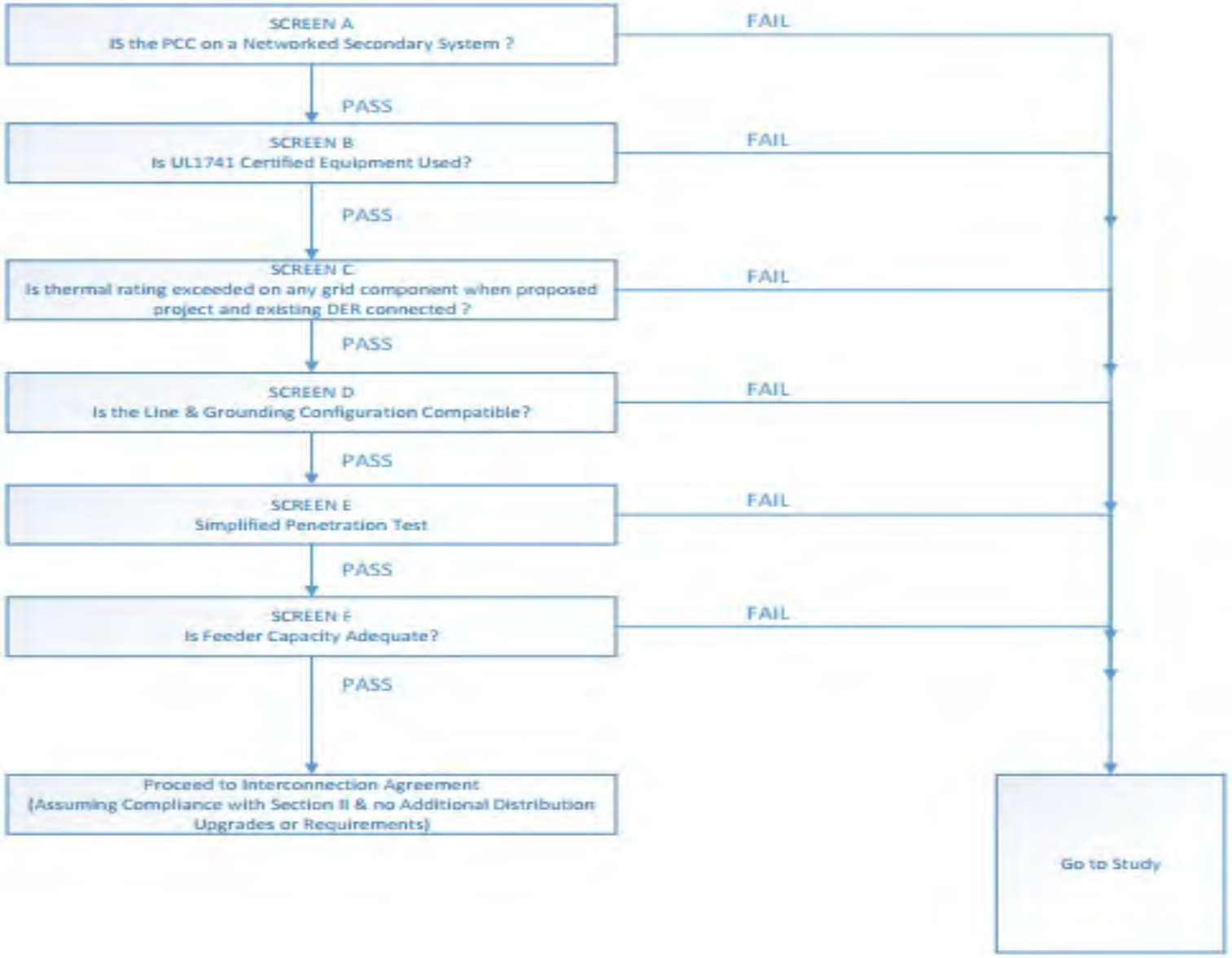
- NYSIR Section 1C – Step 4
  - Preliminary Screening Analysis
  - Supplemental Screening Analysis
  - Coordinated Electric System Interconnection Review (CESIR)

STEP 4: **Utility Performs Preliminary / Supplemental Screening Analysis and Develops a Cost Estimate for the Coordinated Electric System Interconnection Review (CESIR) if required**

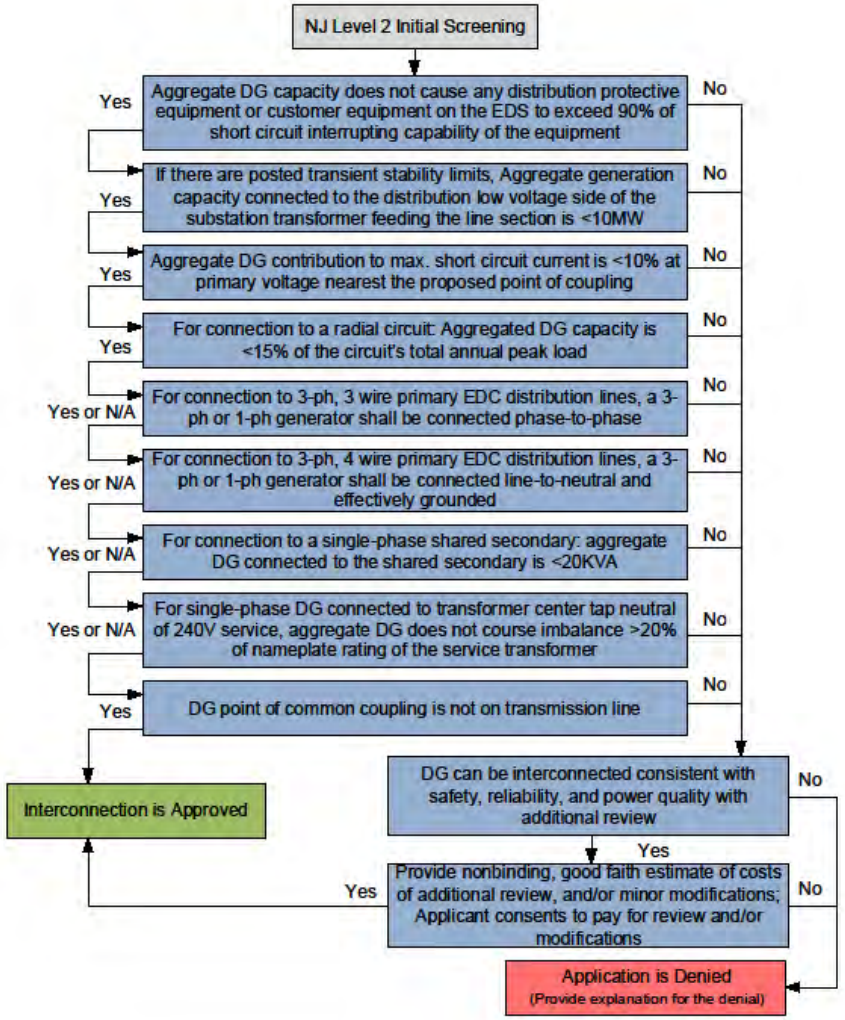
Why Do We Need Studies?

- Prevent Adverse Effects to Our Customers
  - Flicker
    - Noticeable irritation due to change in lighting
  - Customer voltage outside of the range of 114VAC to 126VAC
    - American National Standards Institute C84.1 Range A Service Voltage
  - Thermal damage to electrical equipment
    - Exceeding ampacity

NY Preliminary Screening Analysis



NJ Interconnection Review



NY Preliminary Screen A

- Does the proposed DER system connect to a secondary network system ?
- O&R has no secondary networks, all projects will pass this screen

NY Preliminary Screen B

- Does the equipment meet Underwriters Laboratories standard 1741 SA?
- Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
  - Inverters
  - Converters
  - Charge Controllers
- UL1741 SA is based on IEEE 1547

NY Preliminary Screen C

- Is the Electric Power System Rating Exceeded?
  - Thermal capacity of any component (amperes)
    - Conductors
    - Fused Cutouts

NY Preliminary Screen D

- Any type of DER connected to a 3 phase 3 wire system will pass
- Single phase DER system connected to a 3 phase 4 wire system greater than 5 KV will pass
- All other systems:
  - To pass the aggregate DER KW must be less than or equal to 10 % of the line section peak load

NY Preliminary Screen E

- Simplified Penetration Test
  - Add up the sum distributed energy resource in KW on the circuit where the project will connect. This includes the proposed project
  - Find the peak load in KW for the sections of the circuit between the point of interconnection and an automatic sectionalizing device (i.e. MOAB, recloser, circuit breaker)
  - To pass this screen the sum of DER must be less than the 15% of the peak load of any automatic sectionalizing device

NY Preliminary Screen F

- Is Feeder Capacity Adequate for the Individual and Aggregate DER?
  - Ratio 1 >25

Calculate available short circuit current where the project will connect

Calculate the rated current of the project

  - Ratio 2 >25

Calculate available short circuit current at the substation

Calculate rated current of aggregate DER

  - If both ratios are greater than 25, projects passes this screen

Other Screening Considerations

- Substation transformer capacity
  - Similar to residential screen
  - Ensures that transformer isn’t overloaded (thermally)
  - Very expensive to upgrade

Project Passes All Preliminary Screens A Through F Then…

- To proceed to an Interconnection Agreement
  - Must Comply with Section II of the NYSIR
  - Any Distribution or Interconnection facility upgrades must be agreed to
  - Interconnection facility = utility equipment necessary to facilitate operation of the distribution generation in parallel to O&R's system

- Let's show the highlights in Section II…

Section II Of The NYSIR

Section II A. Design Requirements

- Protection & Control Equipment
  - Faults
  - Over & Under frequency events
  - Over & Under voltage events
  - As per 1547-2018
- No reconnection for at least 5 minutes
- Grounding requirements
- Inverter requirements
- Synchronous & Induction Generator requirements
- Metering

Section II B. Operating Requirements

- 24 hour contact
- Settings changes
- No islanding
- Password protection of settings
- Disconnect switch – systems > 25KW
- Utility contact person
- System modifications after installation

Section II C. Dedicated Transformer

- O&R reserves the right to require a dedicated transformer for interconnection. It may or may not be required.
  - Depends on site conditions
  - Enhance safety
  - Prevent detrimental effects

Section II D: Disconnect Switch

- Systems larger than 25KW
- Rated for voltage & current and basic insulation level requirements
- Meet applicable requirements of UL,ANSI and IEEE standards
- Meet all applicable building codes
- Clear marking “Generator Disconnect Switch”
- Approved location
- Lockable

Section II E,F,G:

- E. Power Quality
  - Conform to Institute of Electrical and Electronics Engineers (IEEE) Standard 1453
  - Recommended Practice for Analysis of Flicker
  - Any mitigations at generator owner's expense
- F. Power Factor
  - Average Power must be greater than 0.9
  - Mitigation will be at generator owner's expense
  - Mitigations must be approved by O&R
- G. Islanding
  - Unintentional Islanding must be prevented
  - System must disconnect during a utility outage

Section II H, I, J:

- H. Equipment Certification
  - Comply with Underwriter's laboratory 1741 SA
- I. Verification Testing
  - Verify equipment operates as designed
  - Protection settings meet NYSIR requirements
  - Utility reserves right to witness any testing
- J. Interconnection Inventory
  - Utility will manage the queue of projects

If The Project Fails Any Of The Preliminary Screens…

- Failing just one screen from A through F
- At this point there are 3 alternatives to proceed:
  - Alter System Size to mitigate any failed screens
  - Request Supplemental Screening Analysis
    - Screens G,H,I
- Skip Supplemental Screening & proceed to a Coordinated Electric System Interconnection Review (CESIR)

Supplemental Screen G

- Supplemental Penetration Test
  - Add up the sum DER in KW on the circuit where the project will connect. This includes the proposed project
  - Find the minimum load in KW for the sections of the circuit between the point of interconnection and an upstream automatic sectionalizing device (i.e. MOAB, recloser, circuit breaker)
  - To pass this screen the sum of DER must be less than the minimum load of any automatic sectionalizing device
  - Otherwise *a reverse flow at light load would exist when all the DER is at full rated output*.

Supplemental Screen H

- Voltage Flicker Test
  - Calculate short term flicker Pst based on Section 7.1 of IEEE 1453-2015 for Short Term Flicker Severity (PST)
  - PST must be less than 0.35
- Sum of existing DER and proposed project does not cause voltage outside of range of 114v to 126v at the metered point of service or 118v to 126v at the Substation bus or Substation distribution transformer terminals.
- A 75% drop in the power output of existing DER and the proposed project does not cause a voltage change of more than 2 volts (typical ½ band) AC for any voltage regulating device.

Supplemental Screen I

- Unintentional Islanding (Sandia Screens)
- Check effective grounding
- Check that the short circuit interrupting capability of O&R equipment is not exceeded
- Check for device coordination issues
- Identify need for 3V0 protection/ substation backfeeding

Project Passes All Supplemental Screens G,H & I then…

- To proceed to an Interconnection Agreement
  - Must Comply with Section II of the NYSIR
  - Any Identified Distribution or Interconnection Facility upgrades must be agreed to
  - Interconnection Facility = utility equipment necessary to permit operation of the distribution generation in parallel to O&R's system
- We reviewed Section II earlier

If The Project Fails Any Of The Supplemental Screens G,H or I…

- At this point for the project to proceed:
  - O&R & the applicant must agree to any necessary modifications that can obviate the need for a CESIR. Any necessary cost estimate will be provided. This assumes the modifications have been identified.
- The applicant can also proceed to a Coordinated Electric System Interconnection Review (CESIR) if modifications were not identified in the supplemental analysis.

Coordinated Electric System Interconnection Review (CESIR) :

- What does the CESIR add that is not already in the Supplemental Screening ???
- Answer: Mitigations and Cost Estimates

Coordinated Electric System Interconnection Review (CESIR) :

- Various parameters studied to determine the violations caused by the proposed DG system
- Mitigations to allow system to interconnect—including EPS upgrades (e.g. reconductoring, substation upgrades) and/or reduction in proposed DG system
- List of items studied:
  - Voltage meets ANSI C84.1 standards
  - Voltage rise related to substation and feeder reverse power flow
  - Voltage fluctuation (and flicker)

Coordinated Electric System Interconnection Review (CESIR) :

- Exceeding Thermal Ratings
- Unintentional Islanding Risk
- Protection Device Coordination
- Effects on Ground Fault Detection
- Effective Grounding
- Need for Overvoltage Protection at the Substation
- Monitoring & Control Requirements, need for SCADA
  - Supervisory Control & Data Acquisition

Coordinated Electric System Interconnection Review (CESIR) :

- Power Factor Settings
- Mitigations
- Distribution Construction Cost Estimate
- Substation Upgrades Cost Estimate

Coordinated Electric System Interconnection Review (CESIR) :

- Examples of Mitigations (1 of 2)

Upgrade Required	Failures Addressed
Upgrading station LTC controls	Reverse power flow at substation
Upgrading station metering	Reverse power flow at substation
Installing 3V0 protection	Reverse power flow at substation
Reduce the project size to 4,000 kW and operate at 0.95 power factor (generating vars) while charging from grid.	Undervoltage and Tap Movement
Install a 900 kvar switched capacitor bank at the POI	Undervoltage and Tap Movement

Coordinated Electric System Interconnection Review (CESIR) :

- Examples of Mitigations (2 of 2)

Upgrade Required	Failures Addressed
Reconductor 524 feet of line section serving the project to 477 AAC from 1/0 ACSR	Conductor overload
Changing the winding configuration of the interconnection transformers to include NGR	Ground Fault Detection
Installing electronic recloser	Monitoring & Control
Installing primary metering cluster	Monitoring & Control
Design and Inspections	Monitoring & Control
Commissioning Time Post Installation & Monitoring	Monitoring & Control
Reclose delay	Risk of islanding

Important Deadlines For NY:

- Perform Preliminary Screening 15 business days
- Perform Supplemental Screening 20 business days
- Perform CESIR study 60 business days

Useful Links:

- NYS Department of Public Service
  - http://www.dps.ny.gov/
- O&R hosting capacity
  - https://www.oru.com/en/business-partners/hosting-capacity
- New York State Energy Research and Development Authority
  - https://www.nyserda.ny.gov/
- New Jersey Office of Clean Energy
  - www.njcleanenergy.com

Any Questions:

- Technology Engineering - Interconnection Team
  ORU_DG@oru.com
  845-577-3683
- Douglas Savino savinod@oru.com
- Ori Shmul shmulm@oru.com

Thank You !

Non Wires Alternative (NWA)

MD Nazmus Sakib

Section Manager

Utility Of The Future

Non Wires Project

What is a Non Wires Project?

- A Non Wires project is the application of Distributed Energy Resources (“DER”) or other technologies to provide a solution to an identified system constraint that would otherwise require a traditional infrastructure solution
  - Non Wires project may consist of a single, or portfolio of, DER
  - Non Wires project are market-based solutions offered by third-parties as a service to the utility

How are Non Wires Projects different than traditional solutions?

- T&D deferral
- Suitability criteria
- Reliance on third-parties/marketplace
- Benefit-Cost Analysis

O&R Non Wires Project Status

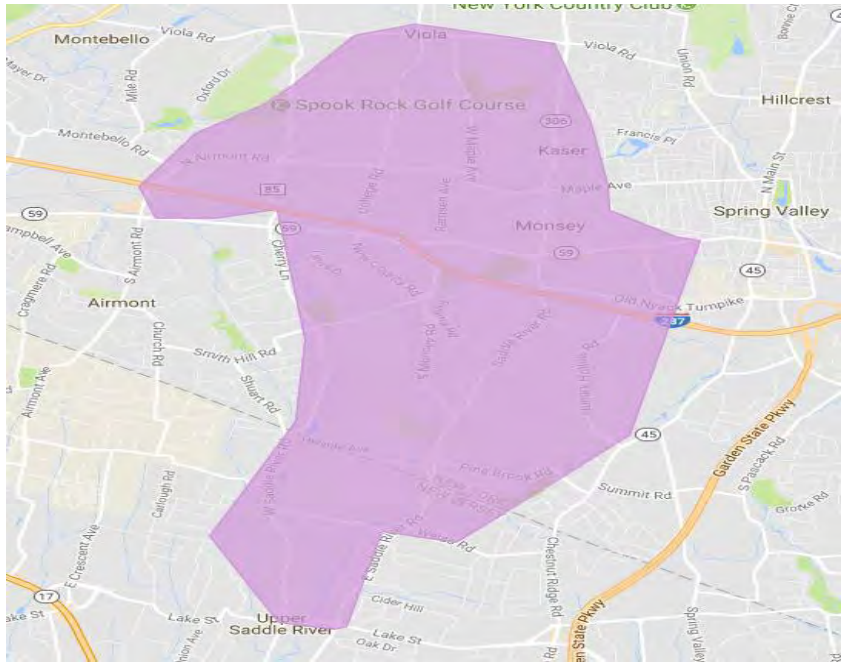
Current O&R projects

- O&R has initiated four Non Wires projects over the past 18 months
- The Monsey and Pomona projects passed BCA and are in development
- The Blooming Grove project is in the RFP process
- The West Haverstraw project did not pass the BCA and the traditional solution will be pursued

Project Name	Project Type	Required Load Relief	Need Date	Status
Monsey	Load Relief/Reliability	9-10 MW	2021	In development
Pomona	Load Relief	Up to 6 MW	2021	In development
West Haverstraw	Reliability	5 MW	2021	BCA negative
Blooming Grove	Load Relief/Reliability	15.5 MW	2021	RFP released
West Warwick	Load Relief/Reliability	7 MW	2022	Q3-2019
Mountain Lodge Park (Blooming Grove)	Load Relief/Reliability	280 kW	2022	Q4-2019

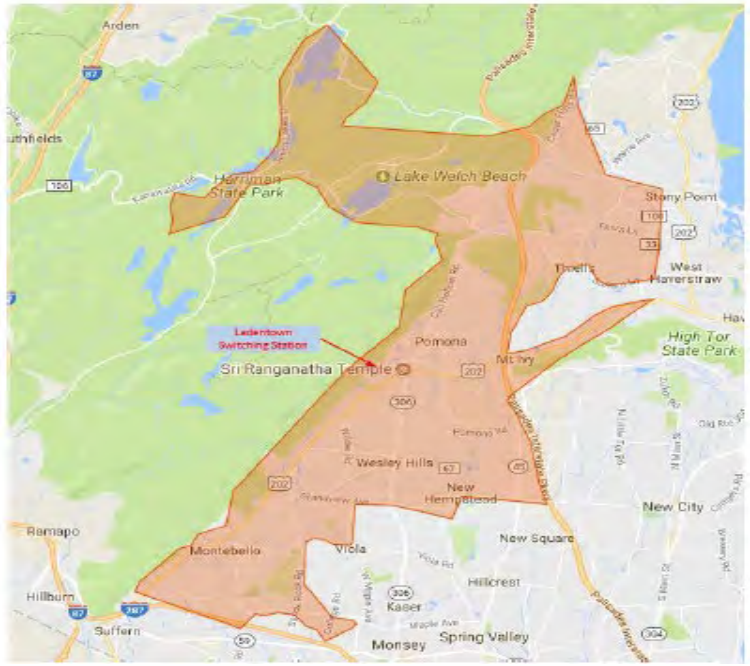
Monsey

- Objective
  - O&R is proposing to implement the Monsey project to defer a capital infrastructure investment to meet short- and long-term customer energy needs.
- Need
  - The scope of the project will be to reduce peak load on the distribution system in the event of a bank contingency (on banks 144 and/or 244), or a circuit contingency (on circuits 44-2, 44-3, and/or 44-6).
- Traditional Solution
  - Upgrade of the Monsey Substation, which will require the replacement of the two 25MVA transformers with two 40MVA transformers and the addition of three distribution circuits.
- Status
  - EE and DR activities to begin in 2019, and 2020, respectively.
  - Work is underway to deploy 15 MW of energy storage across 3 sites (5 MW each). Permitting, Interconnection activities and contracts are ongoing for Site 1 and 2 .
  - Site 3 may be located in a Utility Owned Prop.



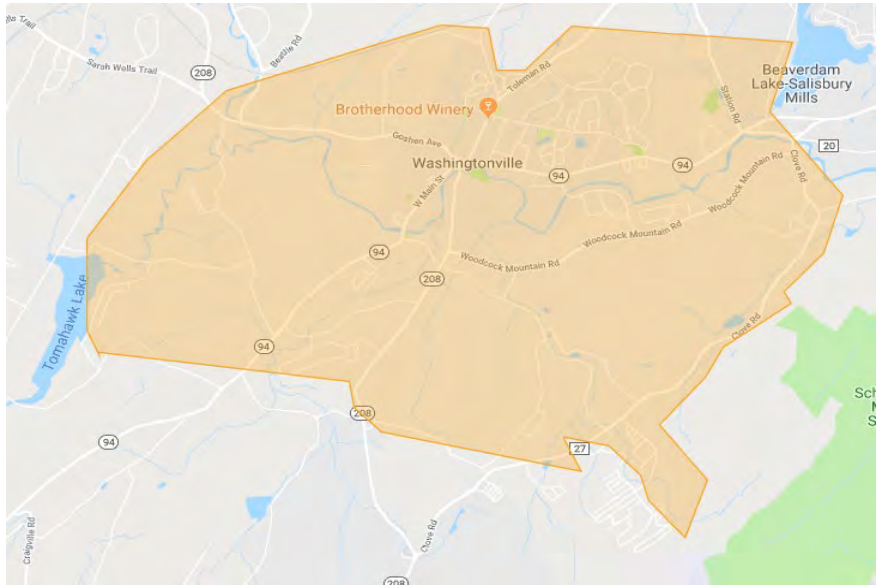
Pomona

- Objective
  - O&R is implementing the Pomona project to defer the need for a new Pomona Substation and associated new transmission and distribution infrastructure.
- Need
  - The scope of the project will be to provide operational benefit to the distribution system in case of circuit contingency.
  - Provide additional capacity into the Pomona Area Load Pocket to address additional growth in the area.
- Traditional Solution
  - Construct a brand new substation with associated 138kV transmission underground loop, two (2) 50MVA 138-13.2kV transformer banks with load tap changers.
- Status
  - EE and DR work underway since 2016
  - Working with local Authorities Having Jurisdictions (AHJ) to Permit and Site the battery asset.



Blooming Grove

- Objective
  - O&R is proposing to implement the Blooming Grove project to defer a capital infrastructure investment to meet short- and long-term customer energy needs.
- Need
  - The scope of the project will be to provide capacity on the portion of the local electric delivery system that does not have backup during the worst contingency scenario.
  - These capacity requirements will be incremented by a to-be-defined reliability factor, to provide equivalent reliability of the traditional solution.
- Traditional Solution
  - O&R's traditional solution would be to upgrade the existing single transformer bank with two (2) 35MVA, LTC banks in the same vicinity as the existing substation.
- Status
  - RFP released in December 2018 / Proposals received on 5/31/19
  - Working with local Authorities Having Jurisdictions (AHJ) to conduct education and outreach for Battery Energy Storage Systems



DER Interconnection Workshop

Break

Orange & Rockland

DER Interconnection Workshop

New Business and Construction Upgrades

Jonathan Escobar

Major Accounts Engineer

New Business Department

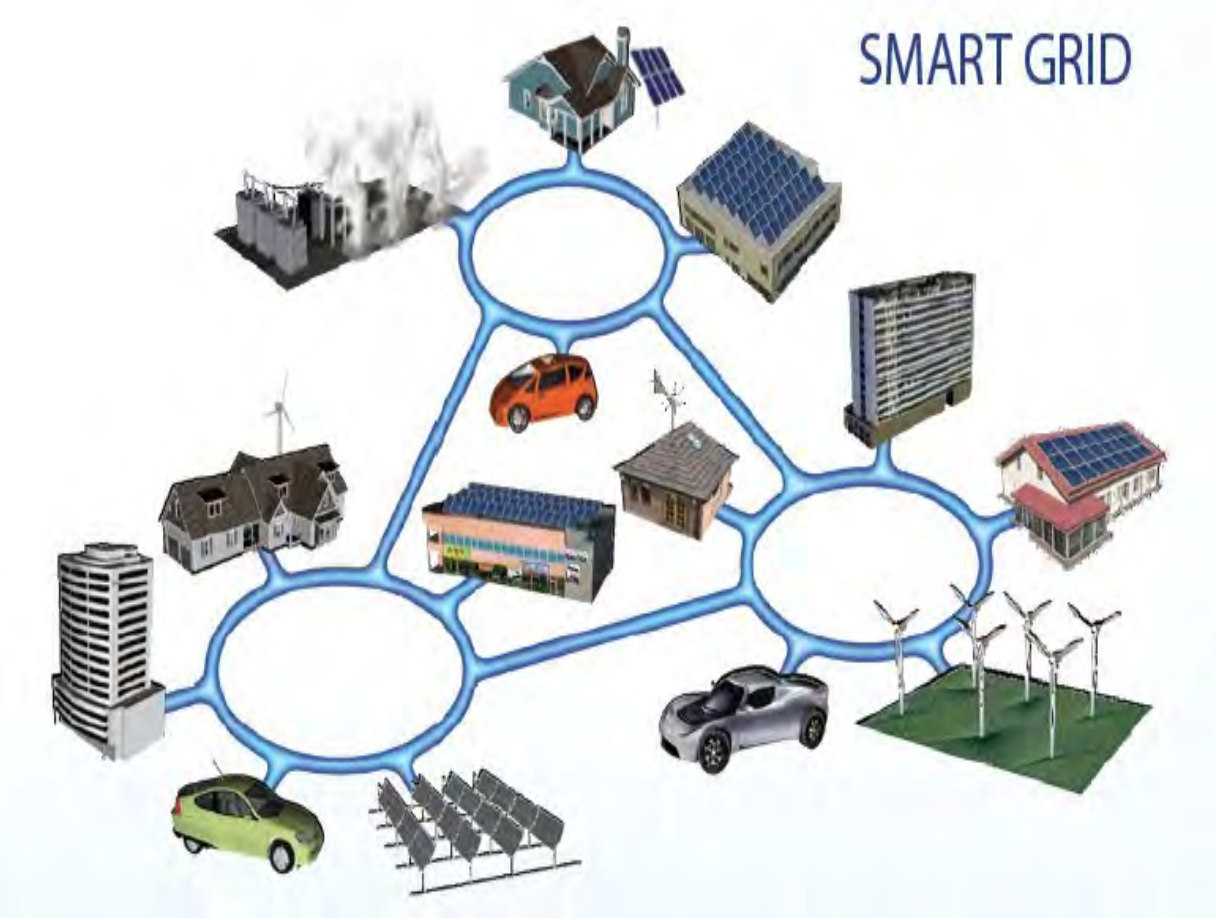
New Business Department

New Business Services (NBS) facilitates the installation of new and additional gas and electric services for O&R's residential, commercial and industrial customers.

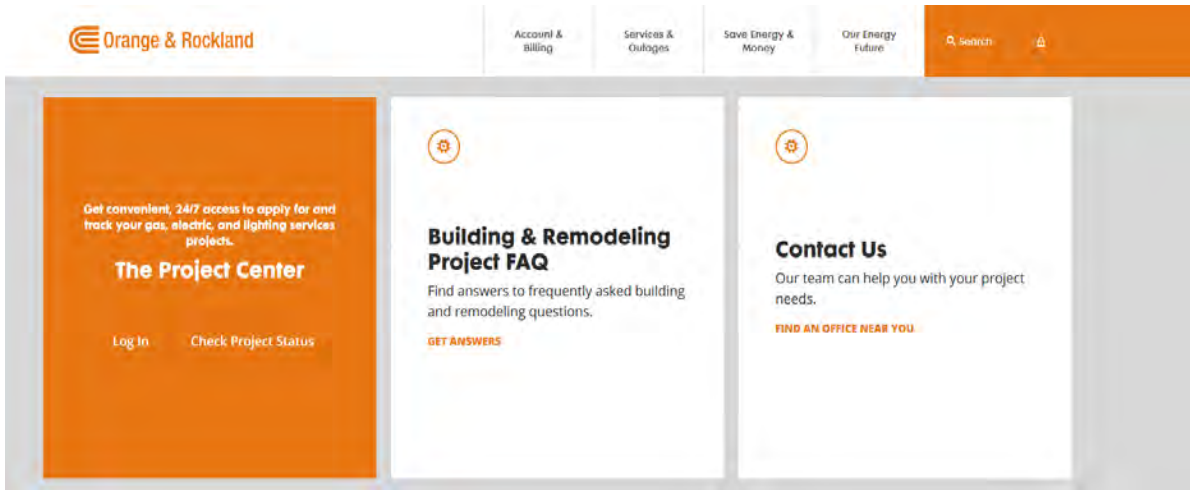
- NBS works on DG projects that require Distribution and/or Customer Upgrades/Construction
  - Line upgrades, 3-phase extensions, 3V0 Substation upgrades, Customer equipment upgrades, and Transformer upgrades
- DG project nomenclature
  - CDG – Community DG
  - LDG – Remote Net metering or Large DG (>50kW)
  - DGINT – Small scale DG (<50kW)
  - NJINT – NJ DG project

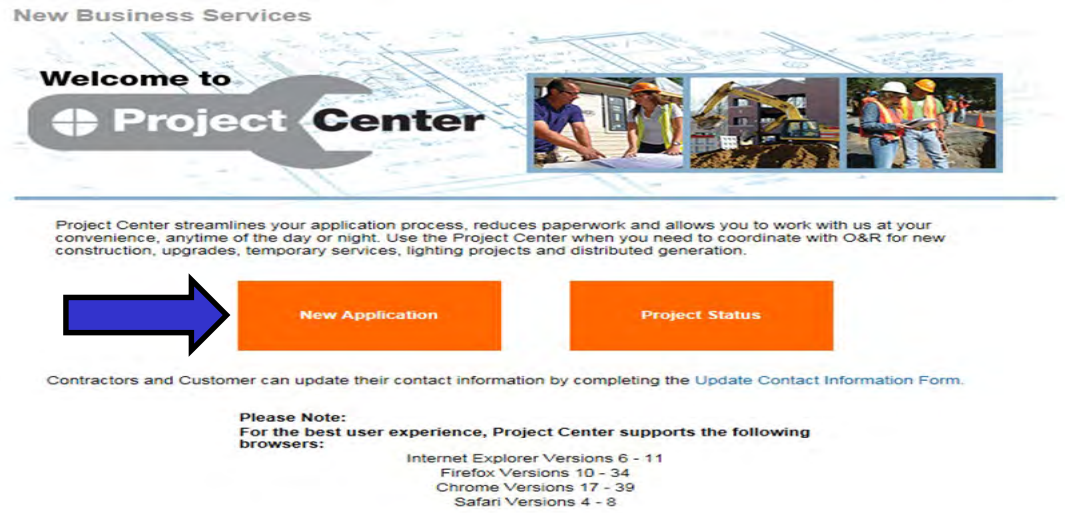
DG Project Process

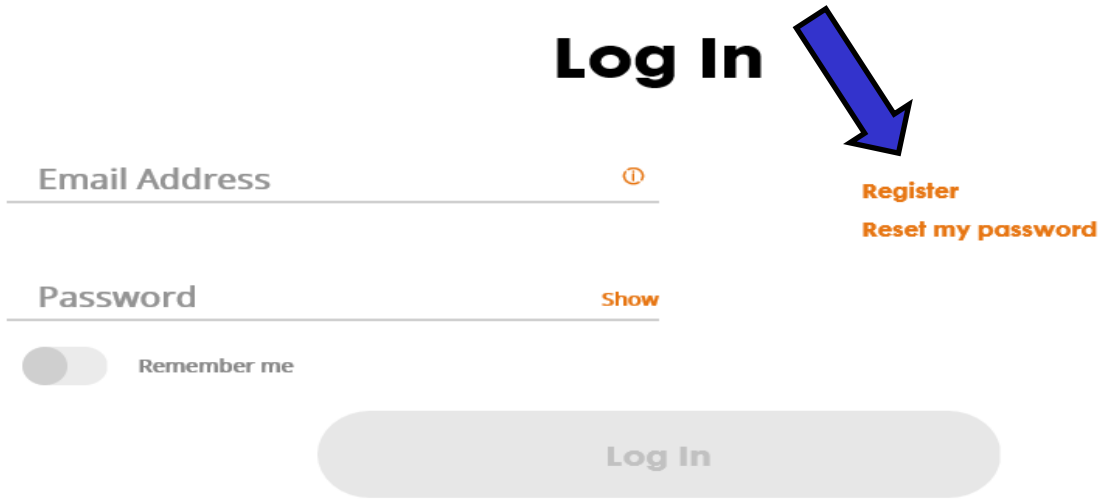
- Process begins with Technology Engineering (DG group)
  - Application/Preliminary Analysis/Supplemental Studies/CESIR
  - Effective Grounding Study
  - CESIR Results give cost-estimate
- After 100% payment, NBS manages the project and becomes main POC
  - Coordination with nine internal customers & multiple external customers
  - Separate Application Needed (No fee)

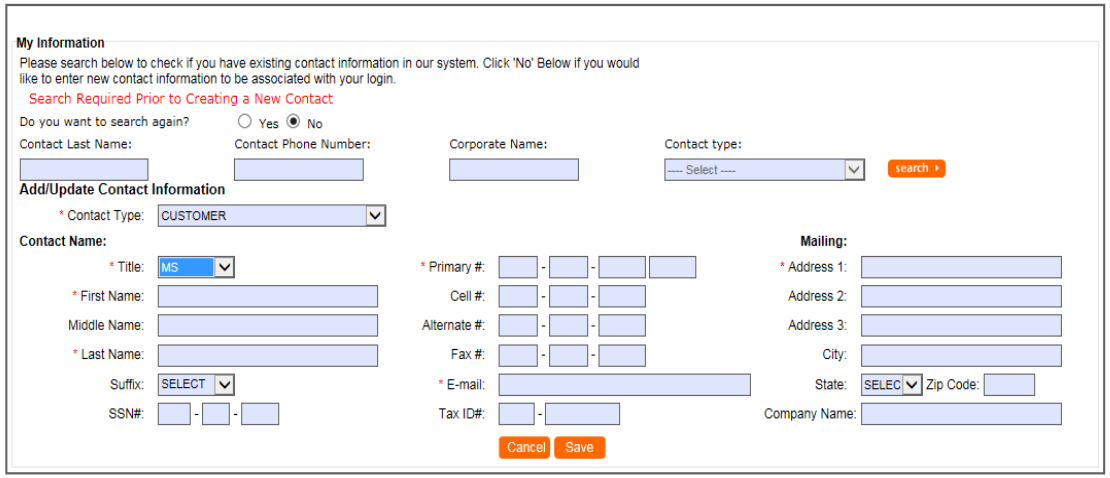


Project Center –> ORU.com/ProjectCenter









Necessary Documents For Construction

- New Business Application
  - All project and billing info
  - Desired metering type
- Scaled Utility Site Plan
  - Showing ALL utilities in area and desired route of service
- One/Three-Line Diagram
  - Showing all equipment up to ORU's feeder
  - Size, Sets, and Type of conductor and conduit
- Building Permit
- Property Deed
  - Showing current owner and listing tax lot
- Equipment Cut-Sheets
  - Primary Metering
    - Transformer (nameplate info)
    - 15kV disconnect
    - Primary conductor
    - Metering Enclosure (if pad mount)
  - Secondary Metering
    - Switchgear or Metering Instrument Cabinet

Metering Configurations

Primary OH

Primary UG

Secondary

NB Construction Process

- Schedule a site-visit
  - ORU will go over plans and diagrams on-site and make comments/changes as necessary
  - **Customer needs to incorporate changes and re-send plans & diagrams to move forward**
- Write construction work order to get designed and finalized
  - In most cases we need property lines and access road staked in field to complete design
- I will put together ROW request and get signed
- I will put together an Engineering request to produce a Site-Specific Spec Book (Red Book)
  - **This is ORU's approval of plans to construct**
- Work will be placed on schedule and get completed
  - Pending Zoning and Building Permit
- Recloser will begin 4-5 week DSCADA process
- Customer will go through inspection process and get energized

PTO Process

- Once the site is energized – Your project will be marked “Construction Complete” in Power Clerk
- Customer has to upload Final Documents in to Power Clerk for Review:
  - Final As Builts (3-Line of existing conditions)
  - Electrical Inspection Certificate of Entire DG service (Not cut-in card)
- Pending Approval – Your project will be marked “Request Verification Test”
  - This requires the customer to fill out a very simple form with contact information
  - Once form is submitted – A DG Engineer will reach out to schedule a test
- Pending the test results – PTO will be issued within SIR allotted time

Typical Timelines For Large DG Projects – Start To Finish

Project with Simple POI (3-4 poles w/ recloser)

~ 365 days

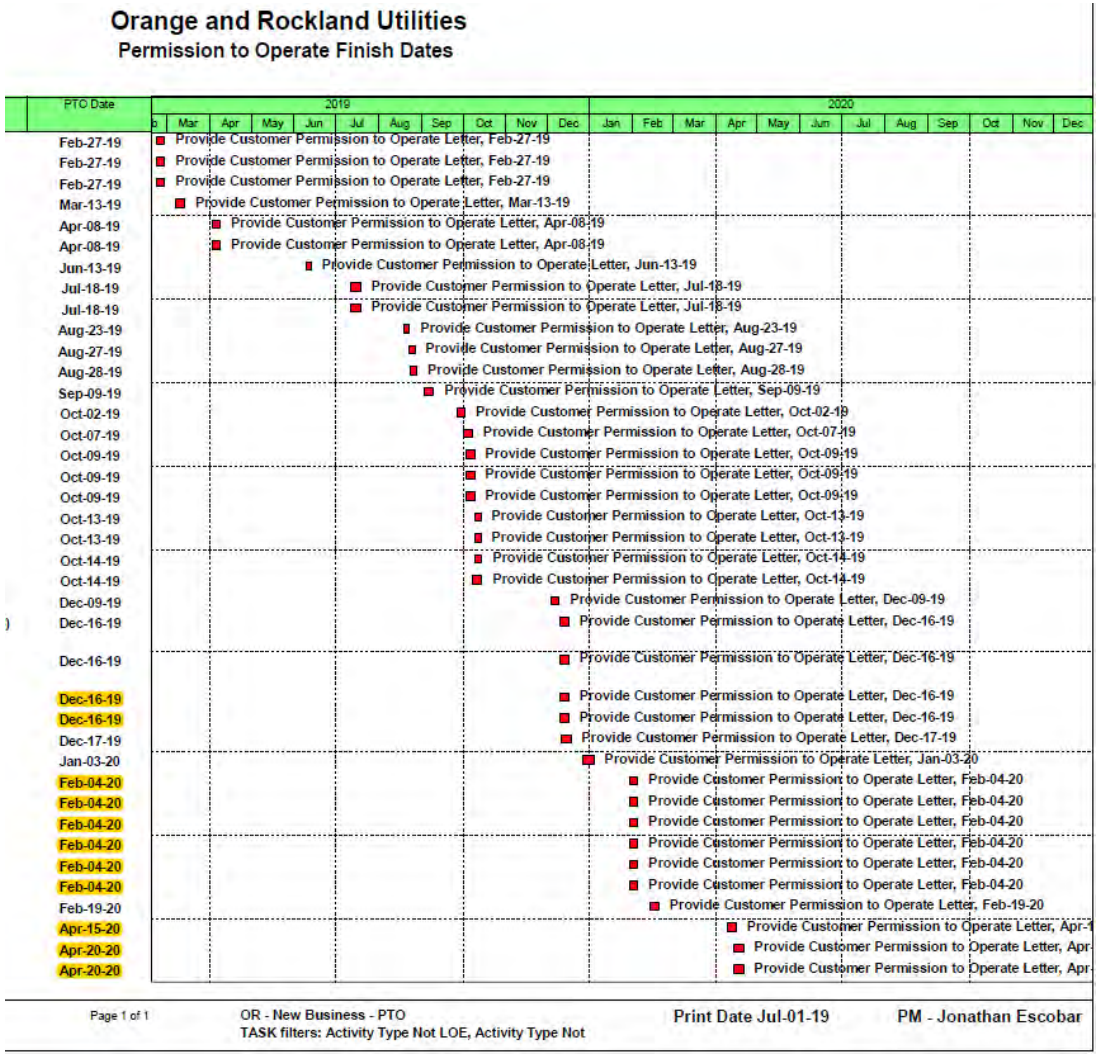
Project with Extensive Line Upgrade

~ 450 days

Project with 3V0:

~ 730 days

Note – Customer drives majority of process



Take Away

- Follow construction specs provided
- There are a large amount of projects in the queue and a lot of coordination/work required for each
  - Earlier the better
  - Be transparent with schedule
  - Communicate Zoning and Permitting outcomes and anticipated dates
  - More accurate requested PTO dates

Questions

?

Jonathan Escobar

New Business Services

(845) 577-3290

escobarj@oru.com

DG Protection

Renjini Joseph

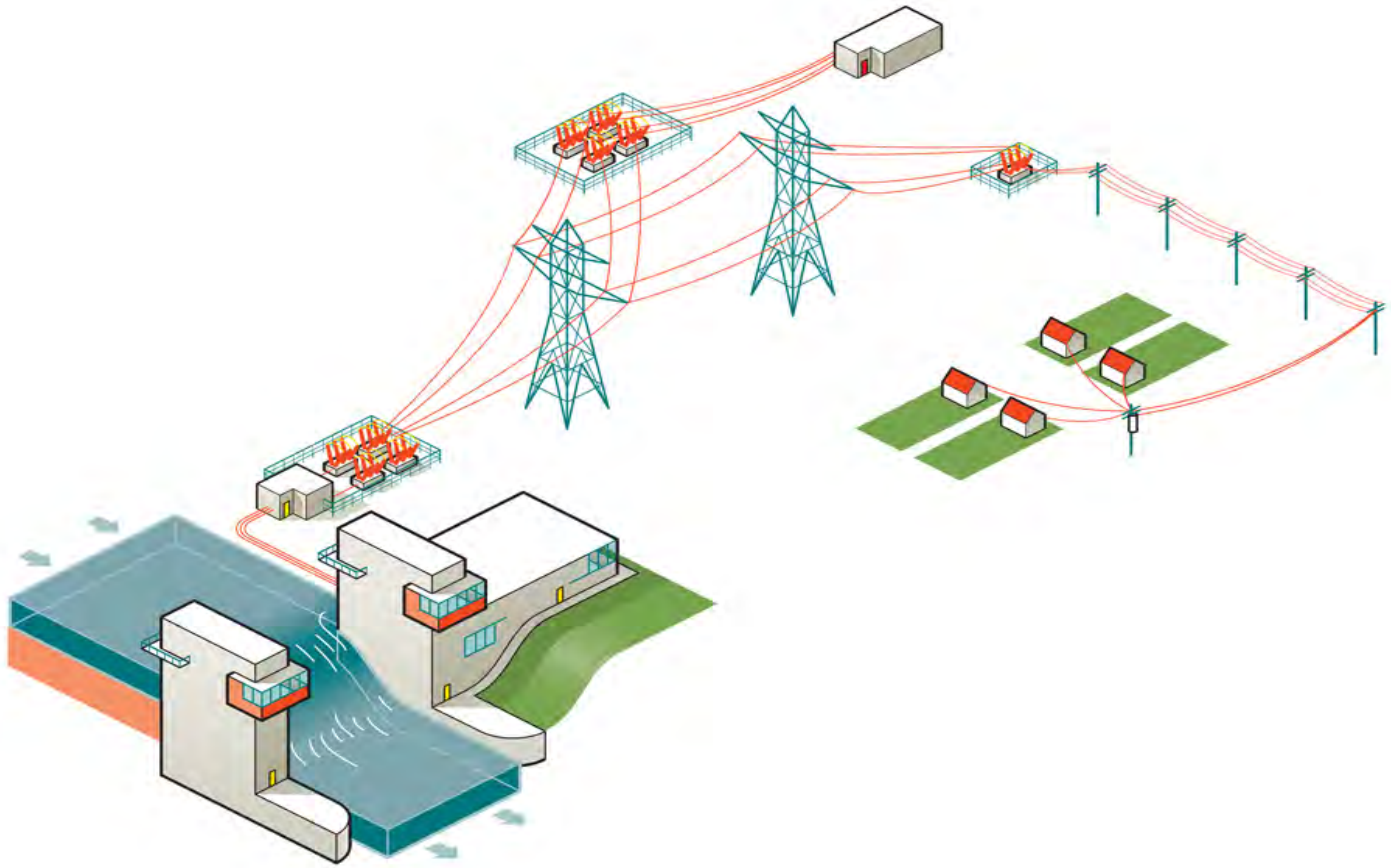
Principal Engineer

Technology Engineering Department

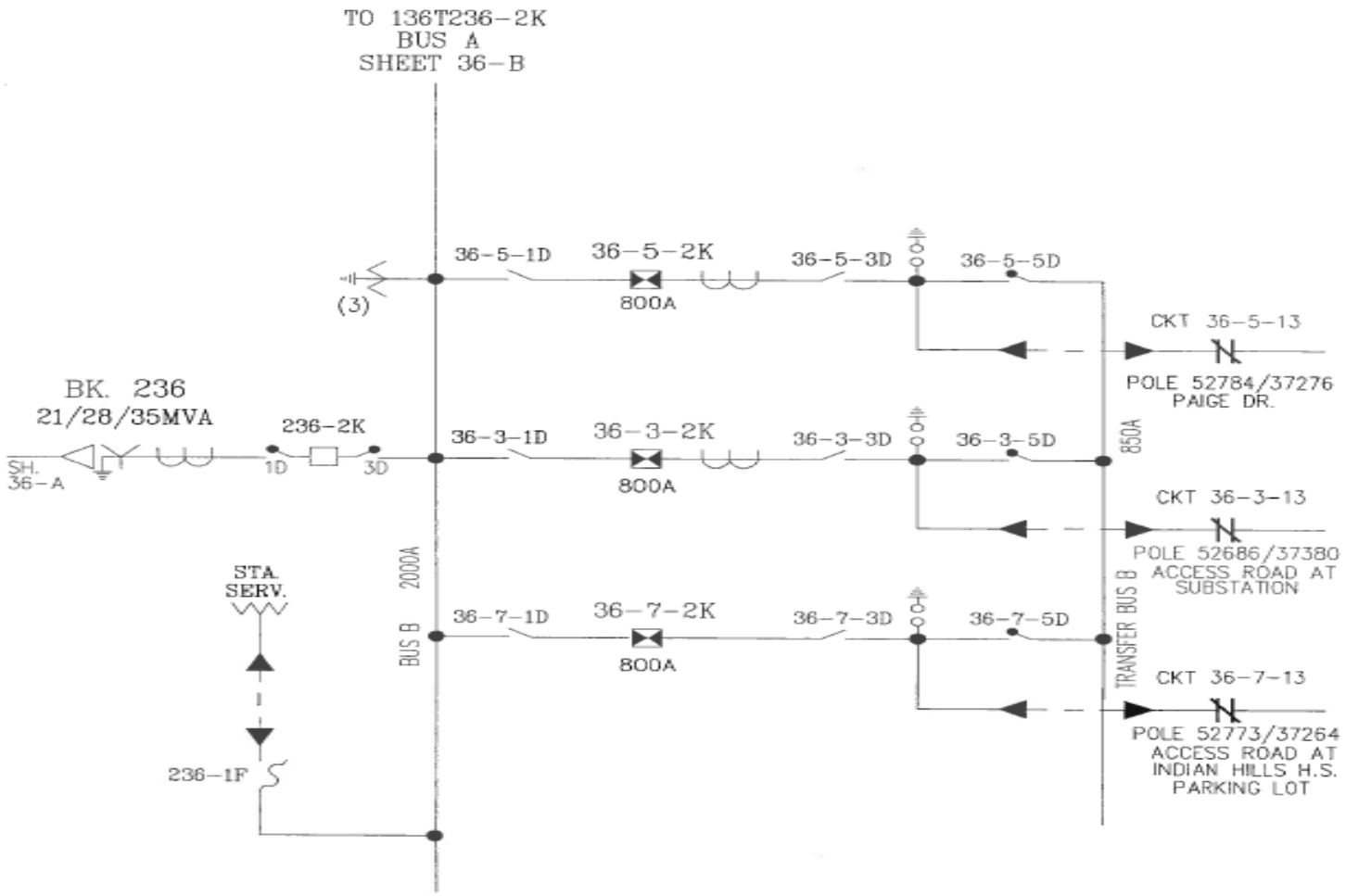
Key Points

- Power System Overview
- ORU Distribution System
- DG Interconnection
- DG Recloser Settings

Power System Overview



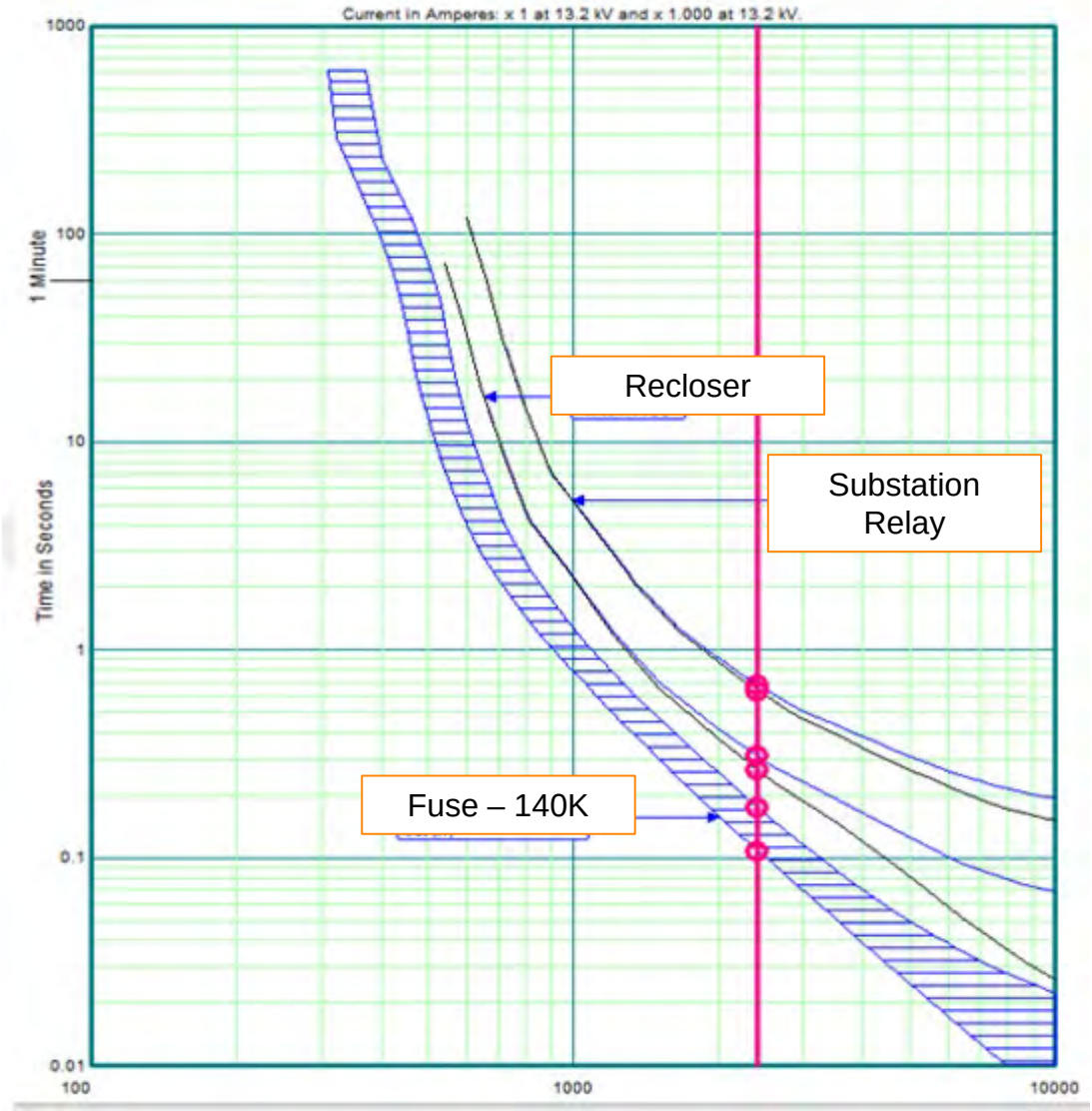
Distribution Substation



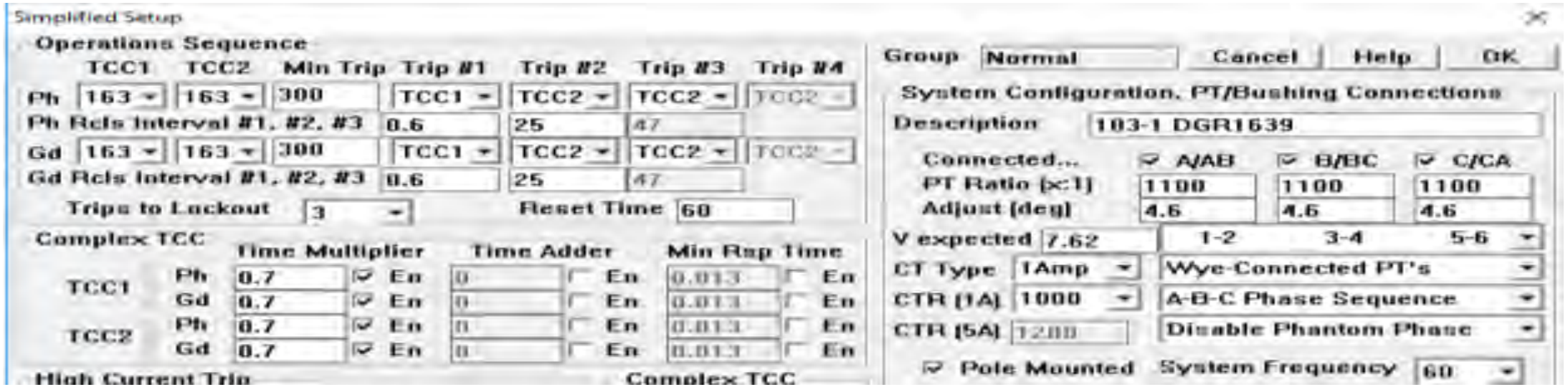
Distribution System

DG Interconnection

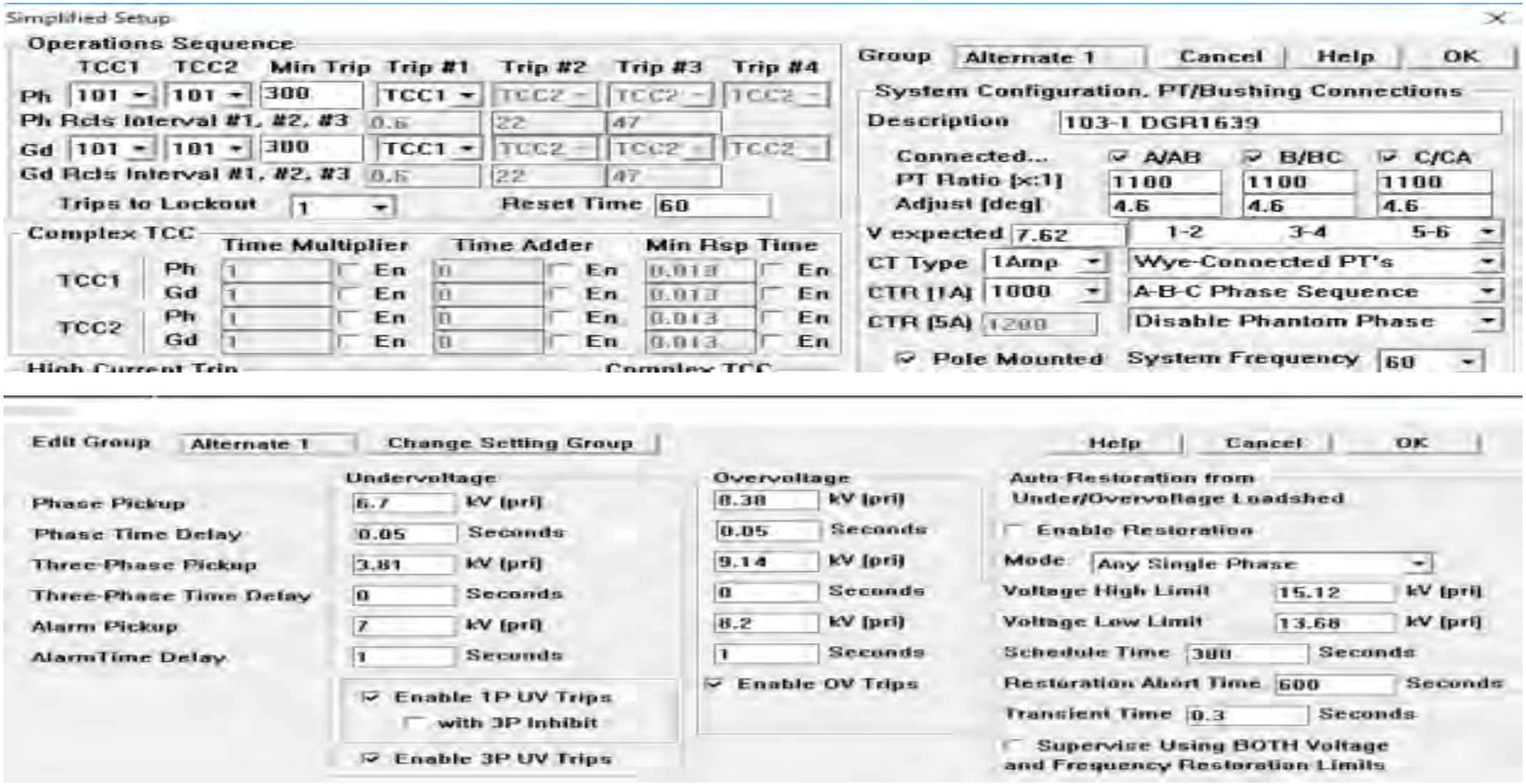
Protection Coordination



DG Recloser Settings In Normal Mode



DG Recloser Settings In Live Line Clearance mode

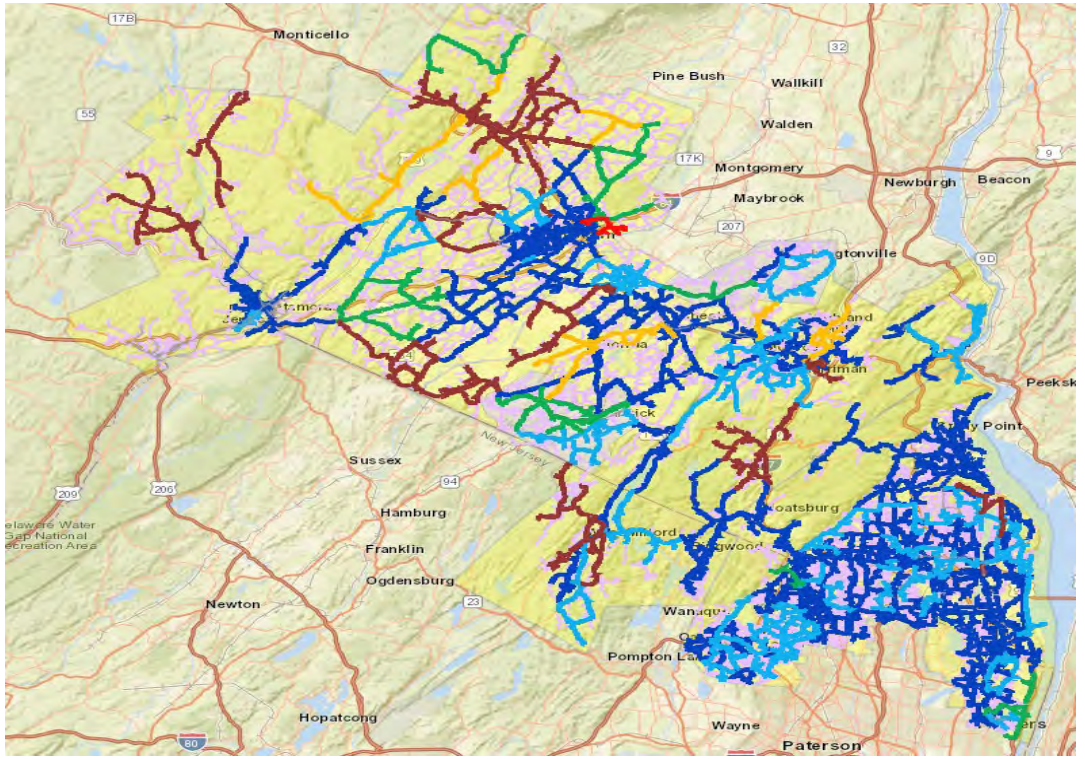


Hosting Capacity Maps

Brandon Peifer

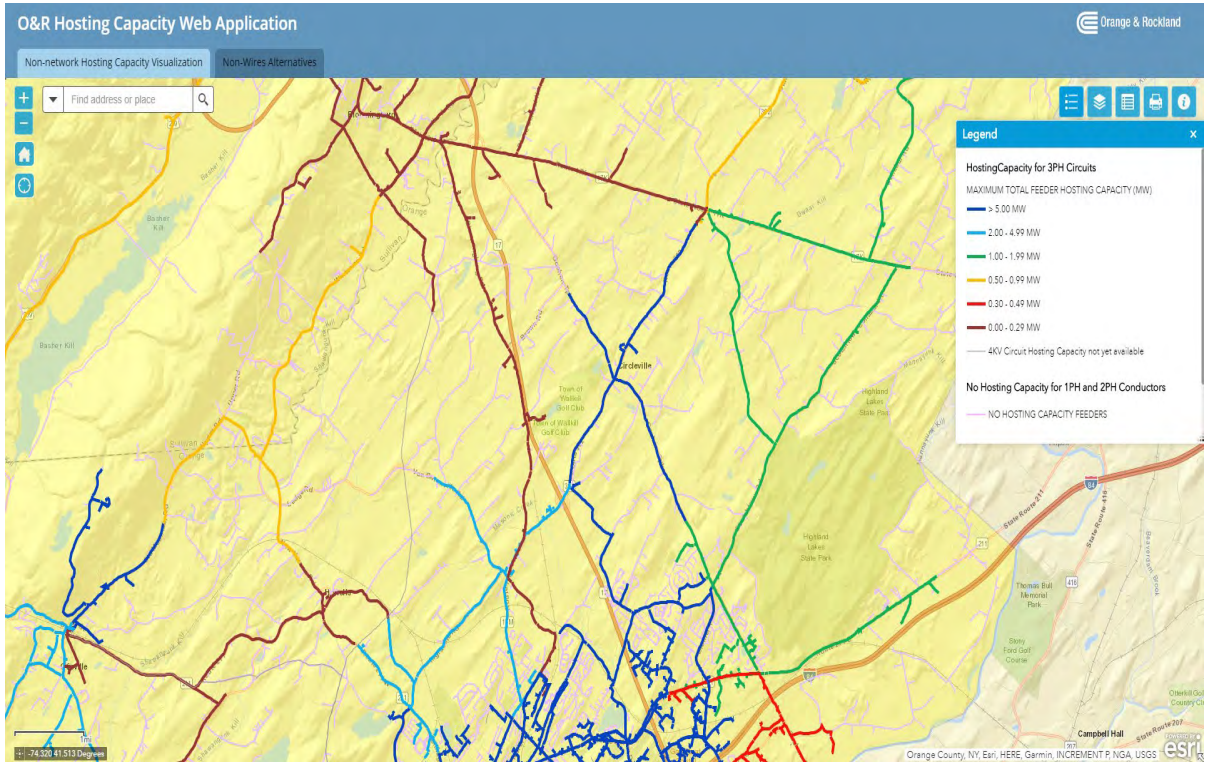
Engineer

Systems Engineering Department



Key Points

1. What is Hosting Capacity?
2. Creating an Account
3. Logging into the Maps
4. Navigating the Maps
5. Downloading Information
6. Next Steps



What is Hosting Capacity?

"Hosting capacity of a distribution system is the amount of DER that can be accommodated without adversely impacting power quality or reliability under existing control configurations and without requiring infrastructure upgrades. Hosting capacity can vary across many feeders, along a single distribution feeder, as well as within a secondary distribution system. Hosting capacity will also change over time as the distribution system infrastructure and operations change."

-EPRI

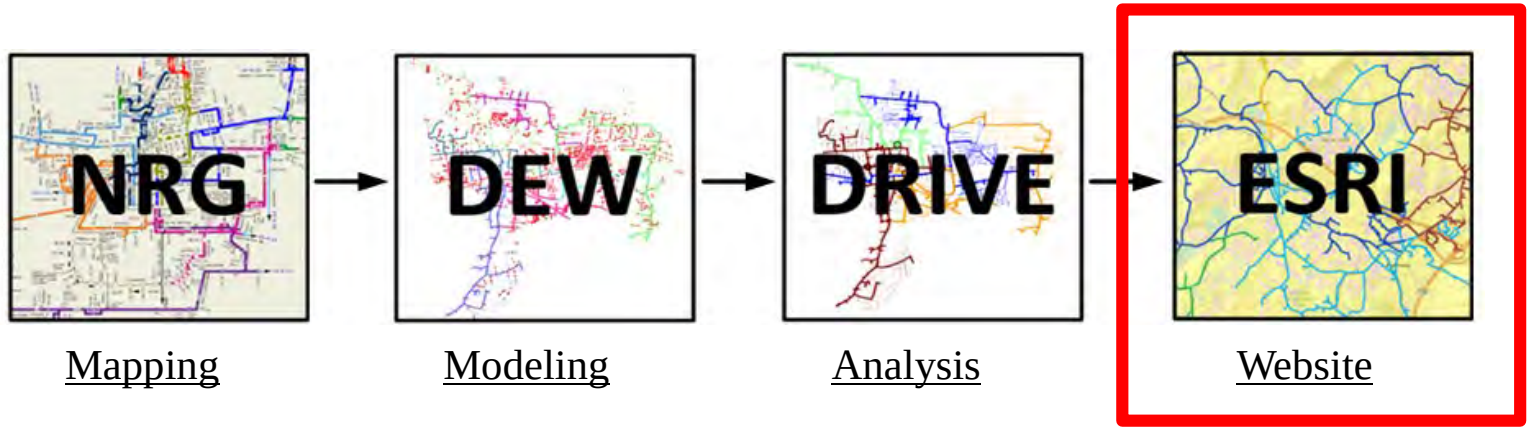
Orange and Rockland's Hosting Capacity

The Hosting Capacity Maps currently show:

- Circuit-Level Hosting Capacity
- Installed and Queued DER Amounts
- Substation Information
- System Data Links
- Non-Wire Alternative and LSRV Areas
- Circuit Information for New York and New Jersey

The Hosting Capacity Methodology follows the standards set by the NY JU

Hosting Capacity Process



- The mapping system contains all of the locational and characteristic data about the distribution system.
- The modeling software calculates the voltage and amperage for the distribution system.
- The Analysis software uses the previous calculations to determine the Hosting Capacity Values.
- The Hosting Capacity Results are published to an online portal.

Creating An Account

In order to view the Hosting Capacity map, a user must have an account made. The purpose is not to filter developers and customers from gaining access, rather increase the cyber security around the sensitive information being shared. The instructions for this section only have to be completed once.

Creating an Account

Enter the URL:

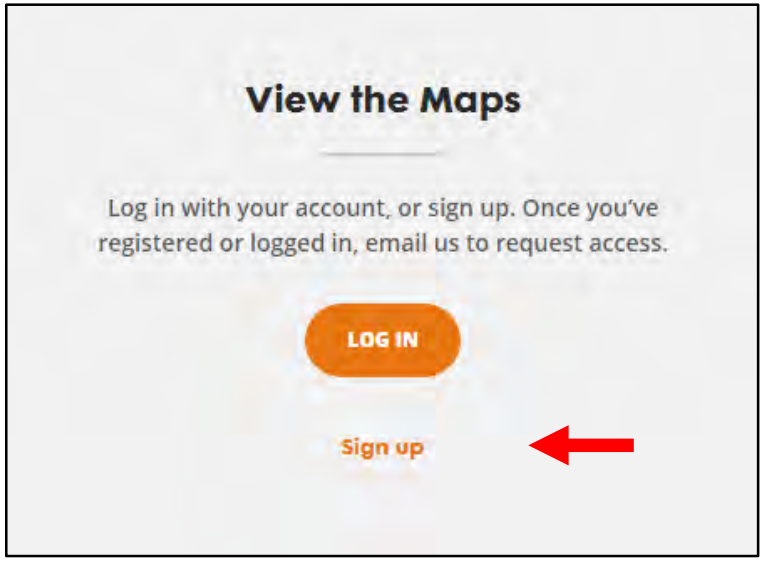
https://www.oru.com/en/business-partners/hosting-capacity

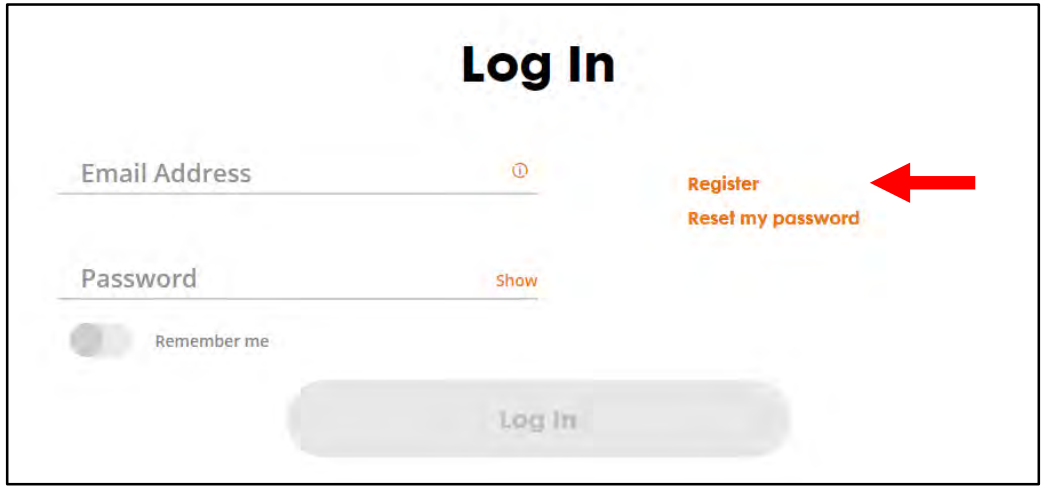
Or follow the instructions:

Go to oru.com → **Scroll to the bottom of the web page** → **Click on "Hosting Capacity and System Data"**

Creating An Account

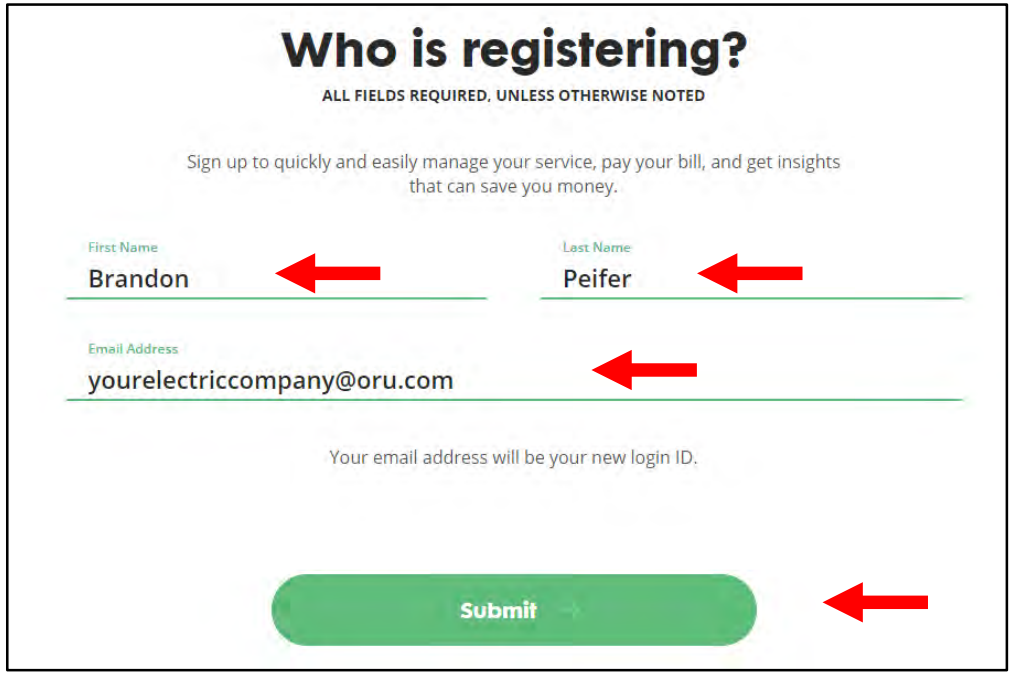
Navigate down the webpage to the tab that states “View the Maps”. Click on the “Sign up” Hyperlink. Once on the login page, press the Register option.

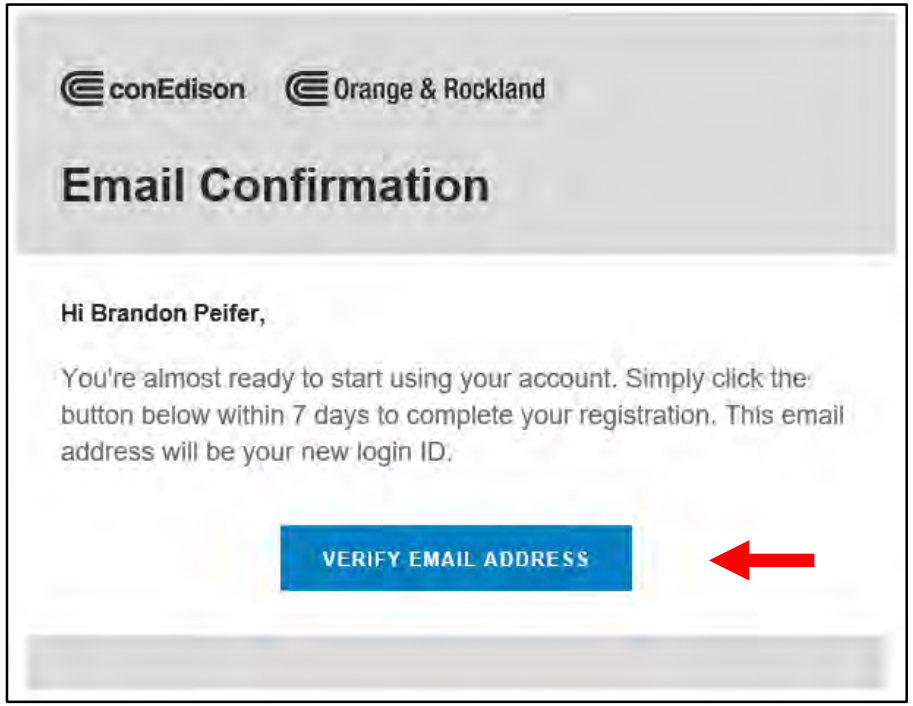




Creating An Account

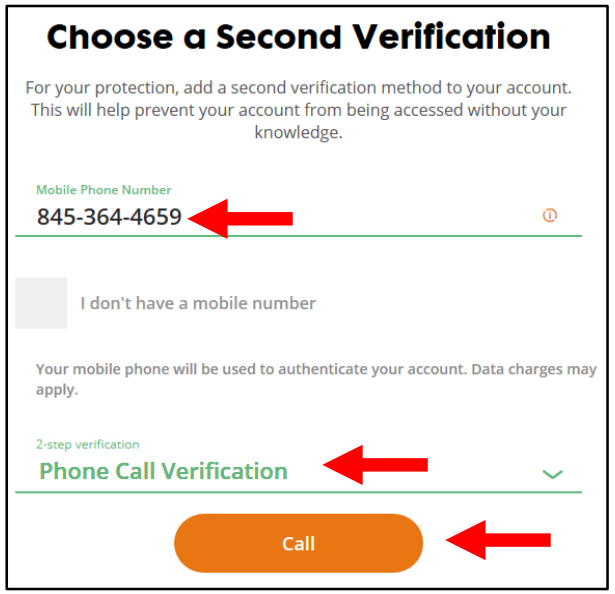
Enter your first and last name, and the email address you will be using to log into the maps. Press submit. An email will be sent to you to verify your account; Press the “Verify Email Address” Button. Then you will be directed to a screen to make a password.

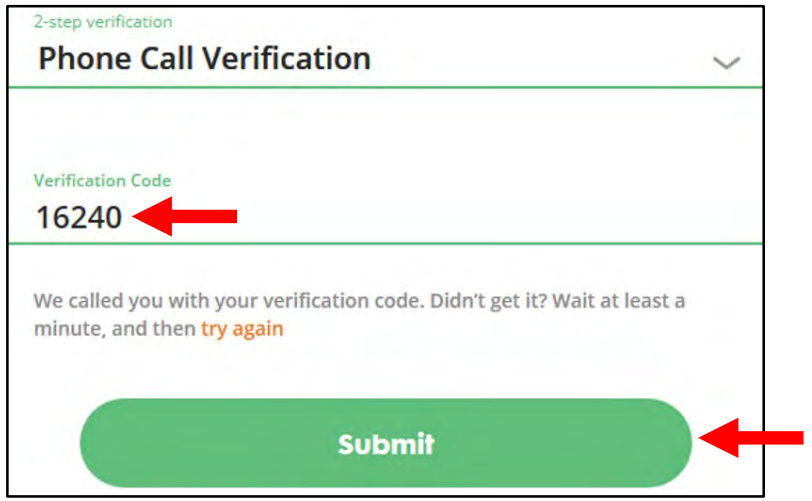




Creating an Account

A second method of logging in will need to be selected. Enter a phone number and choose the method for the 2-Step Verification. A button will appear saying “Call”, Text”, etc. Please press the button and enter the verification code given to you. You may close the page when says you have successfully registered.





Creating An Account

To complete the access to the Hosting Capacity Maps, go to the first hosting capacity page and press the “Emailing us” hyperlink or send an email to ORHOSTINGCAPACITYMAP@ORU.com.

In the body of the email, please include your:

- Name
- Email Address
- Company

You will get a response email saying you have access.

Logging Into The Maps

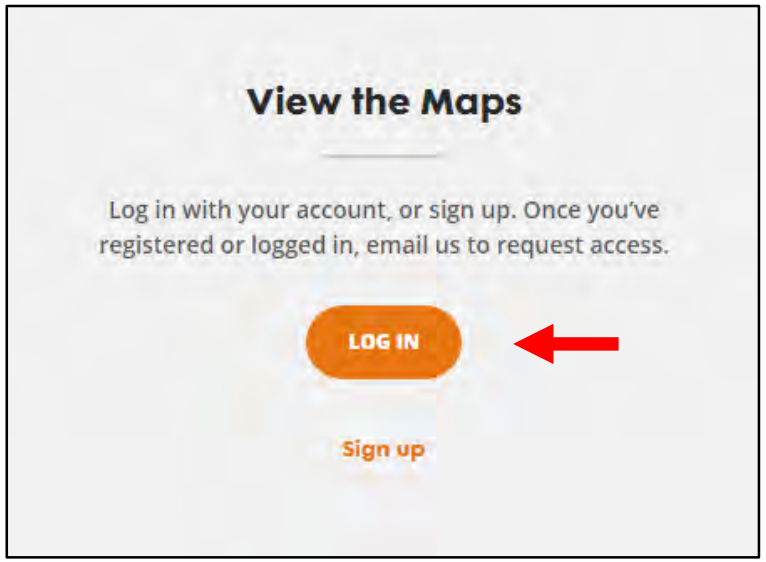
Once your account is made and access is granted, you may log on and view the maps.

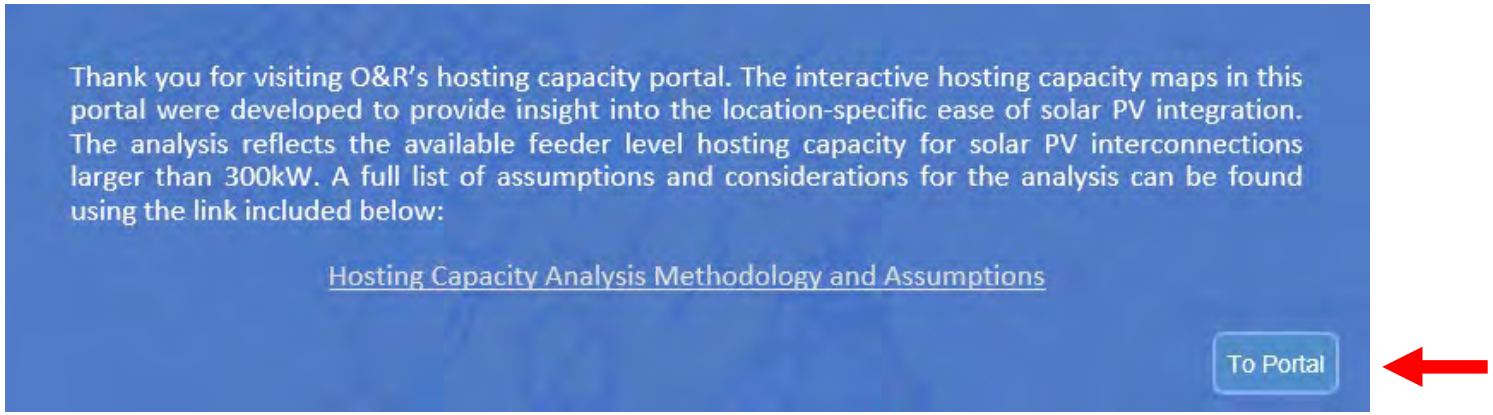
To access the maps, please visit the URL:

https://www.oru.com/en/business-partners/hosting-capacity

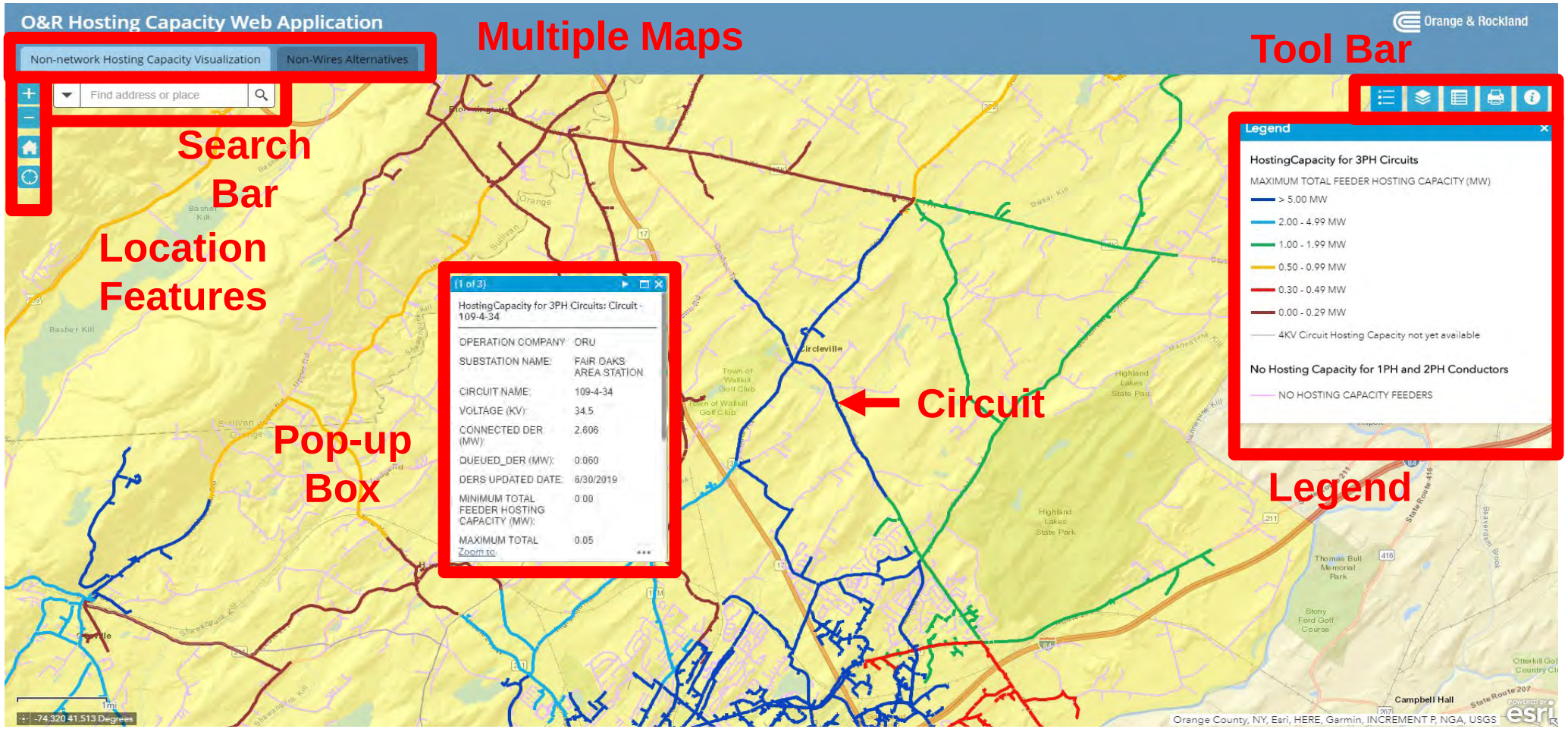
Logging Into The Maps

Navigate down the page and press the “Log in” Button. Once the sign-in page appears, Press “ConEdison” and follow the instructions. The map will appear. A Welcome screen will be overlaid; press the “To Portal” Button.





Navigating The Maps



Navigating The Maps

Multiple Maps

The Map containing all of the Hosting Capacity, System, and Circuit Data.

The Map showing the specific locations for Non-Wires Alternative Projects

Location Features

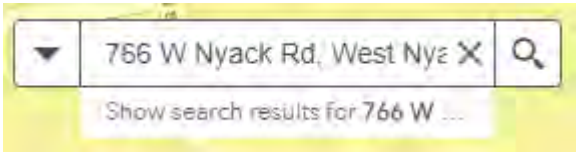
Zoom in

Zoom out

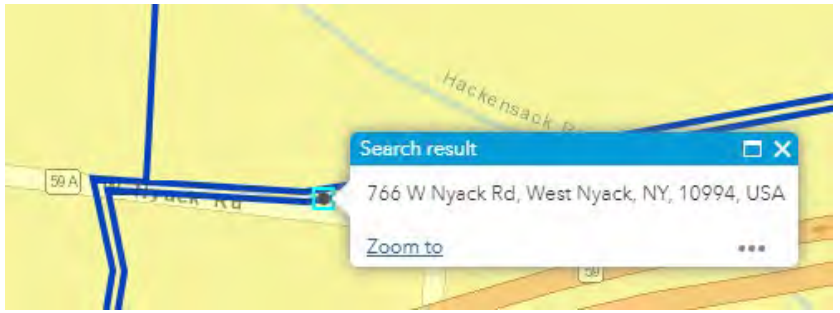
Go to starting map location

Go to current location

Search Bar



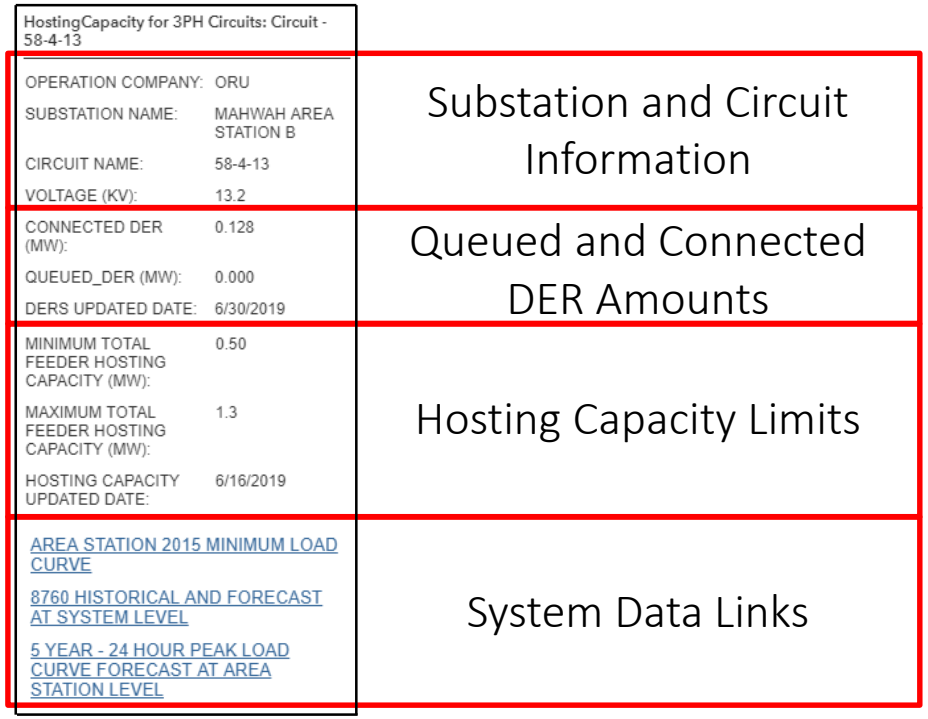
Looks up a location by address



Navigating The Maps

Pop-ups

Circuit-Level



HostingCapacity for 3PH Circuits: Circuit - 58-4-13

OPERATION COMPANY:	ORU
SUBSTATION NAME:	MAHWAH AREA STATION B
CIRCUIT NAME:	58-4-13
VOLTAGE (KV):	13.2
CONNECTED DER (MW):	0.128
QUEUED_DER (MW):	0.000
DERS UPDATED DATE:	6/30/2019
MINIMUM TOTAL FEEDER HOSTING CAPACITY (MW):	0.50
MAXIMUM TOTAL FEEDER HOSTING CAPACITY (MW):	1.3
HOSTING CAPACITY UPDATED DATE:	6/16/2019

AREA STATION 2015 MINIMUM LOAD CURVE

8760 HISTORICAL AND FORECAST AT SYSTEM LEVEL

5 YEAR - 24 HOUR PEAK LOAD CURVE FORECAST AT AREA STATION LEVEL

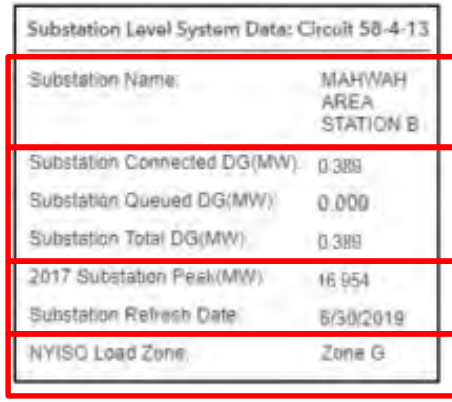
Substation and Circuit Information

Queued and Connected DER Amounts

Hosting Capacity Limits

System Data Links

Substation-Level



Substation Level System Data: Circuit 58-4-13

Substation Name:	MAHWAH AREA STATION B
Substation Connected DG(MW):	0.389
Substation Queued DG(MW):	0.000
Substation Total DG(MW):	0.389
2017 Substation Peak(MW):	16.954
Substation Refresh Date:	6/30/2019
NYISO Load Zone:	Zone G

Substation Information

Queued and Connected DER Amounts

Peak Load

NYISO Zone

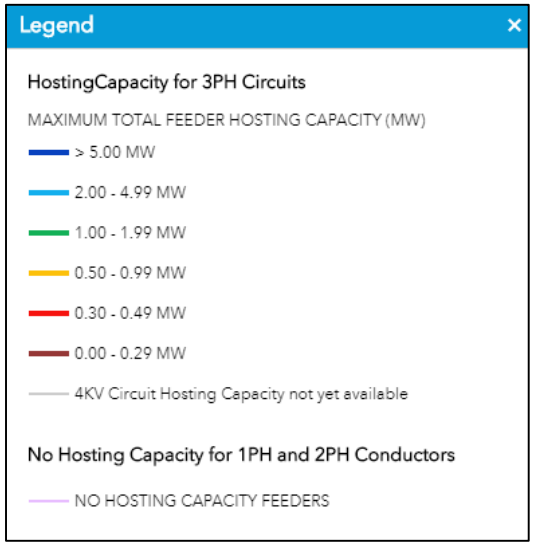
**Clicking on a Circuit will make Pop-up Boxes appear*

Navigating The Maps

Tool Bar

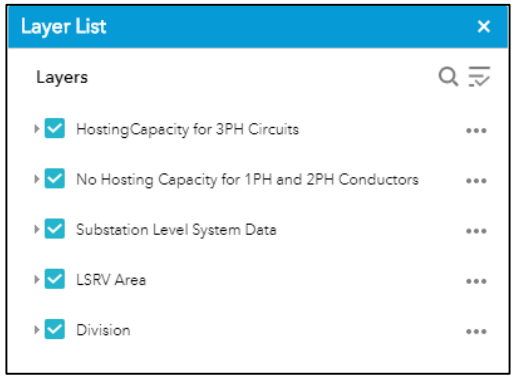
Legend | Layers | Table | Print | Information

Legend



Identifies the hosting capacity values for each of the circuit colors

Layers



Allows Users to make certain Layers hidden or visible

Print

Allows the User to print images from the Maps

Information

Contains the overview of what the Hosting Capacity Maps are along with instructions on how to use the map

Downloading Information

Select the Table Tab in the Tool Bar

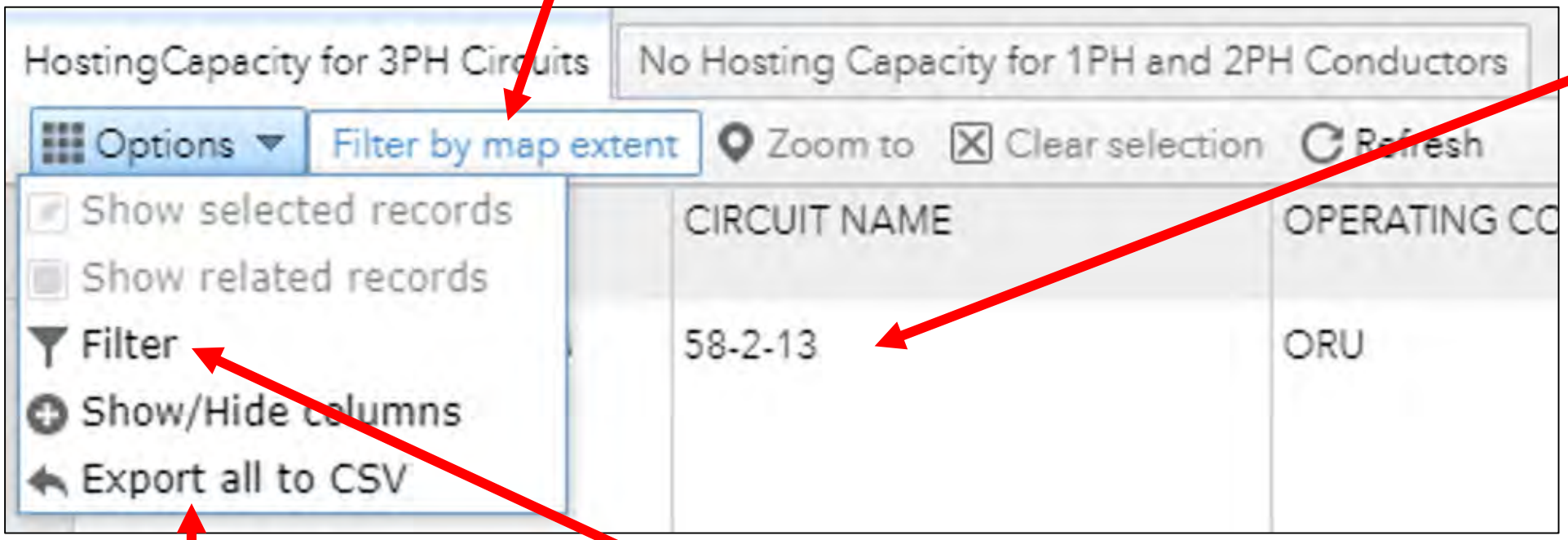
HostingCapacity for 3PH Circuits | No Hosting Capacity for 1PH and 2PH Conductors

Options | Filter by map extent | Zoom to | Clear selection | Refresh

SUBSTATION NAME	CIRCUIT NAME	OPERATING COMPANY	VOLTAGE (KV)	CONNECTED DER (MW)	QUEUED DER (MW)	MINIMUM TOTAL FEEDER HOSTING CAPACITY (MW)	MAXIMUM TOTAL FEEDER HOSTING CAPACITY (MW)	LoadCurve	SystemData
MAHWAH AREA STATION B	58-2-13	ORU	13.2	0.128	0.000	0.48	5.3	https://www.oru.com/-/media/file partners/hosting-capacity/peak-load-curve/system-data-not-available-for-selection.pdf	https://www.oru.com/-/media/file partners/hosting-capacity/historical-8760/system-data-not-available-for-selection.pdf
MAHWAH AREA STATION B	58-4-13	ORU	13.2	0.128	0.000	0.50	1.3	https://www.oru.com/-/media/file partners/hosting-capacity/peak-load-curve/system-data-not-available-for-selection.pdf	https://www.oru.com/-/media/file partners/hosting-capacity/historical-8760/system-data-not-available-for-selection.pdf
MAHWAH AREA STATION B	58-5-13	ORU	13.2	0.158	0.000	0.01	4.422	https://www.oru.com/-/media/file partners/hosting-capacity/peak-load-curve/system-data-not-available-for-selection.pdf	https://www.oru.com/-/media/file partners/hosting-capacity/historical-8760/system-data-not-available-for-selection.pdf
MAHWAH AREA STATION C	58-6-13	ORU	13.2	0.026	0.000	0.22	5.3	https://www.oru.com/-/media/file partners/hosting-capacity/peak-load-curve/system-data-not-available-for-selection.pdf	https://www.oru.com/-/media/file partners/hosting-capacity/historical-8760/system-data-not-available-for-selection.pdf
MAHWAH AREA STATION C	58-8-13	ORU	13.2	0.100	0.010	0.14	5.3	https://www.oru.com/-/media/file partners/hosting-capacity/peak-load-curve/system-data-not-available-for-selection.pdf	https://www.oru.com/-/media/file partners/hosting-capacity/historical-8760/system-data-not-available-for-selection.pdf
MAHWAH AREA STATION C	58-9-13	ORU	13.2	0.000	0.000	0.10	5.3	https://www.oru.com/-/media/file partners/hosting-capacity/peak-load-curve/system-data-not-available-for-selection.pdf	https://www.oru.com/-/media/file partners/hosting-capacity/historical-8760/system-data-not-available-for-selection.pdf

Downloading Information

If selected, will only show the circuits currently displayed on the map



Double-click to navigate to the Circuit

May filter by any column present

Will export all of the data currently shown in the Table to a .CSV file

Next Steps

Stage 3.0 Hosting Capacity Maps will be released on October 1st, 2019

- Sub-Circuit Granularity of Hosting Capacity Values
- Inclusion of Connected DER in Hosting Capacity Calculations
- More Hosting Capacity Ranges for Circuit Coloring
- Voltage Identification at each Location

DER Interconnection Workshop

Rates and Value Stack

Debbie Sassoon

Project Specialist

Utility of the Future Department

Key Points

- Value Stack
- Expanded Eligibility
- Standby and Buyback Service Rates
- Hybrid Energy Storage System
- Resources

* Grandfathered or Phase One NEM

Value Stack

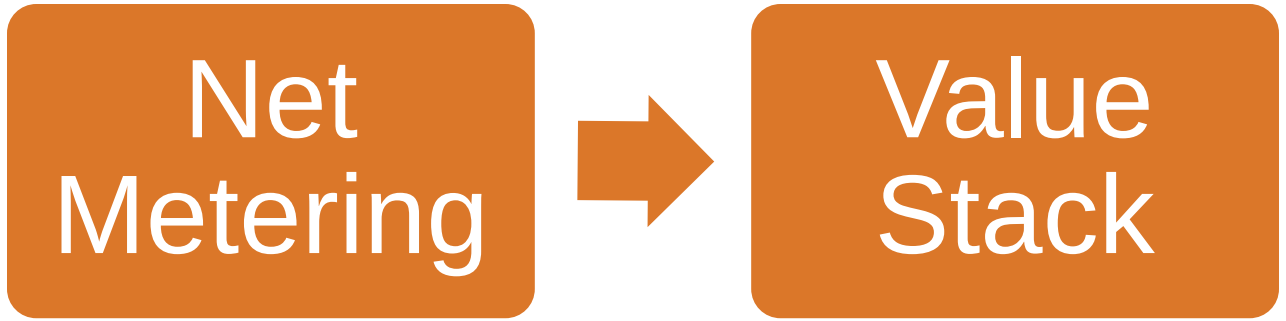
What Is The Value Stack?

On March 9, 2017, the Value of DER Phase One order was issued as the first step in moving compensation from Net Metering to compensation that more accurately reflects the true value of the energy being added to the grid.

The “Stack” is comprised of several components that are calculated separately and stacked together for a complete “Value Stack”.

The tariff went into effect on November 1, 2017.

Refer to O&R Rider N for details on Net Metering and Value Stack.



Value Of DER Chronology

- March 9, 2017 VDER Phase One Order: First step toward DER compensation based on time and location
  - Residential and non-demand small commercial will continue to receive compensation under net metering until 2020 (i.e. Grandfathered or Phase One NEM)
- September 14, 2017 VDER Implementation Order
- September 12, 2018 Value Stack Expansion Order
- December 13, 2018 Hybrid Energy Storage System Order
- April 18, 2019 Value Stack Phase 2 Order

Compensation method dependent upon key dates

Interconnection Date = 25% down payment submitted, if any, or date interconnection agreement signed

Impact Of Value Stack

- Residential and Non-Demand Billed Commercial Customers <25kW
  - Existing* and new distributed generation customers can opt in to Value Stack
  - Can add storage and remain Grandfathered or Phase One NEM
- Large C&I (Demand Billed)
  - Customers who paid their interconnection deposit on or before 7/17/17 are considered Net Metered but can opt into the Value Stack
  - Mandatory Value Stack for new distributed generation systems who have paid interconnection deposit after 7/17/17 or if storage is added
- Community Distributed Generation (CDG)
  - Mandatory Value Stack for CDG projects in O&R tranche 2 through 4 or those projects not assigned to a tranche
- Remote Net Metering (RNM)
  - Existing* distributed generation customers can opt into the Value Stack
  - Mandatory Value Stack for new distributed generation systems who have paid interconnection deposit after 7/17/17 or if storage is added

* Grandfathered or Phase One NEM

Unpacking The Value Stack

Value Stack can be broken into six individual components

	Component	Description
Supply	**Energy**	▪ Day Ahead Hourly Locational Based Marginal Price (LBMP)
	Installed Capacity	▪ Volumetric credit applied to production in all hours with option for higher credit in summer on-peak periods
	Environmental	▪ Represents the value of clean energy
Distribution	**Market Transition Credit (MTC)**	▪ Credit for mass market to bring compensation close to NEM ▪ Declines for projects based on tranche position ▪ No longer available in Value Stack Phase 2
	Demand Reduction Value (DRV)	▪ Applicable to customers not eligible for MTC
	Locational System Relief Value (LSRV)	▪ Additional incentive for DER developed in high value areas

Value Stack Phase 1 vs Phase 2

		VALUE STACK	
		Effective 11/01/2017 for projects that qualified for Value Stack between 07/18/2017 and 07/26/2018 [1]	Effective 6/1/19 for projects qualified for Value Stack after 7/26/18 [1]
	Component	Phase 1 Eligibility	Phase 2 Eligibility
Supply	Energy	All Value Stack-eligible projects	All Value Stack-eligible projects
	Installed Capacity (Alt 1)	All intermittent resources [2]	All intermittent resources [2]
	Installed Capacity (Alt 2)	$/kWh for 460 summer hours; All intermittent resources	$/kWh for 240 or 245 summer hours. All intermittent resources
	Installed Capacity (Alt 3)	Required for dispatchable resources [3] Optional for intermittent resources	Required for dispatchable resources [3] Optional for intermittent resources
	Environmental	Solar PV, Fuel Cell, Hydro, Wind, Tidal, Biomass[4]	Solar PV, Fuel Cell, Hydro, Wind, Tidal, Biomass [4]
Distribution	Demand Reduction Value (DRV)	All; if eligible for MTC, DRV is included in MTC	Available for export in 4 hour window during summer non-holiday weekdays between 6/24 - 9/15. Window assigned during incerconnection.
	Market Transition Credit (MTC)	For portion of CDG exports that go to mass market customers only (SC1 and SC2 non-demand billed)	No longer available
	Locational System Relief Value (LSRV)	For customers in high value areas, as long as MW Cap has not been reached	Will now be based on 10 LSRV events called between 6/24 and 9/15 each year

1 Qualification based on date of payment of at least 25% of interconnection costs, or date of executed interconnection agreement if payment is not required

2 Intermittent resources include: Solar (Photovoltaic), Wind, and Micro hydroelectric

3 Dispatchable resources include: Farm Waste Generation, Biomass, Tidal Power, Fuel Cells, Micro-CHP, and Standalone Energy Storage

4 Eligibility for RECs for Biomass generation depends on the fuel source – please see NYSERDA Guidelines

Value Stack Phase 2

- Expanded the eligibility of Phase One NEM to projects with generating equipment that has a rated capacity of 750 kW or lower and has an estimated annual output less than or equal to 110 % of the customer's historic annual kWh usage
  - Applies to demand billed on-site customers
    - not applicable to RNM or CDG customers

Expanded Eligibility

Order Dated September 12, 2018

Expanded Eligibility Definition

- Residential PV systems can be sized up to 5 MW and receive Value Stack compensation for export
- Added new technology types now eligible for Value Stack (**standalone storage***, regenerative braking, vehicle to grid, tidal energy and biomass generators **up to 5 MW**)
- Any commercial Value Stack project can be a CDG host, regardless of host technology
- Allows inter-zonal crediting (no impact to O&R since O&R service territory is within one zone)

*Standalone storage = electric energy storage system that is not paired or co-located with any other electric generating technology on the same account

Expanded Eligibility Billing

- Non-Residential
  - Billed for consumption under SC25 Standby provisions
  - MDAHP required for full service customers (unless storage capacity is less than 115% of demand)
  - Full service customers with storage nameplate rating or inverter capability less than 115% of customer's load can opt into Voluntary DHAP
  - SC15 Buyback rates apply for hourly injection (export) into the grid but customer may opt into Value Stack tariff

Expanded Eligibility Credits

- Non-Residential (new eligible technologies)
  - Credited for export under SC15 Buyback
  - Customer may opt into modified Value Stack crediting for export

MODIFIED VALUE STACK			
Credit Element	Stand-Alone Other Tier 1	Stand-Alone Storage/Braking	Non-NEM CHP
Energy	**Yes**	**Yes**	**Not at this time**
Capacity	**Alt. 3**	**Alt. 3**	**Not at this time**
Environ.	**Yes**	**No**	**Not at this time**
LSRV	**Yes**	**Yes**	**Not at this time**
DRV	**Yes**	**Yes**	**Not at this time**
MTC	**No**	**No**	**Not at this time**
Project Size Limit	**5 MW**	**5 MW**	**N/A**

Standby & Buyback Service Rates

Standby Service Rates (SC25)

- Electric Standalone Storage (ESS) projects
  - Mandatory SC25 Standby rates charged for usage and SC15 buyback compensation for export, for ESS with maximum capability greater than 1 MW
  - Less than 5MW may opt in to Value Stack for export
  - Projects greater than 5MW, no opt in to Value Stack

- As of July 1, 2019, non-residential demand-billed customers with or without generating equipment can opt into Standby Service rates

Buyback Service Rates (SC15)

- Customers take service under SC15 if the export of the generating facility exceeds the usage on the Standby (SC25) account
- Under SC15, customers may sell energy to the Company:
  - The payment rate for energy will be based on the applicable wholesale rate, which is the Locational Based Marginal Price (LBMP) set by the New York Independent System Operator (NYISO), increased for line losses
- Customer pays a customer charge and a contract demand charge based on the generating facility's ability to deliver energy to the grid
- Eligible customers can opt in to Value Stack compensation for export

Hybrid Energy Storage System

Order dated December 13, 2018

Hybrid Energy Storage Definition

- A facility that has an Electric Energy Storage (Storage) system with a Rider N eligible electric generator on same account
- Facility has a maximum instantaneous aggregate export of no more than 5MW
- 4 configuration options available
  - Option A: Project charges exclusively from the renewable generator and not from the utility system
  - Option B: Project uses the storage resource only to serve on-site load; no injections to the utility system
  - Option C & D: More complex usage models; storage system may be charged from both the renewable generator or the utility system and injections may come from either the renewable generator or the storage resource
- Compensation for injections will be determined based on configuration

Hybrid Energy Storage Billing & Credits

- Billing for Non-Residential Customers
  - Billed for consumption (import) under SC25 provisions
  - MDAHP required for full service customers with a storage nameplate rating or inverter capability more than 115% of customer's load
  - Full service customers with Storage nameplate rating or inverter capability less than 115% of customer's load can opt into Voluntary DHAP
- Credits
  - Export will be credited under SC15
  - Customer can opt-in to modified Value Stack according to configuration option chosen
  - Can change between SC15 and Value Stack once every 12 months

Orange & Rockland Utilities Resources

- Orange & Rockland DG website: www.oru.com/dg
- Orange & Rockland solar website: www.oru.com/solar
- Orange & Rockland Guides: Private_Generation_Tariffs
- Orange & Rockland Electric Tariff including Rider N

Reference

Value of DER Eligibility

Customer Type		Grandfathered	Phase One NEM	Value Stack	
				Phase One	Phase Two
Mass Market Residential and Small Commercial (Not demand billed)	Tariff	NEM	Phase One NEM	Value Stack	Value Stack
	In-service	On or before 3/9/17	Between 3/10/17 through 1/1/20 or date of Phase 2 order, whichever is earlier	Opt -in prior to 6/1/19	Opt-in after 6/1/19
	Duration	Life of the system	20 years from the in-service date	25 years from the in-service date	25 years from the in-service date
Large C&I / Remote Net Metering (RNM)	Tariff	NEM	Phase One NEM	Value Stack	Value Stack
	In-service	On or before 3/9/17	Pay interconnection deposit on or before 7/17/17*	Pay interconnection deposit on or prior to 7/26/18	Pay interconnection deposit on or after 7/27/18
	Duration	Life of the system	20 years from the in-service date	25 years from the in-service date	25 years from the in-service date
Community DG (CDG)	Tariff	NEM	Phase One NEM	Value Stack	Value Stack
	In-service	On or before 3/9/17	Projects in O&R Tranche 0/1	Projects in Tranche 2 - 4 who were assigned a Tranche position on or prior to 7/26/18	Projects with no Tranche position
	Duration	Life of the system	20 years from the in-service date	25 years from the in-service date	25 years from the in-service date

* Interconnection 25% down payment submitted, if any, or interconnection agreement signed

Thank you for joining us!