



Fall 2023 Compliance and Reliability Conference

Scott Nied

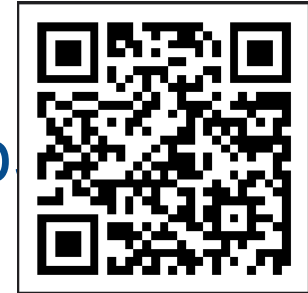
Vice President Compliance

November 8, 2023



Welcome and Housekeeping

- Slido is for questions and feedback
- NPCC website: Program Areas, Compliance, Workshop
 - Agenda
 - Biographies
 - Slides
 - Draft of upcoming NPCC CMEP Survey
 - Issuing survey to PCCs in mid-November
 - Opportunity to provide comments
 - Put any must-haves for us to consider into Slido by COB 11/10/23.



Slido.com
#NPCC2023



Safety Message



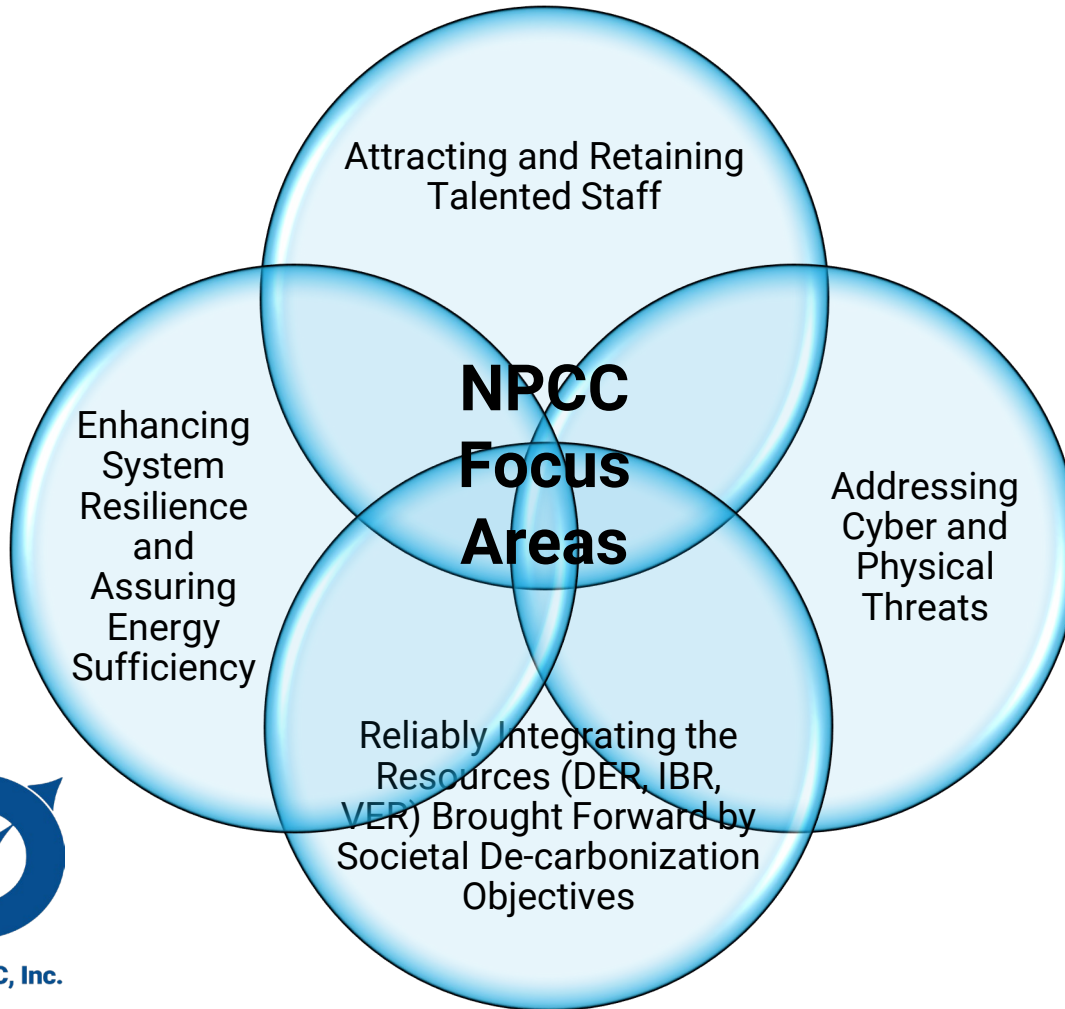


Proviso

The information provided today at this workshop is intended to provide accurate and helpful guidance and education to industry and interested stakeholders. The information provided in this workshop is nonbinding and should not be relied upon for compliance or for other matters. The governing documents for compliance and other matters include the applicable NERC Reliability Standard, NERC Rules of Procedure, various regulatory agency orders, approved Implementation guidance and other laws, rules, and regulations. Compliance with Reliability Standards ultimately depends on the facts and circumstances, quality of evidence, and the language of the Reliability Standard.



NPCC 2024 – 2027 Strategic Focus Areas and NERC 2023 Risk Profiles



1. Energy Policy
2. Grid Transformation
3. Resilience/Extreme Events
4. Security Risks
5. Critical Infrastructure Interdependencies

NERC Board of Trustees Approved 8/17/23



Extras

- Interregional Transfer Capability Study
 - October 24 New Initiative tab on NERC website
- FERC Orders more IBR Standards Development Work
 - October 19



Questions?

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability Risks

Howard Gugel, Vice President of Compliance Assurance and Registration
NPCC Conference
November 8-9, 2023

RELIABILITY | RESILIENCE | SECURITY



- Unplanned generation losses exceeding 70,000 MW
- Firm load shed exceeding 5,000 MW
- Load forecasts were off significantly
- Dry natural gas production decreased
- Issues in production, processing, and pipeline for natural gas
- Reinforced past reports

So what does this mean for the grid?

- Firm gas may not be “firm”
- Load prediction models are limited
- We get what we expect from renewables
- Capacity ➡ energy
- Retirements ≠ renewables

- Retire 100 MW gas generator with solar/batteries
- 2400 MWh needed
- Assume average 8 hours of sunlight
- 100 MW during 8 hours (800 MWh)
- 100 MW storage during 16 hours (1600 MWh)
- 200 MW to charge storage during 8 hours (1600 MWh)
- Need 300 MW of solar and 1600MWh of storage
- Assumes no losses in conversion

Now what actions should be the focus?

- Cold weather standards
- Standard revisions for inverter-based resources
- Planning requirements that focus on energy sufficiency at all hours, not just “peak”
- Registering inverter based resources
- Outreach to states to coordinate efforts on distribution

- EOP-012-2 addresses the following:
 - 1a - identify cold-weather-critical components and systems for each generating unit
 - 1b - identify and implement freeze protection measures for the cold-weather-critical components and systems
 - 1c - account for the effects of precipitation and the accelerated cooling effect of wind when providing temperature data.

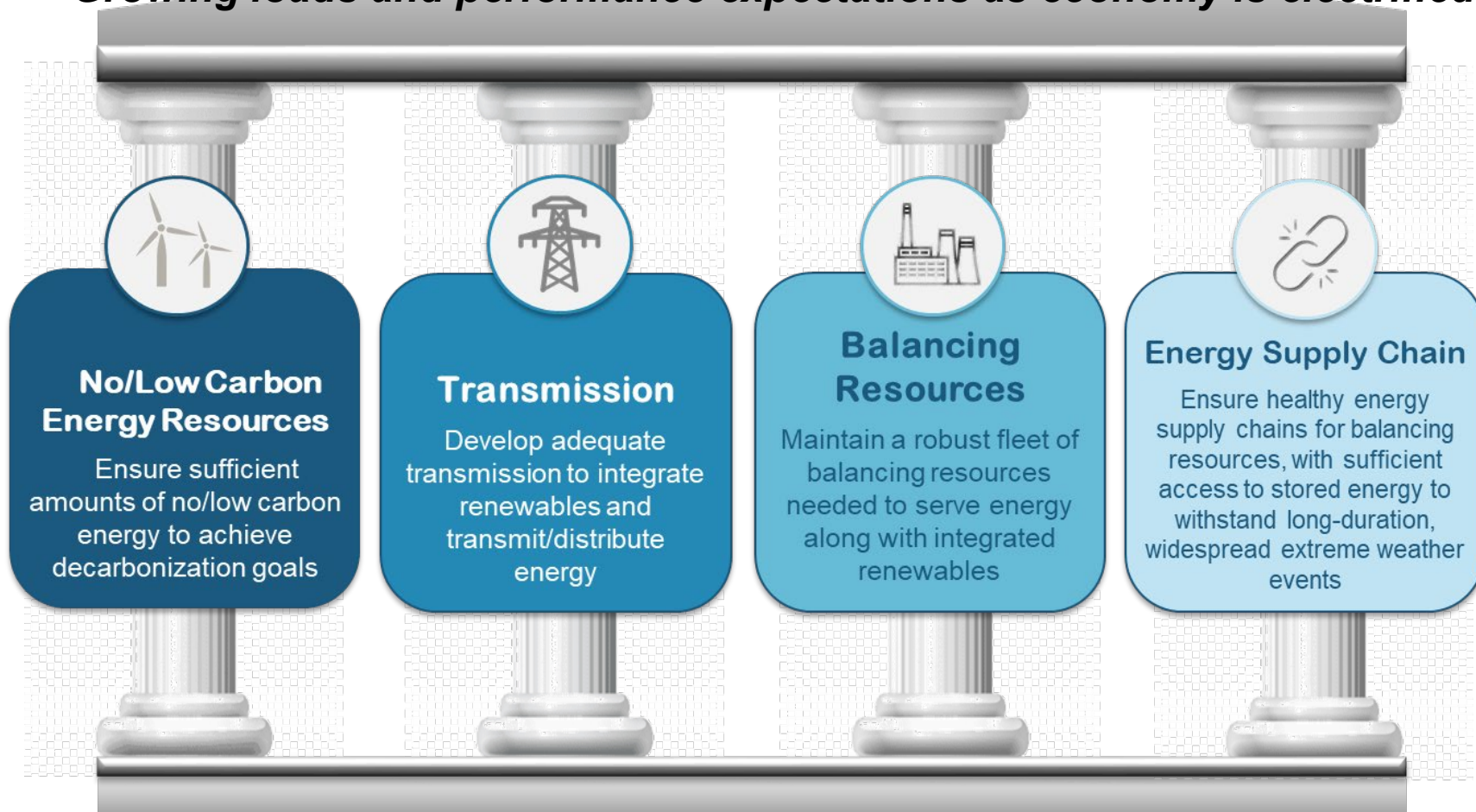
- EOP-012-2 addresses the following:
 - P58 - revise the applicability of the standard to ensure that it captures all BES generation resources needed for reliable operation and excludes only those generation resources not relied upon during freezing conditions
 - P66 - include auditable criteria on permissible constraints and to identify the appropriate entity that would receive the generator owners' constraint declarations under EOP-012-1 Requirements R1 and R7
 - P89 - modify EOP-012-1 Requirement R1 to ensure that generators that are technically incapable of operating for 12 continuous hours (e.g., solar facilities during winter months with less than 12 hours of sunlight) are not excluded from complying with the standard
 - P79 - any requirement requiring the development of a corrective action plan to address capability or cold weather performance issues, shall include a deadline or maximum period for the completion of corrective action plan measures
 - P88 - require a shorter implementation period than five years post approval, as well as a staggered implementation for unit(s) across a generator owner's fleet

- Effective 10/1/2024:
 - R1 – ECWT and unit cold weather information
 - R2 – Applicable to generating units with a commercial operation date on or after October 1, 2027
 - R4 – Cold Weather Preparedness Plan
 - R5 – Annual Training on Cold Weather Preparedness Plan
 - R6 – If a Generator Cold Weather Reliability Event (GCWRE) occurs, develop a Corrective Action Plan within 150 days of July 1, whichever is earlier
 - R7 – Timelines for the completion of Correction Action Plans
 - R8 – Generator Cold Weather Constraint declarations
- Effective 10/1/2025
 - R3 – Applicable to generation unit(s) in commercial operation prior to October 1, 2024

- Posting includes:
 - Clean, redline to last posted, redline to last approved for EOP-012
 - Technical Rationale for EOP-012
 - Implementation Plan
 - Mapping Document
- Posting Dates:
 - Comment period through November 30, 2023
 - Ballot open November 21 – 30, 2023
- Industry Webinar November 16, 1-2pm EST

Moving Forward: The Four Pillars of the Energy Transition

Growing loads and performance expectations as economy is electrified





Energy: Tackle the challenge of grid transformation and climate change-driven, extreme weather



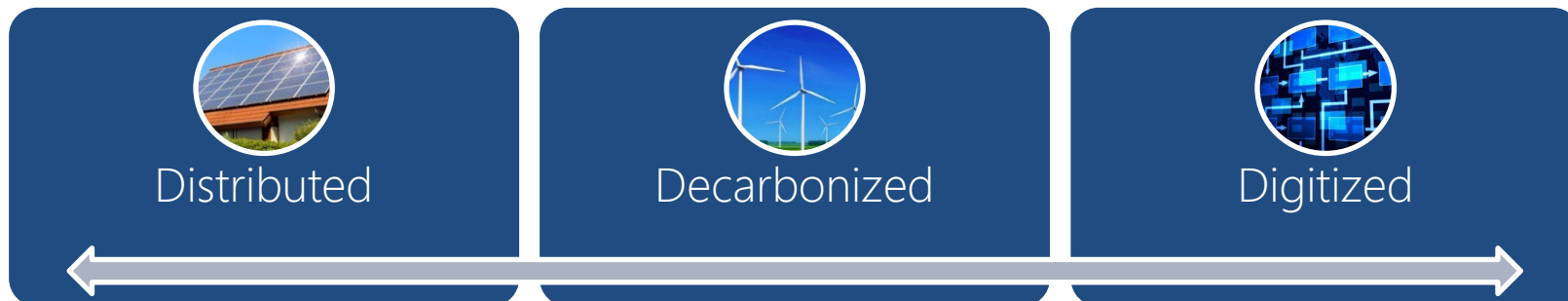
Security: Move the needle by focusing on supply chain, Information Technology (IT) and Operational Technology (OT) system monitoring, cyber design, and evolution of the Critical Infrastructure Protection (CIP) Standards



Agility: Tool the company to be more nimble in key areas, particularly standards development, internal operational processes



Sustainability: Invest in ERO systematic controls, eliminate single points of failure, strengthen succession planning, and ensure robust cyber security protections for all systems



Must Wins:

1. **Manage the pace of transformation** through market mechanisms and inter-agency coordination on policies that impact generation
2. Develop sufficient **transmission**, to integrate renewables and distribute them, make the system more resilient
3. Maintain a robust fleet of **balancing resources**, with an ability to provide **Essential Reliability Services**
4. Ensure a robust **energy supply chain** for the balancing resources, with sufficient access to fuel and stored energy to withstand long-duration, wide-spread extreme weather events
5. **STATES:** Refine resource adequacy requirements that preserves energy assurance



Questions and Answers



Inverter Based Resources Work Plan

Brian Robinson – Manager, ERA



Agenda

- FERC Directive: Registration of Inverter Based Resources (IBR)
- NERC's Workplan
 - Rule of Procedure Proposed Modifications
 - Identification of Unregistered Inverter Based Resources
- Standard Development Directive



FERC's Concern

While Individual IBRs may not have a “material” impact on the BES...
In Aggregate, unregistered IBRs do.

“Therefore, we find that it is necessary to ensure that unregistered IBRs that may have an aggregate material impact on the reliable operation of the Bulk-Power System are required to: (1) register with NERC, and (2) comply with NERC Reliability Standards.”

[FERC Order RD22-04-000](#)



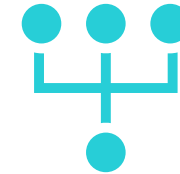
FERC Order: “Registration of Inverter Based Resources”



FERC Order in November 2022



Directed NERC to, within 90 days, file a plan to identify and register “unregistered inverter based resources”



Requirements of the work plan

Within 12 months: How the Registration process will be modified

Within 24 months: Identification of owners and operators of the “unregistered inverter based resources”

Within 36 months: Unregistered IBR are registered and required to comply with applicable standards

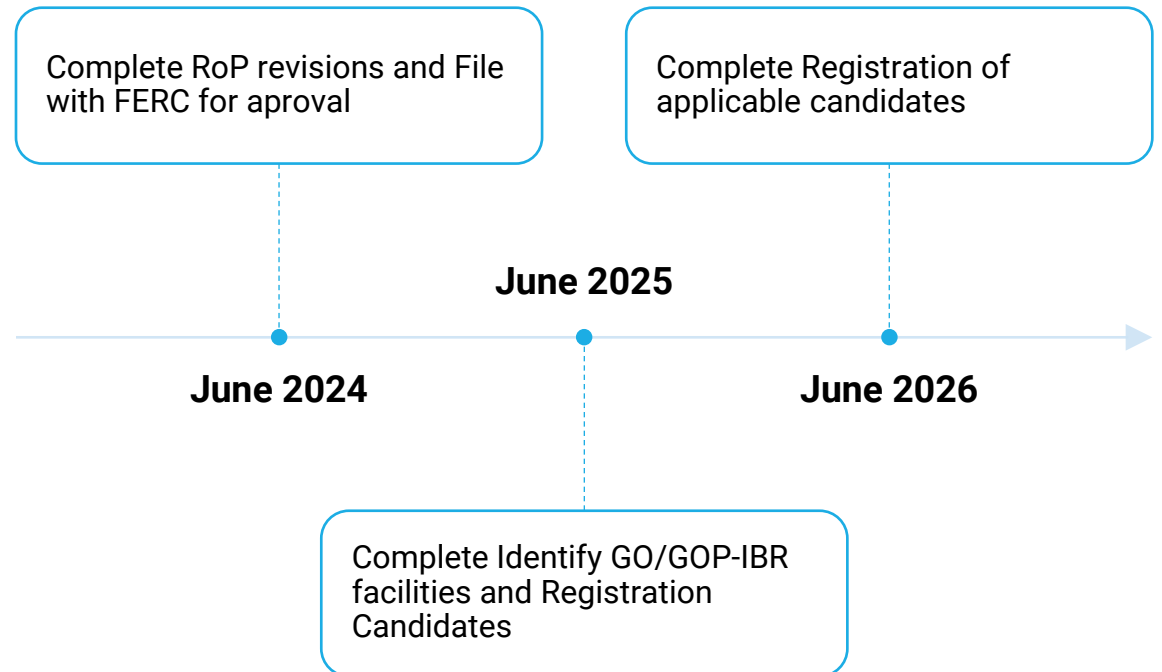


NERC Response: The IBR Work Plan

- NERC filed response on February 15, 2023 (amended in March 2023) highlighting:
 - RoP Changes,
 - Identification of IBRs,
 - IT modifications

NERC Work-Plan

- FERC Approved May 18, 2023 (Clock Starts June 2023)





Rules of Procedure (RoP) Modifications

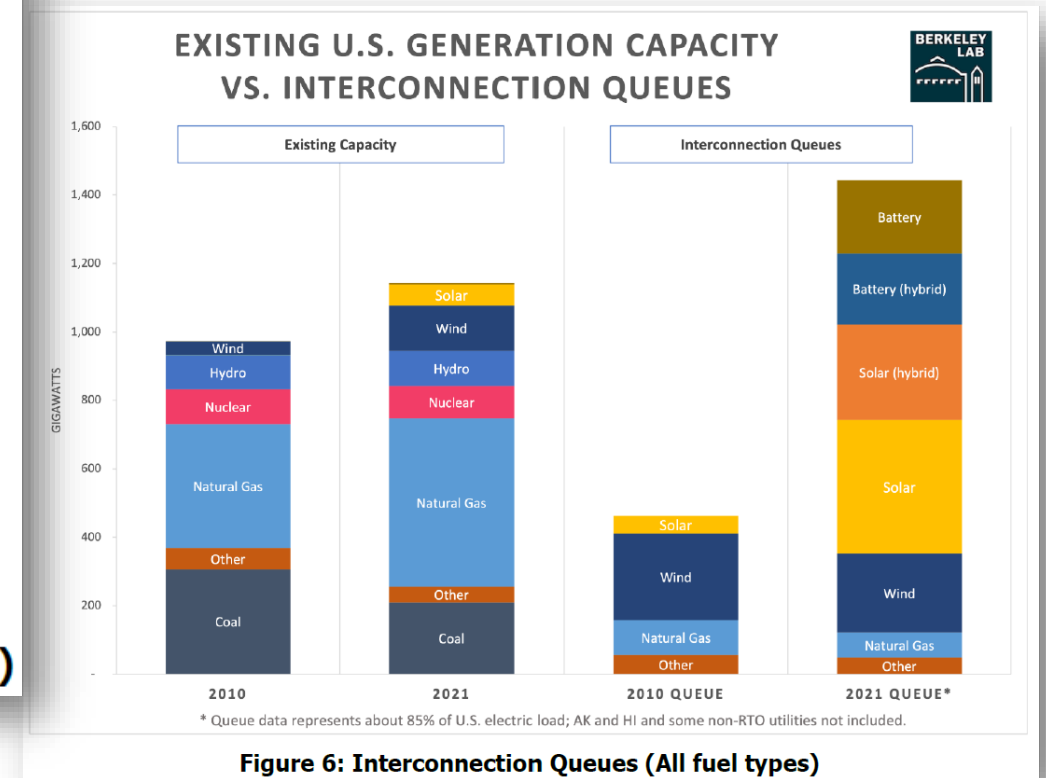
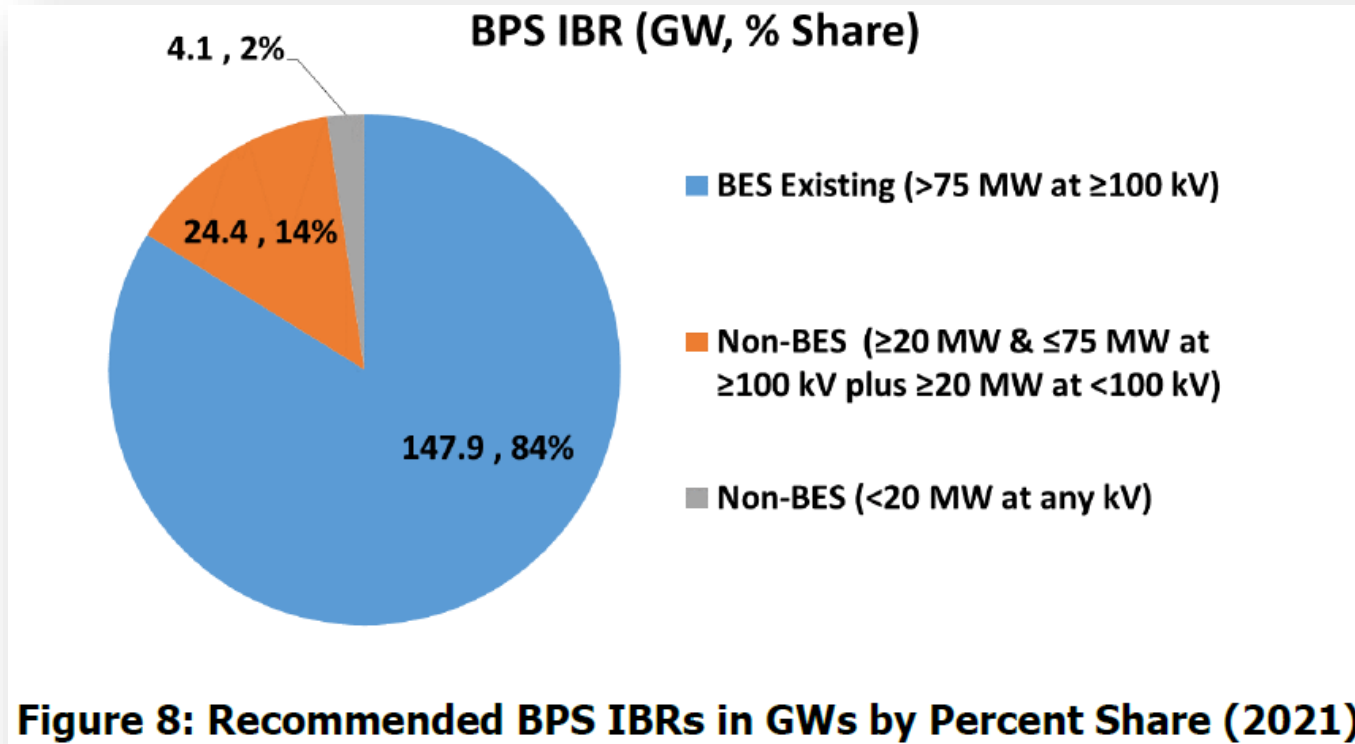
... Generator Owner-Inverter-Based Resource (GO-IBR) and/or Generator Operator Inverter-Based Resource (GOP-IBR) if the entity owns, maintains, or operates non-BES inverter based generating resources that have an aggregate nameplate capacity of greater than or equal to 20 MVA, delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV

Footnote: Owners and operators of IBRs that meet the BES threshold shall be registered as a GO or GOP, as applicable. Entities that own and operate both BES and non-BES IBRs will be registered as both a GO and GO-IBR and/or a GOP and GOP-IBR, as applicable.

[Rules of Procedure \(nerc.com\)](http://nerc.com)



Results of RoP changes





Consideration of Comments

- 18 Sets of Comments Received
- Team working on addressing comments
- Seeking BOT approval at February Meeting





Work Plan Updates

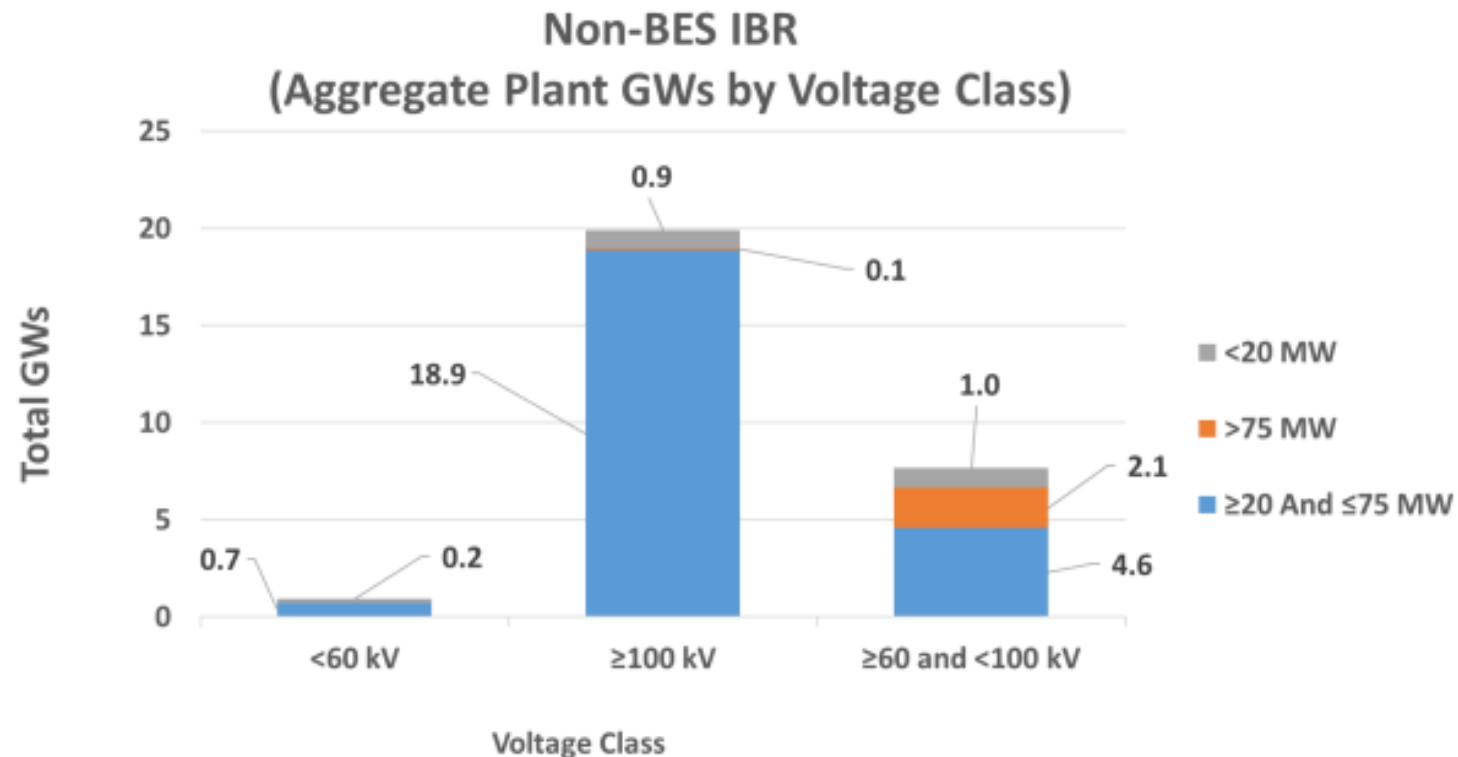
NERC is required to provide updates
Quarterly

August 2023 Update

Detailed timeline for the 36-month
period

Communication Plan for GO-IBR
Entities

Draft RoP language





Identification of IBR (F)acilities

- Combined Communication, Data Requests, and Cross Reference Effort
 - Data Request to RC, PC, TP, TO, DP entities
 - Energy Information Administration (EIA) Form 860 Database
 - <https://www.eia.gov/electricity/data/eia860/>
 - Issue bulletins and communications announcing registration obligations
- Parallel IT efforts
 - CORES



Standard Development Cont.: FERC Directive

- Issued October 19, 2023
- Inclusive of IBR, unregistered IBR, IBR-DER
- Allows for a staggered Standard development
 - November 2024
 - Performance Requirements
 - November 2025
 - Data Sharing
 - Model Validation
 - November 2026
 - Planning and Operational Studies



Current IBR Standard Development Projects

- Project 2018-04 – Modifications to PRC-024-2
- Project 2020-02 – Modifications to PRC-024 (Generator Ride-Through)
- Project 2020-05 – Modifications to FAC-001 and FAC-002
- Project 2020-06 – Verifications of Models and Data for Generators
- Project 2021-01 – Modifications to MOD-025 and PRC-019
- Project 2021-02 – Modifications to VAR-002
- Project 2021-04 – Modifications to PRC-002
- Project 2022-02 – Modifications to TPL-001-5.1 and MOD-032-1
- Project 2022-04 – EMT Modeling
- Project 2023-01 – EOP-004 IBR Event Reporting
- Project 2023-02 – Performance of IBRs



Resources

- [FERC Order RD22-4-000: Registration of IBR](#)
- [NERC Work-Plan](#)
- [Rules of Procedure \(nerc.com\)](#)
- [August Work Plan Update](#)
- [IBR Activities Reference Guide](#)
- [Filings and Orders \(nerc.com\)](#)



Questions?



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Using Geospatial Analytics for System and Operational Performance

Mark Waclawiak
Senior Manager – Operational Performance

Avangrid Networks - Subsidiaries



Central Maine Power Company (CMP)

Maine's largest electricity transmission and distribution utility. Established in 1899, CMP operates approximately 23,500 miles of distribution lines and 2,900 miles of transmission lines. It serves approximately 646,000 customers across 346 communities in central and southern Maine. For more information, visit www.cmpco.com.

New York State Electric & Gas Corporation (NYSEG)

Established in 1852, NYSEG operates approximately 35,000 miles of electric distribution lines and 4,500 miles of electric transmission lines across more than 40% of upstate New York. It also operates more than 8,300 miles of natural gas distribution pipelines and 20 miles of gas transmission pipelines. It serves approximately 907,000 electricity customers and 270,000 natural gas customers. For more information, visit www.nyseg.com.

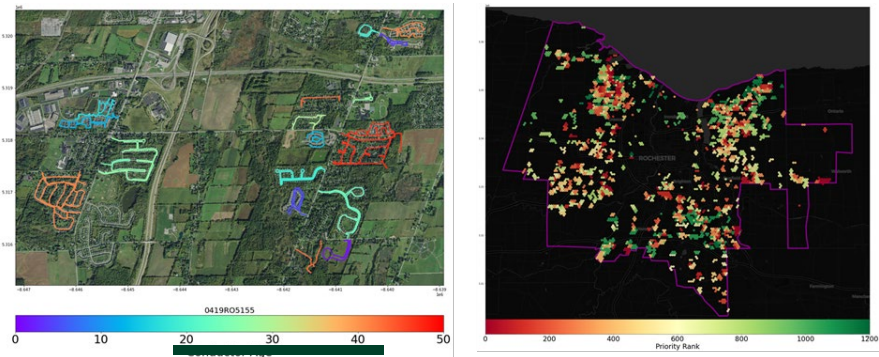
Rochester Gas and Electric Corporation (RG&E)

Established in 1848, RG&E operates approximately 8,900 miles of electric distribution lines and 1,100 miles of electric transmission lines. It also operates approximately 10,600 miles of natural gas distribution pipelines and 105 miles of gas transmission pipelines. It serves approximately 385,900 electricity customers and 319,000 natural gas customers in a nine-county region in New York surrounding the City of Rochester. For more information, visit www.rge.com.

The United Illuminating Company (UI)

Established in 1899, UI operates approximately 3,600 miles of electric distribution lines and 138 miles of transmission lines. It serves approximately 341,000 customers in the greater New Haven and Bridgeport areas of Connecticut. For more information, visit www.uinet.com.

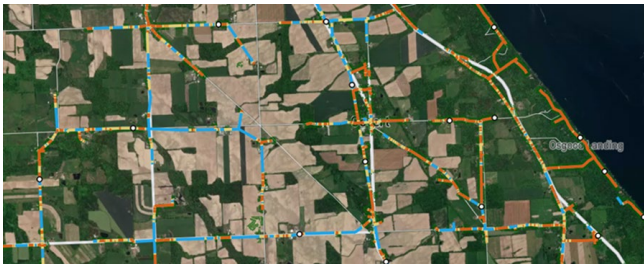
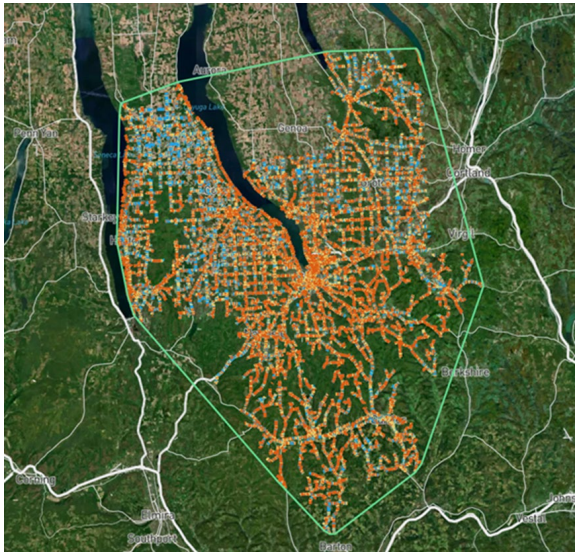
Operational Performance – Who are We?



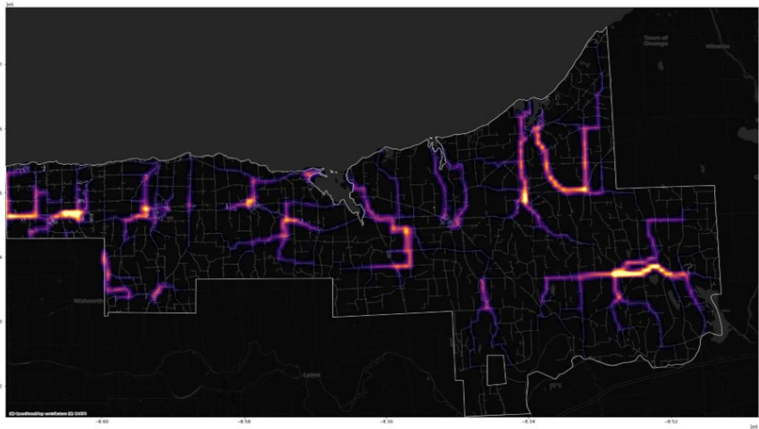
Utilizing Machine Learning models to develop prioritizations of underground replacement based on historical reliability, asset age, and predictive risk



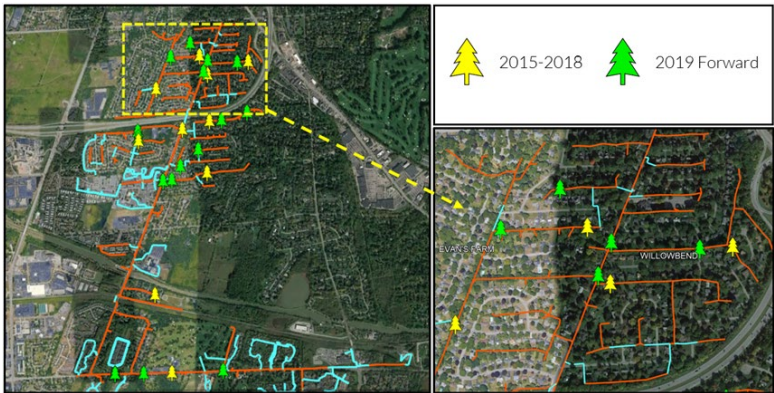
Training a neural network to identify asset locations in images and then a Random Forest classifier to sort overhead assets into health categories



Data analytics using satellite imagery to identify vegetation exposure in Ithaca, NY



Geospatial heatmapping in Sodus for strategic undergrounding



Development of data infrastructure to prioritize solutions of outages by cause

Utilizing industry-proven or developing new, customized models, algorithms, or computational methods, the Operational Performance group brings powerful insights into the reliability and resiliency of the electric grid and is critical to the prioritization of investment

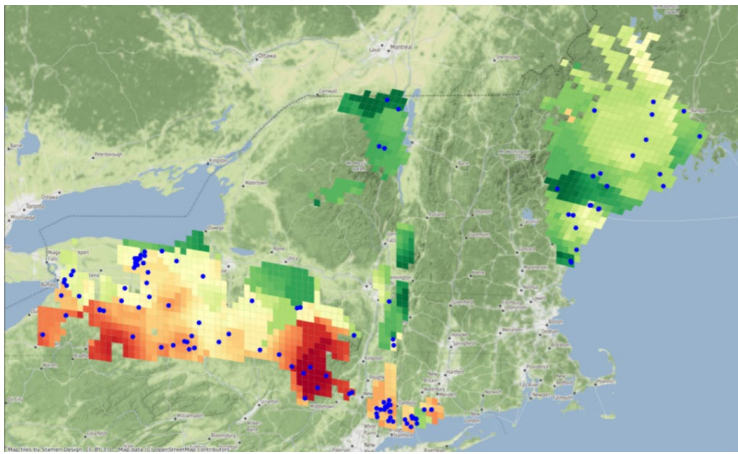
Innovation with Data Science and AI

GeoMesh

This project utilizes a geospatial platform to quantify the strengths and weaknesses of the network and develop Machine Learning models for predictive analytics.

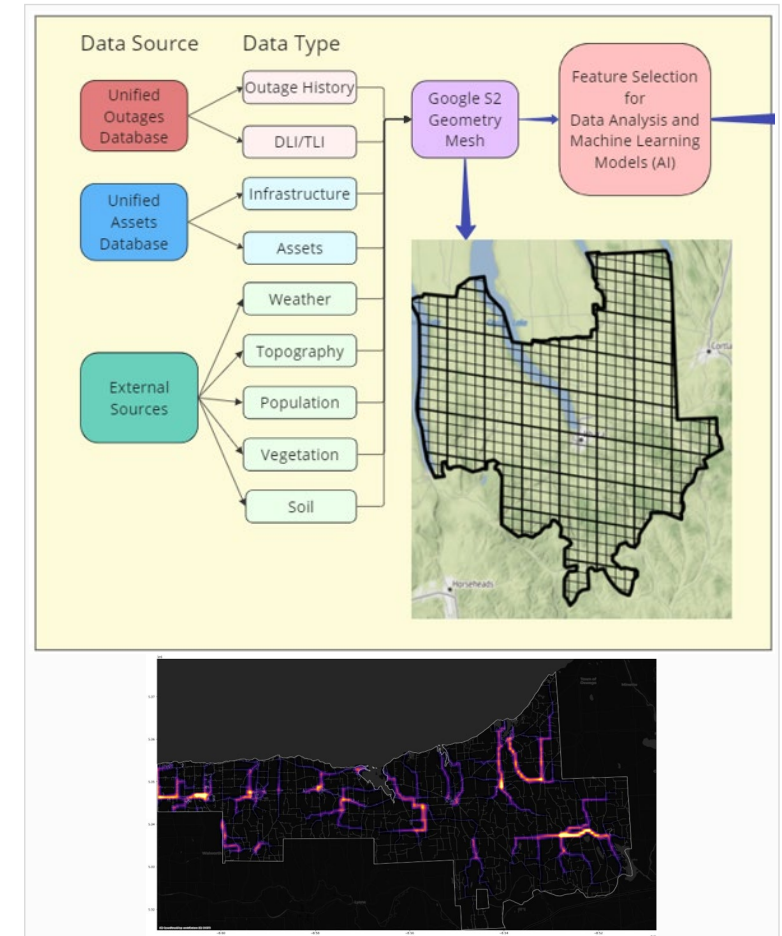
Overview

Geospatial platform comprised of numerous layers such as asset, reliability and weather data to measure the system's performance in different historical scenarios and develop predictive modeling to forecast future performance.



Benefits

- Measuring risk geographically and at increasingly localized granularity
- Maximizing SAIFI benefit of investments by targeting specific geographic weak points
- Smarter evaluation of system performance in grey and dark sky conditions to inform future operational decision-making
- Develop a geospatial platform for future system planning – load growth, electrification, and distributed generation

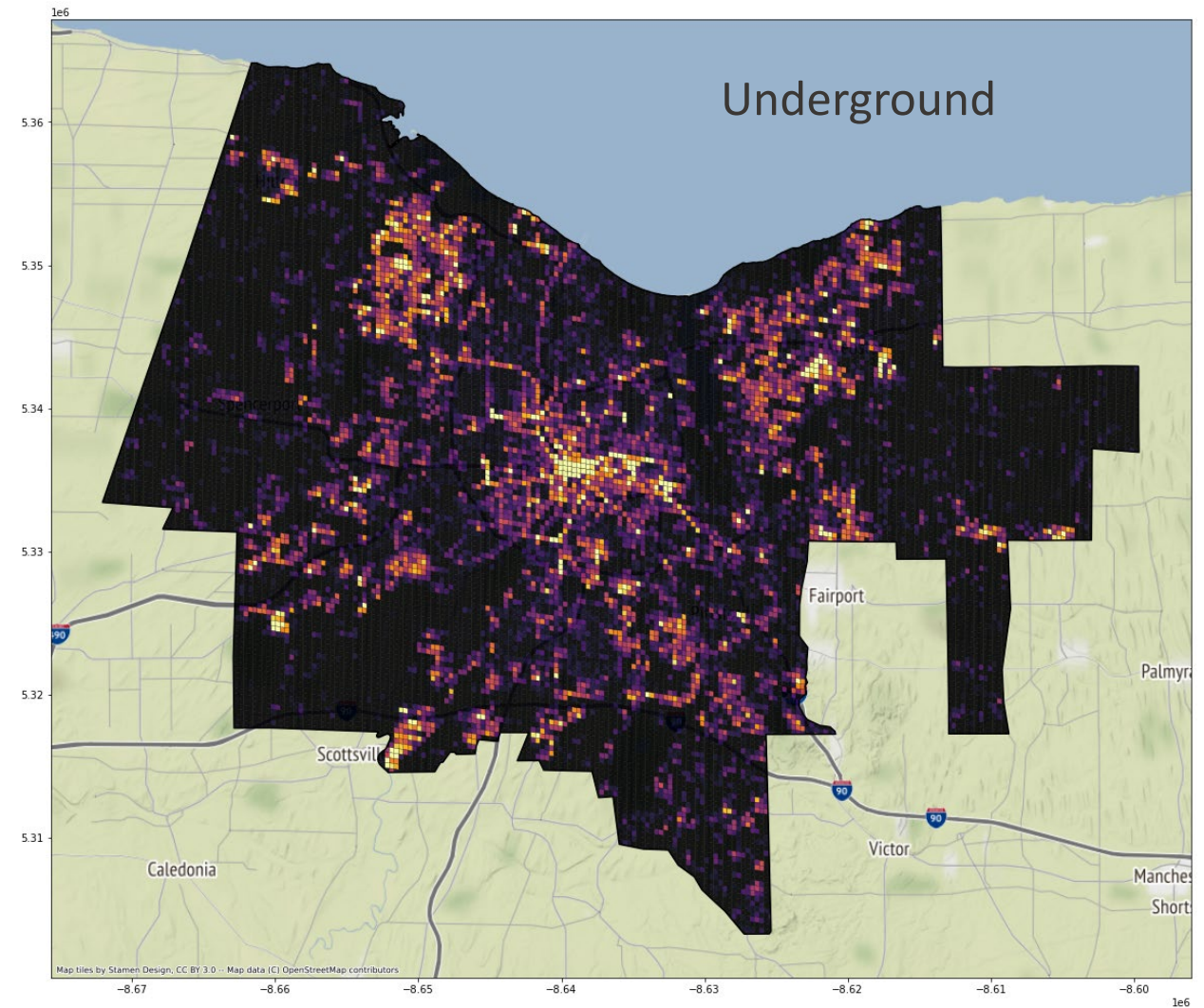
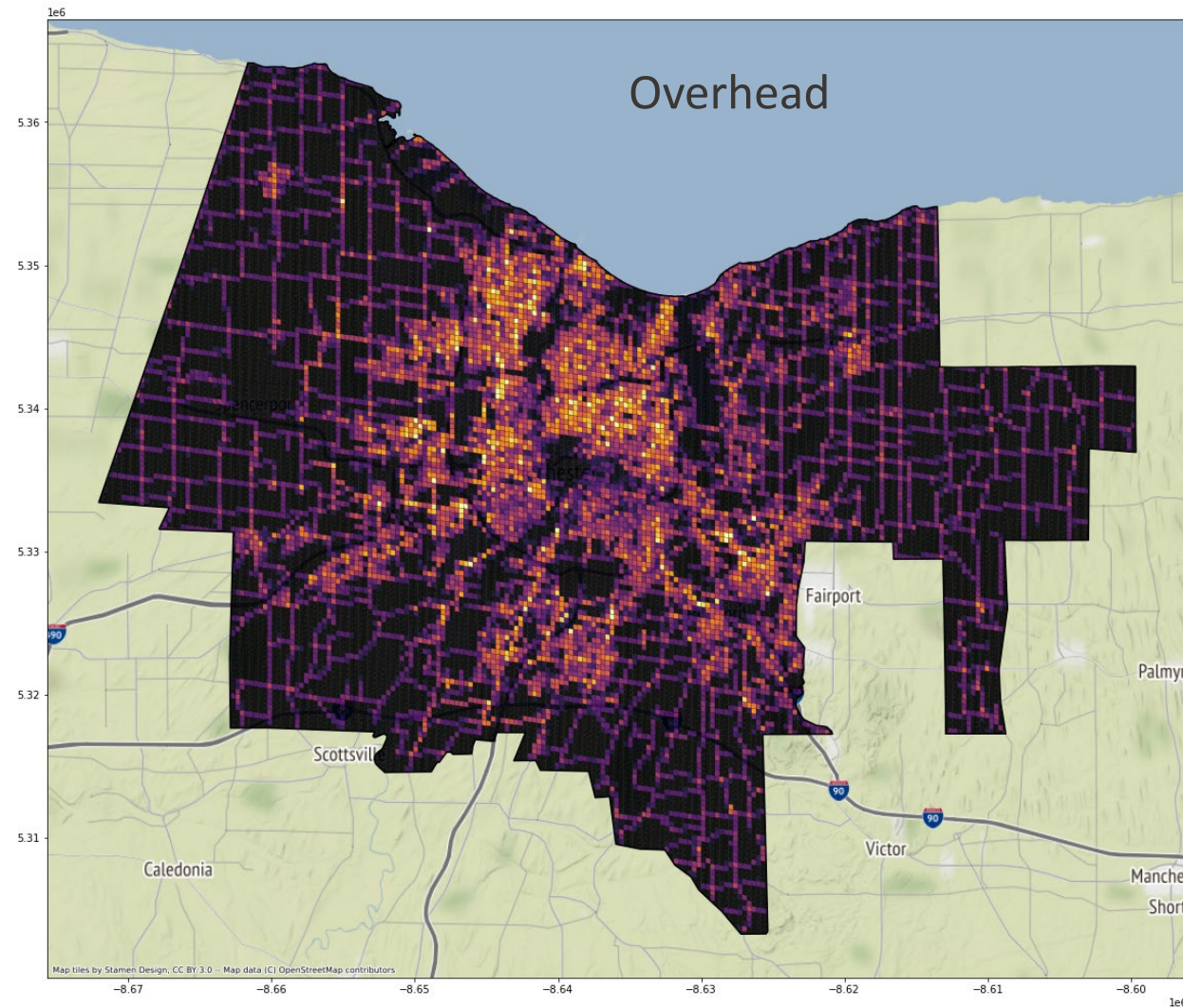


Operational Performance



Proof of Concept: Cell refinement Applications

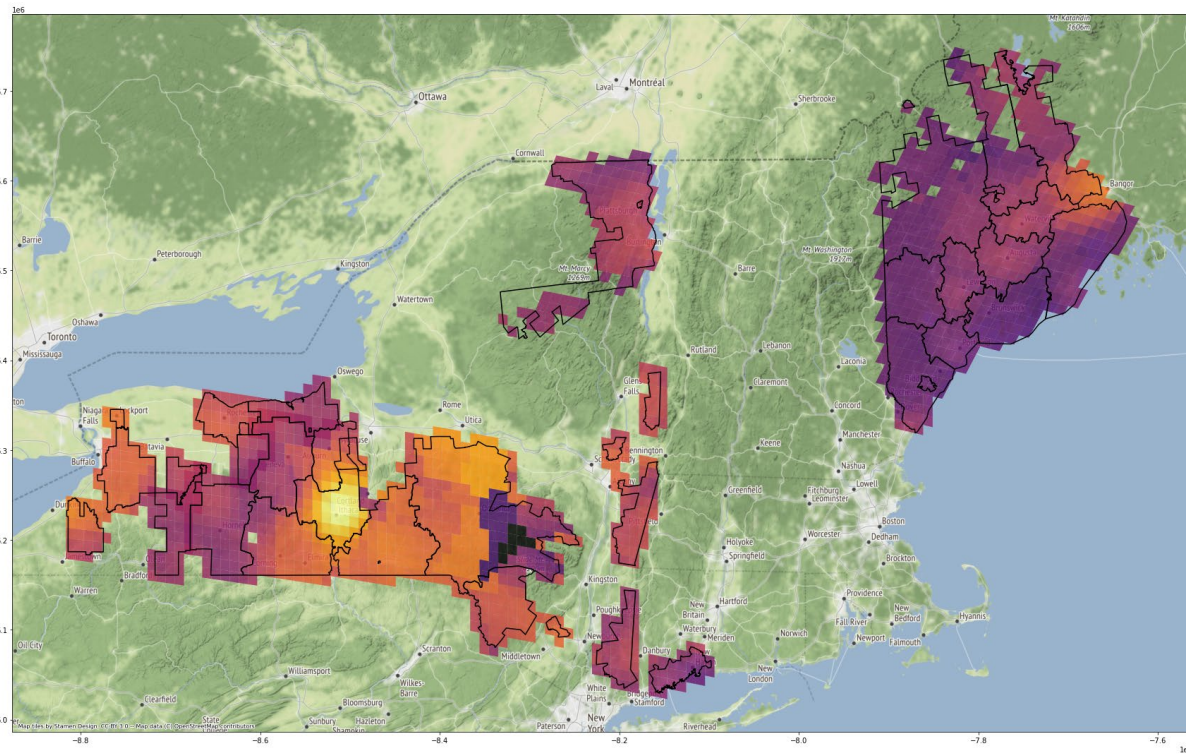
Can visualize the Overhead and Underground networks of RGE with customer density overlaid



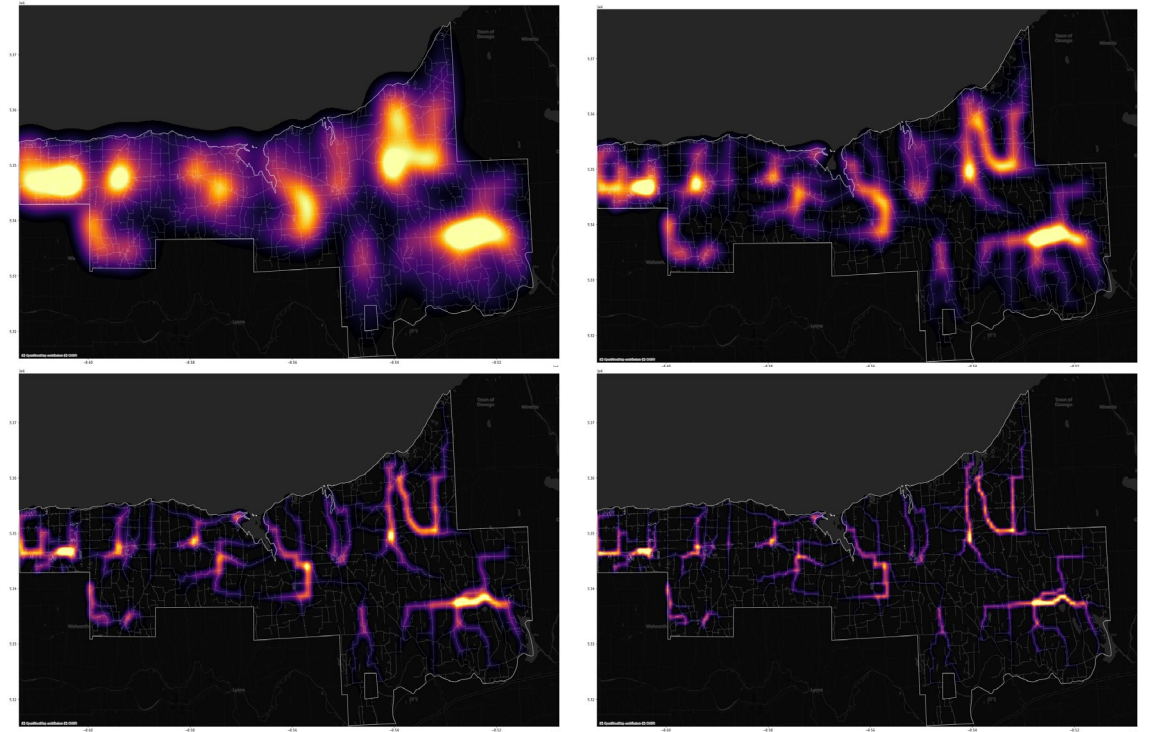


Proof of Concept: Cell refinement Applications

- Wind speed in our service territories on a specific day
- Aggregates data from NOAA and can overlay our asset/outage data



- Heatmap of customers downstream on circuits in Sodus, NY.
- Gives an idea of regional, or even down to circuit-level



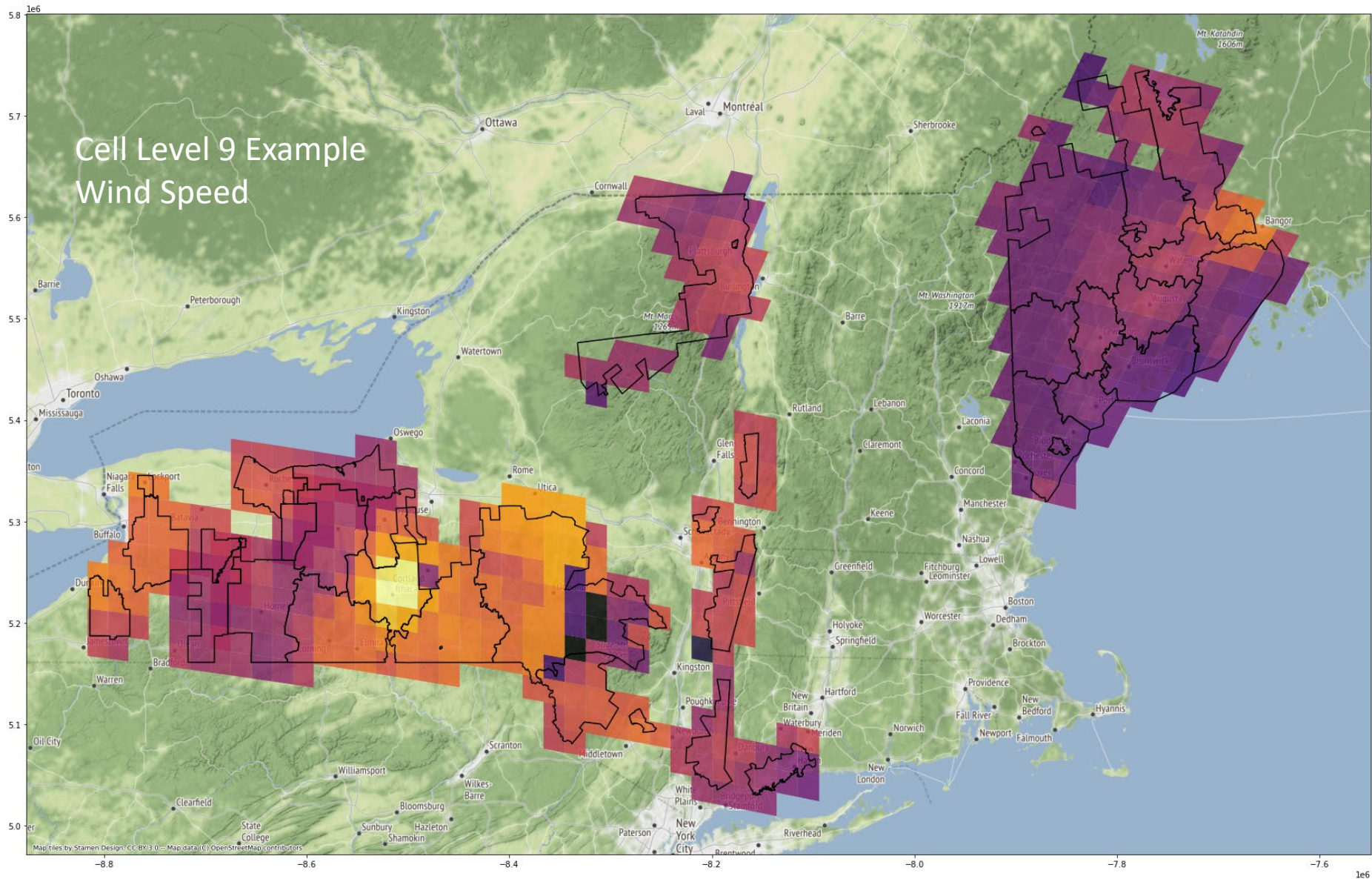


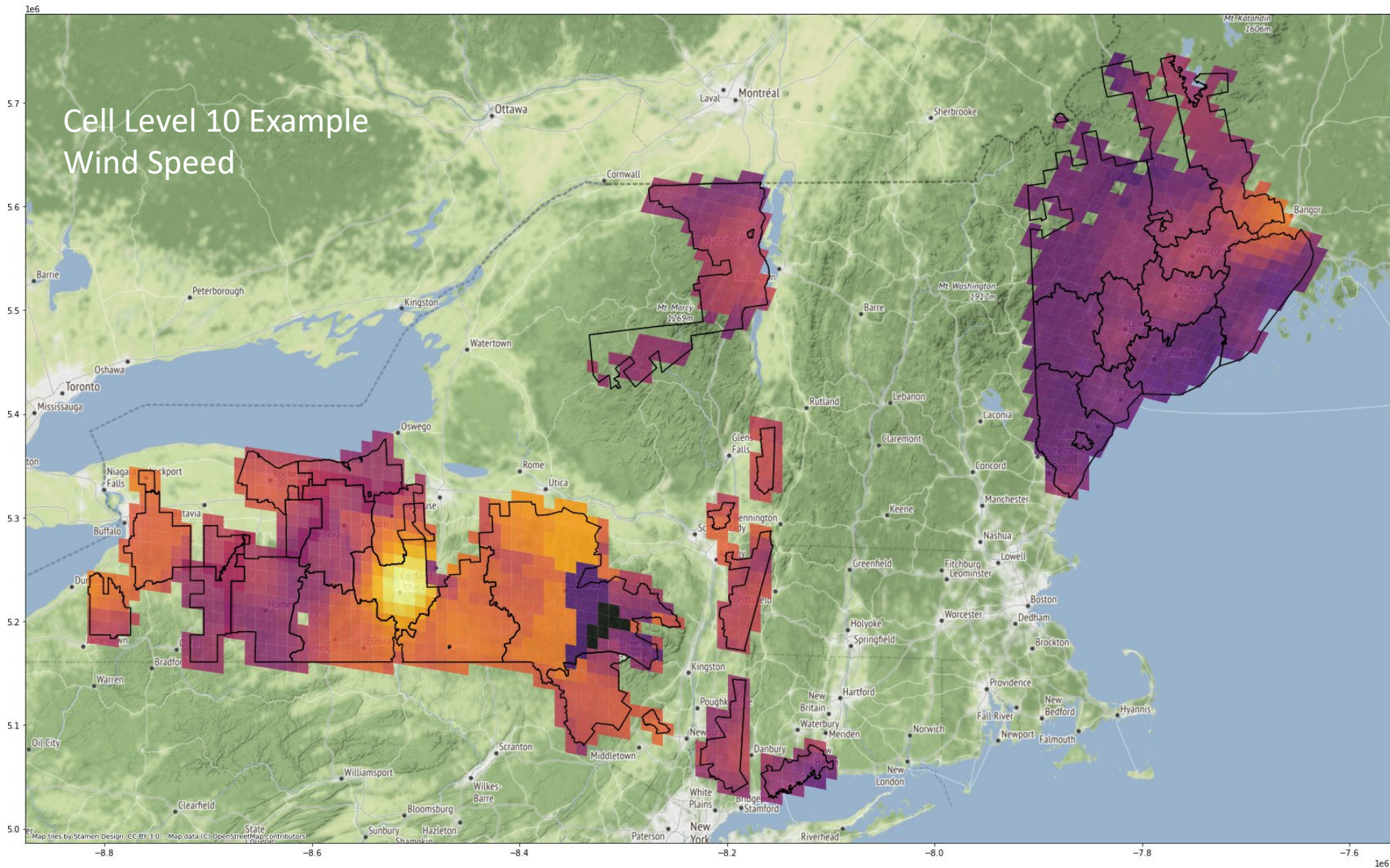
GeoMesh Preliminary Analysis using Weather Data

- Pulled in 10 years of daily weather data from 2013 to 2022 on cell level 9 and 10
 - more than 7 million daily weather records!

State	Level 9 Records	Level 10 Records
CT	43,824	91,300
ME	562,408	1,855,216
NY	1,073,688	3,465,748
All	1,679,920	5,412,264

- Weather data includes min/max temperatures, wind speeds, wind gusts, pressure, humidity, precipitation and precipitation type, and more

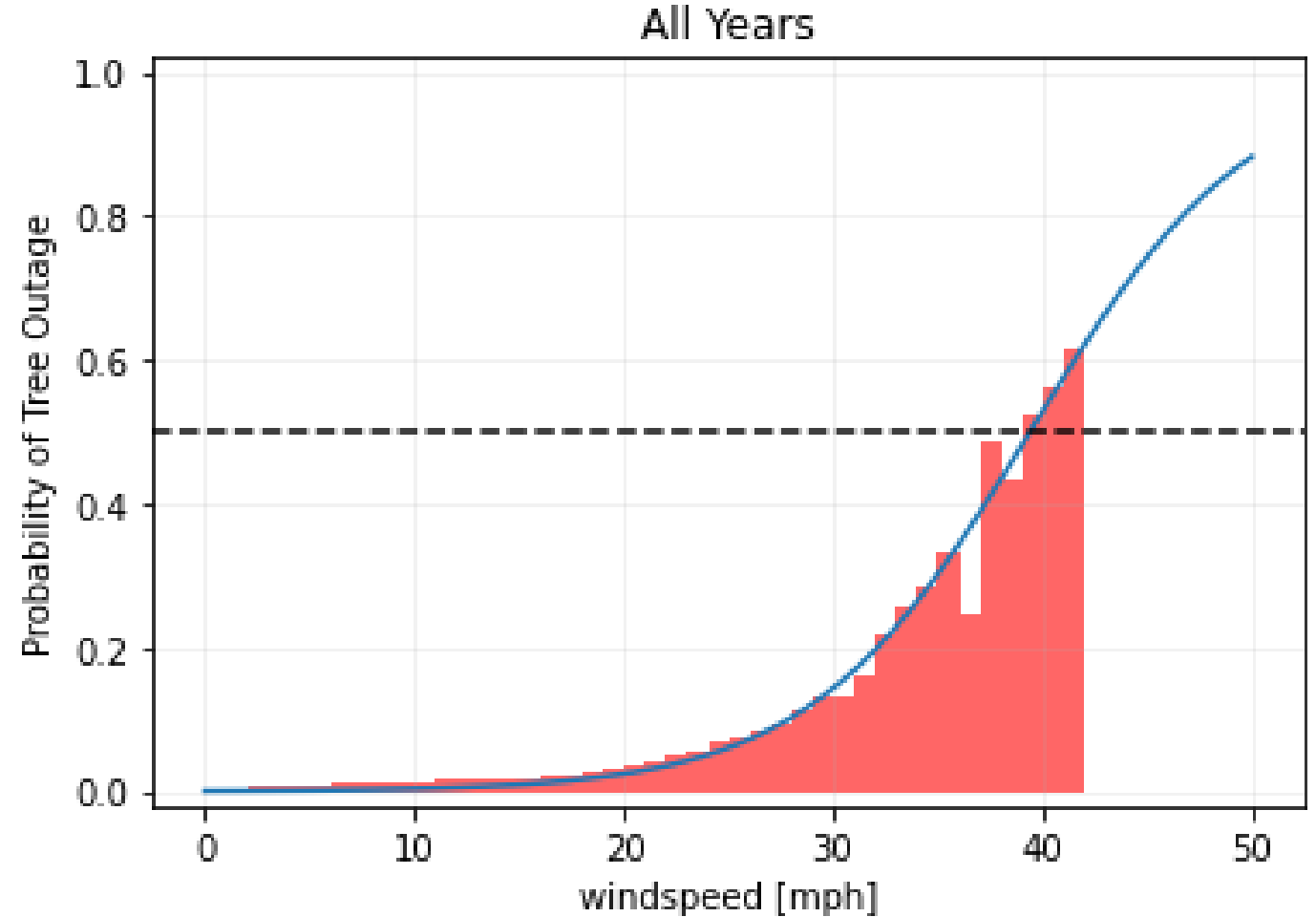






Example: NYSEG Sustained Wind Speeds and Tree Outages

- Can calculate the probability of a tree outage **in a cell** for a given windspeed
- When summing **all cells**, 50% probability around 38 mph
- Historically, have things been getting worse/better/staying the same?
 - Repeat analysis breaking our 10 years of data into 10 1-year segments and calculate the probability as a function of windspeed
 - Transforming the subjective into the objective through analytics

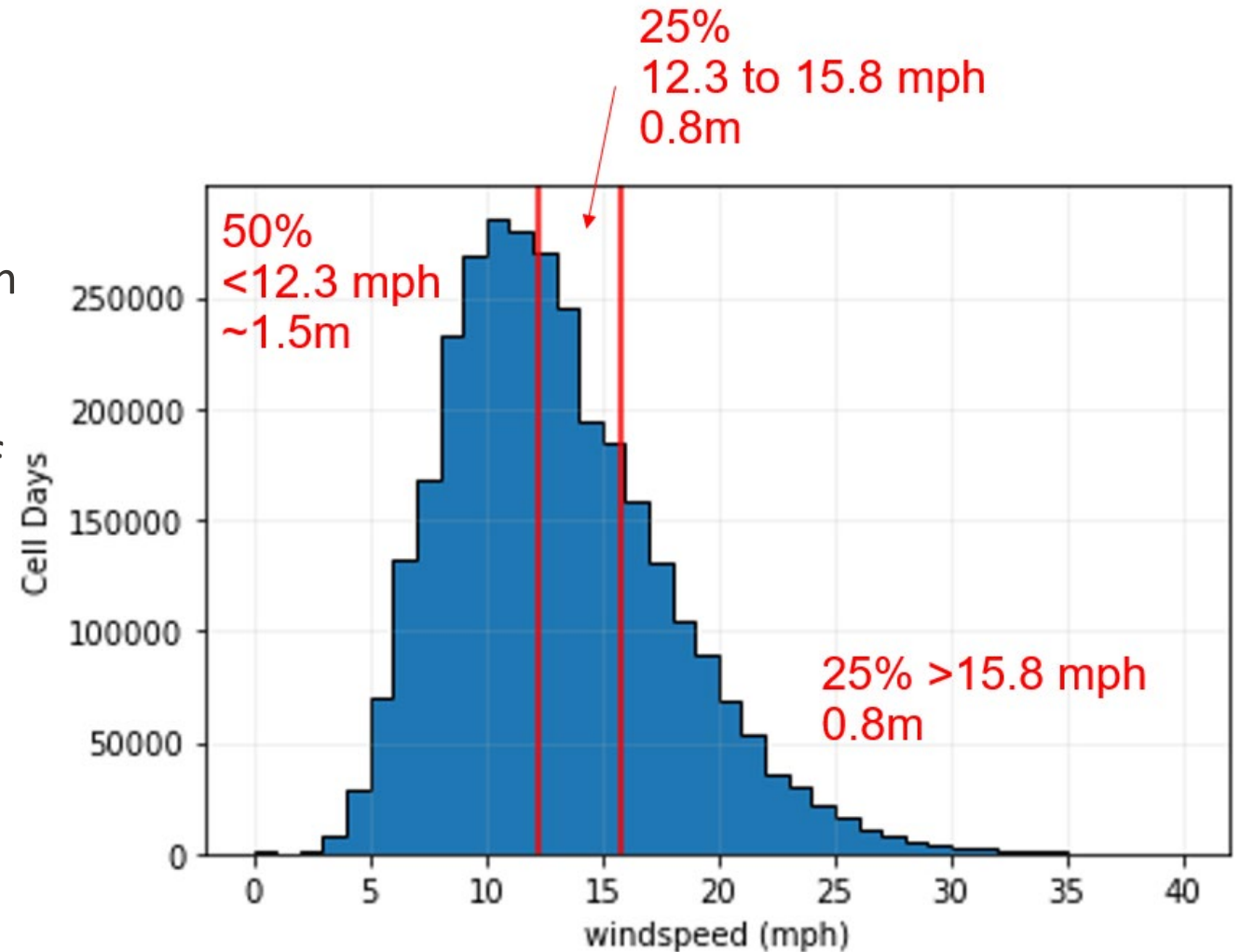


*includes both storm and non-storm tree outages



Partitioning Windspeeds - NYSEG

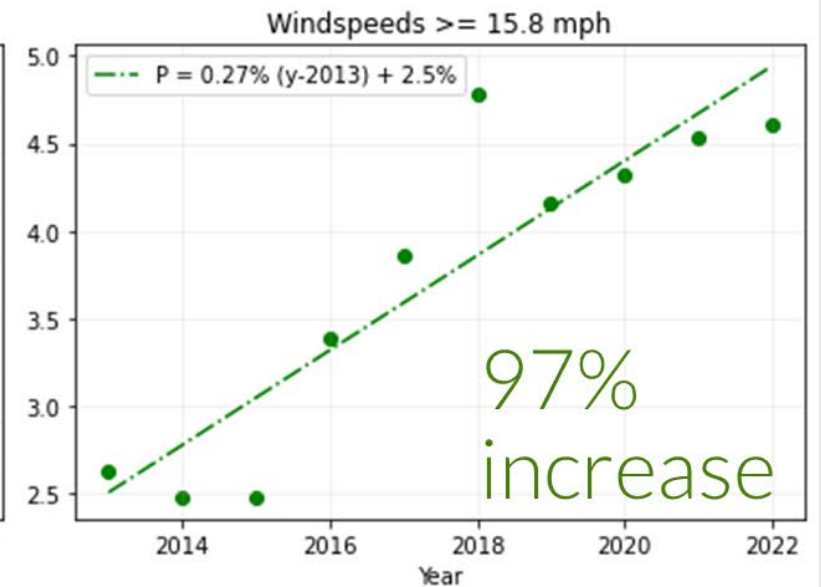
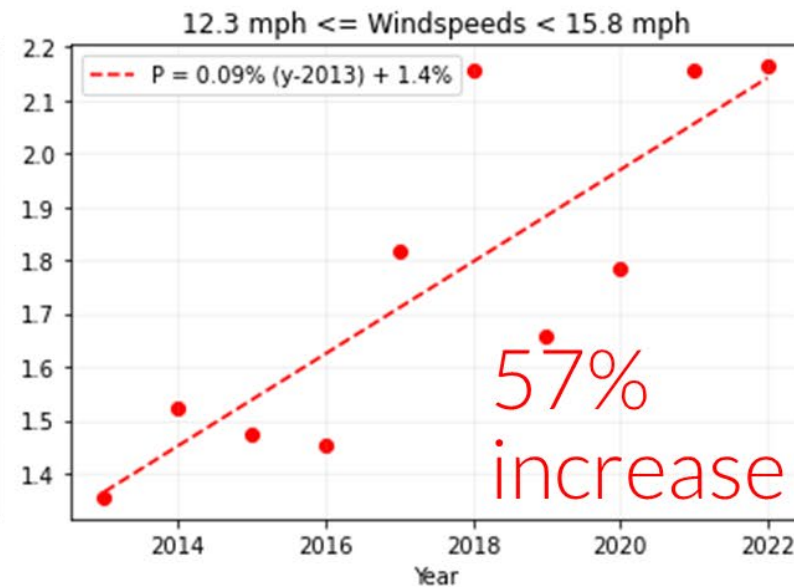
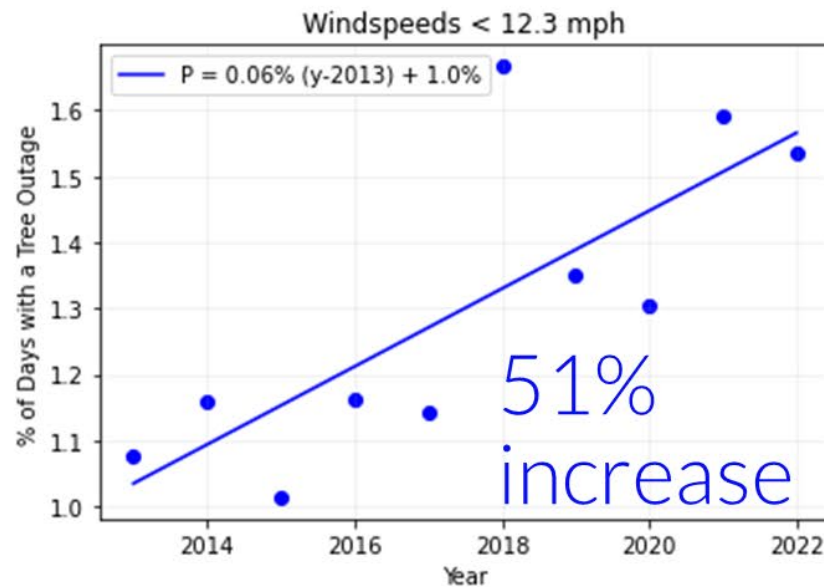
- Cell days = 854 cells x 3652 days
= 3,118,808 cell days
- Look at 3 categories:
 - 50% of cell days have wind speeds <12.3 mph
 - 25% between 12.3 and 15.8 mph
 - 25% >15.8 mph
- In each category, has the percentage of days where we have a tree outage changed with time?
 - Wind brackets consistent over the past ten years – have not seen high levels of variation in wind speed





Percentage of Days with Tree Outages Over Time - NYSEG

- For each of the three windspeed categories, the plots show:
 - Number of Days with Tree Outage / Total Number of Days
- All three categories are increasing year over year, with the top 25% bin (>15.8 mph) doubling since 2013

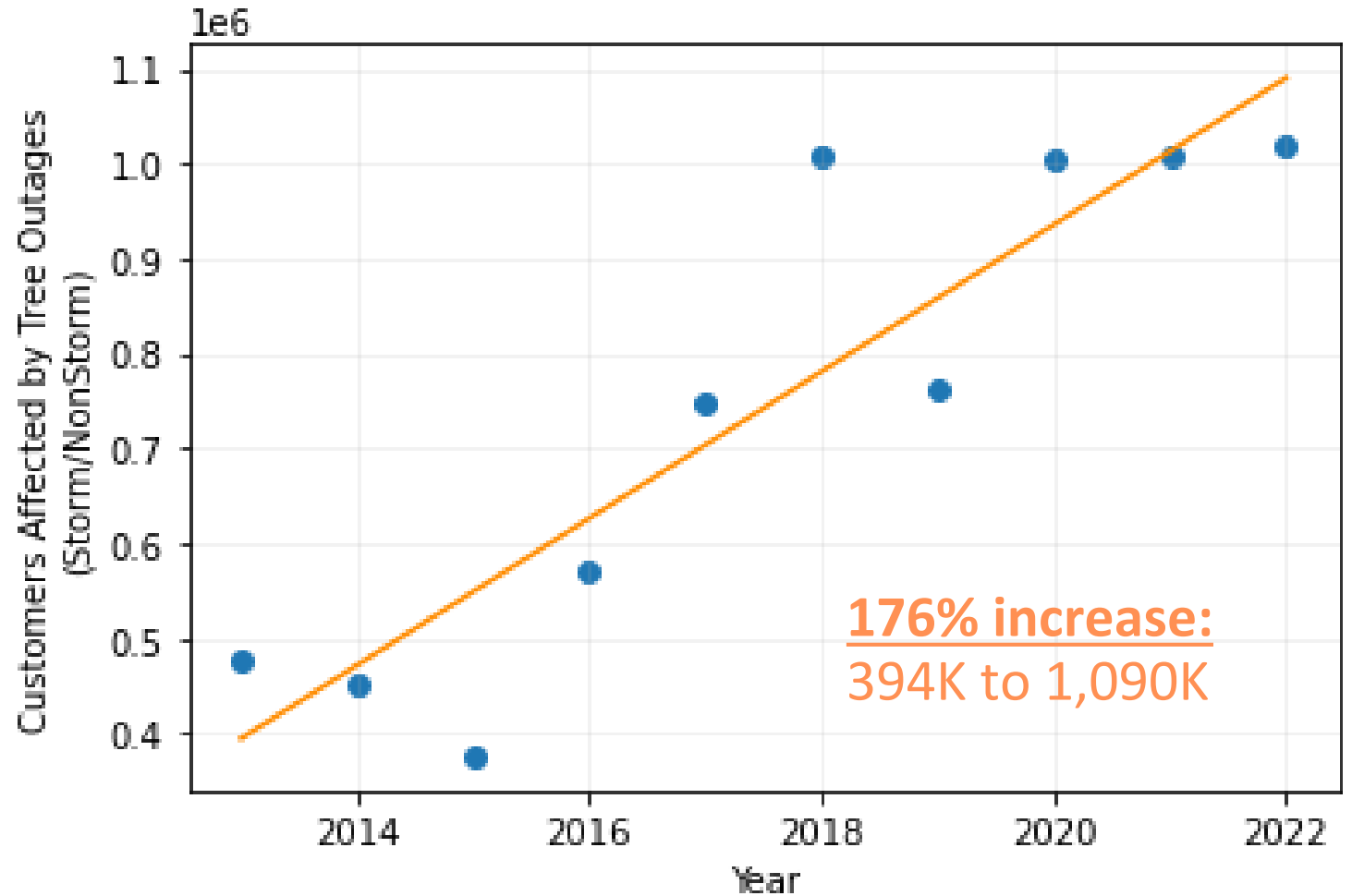


*includes both storm and non-storm tree outages



Customers Affected by Tree Outages Over Time - NYSEG

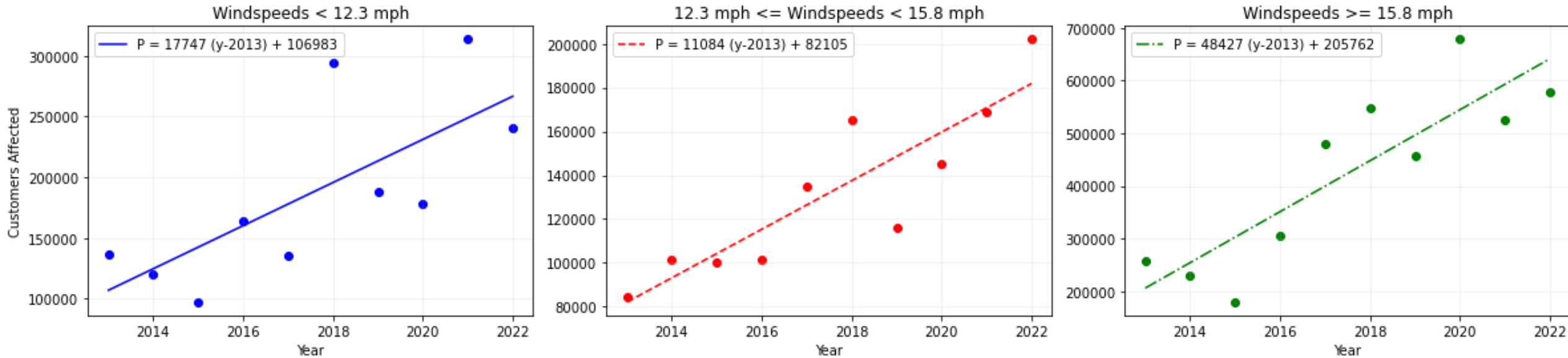
- Customers affected by tree outages (storm and non-storm) have been increasing at a rate of ~77K per year since 2013, leading to a 176% increase since then.
- Is this increase uniform across our wind speed bins?



*includes both storm and non-storm tree outages



Customers Affected by Tree Outages Over Time - NYSEG



149% increase:
107K to 267K

122% increase:
82K to 181K

212% increase:
205K to 641K

- Is the 212% increase across all regions or are there geographical hotspots?

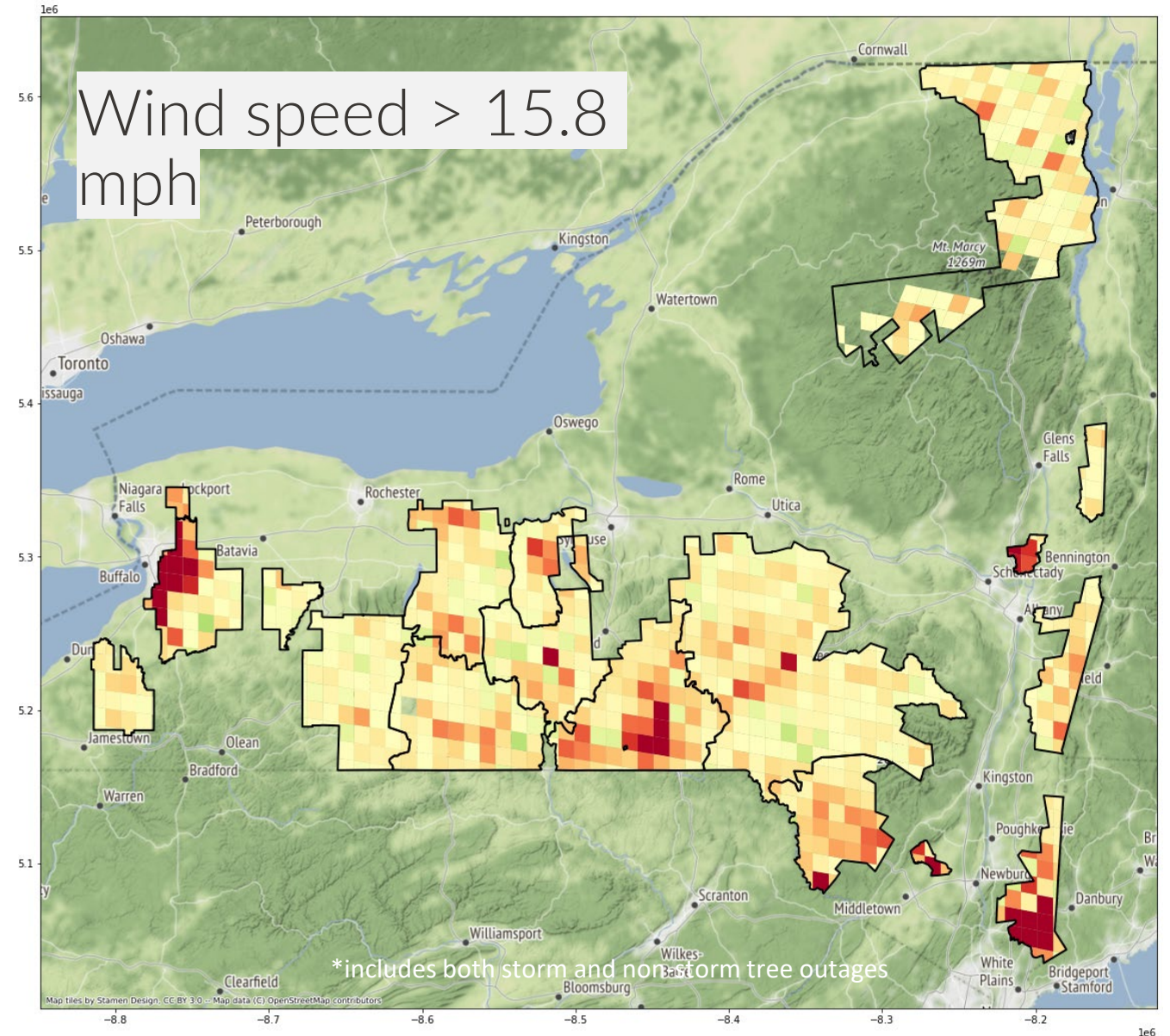
*includes both storm and non-storm tree outages



GeoMesh to Pinpoint Areas of Increased Tree Outages - NYSEG

Difference between Customers Affected within each cell from 2018 to 2022 and 2013 to 2017

- Green is less customers affected in past 5 years than in 2013-2017
- Yellow is approximately neutral, or about the same customers affected in both time periods
- Red is more customers affected recently
- Dark red are our hotspots, with changes of >10K customers, primarily in Lancaster, southern Brewster, and Binghamton



Lessons Learned PRC-027-1 and FAC-008-5

Patrick Palompo, PE
Senior Compliance Engineer

George Dong
Senior Compliance Engineer





PRC-027-1

Coordination of Protection Systems for Performance During Faults



PRC-027-1

Coordination of Protection Systems for Performance During Faults

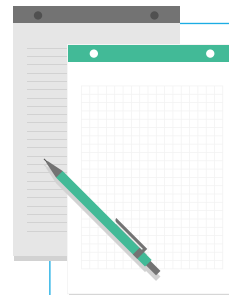


Effective Dates

- 04/01/2021 – United States
- 07/01/2021 – Nova Scotia
- 10/01/2023 – New Brunswick
- 10/01/2024 – Quebec (Future)



NPCC began auditing Requirement 1 and Requirement 3 in 2022.



NPCC has not audited Requirement 2 yet.



PRC-027-1, R1

Requirement 1

Establish a process for developing new and revised Protection System settings for BES Elements, such that the Protection Systems operate in the intended sequence during Faults. The process shall include:

R1.1

A review and update of short-circuit model data for the BES Elements under review

R1.2

A review of the developed Protection System Settings

R1.3.1-1.3.4

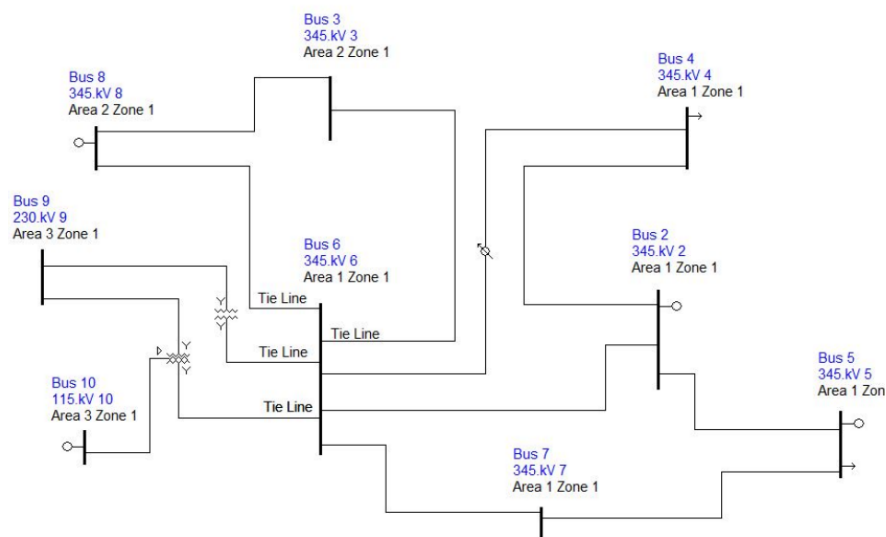
Coordination of proposed and revised Protection system settings of electrically joined Facilities to other owners



PRC-027-1, R1.1

R1.1

A review and update of short-circuit model data for the BES Elements under review



What constitutes a review and update of short circuit model data?

Reviews could include:

A review of applicable BES line, transformer, and generator impedances and Fault currents.

A review of the network model to confirm the network in the study accurately reflects the configuration of the actual System, or how the System will be configured when the proposed relay settings are installed.

A review, where applicable, of interconnected Transmission Owner, Generator Owner, and Distribution Provider information.



PRC-027-1, R1.2

R1.2

A review of the developed
Protection System Settings



What constitutes a review?

Reviews could include:

Peer reviews.

Automated checking programs.

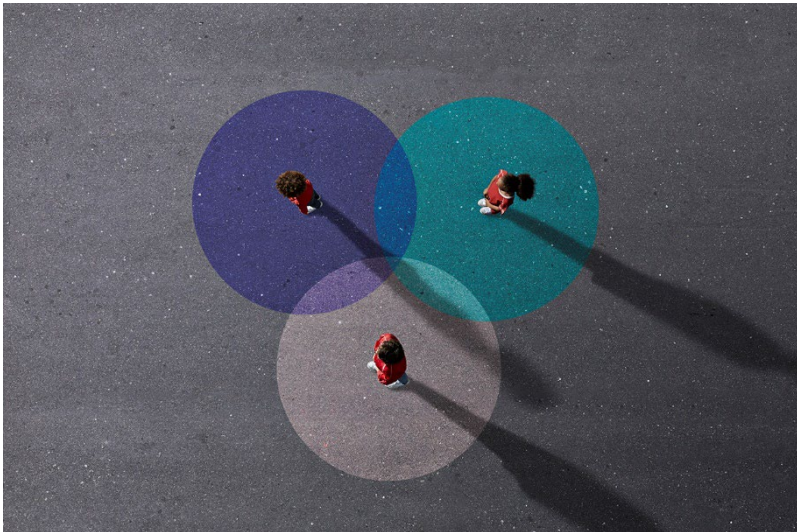
Entity developed review
procedures.



PRC-027-1, R1.3.1 – 1.3.4

R1.3.1-1.3.4

Coordination of proposed and revised Protection system settings of electrically joined Facilities to other owners



What is coordination in this context?

Issuance of developed settings to another entity for their review and how it may impact their system.

The review of developed settings received from another entity and the impact to your system.

Resolving potential issues prior to settings implementation in the field.

Communication to and from another entity for any unforeseen circumstances as a result of Protection System component failure.



PRC-027-1, R1 Audit Approach

Audit Approach Cheat Sheet

1. Review the process document

Requirement 1

Establish a process for developing new and revised Protection System settings for BES Elements, such that the Protection Systems operate in the intended sequence during Faults. The process shall include:

R1.1

A review and update of short-circuit model data for the BES Elements under review



R1.2

A review of the developed Protection System Settings



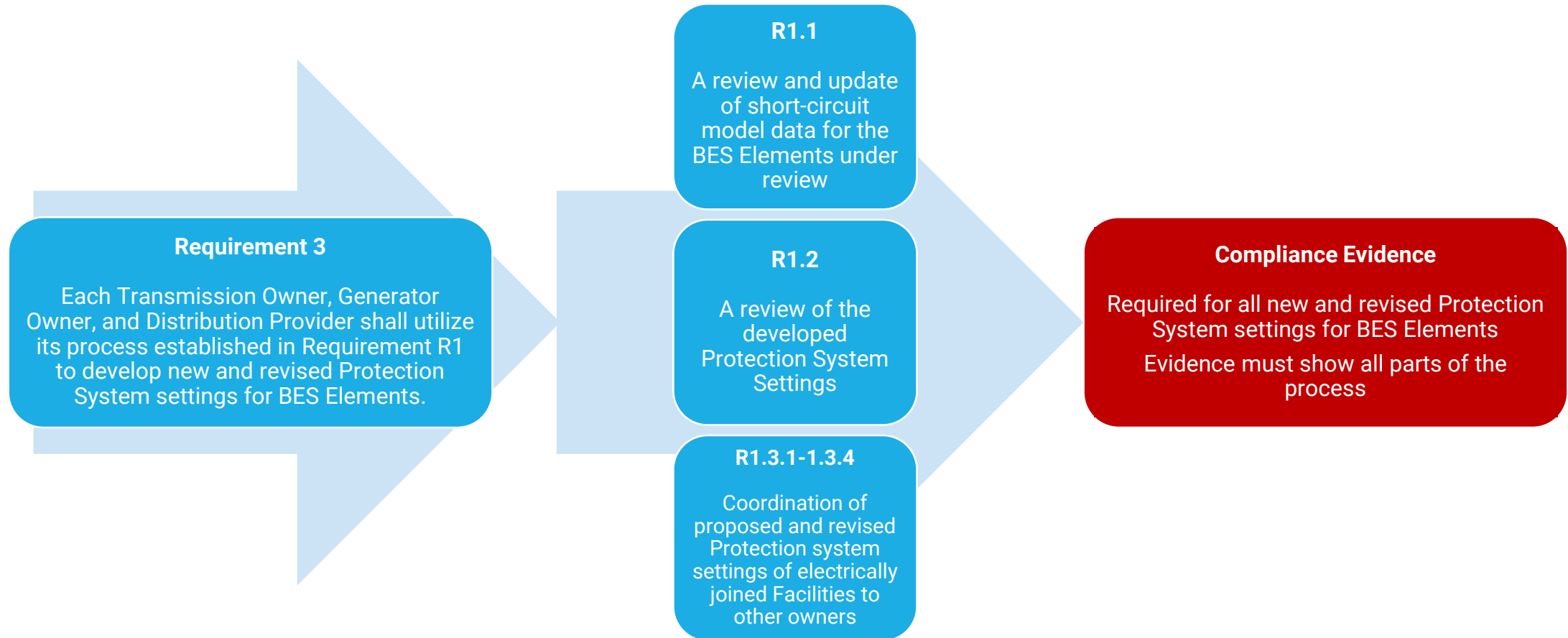
R1.3.1-1.3.4

Coordination of proposed and revised Protection system settings of electrically joined Facilities to other owners





PRC-027-1 , R3





PRC-027-1, R3 Audit Approach

Audit Approach Cheat Sheet

1. Review a sample set of settings
created during the audit period.

Requirement 3

Each Transmission Owner, Generator Owner, and Distribution Provider shall utilize its process established in Requirement R1 to develop new and revised Protection System settings for BES Elements.

R1.1

A review and update of short-circuit model data for the BES Elements under review



R1.2

A review of the developed Protection System Settings



R1.3.1-1.3.4

Coordination of proposed and revised Protection system settings of electrically joined Facilities to other owners



Compliance Evidence

Required for all new and revised Protection System settings for BES Elements
Evidence must show all parts of the process



PRC-027-1 R1 Lessons Learned



Lessons Learned Requirement 1 "The Process"

Requirement 1 Areas of Concerns Provided

Process documentation do not explicitly mention Requirement Parts 1.1-1.3.

Process maps and flow charts do not clearly illustrate how all Requirement Parts 1.1-1.3 are followed.



PRC-027-1 R3 Lessons Learned



Lessons Learned Requirement 3 “Following the Process”

Requirement 3 Potential Noncompliances Provided

Failed to provide dated electronic or hard copy documentation demonstrating that a **review** of the developed Protection Settings was performed.

- (Requirement Part 1.2)

Failed to provide dated electronic or hard copy documentation of **communications** between Entity X and Entity Y as part of the Protection System settings process.

- (Requirement Part 1.3)



PRC-027-1 R3 Lessons Learned



**Lessons Learned
Requirement 3"
Following the Process"**

Requirement 3 Recommendations

Utilize dated checklists or change management tickets to ensure that all required procedural steps are completed and that proper compliance evidence is stored.

Retain all communications with other owner(s) of the electrically joined Facilities regarding revised Protection System settings in relay settings folders for increased availability for staff use and compliance documentation.



FAC-008-5 Facility Ratings



Facility Ratings AGAIN !?!??



**Facility Ratings
are
Foundational**



Facility Ratings – Continued Focus

2023–2025 Areas of Focus

Key areas of focus for the Compliance Assurance, Registration, and Certification programs include:

- Develop and implement a plan to address facility ratings and demonstrate the importance of implementing strong internal controls
- Evaluate supply chain effectiveness and provide and analyze quarterly metrics on compliance data to inform emerging risks and Registration activities
- Enhance outreach to stakeholder/policy organizations and leverage the work of others
- Work to ensure successful roll-out of Align and the ERO Secure Evidence Locker (SEL); ensure meaningful oversight activities; and continue efforts to streamline risk-based CMEP activities

NERC | 2023 Business Plan and Budget – Final | August 10, 2022

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2023 NERC and NPCC Focus Areas

The table below shows the requirements identified by NERC (shaded green) as Focus Areas in the 2023 ERO CMEP Implementation Plan and those identified by NPCC (unshaded) as 2023 NPCC Regional Focus Areas. There 86 total requirements; 21 from NERC (8 CIP, 13 O&P) and 65 from NPCC (16 CIP, 49 O&P).

This table is one of several NPCC considerations used in decision making as part of the development of annual risk-based compliance monitoring plans. Entities are still obligated to remain in compliance with all standards that apply to their functional registration.

Updated March 9, 2023

NPCC 2023 Focus	Year	Source of Focus ¹	Standard	Requirement	Sub-requirements	Functions to Consider Focus
Loss of Control Center	2023	NPCC	EOP-008-2	R5.	All	RC, BA, TOP
Loss of Control Center	2023	NPCC	EOP-008-2	R6.	All	RC, BA, TOP
Loss of Control Center	2023	NPCC	EOP-008-2	R7.	All	RC, BA, TOP
Cold Weather Events	2023	NERC	EOP-011-2	R1.	All	TOP
Cold Weather Events	2023	NERC	EOP-011-2	R2.	All	BA
Cold Weather Events	2023	NERC	EOP-011-2	R3.	All	RC
Cold Weather Events	2023	NERC	EOP-011-2	R7.	All	GO
Cold Weather Events	2023	NPCC	EOP-011-2	R8.	All	GO
Inverter-Based Resources	2023	NERC	FAC-001-3	R1.	All	TO
Inverter-Based Resources	2023	NERC	FAC-001-3	R2.	All	GO
Inverter-Based Resources	2023	NERC	FAC-002-3	R1.	All	TP, PC
Inverter-Based Resources	2023	NERC	FAC-002-3	R2.	All	GO
Vegetation Management	2023	NPCC from NERC	FAC-003-4	R3.	All	TO
Vegetation Management	2023	NPCC from NERC	FAC-003-4	R6.	All	TO
Vegetation Management	2023	NPCC from NERC	FAC-003-4	R7.	All	TO
Facility Ratings	2023	NPCC	FAC-008-5	R1.	All	GO
Facility Ratings	2023	NPCC	FAC-008-5	R2.	All	GO
Facility Ratings	2023	NPCC	FAC-008-5	R3.	All	TO
Facility Ratings	2023	NERC	FAC-008-5	R6.	All	GO, TO
Facility Ratings	2023	NPCC	FAC-008-5	R8.	All	GO, TO



Facility Ratings – Continued Focus

2024 Areas of Focus

Key areas of focus for the Compliance Assurance, Registration, and Certification programs include:

- Continue efforts in addressing facility ratings and demonstrate the importance of implementing strong internal controls
- Continue to evaluate supply chain effectiveness and provide and analyze quarterly metrics on compliance data to inform emerging risks and Registration activities
- Enhance outreach to stakeholder/policy organizations and leverage the work of others
- Work to ensure successful roll-out of Align and the ERO Secure Evidence Locker (SEL); ensure meaningful oversight activities; and continue efforts to streamline risk-based CMEP activities

NERC | 2024 Business Plan and Budget – Final | August 9, 2023

Inverter-Based Resources	2024	NERC	FAC-002-4 (Effective 1/1/2024)	R2.	GO
Inverter-Based Resources	2024	NERC	FAC-002-4 (Effective 1/1/2024)	R1.	TP, PC
Inverter-Based Resources	2024	NERC	FAC-002-4 (Effective 1/1/2024)	R2.	GO
Facility Ratings	2024	NPCC	FAC-008-5	R1.	GO
Facility Ratings	2024	NPCC	FAC-008-5	R2.	GO
Facility Ratings	2024	NPCC	FAC-008-5	R3.	TO
Facility Ratings	2024	NERC	FAC-008-5	R6.	GO, TO
Facility Ratings	2024	NPCC	FAC-008-5	R8.	TO
Establish and Communicate SOL	2024	NPCC	FAC-014-2	R2.	TOP
RC Operational Analyses	2024	NPCC	IRO-008-2	R1.	RC
RC Operational Analyses	2024	NPCC	IRO-008-2	R2.	RC
RC Operational Analyses	2024	NPCC	IRO-008-2	R3.	RC
RC Operational Analyses	2024	NPCC	IRO-008-2	R4.	RC

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October 13, 2023

Page 3 of 4

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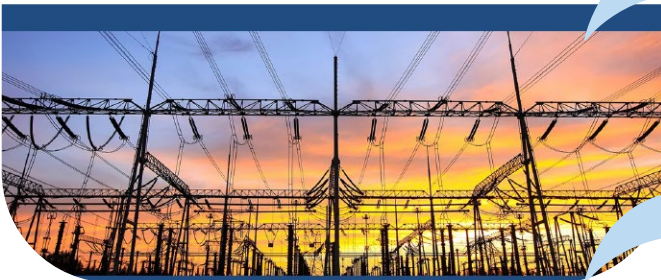


Themes



ERO Enterprise Themes and Best Practices for Sustaining Accurate Facility Ratings

October 20, 2022



Theme 1: Lack of Awareness

Theme 2: Inadequate Asset and Data Management

Theme 3: Inadequate Change Management

Theme 4: Inconsistent Development and Application of Facility Ratings Methodologies



Theme 1: Lack of Awareness

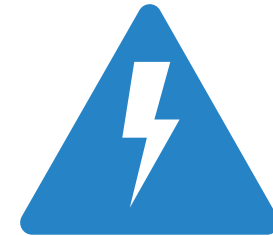


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Failure to adequately document or maintain an accurate equipment inventory

Failure to understand the current carrying series equipment within its electrical system



An ineffective facility ratings validation program, including but not limited to identifying and assessing potential program deficiencies, inadequate methodology, and/or inadequate processes/procedures



Theme 1: Lack of Awareness



Observations

- Lack of awareness tends to concern the failure to verify and validate that Facility Ratings accurately reflect the equipment actually installed in the field upon commissioning and/or consider any subsequent equipment changes in the field because of the addition, removal, or replacement of equipment over time or due to an event (e.g., hurricane).



Suggestions

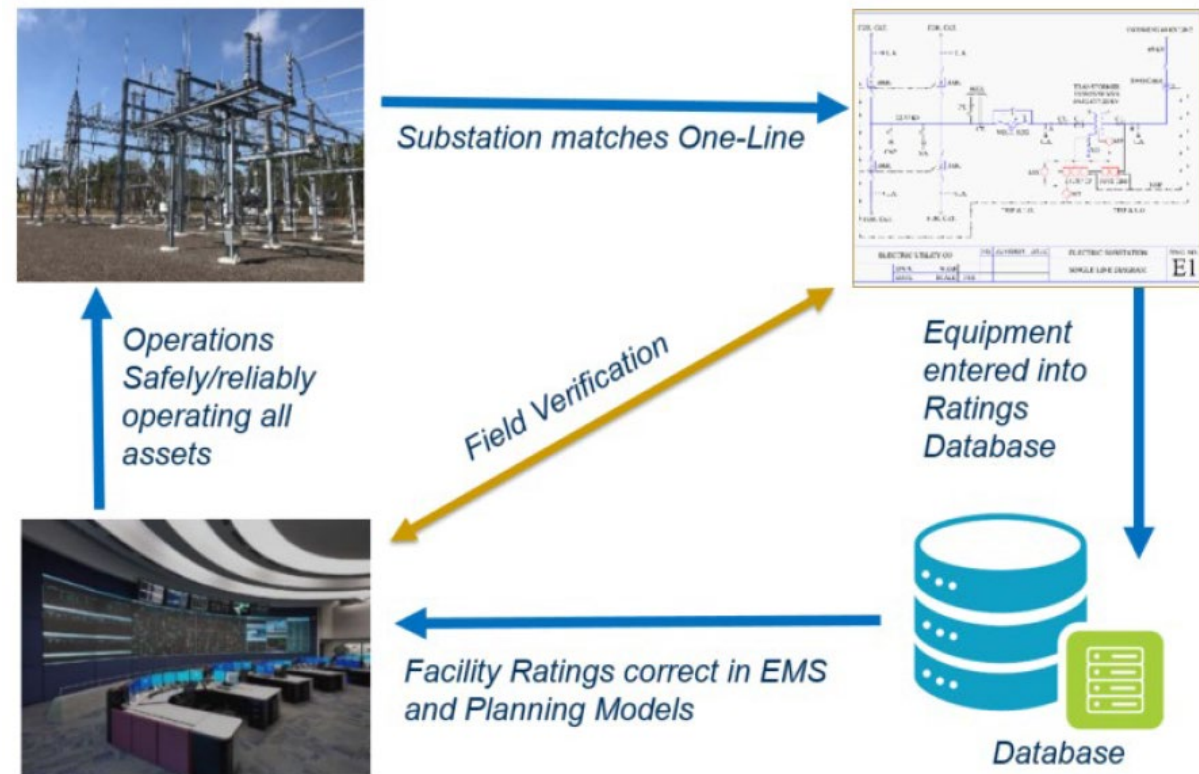
- Establish an accurate baseline with an in-field verification
- Perform periodic **in-field verifications** post maintenance and/or maintenance activities



Theme 2: Inadequate Asset and Data Management

Asset management (as it relates to facility ratings) is the identification, management, and tracking of physical facility ratings assets. Data management (as it relates to facility ratings) is the collection, validation, and storage of all data associated with facility ratings.

Effective and efficient asset and data management plays an integral role in the success of an entity's facility ratings program and reduces the risk of inaccurate facility ratings.





Theme 2: Inadequate Asset and Data Management

Observations

Common data management failures involve programs that do not identify and account for all necessary pieces of equipment or the equipment's ownership in the field when determining a Facility Rating.

Programs frequently miss accounting for equipment such as **wave traps, jumpers, connectors, and bus work.**

Suggestions/Controls

In-Field Verification and Quality Assurance Reviews

Facility Ratings Database, Effective Data Capture and Verification, and Access Controls

Contractor Management

Remember to Always

Identify each individual piece of equipment even those that typically do not impact Facility Ratings.

List each piece of equipment individually; do not consolidate equipment.

Recognize differences in equipment ratings that allow for Emergency Facility Ratings.



Theme 3: Inadequate Change Management

Change management processes and controls enable facility and equipment rating changes to be captured, coordinated, and implemented throughout the entity in a timely manner.

Without a strong and sustainable change management process, there is a significant risk that inaccuracies in facility ratings will occur.



Photo Credit: BC Hydro, EEP



Theme 3: Inadequate Change Management

- Common Change Management Failures:
 - Lack of, or delay in, communicating changes to all necessary personnel
 - Lack of data entry verification
 - Lack of oversight over contractors performing facility ratings work

Observations



- Strong Change Management Process
- Personnel Training
- Periodic In-Field Verification

Suggestions



- Change checklist
- Quality assurance reviews after any change
- Validation through periodic reviews
- Data entry verification
- Periodic in-field verifications

Effective Change Management Process





Theme 4: Inconsistent Development and Application of Facility Ratings Methodologies

Each applicable registered entity is required to have a documented methodology for determining facility ratings of its solely and jointly owned facilities.





Facility Ratings Best Practices



Robust documented change management process

Inventory management tools, with required training

Checklists for new inventory to be added

Effective data capture processes

Single database for master record keeping

Access controls established for facility management tools

Built in quality assurance reviews, in concert with internal controls

Periodic in-field validation/field walk-downs

Facility ratings program owner

Management oversight



Key NATF Practices for Facility Ratings

ERO Themes Report Best Practices

Identify a facility ratings sponsor and owner.

Establish clarity on the foundational components of the facility ratings process or program

Manage data to ensure accuracy

Establish an accurate baseline to determine accuracy of facility ratings

Establish comprehensive work practices for planned construction, acquired facilities, and unplanned or restoration work.

Validate through periodic reviews

Implement human performance measures

NATF Practices for Facility Ratings

Facility ratings program owner

Inventory management tools, with required training

Effective data capture processes

Single database for master record keeping

Access controls established for facility management tools

Checklists for new inventory to be added

Robust documented change management process

Periodic in-field validation/field walk-downs

Management oversight

Built in quality assurance reviews, in concert with internal controls



Additional References

- [ERO Enterprise CMEP Practice Guide](#)
- [2021 ERO Enterprise CMEP Implementation Plan](#)
- [MRO Standard Application Guide FAC-008-3](#)
- [NERC Facility Ratings Problem Statement](#)
- [NPCC Fall 2021 Compliance Webinar with FAC-008](#)
- [NPCC 2022 Focus on Facility Ratings Statement](#)
- [ReliabilityFirst Facility Ratings Webinar](#)
- [ReliabilityFirst Facility Ratings Workshop](#)
- [SERC Facility Ratings Overview Presentation](#)
- [SERC Facility Rating Expectations and Lesson Learned Presentation](#)
- [SERC Facility Ratings E-Learning Module](#)
- [Texas RE FAC-008 Common Themes](#)
- [Texas RE Resource Hub](#)
- [WECC FAC-008 Position Paper](#)
- [Key NATF Practices for Facility Ratings](#)
- [NATF Risk Construct for Prioritizing Facility Ratings Reviews](#)



This list is the last page of the
ERO Themes and Best
Practices document –
Appendix A



NORTH

COORDINATING COUNCIL, INC.



Questions

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Registration and Certification Program Update

Brian Robinson – Manager, ERA



Outline

- NPCC Certification
 - Transition to ERA
- Registration
 - Reminders
 - New Generators
 - GO/GOP Asset Verification Form
- Generator Control Center Data Request
- Inverter Based Resources



Certification Program



Purpose of Certification

- Applicable to
 - Reliability Coordinator
 - Balancing Authority
 - Transmission Operator
- Certification activities assess the processes, procedures, tools, and training these organizations use in performing these functions and provide a prospective level of assurance that the organization has the capacity to meet the reliability obligations of its registration.



Certification Program Options

Certification

- New BA, RC, TOP
- Large Scope

Certification Review

- Existing BA, RC, TOP
- Targeted Scope

Lesser Activity

- Existing BA, RC, TOP
- Scoped to address smaller changes



Certification Review

- Matrix is based on Modification
- Types of changes “Considered” for Certification Review:
 - Changes to “footprint” (changes in the metered boundaries)
 - Relocation of Control Center
 - EMS modifications that impacts a security perimeter or
 - System operators Situational Awareness tools
 - Functionality
 - Machine Interfaces



Steps in Transition to Entity Risk



Build ERA Team

Additional Staff



Training

Certification Team Member
Training

Certification Team Leader
Training



Develop Expertise



Next Steps

- Hybrid Engagements
 - Leveraging Auditor CTL
(Thanks Dan K!)
 - Leveraging auditor expertise as team members
(Thanks Mike B and Aaron H!)
- Future Engagements
 - Mainly ERA staff
 - Audit staff engaged for specific expertise




NPCC Certification/Certification Review

- 2023:
 - Completed 1 Certification Review
- 2024:
 - 1 Full Certification in process
 - 3 Certification Reviews in process or scheduled
- Beyond:
 - 1 Certification
 - 1 Certification Review



Registration Update



Who Needs to be Registered?

- NERC Rules of Procedure (RoP) identifies the Bulk Power System (BPS) Owners, Operators and Users which require registration
 - Rules of Procedure (nerc.com)
 - Appendix 5B of the RoP identifies the criteria for registration
 - <https://www.nerc.com/AboutNERC/RulesOfProcedure/Appendix%205B.pdf>
 - Currently, Generation Facilities meeting the Bulk Electric System definition require registration
 - Bulk Electric System (BES) Definition, Notification, and Exception Process (nerc.com)



ERO Portal

- Registration Activities are administratively managed in the ERO Portal
 - To obtain an account, navigate to <https://eroportal.nerc.net> and register
- ERO Portal provides access to several NERC Applications, including the Consolidated Organization Registration ERO System (CORES)
 - Review the material for submitting a registration request in [CORES](#)



Registration Management (CORES)

- Consolidated Organization Registration ERO System (CORES)
 - Request Registration Changes
 - Manage Coordinated Functional Registrations
 - **Manage Entity Contacts and Permissions**
 - Primary Compliance Officer, Primary Compliance Contact, Alternate Compliance Contacts
 - Align Users
 - MIDAS Users
- Contact NPCC Registration (Registration@npcc.org) prior to submitting registration changes




Asset Purchase, Sale, or Acquisition

- Both Buying and Selling Primary Compliance Contacts (PCCs) must contact NPCC
- NPCC tracks BES assets under each NCR; GO and GOP info is especially important
- Purchaser MUST acquire compliance records from Seller
 - Purchaser could be found in violation from the effective date of the Purchaser's registration
- All NCRs remains active until any outstanding settlement and enforcement issues associated with the entity in question are resolved



NPCC Registration Documents



NPCC, Inc.

ABOUT NPCC

PROGRAM AREAS

COMMITTEES

NEWS

SEARCH

SIGN IN


STANDARDS & CRITERIA

COMPLIANCE

RAPA

SAIS









Registration



Registration and Certification

All Bulk Power System (BPS) owners, operators, and users are required to register with NERC and are subject to compliance with approved NERC Reliability Standards and NPCC Regional Reliability Standards.

Latest Documents

 Registry Posting as of Sept 25 2023	613.4 KB 09/29/2023
 Registry Posting as of Sept 25 2023	89.5 KB 09/29/2023
 ERO Enterprise GO GOP Asset Verification Form	486.9 KB 09/29/2023
 NPCC certification notification and preliminary questionnaire	669.8 KB 08/21/2023
 Generator Welcome Package April 2023	470.7 KB 04/25/2023
 ERO Enterprise 101 Informational Package	769.7 KB 02/07/2022
 NPCC Common Registration Form Jan 2019	638.4 KB 01/09/2019
 NPCC Blank Transmission_and_Reactive Device Form May 2018	17.2 KB 05/29/2018



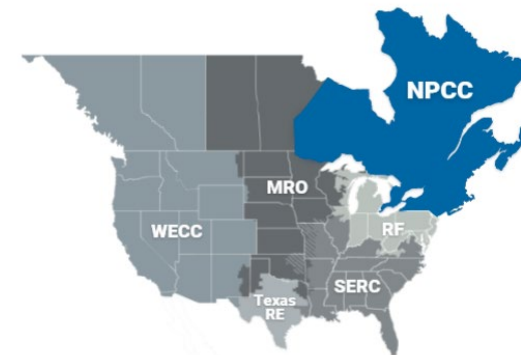
New Generation Registration

- Establish Registration Expectations
- Applicable Standard identification
 - Initial Performance Expectations
 - FAC-008
- Internal Controls
 - Define type of controls
 - Examples for key standards
- Risk Assessment and Compliance Oversight Plan Development



NORTHEAST POWER COORDINATING COUNCIL, INC.


Generator Welcome Package




April 2023





GO/GOP Asset Verification Form





NPCC, Inc.

 ABOUT NPCC

 PROGRAM AREAS

 COMMITTEES

 NEWS

 SEARCH

[SIGN IN](#)


STANDARDS & CRITERIA

COMPLIANCE

RAPA

SAIS









Registration



Registration and Certification

All Bulk Power System (BPS) owners, operators, and users are required to register with NERC and are subject to compliance with approved NERC Reliability Standards and NPCC Regional Reliability Standards.

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Directly Connected Distribution Provider

- Distribution Provider Definition:

Provides and operates the “wires” between the transmission system and the end-use customer. For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider. Thus the Distribution Provider is not defined by a specific voltage, but rather as performing the distribution function at any voltage.

- NERC DP Registration Criteria includes

Distribution Provider system serving >75 MW of peak Load that is directly connected to the BES; or...

- ERO Registration Practice Guide, July 5, 2018

[ERO Enterprise Registration Practice Guide Distribution Provider “directly connected” Determinations.pdf \(nerc.com\)](#)



Generator Control Center Data Request



Generator Operator Identification Data Request

- Section 800 of the RoP is “Reliability Assessment And Performance Analysis”
- Seeking information from all Generator Owners to
 - Identify the Generator Operator associated with each Facility
 - Identify any additional locations with Monitor and Control capability
- Cross Border Operations



Resources

- Registration@npcc.org
- Certification@npcc.org
- [Registration and Certification \(npcc.org\)](http://npcc.org)
- [CORES User Guide](#)
- [NERC ROP](#)
- [ERO Registration Procedure](#)
- [ERO 101 Informational Package](#)
- [Standards One-Stop-Shop](#)



Questions?



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