Climate Resilience Working Group

January 29, 2025

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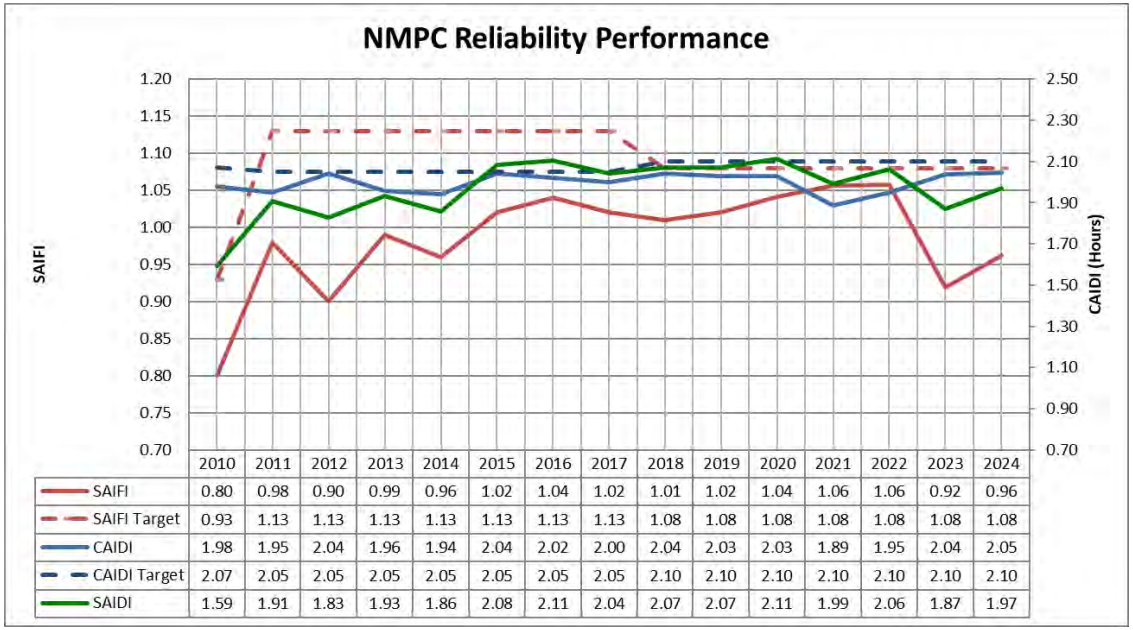
Today's Agenda

- Closing out 2024: National Grid Reliability and Storm Response Performance
- Overview of the New York Public Service Commission December 19th Order on Electric Utility Climate Resilience Plans
- National Grid's Climate Resilience Plan: Delivering on our Commitments – Implementation Plan and Timeline
- Demonstration of a National Grid Resilience Tool: Fault Location, Isolation, and Service Restoration (FLISR) technology to improve reliability and reduce the duration of power outages
- Community and Stakeholder Updates and Feedback
- Next Steps

We have met or exceeded our annual reliability targets for more than a decade

Our storm response, outage restoration, deployment of new technologies, and importantly the professionalism of our workforce have enabled us to achieve reliability targets for more than a decade.

- Electric distribution and transmission network reliability of **99.9%**
- Achieved our Customer Average Interruption Duration Index (CAIDI) and System Average Interruption Frequency Index (SAIFI) reliability targets since 2010.
- Maintaining reliability is becoming harder: 2024 saw the most customers interrupted by significant storms in a single year since 2008.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SAIFI	0.80	0.98	0.90	0.99	0.96	1.02	1.04	1.02	1.01	1.02	1.04	1.06	1.06	0.92	0.96
SAIFI Target	0.93	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.08	1.08	1.08	1.08	1.08	1.08	1.08
CAIDI	1.98	1.95	2.04	1.96	1.94	2.04	2.02	2.00	2.04	2.03	2.03	1.89	1.95	2.04	2.05
CAIDI Target	2.07	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.10	2.10	2.10	2.10	2.10	2.10	2.10
SAIDI	1.59	1.91	1.83	1.93	1.86	2.08	2.11	2.04	2.07	2.07	2.11	1.99	2.06	1.87	1.97

Continued Strong Storm Response in 2024

Notable Storm Performance in 2024

Date	Event Type Primary / Secondary Conditions	Total Cust. Affected	95% Restored from Peak in "X" hrs.	West	Central	East
9-Jan-24	Wind / Wet Snow	206,931	45.5	X	X	X
13-Jan-24	Snow / Wind	79,986	5	X	X	X
28-Feb-24	Wind	198,911	39.5	X	X	X
10-Mar-24	Wind / Wet Snow	33,167	18.5		X	X
11-Mar-24	Wind / Wet Snow	43,860	6		X	X
23-Mar-24	Wet Snow / Ice	216,618	44.5			X
3-Apr-24	Wet Snow / Wind	132,681	27		X	X
20-Jun-24	Thunderstorm/ Wind	54,415	23			X
23-Jun-24	Thunderstorm / Wind	44,491	28.5	X	X	X
10-Jul-24	Thunderstorm / Rain	64,808	18			X
16-Jul-24	Thunderstorm / Wind	213,986	50.5	X	X	X
9-Aug-24	Rain / Wind	101,470	20		X	X
29-Dec-24	Wind	36,431	14.5	X		

Six (6) EEI Awards – Fall 2024

- **Response / Assistance to Other Member Companies**
  - ✓ Central Hudson Gas & Electric – June 2024 Thunderstorms
  - ✓ AEP, Appalachian Power – Hurricane Helene
  - ✓ Duke, Florida – Hurricane Milton
- **Recovery / Restoration**
  - ✓ July 10, 2024 – Remnants of Tropical Storm Beryl
  - ✓ July 16, 2024 – Tornados and Strong Thunderstorms
  - ✓ August 9, 2024 – Remnants of Tropical Storm Debby
- **11 EEI Response / Recovery Awards in Calendar year 2024**
- **Since 1998 – 68 EEI Response & Recovery Awards**

Storm Activity – Calendar Year 2024

- ❑ National Grid prepared for and responded to 59 weather events
- ❑ Major Events – 18
- ❑ Brought external crews in ahead of the event – 9 times
- ❑ Of the 59 Weather Events:
  - o Total Customers Affected 1,953,986
  - o Average Time to Restore 95% of the Affected Customers – 12-hrs.

Feedback Opportunity:

How have storms impacted your family, neighbors and community during 2024?

Scan the QR code or click this link to provide feedback

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National Grid's Resilience Plan approved

On December 19, 2024, the Public Service Commission approved Niagara Mohawk's Climate Change Resilience Plan with modifications. In its decision, the Commission directed **all** the State's electric utilities to include proposed resilience investments as part of ongoing and future rate case proceedings. The press release accompanying the PSC's approval states:

> *"These plans detail how each of the combined electric utilities will incorporate climate change into planning, design, operations, and emergency response efforts," **said Commission Chair Rory M. Christian.** "Incorporating climate change into existing processes and practices will help manage climate change risks and build resilience."*

The PSC approved National Grid's Plan but directed the Company to remove the Spare Transmission Line Structures Program from the Plan.

Utilities must file an updated climate change resilience plan with the Commission every five years.

Delivering on our commitments

Proposed Resilience Investments

Project	Mitigated Climate Hazard	Description
1. Overhead Distribution and Sub-transmission Line Design Upgrades*	Wind Gusts and Ice	Update distribution line standards to move from type class 3 poles to class 1 for main lines and poles that carry heavy equipment (8,000 poles/year) and update sub-transmission line standards to use class 1 poles for single circuit structures, class H1 for double circuit structures, and class H2 for double circuit with distribution underbuilds (900 poles/year).
2. Overhead Transmission Line Design Upgrades*	Wind Gusts and Ice	Build T-Lines to withstand 120 MPH wind gusts in high wind areas (46 total) by using more steel and larger foundations. Projects include 44 – 115kV lines and 2 – 230KV lines (1,300 circuit miles covered).
3. Distribution and Sub-transmission Targeted Undergrounding	Wind Gusts and Ice	Targeted undergrounding of 1-2 miles per year of 3-phase main line in highest wind and icing areas.
4. Spare Transmission Line Structures	Wind Gusts and Ice	Purchase 10 T-Line spare structures per division designed for 120 MPH gusts to speed restoration.
5. Substation Flood Walls	Flooding	Install flood walls at 18 substations in high -risk areas (17,000 linear feet of flood walls total).
6. Substation Transformer Specification Upgrades*	Extreme Heat	Update transformer spec from 32°C (90°F) to 35°C (95°F). There will be 35 distribution projects (81 transformers) and 24 transmission projects (37 transformers) with installs and replacements.

RECLASSIFIED AS NON-RESILIENCY AND REMOVED FROM PLAN

Delivering on our commitments

Timeline

2025
- File updated/approved Climate Change Resilience Plan (CCRP)
- Update standards & specifications, and initiate projects
- Align projects and budgets with the outcome of the Niagara Mohawk rate case

2026
- Begin to implement projects and changes initiated in 2025
- Initiate vegetation study & update to MIT study if approved

2027
- Prepare and file first biennial update on status of CCRP implementation

2028
- File updated CCRP (due every 5 years)

Implementing Approved Resilience Initiatives - 2025

- Adopting tougher equipment standards
  - Substation Transformer Specifications
    - Enhance specs to increase from 32°C (90°F) to 35°C (95°F).
    - Add field in maintenance software (Cascade) for substation transformers indicating ambient temp spec (32 °C vs. 35 °C).
    - Work with planning departments to implement associated changes in temperatures used to develop transformer ratings.
  - Transmission Line Upgrades
    - Enhance standards and specifications to build structures to withstand up to 120MPH wind gusts using the latest wind projections.
  - Distribution & Sub-Transmission Line Upgrades
    - Enhance standards to expand use of stronger (larger class) poles

- Implementation of new projects
  - Substation Flood Wall & Targeted Underground Programs
    - Initiate programs contingent on spending approved in rate case

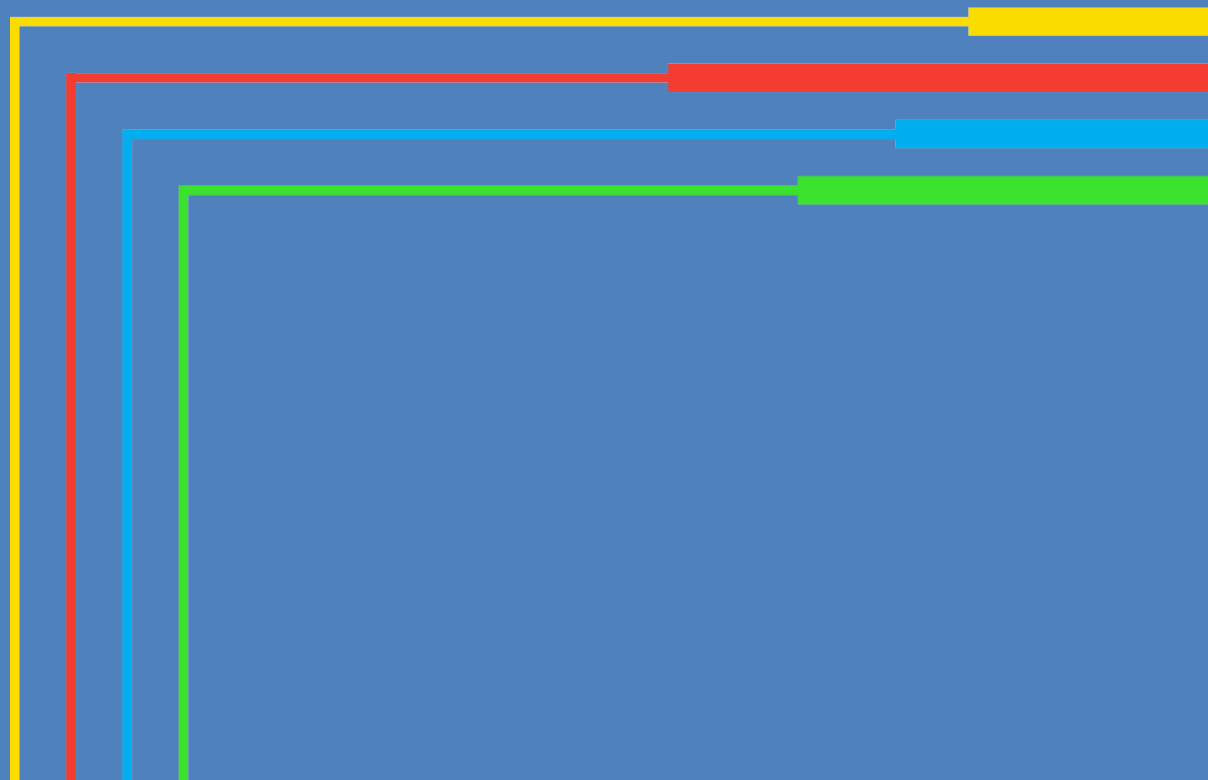
- Resilience initiatives are part of the on-going Niagara Mohawk Rate Case spending plans and subject to the outcome of that proceeding.

Looking Ahead to the 2028 Climate Resilience Plan

The PSC has established clear requirements for the State's electric utilities going forward:

- **Continue working with CRWG to better define and revise procedures and process strategies for the next Plan and work towards an all-encompassing approach to utility-wide climate change adaptation.**
- Include implementation- and outcome-based performance benchmarks for all proposed resilience measures.
- Incorporate adaptations to climate change into internal processes, procedures, and design guidelines or standards.
- Provide more defined and explicit processes, planning, and design changes with respect to climate change projections.
- Provide more explicit & detailed analysis of forecast reliability improvements for each proposed project and program.
- Address coordination opportunities with telecommunication service providers.
- Seek to more fully quantify benefits of resilience investments
- Refine outcome-based performance benchmarks.

FLISR: Fault Location, Isolation, & Service Restoration



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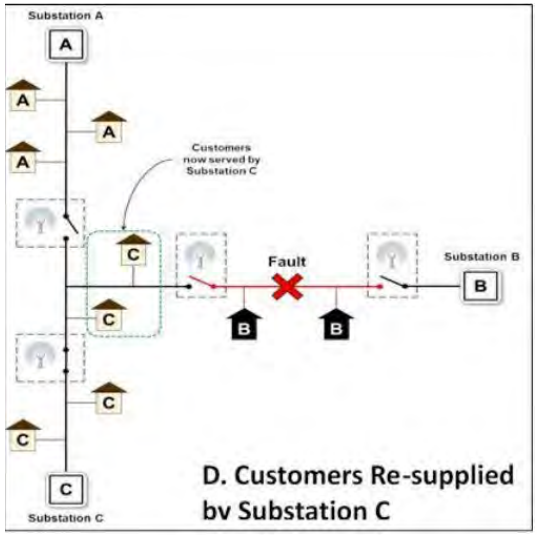
What is FLISR? Why deploy it?

- Real-time system that responds to failure conditions (i.e., faults) of the distribution system and autonomously reacts based on the event in both Blue Sky and Storm scenarios.
- Minimize the effects of permanent faults by re-supplying loads from adjacent feeders through Normally Open tie points.
- Goals of FLISR include reducing Customers Interrupted (CI), Customer Minutes Interrupted (CMI) and increasing visibility of the system for control center operators.



Deployment Strategy

Selection of FLISR Scheme Feeders

- Historical Reliability Indices
- Feeder tie availability
- Communication availability (cellular network)
- Overall customer counts (also consider critical customers/loads)
- Worst Performing Feeders / Area Plans by region
- Material and Resource availability
- Protection Capabilities / Existing Breakers and Reclosers

Engineering & Construction Timeline

- Engineering and design occurs in year one
  - Includes material and resource planning
- Construction occurs in year two
  - Includes Field work & FLISR Scheme Logic buildout

Deployment Progress

Progress to Date

- NY has about 1.69M electric customers
- 123k customers connected to 21 FLISR Schemes
- Ended March 2024 at 6.4% of customers (108k) on FLISR circuits

Looking Forward

- Target of ~60% of NY customers connected to FLISR circuits
- Over 350 FLISR schemes expected to be deployed to achieve target
- Expected to have around 9% of customers (152k) on FLISR circuits by end of March 2025 (40-45 FLISR Schemes)
- Ramping to upwards of 60 FLISR Schemes per year across NY

FLISR Scheme Example (3 Reclosers, Center Open)

Resiliency by FLISR Deployment

Anticipate & Absorb

A major objective of FLISR is to deploy schemes in areas that experience outages along the mainline. Placing reclosers along the mainline to sectionalize the circuits allow for potential minimization of outage events to reduce customer impact.

Respond & Recover

The primary objective of FLISR is to autonomously restore unaffected portions of a given circuit during a contingency event. This reduces overall customer impact and accelerates restorations of unaffected zones while also identifying where a contingency occurred reducing fault location time.

Advance & Adapt

The Company is tracking performance of FLISR schemes to ensure lessons learned are utilized to improve system planning and operations. This includes adaptability of equipment types that can be used for FLISR scheme restoration or system awareness. Progressing towards ADMS FLISR is anticipated to improve FLISR scheme operations and control center ability to respond to system contingencies on the distribution system.

Community Updates & Feedback

Let’s hear from you!

Next Steps

Understanding local concerns and priorities is important to National Grid. To that end, we will convene the Climate Resilience Working Group at least twice annually to seek your feedback and recommendations to be incorporated into our Resilience Plan implementation and the development of future 5-year updates.

Our next meeting will be held in late spring or early summer. We will update you on the progress of our Resilience Plan implementation and the Niagara Mohawk Rate Case. We also look forward to hearing about emergency planning and resilience efforts happening in your communities.