Turning Over New Leaves: Insights into Transmission Data with SEEQ

6/2/2026

Seeq Conneqt

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Who is VELCO?

First transmission-only company in the nation!

- Formed in 1956

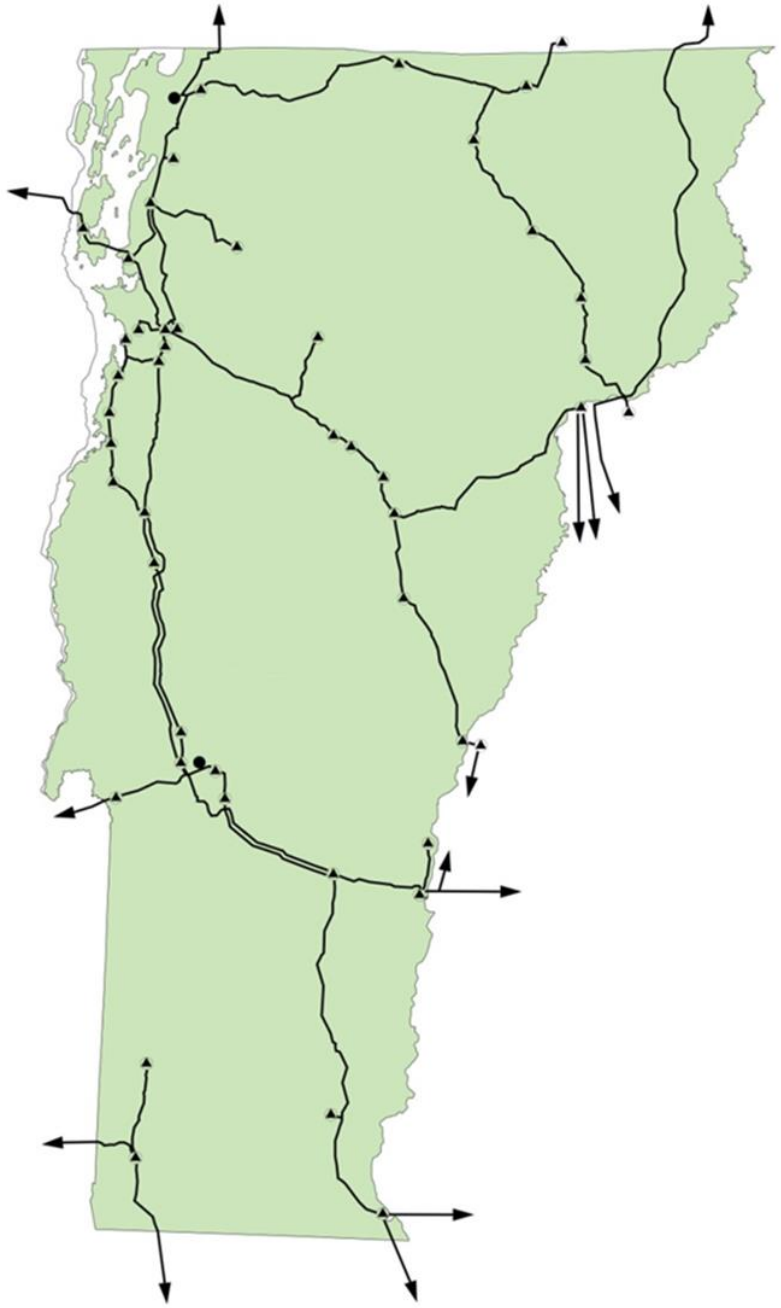
Our Mission: serve as a trusted partner

Our Vision: create a sustainable Vermont through our people, assets, relationships, and operating model

VELCO's Role: ensure transmission system reliability by planning, constructing, operating and maintaining the state's high-voltage electric grid

Related Responsibilities:

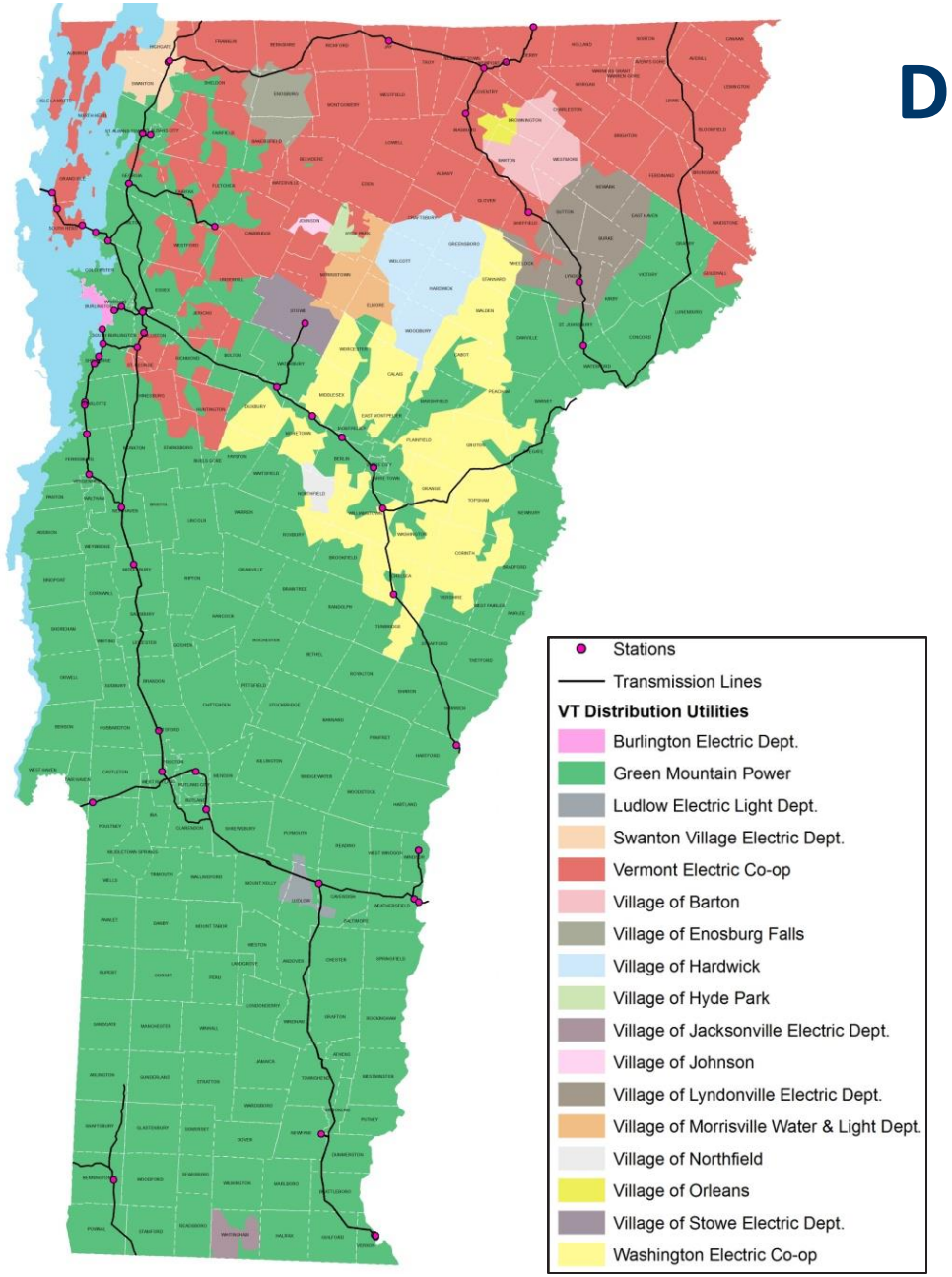
- Serve as Local Control Center for VT grid operations
- Manage the Vermont System Planning Committee
- Develop and submit Vermont's Long-Range Transmission Plan
- Participate in regional process to give voice to Team Vermont



VELCO's Assets

- 740 miles of transmission lines
  - 14,000 acres of rights-of-way
- 55 substations, switching stations and terminal facilities
- 2,000+ miles fiber optics that monitor/control electric system and aid Vermonters' high-speed data internet access
  - Adding 800+ more miles of fiber to connect 500 MW of distributed energy resources
- More than 172 communities served by VELCO middle-mile fiber
- 56 radio sites for the Statewide Radio System to enable both daily operations and emergency response
- HVDC equipment that enables interconnected operations with Hydro-Québec

Distribution Utility Customer/Owners



- Owned by Vermont's 17 distribution utilities and a public benefits corporation
  - ➢ Our owners are also our customers!
- For-profit structured to deliver cooperative like value to every grid connected customer
  - ➢ VELCO profits lower customers' rate pressures!

VELCO substations connect to the sub-transmission systems of…

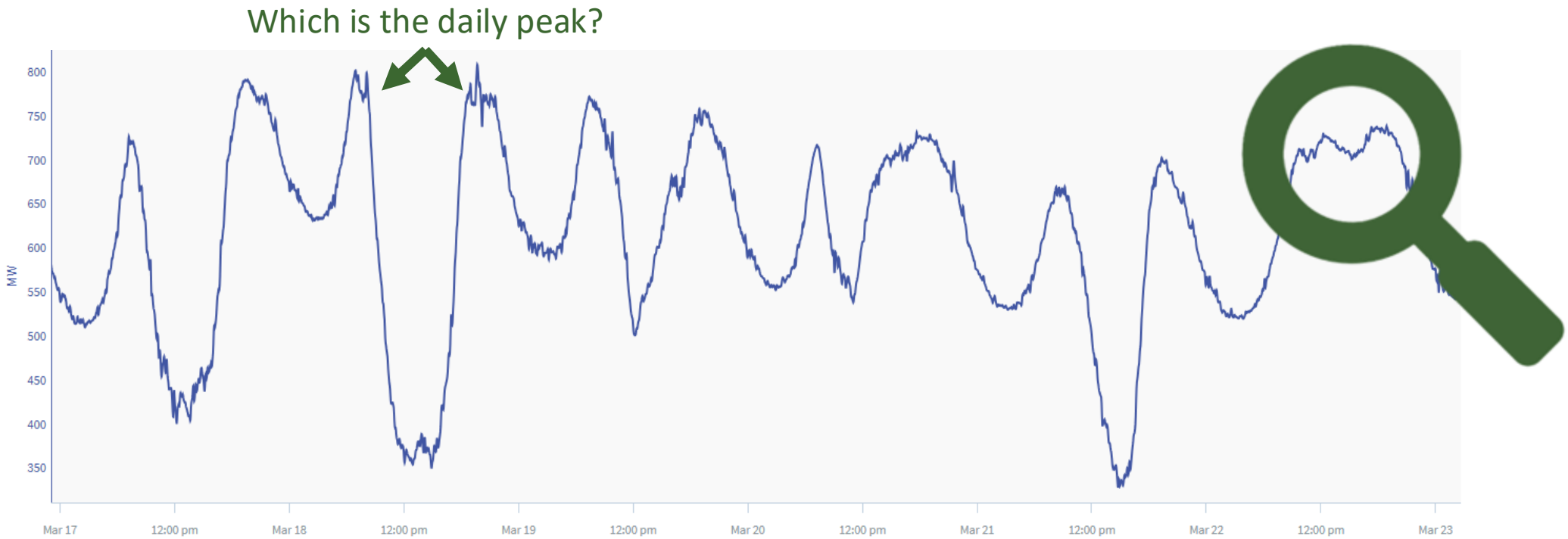
BED (20,000 customers)
GMP (270,000 customers)
Lyndonville (5,700 customers)
Swanton (3,500 customers)
Stowe (5,000 customers)
Vermont Electric Cooperative (32,000 members)
Washington Electric Cooperative (11,000 members)

Leveraging Community Agreements

- Many VT Distribution Utilities (DUs) have limited tools and resources so being efficient and saving time/money is critical for them
- PI Community Agreement
  - DUs can access and visualize their own data
  - Not responsible for the data historian software themselves
- Seeq Community Agreement
  - Enables additional analysis that had either been incredibly time consuming or just not feasible with their current tools

When are the daily peaks?

- New England has some of the most expensive power in the USA, VT has the lowest rate compared to the rest of New England
- Peak loads directly impact customer rates
- Need to know when the peaks happens to make better decisions and lower rates



Substation Feeder Peak Loads

- One Seeq formula that identifies the instantaneous peak load, the exact time it occurs, and the hour it occurs (hour beginning)
- Leverages already built PI AF for ease and scalability
- Same formula used for the State and regional ISO load for comparisons
  - Can also be used to find the peak average hour
- Can then do any type of summary statistics to see how peak loads are changing
  - Electrification, solar, and battery programs are affecting when the peaks happen and how big the peaks are

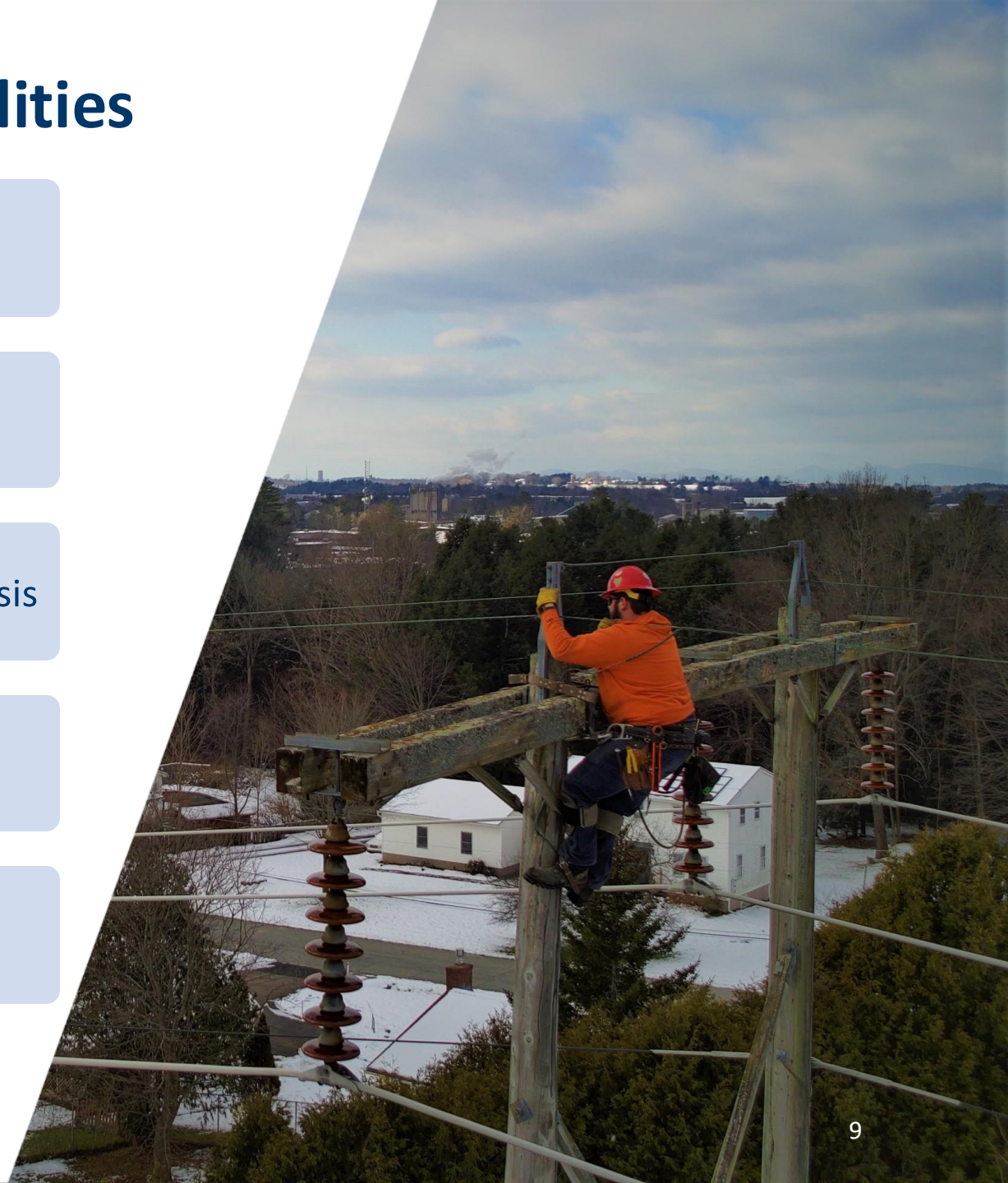
Group	Peak Hour	Feeder Peak Load
[redacted]		
4/21/26 19:10	19	0.479 MW
4/22/26 20:10	20	0.437 MW
4/23/26 20:34	20	0.418 MW
4/24/26 19:43	19	0.435 MW
4/25/26 20:23	20	0.424 MW
4/26/26 20:17	20	0.441 MW
4/27/26 20:06	20	0.409 MW
4/28/26 06:17	6	0.342 MW
[redacted]		
4/21/26 19:55	19	1.531 MW
4/22/26 20:01	20	1.525 MW
4/23/26 19:39	19	1.464 MW
4/24/26 20:24	20	1.428 MW
4/25/26 20:03	20	1.361 MW
4/26/26 20:18	20	1.465 MW
4/27/26 20:16	20	1.399 MW
4/28/26 06:16	6	1.27 MW
[redacted]		
4/22/26 20:03	20	0.671 MW
4/23/26 06:26	6	0.656 MW
4/24/26 06:43	6	0.654 MW
4/25/26 06:58	6	0.613 MW
4/26/26 20:02	20	0.653 MW
4/27/26 20:27	20	0.624 MW
4/28/26 06:15	6	0.599 MW

Generator Performance during Peak Hours

- Leverages the peak load identification formula to find the peak average hour
- Looks at the generator output during that hour
- This generator is a load reducer so any reduction over peak hours can impact rates

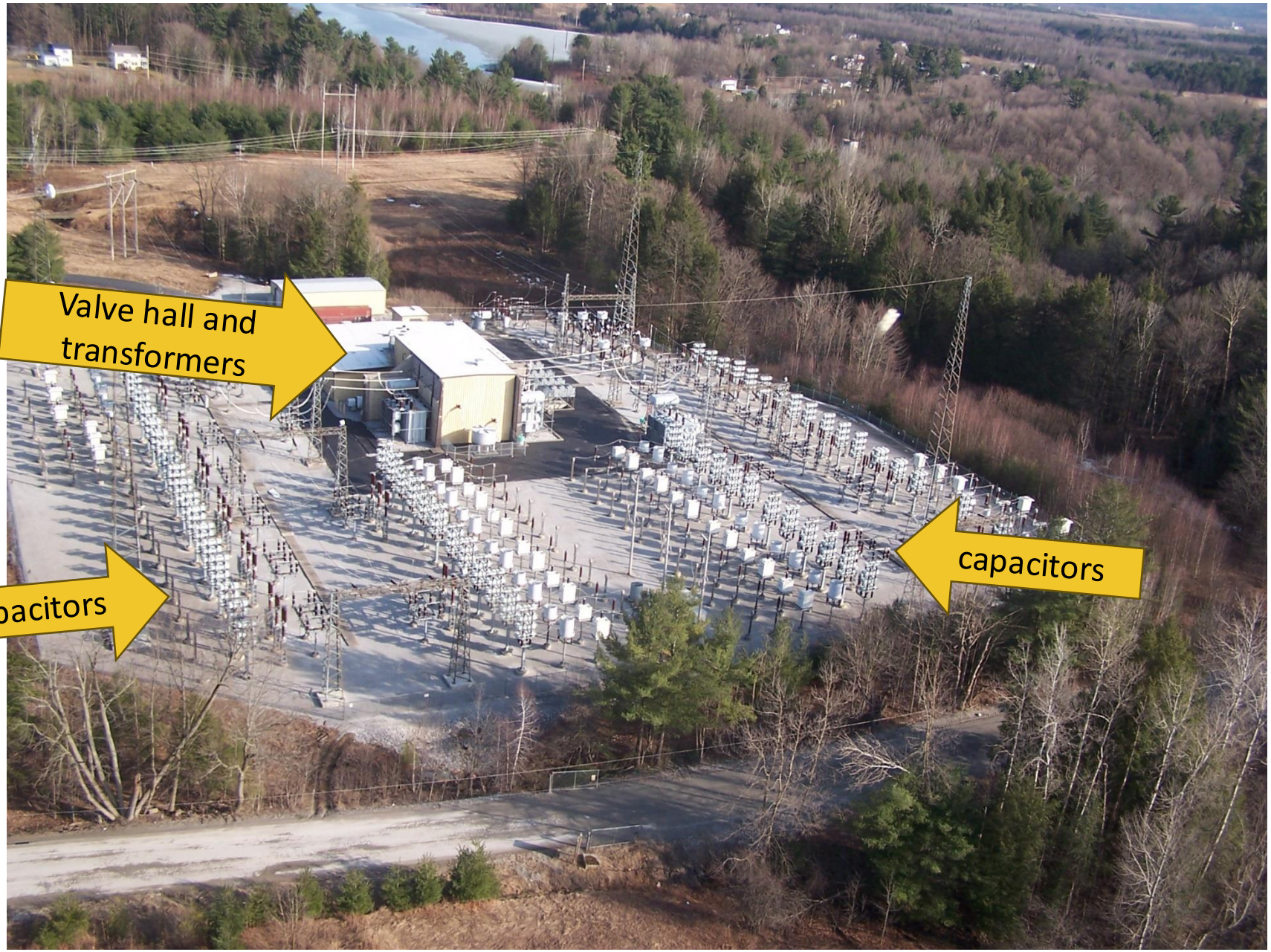
Empowering the Distribution Utilities

- Can monitor their system in real time with PI
- Can track their system performance with Seeq
- Replaces using Excel for faster and easier analysis
- Scalable solutions to apply to all the DUs
- Increased collaboration



Highgate Converter

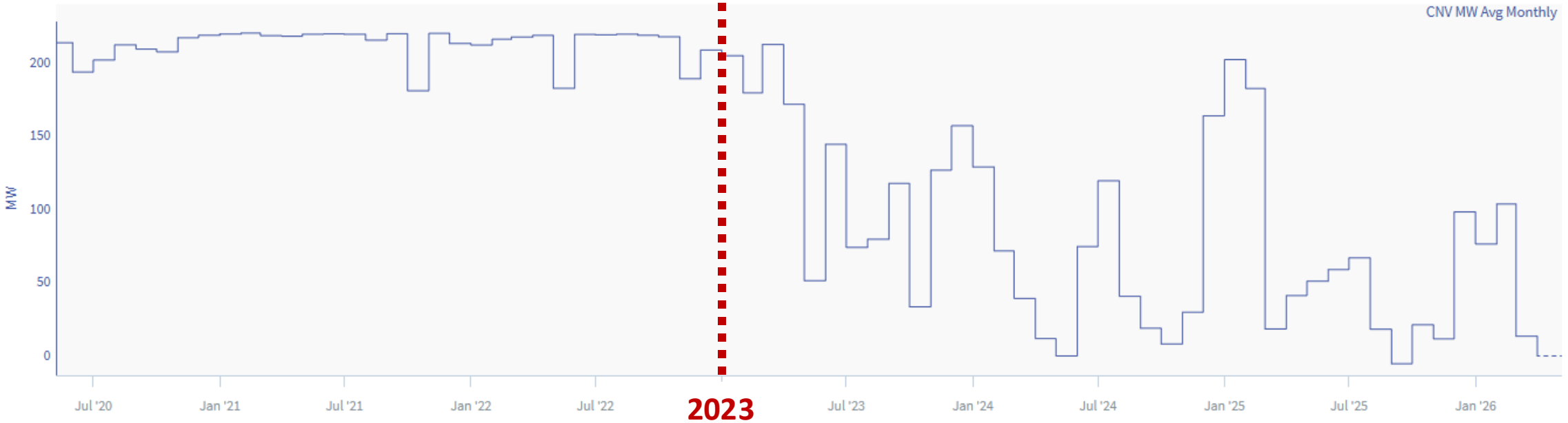
- High Voltage DC (HVDC) Converter
- Constructed 1985, refurbished 2012
- 220 MW max import from HQ
- 170 MW max export to HQ
- 4 shunt cap banks per side
- 4 AC filter cap banks per side
- Output scheduled through ISO-NE in the energy markets
- Operation and maintenance falls on VELCO



Changing Operations

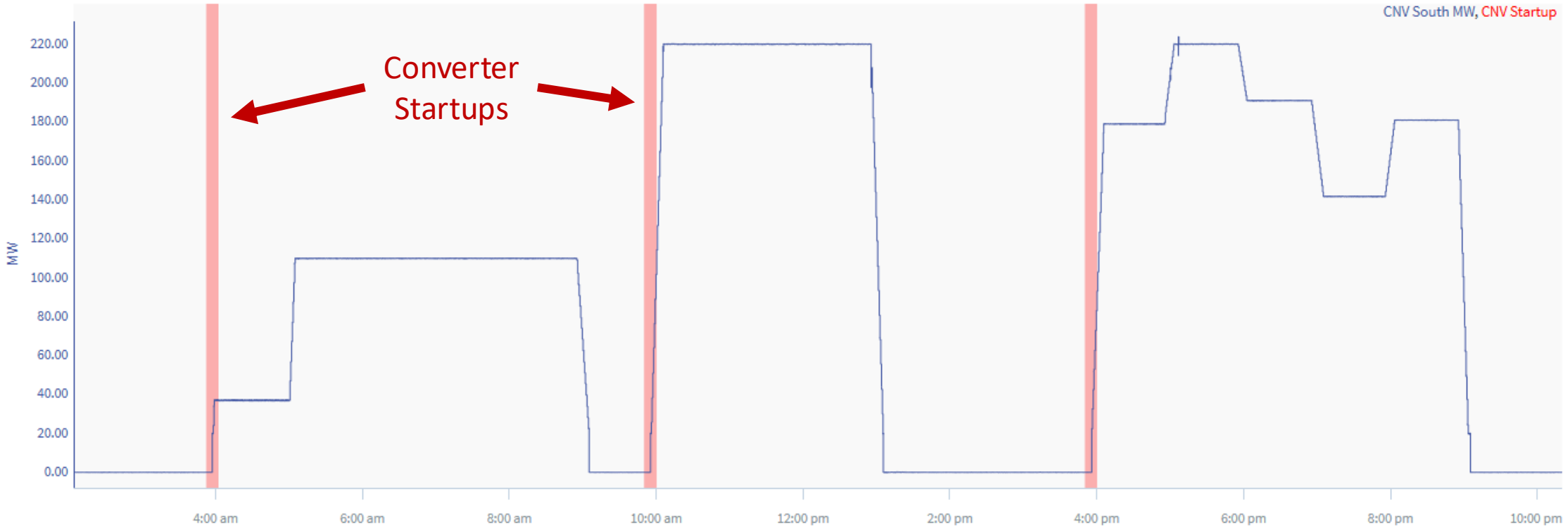
	Percent of Year Importing	Percent of Year Exporting	Average CNV MW
2020	97.6 %	0.0 %	212.1 MW
2021	98.2 %	0.0 %	215.2 MW
2022	97.3 %	0.0 %	211.4 MW
2023	63.0 %	1.7 %	128.8 MW
2024	39.1 %	4.2 %	59.1 MW
2025	54.5 %	11.1 %	63.2 MW
2026	13.3 %	0.3 %	45.3 MW

	Startup Count per Year
2020	36
2021	6
2022	37
2023	357
2024	457
2025	499
2026	115



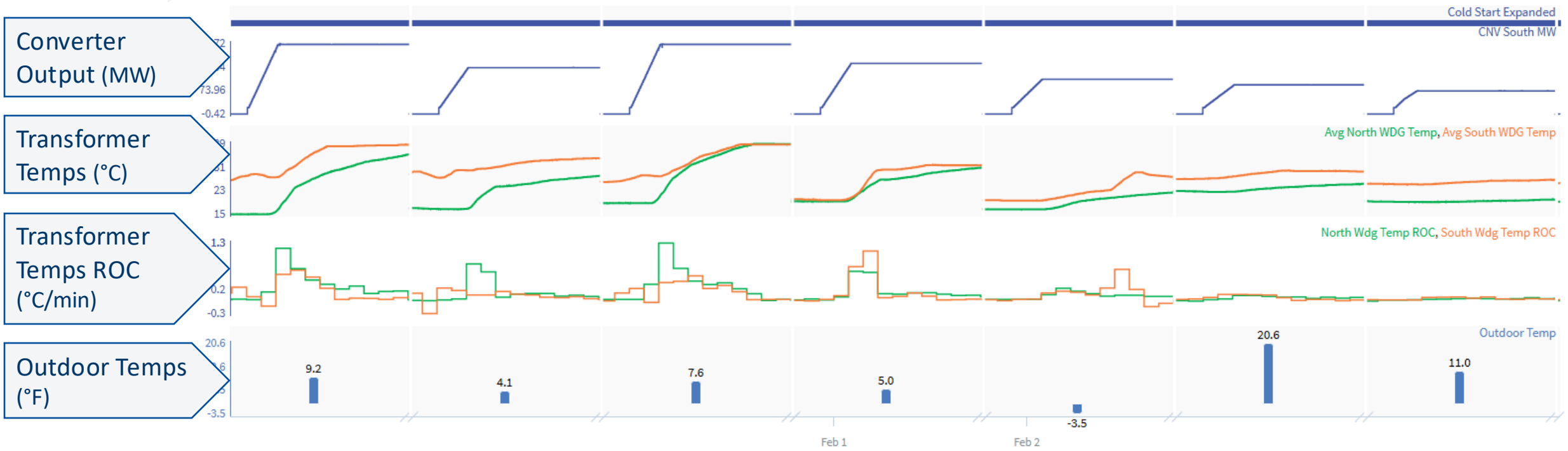
Tracking Startups

- Started with identifying when the Converter goes from no output (stopped) to its minimum output (20 MW) as it starts up



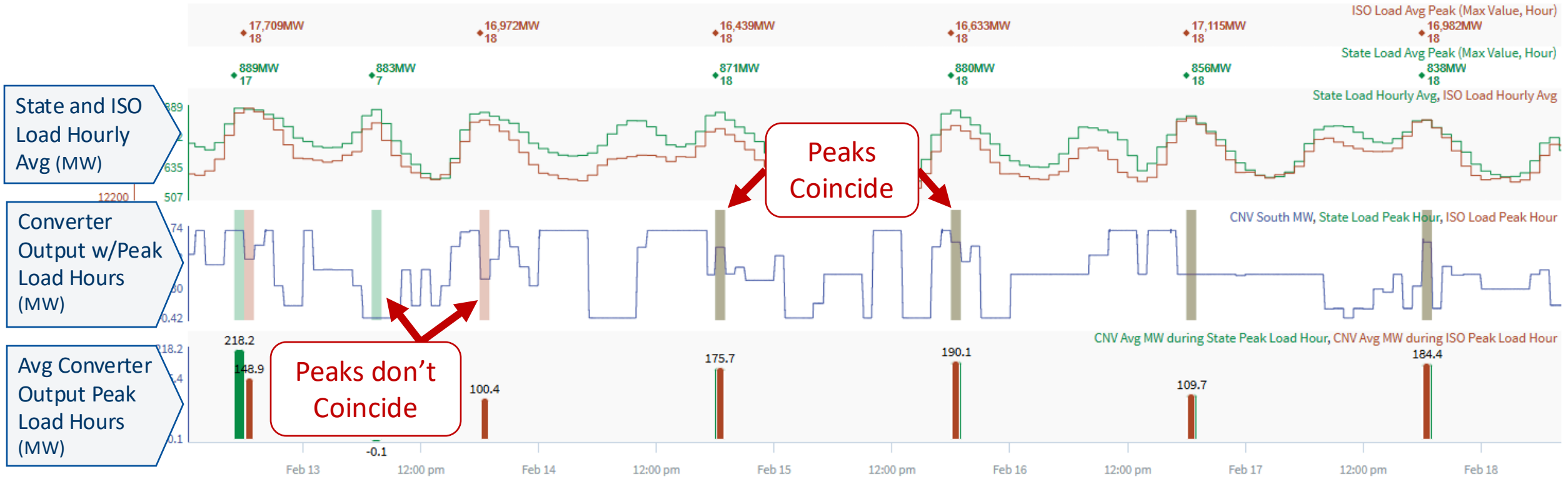
Startup Impact during Cold Weather

- Can layer temperature data on top to identify cold starting the Converter



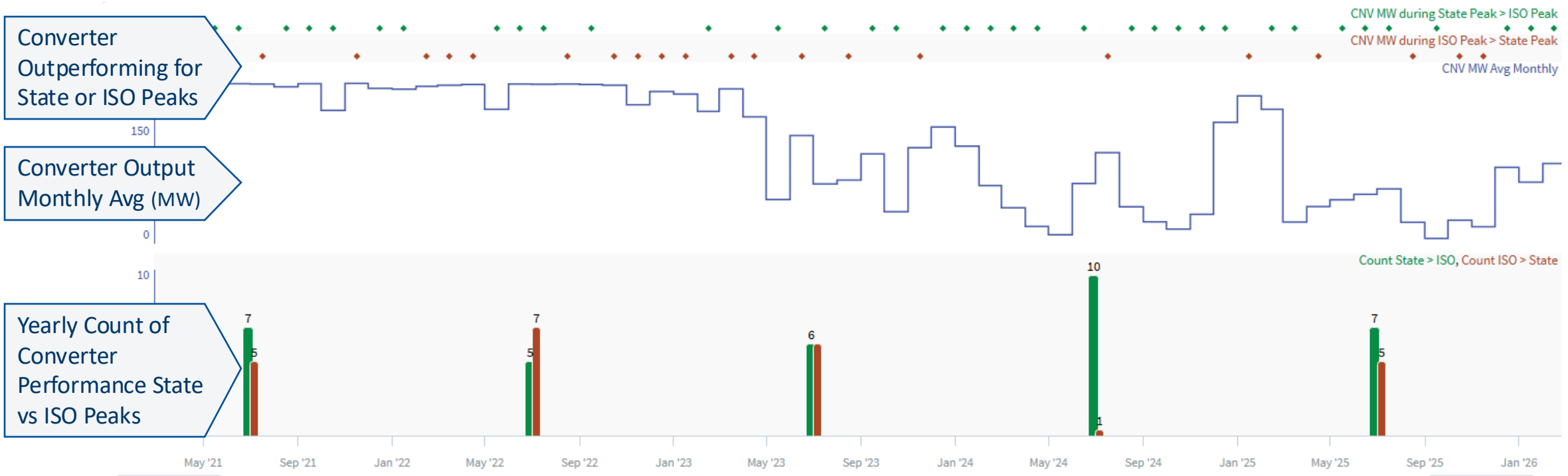
Converter Peak Hour Performance

- Uses the same formula for identifying peak average hours for the State and ISO-NE
- Looks at the Converter output during those peak hours



Making Better Decisions with Data

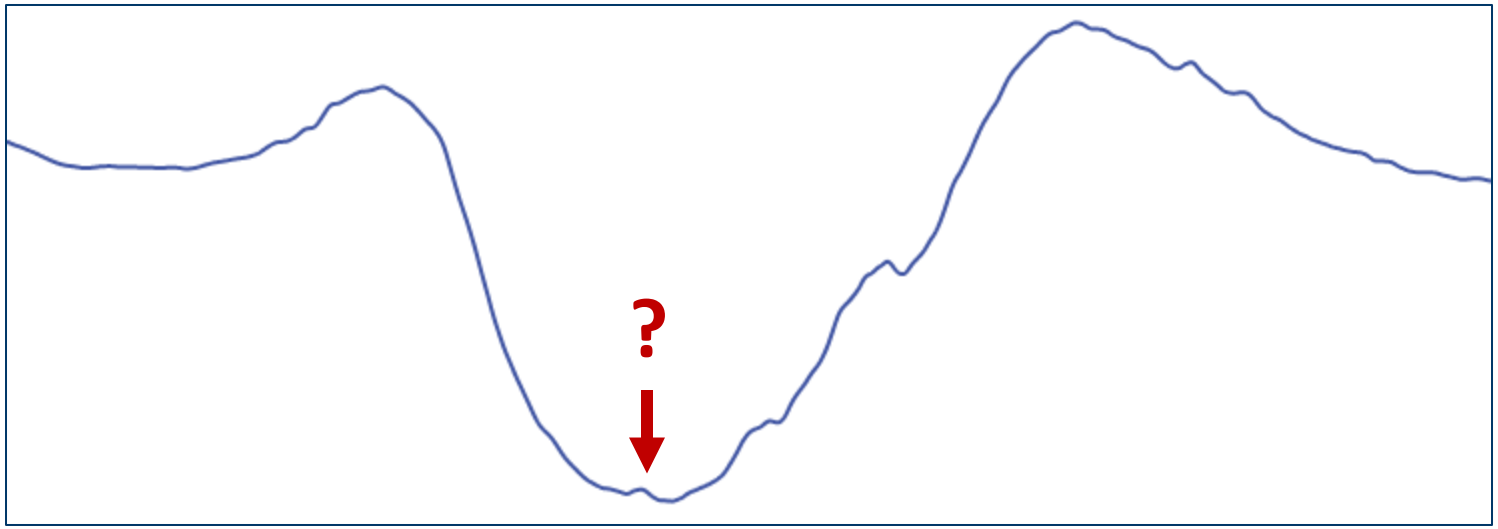
- Often get asked, how often does this thing happen?
- Seeq lets me answer it and quickly too!
  - ➢Does the Converter perform better during the State or ISO peak?



What's the lowest instantaneous load Vermont has had so far?

For reference Vermont's max instantaneous load has been between 900 – 1000 MW

a) 160 MW
b) 87 MW
c) 21 MW
d) -14 MW



Thank You!

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