

Vermont – New York New Interconnection Feasibility: Scope of Work and Preliminary Results

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Background

- Vermont 10-Year Needs Assessment in progress
 - Several problem areas identified in system
 - Additional work underway for sensitivity analysis
 - Several conceptual solutions considered to address system deficiencies
 - Has not been finalized at this point in time
- Major wind projects being studied in upstate New York
 - May need higher rated or additional export paths than are currently available.
 - Subject of ongoing NYISO and TO studies

Background Cont.

- Voltage limitations restrict flow on Central East to 2800 MW
 - Previous studies indicated upgrade of PV20 would increase limit
- Screening analysis completed for NCSP08 of additional tie
 - Preliminary results showed benefits for transfer limits
 - More in-depth work required

Scope

- Evaluate two proposed alternative paths for interregional impacts
 - Plattsburgh – New Haven 230 kV
 - Plattsburgh – Granite 230 kV
- Analyze effects on inter-regional reliability
- Look at effects of new path at multiple North Country wind levels
- Conduct screening for potential impacts on NY Central East & PJM transfers for loss of New England source contingencies
- Conduct follow-up analyses that consider higher voltage classes or extending path further as needed

Methodology

- Examine 2013 and 2018 systems
 - 2013 base case approved by ISO New England, NYISO, and PJM
 - 2018 case under development
- Contingency analysis
 - Look for possible relief of issues outlined in Vermont 10-Year Needs Assessment
 - Evaluate Loss of Phase II at differing transfer levels to New England
- New York Wind Additions
 - Look at three increments of wind plant additions

Methodology – Cont

- Sensitivities
 - Vermont Yankee Out of Service
 - Highgate Out of Service
 - Central East heavy transfers
 - Saranac Energy Out of Service
 - All Alcoa Aluminum Load Out of Service

Planning Alternatives Considered

- Plattsburgh – Essex – New Haven 230 kV option
 - A new phase angle regulator at Sandbar
 - Two 350 MVA 230 kV/115 kV transformers at Essex
 - A 450MVA 345 kV/230 kV transformer at New Haven
- Plattsburgh – Essex – Granite 230 kV option
 - A new phase angle regulator at Sandbar
 - Two 350 MVA 230 kV/115 kV transformers at Essex

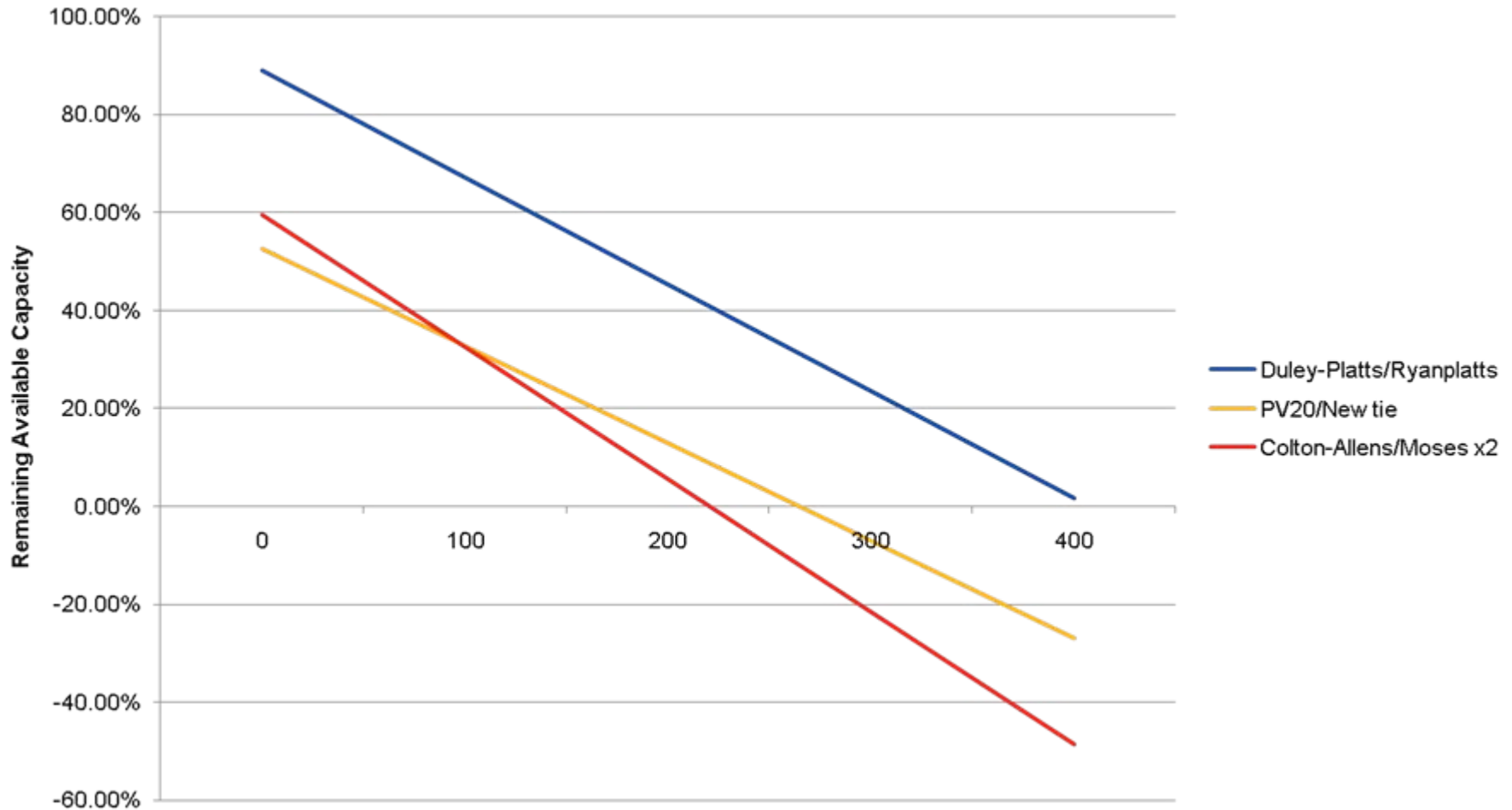
Contingency Simulation - Summary

- Loss of new facilities
- All Vermont local contingencies
- NY North country local contingencies
- Major New England contingencies
- Major New York contingencies
- Loss of Salem generation unit in PJM

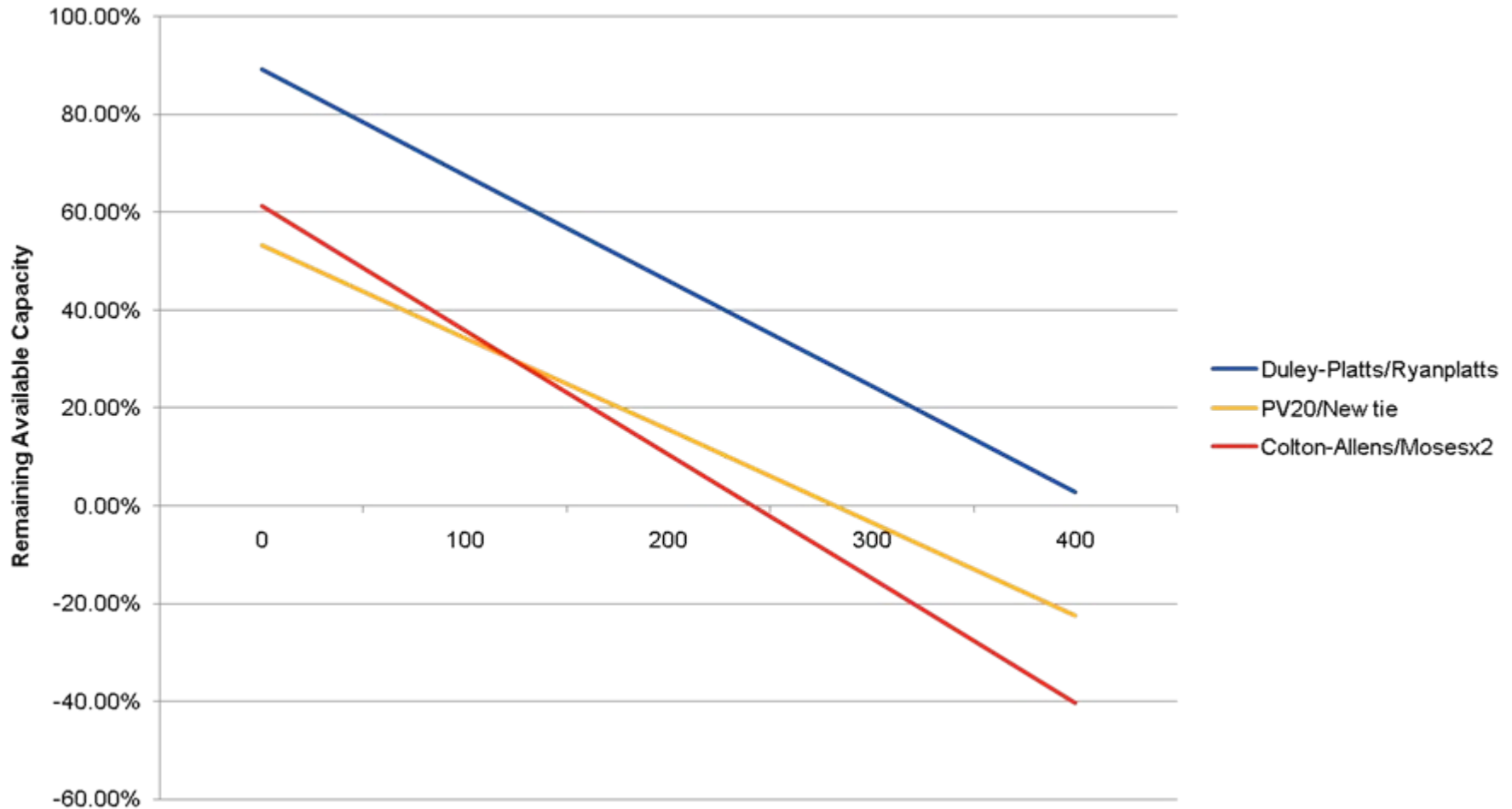
Interregional Screening

- Tested Phase Angle Regulator settings of new tie at 200-500 MW levels (NY to NE) of transfer for both upgrade scenarios
 - Examined various levels of wind in New York
 - Increased imports to Vermont show possible relief for loss of Highgate
 - 400 MW+ levels cause thermal loading issues on the New York system for some contingency conditions
 - Connection of Plattsburgh T1 and T4 on 230 kV side improves system performance

Example of PAR Operating Range Granite Option



Example of PAR Operating Range New Haven Option



PAR Operation Range Analysis Observations

- Activating the Overload Mitigation Scheme (OMS) on the Vermont system for a contingency loss of the new tie backs off PV-20 loading by approximately 33%
- Separation of Moses-Willis lines onto separate towers removes loss of both as an N-1 contingency event
- Maximum level of transfer into New York from Vermont currently under analysis

Pickup Factors

	Base	Ph2 @ 1500	Pickup	Salem	Pickup	Granite	Ph2 @ 1500	Pickup	Salem	Pickup	Nhaven	Ph2 @ 1500	Pickup	Salem	Pickup
CENTRAL EAST W/ NEW TIE	2171	2598	28.5%	2225	3.6%	2246	2723	31.8%	2303	3.8%	2245	2715	31.3%	2302	3.8%
LEEDS-PV	2356	2269	-5.9%	2407	3.4%	2323	2229	-6.3%	2374	3.4%	2327	2234	-6.2%	2377	3.4%
PJM-E	4577	5079	33.5%	5233	43.7%	4577	5060	32.2%	5230	43.5%	4569	5055	32.4%	5222	43.6%
PJM-C	1092	1744	43.5%	1748	43.7%	1089	1718	42.0%	1741	43.5%	1080	1713	42.2%	1734	43.6%
PJM-W	3015	3437	28.2%	3422	27.1%	3013	3419	27.1%	3418	27.0%	3008	3416	27.2%	3413	27.0%
JUNIATA 500X	2241	2474	15.5%	2429	12.5%	2240	2464	14.9%	2427	12.4%	2238	2463	15.0%	2424	12.4%
CENTRAL EAST	2171	2598	28.5%	2225	3.6%	2045	2366	21.4%	2097	3.4%	2044	2363	21.2%	2094	3.3%
UTICA - ALBANY	2049	2410	24.1%	2110	5.8%	1923	2234	16.7%	1983	5.7%	1922	2233	16.7%	1980	5.7%

Loss of Source Contingencies

- The new tie has little impact on the pick-up factors for critical contingencies internal to New York and PJM
- For loss of Phase II
 - The Utica-Albany pick-up factor drops about 8%
 - The Juniata pick-up factor drops about 0.5%
- The results show
 - New York limit would likely increase
 - Limit would vary with system conditions, but is expected to increase at least 100 MW
 - The PJM limit would increase by 75 MW to 100 MW (above its projected limit of 1400-1500 MW)

General Observations – Preliminary Results

- A new tie from Plattsburgh to New York looks promising
 - Shows potential for improving performance of the Vermont system
 - The North Country ability to export and import power likely increases
 - It provides an additional transmission path parallel to Utica - Albany
 - The Loss of Source limit may increase by 75 MW to 100 MW
- Additional analysis is required
 - Further coordinate analysis with the Vermont Ten Year Plan
 - Examine feasibility of switching arrangements that would close the Plattsburgh 230kV bus and separate the Moses- Willis circuits from common structures
 - Comparison with other system alternatives

Additional Technical Work

- Additional sensitivities to consider
 - PV20 at 0 MW of transfer
 - PV20 out of service
 - 350 Coolidge – West Rutland line out of service
 - 370 West Rutland – New Haven out of service
 - F206 (Granite 230kV) line out of service
 - Coolidge transformer out of service
- In depth wind dispatch and other dispatch analysis
- 2018 case analysis

Vermont – New York Stakeholder Interaction

- Results will be coordinated through the JIPC and transmission owners
- Discussions will be held with stakeholders in New England and New York
- Status reports will be provided to the IPSAC for input on study scope of work and draft results
- Results expected 4th quarter 2009

Questions

