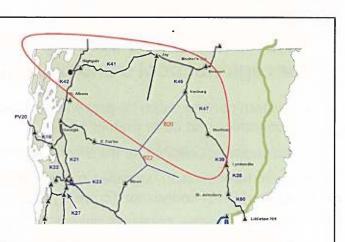


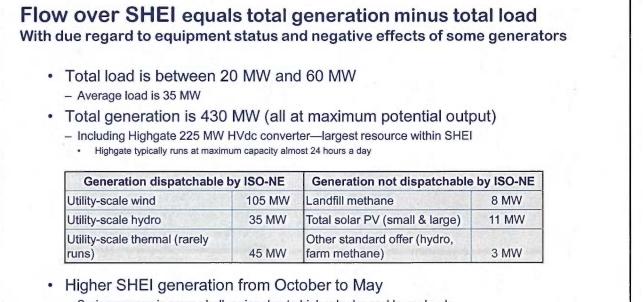
How did we get here?

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- · Generation has grown over the last few years
- Sheffield-Highgate Export Interface created in 2013 by ISO New England to ensure system can handle limiting transmission line outage
- Two types of interface limits: voltage and thermal
 - SHEI limit is currently based on a voltage constraint, i.e., a voltage limit
 - Thermal limit is presently slightly less restrictive than voltage limit in summer; much less restrictive in winter
- · Limits are predetermined by ISO-NE off-line analyses
- Limits vary automatically in real time based on actual system conditions, such as load, generation, equipment status
- ISO-NE keeps interface flows below the limits by managing generation outputs through *Do-Not-Exceed* (*DNE*) signals to individual generators that participate in ISO-NE markets

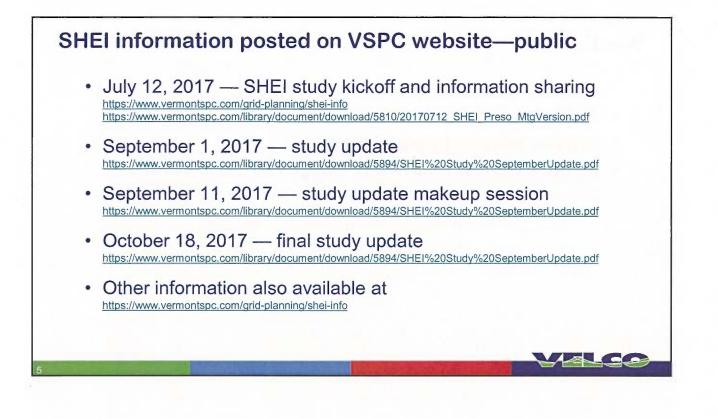




- Spring season is more challenging due to higher hydro and lower loads
 - Growing energy efficiency and behind-the-meter/non-dispatchable generation aggravating constraints

SHEI is not a load-serving reliability problem eligible for regional pool transmission funding support

- System concerns can be prevented by backing down generation based on economics and other market rules
- Solutions not eligible for traditional regional cost sharing
- Initial transmission upgrades or non-transmission options could mitigate most *current* SHEI congestion (current generation sources loads)
 - Reactive devices; operational ambient-based ratings; B-20 line upgrade; energy storage
- Robust, long-term solutions that support 90% renewable by 2050 energy vision will be complex and could lead to costly reinforcements and other strategies
 - New transmission lines; new tools (e.g., storage, demand management, strategic electrification); hybrid solutions
- Collective problem that will require multiple stakeholders' engagement





- Hired EIG to study 17 options and 45 combinations, including...
 Reactive power support, subtransmission and transmission upgrades, and energy storage
- Used VSPC framework to facilitate an open discussion of concerns and solutions
- Key results
 - Logical to address voltage concerns first (B20/B22, SC, AVR)
 - K42 line could be key for relieving thermal concerns
 - · Implement ambient-based ratings (static or dynamic)
 - Reconductor as part of asset condition project
- Tensions
 - Short-term and quick solution versus long-term solution with implementation challenges
 - There is not a pre-established mechanism for the cost allocation of economic upgrades
 - Concern over follow on projects benefitting from the solutions
- Stakeholders will select preferred option(s)
- VELCO will provide support as needed

What's next?

- Cost estimates are under development
- Additional analysis underway by affected distribution utilities
- · Solution selection by year end
- Continuing public information through VSPC and VSPC website