

Asset Management Update



January 16, 2020

AM: For the sake of what?

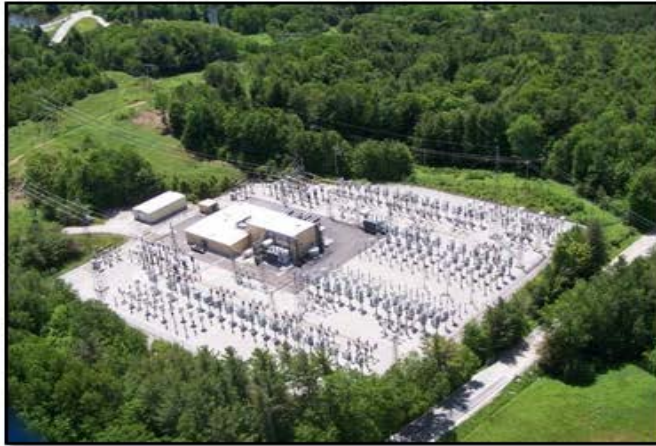
- More substation and line equipment
- Ensure maintenance is prioritized based on criticality and condition
- Develop replacement and critical equipment maintenance plan
- Crew availability for capital projects, work for others, etc.

Developed asset replacement criteria

Breaker Replacement Criteria based on asset condition

	Category	Criteria	Weighting	Florence H84	Florence B10	Florence B11	Florence B12
Relevance	Obsolete Technology	Components are no longer supported by manufacture.	0-2	2	2	2	2
	No Spares	VELCO no longer has any working spare components in stock	1	1	1	1	1
	SF6/Oil	For environmental considerations, VELCO prefers vacuum breakers. 1 for SF6, 2 for oil.	0-2	2	2	2	2
	Meet Rating requirements	The device is not rated for configuration.	1	0	0	0	0
	Device Rating	Does the breaker have a 110% continuous over voltage rating or current rating not adequate. 1 if no for either.	1	0	0	0	0
	CT compliment	Does the breaker have the proper CT compliment for proper future relay protection. 0 for yes, 1 for no.	1	2	2	2	2
	Age	What is age of device, 1 if >30 years old, 2 if > 40 years old, 3 if >50 years old.	0-3	2	2	2	2
	Failure rate	This type of breaker contains a high failure rate.	1	0	0	0	0
Performance	Manufacture known deficiency	Industry wide know deficiencies for equipment type.	1	1	1	1	1
	Overall condition test results	This value is based on breaker test results. Doble, contact wear, timing, and trending.	1	0	0	0	0
	Operations	This breaker has a large breaker counter. 1 if >2000. 2 if >4,000	1	0	0	0	0
	Misoperated	This breaker has had a misoperation due to a failed breaker component.	1	0	0	0	0
		Replace device if weighting is equal to or greater than 6 points		10	10	10	10

Strategic Asset Management Plan



Developing data based criteria for maintenance

- **Criticality * Health = Risk**
 - Criticality = Development of criteria that determines importance of piece of equipment to reliability of system.
 - Health = Current health of equipment based on most recent test and real-time data.
 - Risk = Product of Health * Criticality.
 - Maintenance targeted at highest ranked risks.

Transformer Criticality Rating

Not all transformers have the same value to the bulk electric system or criticality for serving load. As such, below is the criteria assigned for the transformer fleet:

Most critical transformer: (Multiplier of 1.0)

- Large power transformers with restoration time of greater than 30 days for repair or replacement. These units do not have a parallel unit.
- Loss of load with more than 5 days restoration time.
- Transformer impacting a local or regional interface limits.
- Transformers that that may be difficult to move or require significant time for replacement and/or time for restoration.

Second Most critical transformer: (Multiplier of 0.8)

- Large power transformer operating with a parallel unit to transfer power, e.g. West Rutland T1 and T2
- No parallel transformer but has the capability to be operated without it.
- Impacts a local area interface limits and/or has the potential to curtail local area generation.
- No parallel transformer but will result in loss of load for less than 5 days. eg. K65 transformer radial stations and use of mobile.

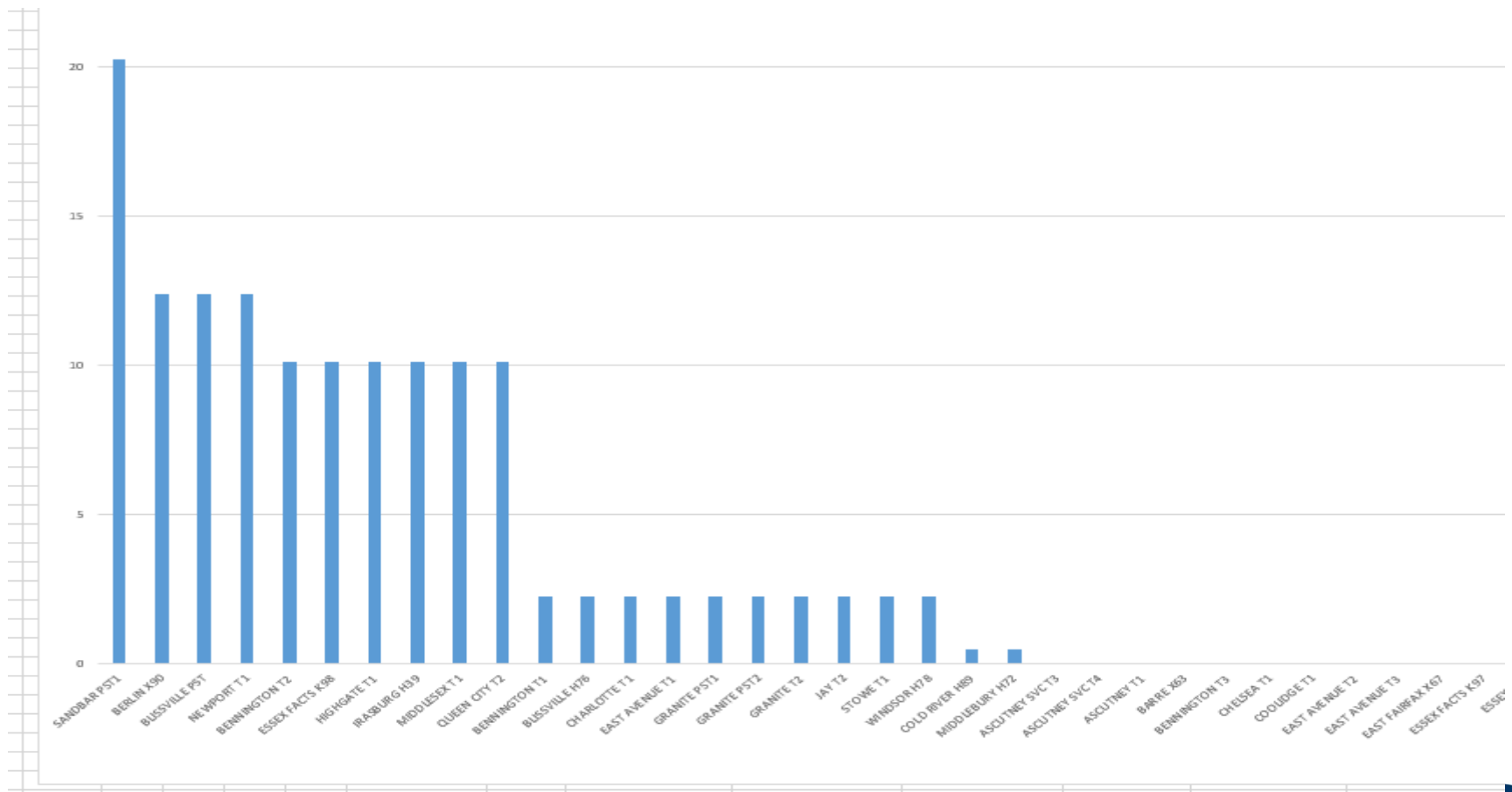
Third Most critical transformer: (Multiplier of 0.6)

- Parallel units that can be operated/controlled without customer outages.
- Substation has the ability to operate without the power transformer or reactor with minor operational restrictions.
- Any 345kV reactor transformer where loss would impact ability to maintain voltages



Risk

- Outcome will be a priority ranking of based on reliability risk



Plan going forward

- Continue development of strategic plan with replacement strategy
- Continue working on transformer risk assessment
- Continue to install transformer DGA monitors
- Next device is breaker monitors and breaker risk evaluation
- Batteries, Telecomm, IT assets
- Key facility equipment:
 - Generators, UPS,
 - Transfer switches

