

Sand Bar Phase Shifting Transformer Asset Condition



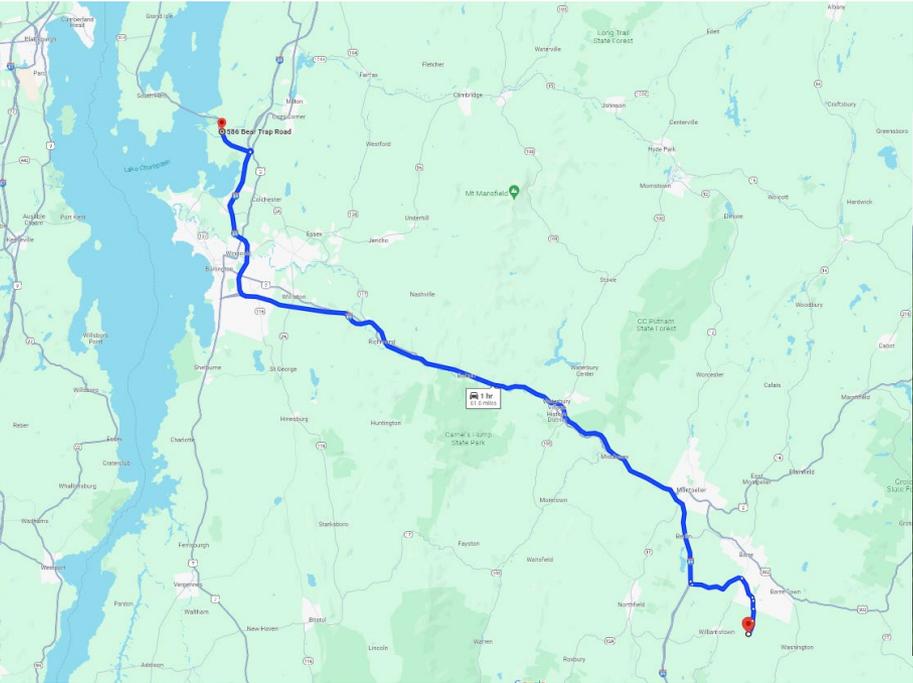
Operating Committee

May 16, 2024

History of PV20 Line

- PV20 LINE
 - 115kV tie line between Vermont and New York
 - Historically flow control has been needed to protect against large-source contingencies
 - Phase Shifting Transformer (PST) at VELCO Sand Bar is currently serving this function
 - February 20, 2021 – PST failed
 - PV20 Line remained opened for 5 months until Granite PST was put in service at Sand Bar.
 - Repair and Re-installation at Granite was >2 ½ years
 - Cost of repair and transportation \$3.5M

PST move from Granite to Sand Bar



Project Need

- Extend the life of the Sand Bar PST by reducing the number of tap changes (Recently 8,000 per year)
- PV20 Line needs the ability to throttle increasing **fluctuating** flow in response to NY wind growth which is predicted to continue.
- Timely Solution is need to reduce Sand Bar PST tap changes

Alternatives and Solutions

- Alternative 1 – install a second PST in series
 - Reduces PST Tap Changes in half
- Alternative 2A: Install full replacement SMARTVALVE™ in series
 - Reduces PST Tap Changes to near 0
- Alternative 2B Install a half replacement SMARTVALVE™ in series (Selected Solution)
 - Reduces PST Tap Changes near 0

Comparison of alternatives

	Alternative #1: Series PST	Alternative #2A: Full PST replacement SmartValve	Alternative #2B: PST augmentation SmartValve (Preferred)
PST life extension	Yes, but not nearly as much as the smart valve options	Yes	Yes
Recovery following PST failure	Restore current imprecise control	Retains fast, precise and full control (+/-64 deg)	Retains fast, precise and half control (+/-32 deg)
Recovery following smart valve failure	N/A	Restore current imprecise control	Restore current imprecise control
Longevity	Portable, but difficult Cannot be used at 230 kV	Easily portable Usable at 230 kV	Easily portable Usable at 230 kV
Delivery timing	4 to 5 years	1 to 2 years	1 to 2 years
Estimated In Service date	Q1 2029	Q4 2026	Q1 2026
Cost estimate with 50% contingency	\$56.2M PTF (+50%/-25% accuracy)	\$66.3M PTF (+50%/-25% accuracy)	\$47.7M* PTF (+50%/-25% accuracy)
Grid-enhancing Technology	No	Yes	Yes
Expected DOE funding support	No	No	Yes – *\$13.8M which drops cost to \$33.9M

