

2020 Resource Report

Swanton Village Inc. Electric Department

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the Vermont Public Utility Commission
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Vermont Public Power Supply Authority
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in fulfillment of Vermont Public Utility Commission Rule 5.206(B)



Overview & Introduction

As a member of the Vermont Public Power Supply Authority (VPPSA), Swanton Village Inc. Electric Department (“Swanton”) relies on VPPSA to plan for and manage its power supply in New England’s wholesale markets. In this role, VPPSA not only manages Swanton’s power supply in the ISO New England’s (ISO-NE) wholesale power markets, but also plans for and solicits new power supplies for Swanton and its other municipal utility members.

The information contained in this report describes Swanton’s power supply needs and acquisition strategy over the next five years. It is divided into four sections.

I. Electricity Demand

This section shows how electricity demand has changed over the past five years, and forecasts the demand for the upcoming five years.

II. Electricity Supply

This section describes each resource in Swanton’s portfolio of supplies, as well as the new resources that have been acquired over the past year.

III. Electricity Supply & Demand

This section illustrates the balance between the supply and demand for energy, capacity, and renewable energy credits.

IV. Anticipated Transactions & Acquisition Strategy

This section lists the resources that are expected to be acquired over the upcoming five-year period, and outlines the strategy for procuring them.

I. Electricity Demand

In 2020, Swanton's energy requirements¹ ("Load") totaled 55,231,771 kWh, and its coincident annual peak with ISO-NE was 10,551 kW on July 27th at hour ending 18. As shown in Table 1, Swanton's energy requirements have fluctuated by about +/- 3% per year while its peak load has fluctuated by up to 33%. This peak fluctuation is partly due to Swanton's run-of-river, behind-the-meter hydro resource, which is not always operating at its capacity during the coincident peak hour.

Table 1: Historical Loads

Year	Load (kWh)	% Change	Peak Load (kW)	% Change
2016	56,378,076	2.7%	9,085	-6.1%
2017	56,298,074	-0.1%	8,832	-2.8%
2018	56,319,569	0.0%	10,303	16.7%
2019	54,639,311	-3.0%	7,915	-23.2%
2020	55,231,771	1.1%	10,551	33.3%

Swanton's peak and energy needs are forecasted annually using a multiple regression model whose inputs include historical loads, weather, and economic variables like employment and income. These forecasts are adjusted for anticipated changes in net metering, heat pump and electric vehicle penetrations. Table 2 shows the results of the most recent 5-year load forecast.

Table 2: Forecast Loads

Year	Load (kWh)	% Change	Peak Load (kW)	% Change
2021	53,709,590		9,337	
2022	53,807,970	0.2%	9,621	3.0%
2023	53,921,770	0.2%	9,913	3.0%
2024	54,108,760	0.3%	10,214	3.0%
2025	54,176,910	0.1%	10,524	3.0%

Assuming normal weather, loads (kWh) are expected to remain steady. However, peak load (kW) is increasing by 3.0% per year.

¹ Swanton's energy requirements ("Load") include behind-the-meter hydro generation, transmission losses, and adjustments for Vermont's Standard Offer Program. Also known as "Total Load - Including Losses, it is not the same as Swanton's Real-Time Load Obligation (RTLO) with ISO New England.

II. Electricity Supply

Swanton's power supply is made up of owned generation, long-term contracts, and short-term contracts. The resources in Swanton's portfolio represent a range of fuel types and technologies. In addition, they are located throughout Vermont and New England, and many of their expiration dates have been chosen not to overlap. As a result, they act as a diversified portfolio that effectively hedges Swanton's power supply costs against the cost of serving load in ISO New England's energy, capacity and ancillary markets. These power supply resources are summarized in Table 3.

Table 3: 2020 Electricity Supply Resources

Resource	2020 MWH	%	Fuel	Exp. Date
Highgate Hydro #1-4	37,693	67.8%	Hydro	Life of Unit
Highgate Hydro #5	3,303	3.2%	Hydro	Life of Unit
Market Contracts	6,424	10.4%	System	Varies
McNeil Facility	8,500	11.9%	Wood	Life of Unit
NYPA Niagara Contract	3,771	5.1%	Hydro	9/1/25
NYPA St. Lawrence Contract	80	0.1%	Hydro	4/30/32
Project #10	31	0.03%	Oil	Life of Unit
PUC Rule 4.100 Program (VEPPI)	225	0.4%	Hydro	10/31/20
Ryegate Facility	1,700	1.9%	Wood	10/31/21
Stony Brook Station	335	0.2%	Oil	Life of Unit
TOTAL RESOURCES	62,063	100.0%		

Total Load Including Losses	55,232			
ISO Exchange (+ Purchase/- Sale)	-9,883	-11.0%		

Resource Descriptions

The following bullets summarize the essential characteristics of each resource, and in some cases, include notes that describe unique aspects of the resource.

1. Highgate Falls Hydro

- Size: 11.392 MW
- Fuel: Hydro
- Location: Swanton, Vermont
- Entitlement: 100%, owned
- Products: Energy, capacity, renewable energy credits (VT Tier I and NH III)
- End Date: Life of Unit
- Notes: This is Swanton's largest energy-producing resource, and it provided 71% of the Electric Department's energy in 2020. Units 1-4 are ISO-settled and VT Tier I qualified while Unit #5 is a load reducer and is NH Class I qualified.

2. Market Contracts

- Size: Varies
- Fuel: New England System Mix
- Location: New England
- Entitlement: Varies (PPA)
- Products: Energy, renewable energy credits
- End Date: Varies, less than 5 years.
- Notes: In addition to the above resources, the Electric Department purchases system power from various other entities under short-term (5 years or less) agreements. These contracts are described as Planned and Market Purchases in the tables below.

3. McNeil Station

- Size: 54 MW
- Fuel: Wood
- Location: Burlington, Vermont
- Entitlement: 3.7% (1.85 MW), joint-owned through VPPSA
- Products: Energy, capacity, renewable energy credits (CT Class I)
- End Date: Life of Unit
- Notes: As the joint-owner, VPPSA has agreements with the Electric Department to pay for and purchase 3.7% of the unit's output.

4. New York Power Authority (“NYPA”)

- Size: 2,675 MW (Niagara), 1,957 MW (St. Lawrence)
- Fuel: Hydro
- Location: New York State
- Entitlement: 0.478 MW (Niagara PPA), 0.01 MW (St. Lawrence PPA)
- Products: Energy, capacity, renewable energy credits (NY System Mix)
- End Date: 9/1/25 (Niagara), 4/30/32 (St. Lawrence)
- Notes: NYPA provides hydro power to the Electric Department under two contracts, which will be extended at the end of their term.

5. Project 10

- Size: 40 MW
- Fuel: Oil
- Location: Swanton, VT
- Entitlement: 7.3% (2.9 MW) MW, joint-owned through VPPSA
- Products: Energy, capacity, reserves
- End Date: Life of unit
- Notes: As the joint-owner, VPPSA has agreements with the Electric Department pay for and purchase 7.3% of the unit’s output.

6. PUC Rule 4.100 Program (VEPPI)

- Size: Small hydro < 80 MW
- Fuel: Hydro
- Location: Vermont
- Entitlement: 1.4% (Statutory)
- Products: Energy, capacity
- End Date: 10/31/2020
- Notes: The Electric Department is required to purchase hydro power from small power producers through Vermont Electric Power Producers, Inc. (“VEPPI”), in accordance with PUC Rule #4.100. The entitlement percentage fluctuates slightly each year with the Electric Department’s pro rata share of Vermont’s retail energy sales, and does not include the renewable energy credits.

7. Ryegate

- Size: 20.5 MW
- Fuel: Wood
- Location: East Ryegate, VT
- Entitlement: 1.04% (PPA)
- Products: Energy, capacity, renewable energy credits (CT Class I)
- End Date: 10/31/2022

8. Stony Brook Station

- Size: 352 MW
- Fuel: Natural Gas, Oil
- Location: Ludlow, MA
- Entitlement: 0.352% (PPA)
- Products: Energy, capacity, reserves
- End Date: Life of unit

Newly Acquired Resources

No new resources were acquired in 2020.

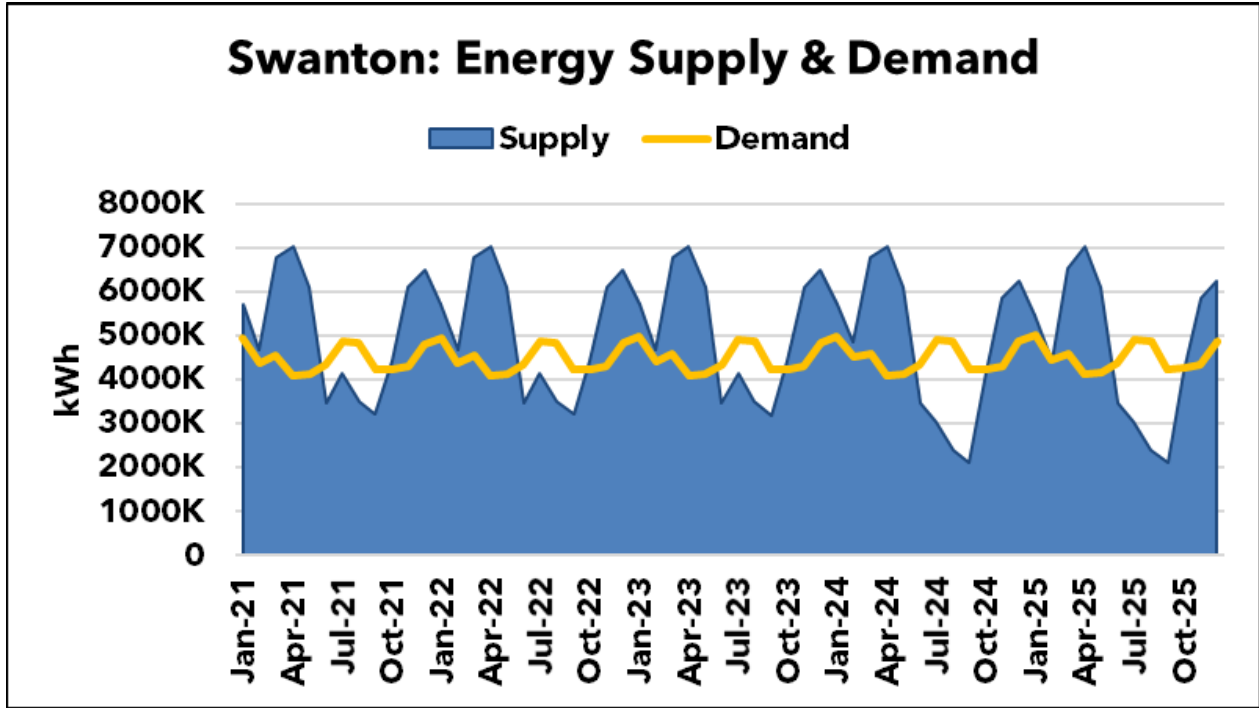
III. Resource Supply & Demand

Energy, capacity and Renewable Energy Credits (RECs) are the primary products that Swanton needs to manage, and the following sections illustrate the forecasted balance between their supply and their demand over the next five to twenty years.

Energy

Figure 1 shows the current forecast of energy supply and demand for the next five years. The forecast shows a surplus of energy in every month of the year except the fall months, when hydrological conditions are dry. As a result, no long-term transactions are anticipated for energy.

Figure 1: Energy Supply & Demand

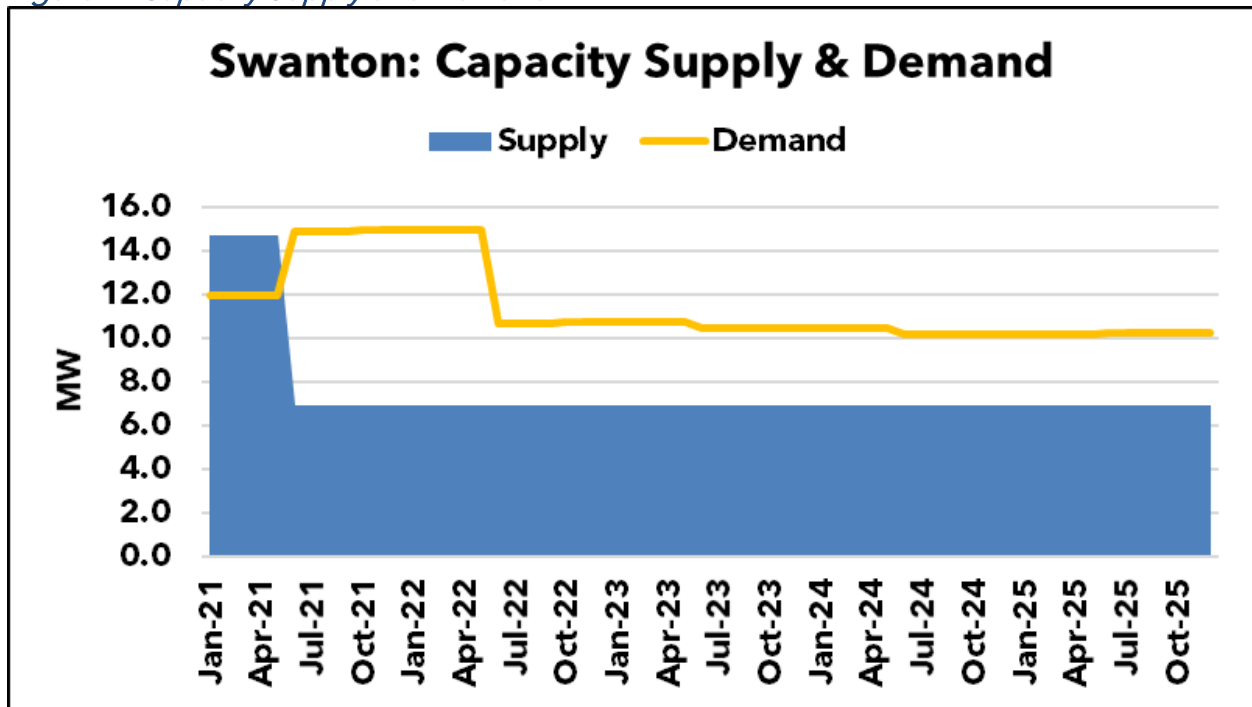


Capacity

Figure 2 shows the capacity supply and demand balance for the next five years. Starting in June 2021, Highgate Falls #1-4 becomes a load reducer, and will no longer receive credit through ISO-NE’s capacity market. As a result, there is a one-year period where Swanton is forecast to experience a large capacity deficit.

Thereafter, the deficit shrinks because of the load-reducing impact of Highgate Falls #1-4. However, the deficit may remain because of persistent dry hydrological conditions during the peak hour over the past 5 years. If hydrological conditions continue to remain low during the peak hour, Swanton may seek an additional capacity resource in the future.

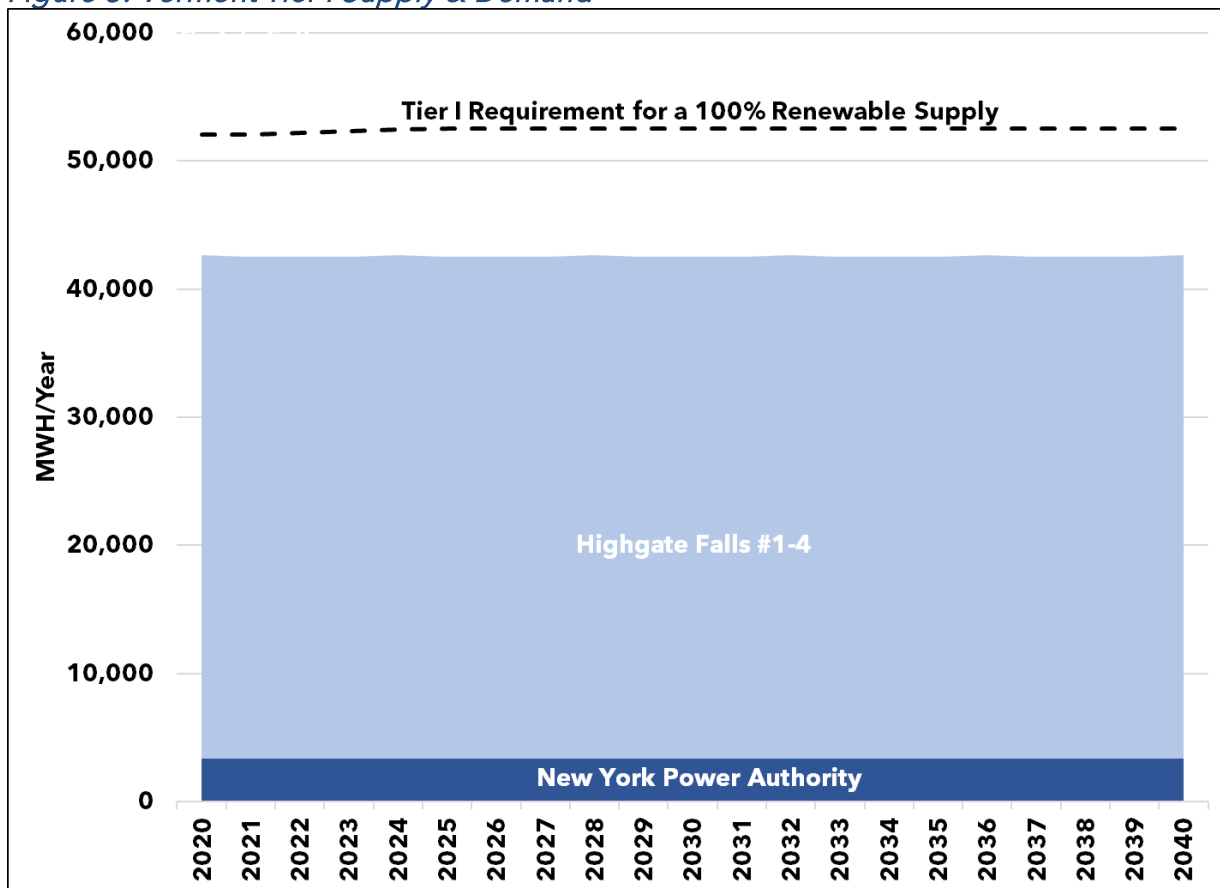
Figure 2: Capacity Supply and Demand



Renewable Energy Credits

Figure 3 illustrates Swanton’s need for RECs under Vermont’s Renewable Energy Standard (RES). Because Swanton sells RECs from McNeil, Ryegate and Highgate Falls #5, it must purchase Vermont Tier I RECs to maintain a 100% renewable power supply. In a typical year, Swanton anticipates purchasing about 10,000 MWH/year of Tier I RECs for this purpose.

Figure 3: Vermont Tier I Supply & Demand



Finally, please note that Swanton is exempt from Tier II requirements as long as it maintains a 100% renewable power supply under Tier I.

IV. Anticipated Transactions & Acquisition Strategy

VPPSA anticipates that Swanton may enter into one or more of the transactions that are listed in Table 4.

Table 4: Anticipated Hedging Transactions

Product	Action	Term	Quantity	Anticipated Price Range	Transaction Anticipated
7x24 Energy	Purchase or Sale	1 month	0-4 MW	\$25-\$75 /MWH	Monthly / Seasonally
On / Off Peak Energy	Purchase or Sale	1-60 months	0-4 MW	\$25-\$75 /MWH	Spring 2021
Long-Term Bundled PPAs	Purchase	5+ years	0-2 MW	\$25-\$75 /MWH	None anticipated.
Capacity	Purchase or Sale	5+ years	3-5 MW	\$2-\$5 /kW-month	Fall 2021
VT Tier I RECs	Purchase	1-5 years	10,000 MWH/Year	\$0.10 - \$1.50 /MWH	May / June 2021
VT Tier II RECs	Purchase or Sale	1-5 years	0 MWH/Year	\$10 - \$40 /MWH	None anticipated.

Energy Acquisition Strategy

7x24 Energy

VPPSA's Power Supply Authorities Policy requires that energy supplies be within +/-5% of the forecasted demand in each month of the year. This is known as the hedge ratio, and it is simply the ratio of the forecasted supply to the forecasted demand. Any imbalances between supply and demand are hedged to these levels before the operating month begins. In practice, changes in weather, generator availability and forecast error sometimes combine to push the actual percentage outside of the +/-5% threshold.

At least seasonally (four times a year), VPPSA uses a 7x24 energy product to refine the energy hedge ratio for Swanton. The following three-step process is used to balance supply and demand on a monthly basis within the current budget (calendar) year.

1. Update Budget Forecast

- a. The budgeted volumes (MWH) are updated to reflect known changes to demand and supply including unit availability, fuel supply, and hydrological conditions.

2. Hydroelectric Adjustment

- a. Supply is reduced by one standard deviation from the long-term average in order to avoid making sales that could end up being unhedged by supply in the event of a dryer-than-normal month.

3. Execute Purchases or Sales

- a. **Internal Transactions:** VPPSA seeks first to make internal transactions between its members to balance supply and demand. The transactions are designed to result in a hedge ratio that falls within the +/-5% range that is required by VPPSA's Power Supply Authorities Policy.
- b. **External Transactions:** In the event that internal transactions cannot bring Swanton into the +/-5% range, external transactions are placed with power marketers, either directly or through a broker.
- c. **Price:** For Internal Transactions, the price of the transaction is set by an average of the bid-ask spread as reported by brokers on the date of the transaction. For External Transactions, the price is set through a negotiation with the counterparty.

On / Off Peak Energy

Known within VPPSA as “planned purchases”, these transactions are almost always purchases. They typically take place no more than once a year, usually carry a 1-5 year term, and if possible, are executed at a time when market prices are at or below budgeted levels.

These purchases are designed to fit the on and off-peak energy needs in each month of the year as precisely as possible. As a result, they minimize the need for monthly 7x24 hedging transactions under VPPSA’s Power Supply Authorities Policy.

The solicitation method is an informal Request for Proposals (RFP), and follows a three-step process.

1. **Pre-Approval Term Sheet:** First, the proposed purchase volumes and anticipated prices are documented in a standardized term sheet. This document is distributed to each VPPSA member for their pre-approval, and it defines their share of the total purchase.
2. **Issue RFP:** Once all of the pre-approvals are received, the term sheet is distributed to three or more power marketers, who are asked to make their best offer by a deadline, typically within 5 business days.
3. **Evaluate & Execute:** When all of the bids are received, VPPSA evaluates them to determine the lowest cost bid, and executes the purchase with that counterparty. Then the purchase is allocated to each VPPSA member according to their pre-approved term sheet, and the data is entered into VPPSA’s database for scheduling, delivery and invoice tracking.

Long-Term Bundled PPAs

VPPSA evaluates long-term Purchased Power Agreements (PPAs) for bundled energy, capacity, renewable energy credits, and/or ancillary products on an ongoing basis. Recently, Swanton has evaluated a solar PPA in partnership with Encore Renewables, and this year, Swanton anticipates that it may evaluate 1.) a contract extension with NextEra as the current Seabrook PPA expires at the end of 2022, and 2.) a hydro PPA that includes energy, capacity, and Tier I RECs. Because long-term PPAs are subject to PUC approval, the acquisition strategy is simply to negotiate the best terms and to make contract execution contingent on PUC approval.

Capacity Acquisition Strategy

Capacity is seldom acquired as a stand-alone product, and because market prices are fixed by the Forward Capacity Market three years in advance of the operating year, there is little opportunity to make short-term (< 5 year) capacity purchases. However, there is short-term opportunity on the demand side. For example, VPPSA forecasts monthly and annual coincident peak loads, and communicates the forecast of the peak day and hour to its members. As a result, all available demand-side actions are taken to reduce capacity requirements. This presently includes maximizing behind-the-meter generation such as load-reducing hydro, and demand response using VPPSA's contract with Virtual Peaker².

For long-term (>5 years) capacity purchases, the acquisition strategy is to bundle capacity into negotiations for long-term, bundled PPAs as mentioned in the previous section.

REC Acquisition Strategy

VPPSA acquires RECs on behalf of Swanton and its other members during the quarterly trading periods that are defined in the NEPOOL Generator Information System (GIS)³. The acquisition strategy has three parts.

1. First, VPPSA completes an analysis of Tier I and Tier II requirements at the beginning of each quarter's trading period. Because REC banking is limited to three years, the analysis never calls for purchasing more RECs than can be used during that time frame.
2. Second, broker quotes are compared to historical prices and budgeted REC prices to decide when to purchase RECs.
3. In the event that no purchase opportunities arise during the first three trading periods, then VPPSA acquires the required RECs at prevailing market prices during the fourth quarter's trading period.

² More information on Virtual Peaker can be found on their website at <https://www.virtual-peaker.com/>.

³ <https://www.nepoolgis.com/>

Generation and Transmission Facility Transactions

Generation

VPPSA continues to work with Encore Renewables to develop Tier II qualifying solar projects within its members service territories. Although Swanton expects to have a surplus of Tier II RECs for the coming five years, VPPSA is monitoring legislative changes that could double the Tier II requirements. In this event, Swanton would seek to participate in another solar project through VPPSA and Encore Renewables.

Transmission

VPPSA is currently working on a lease of Swanton's Phase I transmission rights. The terms of the lease have been under negotiation for much of 2020, and are expected to be completed in 2021.

Waiver Request

In accordance with Rule 5.204, Swanton requests a waiver of the notification for short-term transactions that will be subject to after-the-fact reporting, pursuant to Rule 5.206(A). These transactions could be up to five years in nature and are designed to either hedge Swanton's short-term exposure or maximize short-term value of existing resources. Swanton anticipates seeking individual waivers of any longer-term purchases as otherwise required by Rule 5.200, if necessary.