2023 Resource Report

Village of Orleans Electric Department

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the Vermont Public Utility Commission
and the Vermont Department of Public Service

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Vermont Public Power Supply Authority
on behalf of Village of Orleans Electric Department
in fulfillment of Vermont Public Utility Commission Rule 5.206(B)

VPPSA
Vermont Public Power Supply Authority

Overview & Introduction

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

The information contained in this report describes Orleans' 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 Orleans' 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 2023, Orleans' energy requirements[1] ("Load") totaled 13,069,125 kWh, and its coincident annual peak with ISO-NE was 1,897 kW on September 7th at hour ending 18. As shown in Table 1, Orleans' energy requirements have fluctuated by up to 8% per year while its peak load[2] has fluctuated by up to 23%. This peak fluctuation is primarily due to Orleans' largest customer, Ethan Allen Furniture, whose operations are sometimes lower due to summer vacation during the annual New England peak hour.

Table 1: Historical Loads

Year	Load (kWh)	% Change	Peak Load (kW)	% Change
2019	13,811,828		1,864	
2020	12,930,654	-6.4%	1,832	-1.7%
2021	13,971,323	8.0%	2,015	10.0%
2022	13,919,984	-0.4%	2,459	22.0%
2023	13,069,125	-6.1%	1,897	-22.9%

Orleans' 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
2024	14,064,291		1,916	
2025	14,040,404	-0.17%	1,935	1.0%
2026	14,060,930	0.15%	1,954	1.0%
2027	14,090,434	0.21%	1,974	1.0%
2028	14,164,760	0.5%	1,993	1.0%

Assuming normal weather, loads (kWh) are forecast to remain steady over the next five years, while the peak load is expected to grow by 1.0% per year.

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

[2] Peak Load is defined as the annual coincident peak with ISO New England and is based on RTLO.

II. Electricity Supply

Orleans' power supply is made up of long-term and short-term contracts. The resources in Orleans' portfolio represent a range of fuel types and technologies. In addition, they are located throughout Vermont, New England and New York, and many of their expiration dates have been chosen not to overlap. As a result, they act as a diversified portfolio that effectively hedges Orleans' 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: 2023 Electricity Supply Resources

Resource	2023 MWH	%	Fuel	Exp. Date
Brookfield 2023-2027	5,662	41.2%	Hydro	12/31/27
Market Contracts	4,012	29.2%	System	Varies
NYPA Niagara Contract	606	4.4%	Hydro	4/30/32
NYPA St. Lawrence Contract	32	0.2%	Hydro	4/30/32
Project #10	64	0.5%	Oil	Life of Unit
Ryegate Facility	407	3.0%	Wood	10/31/32
Standard Offer Program	312	2.3%	Solar	Varies
Stetson Wind 2023-2027	2,637	19.2%	Wind	12/31/27
TOTAL RESOURCES	**13,733**	**100.0%**		
Total Load Including Losses	13,069			
ISO Exchange (+ Purchase/- Sale)	-664	-4.8%		

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. Brookfield Hydro 2023-2027
   - Size: 8 MW On Peak, 7 MW Off Peak
   - Fuel: Hydro
   - Location: Varies
   - Entitlement: 0.7 MW On Peak, 0.6 MW Off Peak (PPA)
   - Products: Energy, VT Tier I RECs
   - End Date: 12/31/27

2. Market Contracts
   - Size: Varies
   - Fuel: New England System Mix
   - Location: New England
   - Entitlement: Varies (PPA)
   - Products: Energy
   - End Date: Varies, less than 5 years.
   - Notes: The Electric Department purchases system power from various other entities under short-term (5 year or less) agreements.

3. New York Power Authority (NYPA)
   - Size: 3.044 MW (Niagara), 0.195 MW (St. Lawrence)
   - Fuel: Hydro
   - Location: New York State
   - Entitlement: 0.076% (Nia. PPA), 0.007% (St. Law PPA)
   - Products: Energy, capacity, VT Tier I RECs
   - End Date: 4/30/2032
   - Notes: NYPA provides hydro power to the Electric Department under two contracts, which will be extended at the end of their term.

4. Project 10
   - Size: 40 MW
   - Fuel: Oil
   - Location: Swanton, VT
   - Entitlement: 7.1% (2.84 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 7.1% of the unit's output.

5. Ryegate Facility
   - Size: 20.5 MW
   - Fuel: Wood
   - Location: East Ryegate, VT
   - Entitlement: 0.2394% (0.049 MW), PPA
   - Products: Energy, capacity, renewable energy credits (CT Class I)
   - End Date: 10/31/2032

6. Standard Offer Program
   - Size: Small renewables, primarily solar < 2.2 MW
   - Fuel: Mostly solar, but also some wind, biogas and micro-hydro
   - Location: Vermont
   - Entitlement: 0.2457% (Statutory)
   - Products: Energy, capacity, renewable energy credits
   - End Date: Varies
   - Notes: The Electric Department is required to purchase power from small power producers through the Vermont Standard Offer Program in 2022, in accordance with PUC Rule #4.300. The entitlement percentage fluctuates slightly each year with the Electric Department's pro rata share of Vermont's retail energy sales.

7. Stetson Wind 2023-2027
   - Size: 57 MW
   - Fuel: Wind
   - Location: Maine
   - Entitlement: 2.49% (PPA)
   - Products: Energy, VT Tier I RECs
   - End Date: 12/31/27

III. Resource Supply & Demand

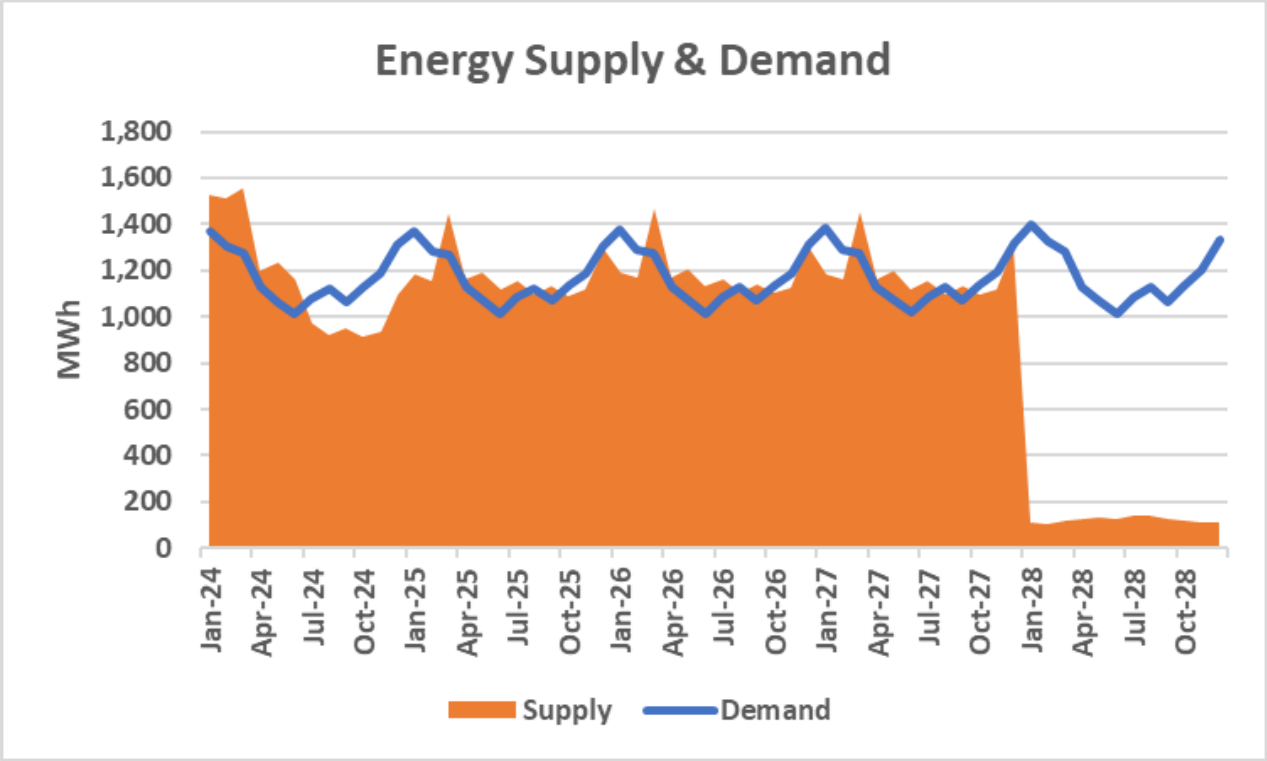
Energy, capacity and Renewable Energy Credits (RECs) are the primary products that OED needs to manage, and the following sections illustrate the forecasted balance between their supply and their demand over the next five to twenty years.

Energy

Deficits starting in 2028 caused by the expiration of market, Brookfield and Stetson contracts will be hedged using the Planned Purchase process that is described in the next section.

Figure 1 shows the current forecast of energy supply and demand for the next five years. Deficits starting in 2028 caused by the expiration of market, Brookfield and Stetson contracts will be hedged using the Planned Purchase process that is described in the next section.

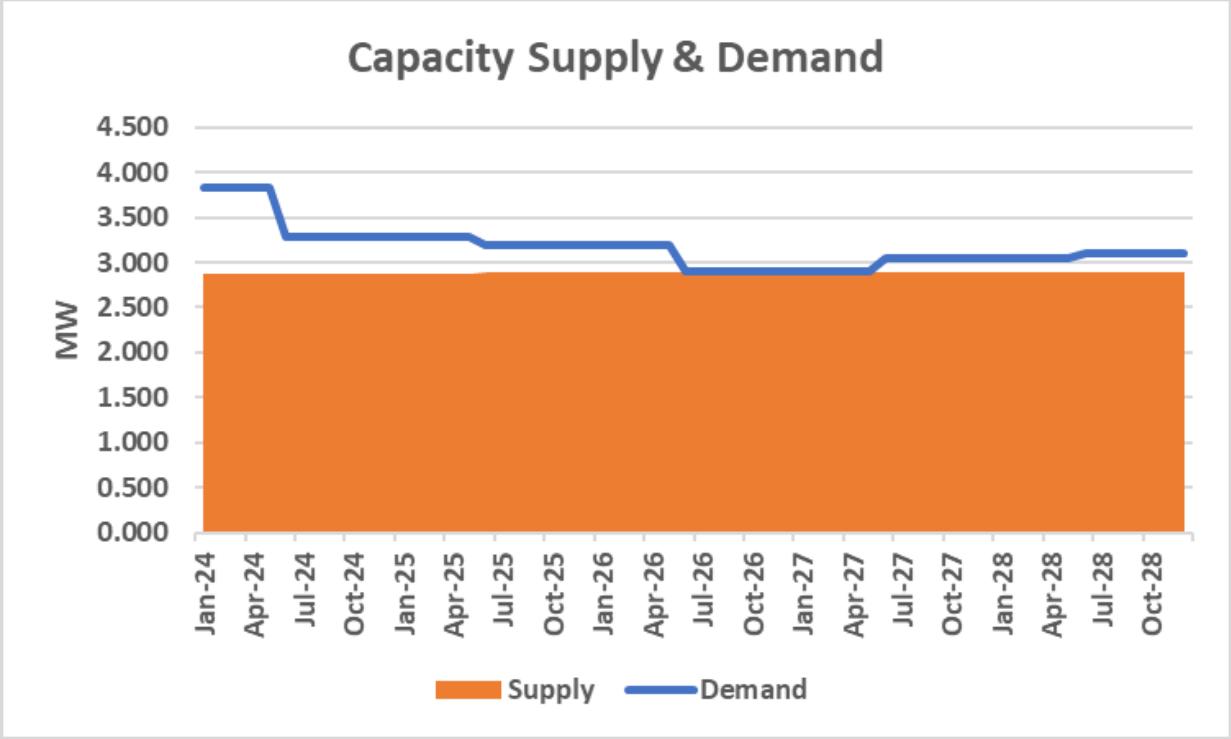
Figure 1: Energy Supply & Demand



Capacity

Figure 2 shows the capacity supply and demand balance for the next five years. The supply is forecasted to be about equal to the demand throughout the five year period. However, this outcome depends on Ethan Allen's coincidence with the annual peal hour. In any event, Orleans' capacity position will be liquidated in ISO New England's Forward Capacity Market.

Figure 2: Capacity Supply and Demand



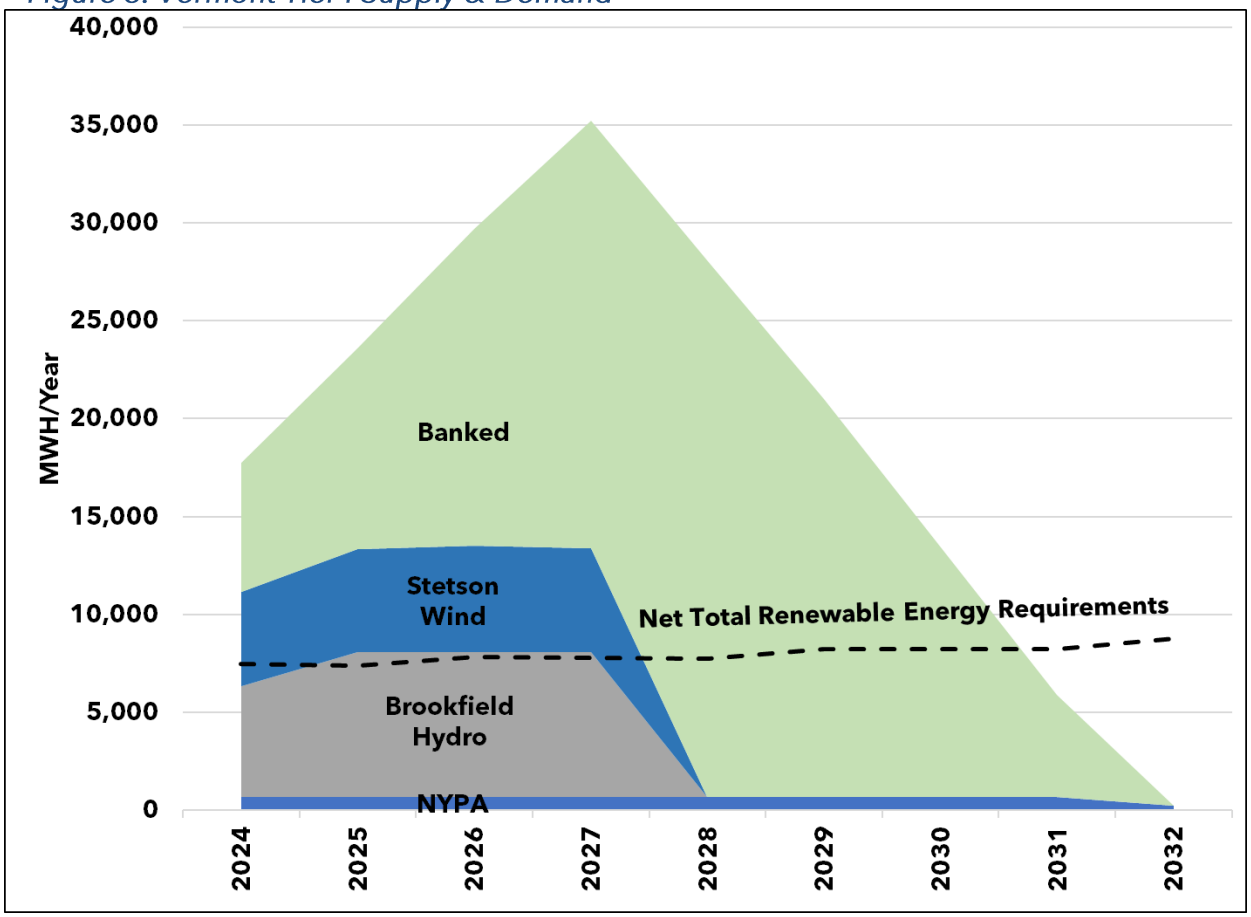
Renewable Energy Credits

Figure 3 and Figure 4 illustrate OED's need for RECs under Vermont's Renewable Energy Standard (RES).

Tier I

Due to a large Tier I purchase in 2023 that will be banked for use for 2024 compliance as well as the Brookfield and Stetson PPAs, Orleans anticipates banking RECs through 2030. After that Orleans will have a deficit of 2,300 RECs which extends to about 8,500 in 2032. This deficit will be filled either with a bundled energy and REC purchase or a REC only purchase.

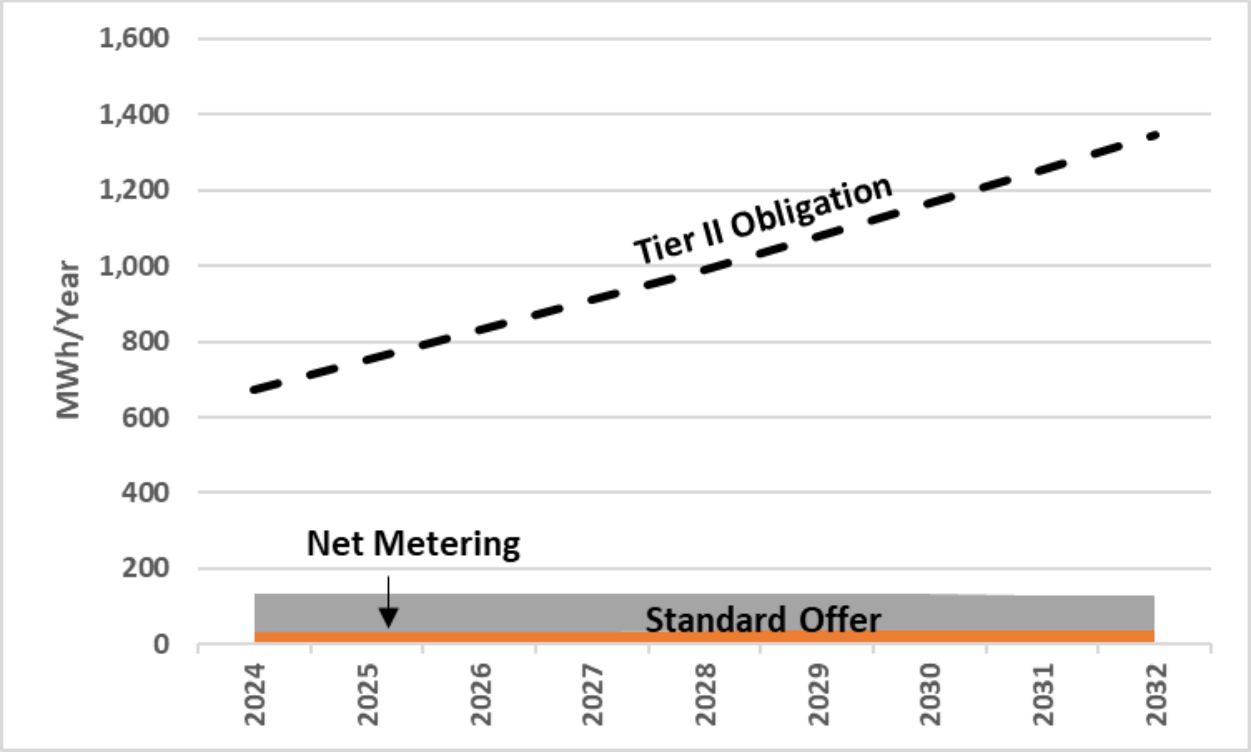
Figure 3: Vermont Tier I Supply & Demand



Tier II

Orleans anticipates purchasing at least 500 MWH/year of Tier II RECs in 2024 and increasing that amount each year as the Tier II obligation increases. Orleans is also likely to pursue a solar PPA as well.

Figure 4: Vermont Tier II Supply & Demand



IV. Anticipated Transactions & Acquisition Strategy

VPPSA anticipates that OED 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	0-0.3 MW	$26-$95 /MWH	Monthly / Seasonally
On / Off Peak Energy	Purchase	1-60 months	0-0.8 MW	$25-$100 /MWH	Monthly / Seasonally
Long-Term Bundled PPAs	Purchase	5+ years	0-1.3 MW	$30-$70 /MWH	None anticipated.
Capacity	Purchase	5+ years	0 MW	$2-$5 /kW-month	None anticipated.
VT Tier I RECs	Purchase	1-5 years	2,300 MWH/Year	$4 - $10 /MWH	2031
VT Tier II RECs	Purchase	1-5 years	500-800 MWH/Year	$35 - $45 /MWH	July 2024

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 OED. 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 OED 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. There is currently no plan for a long-term PPA, although additional energy contracts will be required once the Brookfield and Stetson contracts expire at the end of 2027. 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. ISO New England is on track to drastically change the capacity market to a prompt/seasonal market which is likely to alter Orlean's capacity procurement strategy once the new market details are known. Beyond purchasing capacity, 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 Peaker[3].

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

The acquisition strategy has three parts.

1. First, VPPSA completes an analysis of Tier I and Tier II requirements before or during the annual REC 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 the Alternative Compliance Payment and budgeted REC prices to decide when to purchase RECs.

3. VPPSA may purchase smaller volumes of Tier I RECs toward the close of quarter 4 if prices are lower than budget.

[3] More information on Virtual Peaker can be found on their website at https://www.virtual-peaker.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.

Transmission

Orleans does not anticipate any transmission facilities transactions in the coming five years.

Waiver Request

In accordance with Rule 5.204, OED 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 OED's short-term exposure or maximize short-term value of existing resources. OED anticipates seeking individual waivers of any longer-term purchases as otherwise required by Rule 5.200, if necessary.