

# Orange & Rockland / Sunrun Virtual Power Plant: Technical Specifications

## Overview

Orange and Rockland Utilities (O&R), a wholly owned subsidiary of Consolidated Edison, and Sunrun Inc. launched the Innovative Storage Business Models (ISBM) Project — a REV Demonstration Project approved by the New York State Public Service Commission — to build and operate New York State's largest residential virtual power plant. The program deploys residential solar-plus-storage systems across O&R's service territory in Orange and Rockland counties, aggregating them into a dispatchable virtual power plant that provides grid services during peak demand periods.[1][2][3][4]

## Project Design Targets

The ISBM Project's design specifications, as established in O&R's June 2020 Initial Filing Letter to the PSC, include:[5]

- **Customer installations:** Approximately 300 residential solar-plus-storage (Brightbox) systems
- **Solar capacity:** Approximately 2.9 MW of distributed rooftop solar
- **Energy storage capacity:** Approximately 2.1 MW / 4.7 MWh of distributed battery storage
- **Aggregate VPP size (after 3-year deployment):** 2 MW / 4 MWh[2]
- **Program duration:** 10-year demonstration period with 25-year customer lease agreements[5]
- **Target deployment locations:** 15 distribution circuits identified by O&R as having distribution value[5]

# Battery Hardware Specifications

Participants receive one of two battery options bundled with Sunrun's Brightbox system:[5]

<b>Specification</b>	<b>LG Chem RESU10H</b>	<b>Tesla Powerwall</b>
<b>Customer cost</b>	Free (no charge)	Discounted monthly rental
<b>Usable capacity</b>	9.3–9.8 kWh	13.5 kWh
<b>Power output</b>	5 kW continuous	5 kW continuous (Powerwall 2)
<b>Chemistry</b>	Lithium NMC (Nickel Manganese Cobalt Oxide)	Lithium-ion
<b>Cycle life</b>	6,000+ cycles to 60% capacity	6,000+ cycles to 70% capacity
<b>Backup duration</b>	8–12 hours (essential loads)	10+ hours (essential loads)
<b>IP rating</b>	IP55	IP67
<b>Weight</b>	97 kg	~114 kg

Sources:[6][7][8]

Tesla Powerwall 2 units became unavailable for new sales through the program as of June 2022 due to supply chain constraints, though this did not affect existing pipeline installations.[5]

The solar panel array on each home is designed to produce 110% of the customer's annual average electricity usage.[9][10]

# Dispatch and Operations

## Battery Dispatch Protocol

O&R controls dispatch scheduling while Sunrun manages the virtual aggregation and battery coordination:[11]

- **O&R access:** Up to 80% of available battery energy can be drawn for grid services[10][2]
- **Customer reserve:** A minimum of 20% of battery capacity is always retained for home backup power, sufficient for 4–6 hours of backup[1][2]
- **Dispatch timing:** Peak demand hours, typically between 5:00 PM and 7:00 PM[11]
- **Dispatch trigger:** O&R calls on Sunrun, which then virtually controls the network of batteries to respond to load demand[11]
- **Operation schedule:** Year-round (unlike some VPPs that operate only seasonally)[12]
- **Primary use:** Peak summer load reduction on O&R's distribution system, with future wholesale market participation planned[11]

## Phased Operational Plan

The ISBM Project employs a four-phase approach to progressively increase VPP sophistication:[5]

<b>Phase</b>	<b>Objective</b>	<b>Timing</b>	<b>Description</b>
Phase 0	Customer adoption / site selection	July 2021 – July 2024	Enrollment, installation, commissioning of Brightbox systems
Phase 1	Day-ahead responsiveness	July 2022 – July 2023	Day-ahead dispatch notification for distribution services and demand response; pre-established discharge for capacity
Phase 2	Intraday responsiveness	July 2023 – July 2024	Less-than-2-hour notifications; shaped discharges to set points; capacity split 80/20 (grid/customer); energy arbitrage in shoulder months
Phase 3	Wholesale market participation	July 2023 – July 2024	NYISO wholesale marketplace participation (regulation, energy, operating reserves, capacity markets); localized volt/var optimization

During Phase 1, when no grid need is identified by O&R, Sunrun operates each battery for participant bill management and energy resilience. Sunrun responds to signals from O&R's Commercial Systems Relief Program (CSRP) in the same way as enrolled demand response resources.[5]

In Phase 2, Sunrun expands battery management to include responsiveness to both the CSRP and the Distribution Load Relief Program. Energy arbitrage is provided in winter and shoulder months on a scheduled basis.[5]

Phase 3 envisions enrollment in the NYISO regulation, energy, operating reserves, and/or capacity markets if wholesale market participation proves more economically beneficial.[5]

# 2024 Operational Performance

By summer 2024, the VPP achieved the following milestones:

- **Enrolled systems:** 325 O&R customers contributing approximately 2 MW of aggregated capacity[11]
- **Dispatch events (summer 2024):** Called on 18 times to provide electricity to the grid during peak demand events[11]
- **Dispatch events (2025 heat wave):** In June 2025, Sunrun completed its fourth dispatch event in a single week in New York, helping relieve stress on congested circuits[13]

The VPP was described as having supported dozens of peak electricity demand events during the summer of 2024, with home batteries supplying stored solar energy to help stabilize the electric grid.[14][3]

## Financial and Business Model

### Revenue Structure

The ISBM Project uses a multi-use value-stacking business model:[5]

- **Sunrun compensation:** O&R makes upfront payments to Sunrun based on the installed base of battery storage capacity[15][14]
- **Customer compensation:** Participants receive utility bill credits for excess energy supplied to the grid, plus the benefit of consuming their own stored solar power[12][1]
- **Customer cost:** Free LG Chem battery or discounted Tesla Powerwall rental; solar lease at rates comparable to current and projected utility bills[5]
- **Lease term:** 25-year Program Lease Agreement with no down payment; pricing maintained for the full term regardless of the 10-year demonstration period[5]

### O&R Budget

The total O&R budget contribution for the ISBM Project over five years is \$2.769 million:[5]

Year	O&R Contribution
Year 1	\$78,000
Year 2	\$413,000
Year 3	\$948,000
Year 4	\$1,014,000
Year 5	\$316,000
<b>Total</b>	<b>\$2,769,000</b>

## Deployment History and Challenges

### Enrollment Timeline

The project launched in January 2021 and encountered slower-than-anticipated enrollment due to several factors:[5]

- As of December 31, 2022, 75 Brightbox systems were installed with 77 receiving permission to operate (PTO)[5]
- By January 2023, the target was adjusted to 101 installations by end of Q1 2023[9]
- Active marketing circuits included 80-1, 80-2, 80-3, and 80-5, covering approximately 7,100 customer contacts across four circuits[5]
- The 300-system target was ultimately achieved by summer 2024, with 325 customers enrolled[11]

### Key Challenges Encountered

Significant implementation challenges included:[5]

- **Permitting issues:** Compliance with local municipal codes, particularly in the Village of Warwick regarding basement-sited batteries and sheetrock fire barrier requirements
- **Total addressable market limitations:** Poor roof conditions, tree shading (driven by trimming restrictions), HOA rules, no-knock neighborhoods, and non-owner-occupied homes
- **Installation quality:** Site verification uncovered design revisions needed, improper labeling, non-sanctioned equipment

- additions, and incorrect inverter settings
- **Supply chain:** Tesla Powerwall 2 availability ceased for new sales as of June 2022
  - **Customer trust:** Sunrun door-to-door salespeople needed O&R co-branding and ride-alongs to establish credibility

## Solutions Implemented

O&R and Sunrun addressed these challenges by expanding eligible circuits (adding 1,600 new addresses on circuit 80-2 in mid-2022), conducting community outreach to local organizations including Sustainable Warwick and the Warwick Chamber of Commerce, providing battery fire safety training to fire departments in Orange, Rockland, and Sullivan counties, and implementing O&R-branded ride-alongs with Sunrun sales representatives.[2][5]

## Regulatory and Policy Context

The ISBM Project is formally classified as a REV (Reforming the Energy Vision) Demonstration Project under New York PSC oversight. The project is designed to test whether behind-the-meter solar-plus-storage VPPs can be aggregated to provide value across host customers, the electric distribution system, and bulk system services. [4][5]

Key policy considerations include:

- **FERC Order 2222:** As distributed energy resources gain wholesale market access, the need for O&R incentive payments is expected to diminish, making the VPP concept self-sustaining[5]
  - **CLCPA alignment:** The program supports New York State's nation-leading storage and electrification goals under the Climate Leadership and Community Protection Act[3]
  - **Future wholesale participation:** O&R plans to explore bidding the aggregate battery fleet into the NYISO wholesale energy market[11][5]
-

## References

1. [Sunrun Builds and Operates New York's Largest Residential Power ...](#) - Innovative program is one of New York State's first residential distributed power plants that suppli...
2. [O&R, Sunrun Bring Rooftop Solar/Battery Backup Pilot Project to ...](#) - After a 3-year deployment, the total expected VPP size is 2MW/ 4MWh. O&R is able to draw up to 80% o...
3. [Sunrun Builds NY Residential Power Plant in Partnership with O&R](#) - Successfully activated New York's largest residential power plant using more than 300 solar-plus-sto...
4. [O&R and Sunrun to Bring Innovative Rooftop Solar and Battery ...](#) - By bundling and coordinating the energy stored in Sunrun's Brightbox home battery systems, Sunrun wi...
5. [\[PDF\] Orange and Rockland Utilities, Inc. - Search / Commission Files](#) - Participants receive a free LG Chem battery or pay Sunrun a discounted monthly rental charge (from. ...
6. [Sunrun Brightbox Solar Package: What You Need to Know](#) - The LG Chem batteries are lithium-ion and come in a variety of sizes. Sunrun offers the LG Chem RESU...
7. [Brightbox Solar Battery Vs Tesla Powerwall: 2025 Complete Guide](#) - The Brightbox system is designed around the LG Chem RESU10H, which provides 9.3 kWh of usable capaci...
8. [Sunrun Brightbox | Engineering For Change](#) - The Sunrun Brightbox is a wall-mounted solar battery using LG Chem's Lithium ion technology, that ca...
9. [O&R, Sunrun Bring Rooftop Solar/Battery Backup Pilot Project to ...](#) - Orange & Rockland and Sunrun Inc. have developed a new pilot program to deploy 300 rooftop solar and...
10. [Orange & Rockland Utilities working with SunRun on solar energy ...](#) - Orange & Rockland Utilities (O&R) is working with solar energy provider Sunrun on a pilot program to...
11. [Orange & Rockland partners with Sunrun to Build and Operate New ...](#) - This initiative aims to enhance grid stability during peak-demand hours and assess the value of aggr...
12. [Sunrun creates New York's largest residential virtual power plant](#) - Sunrun has successfully activated the largest residential power plant in New York State, comprised o...

13. [Sunrun Dispatches More Than 340 Megawatts of Power in Single ...](#) - Sunrun (Nasdaq: RUN) announced today that its fleet of home batteries enrolled in distributed power ...
14. [Sunrun's Power Plant Programs Complete Successful 2024 with ...](#) - Sunrun scaled its grid services business in 2024 to include the nation's largest single-owner virtua...
15. [Sunrun, New York utility embark on residential virtual power plant](#) - Sunrun and Orange and Rockland Utilities have launched a residential virtual power plant (VPP) progr...