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SUN's Virtual Power Plant roadmap

Your companion guide to Solar United Neighbors' VPP Model Utility Tariff program

Our "Model Tariff 2.0" at a glance

The SUN Model VPP Tariff is a readily adoptable and flexible template for a tariff-based program that a utility can adapt to support the electric grid using customer-sited distributed energy resources (DERs).*

It provides essential program terms including: eligibility, enrollment, dispatch, measurement, compensation, settlement, and more to help commissions, utilities, industry, and other docket participants streamline regulatory proceedings and accelerate adoption of Virtual Power Plant programs (VPPs).

Solar United Neighbors is a national nonprofit organization working to represent the needs and interests of solar owners and supporters.

For more information about the Model Tariff, model legislation, and related resources, or to request a presentation, visit solarunitedneighbors.org/vpp or contact **advocacy@solarunitedneighbors.org.**

Read & download the full tariff here
solarunitedneighbors.org/model-vpp/

This second edition reflects consultation with industry participants (aggregators, manufacturers of DERs, and third party owners of DER resources), utilities, customer advocates, and experience gained from programs now operating at scale in various jurisdictions. Bracketed text in the tariff marks inputs needed for jurisdiction-specific information. Capitalized terms in this document have the meanings given in the Model Tariff.

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The Model Tariff is optimized to achieve the following objectives

- Provides a template for creating a permanent, utility-administered VPP program and not just a pilot for residential and small commercial customers with multiple technologies.
- Contemplates dispatch year-round, any day or hour, within annual limits specific to each technology type.
- Includes a modest one-time Enrollment Incentive plus pay-for-performance compensation, with rates locked for five years and no penalty for non-performance.
- Credits Battery and EV exports during Events at the retail rate.
- Premised on open access principles that allow any approved DER Manager (OEM, third party owner, or other third-party aggregator) to enroll customers and participate in the program.
- Provides general program terms and conditions coupled with technology-specific program terms and conditions housed in individual technology Riders such that the program can be implemented using one or more technologies without the need to revise other aspects of the program.
- Helps customers understand program value and related participation terms.
- Creates a consistent framework so that industry participants can use existing standards and enrollment, telemetry, and settlement processes across service territories.
- Gives a commission the flexibility to tailor adoption to meet specific needs, such as approving the Battery Rider alone to launch a VPP program quickly, then adding the Smart Thermostat and Electric Vehicle Riders over time without amending the general terms.
- Allows administrators to launch a Virtual Power Plant program without waiting for bespoke tools and systems.

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How the program works

A standard offer, open access, utility-administered retail program
Customers and DER Managers enroll DERs pursuant to the general terms and conditions of the program and the relevant technology-specific Rider, which sets the rules for its device type (e.g., number and duration of Events, performance measurement, compensation). Adding a technology means adding a Rider, not reopening the program. The customer's underlying Interconnection Tariff governs exports outside of Events.

Coexistence with existing demand response programs
Customers may also participate in other utility and wholesale programs unless the Commission or another program's rules prohibit it.

Device-level measurement
Performance is measured at the device, capturing its total performance during an Event and avoiding added utility meters and "baseline" methodologies that otherwise increase program costs, confuse customers, and can inappropriately reduce compensation.

Two dispatch products, two directions, one settlement construct
Planned Events are generally called day-ahead; Emergency Events are called same-day with at least 15 minutes' notice. Load Relief reduces demand for grid-supplied energy, and Load Build increases it by methods like by charging from on-site solar that would otherwise be exported. Participants are paid on performance verified at the close of each Reporting Period. A locational adder for Batteries and EVs in grid-constrained areas lets the program also serve as a targeted non-wires alternative.

Stationary Batteries
Batteries anchor the program, storing and delivering a known quantity of energy on command for Load Relief and Load Build. All discharged energy counts, whether used on site or exported. Batteries are compensated on average kW during Planned Events and total kWh during Emergency Events.

Smart Thermostats
For Smart Thermostats, the Model Tariff measures device response: the share of called Event time during which the device participates. A device that participates in a minimum amount of called Event times earns a flat payment for the Reporting Period. The Smart Thermostat Rider can be readily adapted to incorporate other controllable loads.

Managed Charging and Vehicle to Grid
Under Managed Charging, the participating EV shifts the time of charging in response to utility calls. It requires no bidirectional hardware. Performance is compensated based on participation during managed charging Events. Vehicle to Grid discharges the vehicle to serve host-customer load and export to the grid. Performance is measured and compensated similarly to stationary Batteries.

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Common elements of successful programs

Program stability is a precondition for success. Stakeholders name longevity and predictability as top determinants of VPP success; The Model Tariff provides a durable template to deliver program stability by locking in compensation rates for participants who enroll in the applicable program year for five years. Compensation rates for subsequent program years may be adjusted. This gives participants the certainty to finance or lease high-cost devices such as Batteries, while letting pricing for new enrollees reflect evolving grid needs. Ongoing Commission review of key metrics should ensure the program performs as expected.

Easy customer enrollment creates scale. Most U.S. residential batteries are not enrolled in a VPP, and the largest and fastest capacity gains come from unlocking devices already deployed. The Model Tariff permits enrollment at any time, including at the point of sale or through the manufacturer or third party owner, auto-enrollment where customer authorization has been provided with opt-out provisions, as well as other provisions to make the program simple and attractive to customers.

Different device types have different capabilities and operating characteristics. A Battery delivers a known quantity of energy on command; a Smart Thermostat's load reduction depends on how hard the heating or cooling system is running; an EV may not be plugged in, or even in the service area. A common framework lets the utility manage all technologies, while each Rider reflects its technology's capabilities to maximize grid and customer benefits.

Participation through DER Managers. Enrolling customers through DER Managers (OEMs, third party owners, and other aggregators) that already have customer relationships lets the utility work with a handful of counterparties instead of directly interacting with thousands of participants. This simplifies enrollment and settlement as the program scales and leverages industry experience in program implementation.

Load Relief and Load Build are the foundational services. Dynamic Grid Management reduces peak load that would otherwise require utility capital investment to serve and thus benefits all ratepayers, not just program participants. Additional Grid Services can be added as new grid needs arise and supporting program terms are adopted.

Pay-for-performance compensation. Paying fair compensation for services delivered removes ratepayer risk, avoids administrative burdens of upfront payment clawbacks, and motivates participants to perform. The modest Enrollment Incentive reduces enrollment barriers and bridges the time to receipt of the first performance payment. Performance payments tie ongoing compensation to delivered value. Compensation values are left to each jurisdiction to reflect local grid value and policy priorities.

Retail crediting of energy exported during Events. If Event exports were credited below the retail rate, a customer would earn more by holding stored energy for self-consumption than by exporting it, reducing the capacity available for Load Relief exactly when it is needed. Retail crediting removes this disincentive. Exports outside of Events continue to be credited under the customer's Interconnection Tariff.

What the Model Tariff does not do

Several matters are deliberately left outside the Model Tariff for Regulators and other Stakeholders to resolve. The Model Tariff does not:

- Set compensation rates or program limits. Rate values, Event limits and durations, Reporting Periods, and income-qualification definitions are bracketed for jurisdiction-specific determination.
- Prescribe a cost recovery mechanism. Recovery can follow ordinary practice in the implementing jurisdiction.
- Require a utility DERMS. The program can run through DER Managers' platforms or an Edge-DERMS provider. Program launch and implementation does not require a utility DERMS that can take years to procure and implement and require substantial financial investment.
- Mandate a single communications protocol. Requiring one pathway would strand existing, cost-effective integrations and delay launch.
- Replace interconnection rules or net metering. Participants' underlying Interconnection Tariffs still govern interconnection, operation, and exports outside of Events.
- Require advanced metering. Performance is measured at the device, not the utility meter.
- Penalize non-performance. A Battery or Vehicle to Grid device that does not perform during an Event earns less, and will have its non-performance reflected in reduced compensation. Conversely, Smart Thermostats and Managed Charging must meet a participation threshold for the Reporting Period, but there are no liquidated damages or other financial penalties for device non-performance.
- Target larger commercial and industrial customers. These customers typically have access to existing demand-side management programs, though conceptually there is no reason C&I-specific Riders could not be added.
- Depend on wholesale market participation. Implementation of FERC Order 2222 remains uncertain, and wholesale markets cannot capture distribution-level benefits. The Model Tariff delivers value through a utility-administered retail program now, while permitting co-participation in wholesale programs where and when permitted.

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Program matrix

The table below summarizes key terms and related elements of the Model Tariff.

Tariff element	Description
Program Framework	Standard offer, open access tariff to provide Grid Services, layered on top of the customer's existing Interconnection Tariff and electric service tariff. No requirement to switch to a time-of-use or other service rate to participate.
Market Focus	Standard offer, open access tariff to provide Grid Services, layered on top of the customer's existing Interconnection Tariff and electric service tariff. No requirement to switch to a time-of-use or other service rate to participate.
Program Term	Open-ended, permanent retail program administered by the utility, so that enrolled capacity can be integrated into utility planning and operations and meet ongoing grid needs.
Eligible Customers	Customers on eligible rate schedules (bracketed); SUN recommends residential and small commercial initially. Large commercial and industrial customers often have existing demand-side management opportunities, but participation options for these customers can be readily incorporated through separately added Riders.
Eligible Technologies	Behind-the-meter stationary battery storage, Smart Thermostats (other controllable loads can be readily added), and EVs with supporting EVSE, including bidirectional charging systems. New and existing, customer-owned and third party-owned devices are all eligible. Additional technology Riders can be incorporated as they become available, maximizing the unique operational capabilities and value of each technology.
Enrollment & Participation	Rolling enrollment throughout the year through the Customer Portal or an approved DER Manager, including OEMs and third party owners. DER Managers may auto-enroll pre-authorized customers, who are notified and may opt out.
Grid Service Offerings	A Dynamic Grid Management service providing Load Relief (reducing demand for grid-supplied energy) and Load Build (increasing demand for grid-supplied energy). The program architecture enables additional Grid Services under the Battery, Smart Thermostat, and Electric Vehicle Riders over time.

Program matrix

The table below summarizes key terms and related elements of the Model Tariff.

Tariff element	Description
Dispatch Products	Planned Events, called with day-ahead or twenty-four hour advance notice, and Emergency Events, called same-day with as much notice as possible and not less than fifteen minutes. For Batteries and EVs participating in the Vehicle to Grid option, Planned and Emergency Events are measured and compensated separately. Notice periods vary somewhat by Rider.
Event Frequency, Timing & Duration	Events may be called any day, any time of day, in any month, within limits set in each Rider. Battery Rider: separate [x–y] caps for Planned Load Relief and Load Build, and no cap on Emergency Events. Smart Thermostat Rider: [160] Event hours. EV Rider: [80] Planned and [x] Emergency Events. Maximum Event duration is set within each Rider.
Device Communication Protocols	Communication for remote dispatch participants is provided through the DER Manager portal, an API, OpenADR 2.0b, IEEE 2030.5, or via email and/or push notifications, as appropriate given the specific service, timing of the need, and utility capabilities. A sole communication pathway applicable to all participants is not recommended at this time, to ensure that existing cost-effective options are available to maximize participation and ensure successful program launch. Utility DERMS is not required to enable program launch.
Performance Measurement & Verification	Measured at the device. For Batteries and EVs participating in the Vehicle to Grid option, Planned Event performance is based on the average kW delivered across the Event, averaged over all Planned Events in the Reporting Period; Emergency Event performance is total kWh delivered. For Smart Thermostats and EVs participating in the Managed Charging option, performance is based on the share of called Event time in which the device participates. Performance data is reported at fifteen-minute interval resolution.
Compensation Structure	A modest one-time Enrollment Incentive, higher for Income Qualified Customers to address equity, coupled with ongoing performance payments based on verified performance during Events. Performance payments make up the vast majority of program value for participants and are foundational to VPP program design. Participants lock in the performance rates for the program year in which they enroll for five years, then may re-enroll at the then-applicable rates. There is no penalty for non-performance.
Compensation Value	Compensation should reflect the grid value of the services provided and public policy goals in the applicable jurisdiction, and be sufficiently attractive to ensure robust customer and DER industry participation to maximize enrollment of dispatchable solutions.

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Program matrix

The table below summarizes key terms and related elements of the Model Tariff.

Tariff element	Description
Locational Value	A compensation adder for Batteries and EVs located in grid-constrained areas, identified in a schedule on file with the Commission and posted on the utility's website, to reflect location-specific value.
Payment Methodology	Payments are issued to the system owner (Batteries) or Customer (Smart Thermostats and EVs) unless assigned to another party at enrollment, by check, bill credit, or digital or ACH payment, as elected at enrollment. Enrollment Incentives are issued within [x] days of enrollment; performance payments within [x] days of the close of the Reporting Period, based on verified performance.
Energy Exports During Events	Energy exported during an Event is credited at the retail rate for the customer's service class (Grid Service Export Credits), in addition to performance payments. Energy exported outside of Events continues to be credited pursuant to the customer's underlying Interconnection Tariff. Grid Service Export Credits do not expire and may be cashed out, carried forward, or donated to a Commission-approved income-qualified assistance program.
Co-Participation in Multiple Programs	Customers may enroll and receive compensation under multiple Grid Services within the Model Tariff as well as other programs, including wholesale market programs, except where otherwise prohibited by the [Commission] or another program's rules.
Data Access	Customers may access their energy data and manage data sharing with DER Managers or other authorized third parties through a Green Button Connect or comparable portal, provided by electronic machine-to-machine transfer.
Storm Watch Provisions	The utility will make reasonable efforts not to call an Event within 48 hours of major storms reasonably anticipated to cause widespread outages.
Termination & Assignment	A Customer whose participation ends before the applicable rate-lock term concludes must wait one year before re-enrolling the same device type in the same Grid Service, and may not earn a second Enrollment Incentive for the same device type. Participation may be assigned to a successor customer of record without termination where the device remains at the same physical address.