



ELECTRICITY AFFORDABILITY TOOLKIT

Virtual Power Plants

COST CONTROL

CUSTOMER AGENCY

AT A GLANCE



TARGET COST DRIVERS

- Aging grid infrastructure
- Fuel price volatility
- Extreme weather/wildfires
- Load growth
- Misaligned utility incentives

VPPs provide household savings as well as system-wide benefits. This policy addresses affordability and provides solutions specific to certain drivers.



IMPACT TIME HORIZON

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How long it typically takes before changes materialize in utility behavior or customer bills



Short-term (0–2 years)



POTENTIAL COST SAVINGS

Page 2

The level of cost savings that can reasonably be expected to result from this policy



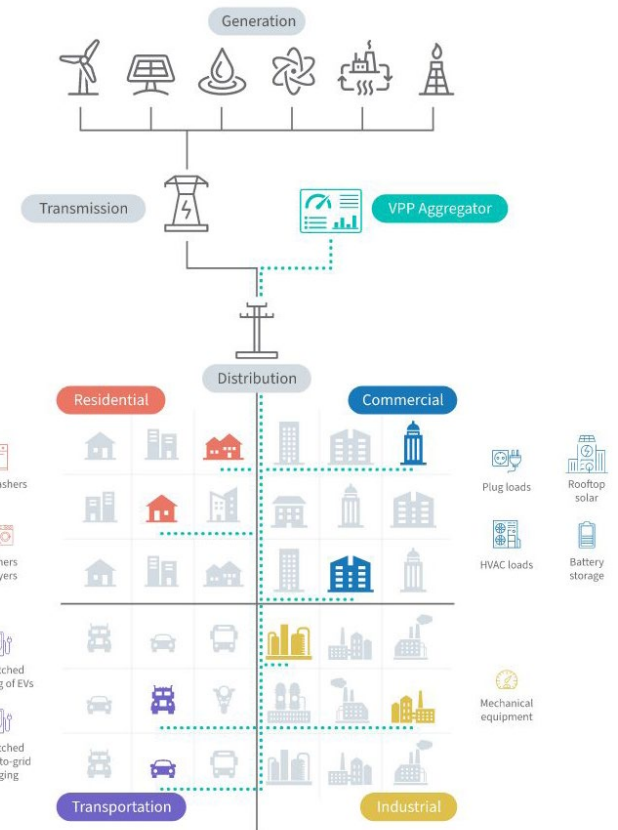
High

CONTEXT AND BACKGROUND

Virtual power plants (VPPs) are aggregations of distributed energy resources (DERs) like electric vehicles, solar and/or battery storage, heat pumps, smart thermostats, and other demand response (DR) technologies.

By coordinating the dispatch of DERs, VPPs can provide a variety of grid services including energy, capacity, resilience, and ancillary services such as frequency and voltage regulation. VPPs can help meet peak demand at lower cost than conventional resources and defer the need for costly transmission and distribution system investments, saving customers and utilities money.

While all customers can benefit from the reduction in system costs which VPPs provide, customers who participate in VPPs



can gain more control over their electricity bills and save money by earning participation incentives and reducing their electricity usage. VPPs can be deployed in as little as [6–12 months](#), are highly adaptable, and directly address major cost drivers like load growth and transmission and distribution investment. Because of these factors, VPPs can empower customers and provide sustainable cost savings for the long term.

State legislatures can enable VPP deployment by supporting DER adoption for all customers (e.g., through tax credits or rebates), directing public utility commissions (PUCs) to study the potential impact of VPPs in their state, requiring the development of utility incentives to grow VPPs, removing rules that prevent demand response from participating in wholesale markets, requiring utilities to create VPP offerings, and establishing statewide VPP capacity goals.

REAL-WORLD EXAMPLES

As of 2025, [at least five states](#) have passed VPP-related legislation. In 2024, an [additional six states](#) introduced VPP-related legislation. Read an in-depth case study about Colorado, Page 4.



California enacted [legislation](#) (A.B. 205) in 2022 authorizing the California Energy Commission (CEC) to implement and administer the Demand Side Grid Support (DSGS) Program, a VPP which provides peak load reduction during summer extreme weather events. To date, the [program has enrolled](#) over 800 MW of capacity across hundreds of thousands of controllable customer-owned devices. However, the program's [funding was cut](#) as part of California's 2025 budget negotiations. The [CEC](#) intends to propose potential changes to the program for the 2026 season to align with its new projected funding level.



Maryland passed the [Distributed Renewable Integration and Vehicle Electrification \(DRIVE\) Act](#) (H.B. 1256) in 2024, requiring investor-owned utilities to file VPP pilot programs with the Maryland Public Service Commission (PSC) by July 1, 2025. The legislation also directs the PSC to consider establishing a process for transitioning to a permanent VPP program if they determine it is in the public interest. In October 2025, [the PSC issued an order](#) directing utilities to submit revisions to their pilot proposals, including expanding the scale of their pilot programs by targeting broader customer participation.



Virginia passed [legislation](#) (H.B. 2346) in 2025, which requires Dominion Energy to propose a 450 MW VPP pilot program by the end of 2025. Following the pilot's conclusion in 2028, the State Corporation Commission must initiate a proceeding to establish a permanent program.



IMPACT TIME HORIZON

Short-term (0–2 years)

VPPs can be implemented within [6–12 months](#).



POTENTIAL COST SAVINGS

High

While cost savings will vary with policy design and implementation, [VP3's PowerShift report](#) found VPP-enabled resource portfolios can reduce net power generation costs by 20% relative to the status quo – about \$400 million per year or \$140 per household per year for an illustrative state electricity system. In another study, [Brattle](#) found that 60 GW of VPPs in the United States could reduce resource adequacy costs by \$15 billion – \$35 billion over ten years (\$1.5 billion – \$3.5 billion per year).



LEGISLATIVE DESIGN AND IMPLEMENTATION CONSIDERATIONS

Legislation can include the following components:

Eligible technologies

Allowing a variety of DR/DER technologies to participate in VPPs can maximize customer eligibility and the benefits of VPPs.

Customer adoption

Directing regulators to enhance program opportunities and compensation for vulnerable communities can increase adoption of DERs and participation in VPPs across all customers

Enabling policies

A range of legislative approaches can promote VPP deployment based on how advanced VPP development is in a given state. Bolstering incentives for DER adoption, directing PUCs to conduct proceedings on VPP development, ensuring that grid services from aggregated DERs are sufficiently considered in utility planning processes, removing rules that prevent demand response from participating in wholesale markets, or creating VPP programs and tariffs can all support VPP deployment.

Program harmonization

Sometimes past regulation and legislation has led to management of DERs and VPPs through a number of uncoordinated programs and regulatory dockets. Legislation can seek to integrate existing approaches into a more rational, harmonized, and consistent approach.

Program scale

Directing regulators to establish scalable programs and create utility capacity procurement targets for VPP programs can create a pathway for programs to progress beyond the pilot stage

Grid services

Allowing VPPs to be compensated for multiple grid services (capacity, frequency regulation, etc.) can maximize their value for utilities and customers while ensuring fair compensation to participants.

Utility incentives

Directing/requiring regulators to establish revenue opportunities like

The table below provides examples of how authority and responsibility for virtual power plants may be distributed across key entities.

VENUE	POTENTIAL ROLES
Legislature	<ul style="list-style-type: none"> • Establish policy framework • Create requirements for regulators to establish incentives for DER and VPP deployment • Create reporting and transparency requirements • Remove barriers to DER market participation/aggregation
Regulator	<ul style="list-style-type: none"> • Enable VPPs to provide different grid services • Create incentives for utilities to support VPP programs • Define program requirements and harmonization • Require, evaluate and approve VPP programs
Administration	<ul style="list-style-type: none"> • Coordinate with other state DR/DER incentives and programs • Support VPP legislation and direct regulators to implement VPP programs
RTO/ISO	<ul style="list-style-type: none"> • Enable DER interconnection and aggregation • Create market mechanisms for VPPs to participate in

performance incentive mechanisms (PIMs) tied to VPP deployment,

adoption, and utilization can encourage utility support for VPP programs.



CASE STUDY: COLORADO

OVERVIEW

Colorado passed the [Modernize Energy Distribution Systems Act in 2024](#) to pave the way for VPP development in the state. The legislation requires Xcel Energy, the largest electric utility in the state, to submit a plan for a VPP program and a tariff for performance-based compensation to the Colorado PUC by February 1, 2025.

Critically, the legislation requires Xcel Energy to develop a fully-fledged VPP program rather than a pilot program with the potential for expansion down the road. As of August 2025, the Colorado PUC is reviewing Xcel Energy's [application](#) for a VPP, which would be deployed in 2026 and grow to 125 MW by 2030.

This legislation strikes a balance between providing clear guidelines for the VPP program and allowing Xcel Energy and the Colorado PUC to determine the best program structure.

THE DETAILS

Grid services

It specifies several grid services for which the VPP should be compensated, including local and system peak reduction, transmission and distribution investment avoidance or deferral, and voltage support, among others, which allows the grid to more fully benefit from the services VPPs can provide.

Eligible technologies

It is technology neutral as it does not explicitly state which DR/DER technologies should be included or excluded from the VPP program.

Customer adoption

It does not contain any provisions designed to facilitate low-income household participation in the VPP program.

KEY TAKEAWAYS

Through this legislation, Colorado has paved the way for its residents to experience the cost savings that VPPs can provide. Overall, the legislation establishes clear criteria that the VPP must fulfill, like grid services, while allowing Xcel Energy and the Colorado PUC to determine other key components of the VPP.



FURTHER READING

- [“Power Shift”](#), RMI, 2024
- [“VPP Policy Principles”](#), RMI, 2024
- [“Virtual Power Plant Flipbook”](#), RMI, 2025
- [“Virtual Power Plants: Insights, Profiles, and Inventory”](#), Lawrence Berkeley National Laboratory, 2025
- [“VP3 Progress Report: From Awareness to Action”](#), RMI, 2025
- [“Pathways to Commercial Liftoff: Virtual Power Plants 2025 Update”](#), DOE, 2025
- [“How Virtual Power Plants Can Help the United States Win the AI Race”](#), RMI, 2025

