

Market Scan: Virtual Power Plants (VPP)



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EXECUTIVE SUMMARY

This document presents the results of a quick turnaround market scan focused on virtual power plant (VPP) programs/markets. This market scan confirmed that VPPs are an emerging solution for jurisdictions focused on increasing grid reliability, improving the integration of renewable energy and aggregating distributed energy resources (DERs). This project sought to understand how VPP definitions and implementation vary by region and purpose and how VPP resources are similar to or divergent from traditional demand response.

VPPs are an emerging solution. There is a substantial difference between how VPPs are promoted or discussed by industry advocates and how these programs are rolled out via utilities. The literature tends to describe a future state of fully integrated DERs, valued appropriately and integrated into grid planning. Sources agree that load aggregated into a VPP can provide enhanced grid services; however definitions of VPP (including programmatic approaches) differ in their emphasis on reducing demand versus injecting load. The latter requires the capability for bidirectional power flow that can require infrastructure upgrades.

In-depth interviews and case study program reviews revealed several common success factors and challenges, with most contacts noting that real-world implementation tended to be incremental. The evolution of VPP programs suggests a gradual shift from emergency-focused reliability resources toward market-integrated platforms that can support grid services year-round. Lessons learned include the following:

Invest in infrastructure to support VPP programs. Interviewees described the need for IT support for successful enrollment and dispatch of resources. Literature confirmed the need for common data standards and standardization across service agreements and cybersecurity protocols including streamlined interconnection processes and consistent open-source modeling tools.

Identify the primary use case(s) for the investment in VPPs. Interviewees said that instead of accommodating every potential scenario (emergency resource, economic trigger, peak load management), they had success with programs that had a clear purpose. This focus affected the resources selected, the incentive levels available and the enrollment agreements (especially the frequency and duration of events).

Simplify communication and customer offers through upfront incentives and/or clear curtailment or injection performance expectations.

Leverage the relationship DER product manufacturers have with their existing customers. It may not be necessary or realistic for utilities to identify qualified DERs independently.