Virtual Power Plant Sensitivity

I request that PSE's 2021 IRP sensitivity studies include analysis of PSE-orchestrated Virtual Power Plants (VPP). A VPP is the epitome of Distributed Energy Resources, using monitoring and control software to optimize the contributions of many small resources (like residential batteries and solar panels). Such a system can provide significant amounts of electricity to the grid during peak demand periods.

At the PSE's August 11 IRP webinar, PSE said the company did not have the right software to implement a VPP at present, but this will likely change in the 24-year period covered by this IRP.

To appreciate the benefits of VPPs, imagine that tens of thousands of PSE's residential customers have installed batteries paired with solar panels. (As prices fall, this is a likely scenario in the next decade or two, whether PSE participates or not.) Without technology to coordinate the operation of this large collective resource, individual systems operate independently for the benefit of their owners, but not necessarily addressing grid needs. The resource is wasted.

Now imagine a scenario where PSE can coordinate those systems via its VPP software. As demand peaks on a typical morning, PSE taps thousands of batteries to help meet demand rather than firing up carbon-spewing peaker plants. As demand starts to subside in the late morning hours, PSE reverses the flow. Now the batteries soak up extra electricity coming from solar and wind plants, as well as solar panels on customer rooftops. When the next demand peak comes late in the afternoon, the batteries are full and ready to assist once again. During the night, the batteries are gradually recharged to prepare for the next morning.

That scenario could be handled with large grid batteries, but there are a few advantages to a VPP created with thousands of small batteries.

1. A VPP delivers higher reliability and resilience when a big storm or earthquake damages the grid for days or weeks. It is advantageous for at least some customers to have power in that dire scenario. They can help their neighbors, charge cell phones, or even provide temporary refuge for vulnerable members of society.

2. Many customers are willing to pay a portion of the cost of an energy system that provides greater security and increases the value of their homes. Some customers are motivated to make investments that reduce the environmental impact of their energy consumption.

3. Small batteries don't require a dedicated plot of land and high interconnection costs. A VPP can't be destroyed by an accident in a single location.

4. Local jobs will be created to install these systems. It would be a post-COVID shot in the arm for our economy, supporting local businesses without tapping taxpayer funds.

To provide equitable access, we think PSE should incentivize purchase of solar and battery systems. Perhaps families in the bottom quartile of the income scale could buy the system with attractive financing and a 75% discount. Even with financing payments, they would enjoy lower energy bills than without the system. Families with higher incomes should also get a discount, but perhaps only 25%.

Portland General Electric and PacifiCorp are both considering VPP for their next IRPs. PSE should likewise study a sensitivity with a growing VPP resource over time. Although the prevalence of VPPs will grow over time, Tesla is currently running a VPP with 1,000 low-income participants, growing to 50,000 in the years ahead (video here: https://youtu.be/k8WHS2n4Iq0). The U.K. and China also have large programs.

The "transformation" aspiration of the Clean Energy Transformation Act requires bold planning and timely action to achieve our emission targets by 2030 and 2045. VPPs, Vehicle-to-Grid, and Time-of-Use electric rates are powerful tools to achieve this transformation. All should be included in sensitivities studied for the 2021 IRP.

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