

Virtual Power Plants

2023 NASEO Annual Meeting



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Nest makes saving energy easy



10 - 12% Heating Savings*



15% Cooling Savings*

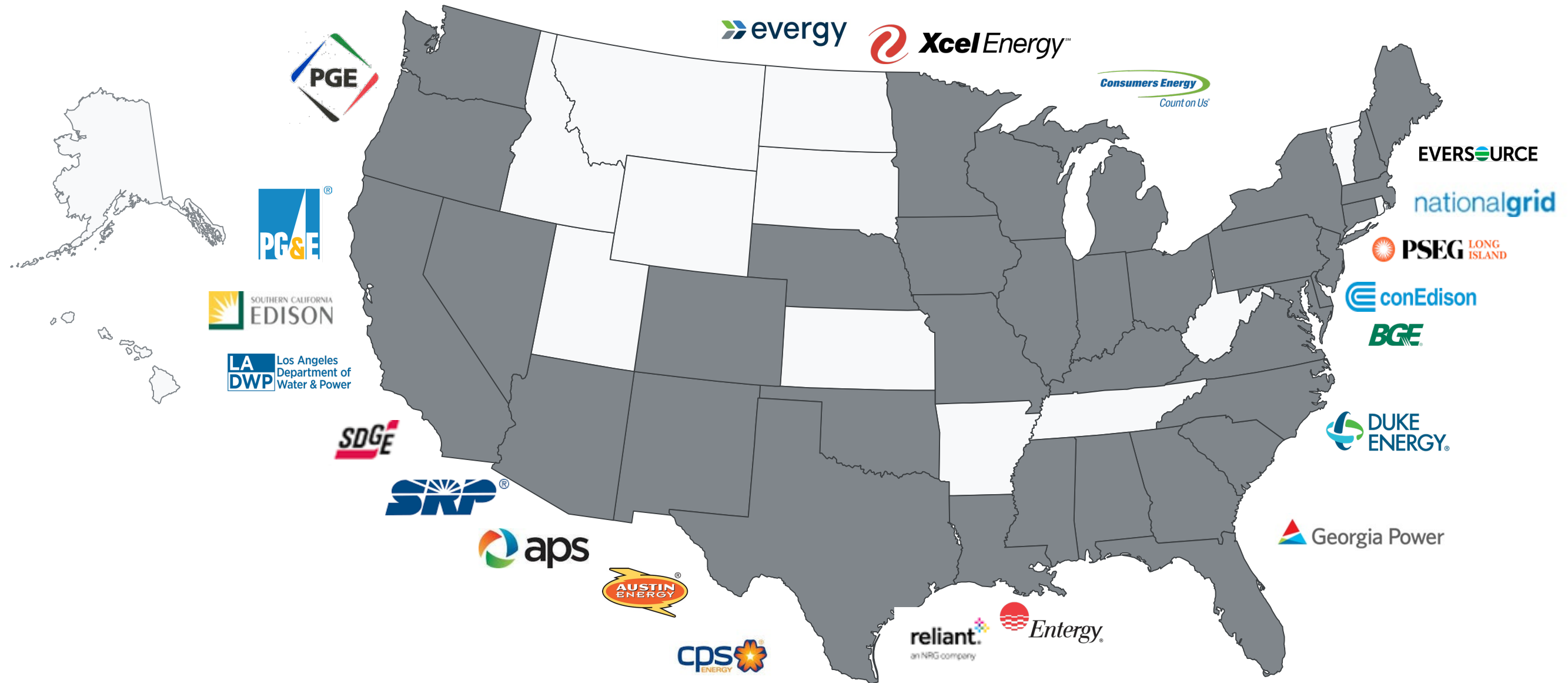


Demand Response for Utility
and Energy Partners

*Independent studies showed that Nest thermostats saved people an average of 10% to 12% on heating and 15% on cooling. Based on typical energy costs, we've estimated average savings of \$131 to \$145 a year.

Proven and Ready to Scale:

Utilities and energy providers across the country have launched programs to cost effectively drive grid reliability



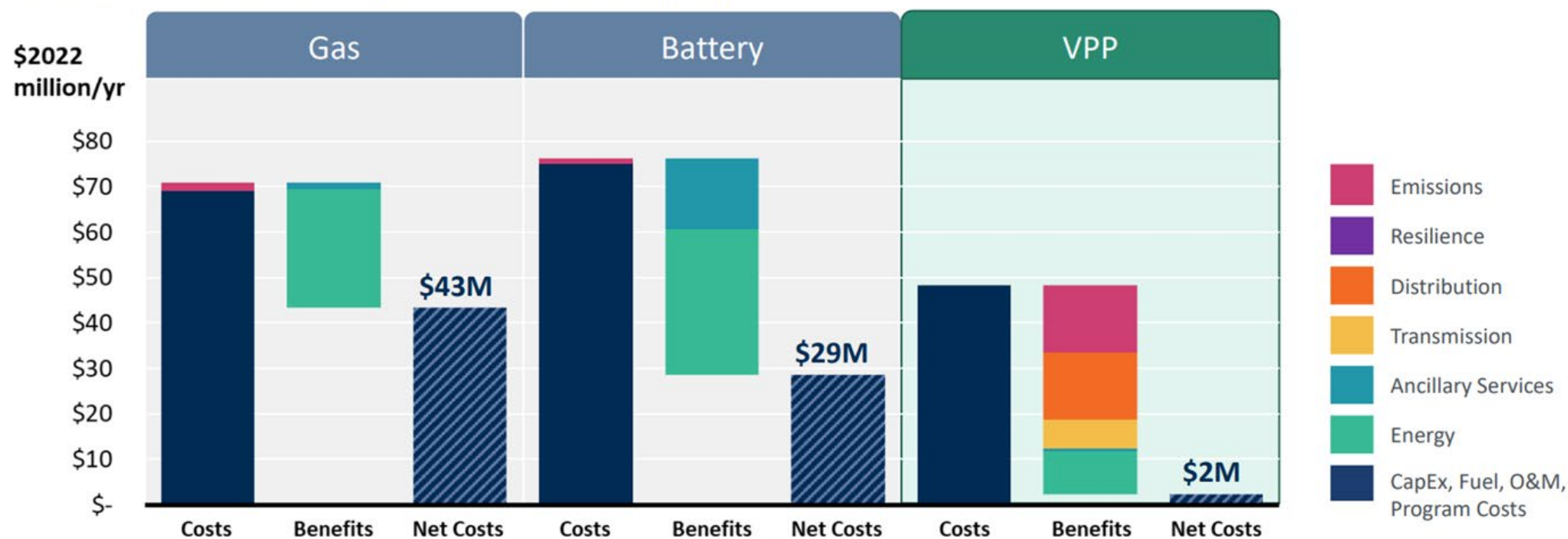
100+ programs in 36 states

Real Reliability: The Value of Virtual Power

Resource Adequacy... For Cheap

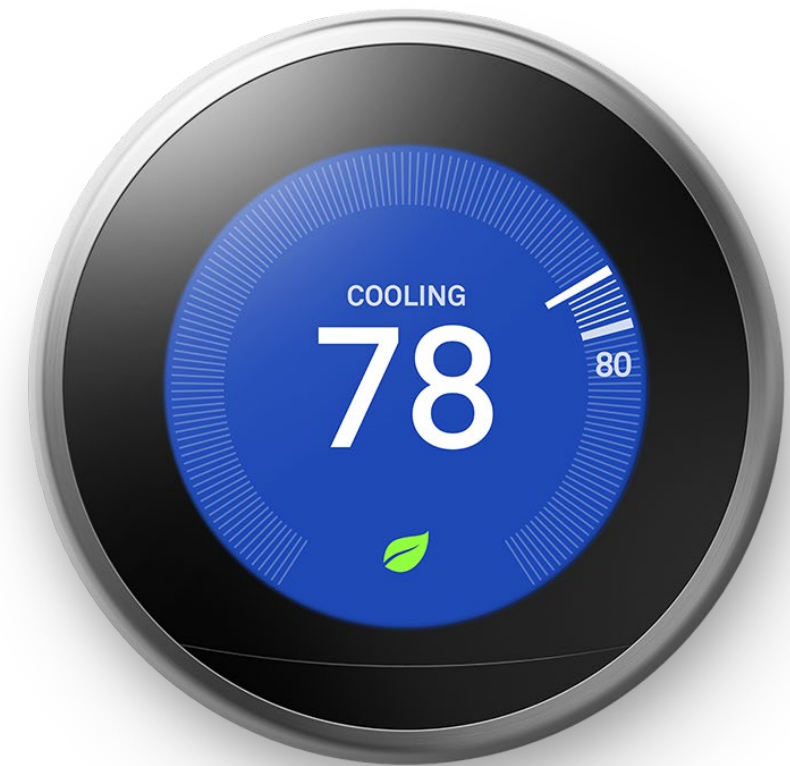
The VPP could provide the same resource adequacy at a significant cost discount relative to the alternatives.

Annualized Net Cost of Providing 400 MW of Resource Adequacy



We are still early in the smart thermostat story

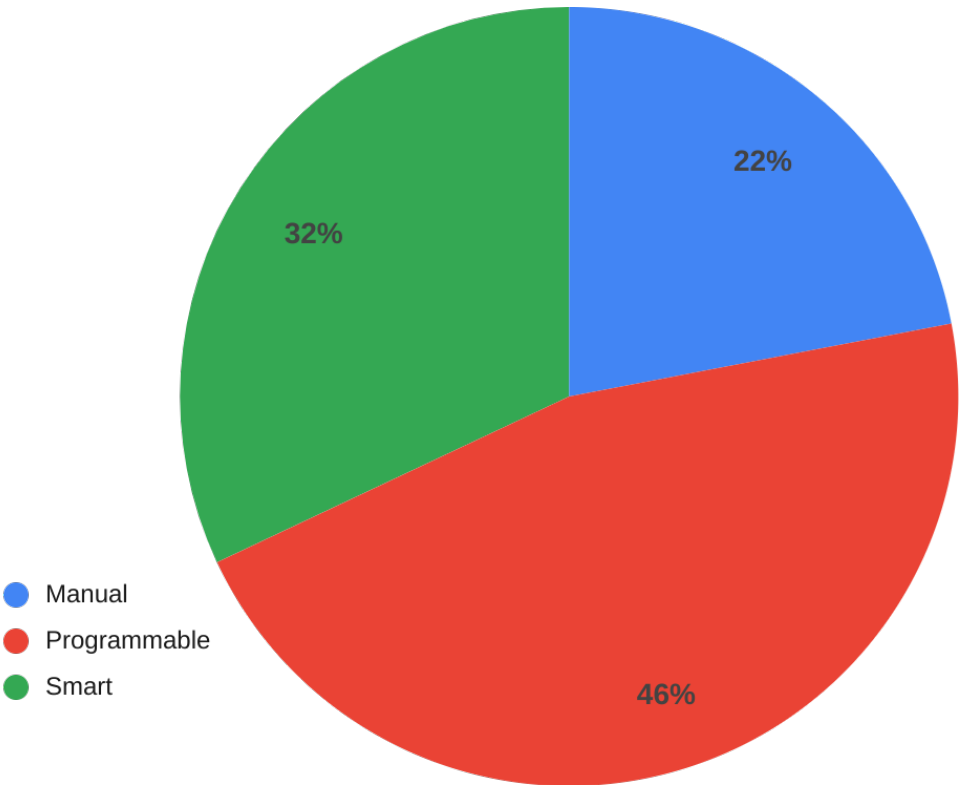
Of the 100 million eligible housing units in the U.S. today, just 16.6% of broadband households have a smart thermostat installed.¹



1. U.S. Energy Information Administration (EIA), accessed June 27, 2022, <https://www.eia.gov/energyexplained/use-of-energy/homes.php>; “Smart thermostats gain traction in US, point to modest electricity savings,” S&P Global Market Intelligence, accessed July 20, 2022, <https://www.spglobal.com/marketintelligence/en/news-insights/blog/smart-thermostats-gain-traction-in-us-point-to-modest-electricity-savings>.

And unfortunately most thermostats sold today can't support Automated Demand Response or TOU

Estimated USA residential thermostat market, by thermostat type, 2021, volume %*



Type	% Sold	CAGR
Manual	22%	-7%
Programmable	46%	+6%
Smart	32%	+12%
Total		+5.4%

(and will be on the wall for a very long time)

*BSRIA USA residential thermostats market 2021:trends in professional channels, Study completed for Google Nest July 2022

Smart Thermostats are an eligible IRA Measure

State Program Recommendation: as part of the heat pump programs, require a smart thermostat with installation



To ensure those customers have the opportunity to enroll in VPP programs and grid operators have the levers to cost effectively balance the new load electrification will add to the grid

Nest Thermostats can make Heat Pumps even better



Standard 24V thermostat controlled and many Variable Speed / Inverter based Heat Pumps

Nest thermostats have been updated with more **intelligent heat pump control features** that help customers save energy.¹ They continuously **optimize the heat pump** by actively **adjusting auxiliary heat usage** based on temperature and performance.

Some Variable Speed / Inverter based Heat Pumps and Mini Splits

Compatible when an interface module is utilized, either from the HVAC OEM or third party.

¹Not available on the 1st or 2nd generation Nest Learning Thermostat.