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Memo: **Value of Demand Response for Ohio**

G. Ehrendreich, MEEA | *June 18, 2025*

Legislative changes in 2019 forced Ohio's electric distribution utilities to eliminate their demand-side management (DSM) activities. Since that time, there have been numerous attempts – legislative and regulatory – to bring back voluntary demand side programs for Ohio's electric distribution utilities. They have been largely unsuccessful; what has been approved has been very limited in scope.

A proposal currently being considered for introduction at the Ohio Legislature would provide authorization for the electric distribution utilities to offer residential customers the opportunity to participate in smart thermostat-based demand response (DR) programs. In this type of program, a utility offers its customers the option of either a rebate toward the purchase of a compatible smart thermostat or the ability to "bring your own device" (BYOD) for customers who already have a smart thermostat. In exchange for a seasonal bill credit or other payment, the customers allow the utility to automatically adjust the set point on their thermostat up or down a few degrees at times of high electricity demand to reduce the load on the system. When the smart thermostat DR customers are aggregated together, they can act like a power plant – reducing demand to provide capacity that the utility would otherwise need to purchase from the regional grid operator (PJM) during times of peak load. This is known as a Virtual Power Plant (VPP). VPPs could include just DR or be aggregated with other distributed energy resources (DERs).

This memo analyzes the cost of smart thermostat demand response compared with the cost of grid capacity, demonstrating the system cost savings that utilities can achieve when a low-cost demand resource is substituted for a high-cost supply-side resource.

Methodology

To estimate the impacts and cost of DR for Ohio, MEEA reviewed a number of inputs from recent literature and data sources necessary to perform the calculations.

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We calculated the estimates under two scenarios – a "low participation" scenario at a participation rate of 10% of residential customers and a "high participation" scenario at 30%. These values come from a review of recent DR and VPP literature and present a reasonable range that utilities could expect under a well-designed program. The rebate and credit values were provided based on what is expected in the proposal and are consistent with what is seen in other DR programs. We also included other per-customer costs as an aggregated value that includes program marketing and the cost of running a distributed energy resource management system to control and aggregate the DR. The per-customer peak impact represents the average capacity that is saved per customer during a peak event when the utility dispatches DR. Customer counts are based on the number of residential customers as reported by the utilities to the federal Energy Information Administration in 2023, the latest year of available data.

Table 1: Input values used to estimate DR costs and impacts.

Input Variables	**value**
T-stat rebate amount	$75 [1]
annual credit	$25 [2]
BYOD percent	40% [3]
PJM cost of capacity	$269.92 [4]
other per customer costs	$43 [5]
high customer participation rate	30% [6]
low customer participation rate	10% [7]
kW peak impact per customer	1.0 kW [8]
AEP residential customer count, bundled	713,995 [9]
AES residential customer count, bundled	196,500 [10]
Duke residential customer count, bundled	334,752 [11]
CEI residential customer count, bundled	296,401 [12]
TE residential customer count, bundled	88,417 [13]
OE residential customer count, bundled	363,647 [14]

These variables were used to estimate the number of participating customers, the total cost of the program including rebate and credit costs and per-customer other costs, and the peak impacts for the programs.

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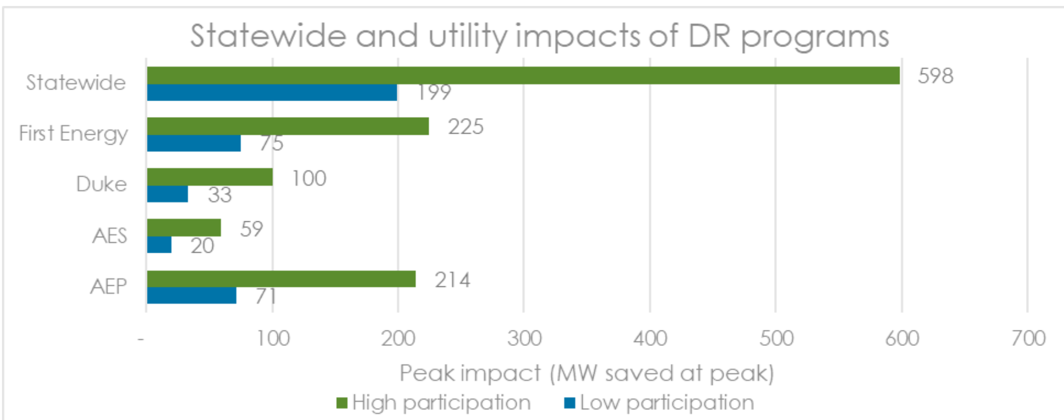
Results

At 10% participation, 199,000 participating customers saving 1.0 kW each would provide 199 MW of peak demand savings statewide. At 30% participation statewide, 598,000 customers participating would provide 598 MW of peak demand savings. These impacts scale with the number of residential customers – so the larger utilities would have larger impacts than smaller utilities, but more customers also means these utilities will likely have higher demand needs to be met.

Figure 1: Estimated statewide peak impacts from demand response programs



At the low participation rate, statewide DR programs would cost utilities – and their customers - $31 million to achieve the peak impacts. This would avoid the cost of $53.8 million in capacity from the grid, a net savings for the utility system of $22.7 million. At high participation rates, those program costs go up to $93 million but avoid $161 in capacity for net savings of $68 million. The analysis does not include savings from reduced utility spending on the grid, which utilities design to meet peak demand.

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Figure 2: Statewide system cost savings from DR programs

As with peak impacts, the costs of saving capacity through demand response scale with the number of customers participating – with more customers comes higher impact and higher costs but also avoids more costs from using grid resources to meet capacity. All Ohio's utilities would benefit from using lower cost demand response resources rather than supply-side resources to meet customer demand needs, in both low and high participation scenarios.

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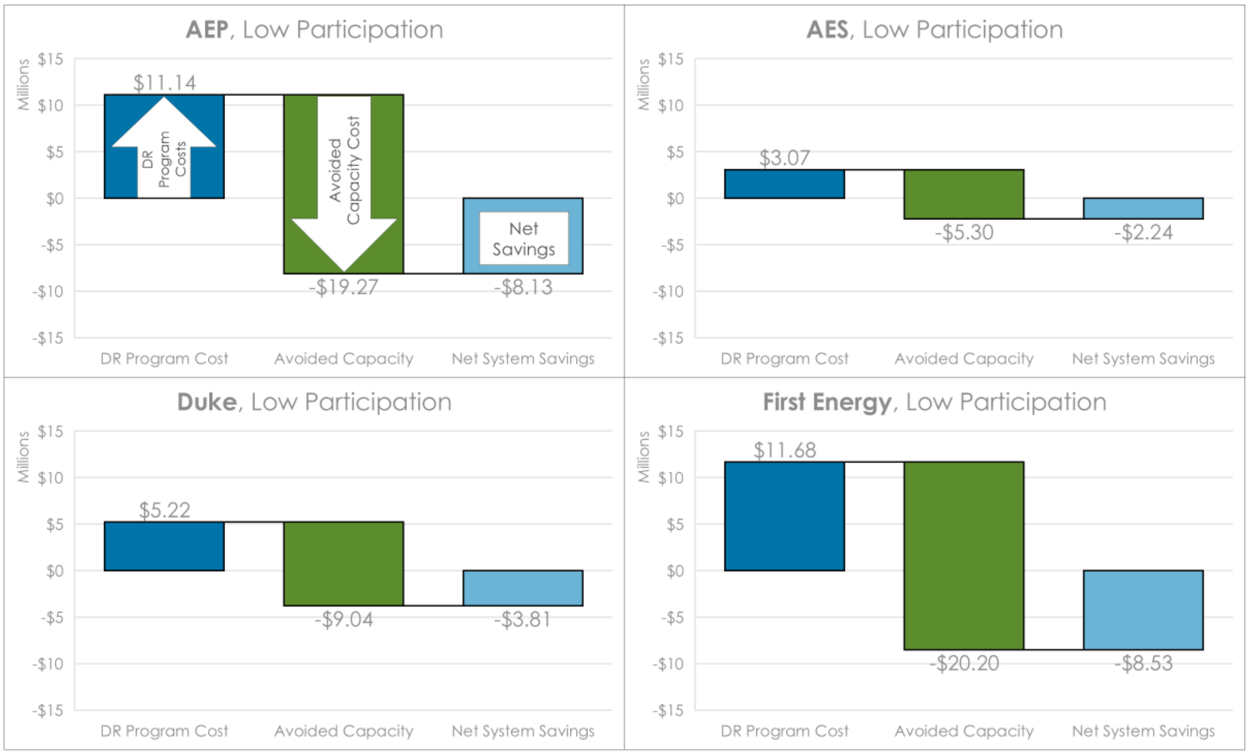
Figure 3: Estimates of utility level costs savings from DR programs in low participation and high participation scenarios



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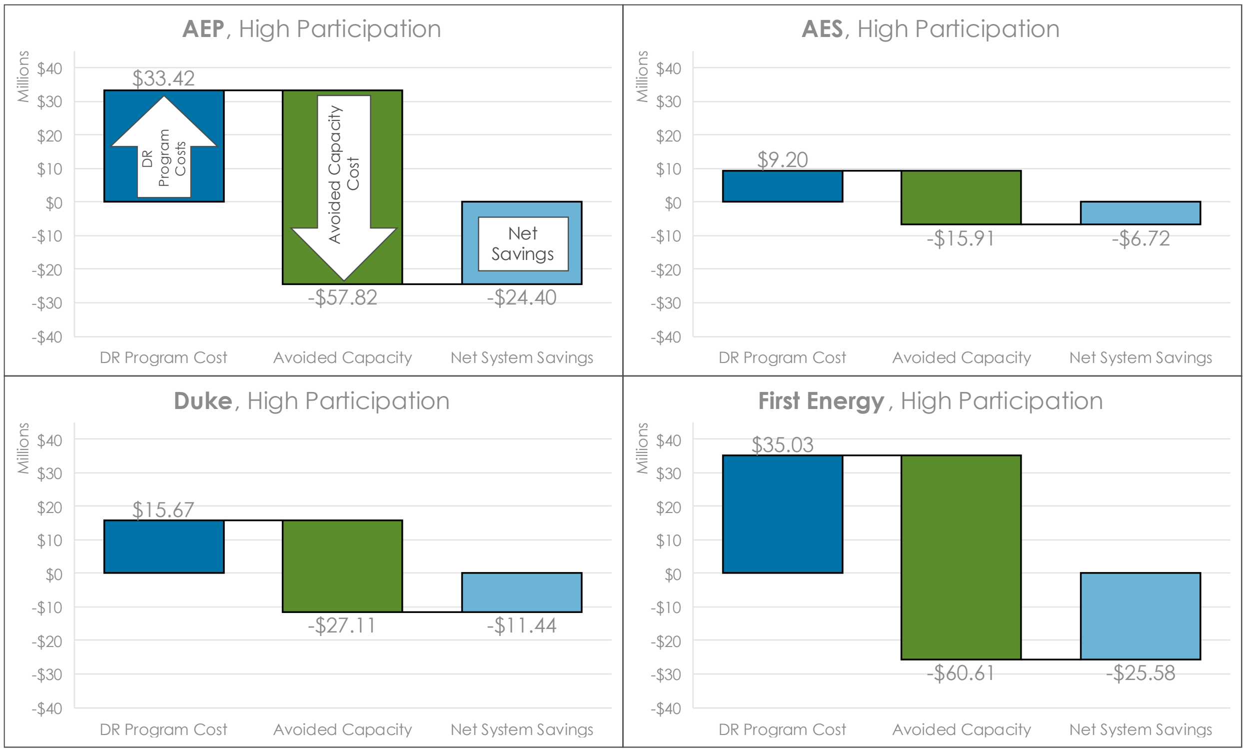

This analysis presumes that about 40% of participating customers in the first year of the program would already have a smart thermostat (the BYOD customers) and 60% of participating customers would take advantage of the device rebate to upgrade their thermostat. In subsequent years, it would be expected that some of the rebate customers would continue to participate in the program. For a customer who received a rebate in one year and continues to participate in a future year there is about a 45% reduction in the per-customer cost for the utility.

Conclusion

With the extremely high market clearing price for PJM's most recent capacity auction, the time to act on demand response in Ohio is now. There will be costs to the utility system and its customers to meet rising demand with or without demand response – but with demand response substituting a portion of demand, the costs will be lower than if all of the demand was met through the supply side. Aggregated demand response in the form of a Virtual Power Plant also has the possibility of being bid into PJM's capacity market and ancillary services markets, and ongoing work continues to work on getting aggregated DR and other distributed energy resources to be allowed in energy markets as

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well. This will create opportunities to offset those implementation costs by selling demand on the market. However, estimating those market-based impacts is beyond the scope of this analysis.

Demand is rising in Ohio, and demand peaks will go up. Demand response through smart thermostats is being used across the country to meet capacity, avoid high grid costs and prevent blackouts for customers in times of extreme demand. Ohio needs demand response and other demand-side utility programs like energy efficiency if it wants to maintain resilient, reliable and least-cost energy services.

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[1] Personal Communication, Rob Kelter (6/5/2025)

[2] ibid

[3] ibid

[4] PJM. 2025. Resource Clearing Prices Auction Summary (03/15/2025). https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/rpm-auctions-resource-clearing-price-summary.xlsx

[5] Hledik, R. and K. Peters. 2023a. Real Reliability, The Value of Virtual Power. The Brattle Group. https://www.brattle.com/real-reliability/

[6] ibid

[7] Parrish, B., Gross, R. and P. Heptonstall. 2019. "On Demand: Can Demand Response Live up to Expectations in Managing Electricity Systems?" Energy Res. Soc. Sci. 2019, 51, 107-118. https://doi.org/10.1016/j.erss.2018.11.018

[8] Hledik, R. and K. Peters. 2023b. Real Reliability, The Value of Virtual Power, Technical Appendix. The Brattle Group. https://www.brattle.com/real-reliability/

[9] EIA [US Energy Information Administration]. 2024. Annual Electric Power Industry Report, Form EIA-861 detailed data files, 2023 final data. "Sales_Ult_Cust_2023.xlsx" https://www.eia.gov/electricity/data/eia861/

[10] ibid

[11] ibid

[12] ibid

[13] ibid

[14] ibid