



WHITE PAPER

Next-Gen Demand Response: Engaging Consumers, Meeting Energy Demand

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Introduction

Utilities face mounting strain from increased energy consumption driven by transportation, HVAC, and home appliance electrification, rising demand from data centers, and renewable energy intermittency. Demand response (DR) programs are increasingly seen as a flexible solution. These programs can help utilities and consumers alike by actively shifting energy use to off-peak hours, benefiting both grid stability and consumer savings.

Utilities aim to scale programs much more quickly and need to connect with customers in a better and more meaningful way to capture the opportunity. The growing demand for orchestrated DR programs is driven by the need for grid stability, energy efficiency, cost reduction, and the integration of renewable energy.

This white paper assesses consumer awareness and engagement with DR programs and provides feedback on the experience of current participants. It evaluates opportunities to grow demand response programs, both by encouraging broader enrollment and by increasing the number of events utilities may call without inconveniencing participants. Sophisticated program execution, with more targeted events, is a critical method for achieving this goal. By refining customer engagement & leveraging advanced management tools, utilities can create a more effective, customer-friendly demand response strategy and support grid stability.

According to Parks Associates research, 16% of all internet households now own a smart thermostat, and about one-fifth of those households (approximately four million US internet households) are enrolled in a DR program.

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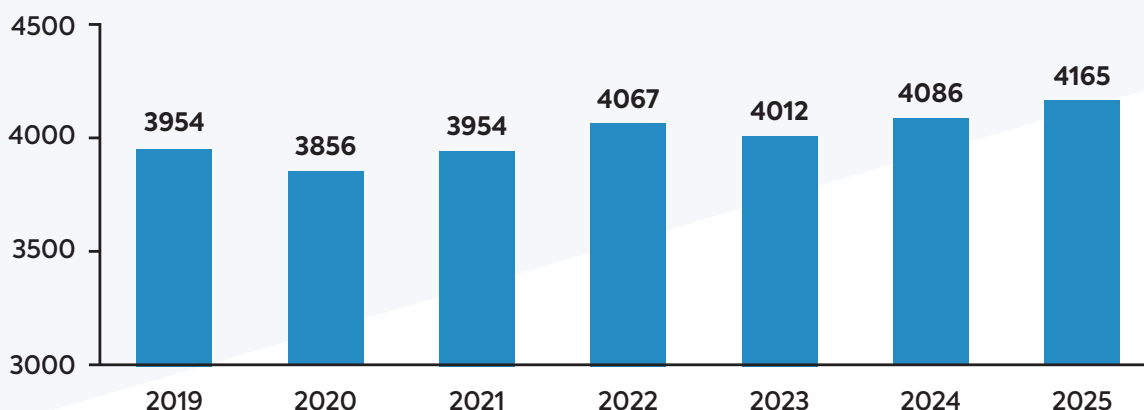


Growing Need for Demand Management Programs

Utilities Need Flexible Grid Management Options

The demand for electricity in the US continues to climb as household appliances, HVAC systems, and vehicles switch to electric power. The rapid expansion in artificial intelligence processing and cryptocurrency mining is also fueling data center construction and expansion, further driving power demand. The US Energy Information Administration (EIA) projects 2025 to be another record year, with a projected 4,165B kWh of electricity consumed in 2025. With more electrification needs across multiple sectors, utilities need flexible grid management options to maintain stability.

US Electricity Consumption (1B kWh)



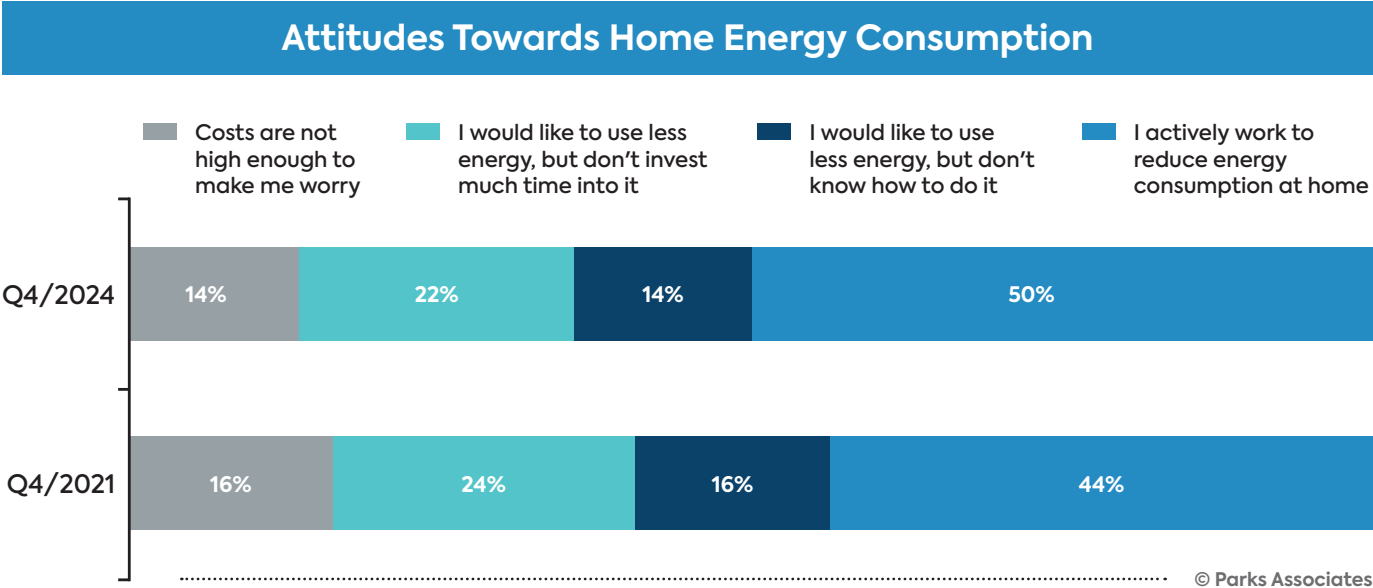
Source: US Energy Information Administration Short Term Energy Outlook December 2024

While solar and wind are making up a larger share of generation resources, their intermittency has contributed to a widening gap between demand for electricity and solar availability throughout the day.

Demand response programs, along with other solutions like energy storage and interconnected grids, offer an effective way to shift the energy load. By encouraging consumers to use electricity when demand is lower or solar production is higher, utilities can significantly reduce peak demand.

Consumers Struggle with High Energy Costs

Consumers are struggling with high energy costs. According to Parks Associates consumer survey research, the average US internet household reports electricity costs of \$156 in Q4 2024, up 14% since 2019 (\$137). At the end of 2023, inflation came down from mid-2022 peaks, but high interest rates and high electricity costs continue to challenge the American consumer. The majority of US internet households, 61%, feel their costs are too high, even among high-income households. Those with large families are particularly challenged by high energy costs. Energy players should not consider any segment to be immune to rising energy costs.



Worried about high electricity rates, more households (50%) are actively working to reduce their energy consumption at home today, compared to previous years (44% in 2021). Another 36% want to consume less energy as well but lack knowledge and/or time to invest in energy-saving practices. Households with children are particularly likely to feel this way, 41% of whom lack the time or knowledge to do much about their energy bills.

Energy players can proactively engage consumers with solutions that automate energy savings or provide energy insights that can help households make better decisions. Smart energy devices, including smart thermostats, water heaters, and pool pumps, can automatically take action based on pre-programmed schedules or household behaviors to save on energy consumption. They also form a foundation for demand response programs that both can help consumers unlock bill savings through an incentive from their utility and become a source of flexible load for the grid.

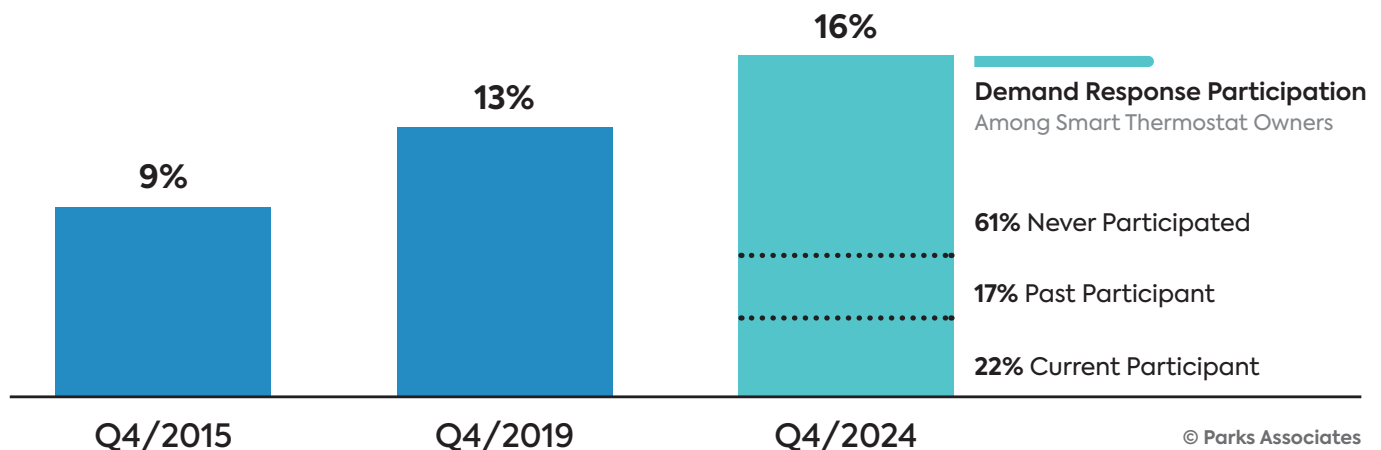


Assessing Demand Response: Awareness, Retention, Experience

16% of all internet households now own a smart thermostat, a rate that doubled over an eight-year period. One-fifth of smart thermostat households (approximately four million US internet households) are enrolled in a demand response (DR) program, and an additional 13% (approximately 2.7 million households) have participated in the past but are no longer enrolled. While slow-and-steady growth is occurring, utilities aim to scale programs much more quickly to enhance their flexibility in dealing with extreme weather events and the projected growth in demand on the grid.

Three elements must be addressed to further scale programs: customer awareness of programs, program retention, and participant experiences.

Smart Thermostat Adoption

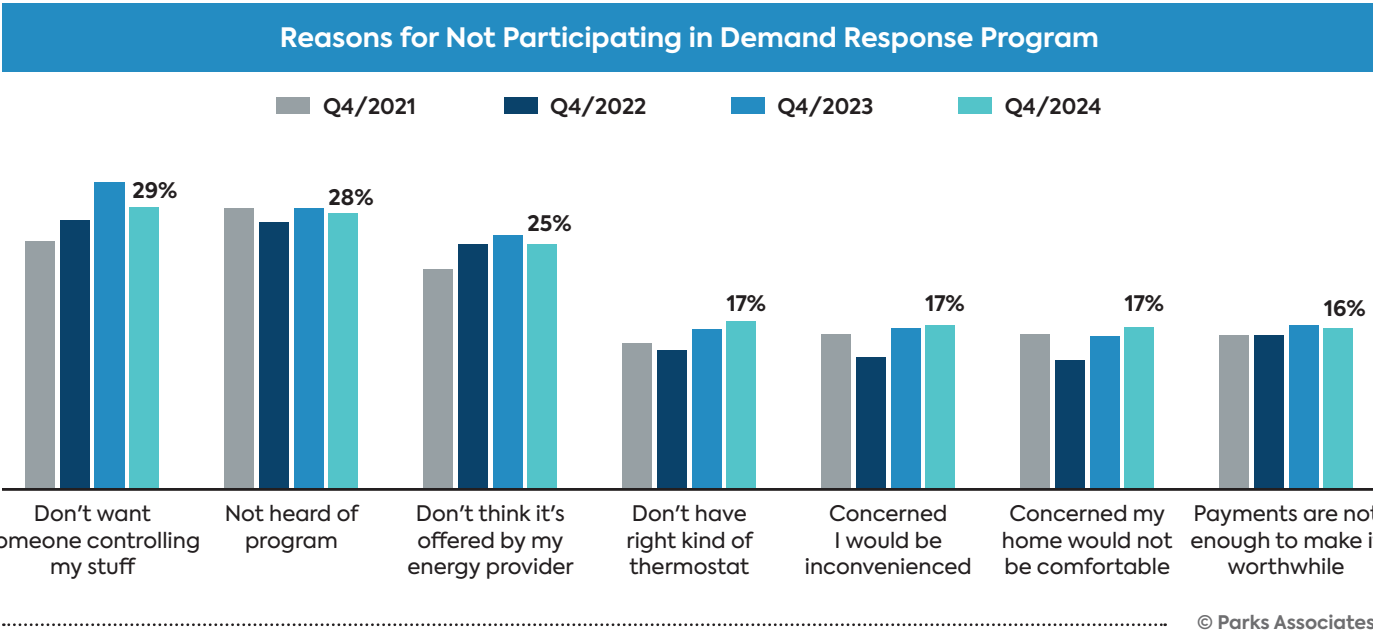
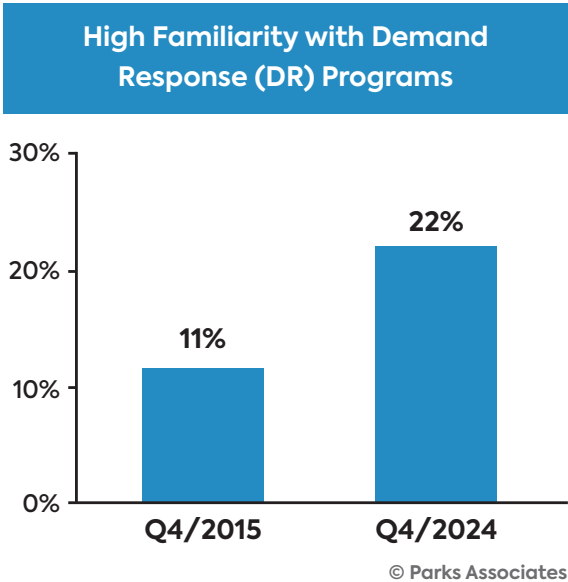


Program Awareness

Awareness remains a top barrier to Demand Response program participation – most consumers have low familiarity with these programs. Familiarity with DR programs has grown in the past five years but awareness remains low. Twenty-two percent of consumers considered themselves “very familiar” with demand response programs in 2023, compared with 11% in 2015.

The first step to scaling these programs is broadening consumer awareness of programs and their benefits. Among households not currently enrolled, **54% have not heard of or do not think their energy company offers a demand response program.**

Current marketing efforts are not reaching these individuals. Notably, awareness varies by region. For example, 59% of those living in East South Central States (Kentucky, Tennessee, Mississippi, Alabama) who do not participate in demand response programs today cite low awareness or no access to a DR program whereas that rate is 15 points lower (44%) for those in Pacific states (California, Washington, Oregon). Utilities need to focus on clear, customer-centric messaging that highlights the financial, environmental, and community benefits of participating in DR program.

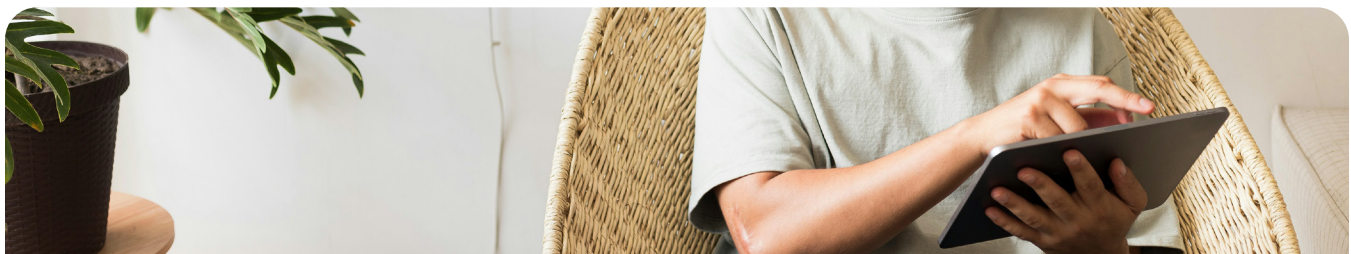


Program Enrollment & Retention

Beyond lack of awareness, the top barriers to program participation are concern over an outside party controlling devices in their home and payments not being worth the inconvenience. Energy providers can address hesitation about DR participation in a more personalized way, by understanding the nuances of motivation and resistance.

Men, for instance, are slightly more likely to feel that programs are simply not worth it — the payments aren't high enough and the potential for inconvenience is too great. Women are more likely to be simply unaware of programs.

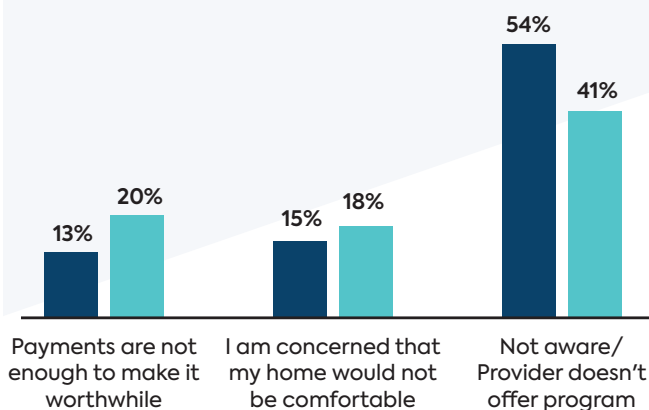
Older consumers show stronger familiarity with demand response but also stronger resistance to the outside control of their devices. Partnering with trusted community brands and personalities (i.e., news anchors, other known local leaders), clearly outlining how personal information is protected, and providing opt-outs for called events may be helpful in communications with older demographics.



Barriers to Demand Response Participation

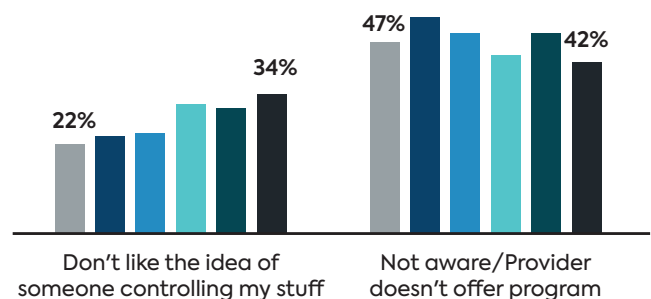
BY GENDER

■ Woman ■ Man



BY AGE

■ 18-24 ■ 25-34 ■ 35-44
■ 45-54 ■ 55-64 ■ 65+



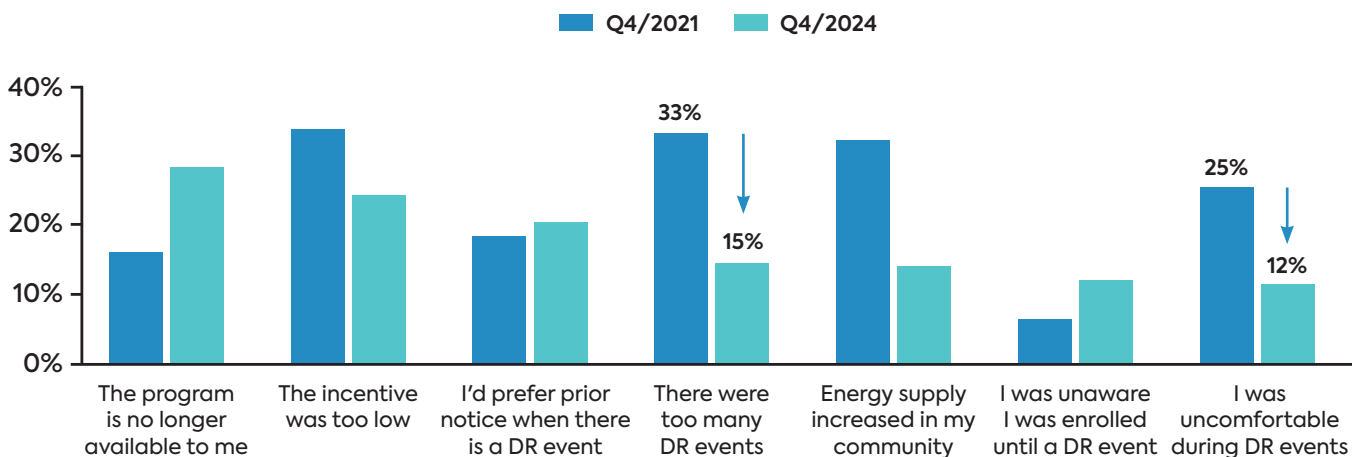
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Financial incentives work to drive enrollment: 60% of DR participants signed up because they liked the incentive, compared with just 33% who signed up due to power outage concerns or to help the community generally.

Once in programs, energy providers need to retain participants. The percentage of households that were formerly in a DR program but no longer participate is nearly equal to that of those currently enrolled. Thirteen percent of US households are currently enrolled in a demand response program; 12% have enrolled in the past but no longer participate. Energy providers seeking maximum engagement in their energy programs must watch for customer churn and can look to other industries (e.g., streaming video, residential security, streaming music) that rely on consumer subscriptions to mimic best practices for consumer retention.

Reasons for Churning Out of Demand Response Program



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As utilities and energy providers become more experienced in managing DR programs, participant experience has improved. Far fewer consumers who churn out of programs today report that they were uncomfortable or that too many events were called. Instead, the top reason in 2024 is that the program is no longer available – the past enrollee may have moved out of a service area or switched plans and no longer have the plan available to them. As DR programs scale and become more targeted, customer discomfort has declined in all but the most extreme events.

Participant Experience

Across the past three years of testing, consumers are consistent in reporting primarily positive experiences with DR programs.

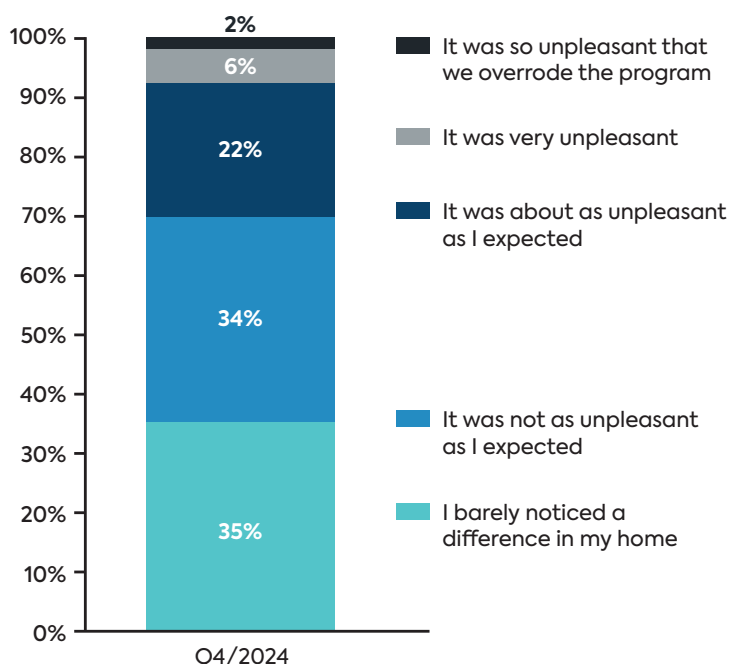
- 35% say they barely noticed a difference when an event was called.
- Another 34% said it was not as unpleasant as they were expecting.

The majority of program participants (67%) report that events lasted for less than two hours. Energy providers and utilities should share real experiences of current participants to allay fears and encourage those on the fence to enroll.

As utility programs mature and the base of smart thermostats and other distributed energy resources grow, utilities are likely to call for load shedding more often. Notably, too many DR events being called has declined as a driver of program drop-outs.

As the experience improves, utilities can increase the number of DR events without driving churn through carefully executed programs that keep the user experience in mind.

Demand Response Event Experience



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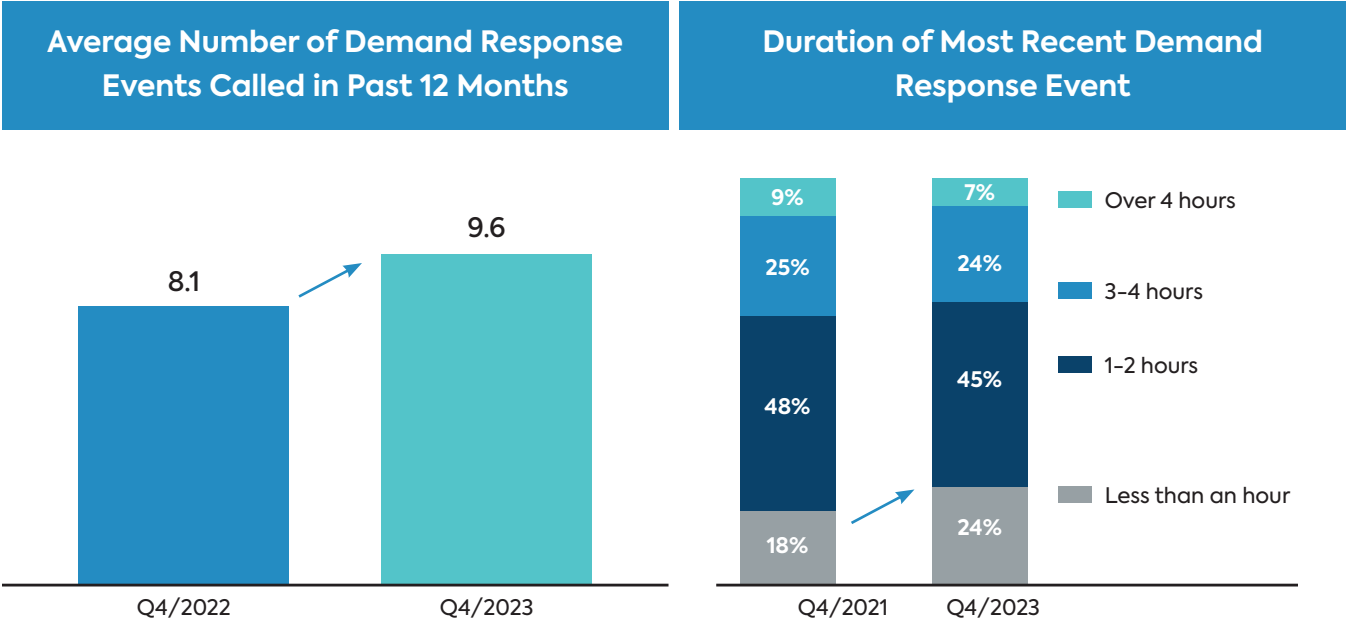




Elevating Demand Response: Thoughtful and Targeted

Demand response program execution has evolved. Programs are no longer one-size-fits-all; they are smarter and better able to balance customer preferences and grid stability. DERMS (Distributed Energy Resource Management Systems) providers can help utilities scale programs and the number of events with less impact to the customer. Adding other residential loads to aggregations such as pool pumps, water heaters, and batteries can also minimize customer discomfort while still achieving program load-shed goals.

Parks Associates data confirms that DR events are being called more frequently. Consumers report an average of 9.6 DR events in 2023 versus an average of 8.1 in 2022. Though events are being called more frequently, they do not last as long. In 2023, 24% of program participants reported their most recent event lasted less than an hour, up from just 18% of participants in 2021.



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With careful planning, utilities can run more – but shorter – events. Shorter events can help to reduce customers' feelings of inconvenience while at the same time providing them with energy savings. Utilities can work with their DERMS partners to improve customer experience in several ways:

LOAD FORECASTING

Utilities can use DERMS to predict load demand and schedule DR events with better accuracy, allowing them to target the right customers at the right time. Accurate forecasting helps utilities keep events short while still enforcing grid stability. By anticipating demand surges and scheduling precise load reductions, utilities can avoid unnecessary disruptions for customers, making the DR experience more seamless and less intrusive.

CUSTOMER SEGMENTATION

Utilities can categorize customers by factors such as energy use patterns, device type, and geographical location (e.g., substations, feeders, or larger areas). Advanced DERMS providers can also anticipate expected performance based on house envelope efficiency and past participation in events. Targeting specific segments of customers ensures that not all customers experience every DR event, allowing for demand reductions to be distributed more evenly and a focus on efforts where the largest energy reductions can be achieved.

ADJUST PRECONDITIONING STRATEGIES

Precooling and preheating adjust the temperature of a building before peak demand hours to reduce the amount of cooling/heating needed during the event time, while also ensuring residents are comfortable during the event. Smart DERMS strategies take customers' Time-of-Use (TOU) rates into consideration, ensuring that preconditioning is done during lower-rate periods. This prevents utility-driven spikes in customers' energy bills while still delivering effective load reductions.

STAGGER START AND END TIMES

Adjusting devices at varied times creates a rolling load reduction for customers, allowing them to experience a shorter window of adjustment while still contributing to grid stability.

Staggering times can also help prevent load spikes, which can occur when all devices return to normal settings at the same time after a DR event.

By minimizing inconvenience and personalizing the DR experience, these strategies can help utilities reduce churn and maintain sustained customer participation in their programs.

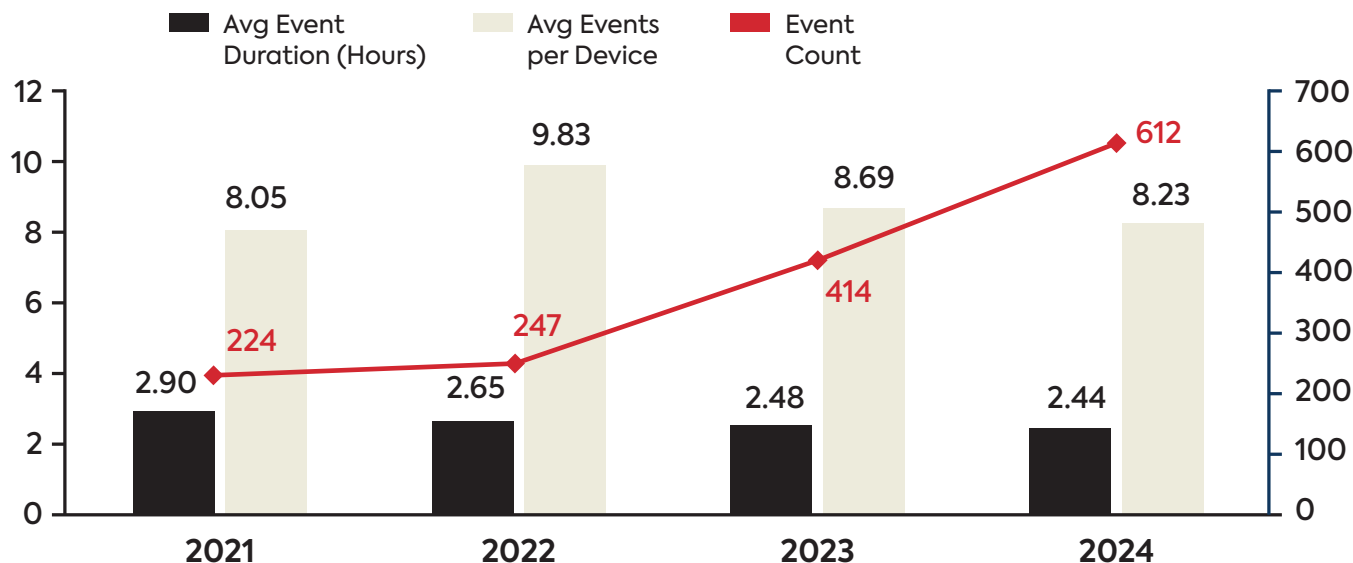
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Unlike traditional broad-based DR programs, which may disrupt all enrolled customers regardless of actual grid needs, DERMS allow utilities to pinpoint specific areas or customer segments where load reductions will have the greatest impact. **Resideo Grid Services data reveals a 173% increase in total number of events called from 2021 to 2024, reflecting both an uptick in the number of DR programs on the Resideo platform and more events called per program.** However, by taking a targeted approach, households are not being overwhelmed by demand response requests: the average number of events each device has participated in has risen only 2% since 2021, and is down from highs in 2022.

The company reveals that in 2022, almost all demand response events with Resideo DERMS utility partners involved the majority of connected devices in their portfolio. Fast forward to the summer of 2024 where 22% of events activated less than half of the available devices, reflecting a shift toward targeted, smaller grid sections.

The duration of events is also declining, making the experience less impactful or uncomfortable for consumers. The average demand response event lasted nearly 3 hours in 2021; in 2024, the average event lasts less than 2.5 hours. Smarter, more dynamic and targeted approaches ensure that utilities can call more DR events when needed—improving grid reliability and resilience—while reducing disruptions to consumers by tailoring interventions to those most effective and least disruptive.

Resideo Grid Services: DR Events & Duration Trends



Source: Resideo Grid Services



Opportunities for Growth

Three critical strategies will help utilities reach the scale they need to keep up with growing energy demand: expanding the number of households with smart thermostats, expanding the type of devices enrolled in demand response programs, and refining the demand response experience to increase calls without increasing program churn.

!! Grow Smart Thermostat Base and Engage More Users in DR Programs

Engaging the 78% of smart thermostat owners not currently participating in a demand response program will take a mix of education, tailored incentives, and user controls that give them confidence about program administration.

Seniors are a prime target for higher enrollment in demand-response programs.



Seniors are the most engaged in energy savings activities: 63% of seniors ages 65+ actively work to reduce energy consumption at home — the highest of any group.



While seniors typically own technology at far lower rates than other groups, 17% of seniors now own a smart thermostat, on par with other age groups.



Seniors pay attention to energy programs: educational efforts are reaching seniors, who are least likely to say that the reason they don't engage in demand response programs is that they are unfamiliar with them.

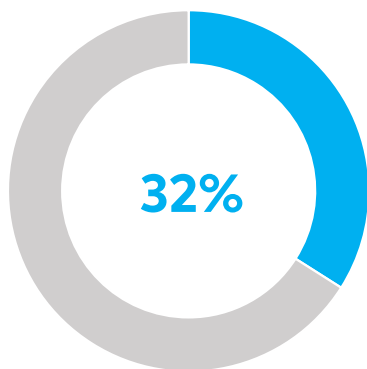
To engage and convert this group to DR program participants, it is important for utilities to offer assurances. Since seniors are more likely to be sensitive about the privacy of their data, transparency and assurances about data privacy and controls will help overcome concerns.

!! Engage New Device Types and Expand Partnerships

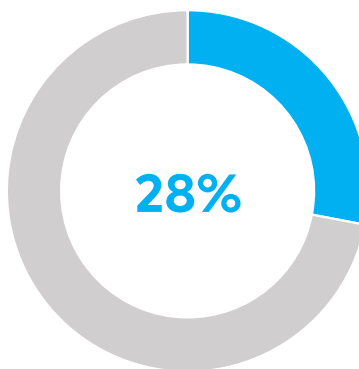
Electric vehicles, water heaters, clothes dryers, and pool pumps are all strong targets. Reduced energy consumption from these devices during peak times would have substantial impact on grid demand, and consumers show some willingness to enroll these devices.

Willingness to Enroll Devices in Demand Response Programs

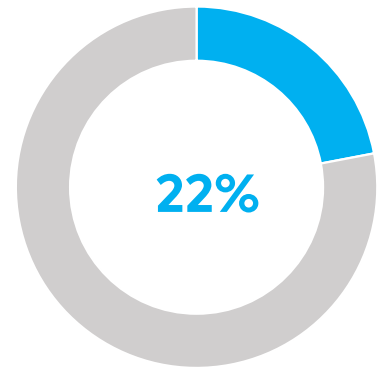
Among Device Owners in US Internet Households



Electric Vehicle



Pool Pump



Water Heater

© Parks Associates

While many utilities already bundle demand response enrollment with smart thermostats, there's an opportunity to extend this offering to EVs, connected appliances, and other high-energy consuming devices. Connecting early adopters of these devices with the large base of enrolled thermostat customers may make for an easier path for enrollment of these new devices. Partnering with smart device manufacturers allows utilities to bundle demand response enrollment at the point of purchase, creating a seamless, automated experience for customers and potentially leading to higher participation. Utilities can use data from devices to provide personalized energy insights and optimize load reductions.



!! Work with DERMS Providers for Targeted Programs

With more sophisticated program management and targeting capabilities, utilities can increase the number of events while maintaining healthy retention rates. Both program data and consumer-reported sentiment reveals that more events can be called without impacting customer satisfaction and program retention. Energy providers and utilities can share testimonials of current participants to influence others in their community to enroll.

Utilities can also re-engage past participants by highlighting program improvements such as shorter DR events, better communication, and a personalized experience. Providing alerts before, during, and after events can ensure transparency and foster trust, and tailored messaging to individual customer preferences and motivations can keep program participants engaged.

Utilities are facing multiple challenges, including rising electricity consumption, worsening peak load demand, and generation intermittency. Expanding demand response capabilities through smarter targeting will help utilities expand this critical source of flexible demand to optimally respond to these critical challenges.



About Parks Associates



www.parksassociates.com
info@parksassociates.com
972.490.1113

Parks Associates, a woman-founded and certified business, is an internationally recognized market research and consulting company specializing in emerging consumer technology products and services. Founded in 1986, Parks Associates creates research capital for companies ranging from Fortune 500 to small start-ups through market reports, primary studies, consumer research, custom research, workshops, executive conferences, and annual service subscriptions.

The company's expertise includes new media, digital entertainment and gaming, home networks, internet and television services, digital health, mobile applications and services, consumer apps, advanced advertising, consumer electronics, energy management, and home control systems and security.

About Resideo Grid Services

Resideo Grid Services is a leader in demand response aggregation and program management, helping utilities and energy retailers manage grid demand with precision and efficiency. Since 2012, our team has been providing innovative solutions to reduce peak demand, optimize load flexibility, and support utility programs nationwide. Resideo currently manages or participates in nearly 300 U.S. utility demand management programs and engages in six wholesale energy markets. For more information about Resideo Grid Services, visit ResideoGridServices.com.

About the Author

Jennifer Kent, Vice President, Research, Parks Associates

Jennifer manages the research department and Parks Associates' process for producing high-quality, relevant, and meaningful research. Jennifer also leads and advises on syndicated and custom research projects across all connected consumer verticals and guides questionnaire development for Parks Associates' extensive consumer analytics survey program. Jennifer is a certified focus group moderator, with training from the Burke Institute.



ATTRIBUTION

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