

Encouraging the Switch: What Drives Participation in Electrification, Battery Storage and Load Control Programs

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ABSTRACT

Home and vehicle electrification, battery storage and demand response are core to decarbonization and load management strategies, but encouraging consumer adoption of advanced electric equipment and participation in load management can be challenging. This study reveals new findings from a nationally representative survey of 350 U.S. homeowners, that uncovers what utility customers value, and what stops them from participating in programs. The study identifies the characteristics of homeowners who already own and/or are likely buyers of advanced electric equipment, including air source heat pumps (ASHP), heat pump water heaters (HPWH), induction cooktops/ranges, photo-voltaic (PV) solar panels, electric vehicles (EVs) and battery energy storage systems (BESS). It measures product adoption likelihood and explores motivators and barriers. It also quantifies interest in load management programs and bundled virtual power plant (VPP) program elements that can help alleviate the demand increases that accompany advanced electric equipment adoption. Results show that the target audience for home and vehicle electrification is also the target for load management, and that resilience, health, and safety outperform cost savings, as motivators, particularly for respondents experiencing frequent outages.

INTRODUCTION

Electrification Benefits

Residential buildings account for approximately 20 percent of total U.S. energy consumption (EIA 2026). Space and water heating, specifically, represent ~60% of residential energy consumption and carbon emissions, making upgrading this equipment to more efficient electric models the largest opportunity for residential energy consumption and carbon reduction (EIA 2020).

In addition, fossil fuels are used for heating or cooking in more than half of U.S. homes, which produces carbon dioxide (CO₂), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen oxides (NO_x), and methane (Billimoria and Lee 2021). These emissions produce unhealthy indoor air quality and contribute to climate change. Electrification programs aim to reduce these emissions by replacing gas and fuel oil space, water heating and cooking equipment with high-efficiency electric alternatives.

Utilities are also pursuing electrification initiatives to achieve additional strategic objectives. Electrification can increase electricity sales while improving system utilization, particularly when new electric loads are flexible and can be managed through demand response programs. Further, electric space and water heating load can be shifted to times that facilitate the integration of more renewable energy onto the grid (Billimoria, Guccione, and Louis-

Prescott2018).

Finally, low income, Black, Hispanic, and disadvantaged households face dramatically higher energy burdens – spending a higher percentage of their income on energy bills, compared to the average household. According to the ACEEE’s 2024 Energy Burden Report update, 25% of low-income households in metropolitan areas spend over 15% of income on energy bills (Drehobl and Ayala 2024). Building electrification can decrease energy costs by avoiding the need for gas system investment and putting downward pressure on electricity rates through more efficient use of the existing electric system (Yim and Subramanian 2023).

Barriers to Participation

While the potential benefits for electrification are numerous, there are also barriers to consumer adoption. The first has to do with purchase timing. There are two common replacement scenarios: The first, where broken equipment is being replaced, can be strongly influenced by contractor education and midstream incentives, but decisions are still influenced by homeowner biases. The other, more difficult, scenario is to convince homeowners to retire existing (operational) equipment that usually lasts up to 25 years (Rao, Siam and Bond 2024).

Studies have also shown that consumer affinity for gas cooking appliances is a significant barrier to adoption of electric induction cooktops and ranges (ILLUME Advising 2025). Additionally, Heat pump water heating adoption studies have identified consumer reluctance to replace conventional gas water heaters due to equipment cost concerns, and perceived differences in performance (Houssainy, Torcellini, and Pless 2022).

Finally, increased electrification can potentially exceed grid capacity without integrated load optimization, so advanced electric equipment adopters should also be convinced to enroll in load management programs. This creates behind the meter flexibility to curtail demand and create virtual power plants (VPPS) to balance the grid and avoid blackouts and expensive grid modernization and expansion costs. Behavioral research, however, indicates that household participation in demand response initiatives can be difficult to secure due to cognitive biases, perceived inconvenience, and uncertainty about program benefits (Sloot et al. 2023).

Study Goals

The goals of this study were as follows:

- Explore homeowners’ current home upgrade needs and priorities (and where energy-related upgrades fall within these priorities)
- Measure familiarity and ownership levels of advanced electric equipment including air source heat pumps, induction cooktops and ranges, heat pump water heaters, battery energy storage systems, photovoltaic solar panels and electric vehicles
- Measure purchase propensity and identify purchase barriers for advanced electric equipment
- Test messaging strategies that might help to overcome electrification (or fuel switching) barriers
- Measure load management participation propensity, by equipment type
- Test messaging strategies that might help to overcome load management participation barriers

- Identify the characteristics of current owners and likely purchasers of advanced electric equipment and see they align with the characteristics of likely participants in load management.

METHODOLOGY

This study is based on findings from a stratified national online survey of 350 U.S. homeowners, age 29-76, who report household income of \$30,000 or more. Because respondents were recruited through an online panel rather than selected through a probability sample of all eligible U.S. homeowners, a traditional sampling margin of error is not strictly applicable. For reference, had this study utilized a simple random sample of 350 respondents it would have resulted in a maximum sampling error of ± 5.2 percentage points at the 95% confidence level. The survey questionnaire included a variety of question types, including open-end response, closed-end response, five-point Likert scale, and MaxDiff most/least appealing. The quantitative analysis included descriptive statistics, cross-tabulation analysis, top- and bottom-two-box analysis, mean score analysis, two-tailed t-test for statistical significance testing, and maximum difference scaling analysis. Qualitative analysis included AI-aided content analysis, including coding and summary of open-ended feedback.

Figure 1, below, provides sample characteristics. Age and gender samples are proportional. Regional distribution closely mirrors the U.S. population, with responses received from all 50 states and state-level sample proportions aligning closely with each state's share of the national population. Race/ethnicity distribution is close to U.S. population percentages, with an intentional over-sample of indigenous (Native American, Alaskan Native, Hawaiian Islander) respondents. The Toluna online survey panel was utilized for this study.

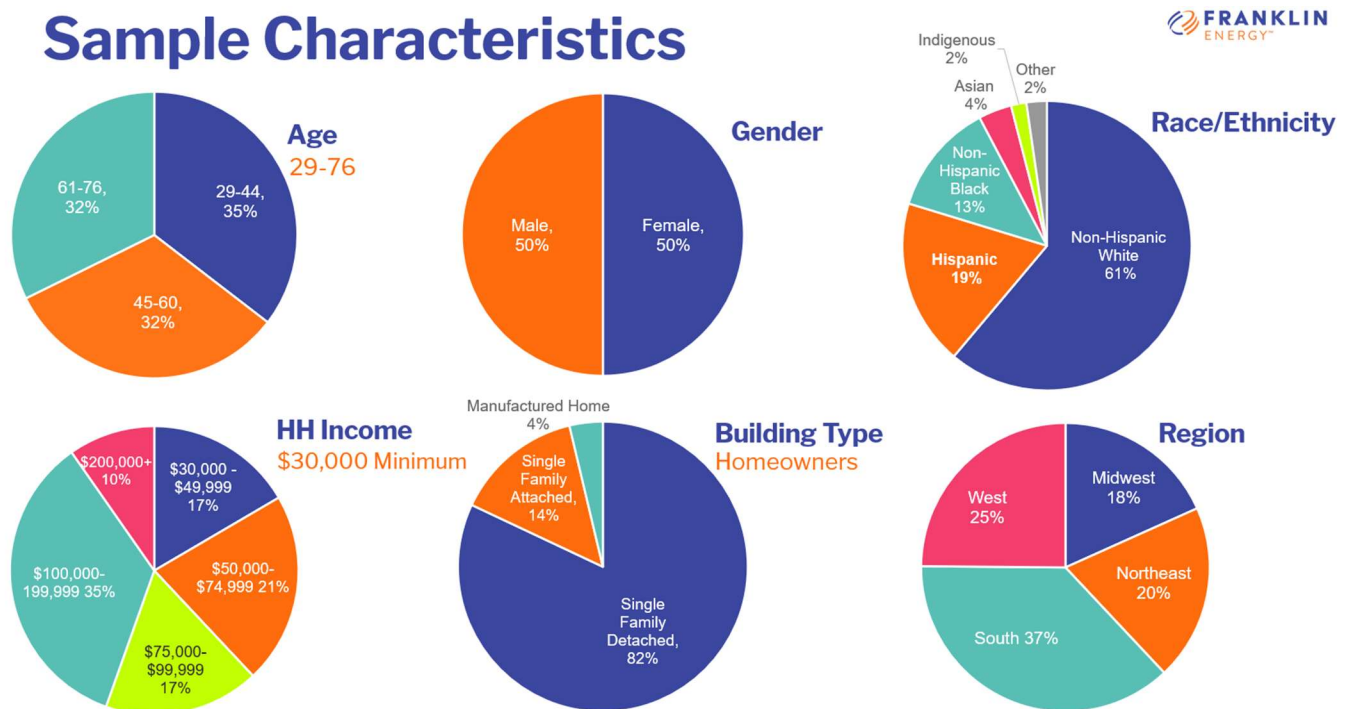


Figure 1. U.S. electrification and load management survey sample characteristics. *Source:* Franklin Energy 2026.

RESULTS AND DISCUSSION

Homeowner Needs and Desires

It's important to remember that when utilities encourage their customers to purchase energy efficient equipment (even with a significant rebate), their suggestions enter an existing line of home improvement needs and desires. Many of those needs, such as structural damage, faulty electrical, or insufficient insulation, seen in Table 1, below, make it impossible or inappropriate to install advanced electric equipment. 63% of homeowners reported at least one of the issues noted below:

Table 1. Perceived home improvement needs (n=350)

Perceived home problem or need	%
None of the above	37%
Insufficient insulation	29%
Power outages	21%
Structural damage	17%
Mold/water damage	15%
Central air conditioning	13%
Faulty electrical	11%
Central heating system	10%
Insufficient hot water	9%
Cooking appliances	6%

Below are the characteristics of respondents who over-indexed for various home issues, compared to the total sample population percentages, above:

- Younger respondents, age 29-44, were more likely to indicate their homes had structural damage (29%), while those age 61-76 were more likely to say they had none of these issues in their homes (55%).
- Non-Hispanic Black (21%) and Indigenous (33%) respondents were more likely to report having no/broken central heating system, while Indigenous respondents were also more likely to report insufficient insulation (50%), and power outages (50%). Hispanic respondents were more likely to report old or inoperable cooking appliances (14%).
- Rural respondents were more likely to report power outages (29%) and no/broken central air conditioning (33%).
- Respondents in the Northeast were more likely to report power outages (32%) and no/broken central air conditioning (20%), while those in the Western region were more likely to report insufficient insulation (47%).
- Those living in single family attached homes were more likely to report structural damage (28%), while those living in manufactured homes were more likely to report mold/water damage (39%) and no/broken central heating systems (31%).
- Finally, respondents living in homes built before 1920 were more likely to report insufficient insulation (64%) and no/broken central AC (27%).

Electrification programs - particularly those targeting income-constrained customers and disadvantaged communities, should allocate a portion of their funding (or obtain additional grant money), if possible, to address these problems. Remediation repairs and weatherization upgrades will (often) be required as a necessary first step to participation.

Homeowners also have home improvement desires (that seemingly have little to do with the needs identified above). We asked respondents an open-ended question: If you had \$20,000 to spend on improving your home, what would you update, replace, or change? In Table 2, below, you can see that given funding, most homeowners would prioritize aesthetic improvements, with kitchen or bathroom renovations, and flooring, furniture and décor upgrades making up 54% of mentions. Only 6% mentioned energy-related improvements such as heating, air conditioning, electrical repairs, solar, etc. Describing energy-efficiency or electrification upgrades as a natural component of the renovation improvements homeowners already desire could be a smart messaging strategy.

Table 2. Verbatim Home Improvement Response Summary (n=350)

Home Improvement Category	Verbatim Mentions	%
Kitchen Renovation	136	25%
Bathroom Renovation	85	16%
Roof & Exterior	73	14%
Home Addition / Living Space	62	12%
Flooring Updates	56	10%
Windows & Doors	47	9%
Landscaping & Outdoor	29	5%
HVAC / Energy Systems	21	4%
Furniture & Decor	15	3%
Plumbing/Water	13	2%
Total	537	

Advanced Electric Equipment Familiarity/Ownership

Respondents were asked “How familiar are you with the following home features?” rating their familiarity on a five-point Likert scale with one (very unfamiliar) to five (very familiar/I own this equipment). The percentage claiming product ownership is shown in Table 3, below:

Table 3. Stated Equipment Ownership (n=350)

Equipment	Stated Ownership Percentage
Smart Thermostat	31%
Heat Pump Water Heater	25%

Equipment	Stated Ownership Percentage
Induction Range or Cooktop	21%
Backup Battery Storage System	14%
Air Source Heat Pump	14%
Photovoltaic solar panels for electricity generation	7%
Electric Vehicle	2%

Stated ownership is significantly higher than actual market penetration estimates for heat pump water heaters (HPWH), battery energy storage systems (BESS), and induction range/cooktops, suggesting an actual lack of familiarity with this equipment:

- According to sales trends reported by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI), only 2% of U.S. households (compared to the reported 25%) would be expected to own a HPWH (AHRI 2024).
- SEIA reports that roughly only .8% of U.S. homes have a battery energy storage system, based on an estimated 9 GWh of residential battery capacity and an average system size of 13.5 kWh (SEIA 2025). This indicates that “Backup Battery Storage System” was seemingly misinterpreted to refer to a broad range of device battery chargers, rather than an integrated home “Battery Energy Storage System” as intended and described more fully later in the study.
- Rewiring America estimates that only 4% of Americans own an induction cooktop or range, compared to the respondents’ 21% self-reported ownership (Rewiring America 2023). It’s likely that many respondents with smooth-surface electric cooktops or ranges assumed they owned induction equipment.
- Stated ownership of Electric Vehicles is a little low, at 2%, since U.S. EV market share is currently estimated to be 5% (Atlas Public Policy).
- Air source heat pump (ASHP) (EIA 2020), Solar PV (Hopper 2024), and Smart Thermostat (S&P Global Market Intelligence 2022) stated ownership percentages are very close to market estimates.

These findings indicate that familiarity with much of this equipment is actually low and it is important for utilities to provide educational content and clear product descriptions to avoid confusion and misunderstandings.

Advanced Electric Product Purchase Interest

Respondents who didn’t report ownership of a technology received a follow-up five-point Likert Scale question, asking their likelihood to purchase it, with one very unlikely and five very likely. These questions offered product details not provided in the previous familiarity/ownership prompts. The descriptions varied in format, with most including product benefits and three (ASHP, HPWH, and induction cooktop/range) specifically mentioning rebates, since state and utility rebates for these products are widely available. Table 4, below, details the question

prompts/descriptions, along with the top two (likely/very likely) and bottom-two (unlikely/very unlikely) purchase likelihood percentages for each:

Table 4. Advanced electric product purchase likelihood – top and bottom two percentages

Advanced Equipment	Survey Description	Unlikely/ Very unlikely %	Likely/ Very likely %
Induction Cooktop/ Range n=277	Induction cooktops and ranges use electromagnetic energy to heat up the cookware (not the cooking surface), quickly and efficiently. How likely are you to switch to an induction range or cooktop if offered an \$800 rebate?	27%	48%
Air Source Heat Pump (ASHP) n=314	An energy-efficient air source heat pump uses electricity to extract heat from the air and move it outside to cool your home and inside to heat your home - using a compressor and a heat exchanger to further warm or cool the air. Heat pumps have both indoor and outdoor components, and some (mini-split systems) can work without air ducts. How likely are you to switch to an air source heat pump, if offered a significant rebate?	24%	47%
Heat Pump Water Heater (HPWH) n=263	Heat Pump Water Heaters use electricity to transfer heat from the surrounding air to water in an enclosed tank - and are significantly more efficient than standard water heaters. How likely are you to switch or upgrade to an electric heat pump water heater, if offered a significant rebate?	26%	47%
Battery Energy Storage System (BESS) n=302	Stand-alone home battery backup systems can charge/store power from the electric grid during cheaper off-peak hours for use during peak electricity demand hours or during electric outages. Solar battery storage systems can charge/store power generated by a solar panel system to provide power when the sun isn't shining or during outages. How likely are you to get a home battery backup system?	26%	45%
Electric Vehicle (EV) n=344	How likely are you to purchase an electric vehicle?	39%	43%
Solar PV Panels n=324	How likely are you to purchase a Solar photovoltaic (PV) rooftop panel system for generating electricity for your home?	37%	38%

While the product descriptions weren't consistent in their structure, these results indicate a significant potential market open to purchasing advanced electric products – particularly when their benefits are clearly stated and/or rebates are offered. 45%+ of U.S. homeowners are interested or very interested in purchasing an ASHP, HPWH, induction cooking appliance, or

BESS. EV and solar purchase interest is more polarized, with almost equal percentages likely and unlikely to purchase.

Below are the characteristics of respondents over-indexing as likely/very likely to adopt each technology, compared to the total sample population:

- **ASHP** (Total sample 47% likely/very likely) vs. Younger respondents, 29-44 (78%), Men (56%), Hispanic (60%), Asian (67%), and Indigenous respondents (67%), owners of homes built since 1980 (57%), those living in the Northeast (53%) and West (59%), and those on a TOU rate plan (65%)
- **HPWH** (Total sample 47% likely/very likely) vs. Younger respondents, 29-44 (76%), Men (55%), Households earning \$75-\$199K (56%), non-Hispanic Black (68%) and Asian (64%) respondents, those living in the West (64%) and those on a TOU rate plan (67%)
- **Induction cooktop/range** (Total sample 48% likely/very likely) vs. Younger respondents, 29-44 (72%), Men (55%), Households earning \$100-\$199K (56%), non-Hispanic Black (64%), Hispanic (64%), and Indigenous respondents (80%), and manufactured homeowners (58%)
- **Solar PV Panels** (Total sample 38% likely/very likely) vs. Younger respondents, 29-44 (63%), households earning \$100K+ (49%), Hispanic (57%) and Indigenous respondents (83%), those living in the West (59%), those on TOU rate plans (47%), and those reporting both frequent long and/or short electric outages (69% and 60%, respectively).
- **BESS**: (Total sample 45% likely/very likely) vs. Men (54%), Younger respondents, 29-44 (63%), Non-Hispanic Black (61%), Hispanic (54%) and Indigenous respondents (67%), those living in the West (58%), and owners of single-family detached homes (63%), those on a TOU rate plan (64%) and those reporting frequent long (one day or more) outages due to weather events or electrical grid failure (75%)
- **EV**: (Total sample 43% likely/very likely) vs. Men (52%), Younger respondents, 29-44 (72%), Hispanic (58%) and Indigenous respondents (67%), respondents earning \$100K+ (59%), those living in the West (55%), and in newer homes - built since 2010, (63%), and respondents on a time of use rate plan (64%)

Advanced Electric Product Purchase Barriers

Respondents who rated product purchase propensity undecided to very unlikely were asked a follow-up question: “Why are you not likely to purchase (X)?”. Responses are shown in Table 5, below. The most common barrier was “I don’t need a new (X), mine is new enough and works well” (46-49% agreement). This indicates strong resistance to proactive retirement of working equipment and indicates the need for continued investment in market transformation and contractor education initiatives, along with midstream and/or downstream incentives that ensure that advanced equipment is promoted and readily available for purchase at an affordable price when existing equipment fails.

“I likely couldn’t afford it” was also a top response for all products tested. This answer option for HPWH, ASHP, and induction cooktop/range included the words “...even with a rebate” since those products are frequently incentivized by utilities. Those who expressed this barrier for ASHP saw a follow-up question: “What percentage of the cost would a rebate need to cover to encourage you to install an air source heat pump? (Enter a percentage amount)”. 62% of

these price-sensitive respondents said they would need 50-100% of costs covered, with the median response, overall, being 75% (significantly more than most utility rebates cover). This was also the most common barrier expressed for Solar PV and BESS. While actual costs weren't provided, this scenario mimics the real world. Utility customers are choosing which programs to engage with (or not), based on their cost perceptions. Utilities list incentive or rebate values, and generally shy away from detailing average equipment and installation costs in their program descriptions. In addition, most don't engage with suppliers and contractors to negotiate pricing to drive down total installed cost.

Another frequently expressed concern indicates an underlying skepticism or unwillingness to undertake multiple purchases/wholly switch fuels: "I use gas for (heating or water heating or cooking), so I would still need that service anyway." This indicates that whole-home electrification programs, offering an attractive package of incentives for multiple fuel-switch upgrades, will likely be more successful at converting the market than one-off, appliance/equipment-specific incentives.

Finally, there were also frequently selected product-specific barriers, listed below, that should be addressed when promoting these products/programs.

Table 5. Top barriers to purchase by equipment type

Barrier	ASHP n=167	HPWH n=140	Induction Cooking n=145	Solar PV n=200	BESS n=167	EV n=344
I don't need a new (X) my current one works well	46%	49%	48%			
I likely couldn't afford it (even with a rebate)	33%	26%	20%			
I likely couldn't afford it				44%	38%	32%
It might increase my energy costs	28%	27%	19%			
I use gas for (cooking, space or water heating) so I'd still have to pay for gas.	26%	29%				
I don't have the right kind of home/my home isn't appropriate for this product				28%	14%	
I'm uncertain about the payback period				40%		
I don't need one					25%	
I prefer cooking with gas			35%			
I'd have to buy new cookware			24%			
I don't have a solar panel system					48%	
I am concerned about limited availability of charging stations for longer trips						61%
I am concerned about the lack of public charging stations where I live						55%
I couldn't charge an electric vehicle at my home						34%

Home Electrification Motivational Messaging

Respondents were asked to rate five fuel switching messages, featuring different electrification drivers, using a one- (very ineffective) to five (very effective) Likert scale: *Please rate the following messages based on their effectiveness in encouraging you to switch from gas heating and appliances to electric.* The test messages, with their top two (effective/very effective) percentage rankings, are shown in Table 6, below:

Table 6. Home electrification motivational messages (n=350)

Motivation	Test Message	Top 2 Box %
Resilience	A solar battery back-up system makes it possible for all-electric homes to be self-sufficient and resilient during severe weather and grid-failure events.	80%
Comfort	Well-sealed homes with high efficiency heat pumps and electric appliances are comfortable homes.	75%
Safety	Modern electric heat pumps and appliances are generally safer for your home. While rare (with regular maintenance and repairs), gas appliances can leak - posing a risk of explosion if ignited by a spark or flame.	73%
Health	All-electric homes generally have better indoor air quality. Gas appliances can release harmful pollutants like nitrogen dioxide, carbon monoxide (CO), and volatile organic compounds (VOCs) - which can worsen asthma and create other health problems.	72%
Environment/ CO2 Reduction	Using electric appliances generally produces less carbon dioxide emissions than using natural gas or propane appliances, potentially reducing your carbon footprint.	72%

While none of the messages tested poorly, the “resilience” message tested best. Below are characteristics of respondents over-indexing for each electrification message, compared to the total sample population. (See sample pop. effective/very effective scores above, for comparison):

- Younger respondents, age 29-44 (83%) and Hispanic respondents (88%) rated the Health message more effective
- Younger respondents, age 29-44 (85%) rated the Safety message more effective
- Younger respondents, age 29-44 (85%) and Non-Hispanic Black (89%) and Indigenous (100%) respondents rated the “Comfort” message more effective
- Non-Hispanic Black (94%) and Indigenous (100%) respondents rated the “Resilience” message more effective

Load Management Propensity

As noted in the introduction, increasing grid demand requires most utilities to attempt to engage their customers in some form of load management, via direct load control of smart thermostats, or smart (internet-connected) water heaters; managed EV charging through connected electric vehicle supply equipment (EVSE) or direct telematics control; or by drawing stored energy from customers’ battery energy storage systems or electric vehicles. Respondents were asked the following question: *Assuming you have the smart (connected) features below, how likely would you be to allow your utility to access and control these items (either by*

adjusting their settings to reduce power demand or by using their stored energy to help reduce stress on the utility grid during periods of high electricity demand, if you were paid an incentive and could (very occasionally) opt-out or override their control if necessary?

As seen, in Table 7 below, we found that assuming ownership of equipment, and given a scenario that includes an incentive and occasional opt-out option, more than half of homeowners surveyed said they'd be willing to allow their electric utility to directly control their smart thermostat or water heater, or utilize stored energy in their battery energy storage system, while over 40% were willing to engage in managed charging or utilize their EV's stored energy.

Table 7. Load Management Participation Likelihood (n=350)

Equipment	Bottom 2 Unlikely %	Top 2 Likely %
Smart Thermostat	27%	58%
Smart Water Heater	28%	54%
BESS	29%	52%
Electric Vehicle	42%	42%
Smart EV Charger	39%	42%

The good news for utilities is that there is a significant difference in participation propensity among respondents who indicated that they currently own (or think they own) advanced electric equipment, compared to homeowners, overall. As seen in Table 8, below, participation propensity is generally 20 percentage points higher for (stated) equipment owners. This indicates a willingness both for “aspirational” owners who may have been mistaken about the equipment in their homes, as well as increased interest potentially due to “lived experience” and familiarity with advanced product functionality and performance. This also highlights an opportunity to educate about load management capabilities and benefits when promoting energy efficiency incentive programs. At a minimum, direct marketing to recently incentivized equipment owners should be an effective strategy to increase load management enrollment. Lead referrals should be shared between EE and DR/load management programs. Additionally, utility program managers should not be reluctant to require DR/load management enrollment to receive energy efficiency incentives. Utilities experiencing grid constraints should consider making qualifying product rebates contingent upon participation in load management.

Table 8. Likely/Very Likely Load Management Participation By Device

	Smart Thermostat	Smart HPWH	BESS	EV Smart Charger*	EV Telematics*
All Homeowners	58%	54%	52%	42%	42%
Current (Stated) Equipment Owners	79%	75%	77%	67%	50%

* While sample size is small (6) it's interesting to note that EV owners seem more comfortable with managed charging via EVSE versus control via vehicle telematics. This likely reflects a concern that vehicle charging might be curtailed while away from home.

Load Management Messaging

Four Messages, detailed in Table 9 below, encouraging participation in load management programs were tested as follows: *Rate the following messages on their effectiveness at encouraging you to participate in a utility “demand response” or “load management” program to shift your electricity consumption (for example by setting back your smart thermostat by several degrees, delaying the charging of your electric vehicle, or dispatching energy from your battery backup system).* The messages promising immediate personal gain (free/discounted devices or bill credits) outscored future savings or grid resiliency.

Table 9. Load management top two (effective/very effective) message percentages (n=350)

Motivation	Test Message	Top 2 Box %
Free/discounted devices	Customers can receive free or discounted battery storage or smart devices for their homes if they participate in their utility demand response programs to help manage grid load.	77.2%
Bill credits	Customers can receive bill credits when they allow their utilities to adjust smart device settings in their homes or use their stored battery power during times of peak electric demand.	76.9%
Avoid bill increases	The electrical grid is in need of upgrades to meet increasing electricity demand. If customers allowed their utility access to their smart devices or battery storage systems during times of peak demand, load could be better managed without expensive improvements that would increase bills.	70.0%
Grid resiliency	Customers can help make the electric grid more resilient by participating in their utilities' demand response or load control programs.	70.0%

The list, below, identifies characteristics of respondents who over-indexed in their effectiveness ratings for specific load management messages, compared to the total sample population. (See sample pop. effective/very effective scores above, for comparison):

- Hispanic (80%) and Non-Hispanic Black (77%) respondents, those living in homes built in 2010 or later (80%) and those on TOU rate plans (83%) found the “Avoid bill increases” message more effective.
- Those living in single-family detached homes (88%) found the “Free/Discounted devices” message more effective.
- Non-Hispanic Black (86%) and Indigenous respondents (83%) found the “Grid resiliency” message more effective.

- Non-Hispanic Black (86%) respondents and those on a TOU rate plan (93%) found the “Bill credits” more effective.

“Best and Worst” Electrification and Load Management Offers

This study utilized a Max Diff methodology to test 10 different advanced electric home features, and electrification and load management offers. Respondents were shown a random series of ten two-item comparisons and asked, “*For the options below, which is the most appealing and which is the least appealing?*” Results, in Figure 2, below, show that homeowners have the strongest affinity for solar panels and battery storage features and less enthusiasm for home assessments and managed charging - highlighting consumer desires for independence and resilience in their energy generation and usage vs. offers requiring utility-evaluation or constraints.

While “Incentives for new appliances” received the third-highest “most appealing” percentage scores, there were, as noted earlier in the study, apparent concerns about affordability (even with incentives) that resulted in a higher percentage of “least appealing” scores that pulled this offer’s absolute difference (most appealing percentage minus least appealing percentage) below a “packaged” electrification offer to switch multiple appliances/equipment from gas to electric, with electric system upgrades, as necessary. This is a program design that shows great potential, particularly for increasing equity, by enrolling more low-income and disadvantaged community households.

The only load control offer that achieved a positive absolute difference score was battery storage load control, which echoes the strong participation likelihood scores received for this type of program. This signals strong potential for BESS as a VPP component for grid optimization, as consumer adoption of this technology increases.

Offers: Best to Worst

Offer	n=350	Most Appealing	Least Appealing	Absolute Difference
A solar battery storage system to keep critical lighting, cooling, heating, or refrigeration going during electric outages		37.8%	17.5%	20.3%
A solar PV panel system to generate a significant percentage of my home electricity needs		30.3%	21.3%	9.0%
A package of incentives to upgrade my electrical system (if needed) and replace gas heating and appliances with electric equipment		27.9%	20.8%	7.2%
Incentives for new electric appliances		28.5%	23.8%	4.6%
An enrollment credit and annual incentive for allowing my utility to use stored power from my home battery storage system during occasional peak demand times		23.3%	19.9%	3.5%
An enrollment credit (or free smart thermostat) and annual incentive for allowing my utility to change my smart thermostat setting a few degrees during occasional peak demand times		23.6%	24.6%	-1.0%
A time of use rate plan that rewards shifting electricity usage to late evenings and weekends, with a lower cost per kWh, and a higher cost during weekday hours		24.4%	25.7%	-1.3%
An incentive for a new air source heat pump		16.3%	27.7%	-11.4%
A free home electrification assessment provided by my utility		19.8%	34.8%	-15.0%
An enrollment credit and annual incentive for allowing my utility to optimize my electric vehicle charging (avoiding peak demand periods) through my home charger or vehicle telematics control		18.0%	33.9%	-15.9%

Figure 2. Max diff product/offer scores. *Source:* Franklin Energy, 2026.

CONCLUSION

This study offers an optimistic outlook on the future of electrification and load management, finding that a significant percentage (40%+) of U.S. homeowners are open to switching from fossil fuels to adopt advanced electric products. Thankfully, this group is also generally willing to participate in load control, managed charging, and virtual power plant programs that access energy stored on their side of the meter if the following insights are leveraged:

1. Homeowners prioritize aesthetic renovations over addressing serious home performance and energy efficiency issues, while also demonstrating strong reluctance to replace functioning equipment. "I don't need a new one" is the most common barrier. To accelerate electrification, marketers should integrate electrification measures into high-interest renovation projects (e.g., positioning induction cooking as part of kitchen remodels) and tie upgrades to homeowners' perceived problems (e.g., promoting heat pump water heaters as a solution to insufficient hot water during bathroom renovations). Messaging should also emphasize psychological benefits such as comfort, health, and safety to motivate the early replacement of otherwise functional equipment.
2. A “whole home” approach, offering a package of equipment incentives (including necessary electrical/panel upgrades) will likely encourage fuel switching better than one-off equipment incentives.
3. Too many people think they already have induction cooking, HPWH, and “backup battery storage”. Energy efficiency, electrification and decarbonization programs should explain equipment terminology, features and benefits in engaging ways, utilizing “Electrification 101” videos, product “shorts”, and fact sheets.
4. A significant portion of aspirational equipment purchasers and program participants are income constrained. Programs should add a higher incentive tier for low-income households – meeting at least 50% of costs. Consider an “IRA-style” comprehensive retrofit program with a generous maximum incentive cap and a total energy reduction minimum (e.g., 20%+) to meet cost effectiveness goals.
5. This study finds that Hispanic, non-Hispanic Black, and Indigenous homeowners frequently over-index on purchase interest for advanced electric equipment and likelihood for participation in load management programs. There’s great opportunity to expand program participation to include more people of color through intentional and targeted marketing initiatives, including local community outreach and engagement.
6. The promotion of solar energy programs can be tricky in some markets, due to the current political climate. “Self-sufficient and resilient”, however, is a beautiful theme! Even those who aren’t necessarily great targets for purchasing solar PV and BESS love this idea. Solar with battery storage opens the “other half” of the solar market & facilitates electrification. This was the most popular offer tested in this study. Solar PV (alone) had significantly more “least favorite” scores.

7. Leverage TOU participation for load management. This was one of the strongest “predictors” of current and likely direct load control program participation. Utility customers on time of use rate plans are looking for ways to better manage their on-peak usage and reduce their electricity bills.
8. While there’s a surprisingly large market open to load management, enthusiasm varies by device: Smart thermostat is widely accepted, for example, while EV telematics control is not. Be generous with smart thermostats. Programs should make them a direct install and/or load management enrollment “freebie” whenever possible, as they unlock load management for larger populations.
9. A surprising percentage of homeowners are open to sharing stored BESS power. There is great potential for virtual power plants using behind the meter battery energy storage.
10. The advanced electric equipment market is also the load management market. Utilities should be integrating EE and DR programs. This study indicates that most homeowners will accept load management as a string attached to equipment incentives. Discounted/free equipment/devices and bill credits will motivate the market to participate in load management (as long as utilities allow occasional opt-outs).

This study presents evidence that decarbonization and electric load growth can occur (in tandem) with greater grid flexibility with strong product education, appropriately designed incentives, bundled product offerings and integrated EE/DR programs. When paired with targeted engagement and strategic messaging, homeowners can be motivated to participate—pursuing self-sufficiency, resilience, health, safety, and cost savings—while contributing to grid reliability and emissions reductions.

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