



February 2020

Home Batteries:

The Homeowner Perspective





INTRODUCTION



Are home batteries poised to be the next big phenomenon in the residential energy market? That's a question on our minds at KSV.

Forecasts indicate the residential storage industry is primed for massive growth in the next few years through a confluence of factors—drops in manufacturing costs, available tax credits and utility incentives, and grid disruptions due to natural events such as hurricanes and the California wildfires.

Residential storage installations grew 350% in terms of MWh from 2017 to 2018, with almost 15,000 installations. The first three quarters of 2019 saw quarter-over-quarter residential installation increases.*

Though the residential storage market is maturing, installations of home batteries represent a niche segment of homeowners.

So how does the average homeowner feel about home batteries today?

Our recent survey with 500 homeowners in the Northeast reveals that most are in the dark when it comes to home batteries:

- Three-quarters of Northeast homeowners say they've *never heard of home batteries or home energy storage devices*
- Over half of those that are aware of home batteries say they're either *slightly familiar or not at all familiar* with the benefits of a home battery

However, when home batteries and their benefits are described, homeowners do express interest—4 in 10 would be very interested or extremely interested in a home battery, with homeowners 25-44 and those with solar leading the way.

In addition to highlighting a clear need for greater education on home battery technology, its uses, and its benefits, our research also reveals opportunities to generate homeowner interest in batteries through leasing models, time-of-use rate plans, and bill credit programs.

Our Research Methodology

We conducted an online survey served to mobile devices with 500 homeowners ages 25+ in the US Northeast. The survey was in the field in Spring 2019.

*Wood Mackenzie Power & Renewables/ESA U.S. energy storage monitor

⚡ WHAT WE LEARNED



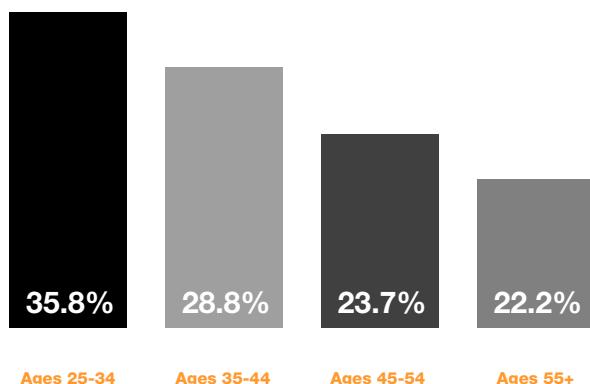
To get to mainstream appeal, home batteries need a boost in awareness and a clearer articulation of the value proposition.

Just 1 in 4 Northeast homeowners surveyed (26%) say they have heard of a home battery, and awareness declines as age increases. Perhaps more surprising and somewhat startling, of those that are aware of home batteries, 54% say they are only slightly familiar or not at all familiar with the benefits. Knowledge of batteries is only surface deep for many.

There may be several factors at play here. For starters, the technology is new to most, it comes at a premium price point, and thus may be perceived as unattainable, so homeowners may be tuning out when batteries are mentioned in communications.

On the other hand, this may also be a signal that battery manufacturers, utilities, solar companies, government agencies, and other organizations promoting home battery installations are falling short in conveying the value of a home battery to the average homeowner.

Awareness of Home Batteries By Age
% of respondents that have heard of home batteries



- Of northeast homeowners:** 26% have heard of home batteries
- Of those aware of home batteries:** 54% are only slightly or not at all familiar with the benefits

TAKE ACTION

As with any new energy technology, it can be easy for consumers to get lost in specs and jargon. Remember, the average homeowner doesn't think in MWh or kWh. They're thinking in terms of dollar savings or hours without power. They're thinking visually. Consider how you can distill the value proposition of home batteries into a 280-character tweet, brief infographic, or 15-second customer video posted on Instagram.

High-level home battery benefits resonate with most homeowners.

When exposed to a few of the primary benefits of having a home battery, homeowners overwhelmingly rate all of them as appealing. Of the following benefits below, 7 in 10 of all homeowners surveyed rated them as either very or extremely appealing:

Appeal of Home Battery Benefits	
<i>Q. How appealing are the following benefits typically associated with home batteries?</i>	
<i>[% that say “very appealing” or “extremely appealing”]</i>	
Having backup power in an outage	71%
Storing energy that can be used when electricity from the grid is expensive	70%
Helping cut carbon emissions by reducing the amount of grid power needed during energy peaks	68%
The potential to go off the grid when combined with solar	68%

Batteries in the Spotlight:

An October 2019 storm knocked out power for 115,000 Green Mountain Power customers across Vermont, but for 1,100 customers participating in the utility’s battery pilot, backup power was instantly available. The average duration the batteries provided backup power was nine hours, with the longest instance lasting 82 hours.

Source: Batteries vs. Blackouts: 1,100 Homes Powered Through Vermont Outage With Storage (<https://www.greentechmedia.com/articles/read/green-mountain-power-kept-1100-homes-lit-up-during-storm-outage>)

Looking at the responses of Northeast homeowners as a whole, we don't see any benefit rising to the top as the key benefit. As homeowners get to know batteries a little more, and as more details and data come about through batteries in action, we imagine homeowners will start to gravitate toward one key benefit as the reason they would consider a battery.

Demographic breakouts of the survey responses reveal several differences among segments. Women are more likely than men to find appeal in home battery benefits tied to peak energy applications. We see this as tapping into a desire for everyday household savings as well as a concern for the environment. Similarly, younger homeowners are more likely to say carbon reductions during peak energy events are appealing.

Interestingly, we also see 35- 44-year-olds more likely to say the potential to go off-grid with solar is appealing. It could be this group is thinking about self-sufficiency, but it's also likely they're just looking to maximize the potential of a solar-powered home.

⚡ WHAT WE LEARNED



Home Battery Benefits

Highlights by demographic it comes to home batteries:

Women find peak hour benefits more appealing than men.

Storing energy that can be used when electricity from the grid is expensive. [% very/extremely appealing]

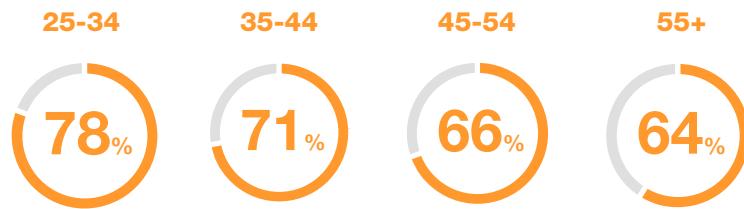


Helping cut carbon emissions by reducing the amount of grid power needed during energy peaks [% very/extremely appealing]



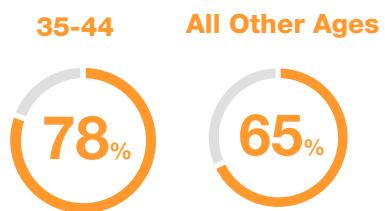
Cutting carbon emissions during energy peaks appeals most to younger homeowners

Helping cut carbon emissions by reducing the amount of grid power needed during energy peaks [% very/extremely appealing]



35-44 year-olds are most intrigued by going off-grid.

The potential to go off-grid when combined with solar energy [% very/extremely appealing]



TAKE ACTION

In consideration of this enthusiasm for home battery benefits, utilities, manufacturers, government organizations, or anyone else promoting home batteries need to set proper expectations, especially when it comes to potential bills savings, return on investment, and off-grid applications.

The Sacramento Municipal Utility District (SMUD) is a great example of being transparent. They note that while those with batteries can expect to save \$200-\$350 annually using stored energy when rates are highest, given the current price of batteries this would only cover about 50% of its cost. Similarly, they note that while it may be possible to go off-grid, it is not realistic for most homeowners.

For information they could trust, homeowners would lean on their utility.

When it comes to bridging the gap between awareness of home batteries and familiarity with their benefits, homeowners may first look to their electric provider. Half of respondents said they would trust their utility or electric provider to provide information about batteries, leading all other sources of information.

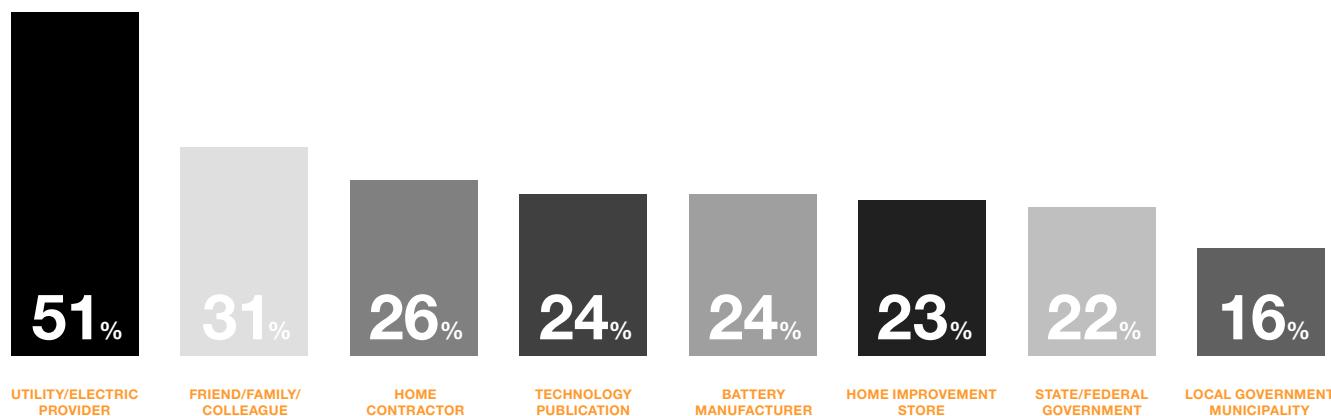
This continues a trend we have seen in our recent research where consumers consider the utility to be an authority on new or unfamiliar energy technologies, including electric vehicles, community solar, heat pumps, and smart thermostats.

Beyond utilities, homeowners trust their own peer network, unsurprisingly, with 3 in 10 citing their friends, family, and colleagues as trusted sources. Next on the list are home contractors, whom 26% of homeowners would trust.

Government sources, whether at the federal, state, or local level, are currently not seen as a go-to for battery information. Previous research we've done indicates that people place trust in these sources when it comes to energy efficiency and clean energy, so government organizations may find success in promoting batteries by positioning their benefits in this same vein, in addition to exploring partnerships with utilities.

Trusted Resources

Q. Who would you trust to provide you with information about home batteries?



TAKE ACTION

Customer trust may be increased through strategic partnerships. Utilities may find it beneficial to partner with trade allies and develop a list of qualified installers that could boost homeowner confidence in a battery installation.

Younger homeowners and solar owners lead the way in battery interest.

38% of surveyed homeowners indicate they are either very interested or extremely interested in either purchasing or leasing a home battery (65% of all respondents are at least moderately interested).

There is a clear age gap in interest shown for home batteries. Those aged 25-34 years old (51% either very or extremely interested) and 35-44 years old (53%) are much more interested than those aged 45-54 (34%) or 55+ (28%). A combination of the openness to embrace new technologies, along with a penchant for solutions that offer positive environmental outcomes, could offer an explanation for this gap.

Of the 61 homeowners we surveyed that said they have solar panels installed at home, 40 of them (66%) said they would be very or extremely interested in a home battery. Additionally, 54% of all homeowners said they would be interested in a bundled solar-plus-storage system. Given the natural fit between solar and home batteries, this data indicates “low-hanging fruit” to help spur home battery adoption. Wood Mackenzie analysts predict 1 in 5 of every residential solar installation will include battery storage.*



*Source: WoodMac predicts 20% of residential solar installed in 2020 to be paired with storage
(<https://www.solarpowerworldonline.com/2019/12/woodmac-predicts-20-of-residential-solar-installed-in-2020-to-be-paired-with-storage/>)

TAKE ACTION

Batteries need to be more than a complement to solar to avoid status as a niche product for the few. As previously noted, homeowners in our survey were just as enthusiastic about batteries benefiting them as backup sources of power and as peak energy savers. Find out what's motivating customers in your area—safety during outages, the environment, money savings—and tailor communications to their needs.

Homeowners indicate a preference toward battery leasing opportunities – but are they okay with giving up control?

When given a choice between purchasing a home battery outright, leasing through a utility or other third-party provider, or not getting a battery at all, a majority of homeowners (55%) would prefer a lease. 38% said they would prefer a lease with monthly payment terms, while 17% would prefer to have a utility-owned battery installed for a one-time up-front payment.

Purchase vs. Lease

Q. Which method of getting a home battery would you prefer?

Lease a home battery system for a monthly fee (battery is owned by utility or third-party)	38%
Purchase your own home battery system (est. cost \$6,000 - \$12,000 before rebates or tax credits)	22%
Lease with a one-time payment up front (battery is owned by utility or third-party)	17%
I don't want a home battery	23%

22% said they would be willing to shell out an estimated \$6,000-\$12,000 to purchase a battery. For most others, a lease would help homeowners dip their toes in the residential energy storage market, a low-risk way to assess whether a battery provides enough value and positively changes the way they consume energy at home.

A few utility pilot programs offered leases for home batteries. Green Mountain Power's program gave Vermonters the option of paying \$15 per month over the course of 10 years or a one-time payment of \$1,500 to have a Tesla Powerwall 2.0 installed. Liberty Utilities in New Hampshire also offered the Powerwall to homeowners in a pilot program that installs two batteries in a home for \$50 per month for 10 years or \$4,866 up front. The pilots are now full or completed.

How much would homeowners be willing to pay for a monthly lease term? 57% of all homeowners would pay at least \$15 per month. Of those surveyed that would prefer a lease (n = 189), 56% would be willing to pay at least \$20 per month.



WHAT WE LEARNED

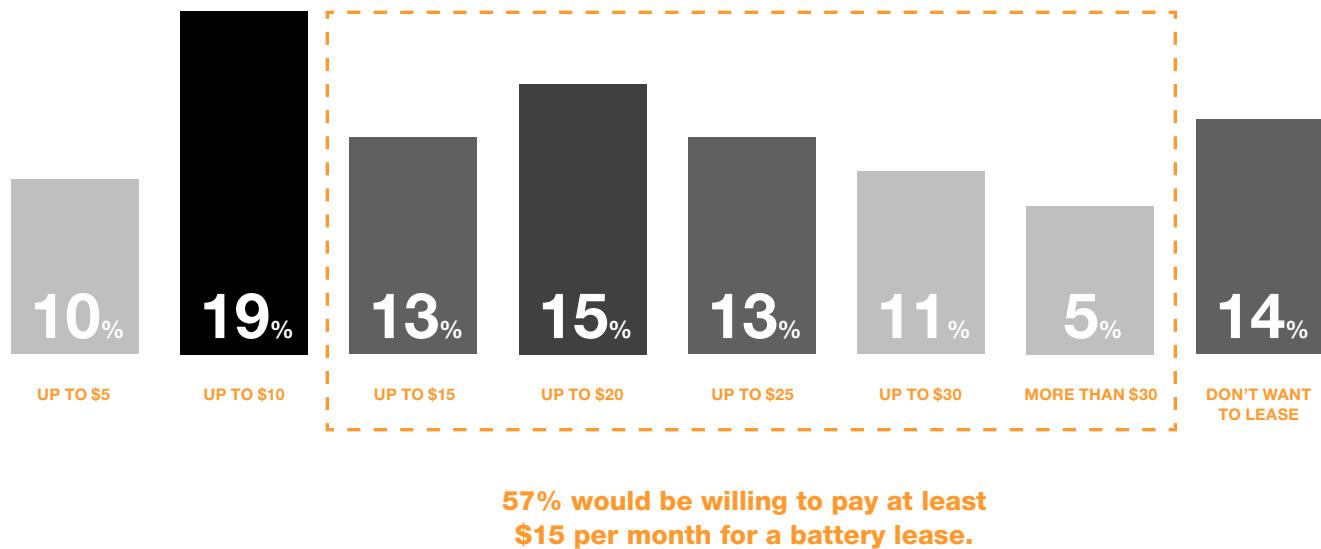


While a majority of respondents indicate preference toward leasing a battery over purchasing one, we wonder whether that preference changes when the question of control over the battery comes into play. The lease program pilots mentioned above were designed to give utilities access to energy stored in the batteries while always leaving some available to homeowners to provide a few hours of power during an outage – in the case of Liberty Utilities’ pilot, 20% charge or about 8-12 hours.

Homeowners that prioritize environmental sustainability and reducing greenhouse gas emissions over the desire to have ultimate control over a battery are a good fit for these types of lease programs. But for the homeowners that prefer to have that control and the ability to use a battery to its fullest extent during an outage, a lease program isn’t an ideal scenario. Those homeowners would be better off with a battery purchase, and financing could help lessen the burden of the premium price point.

Preferred Lease Terms

Q. What would be the most you would be willing to pay per month to lease a home battery from your utility or other service provider?



TAKE ACTION

Homeowners may be leery of leasing programs if they have never done it before, whether through a utility water heater lease, for example, or even a vehicle lease. It is imperative to clearly spell out all terms and conditions, especially monthly payments and additional fees that may apply, including early termination fees. Be clear about what happens when the lease ends and how maintenance will be handled during and after the lease expires.

Time-of-use rates and battery leasing programs could be a perfect match for utilities and their customers.

For utilities looking for a hook that could motivate customers to switch to time-of-use rate plans, home battery leasing programs offer an attractive opportunity.

Nearly two-thirds of Northeast homeowners (64%) indicate they are at least moderately interested in time-of-use rate plans. Four in 10 would actually be very or extremely interested.

Interest in Time-of-Use Rate Plans

Q. If your electric utility had an option giving you lower rates during hours when people use less electricity in exchange for higher rates during times of high demand, how interested would you be? [% indicating at least “moderately interested”]

25-34 years old	75%
35-44 years old	73%
45-54 years old	60%
55+ years old	58%

Despite this interest, two-thirds of homeowners indicate they would find it at least moderately difficult to use less electricity during times of high demand (weekdays between 4pm and 9pm), even with the prospect of bill savings hanging in the balance. A home battery would minimize that pain. As previously mentioned, 7 in 10 say being able to use stored energy when grid power is more expensive is a very or extremely appealing benefit of a home battery.

Having time-of-use rates would also increase homeowner interest in leasing a battery—half of surveyed homeowners said they would be more likely to consider a battery lease if their utility offered time-of-use rate plans.

Some utilities are already combining time-of-use rates and home batteries. In its residential storage pilot, Liberty Utilities required program participants to enroll in a time-of-use rate plan if they want to be able to lease home batteries.

TAKE ACTION

Regardless of whether time-of-use rates are voluntary or mandatory, utilities can provide value to customers by helping them contextualize the impact of variable rates with tools like interactive calculators that can predict their bill with or without behavioral changes and with or without home battery support.

For homeowners that would prefer a battery purchase, they look to improve their ROI by sharing energy in exchange for credits.

Though a majority of homeowners overall would prefer to lease a battery, a significant portion of homeowners that are most interested in batteries would go for a purchase. Of those either very interested or extremely interested in a home battery, one-third said they would prefer a purchase.

Cost is the biggest barrier to purchase, for obvious reasons. The average home battery system plus installation costs ranges from \$6,000-\$12,000. Lack of familiarity is also a significant barrier, which can be overcome through education and communication.

Barriers

Q. What barriers or obstacles prevent you from getting a home battery?

Costs	63%
Don't know enough about them	51%
Don't know anyone else that has one	33%
Would require a lot of research	29%
Seems too complicated	18%
Don't have space to install it	13%
The benefits don't sound appealing enough	12%

It's no surprise that factors that lower the price tag would increase homeowners' interest in a battery purchase. Of those that would prefer to purchase a home battery, 7 in 10 homeowners said their likelihood of purchasing a home battery would increase with tax credits and rebates and incentives, while 5 in 10 also said their likelihood to purchase would increase with discounts on installation or if 0% financing were available.

WHAT WE LEARNED



Beyond lowering the price tag of a home battery, homeowners are interested in finding other ways to make it worth their investment. Nearly half of those interested in purchasing a home battery (47%) said their likelihood of purchasing would increase if their utility offered a program where they could send stored energy to the grid during times of high electricity demand in exchange for bill credits. Four in 10 of all respondents said their interest in purchasing a battery would increase if their utility offered such a program.

A few utilities already incentivize customers to help reduce peak demand on the grid with programs that exchange bill credits for access to the energy stored in residential batteries. The Sacramento Municipal Utility District offers this to those that have solar-plus-storage. Green Mountain Power has a Bring Your Own Device Program for battery owners. Both of these programs cater to battery owners, while Liberty Utilities' Battery Storage Pilot Program allows those leasing batteries from them to earn bill credits for giving access to stored energy during peaks. In all instances, the utilities assure homeowners they will leave them with enough energy to power their home in case of an outage.

Increasing Purchase Likelihood

*Q. Which would increase your likelihood of purchasing a home battery?
[Homeowners that would prefer to purchase (n = 109)]*

Tax credits available	72%
Rebates available	71%
Discounts on installation	56%
0% financing available	51%
Send stored energy in exchange for bill credits	47%
Having solar panels installed	38%
If utility offered time-of-use rates	36%

Batteries in the Spotlight:

Batteries help utilities save, too. During a peak event in July 2019, Green Mountain Power saved almost \$900,000 in capacity fees in the course of one hour by accessing the stored power from its network of customer batteries.

Source: Batteries vs. Blackouts: 1,100 Homes Powered Through Vermont Outage With Storage (<https://www.greentechmedia.com/articles/read/green-mountain-power-kept-1100-homes-lit-up-during-storm-outage>)

TAKE ACTION

Sharing is caring, but sometimes situations arise where homeowners would want to keep their energy to themselves, like when family is visiting or when they anticipate charging an electric vehicle. Regardless of the reason, make it easy for customers to opt out when they'd rather you not access stored energy from their battery.



What This Means for Utilities and Battery Manufacturers

Awareness and education of home battery benefits are needed in order to generate interest.

The residential energy storage market is still very much in its infancy, as our survey reveals nearly three-quarters of Northeast homeowners haven't heard of home batteries. And of those that are aware of batteries, the majority still aren't sure how they could benefit with one.

Utilities, manufacturers, and government organizations looking to increase the adoption of home batteries need to launch a crash course in home battery benefits. At this point in time, education efforts should be more like Home Batteries 101 rather than an advanced placement course.

Battery lease programs and financing can help propel future growth.

The current rebates and tax credits available for home batteries most likely won't be enough to convince a significant portion of homeowners to fork over the cash for a home battery given current prices. Until manufacturing costs plummet, which won't be in the next few years at least, homeowners are more content to explore leasing a battery. A few utilities have launched pilot programs in the last few years, and perhaps more will soon. This is the type of low-stakes proposition for homeowners that could build the case for batteries until they become more affordable for the masses.

However, some homeowners that want a home battery as a dedicated backup power source or to reduce drawing from the grid during peak hours likely won't be willing to give up control of their battery to the utility, as some lease pilots require them to do. Utilities and battery installers may see more success with these customers with attractive financing terms and bill credit rewards for the times homeowners are willing to share the power.

Prepare customers for a new utility experience.

With our research revealing a high degree of consumer enthusiasm for home batteries and their benefits, as well as interest in time-of-use rate plans, the stage is set for homeowners to have a new relationship with energy and their utility. Though customer participation in time-of-use rate plans and peak energy saving programs can help utilities reach regulatory milestones, utilities need to have their customers' needs and motivations at the forefront of program design and communication. What's important to consumers is the continuity of service during an outage, reducing their personal carbon footprint, and, of course, saving money.

Because utilities will be helping customers leverage a new technology and an unfamiliar rate structure, attention must be paid to designing an easy, seamless, customer-centric experience. Think about text alerts as a way to inform customers when peak rates kick in or when a demand response event is triggered, and give them the opportunity to optout to give them more control in times when they don't want to give up access to their battery's stored energy.

KSV is a full-service, data driven marketing and advertising agency specializing in energy and sustainability.

For more than 40 years, KSV has worked with a host of energy and energy product companies building brand awareness and meeting client KPIs through creative marketing solutions. Founded in 1977, the firm has offices in New York City and Burlington, Vermont.

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