



Wired for Tomorrow:

How Whole Home Electrification
Is Redefining Residential Energy
Capabilities





Imagine a home that not only powers itself but also charges your car and puts money back in your pocket.



The electric home of the future is here, and it's more accessible than you might think.

As energy prices continue to fluctuate and increase and the strain on the power grid grows, millions of Americans will face new challenges when it comes to energy usage. Despite major grid-scale investments in our infrastructure, more modernization efforts are needed urgently and energy reliability has been left in question—creating growing volatility for energy prices over the past several years.

Access to reliable and affordable energy has never been more critical for homeowners. A home with an updated electrical infrastructure can seamlessly charge an electric vehicle (EV) and simultaneously power multiple electric appliances, making

cutting back on greenhouse gas emissions and saving on fuel and utility bills a reality.

These trends and developments in technology are shaping the future of home living. The home of tomorrow is self-sufficient, generating its own power through solar panels and battery storage. Whether for supplementing energy production or uploading unused energy in exchange for bill credits, a smart home will interact with the grid to achieve state-of-the-art home efficiency.

Whole-home electrification is turning this vision into a reality for a growing number of homeowners. With cost-saving incentives and cutting-edge innovations, there has never been a better time to explore this transformative trend.



Whole Home Electrification

Trends and Overview



70%

REDUCTION IN GREENHOUSE GASES

with full electrification of the U.S.
transportation, commercial and residential
sectors by 2050

The idea of electrification dates back to the late 19th century, when the electric railway was developed, and residential electric infrastructure was established, bringing power to millions of American households.

As technology evolved, electricity became the driving force behind a growing number of innovations, from home appliances to industrial machinery.

The turn of the 21st century marked the beginning of a new **electrification** era, characterized by the rise of personal electric transportation and whole-home or whole-building solutions. Unlike earlier efforts that focused on electrifying individual functions or appliances, today's modern approach aims to power an entire lifestyle with electricity, ideally sourced from renewable resources.

The Transformative Power of Electrification

For homeowners, home electrification solutions translate into freedom from fossil fuels, a more sustainable and cost-effective lifestyle, and even independence from the grid. Businesses, too, are embracing building and transportation electrification to manage energy costs and meet ESG goals in this era of technology, sustainability, and environmental accountability.

At the community level, **whole home electrification** represents resilience and protection during inclement weather and power outages, while reduced fossil fuel consumption leads to lower pollution levels and improved public health.

On the utility front, whole home electrification has been a transformative force contributing to the



estimated record-breaking **4,128 billion kWh** of electricity consumption projected for 2025. To meet this rising demand, utilities are investing in grid-scale projects to enhance renewable energy production capacity and are evolving into energy marketplaces, coordinating contributions from various smaller energy production sources, including commercial buildings and homes supplementing the grid with solar or stored energy.

Which Factors Are Driving Whole Home Electrification?

Whole home electrification is gaining momentum, driven by several key factors:

- There is a growing interest from consumers, businesses, and utilities motivated by the desire to create a more sustainable lifestyle and manage energy costs.
- With **\$11 billion** invested to develop a clean energy infrastructure in rural America and **\$15.5 billion** to support the transition to EVs, federal and state investments are supporting the adoption of new appliances and technologies with tax credits, rebates, and grants.
- Many electrification technologies are becoming more accessible and affordable. The residential solar market has matured, resulting in a **40% reduction in solar installation** costs compared to a decade ago. Bidirectional EV charging is enabling EV batteries to act as mobile, on-demand power sources for essential circuits
- Technologies are also better performing. Advancements in **battery storage** slow down energy depletion, residential solar panels now have an average efficiency rating of 24%, and AI is powering the next generation of digital grid components.

Qmerit's white paper, *Electrification2030*, takes a deeper look at electrification trends as well as the opportunities and challenges the U.S. faces along the way to building an electric future.





Whole Home Electrification Benefits and Use Cases

Despite the initial costs, investing in whole-home electrification offers significant benefits over time including cost savings, energy independence, and a more sustainable lifestyle.

Cost Savings

Fluctuating energy prices can affect multiple aspects of your household's budget, influencing what you spend at the pump, heating and cooling costs, and even the prices of everyday items such as groceries due to increased transportation costs.

With crude oil going from negative prices in 2020 to over **\$90 a barrel** only two years later, it's no surprise that Americans bought a record **1.2 million EVs** in 2023. On average, driving an EV can reduce transportation **costs by 60%**, and home **EV charging** solutions can be even more cost-effective than public charging options.

Solar panels offer another way to substantial energy savings. Over their lifetime, experts estimate that solar panels can save homeowners between **\$28,000 to \$120,000**. Plus, when combined with home energy storage, renewable energy generation can lead to additional savings by reducing dependence on the grid.

Rising energy bills are a real concern for people across the U.S., and for good reason. Although solar power is currently the **fastest-growing source of energy production** in the U.S., **43% of the electricity generated** is still from natural gas. With **demand for natural gas** currently outpacing available supply, electricity prices tend to increase.

Many utilities are responding to higher prices by offering time-of-use programs to discourage energy consumption during peak hours, making it necessary for consumers to be more mindful of their energy usage.



In this context, a whole home electrification system that can both produce and store energy is a sound investment for homeowners all over the country.

Independence From the Grid

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Additionally, many utilities have adopted demand-response programs or time-of-use pricing in an effort to curb energy consumption during peak demand. Rather than paying higher energy rates, digital power

management solutions can seamlessly switch the energy source to home battery power during these peak hours automatically—creating a solution that brings both cost-savings during peak demand and energy resilience during grid outages.

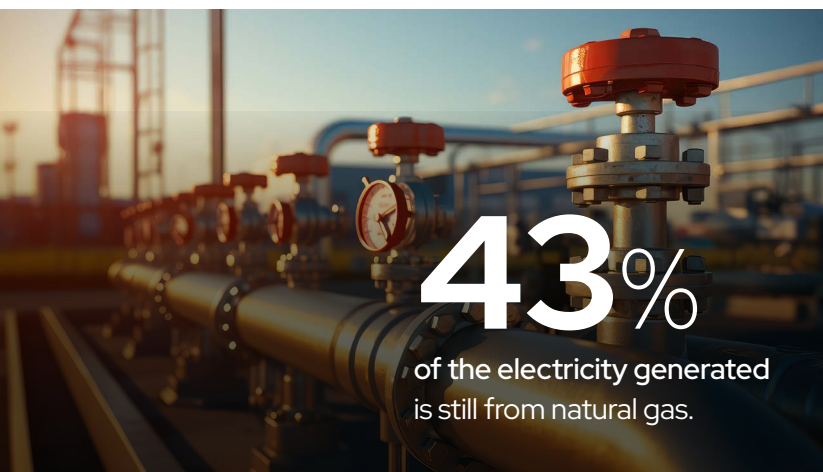
Whole home electrification benefits the grid by turning homeowners, businesses, and other entities into energy producers, whether through solar panels or stored energy in an EV or home battery. **With smart integration solutions**, these local energy sources can help reduce strain on the grid and provide power to critical services during widespread outages

As more homeowners embrace electrification solutions, building a modern grid that integrates and leverages these local resources would enhance energy stability at the community level, increase the accessibility of renewable power, and potentially result in lower rates.

Sustainable Lifestyle

You are able to make a positive impact on the environment simply by making the right choices for where your home energy is sourced. Driving an EV reduces your greenhouse gas emissions by **as much as 70%** compared to a gas-powered car, and upgrading your home with an electric pump can cut heating-related pollution by **45-72%**.

However, these electrification solutions require the right home electrical infrastructure. For example, a residential **Level 2 EV charger uses 16 to 80 amps**, which can quickly consume the capacity of a 100-amp panel.





While **charging an EV at home is much more affordable** than fueling at the pump or using public EV charging stations, it will increase your home energy bills. Additionally, energy from your utility provider isn't necessarily renewable. As of 2024, only **18% of the power generated** in the U.S. comes from renewable sources, with each kWh produced resulting in an average equivalent of **0.857 pounds of carbon dioxide** released into the atmosphere.

Whole home electrification takes a holistic approach to creating the necessary residential electrical infrastructure to support a sustainable lifestyle.

Smart panels, load management systems, and smart home automation solutions offer enhanced freedom and control over your energy consumption. Thanks to open systems, integrating products from various brands to create a fully customized whole-home electrification solution is now easier than ever. With whole-home electrification, the possibilities for optimizing your home sustainably are virtually endless.

Use Case Examples

There are many use-case examples of how electrification technologies can be combined both theoretically and in real-world examples already being put into use in homes and businesses across the world. These scenarios illustrate how modern whole-home electrification technologies can enhance your energy efficiency and can serve as inspiration for short- and long-term electrification plans for your home.

SOLAR-POWERED EV CHARGING

Solar panels typically produce **750 to 850 kWh** of energy annually. Considering that EVs get three to four miles of range per kWh on average, a solar energy system can power a significant portion, if not all, of the energy needed for these EV miles. Depending on the size and scale of your solar array, you can feasibly generate enough energy to power your home and vehicle needs.

During the day, solar panels can produce power while a home battery solution stores it. This stored energy can **power an EV charger**, and once the battery reaches a predetermined threshold, a smart energy management solution can automatically switch the EV charger back to the grid to complete the charging process.

SAVE WITH TIME-OF-USE RATES

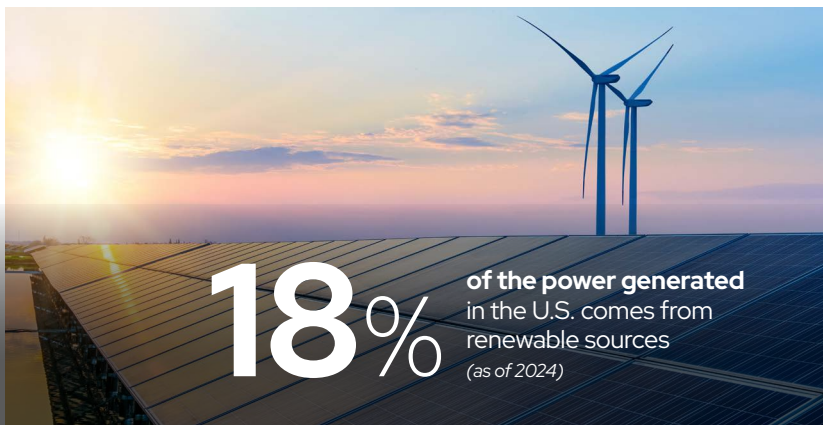
An increasing number of utilities are adopting time-of-use (TOU) rates to encourage consumers to shift their power usage to off-peak hours.

Managing TOU rates is straightforward with smart panels and digital power management solutions. These technologies allow you to program your energy usage, specifying which critical circuits should receive power during peak hours and which can be delayed until off-peak times.

You can conveniently plug in your EV when you arrive home, and the system will automatically delay charging until the TOU rate decreases, helping you save on energy costs effortlessly.

SMART PANEL OPTIMIZATION

Upgrading your home with a **smart panel** gives you access to advanced insights into your energy consumption. You can monitor your weekly energy consumption to see which applications draw the most electricity, determine how energy-efficient different appliances are, and spot energy leaks. This information can help you save on energy by either adjusting your consumption patterns or identifying applications that can benefit from an energy-efficient upgrade.





Addressing Obstacles to Whole Home Electrification

Whole home electrification is an investment, and getting the most out of it requires careful planning to maximize its benefits. Let's examine some common challenges and the strategies to address them.

OBSTACLE #1: Residential Electrical Infrastructure

Many American homes are equipped with a 100-amp panel, and in older homes, you might even encounter 60-amp panels. Depending on the scope of your electrification project, this existing infrastructure may not support the increased energy demands.

Upgrading your electrical infrastructure—including panels, switches, and wiring—might be necessary to ensure safety and accommodate new technologies. For instance, adding a second meter for EV charging could be a good option for you.

These necessary upgrades can add to the overall cost of your project, particularly in older homes, where more extensive work is often required. Homeowners in the Northeast, Midwest, and West, **areas that tend to have a larger percentage of older construction** homes, may need to invest more to bring their properties up to current standards.

A crucial step in your electrification journey is to have a qualified electrician perform a **load calculation**. This process involves evaluating how different applications will impact your home's energy consumption and determining whether your current panel can handle the load or if you need a panel upgrade.

Additionally, an expert can guide you in considering load management and power distribution solutions, which help prevent circuits from overloading and reduce strain on the grid.

Popular solutions include smart panels and smart load-shedding devices, each offering distinct advantages:

- **Smart Panels:** Although they require a higher initial investment, smart panels enhance your home's electrical capacity and provide real-time insights





into energy usage. This option is particularly beneficial if you live in an older home or need to charge an EV while powering other circuits simultaneously.

- **Smart Load-Shedding Devices:** These are a more affordable alternative, ideal if your existing panel can manage the additional load and if staggering energy usage is a practical solution.

There is no one-size-fits-all approach to whole home electrification. It is essential to have a qualified electrician review your energy usage and design a personalized solution based on your unique needs and current electrical infrastructure, in order to ensure your electrification project is both effective and efficient.

Remember, whole home electrification doesn't have to happen all at once.

OBSTACLE #2: Cost

While the upfront cost of whole home electrification can be significant, the long-term savings are substantial.

One of the key benefits is the ability to charge an EV at home, which can lead to considerable savings compared to fueling a gas-powered vehicle. At-home charging is both **more cost-effective** and convenient than using public charging stations.

Additionally, with electric heating and cooling, and by optimizing energy usage through power management solutions or smart panels, you can further reduce your energy expenses.

Another aspect to consider is the impact on your home's value. As demand for whole home electrification grows, homes equipped with these technologies or an upgraded electrical infrastructure can **sell faster and for higher prices** on the market.

There are various ways to offset the initial costs of whole home electrification. Financing options are often available, with some lenders offering advantageous terms to support sustainable projects. To reduce the cost even more, you can take advantage of

Once your electrical infrastructure is safely updated, you can gradually add more electrification solutions over time, spreading out your investment.

It's also important to consider that some electrification upgrades may need to extend beyond your home. In some cases, improvements to the utility grid may be required. It's a good idea to consult with your utility provider early in your planning process to understand the grid's capabilities in your area and to inquire about potential utility-supported upgrades.

numerous stackable **tax credits, rebates, and incentives** from federal, state, local, and utility programs.

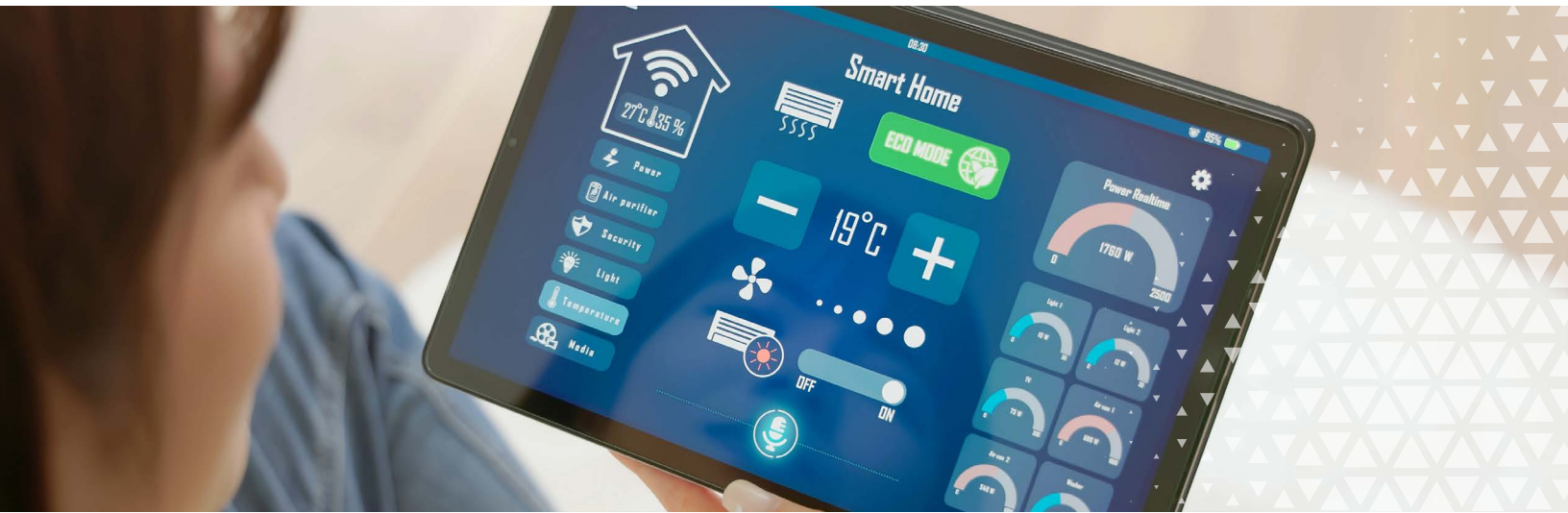
For example, a Los Angeles, CA resident who gets their electrical service through the Los Angeles Department of Water and Power (LADWP) could stack the following incentives:

- Federal tax credits of **up to 30%** for a solar installation, home battery, and EV chargers.
- Rebates ranging from **\$150 to \$1,000 per solar kWh** via the California Self-Generation Incentive Program.
- Solar financing through the PACE program.
- A property tax exclusion.
- A **rebate of up to \$1,000** on a Level 2 EV charger through LADWP, plus an additional \$250 rebate for a second meter.
- A 10-12% reduction on energy bills is possible when taking advantage of the **utility's TOU program** from June through September.



The Electric Home of the Future

Discover the cutting-edge technologies transforming homes, making them more efficient, sustainable, and independent.



Home Energy Production

Producing your own electricity not only reduces costs but also supports a more sustainable lifestyle, and increases your independence from the grid.

For most homeowners, [solar energy](#) is the most practical and accessible option for energy generation. With an average system costing [around \\$18,000](#), solar panels are an affordable investment. Typical systems include [15 to 20 panels](#), though some experts recommend [up to 30 panels](#) depending on your energy needs.

To ensure continuous power for your home even when your solar system is offline, consider investing in a generator as a backup for essential circuits.

ENERGY STORAGE

There are two options for the renewable energy you produce with your solar panels:

- Upload the excess energy to the grid and receive energy credits through a net-metering program or similar incentive.
- Store the energy in a home battery system to power whole home electrification solutions, such as EV charging or electric HVAC systems.

As more states reduce net-metering incentives, home battery systems are becoming increasingly popular. These systems provide greater control and independence from the grid.

Most home batteries have a capacity of [10 to 16 kWh](#), but these systems are easy to customize, and you can integrate additional batteries as your needs change.



If you're considering buying a new EV, you should know that recent lineups offer more models with **bidirectional charging**, allowing your EV to act as a backup power source for your home. A fully charged EV battery can power your home for **up to three days** or more on a full battery.

EV Charging, Electric HVAC Systems, and Other Applications

Combining solar panels with battery storage creates an ideal setup for sustainable at-home EV charging.

At-home charging is not only more convenient but also more cost-effective, saving at least **\$0.04 per kWh** and up to \$0.44 per kWh compared to public charging. For a driver covering approximately 50 miles per day, this can translate to savings of \$182.50 to \$2,676.67 annually when charging from the grid. With enough solar energy production, your "fuel" costs could be entirely eliminated.

Heat pumps are another technology that is growing in popularity. These appliances save on heating costs




by extracting existing heat from the outdoors rather than generating it. Homeowners who opt for heat pumps with A/C save an average of **\$300 to \$650 a year**, and these savings can increase if you can power your heat pump with solar energy.

Heat pumps are another growing technology that offers significant savings by extracting heat from the outdoors instead of generating it. Homeowners who opt for heat pumps with A/C can save an average of **\$300 to \$650 annually**, with even greater savings possible if the heat pump is powered by solar energy.

Other electric solutions to consider include electric dryers, electric cooking ranges, heat pump water heaters, and heat pump pool heaters, all of which contribute to a more energy-efficient home.

Automation

Digital power management devices offer innovative solutions for personalizing your whole-home electrification experience, from improved visibility to cost control and enhanced energy management.

 <p>Solar Panels</p> <p>SAVINGS: \$20-97k <i>over the life of solar panel system</i></p> <p>Solar energy is the most practical and accessible option for energy generation.</p>	 <p>Energy Storage</p> <p>PER DAY: 30kWh <i>average American household use</i></p> <p>Most home batteries have a capacity of 10 to 16 kWh, additional batteries can be added as your needs change.</p>	 <p>Heat Pumps</p> <p>SAVINGS: \$300-650 <i>per year</i></p> <p>Homeowners who opt for heat pumps with A/C save an average of \$300 to \$650 a year, and these savings can increase if you can power your heat pump with solar energy.</p>
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If your utility uses a demand charge billing model, a smart panel or load-shedding solution can help maintain your energy draw below a specified threshold, keeping your demand charges low. Additionally, a load-shedding system can maximize your home storage by automatically switching to stored power on a set schedule or when your electricity usage reaches a certain limit.

A digital load center can be programmed for time-based automation, such as powering your EV charger

when rates are low or turning off heating and cooling systems when you're not home. Smart thermostats also offer an easy and effective way to save on energy costs, with average savings of \$140 per year on heating bills.

The key to successful automation is having a professional assess your unique needs and by integrating the right solutions into your home's electrical infrastructure to optimize energy consumption.



Turn Your Home Into a **PowerHouse by Qmerit™**

From solar-powered EVs to smart energy management, whole home electrification isn't just a trend—it's a pathway to energy independence and long-term cost savings.

The electric home of tomorrow has never been more accessible and with PowerHouse by Qmerit™, we're offering a game-changing suite of services tailored to your individual needs.

PowerHouse by Qmerit™ gives you access to the seamless integration of cutting-edge electrification technologies into your living spaces without having to deal with the complex installations that were once required.

From solar panels to smart energy storage or EV charging, Qmerit's network of certified experts is uniquely qualified to develop a highly customized

whole home electrification solution. As the largest network of certified EV charger installers in North America, Qmerit is the electrification leader for energy transition solutions and services and is recommended by automakers, EV charger manufacturers, utilities, businesses, and homeowners alike.

We've built our business around the goal of Electrification Made Easy™ and our network of certified electricians has installed more EV chargers and other electrification technologies in the last decade than anyone else in the industry—more than 450,000 EV charging station installations, 37,000 battery storage installations, 81,000 solar panel system integrations, and 86,000 electric panel upgrades in homes and businesses across the U.S. and Canada!



How to Electrify Your Home with Qmerit

The process is simple. Get started by connecting with Qmerit, and we'll put you in touch with an electrification advisor who can review your goals and discuss your options. Next, you'll get a detailed installation estimate for your whole home electrification project, and your electrification advisor will help you explore available incentives.

Our certified installers will then start working on your project. With over 450,000 EV chargers installed

and more than 81,000 solar system integrations completed, you're in good hands! We also offer post-installation support to ensure peace of mind and keep your whole home electrification solutions in optimal shape.

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- ▶ **Turn your home into a PowerHouse by Qmerit™!**
Connect with an electrification advisor and get started today.

