

Switching to Electric:

Home Electrification for the Future **Part 2**

LG's "Home Electrification White Paper" offers a step-by-step approach to creating a more sustainable home. Explore the future of electric with LG's latest innovations.



Switching to Electric: Home Electrification for the Future Part 2

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Introduction

The journey towards total home electrification represents a transformative shift in how we power our living spaces, aligning closely with the broader goals of energy efficiency and environmental stewardship. In the first part of this white paper, we defined the concept of home electrification and took an in-depth look at how the electrification process might begin.

In part 2, we delve into the complex yet rewarding process of converting entire homes into fully electrified habitats. It outlines the practical steps homeowners can take, from initial assessments through to total home electrification through installation of electric home appliances, providing a roadmap for sustainable living. The narrative underscores the importance of strategic planning and professional guidance, ensuring that every phase of the transition is handled with precision and care.

Benefits of Home Electrification

Home electrification stands at the forefront of contemporary sustainable living, offering a spectrum of benefits that extend from environmental impact to technological advancement. This process involves replacing traditional energy sources and systems with electric alternatives, leading to significant environmental contributions through the reduction of carbon emissions. Electric appliances and systems, known for their superior energy efficiency, play a pivotal role in this transition, ensuring that homes not only contribute to a greener planet but also operate more efficiently. The efficiency of these modern electric solutions often translates into notable cost-effectiveness, with long-term financial savings accruing from lower energy consumption and reduced maintenance requirements.

In addition to financial and environmental advantages, home electrification enhances safety standards within residential settings by significantly lowering the risks associated with gas leaks and fires, contributing to a safer living environment. The shift towards electric appliances not only brings access to the latest technological advancements, including smart technology that provides homeowners with increased control, convenience, and adaptability in their daily energy usage, but also aligns with global sustainability goals. This move towards home electrification thus improves the quality of living and paves the way for a safer, more efficient, and technologically advanced future.

Benefits of Home Electrification



Improve Quality of Living



Enhance Safety Standards



Long-term Financial Savings

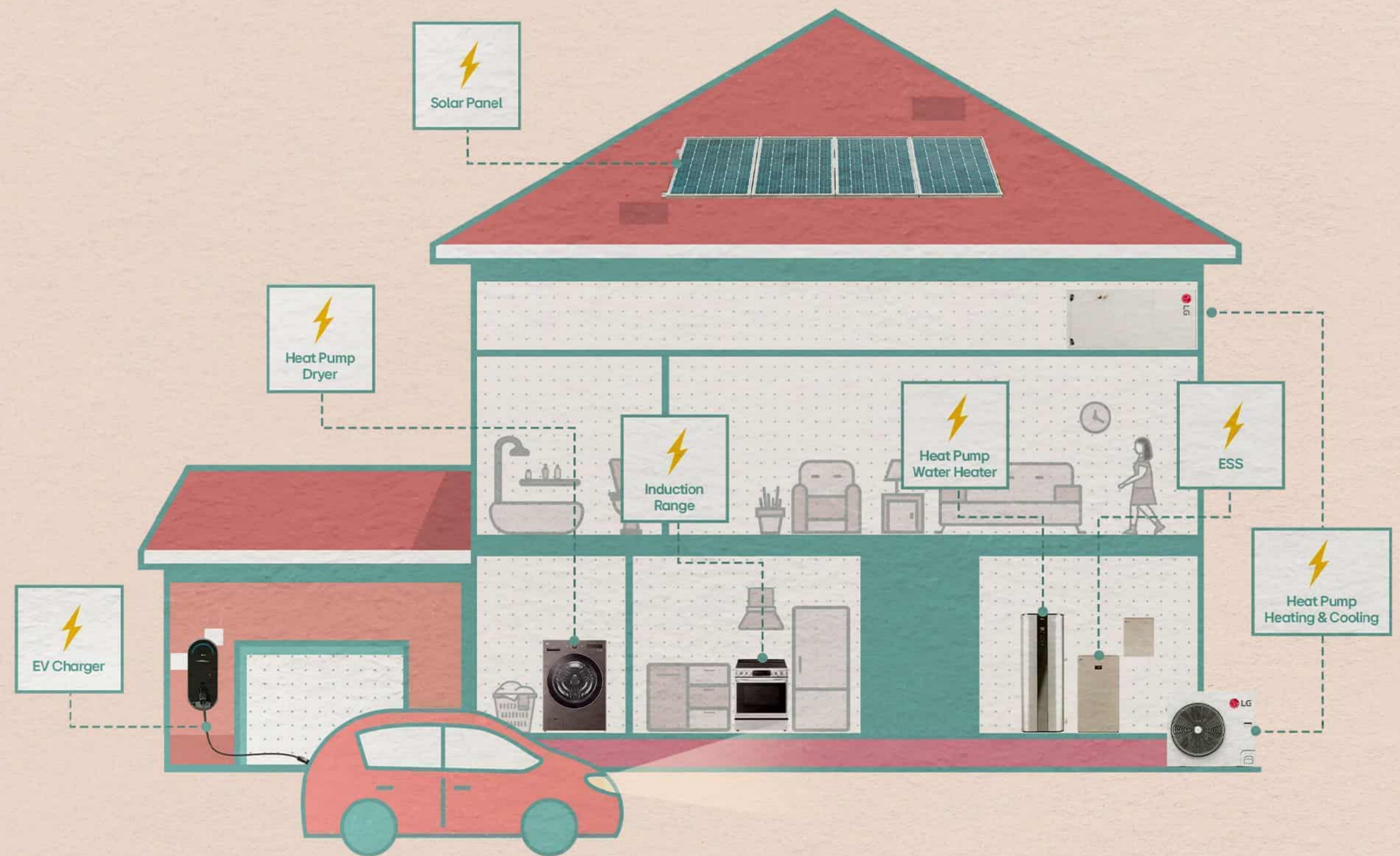


Reduce Carbon Emissions



The Path to Total Home Electrification

The process of electrifying a house might seem daunting at first, given its complexity and the range of technicalities involved. However, by understanding and following some key steps, such as assessing energy needs, upgrading electrical panels, and installing efficient appliances, this task becomes significantly more manageable. Let's delve into the intricacies of the home electrification process to demystify it further.

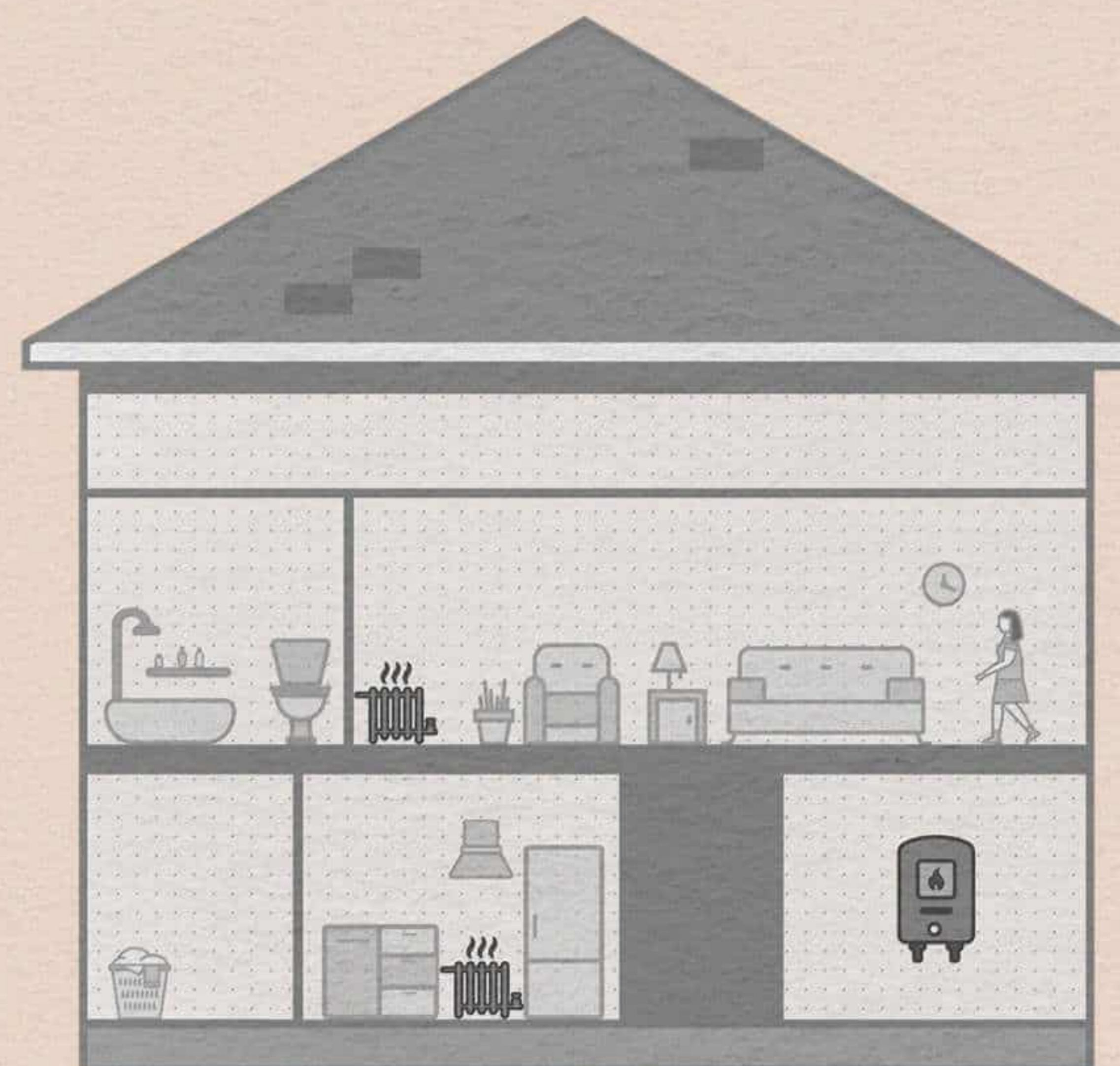
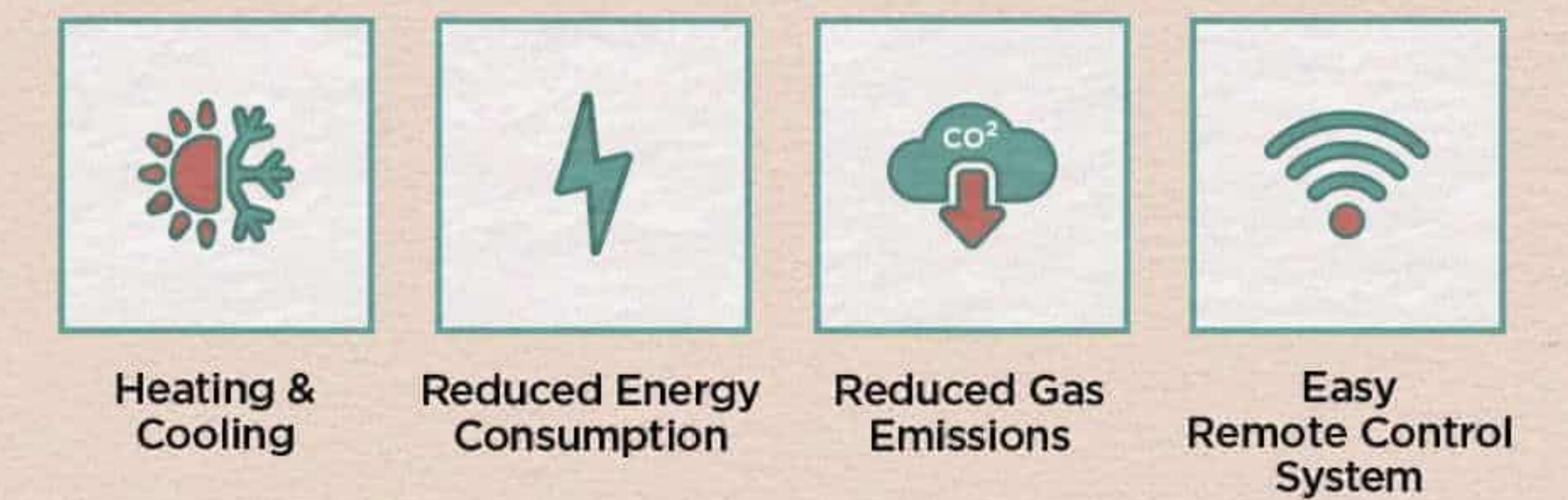
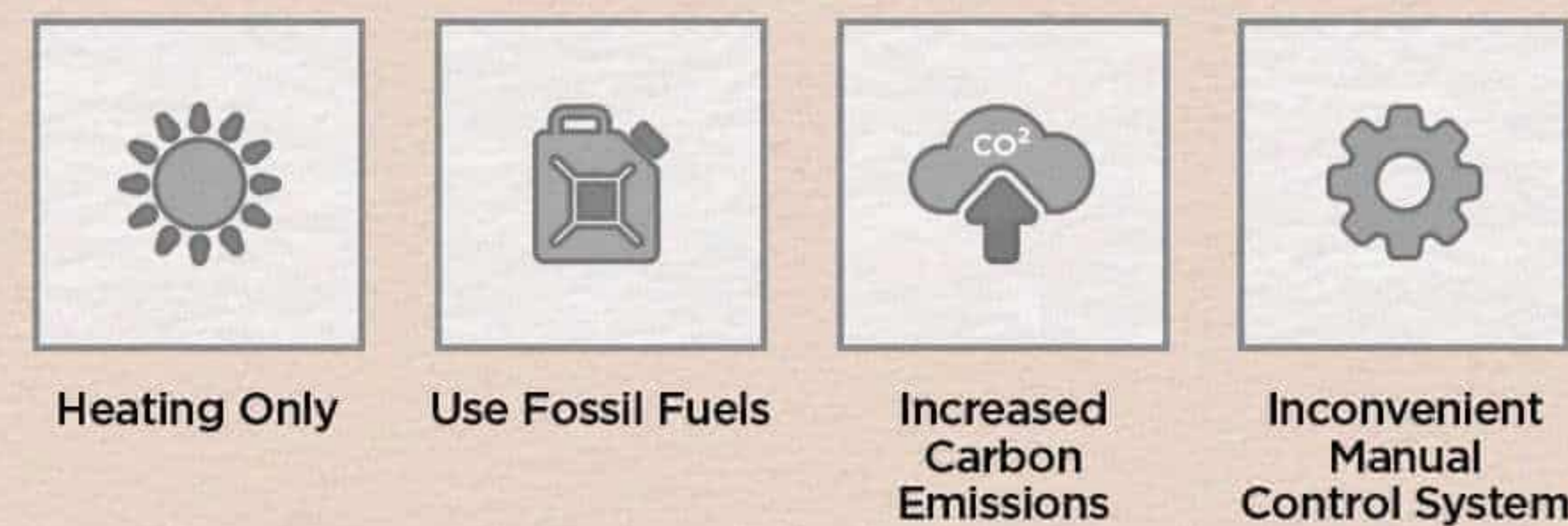


Inside the House

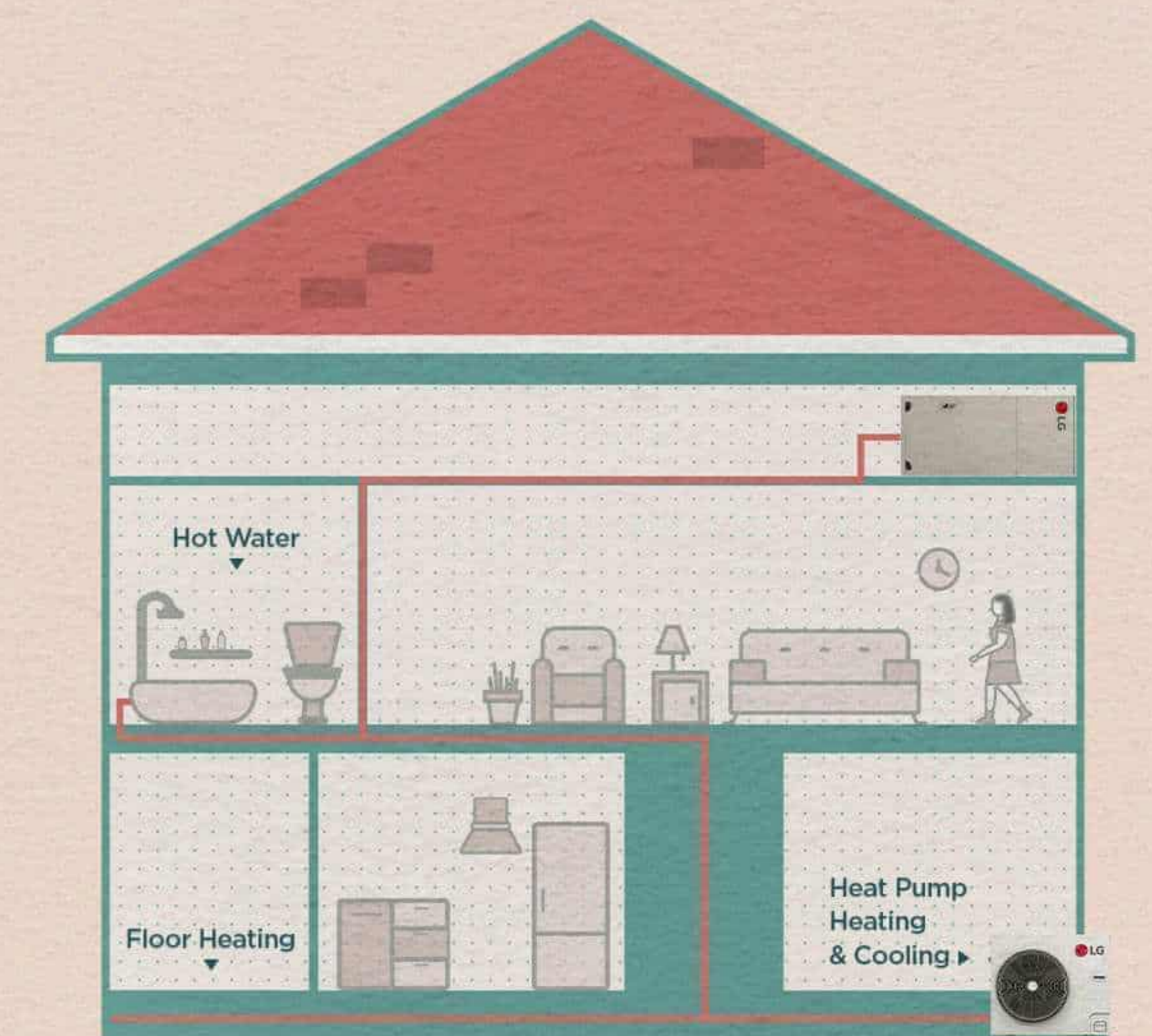
HVAC System

• Benefits

Electrifying HVAC systems in homes leads to marked improvements in energy efficiency, as modern electric heat pumps offer both heating and cooling solutions in one device, reducing overall energy consumption. These systems contribute to a cleaner environment by significantly lowering greenhouse gas emissions, especially when paired with electricity from renewable sources, aligning with global sustainability goals. Electric HVAC systems also enhance indoor air quality by eliminating the combustion process associated with traditional gas heating, thus reducing the presence of harmful pollutants indoors. Furthermore, the integration of smart technology in electric HVAC systems allows for precise temperature control and remote management, providing unparalleled comfort and convenience for homeowners.



Traditional Gas Heating



Electric Heating

• Process & Requirements

Step 1: Find and Select Home Assessor

Finding a qualified home assessor is the initial step in home electrification. You can locate professional energy assessors through state or local government energy offices, utility companies, or the Residential Energy Services Network. The U.S. Department of Energy's Home Energy Score program provides a list of assessors who offer detailed energy score reports. When choosing an auditor, it's crucial to check references, consult the Better Business Bureau for any complaints, and verify that they use calibrated equipment for thorough inspections.

Before the energy assessor arrives, prepare by listing any existing home issues like drafts or condensation and gathering records of your annual energy expenses, which can be sourced from your utility provider's online portal. This information helps the assessor pinpoint specific areas to focus on during the audit. Additionally, engaging in detailed discussions with the assessor allows them to understand your specific needs and assess your home's physical characteristics, including wall surfaces and window dimensions, as well as inquire about your household's energy usage and lifestyle patterns to provide a comprehensive evaluation.

Types of Certifications for Home Energy Assessors



Building Energy Assessment Professional (BEAP) certification



The Association of Energy Engineers Certified Energy Auditor certification



The Building Performance Institute Home Energy Professional Energy Auditor certification



The Residential Energy Services Network Home Energy Rater certification



Any third-party certification acknowledged as equivalent by the U.S. Department of Energy

Step 2: Get a Home Energy Audit

When selecting a home energy auditor, it's essential to choose one with recognized industry certifications from authorities like the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, the Association of Energy Engineers, or the Building Performance Institute. These certifications ensure the auditor's expertise and are vital for homeowners seeking tax credits from initiatives such as the Inflation Reduction Act and the Infrastructure Investment and Jobs Act. From 2024, auditors will need to provide a business employer identification number (EIN) or another taxpayer identification number to homeowners for claiming the Energy Efficient Home Improvement Credit.

A professional energy audit involves a detailed examination of your home's energy usage, including room-by-room inspections and historical utility bill analysis. Auditors use advanced equipment such as blower door tests, thermographic scans, infrared cameras, and furnace efficiency meters to detect energy loss areas. Following the audit, a comprehensive report is provided, detailing the home's energy characteristics, and recommending improvements like air sealing, insulation, and the installation of high-efficiency appliances and systems tailored to your home's specific needs and local climate conditions. These improvements aim to enhance both the efficiency and comfort of your living space. Click the [link](#) to get a home energy rating.

Your answers may help uncover some simple ways to reduce your household's energy consumption.

Step 3: Find a Contractor

Finding the right contractor for home electrification can be a challenge for consumers, but LG is able to assist with locating knowledgeable distributors and contractors across the country. You can find a professional who is available to assist you by following the [link](#).

Questions Home Energy Assessors May Ask



Is anyone home during working hours?



What is the average thermostat setting for summer and winter?



How many people live in the home?



Is every room in use?

Laundry Appliances

Benefits


Electric washers and dryers bring a wealth of advantages and benefits to modern households, starting with significant energy savings. These appliances often feature advanced technology that can sense the size of the laundry load and adjust water and energy use accordingly, promoting conservation. With heat pump electric dryers, the efficiency is further enhanced by recycling heat, leading to even more energy savings. Additionally, electric washers and dryers are known for their quiet operation, a welcome relief in homes where laundry must be done frequently or during odd hours. Installation flexibility is another benefit; most heat pump models do not require external venting, allowing them to be placed in a variety of locations within the home. Finally, the long-term cost savings of using energy-efficient electric washers and dryers, combined with their reduced environmental impact, make them a smart choice for eco-conscious consumers.

The LG WashCombo™ All-in-One exemplifies advancements in energy-efficient laundry solutions, completing full wash and dry cycles in approximately two hours*—a significant time efficiency that parallels its energy savings.


Its innovative ventless technology is engineered to maximize energy conservation, achieving up to 60% energy reduction per load, a figure corroborated by its recognition as the Most Efficient of ENERGY STAR® 2024 rating. Complementary to the WashCombo™, the LG heat pump dryer utilizes a sophisticated heat-recycling process that curtails energy usage by up to 65%, marking it as a leading model in sustainable home appliances. The integration of such energy-saving technologies into the LG laundry suite represents a substantial leap forward in reducing household energy consumption while maintaining high-performance standards.

* Please note that wash times may vary based on the type of items being washed and other influencing factors.


LG WashCombo™




Mega Capacity
5.0 cu.ft. mega-capacity washer/dryer combo




6MOTION™
6 motions to optimize wash & dry for each load




Energy Saving
With LG's Inverter heat pump technology, 60% less energy use




Two Hours
Complete wash & dry cycle as fast as 2 hours¹⁾



ezLintFilter™
Easy to access and easy to clean



ENERGY STAR® Most Efficient 2024
ENERGY STAR www.energystar.gov



1) Based on independent testing in Wash+Dry cycle with Dryer on Energy Saver mode, 10 lb. DOE standard load (October 2023). Cycle time may vary depending on load type/weight.

07

Kitchen Appliances

Benefits


All-electric induction cooking solutions stand at the forefront of energy-efficient cooking technologies. Induction cooking harnesses electromagnetic energy to directly heat pots and pans rather than the cooktop itself, which drastically reduces heat loss and results in faster, more economical cooking. The precise temperature control inherent to induction ranges translates to less energy wastage, ensuring that only the exact amount of energy needed is consumed. The cool-to-the-touch surface when not in contact with induction-compatible cookware contributes to a safer, energy-conserving kitchen environment. Furthermore, by obviating the use of gas, electric induction ranges and cooktops represent a clean energy solution, reinforcing the commitment to reducing household carbon footprints.

The LG induction range epitomizes the fusion of high-efficiency cooking with innovative technology, offering a cooking solution that marries rapid heating capabilities with substantial energy savings. Its precision induction elements convert electricity into a magnetic field, which directly heats cookware, resulting in up to 3 times more energy efficiency¹⁾ compared to traditional gas ranges. This direct energy transfer not only accelerates cooking times but also enhances kitchen safety with lower surface temperatures due to electromagnetic induction and adds to the unit's overall energy-conserving profile. Recognized for its energy-efficient performance, the LG induction range adheres to the rigorous standards set by ENERGY STAR®. As part of LG's commitment to sustainable appliance solutions, the induction range is designed to decrease energy consumption significantly, while its sophisticated control and sleek design maintain the high performance that users expect. LG's induction ranges and induction cooktops exemplify the pinnacle of energy-efficient cooking technologies, using electromagnetic energy to enhance kitchen performance and sustainability.

Both products utilize induction technology to directly heat cookware, minimizing heat loss and maximizing energy efficiency. This method provides rapid heating, precise temperature control, and significant energy savings by only using the necessary amount of energy, while also maintaining a safer, cooler cooking surface.


1) <https://www.lg.com/us/cooking-appliances/lg-ls16334fe-slide-in-induction-range>

LG Induction Cooking




UltraHeat™

Quickly boil water or hold a true simmer with ease



Exclusive Coil Design

Provide stable power output for optimal performance



Cookware Compatibility Indicator

Indicator	Compatibility
0 - 3	LOW
4 - 8	MEDIUM
9 - 10	HIGH

Optimize performance and maximize energy efficiency³⁾


Faster Heating

Gas	4min 36sec
Radiant	3min 58sec
Induction	1min 36sec ¹⁾

Energy Efficient

Induction	85% Efficient ²⁾
Radiant	75% Efficient
Gas	32% Efficient

ENERGY STAR®



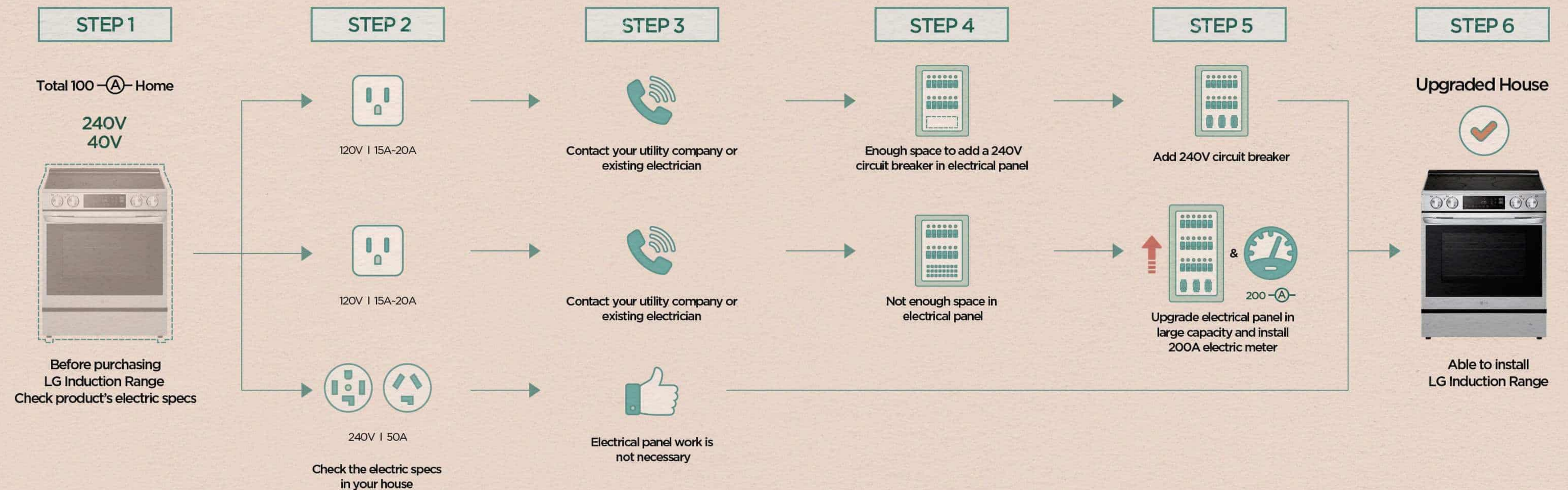
1) Based on internal LG testing comparing the boiling speed of LG cooktops at maximum power.
 2) According to ENERGY STAR
 3) The LG Heating Index only applies to the LG appliance(s) being used.

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Process & Requirements

When installing a new induction cooking solution, it is essential to follow a structured process to ensure compatibility and safety. Initially, verify the product specifications to understand the power requirements and features. Next, determine the type of outlet required to connect the product, ensuring it matches the existing electrical setup. If the product operates on a 120V type and requires electrical work, begin by contacting the utility company listed on the electrical panel. If specialized electrical services are necessary, reach out to a professional electrical firm previously utilized. For those encountering a need for additional space within the electrical panel, or if the current breaker capacity is insufficient, assess whether there is a 240V margin available. Should there be no margin at 240V and an upgrade to a 200A main breaker is needed, professional modification of the electrical panel will be required to accommodate the new installation safely. This methodical approach minimizes risks and ensures that the electrical infrastructure adequately supports the new product's demands.

Electric Panel Guide Process



| Water Heater

• Benefits

Converting to heat pump water heaters presents a suite of advantages, notably in the realm of energy efficiency. Heat pump water heaters are typically more energy-efficient than their gas counterparts, as they convert almost all the electricity they consume into heat with minimal loss, thus reducing overall energy expenditure. Many models come with programmable timers, allowing users to heat water during off-peak hours, leveraging lower electricity rates and contributing to energy conservation. The lack of a need to vent exhaust gases makes installation more flexible and eliminates the energy loss associated with gas flue systems. Such energy-saving features align with increasing environmental sustainability goals, making electric water heaters a smart choice for eco-conscious consumers seeking to reduce their carbon footprint and energy bills.

LG Inverter Heat Pump Water Heater



Differentiated Design

Luxury silver color makes an excellent design for the home



Excellent Efficiency

Energy savings of over 70%, with DUAL Inverter HeatPump Compressor™



Hot Water Supply

DUAL Inverter HeatPump Compressor™ providing a higher FHR¹⁾ value relative to storage volume



Low Noise

With DUAL Inverter HeatPump Compressor™, noise is reduced to 42db(A)



Easy Control

LG ThinQ app can control systems remotely



ENERGY STAR®

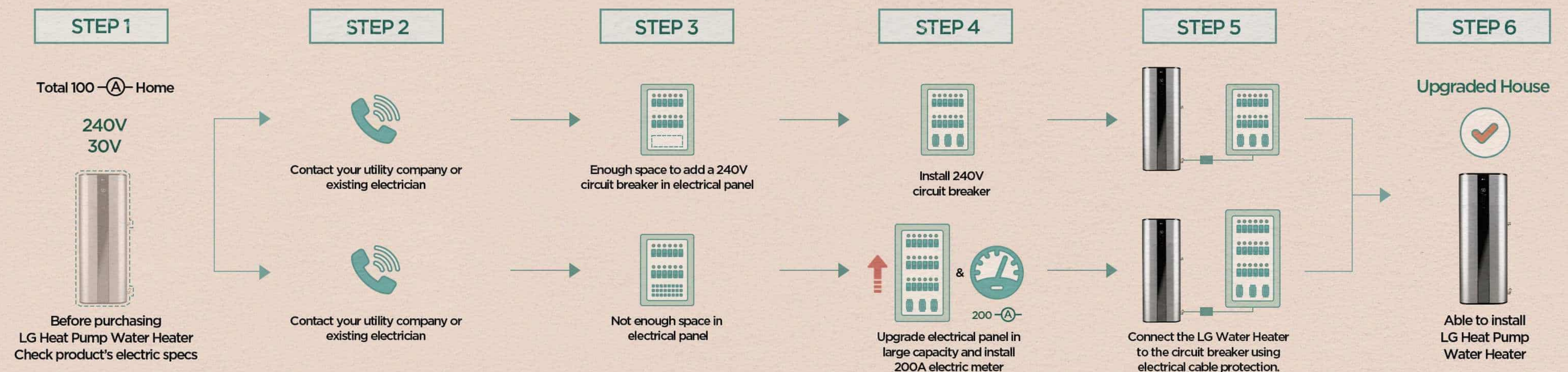


1) First Hour Rating(FHR) for LG 58-gallon model is 76 gallon on Auto mode (Certified by Intertek US) and 80 gallon on Turbo mode.

Process & Requirements

Transitioning to a heat pump water heater involves several key steps and requirements to ensure successful installation and operation. First, homeowners should assess their current plumbing and electrical systems to determine compatibility with an electric water heater. This involves evaluating the existing electrical panel capacity to ensure it can handle the additional load, as electric water heaters may require significant power, particularly if a high-capacity model is chosen. It is often necessary to upgrade the electrical panel or circuits to accommodate the new unit's power requirements. Furthermore, the installation space must be assessed for proper ventilation and accessibility, as electric models can have different spatial requirements compared to gas units. Professional installation by a certified electrician or plumber is recommended to ensure that all local building codes and safety standards are met, securing the system's efficiency and longevity.

Electric Panel Guide Process




ESS (Energy Storage System)

Benefits

Converting to an electric ESS provides significant advantages in energy efficiency and system integration. These systems optimize energy costs and reduce grid strain by storing excess electricity during off-peak times and releasing it during high demand. When integrated with renewable energy sources like solar or wind, ESS solutions store surplus energy and ensure a consistent supply, enhancing the use of renewables and reducing carbon emissions. Additionally, modern ESS technologies feature smart management systems that adapt charging and discharging based on usage patterns and grid demands, boosting energy system efficiency. By adopting an ESS, users gain energy independence, stabilize costs, and support a sustainable energy transition.

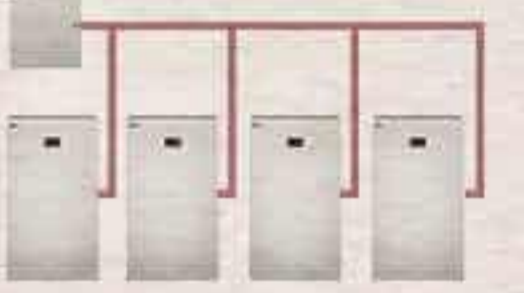
The LG Home 8 Energy Storage System significantly enhances home electrification by providing up to 14.4 kWh of cleaner, more reliable backup energy, which not only supports eco-friendly initiatives but also ensures energy cost reductions. Its innovative design integrates seamlessly with LG Electronics appliances and HVAC systems, enabling optimal energy management and improved efficiency, which translates into a more cost-effective and sustainable lifestyle.


Energy Storage System



Powerful & Modular


Can Connect up to 4 system and provide up to 57.6kWh






External Display

Can easily see how much battery is in the system




Smart Mode

Optimize battery charging using weather forecasts to save money




Unique Modular

LG HBP battery has a control unit and two modules for easy transport and installation



Easy Monitoring

Homeowners can easily control and navigate the LG ESS system via the LG ThinQ app®



Integrated Service

Provide to customers up to 10-years limited warranty¹⁾

1) Warranty conditions may vary depending on the marketing policy by countries, please check before purchase the products.



Outside the House

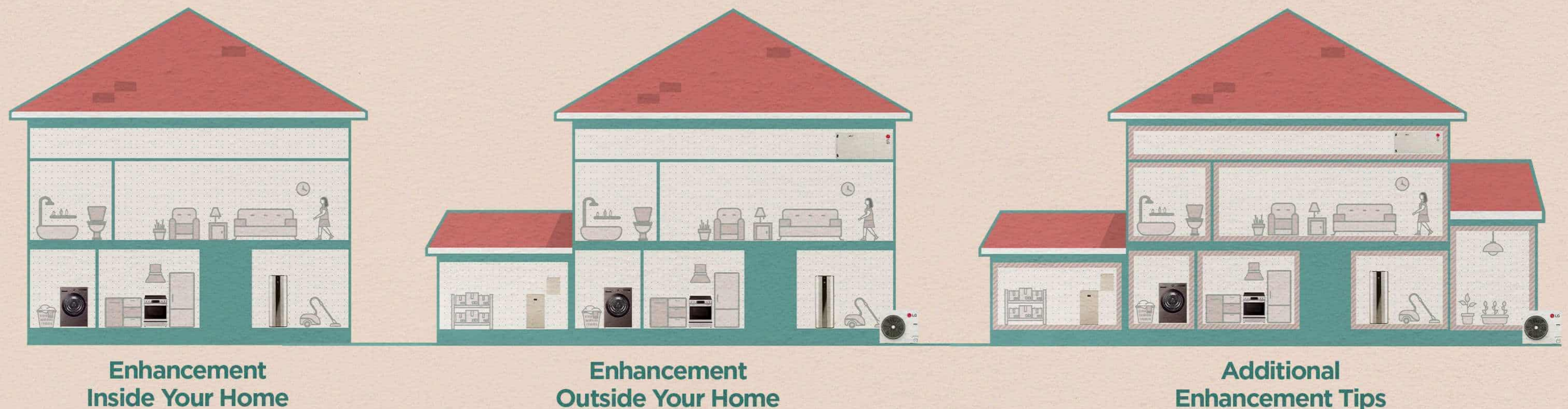
(Solar Panels, EVC, Outdoor Lighting, Smart Grid Integration)

The electrification of outdoor home components plays a pivotal role in enhancing energy efficiency and sustainability. Solar panels are a cornerstone of this movement, converting sunlight into electricity and significantly reducing reliance on non-renewable energy sources. The integration of solar power not only diminishes household energy costs but also increases property values with the added benefit of potential tax incentives. Additionally, the installation of Electric Vehicle (EV) charging stations at home provides the convenience of charging personal vehicles overnight, promoting the adoption of electric vehicles. This, coupled with energy-efficient outdoor lighting solutions, which use less power and reduce light pollution, complements a comprehensive approach to green living.

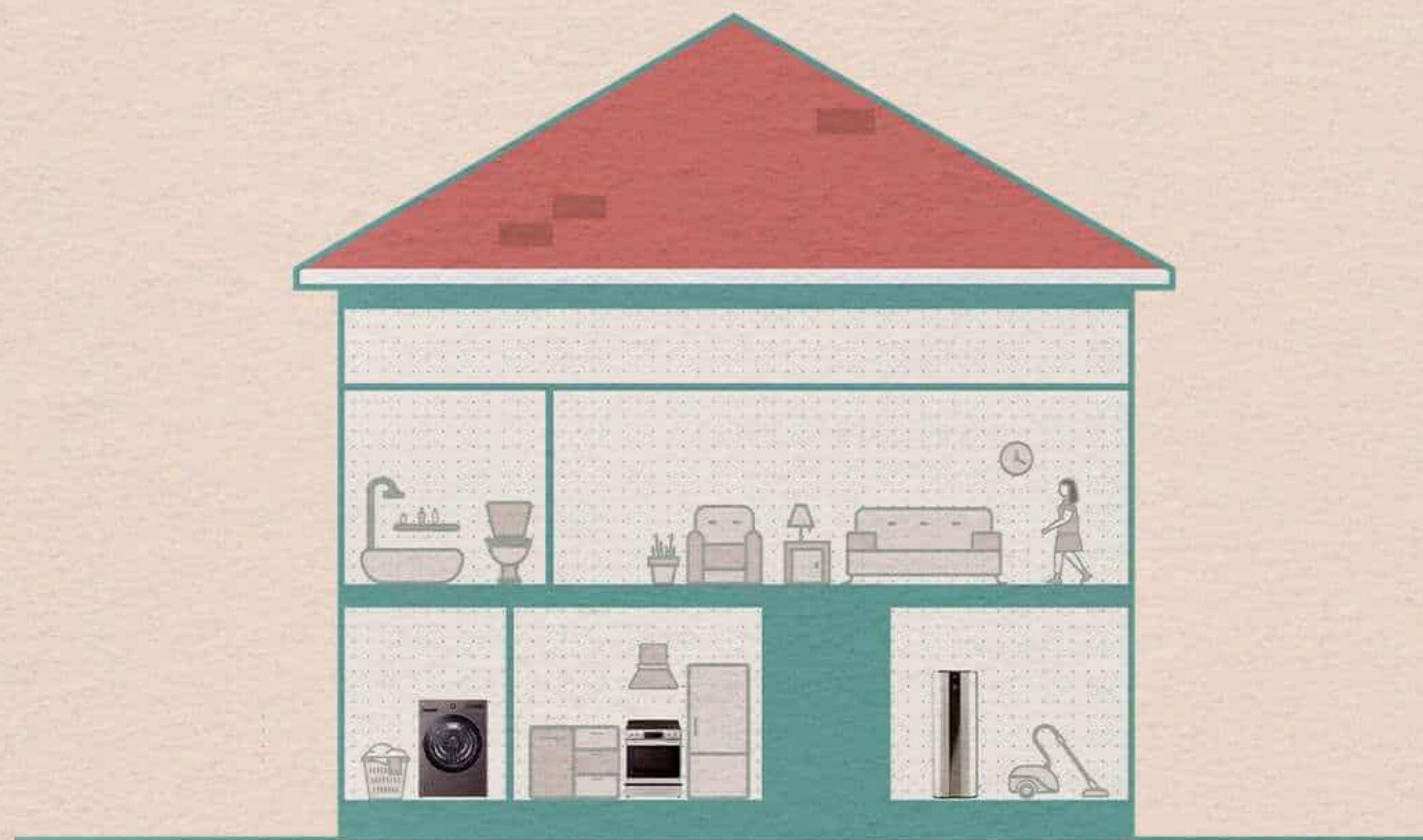
Smart Grid integration further elevates the benefits of home electrification by allowing homeowners to connect with utility grids in an intelligent manner. Through smart grids, energy consumption can be optimized in real-time, enhancing the efficiency of solar panels and other home electrification systems by dynamically adjusting to energy demands and supply. This connectivity also facilitates the use of excess energy generated by home systems to be fed back into the grid, providing energy credits and reducing costs. The adoption of these technologies not only supports personal energy management but also contributes to the broader goals of reducing carbon footprints and promoting sustainable energy practices. Ultimately, the integration of these advanced outdoor electrification technologies fosters a more resilient and energy-independent home environment.

Home Enhancement Steps – Using LG Home Electrification Products

Transitioning to sustainable home systems is increasingly supported through substantial financial incentives, aiming to make energy-efficient upgrades more accessible to a wider range of homeowners. These incentives are not uniform but are instead calibrated according to household income, with a generous overall rebate limit of \$14,000 available once in a lifetime per household. Furthermore, eligibility for these rebates is tailored; households with an Area Median Income (AMI) under 80% qualify for higher rebates than those with an AMI between 80% and 150%.



Step 1: Enhancement Inside Your Home



For those considering upgrades to water heating systems, LG heat pump water heaters are eligible for rebates up to \$1,750 for lower-income households, encouraging the shift away from traditional, less efficient water heaters. Similarly, LG heat pump dryers like the LG WashCombo provide more energy-conscious solutions for homes and are eligible for an \$840 rebate. LG induction ranges also provide alternatives to conventional stovetops, promoting safer and more precise cooking with reduced energy waste. These induction ranges are also eligible for an \$840 rebate, supporting the reduction of electricity consumption.

Category	Replacing	Product Cost ¹⁾	Installation Cost ²⁾	Total Cost	Rebate HEAR ³⁾	Tax Credit ⁴⁾	Final Cost
 Water Heater	 → 	\$2,000	\$1,900	\$3,900	-\$1,750	-\$1,170	75%↓ \$980
 Washer/Dryer Combo	 → 	\$2,199	\$70	\$2,269	-\$840		25%↓ \$2,508
 Cooking	 → 	\$999	\$80	\$1,079			
 Electric	 100A → 200A	-	\$4,500	\$4,500	-\$4,000		89%↓ \$500
	Additional Wiring & Circuit Breaker	-	\$3,000	\$3,000	-\$2,500		83%↓ \$500
Total	-	\$5,198	\$9,550	\$14,748	-\$9,090	-\$1,170	70%↓ \$4,488

* The simulated values exclude existing utility rebates and only include the rebates provided by the Inflation Reduction Act (IRA).

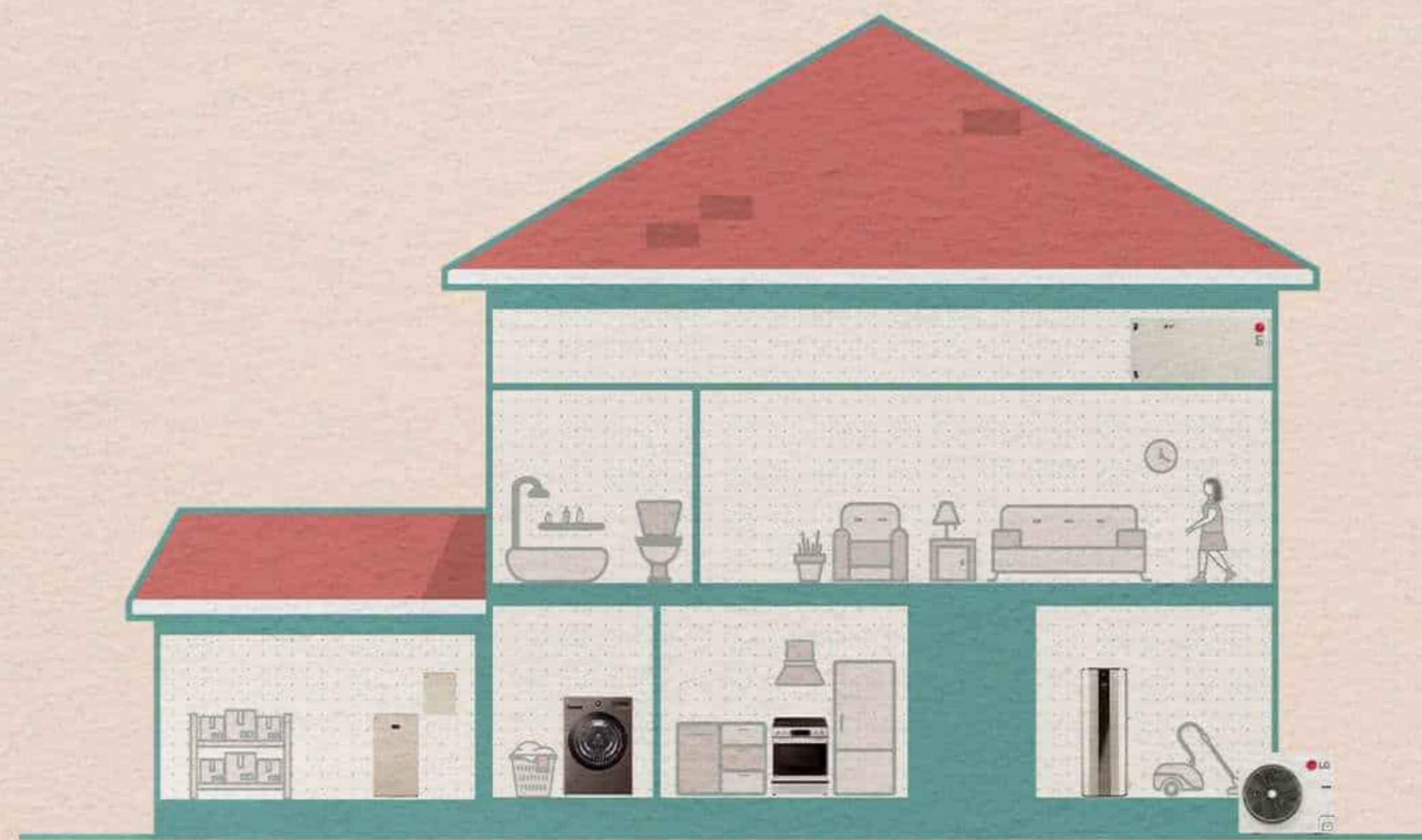
1) Prices for products can differ across states in the United States.

2) The installation costs are based on average pricing, and the prices include haul away fees.

3) Rebate cost and incentives may vary from state to state across the United States. The maximum rebate amount that can be received is \$14,000.

4) The tax credit for Heat Pump water heaters is 25%.

Step 2: Enhancement Outside Your Home



When it comes to space heating and cooling, LG HVAC heat pump systems offer substantial incentives, including an \$8,000 rebate for households with an AMI under 80% and a 30% tax credit capped at \$2,000. For homeowners installing an ESS solution, upgrading the electric panel to 200A qualifies for a rebate of up to \$4,000. Additionally, updating the electrical wiring and circuit breaker in the home provides a \$2,500 rebate. When homeowners install an ESS solution and simultaneously upgrade their electric panel and wiring, they are eligible for a total of \$6,540 in tax credits.

Category	Replacing	Product Cost ¹⁾	Installation Cost ²⁾	Total Cost	Rebate HEAR ³⁾	Tax Credit ⁴⁾	Final Cost
 Water Heater	 Gas → Electric	\$2,000	\$1,900	\$3,900	-\$1,750	-\$1,170	75%↓ \$980
 Washer/Dryer Combo	 Gas → Electric	\$2,199	\$70	\$2,269	-\$840		25%↓ \$2,508
 Cooking	 Gas → Electric	\$999	\$80	\$1,079			
 Inverter Heat Pump	 Gas → Electric	\$5,500	\$13,000	\$18,500	-\$8,000	-\$2,000	54%↓ \$8,500
 Energy Storage System		\$10,000	\$4,300	\$14,300		-\$6,540	60%↓ \$8,760
 Electric	 100A → 200A	-	\$4,500	\$4,500	-\$4,000		
	Additional Wiring & Circuit Breaker	-	\$3,000	\$3,000	-\$2,500		
Total		\$20,698	\$26,850	\$47,548	-\$14,000	-\$9,710	50%↓ \$23,838

* The simulated values exclude existing utility rebates and only include the rebates provided by the Inflation Reduction Act (IRA).

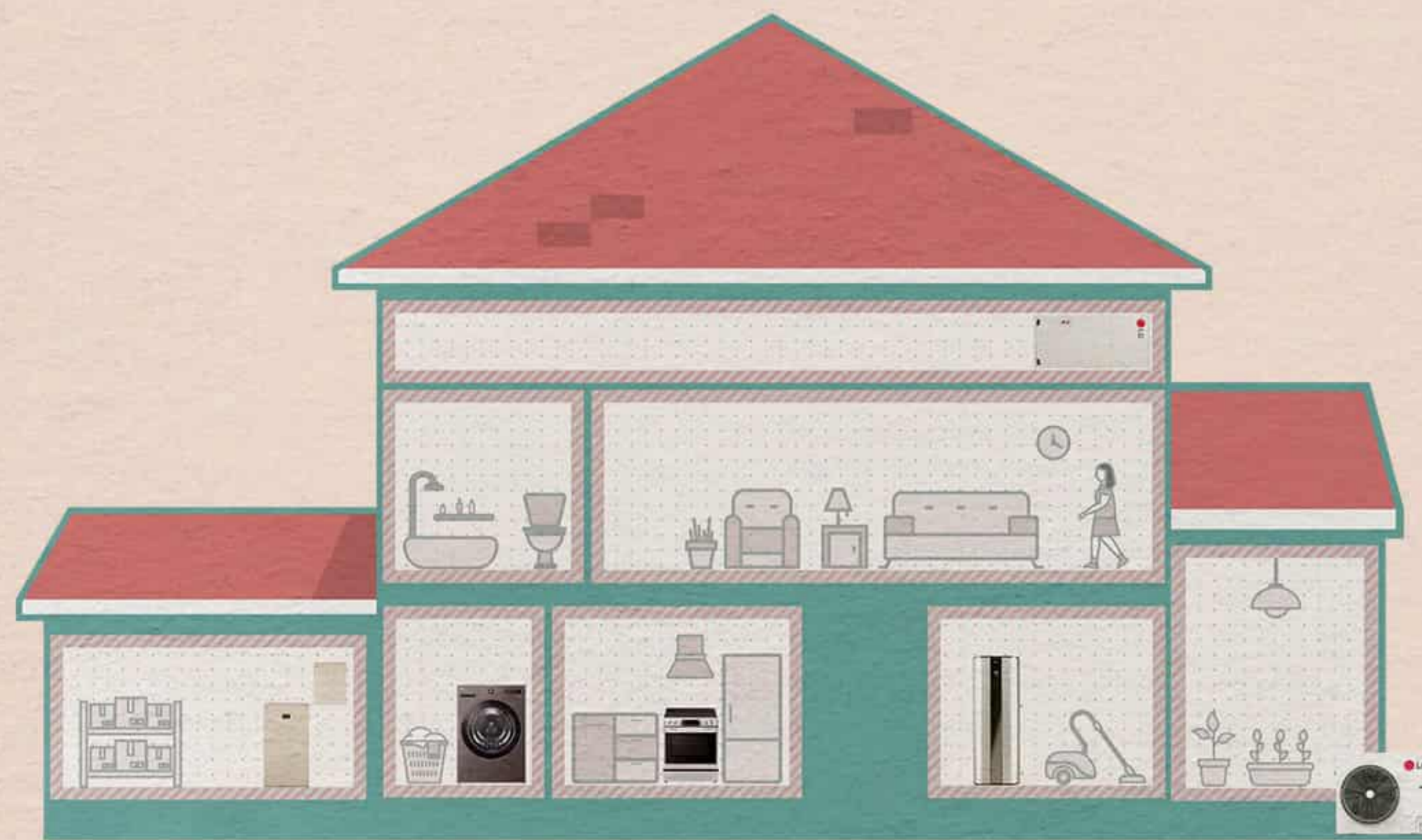
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2) The installation costs are based on average pricing, and the prices include haul away fees.

3) Rebate cost and incentives may vary from state to state across the United States. The maximum rebate amount that can be received is \$14,000.

4) The tax credit for Heat Pump / Heat Pump water heaters is 25C and Energy Storage System is 25D.

Step 3: Additional Enhancement Tips



To fully complete the electrification process, there are a few additional steps homeowners can take. For maximum energy efficiency in your home, it's essential to conduct weatherization improvements such as air sealing, insulation, and upgrading doors and windows. These measures, along with ventilation improvements, significantly enhance your home's efficiency. The initial step for most homeowners is to get an energy audit, where a trained professional identifies trouble areas. Many local electric utilities offer energy audits at little to no cost.

Conclusion

Electrifying a home is not merely about adopting new technologies but embracing a lifestyle that significantly contributes to global sustainability efforts. This white paper has navigated through the essentials of indoor and outdoor electrification, from integrating smart HVAC systems to leveraging the sun's power with solar panels.

It encapsulates the strategic, economic, and environmental dimensions of adopting comprehensive electrification solutions, highlighting the role of tailored incentives and expert installations in facilitating this shift. As the landscape of home energy continues to evolve, this guide serves as a crucial resource for homeowners seeking to make informed, impactful decisions towards a greener future.

LG Electrification Full Line-up (IRA Rebate Ready)

| Laundry Solution



WashCombo
(All-in-one Washer & Dryer)



WashTower



Heat Pump Dryer

| HVAC Solution



Inverter Heat Pump
Heating & Cooling



Inverter Heat Pump
Water Heater

| Kitchen Solution



Induction Range



Induction Cooktop



Radiant Range




Radiant Cooktop

| Home Energy Storage Solution



Energy Storage System



 www.lg.com/global/business/air-solution

 facebook.com/lghvacglobal

 linkedin.com/company/lghvacglobal