

# Switching to Electric:

## Home Electrification for the Future **Part 1**

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.



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# Home Electrification White Paper Part 1 Contents

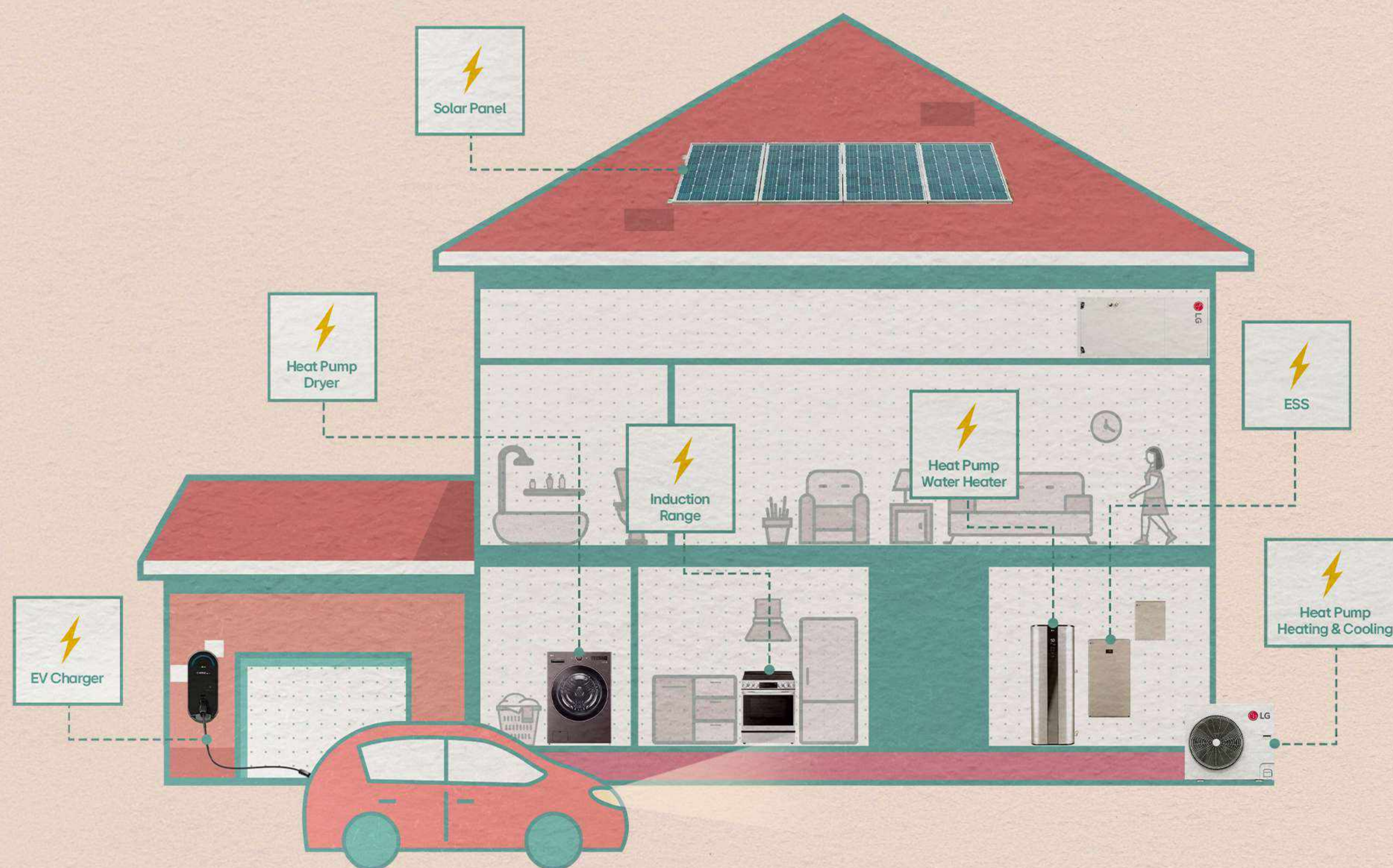
<b>01</b>	Introduction	01
<b>02</b>	Benefits of Home Electrification	02
<b>03</b>	Home Electrification Support	03
	a. Inflation Reduction Act (IRA)	
	b. Home Electrification and Appliance Rebate (HEAR)	
	c. Home Efficiency Rebates (HER)	
	d. Additional Support Through IRA Tax Credits	
<b>04</b>	The Electrification Processes	08
<b>05</b>	Conclusion	13
<b>06</b>	LG Electrification Full Line-up	14

# Introduction

The trend of home electrification is revolutionizing the way we think about energy efficiency and sustainability. By shifting from fossil fuels to electricity, often sourced from renewables like solar and wind, households significantly reduce their carbon footprint and contribute to global environmental efforts. This transformative approach not only aligns with modern sustainability goals but also offers enhanced living standards.

Home electrification, the process of transitioning a household's energy sources from fossil fuels such as natural gas, oil, and coal to electricity, is driven by the need to reduce carbon emissions and combat climate change. Electricity can be generated from renewable sources like solar, wind, and hydro, and involves replacing gas-powered appliances like stoves, water heaters, and heating systems with electric alternatives. The growing awareness of climate change, advancements in renewable energy technology, and increasing government incentives and policies have made home electrification a more viable and environmentally conscious choice, further accelerating its adoption and emphasizing its importance in achieving sustainability goals.

\* The policies, assessments, installation procedures, and energy efficiency information described in this whitepaper may vary based on location, administrative region, and lifestyle. Therefore, it is highly recommended that you consult with a professional and engage in thorough discussions before proceeding with any electrification initiatives.



# 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**





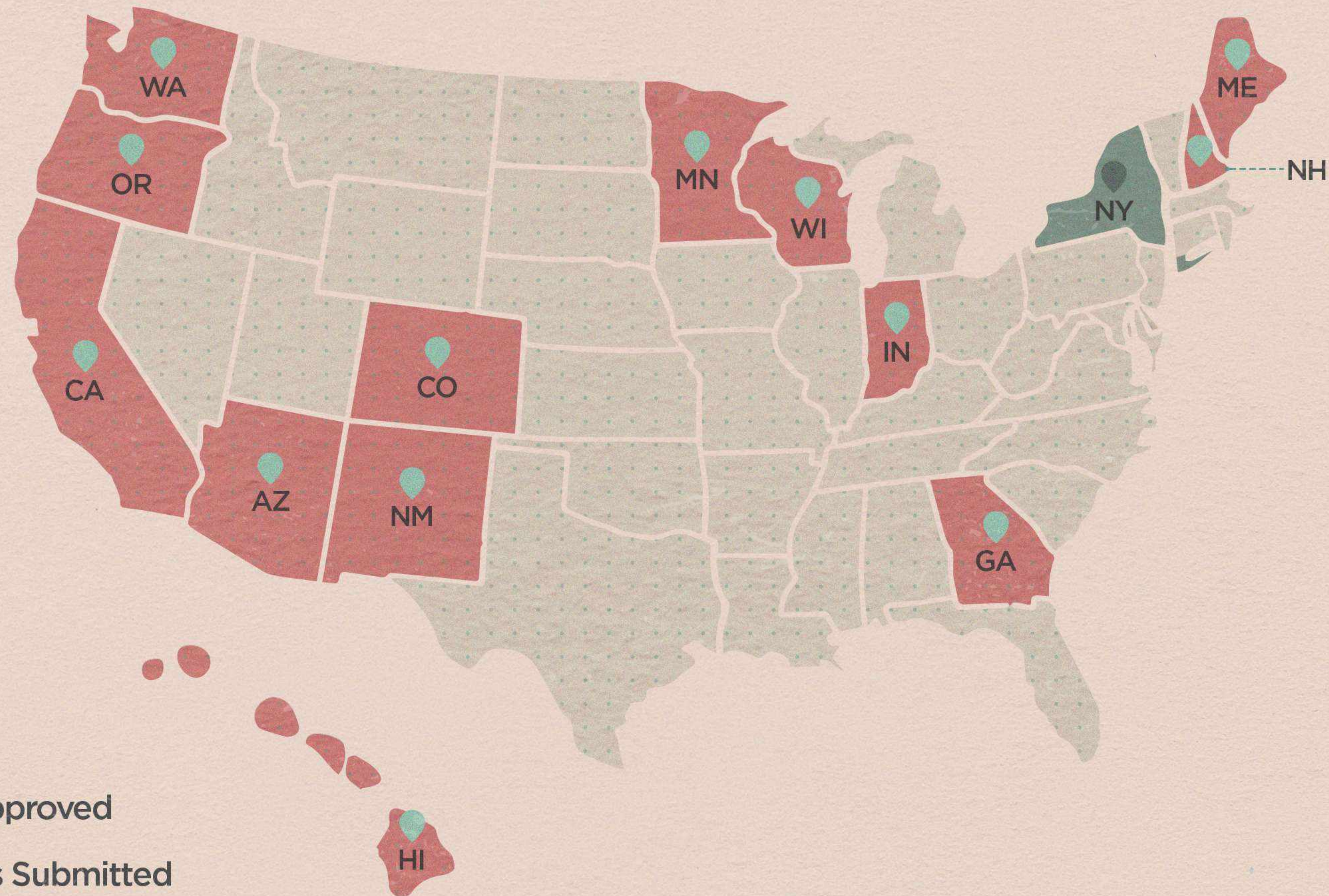
# Home Electrification Support

There are different government initiatives that support home electrification, each designed to assist homeowners in different ways. The Inflation Reduction Act (IRA) offers a wide range of financial incentives for homeowners implementing eco-friendly modifications. The Home Electrification and Appliance Rebates (HEAR) program specifically reduces the financial burdens associated with upgrading to high-efficiency appliances. Complementing HEAR, the Home Efficiency Rebates (HER) program extends its focus to encompass overall improvements in home energy performance. Each of these programs plays a crucial role in fostering sustainable energy use and reducing environmental impact at the state and national levels.

## Inflation Reduction Act (IRA)

The Inflation Reduction Act (IRA) is a landmark piece of legislation aimed at addressing climate change and promoting energy sustainability by offering a suite of financial incentives. Specifically, the legislation provides homeowners with a variety of benefits, including incentives, rebates, and tax credits for those who install or implement environmentally-conscious solutions in their homes. However, it's important to note that the level of support and availability of these benefits can vary significantly across different states in the US, reflecting the diverse stages of readiness and implementation policies aligned with the IRA's objectives. This variability underscores the need for homeowners to navigate their state-specific opportunities to maximize the environmental and financial advantages of home electrification and other sustainable practices encouraged by the IRA. The following [link](#) provides more information about the support provided in each state.

# State Implementation Status










- Application DOE Approved
- Rebate Applications Submitted

\* Please note that rebate programs are continuously being updated. For the most current information, [click this link](#).

## Home Electrification and Appliance Rebates (HEAR)

The Home Electrification and Appliance Rebates (HEAR) initiative is a pivotal component of a forward-thinking energy policy designed to incentivize residential property owners to transition towards more sustainable and energy-efficient home systems. Through the provision of rebates, the HEAR program aims to reduce the economic barriers associated with upgrading to high-efficiency appliances and home electrification technologies. These incentives not only encourage the adoption of environmentally-friendly solutions but also support the national goal of reducing carbon emissions. The strategic focus of HEAR is to facilitate a nationwide shift towards clean energy, enhancing the long-term sustainability of residential energy consumption and contributing to a more resilient energy infrastructure.

## Home Electrification and Appliance Rebates (HEAR)

 <p><b>Benefits</b></p>	 <p>Instant Discount on Purchase</p>	 <p>Max. \$14,000 Per Household <small>* Products / Once per Item</small></p>	<p><b>Heat Pump:</b> Space Heating &amp; Cooling: \$8,000 / Water Heater: \$1,750 / Dryer: \$840</p> <p>Electric Range/Oven: \$840 Electric Panel: \$4,000 Electric Wiring: \$2,500 Insulation: \$1,600</p>
 <p><b>Condition</b></p>	 <p>Energy Star Certification</p>	 <p>Below 80% of Average Median Income <small>(100% of project cost, up to rebate maximum)</small></p>	 <p>Between 80% and 150% Average Median Income <small>(50% of project cost, up to rebate maximum)</small></p>



\* Rebate-eligible products may vary by state in the US.

Program	Law	Budget	Beneficiary	Target	Rebates / Incentive
Home Electrification and Appliance Rebates (HEAR)	IRA. 50122	\$ 4.5 Billion	Consumer & Contractor	<b>Energy Star Certification</b> = Heat Pump (Dryer, Water Heater, Space Heating & Cooling) = Induction / Radiant	<p><b>Consumer</b> = Once per Product, Max. \$14,000 limit</p> <p><b>Contractor</b> = \$500 Rebate</p> <p><small>* Space Heating &amp; Cooling requires Energy Home Assessment</small></p>

## Home Efficiency Rebates (HER)

Home Efficiency Rebates (HER), a distinct yet complementary program to HEAR, focuses on broader energy improvements within the home. HER targets the overall energy performance of residential properties, offering financial incentives for homeowners who undertake energy audits and implement recommended upgrades. These upgrades could include enhanced insulation, sealing of leaks, and installation of energy-efficient windows and doors. HER's objective is to bolster the intrinsic energy efficiency of homes, resulting in reduced energy consumption, lowered utility bills, and a significant step towards a lower carbon footprint for the housing sector. The program is tailored to support homeowners in making substantial long-term investments in their properties, leading to both economic and environmental payoffs.

## Home Efficiency Rebates (HER)

	Standards for Energy Savings for Housing			
	Modeled Approach		Measured Approach	
 <b>Benefits</b>	When 20-34% energy is saved, up to \$4,000. When more than 35% energy is saved, up to \$8,000 rebates.		At least 15% home energy savings is required. \$4,000 rebate is provided for reducing energy usage by 20% compared to the State average home.	
 <b>Condition</b>	Single Family Median Income		Multi Family Median Income	
	Below 80% of Average Median Income (Maximum \$8,000 or 80% of project cost)	Above 80% of Average Median Income (Maximum \$4,000 or 50% of project cost)	More than 50% of Residents are below 80% of Average Median Income (Maximum \$8,000 or 80% of project cost)	More than 50% of Residents are above 80% of Average Median Income (Maximum \$4,000 or 50% of project cost)

\* Rebate-eligible products may vary by state in the US.

Program	Law	Budget	Beneficiary	Target	Rebates / Incentive
Home Efficiency Rebates (HER)	IRA. 50121	\$ 4.3 Billion	Consumer & Contractor	Single Family / Multi Family (Reduce Energy Use)	<b>Consumer</b> = Max. \$8,000 Rebate  <b>Contractor</b> = \$200 Rebate  <small>* Air conditioner requires Energy Home Assessment</small>



## Additional Support Through IRA Tax Credits

In addition to the rebate programs offered under the IRA, there are also a wide range of tax credit programs that benefit consumers, building owners, and contractors. Some of these include the Energy Efficiency Home Improvement Credit, which targets heat pump installations, and the Residential Clean Energy Tax Credit, focusing on support for ESS solution installations. The figure below offers an overview of these tax credit programs and how they can benefit you.

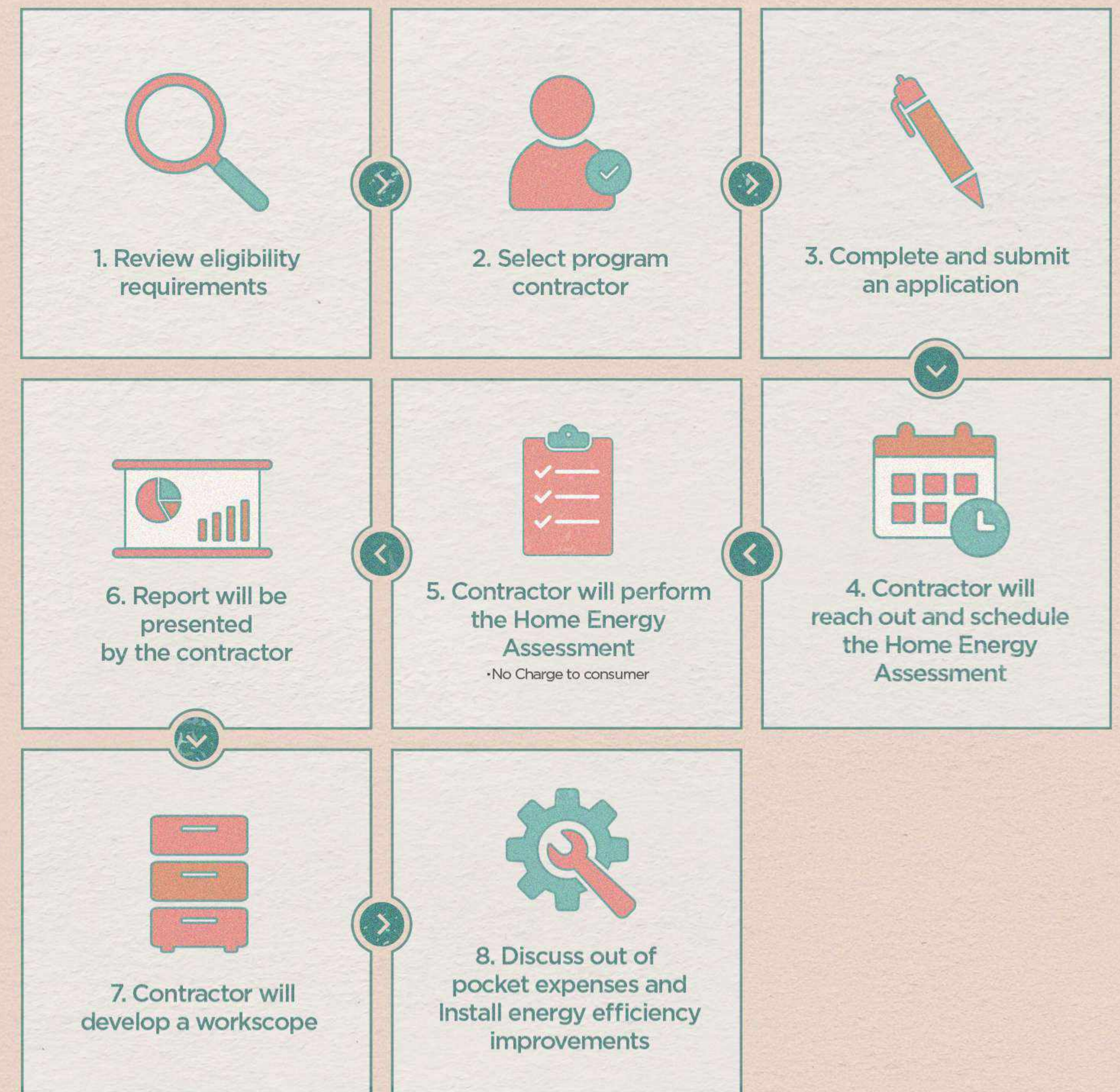
Division	Program	Law	Budget	Beneficiary	Target	Rebates / Incentive
Home Energy Rebate	Home Electrification and Appliance Rebates (HEAR)	IRA.50122	\$ 4.5 Billion	Consumer & Contractor	<b>Energy Star Certification</b> = Heat Pump (Dryer, Water Heater, Space Heating & Cooling) = Induction / Radiant	<b>Consumer:</b> 1-time per product Total Rebate limit up to \$14,000 <b>Contractor:</b> \$500 Rebate
	Home Efficiency Rebates (HER)	IRA.50121	\$ 4.3 Billion	Consumer & Contractor	<b>Single Family / Multi Family</b> (Reduce Energy Use)	<b>Consumer:</b> Up to \$4,000 Rebate <b>Contractor:</b> \$200 Rebate
Tax Credit	Energy Efficiency Home Improvement Credit	25C	\$ 12.5 Billion	Consumer	<b>Heat Pump</b> (Dryer, Water Heater, Air Conditioner)	<b>Homeowner:</b> 30% tax credit (Per Upgrade), Max. \$2,000 (Heat Pump, Water Heater)
	New Energy Efficient Home Credit	45L	\$ 2.0 Billion	Builder	Single/Multi-Family Residential Building Construction	<b>Homeowner:</b> Up to \$5,000
	Energy Efficient Commercial Building	179D	\$ 0.4 Billion	Building Owner Architect Designer Engineer	Commercial Building Energy Conservation	<b>\$5 / Sq.ft</b> (Previously: \$1.88 / Sq.ft)
	Residential Clean Energy Tax Credit	25D	\$ 22.0 Billion	Consumer	<b>ESS</b> (3kWh and above), Solar Power, Small-Scale Wind Power	30% of the product cost + Installation fee
	Extension and Modification of Energy Credit	48ITC	\$ 14.0 Billion	Building Owner Architect Designer Engineer	<b>ESS</b> (5kWh and above), Solar Power, Micro Grid Controller	Tax credit 6%-50% depending on the condition
	Alternative Fuel Refueling Property Credit	30C	\$ 1.7 Billion	Consumer	Electric Vehicle Charger	<b>Up to 30%</b> (Limit: Individual \$1,000, Business \$100,000)

# The Electrification Process

## Assessment and Planning

An essential first step in the home electrification process is conducting an energy audit, which involves a detailed evaluation of a home's energy usage to pinpoint specific opportunities for electrification. Following this assessment, a customized electrification plan is developed, tailored to meet the unique requirements and potential of the home. This plan ensures that the electrification process is both efficient and effective, taking into account the specific needs and characteristics of each individual property.

Local initiatives like New York's EmPower+ program provide valuable assistance in evaluating and strategizing for home electrification. These programs, although varying by region, share a common goal of guiding homeowners through the transition to more sustainable energy solutions. By examining the EmPower+ program's structured approach in New York, one can gain insights into the typical workflow and support offered through such initiatives. This understanding can serve as a reference point for engaging with similar programs nationwide, facilitating a smoother electrification process for homeowners.



\* Source: New York State Energy Research and Development Authority

## Guide on Benefit Differences According to Consumer Income Level


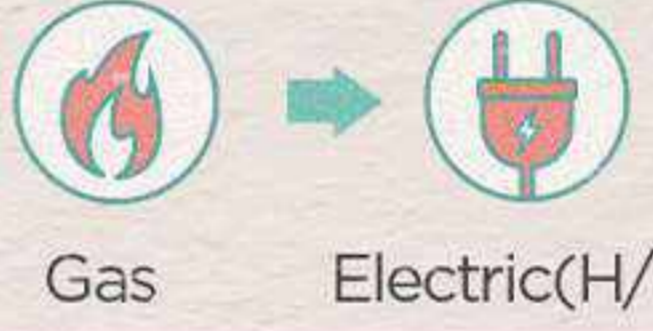

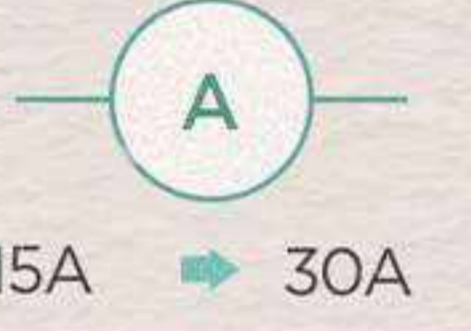
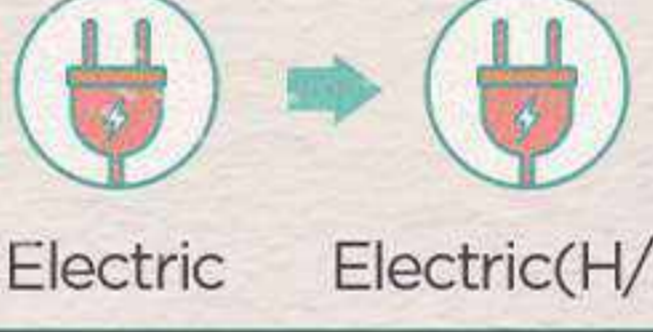

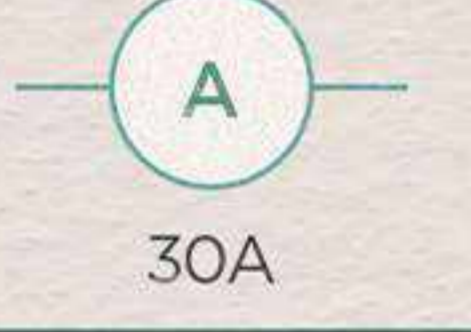

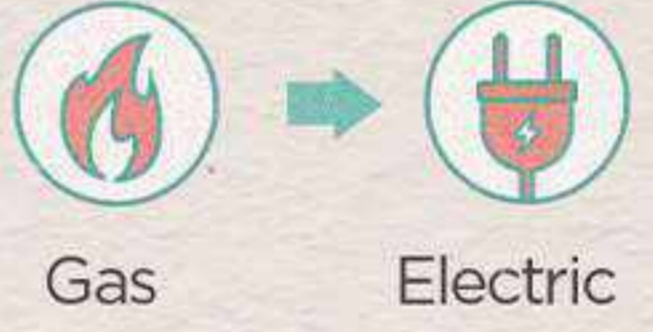

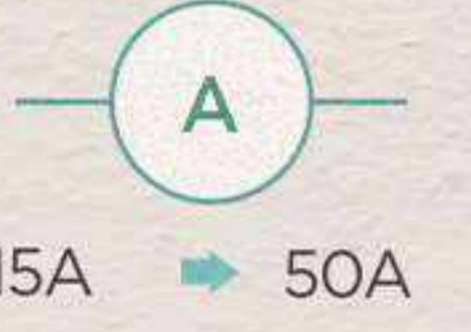
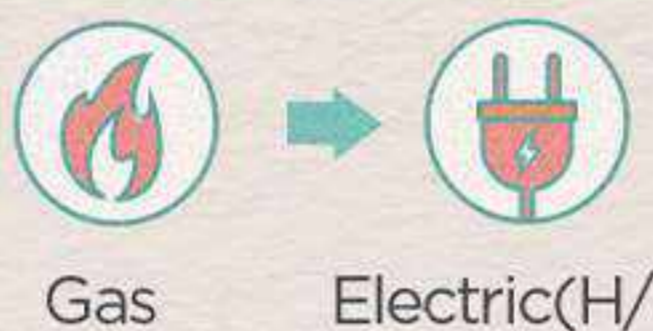

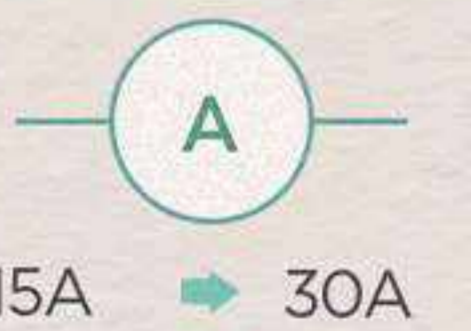

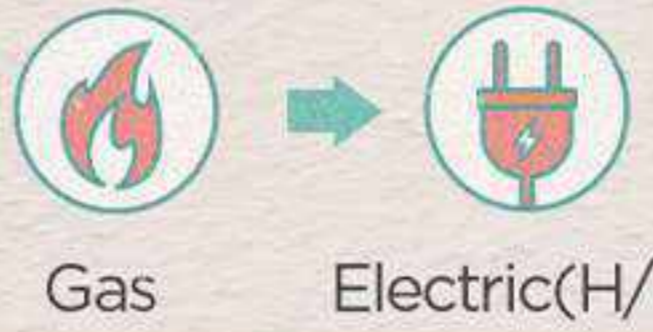

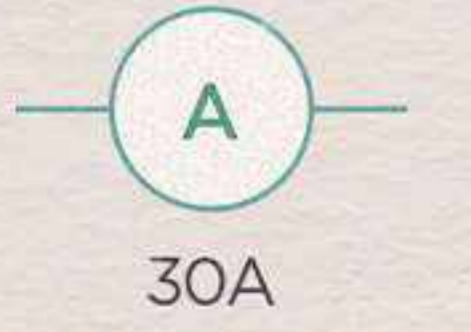
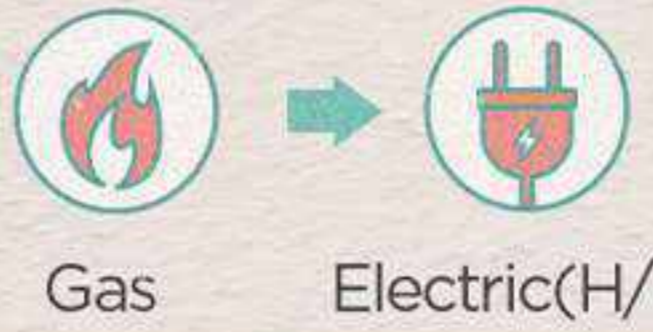

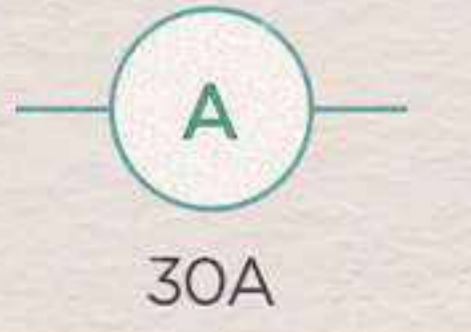



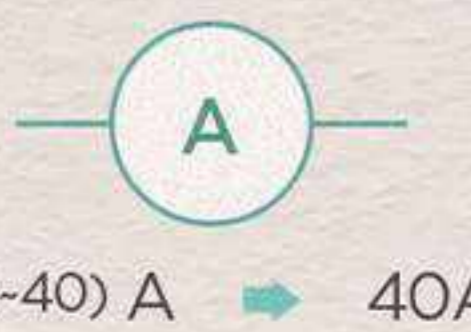
To understand the varying benefits available based on consumer income levels, it is essential to stay informed as these advantages can change frequently. To check the latest guidelines and differences in benefits according to your income bracket, please visit this [website](#). This resource is regularly updated to reflect the most current information and ensure that consumers can make well-informed decisions about their eligibility for various programs.

## Availability of Programs by Region

The benefits and incentives offered by various programs can differ significantly from one state to another, making it crucial for residents to understand exactly what they are eligible to receive based on their specific location. This variability means that what is available in one state may not be offered in another, underscoring the importance of localized research. To ensure you have access to the most accurate and relevant information, it is essential to investigate the specific programs and benefits available in your state. For detailed information about the different incentives and to see a comprehensive list of what your state offers, please [click this link](#).

## Installation and Upgrading

The next phase in the home electrification process involves the careful selection of appropriate electric appliances and systems, ensuring they align with the home's specific needs and the goals of the electrification plan. Professional installation of these appliances and systems is crucial, as it guarantees both safety and efficiency, key factors in the successful transition to electrification. In many cases, this transition may necessitate an upgrade to the home's existing electrical infrastructure, ensuring it has the capacity to support the new electric appliances and systems effectively and safely. This step is vital for the seamless integration and optimal functioning of the electrification upgrades.

	Condition	Voltage	Ampere	Outlet	Wiring	Panel
 <b>Dryer</b>	 Gas    Electric(H/P)	 120V    240V	 15A    30A	Essential	Essential	Optional
	 Electric    Electric(H/P)	 240V	 30A	-	-	-
 <b>Cooking</b>	 Gas    Electric	 120V    240V	 15A    50A	Essential	Essential	Optional
	 Gas    Electric(H/P)	 240V	 30A	N/A	Essential	Optional
 <b>Water Heater</b>	 Gas    Electric(H/P)	 240V	 30A	-	-	Optional
	 Gas    Electric(H/P)	 240V	 30A	-	-	Optional
 <b>Heat Pump</b>	 Electric (A/C)    Electric (H/P)	 240V	 (30-40) A    40A	-	Optional	Optional

## Rewiring and Panel Upgrades

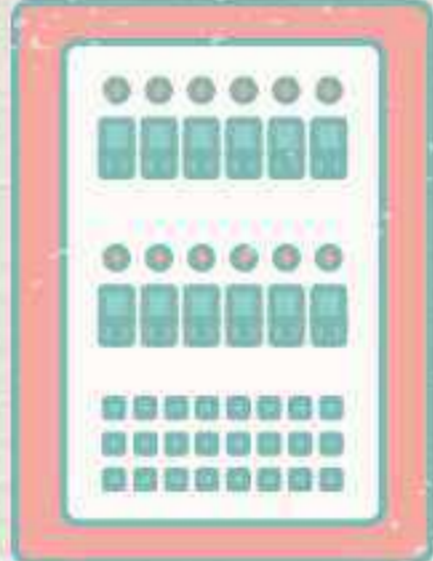


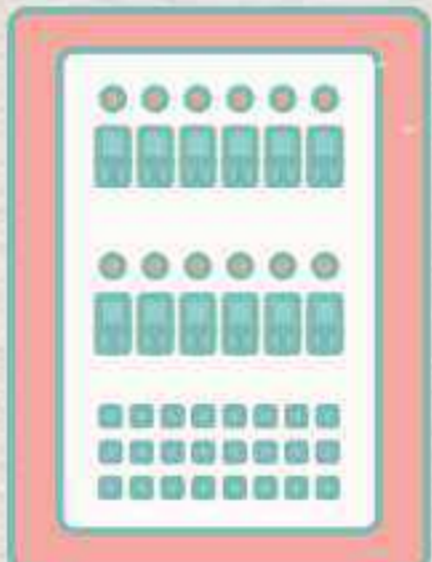




Your home is connected to the electric grid, receiving power through major wires, akin to pipes, and distributed via an electrical panel. Older homes may have a 60A or 100A panel, while newer ones may handle 200A or more. It's possible to electrify a home with a 100A service, but upgrading to 200A may be desirable for comprehensive electrification.

## Identifying Your Panel Size

Determining your panel size involves checking your electric meter, electrical panel, and main breaker or fuse for amperage ratings. This helps establish the lowest amperage rating, indicating your home's electrical service capacity. At least 100A, which is the National Building Code minimum, is required for complete home electrification.

## Panel Upgrade Considerations

If you need more than 100A, contact your utilities provider to check the maximum service available without altering home wiring. Upgrading to 200A is advisable for future-proofing, especially if you're considering adding solar panels or multiple electric vehicles, and it may cost between \$750 and \$4,000.

	Cost Estimate	Rebate
 <p>Allowable Electric Capacity After 2015, 200A † Before 2015, 100A</p> <p>Electric Panel</p>	 <p>+\$4,500</p>	 <p>+\$4,000</p>
 <p>Electric Range/ Cooktop Only Need 240V 50A Circuit Breaker (by NEC)</p> <p>Wiring &amp; Circuit Breaker</p>	 <p>+\$1,500~\$3,000 <small>* Standard of 1780ft<sup>2</sup> for a single-family house. * \$10,000 for full replacement</small></p>	 <p>+\$2,500</p>
<p>120V → 240V</p>  <p>Outlet (120V → 240V)</p>	 <p>+\$20~\$200</p>	-

\* For inquiries regarding electric panel installation, contact the installer listed on the panel.

\*\* If an electrical specialist is required, ensure to reach out to a licensed electrical contracting firm.

\*\*\* For issues or questions about your current utility services, please directly contact your utility provider.

## Anticipating Future Upgrades

When considering upgrades or maintenance to your home's electrical system, it's wise to anticipate future needs by installing dedicated circuits and outlets for appliances you may transition to electric. This foresight not only prepares you for unforeseen equipment replacements but also offers cost efficiency by minimizing the need for multiple electrician visits. For instance, pre-wiring for essential appliances such as a heat pump water heater, a combination induction stove and electric oven, a heat pump dryer, and an EV Level 2 charger can significantly enhance your home's electrical infrastructure. Such wiring installations, which range in cost from \$250 to \$750 and take approximately 2-3 hours, depend on the proximity of the electrical panel to the appliances. Moreover, planning for higher capacity circuits than currently necessary can provide additional flexibility and efficiency for future upgrades or new installations.

Wire Gauges Size & Wire Ampacity Table	
3/0 Gauge	200 AMPS Service Entrance - From Utility Pole to Energy Meter
1/0 Gauge	150 AMPS Service Entrance & Feeder Wire - To Panel Box
3 Gauge	100 AMPS Service Entrance & Feeder Wire - To Panel Box
6 Gauge	55 AMPS Feeder & Large Appliance Wire
8 Gauge	40 AMPS Feeder & Large Appliance Wire
10 Gauge	30 AMPS Appliances e.g. Dryer, Air-Conditioning, Water Heater
12 Gauge	20 AMPS Appliances for Laundry, Bathroom, & Kitchen Circuits
14 Gauge	15 AMPS General Lighting, Fans & Outlet/ Receptacle Circuits



## Ongoing Maintenance and Upgrades

Key practices for the long-term success of home electrification include regular maintenance of electrical systems, staying informed about technological advancements, implementing energy monitoring systems, and integrating smart grid technologies for optimized energy usage.

# Conclusion

The transformative journey towards home electrification represents a critical stride in aligning residential living with global sustainability and energy efficiency goals. By embracing electricity, particularly from renewable sources, households can significantly reduce their carbon footprint, enhance safety, and enjoy the benefits of advanced technology and cost savings. The landscape of incentives, such as those offered by the Inflation Reduction Act, further accelerates this shift, providing tangible support for those ready to make the transition.

Amidst the complexities and technicalities of electrifying homes, LG stands as a steadfast ally, offering expertise and solutions to ensure that the transition is seamless and beneficial for homeowners seeking to contribute to a more sustainable and efficient future. In the next part of our Home Electrification White Paper, we will look beyond HVAC systems and explore the total home electrification process, including washing machines and dryers, dish washers, ESS solutions, and EV charging stations

# 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





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