# We can Electrify EVERYTHING!



Powering our lives with clean energy

~ heat pumps ~ induction ~ EVs ~ insulation ~ solar ~ and more ~

Presbyterians for Earth Care July 10, 2025 Instructor:
Trisha Tull
Certified Electric Coach,
Rewiring America

#### Science of Climate Change

- Brief, clear explanation is available on my website:
- Inhabiting-eden.org. Scroll down to April 22, 2024 for link, or go to:
- https://inhabitingeden.org/carbon-and-energy/

#### Carbon and Energy

#### **NOTE TO READERS**

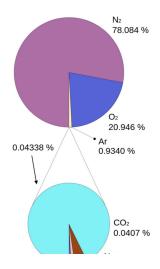
The following basic explanation of the science of climate change, extracted from my book *Inhabiting Eden: Christians, the Bible, and the Ecological Crisis,* was written in 2012. Important situational changes that have taken place in the years since are noted in red.

One of the most important things we can do is to have climate conversations, i.e., to talk with others about climate change and what we hope to gain by stemming it. We do not need to explain the science to do so. This excerpt is simply offered in lay terms for those interested in a bit of background.

#### Carbon and Energy

We all know that different solids and fluids have differing properties. Gold, iron, calcium, carbon, and sulfur are all solid elements, but we can see, feel, and in some cases smell the differences among them. Similarly, though oxygen, nitrogen, argon, and carbon dioxide are all invisible gases, they too differ in behaviors. Most of the atmosphere is nitrogen (78 percent) and oxygen (20 percent). Argon comes next (1 percent). These three gases are simple:  $N_2$ ,  $O_2$ , and Ar. Sunlight passes through them as if they were not there.

But the next most prevalent gas is carbon dioxide, CO<sub>2</sub>. As a more complex molecule, it absorbs the sun's infrared light, trapping heat. This reality, which can be demonstrated by simple experiments, is called the "greenhouse" effect, and carbon dioxide is called a greenhouse gas. Other greenhouse gases are methane (CH<sub>4</sub>), water vapor (H<sub>2</sub>O), nitrous oxide (N<sub>2</sub>O), ozone (O<sub>3</sub>), and a variety of chemically complex human-made gases such as CFCs and HFCs.



## Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments

Incheon, Republic of Korea, October 8 – Limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society, the IPCC said in a new assessment. With clear benefits to people and natural ecosystems, limiting global warming to 1.5°C compared to 2°C could go hand in hand with ensuring a more sustainable and equitable society, the Intergovernmental Panel on Climate Change (IPCC) said on Monday.

# We can Electrify EVERYTHING!



Powering our lives with clean energy

~ heat pumps ~ induction ~ EVs ~ insulation ~ solar ~ and more ~

Presbyterians for Earth Care July 10, 2025 Instructor:
Trisha Tull
Certified Electric Coach,
Rewiring America

#### Agenda

- 1. Why electrify?
- 2. How can we prioritize?
- 3. How can we pay for it?
- 4. What about church buildings?
- 5. Questions?

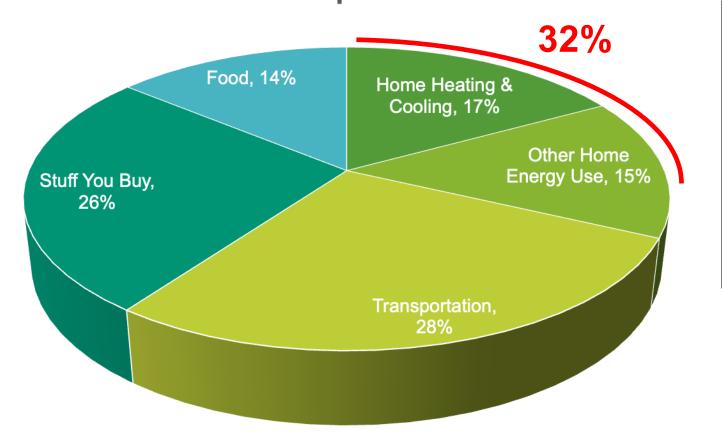


#### Why Electrify?

- Because our household decisions matter.
- To cut down/out pollution from mining and burning.
- To save money.
- To enjoy more comfortable homes and commutes.
- To get to "renewable energy ready," or even net-zero carbon.
- Collectively, to protect health, stimulate jobs, and renew the economy. Nationwide, robust electrification can create over 3 million new jobs by 2035.



#### Average American's Carbon **Footprint**



Your home is roughly a third of your carbon footprint

**Union of Concerned Scientists** 



#### Renewable Capacity Highlights

26 March 2025

#### 2024 Headline Figures

Renewable power capacity

4448 GW

Renewables share of total capacity

46.4%

YoY growth of renewable power capacity

15.1%

Variable renewable share of total capacity

31.3%

YoY growth of variable renewable power capacity

23.2%

2030 Target **11.17** TW

Base year (2022)

**3.38** TW

End of 2024, cumulative

**4.45** TW

Needed to reach target **6.72** TW



1865 GW



Hydro **1283** GW



Wind **1133** GW



Bioenergy 151 GW



Geothermal **15** GW

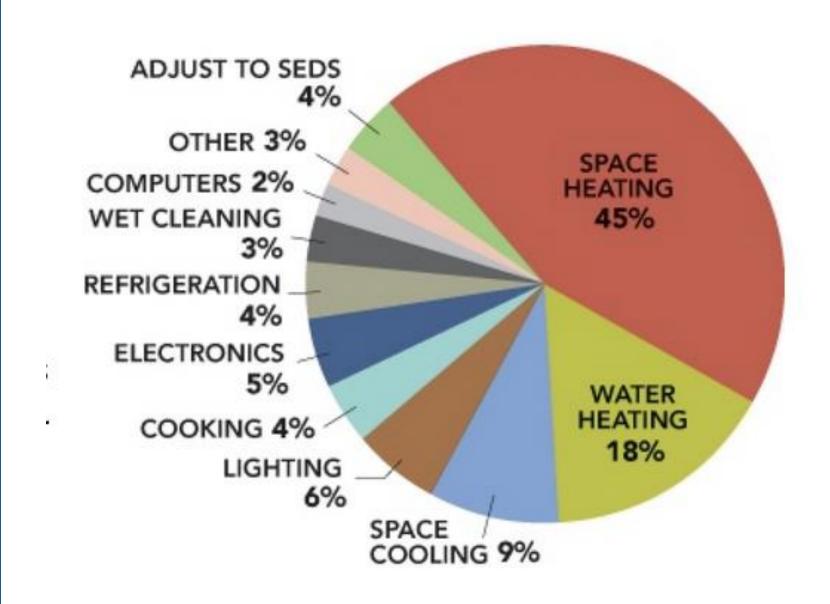


Marine 1GW

#### Household Energy Use

Space
Heating &
Cooling,
combined: 54%

Water heating: 18%



## What can we electrify?

- Anything that currently runs on coal, oil, or gas....in other words that works by burning stuff:
  - Home heating system
  - Home water heating
  - Clothes drying
  - Cooking
  - Transportation
  - Yard and garden maintenance
- But aren't some electrical things like heating and cooking inefficient?
  - Not anymore. They are more efficient to run now than gas.

## How else can we save money and energy?

- Not only electrification but energy conservation...
  - Energy audit, Blower door test
  - Sealing and insulating
  - Any more of those old lightbulbs to change?
  - How old are the other major appliances? Are they Energy Star?
  - What about that old refrigerator in the garage?
  - What do you already do...? Or do without?



### Step 1: Get an Energy Audit

- 1. Have an expert do an energy audit with "blower door" test to look for leaks and poorly insulated areas
- 2. To find energy auditor....

#### Ways to find an Energy Auditor

\*\*\*Building Performance Institute: https://locate.bpi.org

- 1. Home Performance with Energy Star
- 2. <u>RESNET</u> (Residential Energy Services Network)
- 3. Local utility may perform audit or refer you to auditor
- 4. Call a local energy efficiency contractor
- 5. Certified Home Energy Rating (HERS) companies <a href="https://www.hersindex.com/find-a-hers-rater/">https://www.hersindex.com/find-a-hers-rater/</a>
- 6. Consult Nextdoor or local community groups



#### Do-It-Yourself basic energy audit

#### Do-It-Yourself Home Energy Assessments

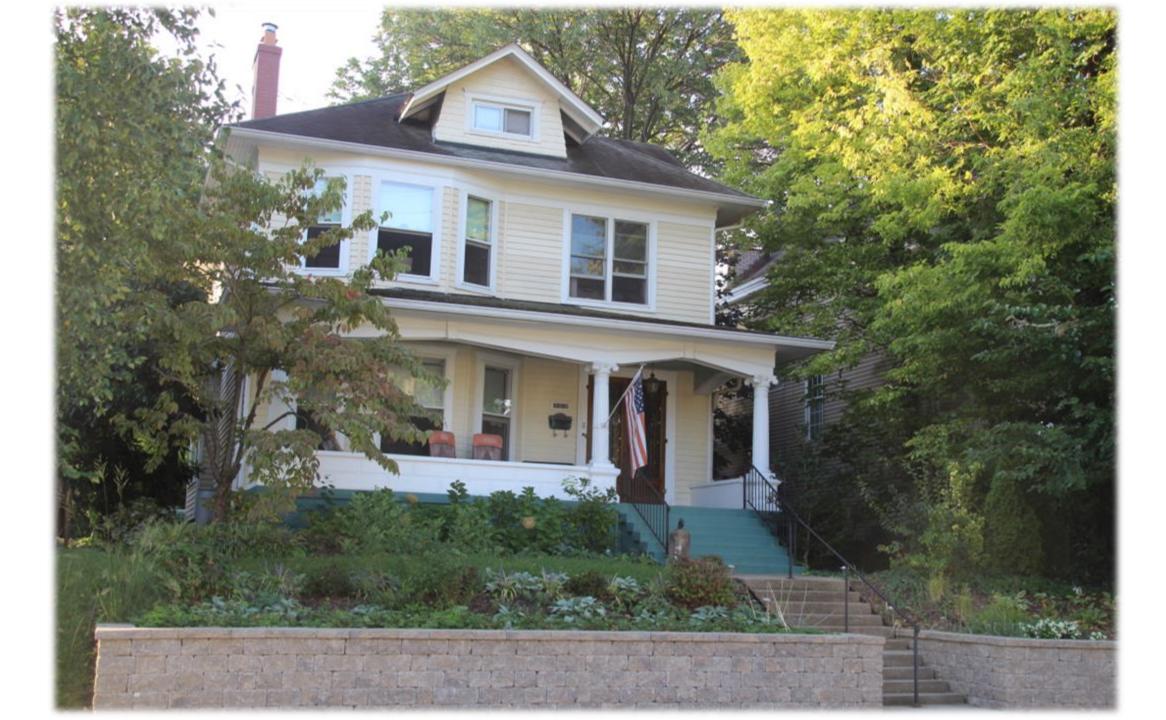
While a <u>professional home energy assessment</u> is the best way to determine where your home is losing energy and where you can save, you can conduct your own simple but diligent walk-through and spot many problems in any type of house. This "do-it-yourself" home energy assessment will not be as thorough as a professional home energy assessment, but it can help you pinpoint some of the easier areas to address.

When walking through your home, keep a checklist of areas you have inspected and problems you found. This list will help you prioritize your energy efficiency upgrades. Do not assume that just because your home is recently constructed—or even new—that there are no opportunities to save energy. Energy-saving technology has evolved rapidly over the past few years, outpacing training commonly available to many builders, including some of the most reputable.



### Step 2: Seal and insulate

Have an expert seal and insulate your home.



## Step 3: When you can, install a Heat Pump

MOVES heat from one place to another, rather than creating it

Replaces both home heating system AND air conditioner

3-5 times times more energy efficient than other systems

When? PLAN FOR THIS BEFORE IT'S AN EMERGENCY! Before your current system breaks. Or when building an addition.

What? Room minisplit or whole home heat pump systems for homeowners; portable and window units for renters

Who? Search on "heat pump installer" and your city.





#### **HEATING & AIR CONDITIONING**

As a Trane Comfort Specialist, our technicians have what it takes to make sure every project achieves exceptional results. We've been a trusted Georgetown HVAC company for decades for one simple reason. We bring our customers the best in service and savings. What can we do to make your life more comfortable today?

- Air conditioning, heat pump, and furnace installations
- > Prompt furnace, heat pump, and AC repair services
- > Cost-effective seasonal HVAC maintenance agreements
- Ductless and geothermal HVAC products and services
- > Refreshingly effective indoor air quality solutions
- > Advanced HVAC controls and thermostats





## Step 3: When you can, install a Heat Pump

MOVES heat from one place to another, rather than creating it

Replaces both home heating system AND air conditioner

3-5 times times more energy efficient than other systems

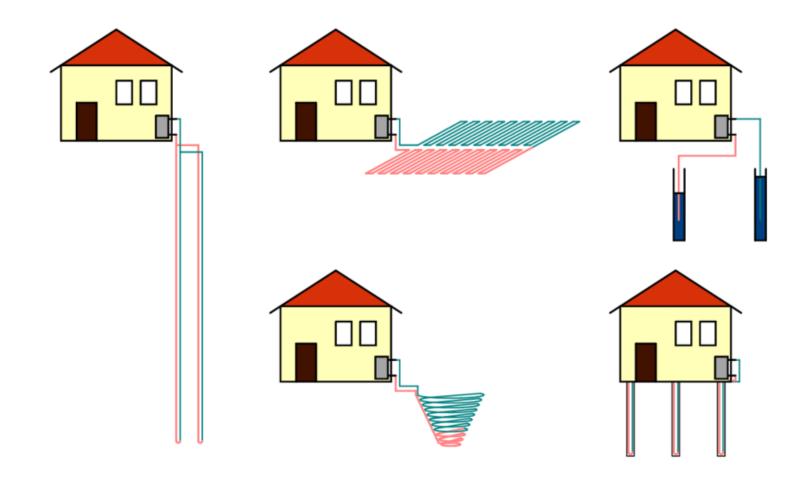
When? PLAN FOR THIS BEFORE IT'S AN EMERGENCY! Before your current system breaks. Or when building an addition.

What? Room minisplit or whole home heat pump systems for homeowners; portable and window units for renters

Who? Search on "heat pump installer" and your city.



#### **Ground-Source Heat Pumps**



Various installations for ground loop systems



#### Ground-Source Heat Pump



## Ground-Source Heat Pump



VARIABLE SPEED
HORIZONTAL VERTICAL AND DOWNFLOW
EARTHPURE® SYSTEMS SIZES 0930–1860



## 9. EFFICIENT HOT WATER



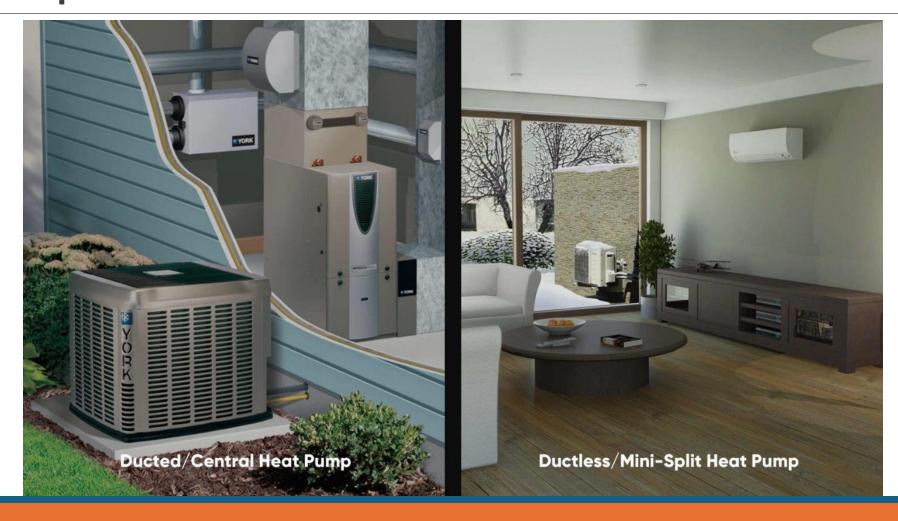
#### In-Floor Radiant Heat



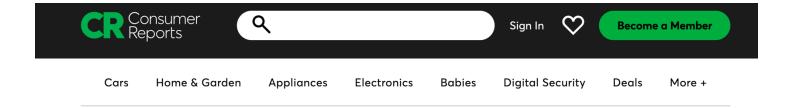
## Tranquility (TBW) Water-To-Water Series

WATER-TO-WATER SYSTEMS SIZES 036, 060, AND 120 [8.7, 13.5 and 26.9 kW]

## Two Types of Air-Source Heat Pumps



#### Consumer Reports on Electric Heatpumps



### 4 Reasons You Might Consider a Heat Pump (Plus a Few Caveats)

These eco-friendly, highly efficient HVAC systems could save you money. But what is a heat pump, exactly?



 Read this Consumer Reports article about heat pump cost and efficiency relative to furnaces: "Four Reasons You Might Consider a Heat Pump (Plus a Few Caveats)"

## STORAGE CONDENSATE COLD TO DRAIN

A diagram of how heat pump water heaters work, including air intake (1), compressor (2), heating element (3) and digital controls (4) (New Buildings Institute)

#### Step 4: Install Heat Pump Hot Water Heater

- 3 to 4x more efficient than traditional
- Replace when current water heater is around 10 years old to avoid emergency replacement
- Costs more upfront, but saves \$100-\$300 annually on utilities
- Fed credit of 30% up to \$2,000 + State & Utility
- Most require 240V but some 120V available



#### Steps 5 and beyond: Other Electrification Projects

Induction Stove or Cooktop

Electric Heat Pump Clothes Dryer

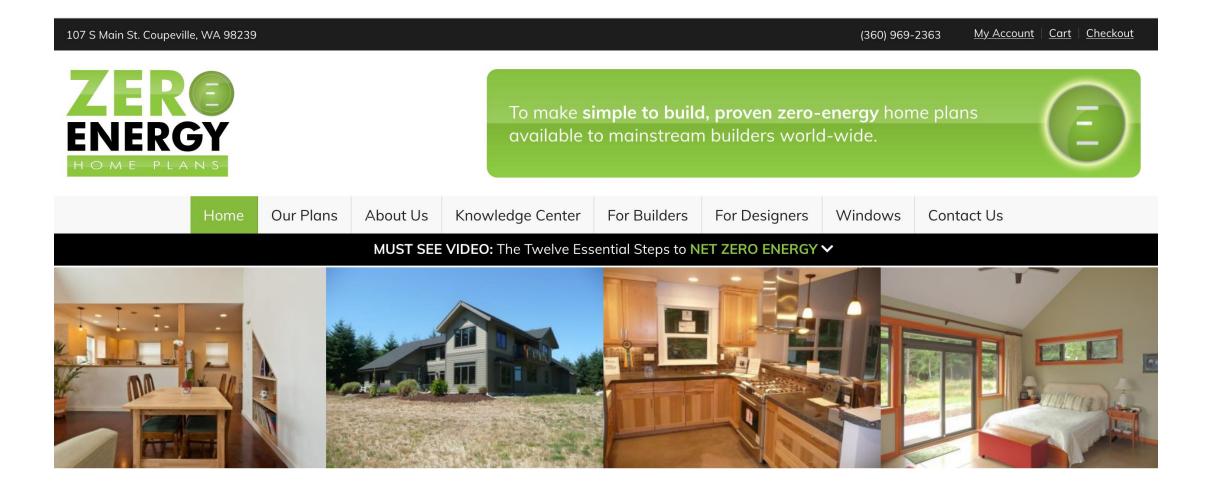
**LED Lighting** 

Electric Lawnmower & other yard equipment

Electric outdoor grills

Solar array

#### www.zero-energyplans.com



## Twelve Essential Steps to Net Zero Energy

- 1. Building orientation
- 2. Simple design
- 3. Window orientation
- 4. Thermal mass
- 5. Tight building envelope
- 6. Balanced insulation

- 7. Balanced ventilation
- 8. Heating/cooling equipment
- 9. Domestic hot water
- 10. Efficient appliances
- 11. Efficient lighting
- 12. Alternative energy



#### **ALTERNATIVE ENERGY**

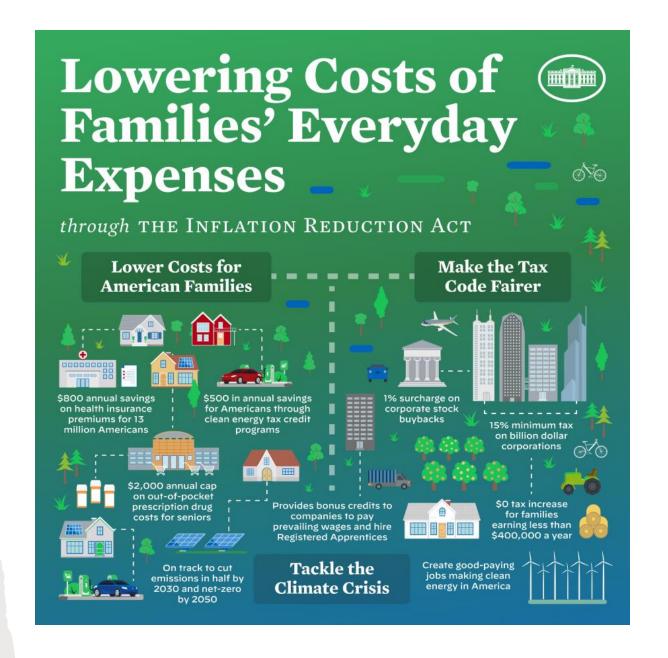
26 panel, 7.8 kW system from Solar Energy Solutions + battery storage 8 more panels added in 2025



Until the end of 2025, we still have help from the Inflation Reduction Act of 2022

Federal home tax credits will expire Dec 31, 2025

EV tax credits expire September 30, 2025



ITEM	AMOUNT	TIMELINE
Battery Storage Installation	30%	Available Now!
Geothermal Heating Installation	30%	Available Now!
Electric Panel	\$600	Available Now!
Electric Vehicle Charger	\$1,000	Available Now!
New Electric Vehicle	\$7,500	Available Now!
Used Electric Vehicle	\$4,000	Available Now!
Heat Pump Air Conditioner/Heater	\$2,000	Available Now!
Heat Pump Water Heater	\$2,000	Available Now!
Rooftop Solar Installation	30%	Available Now!
Weatherization	\$1,200	Available Now!

## Tax Credits IRS form 5695

Also available to churches via "Direct Pay"

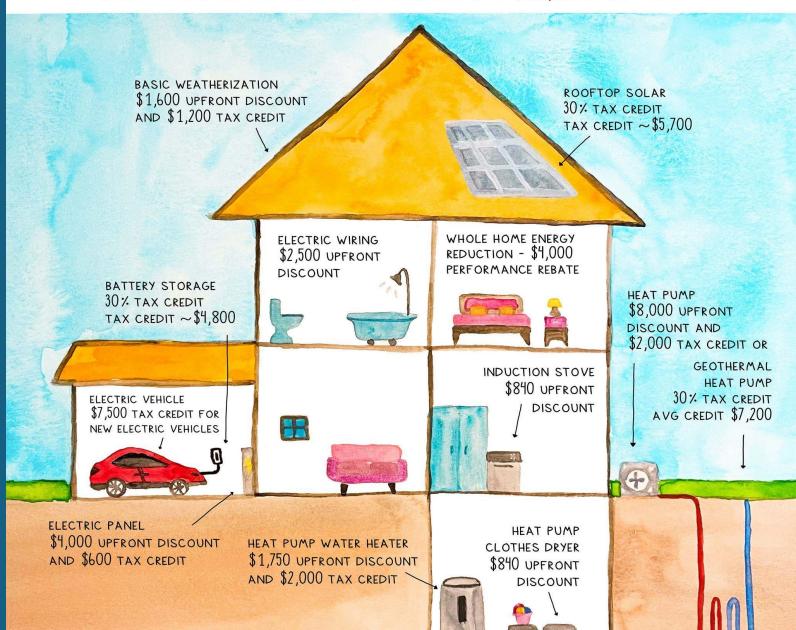
#### **IRA INCENTIVES**

Federal Tax Credits are available until Dec 31, 2025

Rebates are rolling out state by state

#### POTENTIAL SAVINGS FROM THE IRA

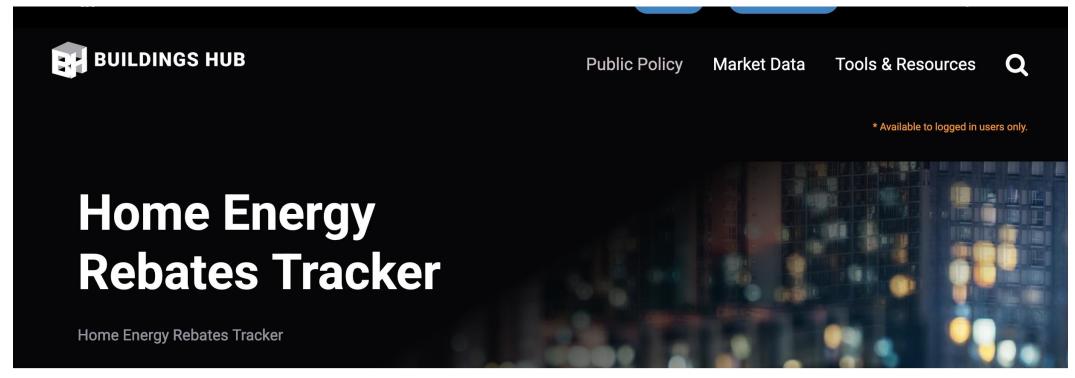
BASED OFF A 2 PERSON HOME WITH A COMBINED INCOME OF \$150,000 IN NEW YORK CITY



ITEM	AMOUNT
Electric Panel	\$4,000
Electric Stove	\$840
Electric Wiring	\$2,500
Heat Pump Water Heater	\$1,750
Heat Pump Air Conditioner/Heater	\$8,000
Heat Pump Clothes Dryer	\$840
Weatherization	\$1,600
Whole Home Energy Reduction	\$4,000

# State Rebates/ Point of Purchase Discounts

#### Atlas Building Hub Home Energy Rebates Tracker

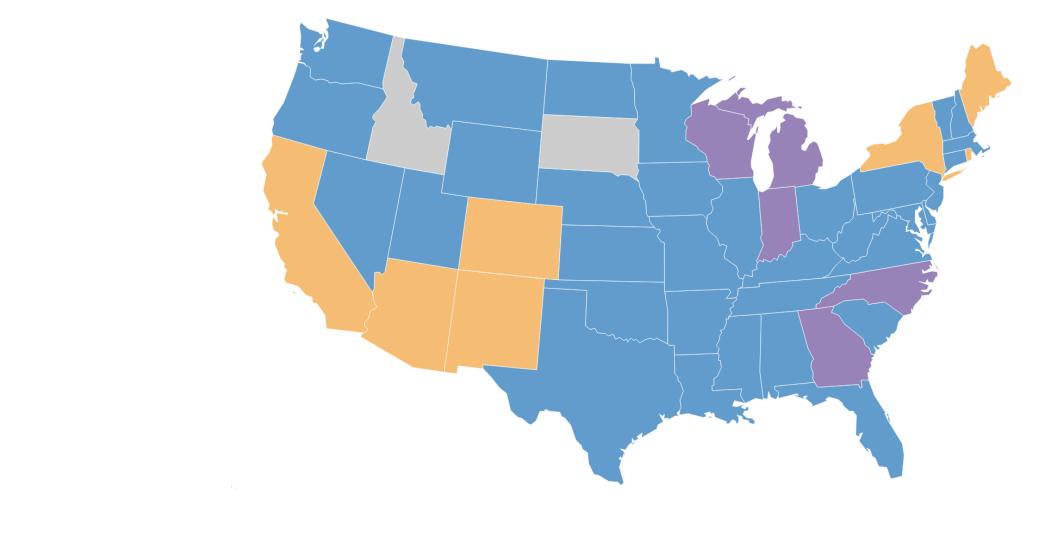


This dashboard displays information on the status of Home Energy Rebates programs across U.S. states and territories. The Home Electrification and Appliance Rebates (HEAR) programs provide up to \$14,000 in point-of-sale rebates for appliances. The Home Efficiency Rebates (HER) programs provide up to \$8,000 in rebates for whole-home projects that reduce energy use by at least 20 percent. All data is from the U.S. Department of Energy, state implementing agencies, or news reports. This dashboard is updated on a rolling basis as states receive their awarded funding, stand up their programs, and make rebates available to their residents.

#### Home Energy Rebates Program Map

Alaska

**Status** • HEAR and HER Approved • HEAR and HER Available • HEAR Available • Not participating



American Samoa Guam Puerto Rico

Northern

Mariana Islands

#### Status of Home Energy Rebates Programs

\$145,895,255 Approved

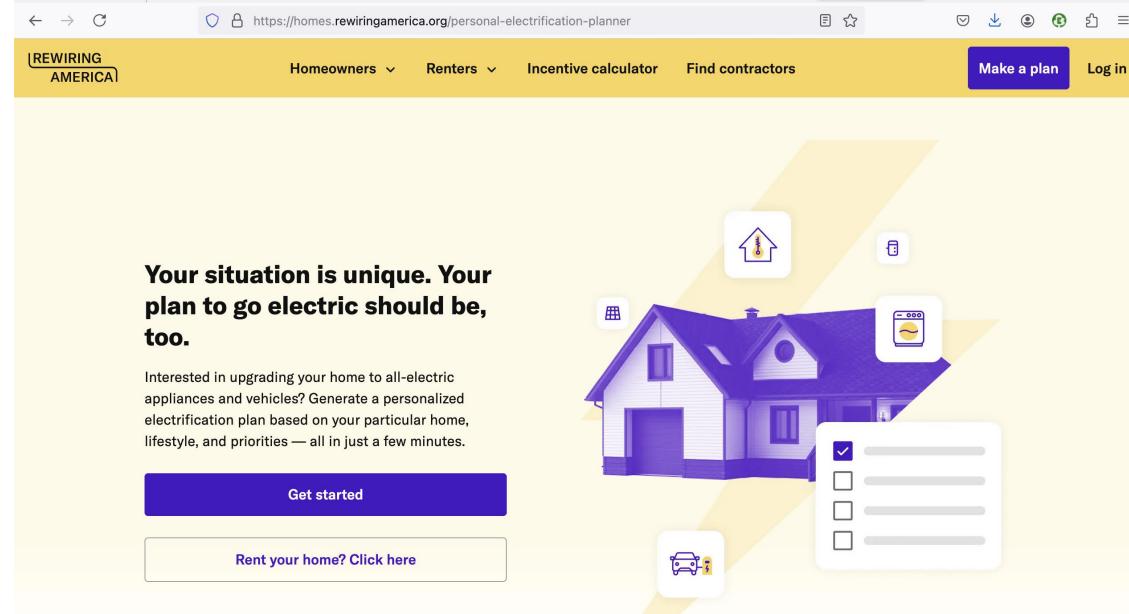
Massachusetts

State	Total Funding Awarded	HEAR Program Status	HEAR Funding Awarded	HER Status	HER Funding Awarded	Link
Alaska	\$74,444,011	Approved	\$37,150,940	Approved	\$37,293,071	
American Samoa	\$49,942,860	Approved	\$24,923,740	Approved	\$25,019,120	, (
Arizona	\$153,138,233	Launched	\$76,421,080	Approved	\$76,717,153	,
Arkansas	\$105,066,302	Approved	\$52,433,010	Approved	\$52,633,292	
California	\$581,619,486	Launched	\$290,252,580	Approved	\$291,366,906	,
Colorado	\$140,242,735	Launched	\$69,985,890	Approved	\$70,256,845	;
Connecticut	\$99,273,907	Approved	\$49,541,390	Approved	\$49,732,517	(
Delaware	\$65,802,063	Approved	\$32,837,400	Approved	\$32,964,663	,
District of Columbia	\$59,384,096	Launched	\$29,635,400	Launched	\$29,748,696	d
Florida	\$345,975,930	Approved	\$172,657,670	Approved	\$173,318,260	, (
Georgia	\$218,778,746	Launched	\$109,178,020	Launched	\$109,600,726	,
Guam	\$51,428,435	Approved	\$25,665,110	Approved	\$25,763,325	j
Hawaii	\$68,318,853	Approved	\$34,093,900	Approved	\$34,224,953	,
Idaho	\$80,890,291	Not participating	\$40,367,910	Not participating	\$40,522,381	
Illinois	\$263,404,844	Approved	\$131,452,470	Approved	\$131,952,374	
Indiana	\$181,891,023	Launched	\$90,772,430	Launched	\$91,118,593	,
Iowa	\$121,178,511	Approved	\$60,473,810	Approved	\$60,704,701	
Kansas	\$105,528,884	Approved	\$52,663,910	Approved	\$52,864,974	
Kentucky	\$134,114,438	Approved	\$66,927,750	Approved	\$67,186,688	,
Louisiana	\$212,356,801	Approved	\$105,972,960	Approved	\$106,383,841	
Maine	\$71,592,450	Launched	\$35,728,050	Approved	\$35,864,400	,
Maryland	\$136,685,144	Approved	\$68,212,540	Approved	\$68,472,604	

\$72,809,130 Approved

\$73,086,125

#### Rewiring America @ Rewiringamerica.org



#### The tools...

- Savings Calculator
  - There is also a tab for renters
  - And a search tool for finding contractors in your area
- Project Planner
  - This you personalize by creating a log in and adding your own information
- Many more resources, growing constantly

## Go here to find more incentives in your local area...

DSIRE: <a href="https://www.dsireusa.org/">https://www.dsireusa.org/</a>

Climate One podcast about home electrification and Rewiring America: "Even Old Houses Can Learn New Elec-Tricks" (1/17/25)

https://www.climateone.org/audio/even-oldhouses-can-learn-new-elec-tricks



Congregational Rooftop Solar

#### Last things...

I can help you plan your projects if you like (<a href="mailto:trishatull@gmail.com">trishatull@gmail.com</a>), or Dave Penzcover at <a href="mailto:Go Electric">Go Electric</a>
<a href="Colorado">Colorado</a> can provide virtual help.
<a href="mailto:Contact him at:">Contact him at:</a>

dpenzcover@gmail.com



#### Questions?

