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The Sponsors of Energize Connecticut, and in partnership with Connecticut Passive House, are pleased to offer *Passive House & All-Electric Homes Initiative* to support workforce development and help transform the energy efficiency and building construction industries in Connecticut.



For more information, please visit [EnergizeCT.com/passive-house](https://EnergizeCT.com/passive-house)  
or email [PassiveHouseTrainingCT@icf.com](mailto:PassiveHouseTrainingCT@icf.com)

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# Take energy efficiency to a new level

Residential New Construction Passive House Multi-family buildings with five units or more



PASSIVE HOUSE INCENTIVE STRUCTURE FOR MULTI-FAMILY (5 UNITS OR MORE)				
Incentive Timing	Activity	Incentive Amount	Max Incentive (Per Unit)	Max Incentive (Per Project)
Pre-Construction	Feasibility Study <sup>1</sup>	Up to 100% of Feasibility Study Costs	N/A	\$5,000.00
	Energy Modeling <sup>2</sup>	75% of Energy Modeling Costs (Before 90% Design Drawings)	\$500.00	\$30,000.00
		50% of Energy Modeling Costs (90% Design/50% Construction)	\$250.00	\$15,000.00
Post Construction	Certification <sup>3</sup>	Up to 100% of Certification Costs	\$1,500.00	\$60,000.00

1. Feasibility Study will require documentation in the form of a Feasibility Study report and invoice from the Passive House Consultant

2. Incentives will only be awarded prior to 50% Construction Drawings for Passive House projects. No incentives will be granted after 50% Construction Drawing set.

3. Certification may be either through PHIUS, PHI, or EnerPHit certification offerings.

Next steps you can take...

Contact your Energy Efficiency Representative or

Go to [EnergizeCT.com](https://energizeCT.com) or call 1-877-WISE USE for more details.

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The future of high-performance,  
all-electric homes starts here.



	LEVEL 1		LEVEL 2	
	Single Family (Detached Dwellings)	Multifamily (Attached Dwellings)	Single Family (Detached Dwellings)	Multifamily (Attached Dwellings)
Total UA Alternative Compliance or HERS Index Score <sup>†</sup>	Total UA $\geq$ 7.5% better than 2021 IECC or HERS Index Score $\leq$ 55		Total UA $\geq$ 15% better than 2021 IECC or HERS Index Score $\leq$ 45	
Heat pump for space heating <sup>††</sup>	Required		Required	
Space Conditioning Connectivity & Controls <sup>†††</sup>	Optional		Required	
Heat pump for water heating	Required	Optional	Required <sup>††††</sup>	
Hot Water Distribution <sup>††††</sup>	Required		Required	
Envelope Infiltration Rate (ACH)	ACH50 $\leq$ 2.5	CFA > 850ft <sup>2</sup> : ACH50 $\leq$ 4.0 CFA < 850ft <sup>2</sup> : ACH50 $\leq$ 5.0	ACH50 $\leq$ 2.0	CFA > 850ft <sup>2</sup> : ACH50 $\leq$ 3.0 CFA < 850ft <sup>2</sup> : ACH50 $\leq$ 4.0
Duct Leakage Rate (CFM)	2021 IECC code minimum requirements		All ductwork must be located in conditioned space	
Balanced Ventilation Systems	Optional		Required HRV/ERV ( $\geq$ 70% SRE / $\geq$ 40% TRE)	
Induction Cooking	Optional		Required <sup>†††††</sup>	Optional
Electric Vehicle Readiness <sup>††††††</sup>	Required		Required	

ALL-ELECTRIC HOME INCENTIVE STRUCTURE		
	Level 1	Level 2
Single Family	\$7,500	\$10,000
Single Family Attached	\$3,000	\$5,000
Multifamily	\$1,500	\$2,500

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## Joe Wachunas

Joe is a passionate environmentalist and writer. In addition to working for Electrify Now, he is a Project Manager at New Buildings Institute, focusing on the Advanced Water Heater Initiative which promotes high efficiency heat pump water heaters. Joe is a frequent contributor to Cleantechnica with articles on a variety of electrification and carbon reduction topics.



## Brian Stewart

Brian has over 35 years experience in product design and manufacturing. He has held senior leadership roles at IDEO and NIKE Inc. including vice president of sustainability. He co-founded Electrify Now to help educate homeowners on how we can all accelerate the clean energy transformation.

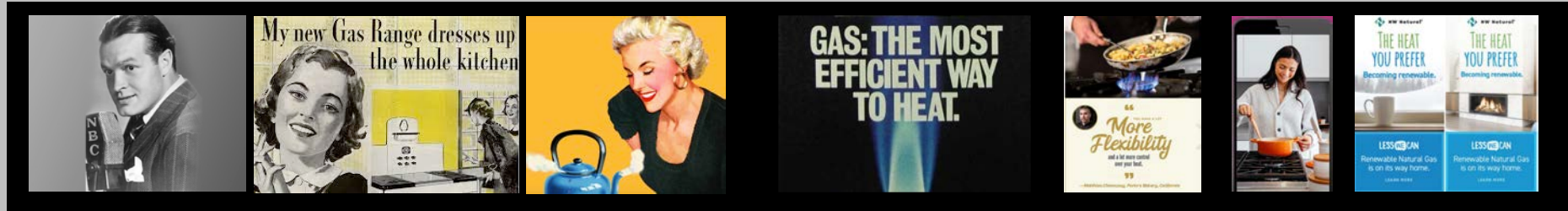
# All Electric Homes and the IRA

Trends in home energy building codes and legislation  
The advantages of all-electric homes  
The key technologies that enable all-electric construction  
Overview of the IRA



# Why do so many Americans love gas in their homes?

## Pro-Gas Campaigns

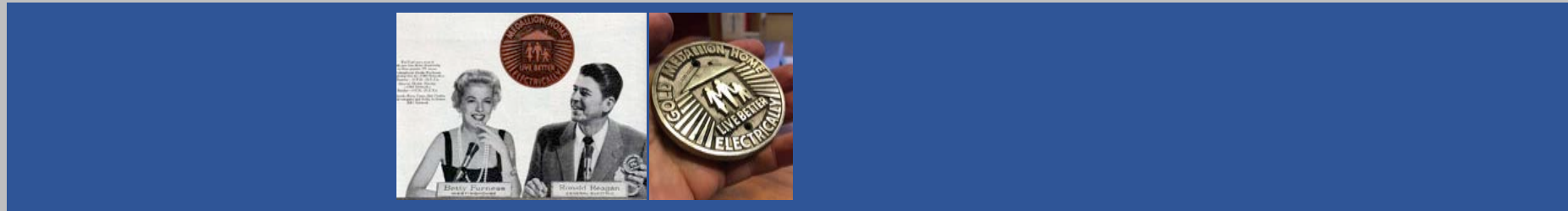


Bob Hope & American Gas Association:  
"Now we're cooking with gas!" (1941)

"Save money with  
gas heating" (1970– 1980)

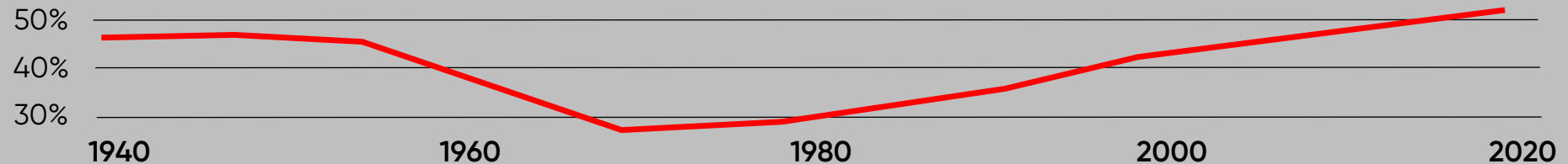
"Natural gas industry's \$1 million PR campaign sets  
up fight over Northwest's energy future" (2019)

## Pro-Electric Campaign



"Live Better Electrically – Gold Medallion Homes"  
900+ utilities, 1 million homes (1956 – 1983)

% of new homes  
w/ gas ranges



Why do so many Americans love gas in their homes?

\$

\$\$



What's changing?



New Products  
Better Information  
Legislation  
Incentives





*Gas appliances contribute to indoor air pollution and are a health hazard, increasing the risk of childhood asthma and asthma severity.*



# HEALTH EFFECTS FROM GAS STOVE POLLUTION

BY BRADY ANNE SEALS AND ANDEE KRASNER



# Building Codes and Legislation

33 States have climate action plans

24 states have specific GHG Reduction Targets

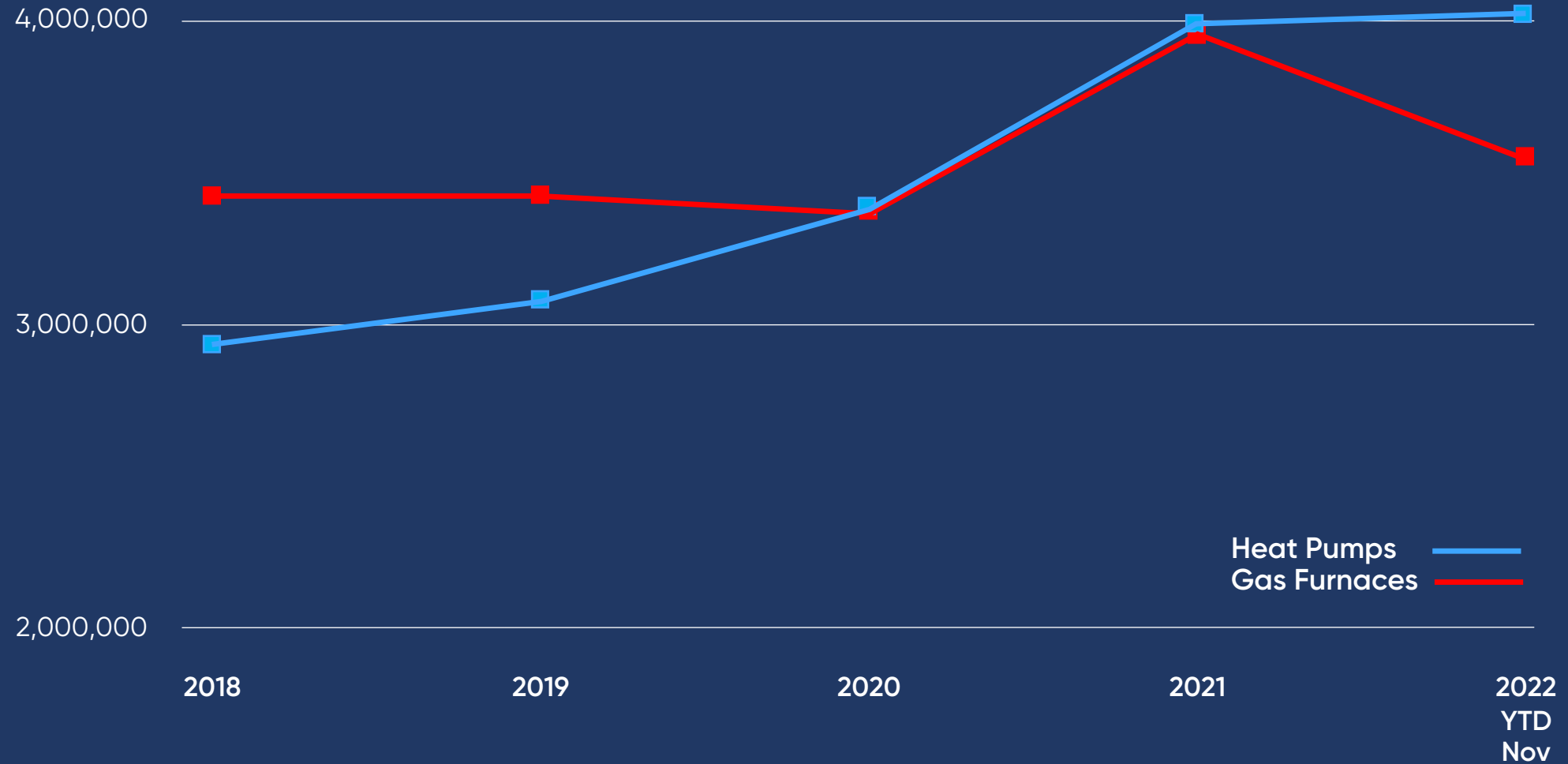
23 States have 100% Clean Energy commitments (51% of US population)

99 cities and counties have zero emissions buildings ordinances

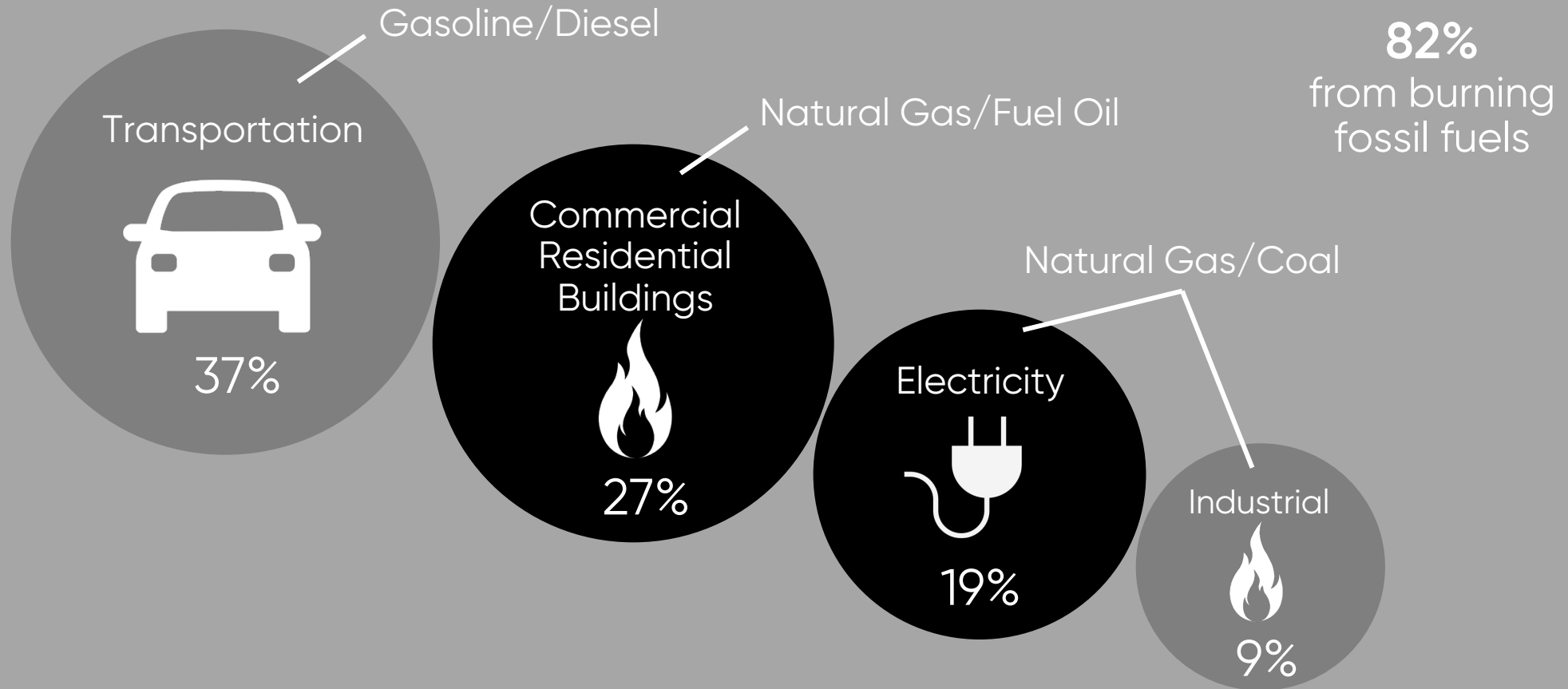
11 States have passed building electrification polices at city or state level

California, Oregon, Washington, Utah, Colorado, Massachussets, Maryland, New York, New Jersey, Maine, DC

# US Heat Pump vs Gas Furnace Sales



# Connecticut Sources of GHG Emissions



# Good News:

Wind and solar are now the lowest cost sources of new energy

Solar \$359

Wind \$135

Nuclear \$118-192

Coal \$66-152

Gas CC \$44-68

Solar \$32-42

Wind \$28-54

2009 \$/MWh

2019 \$/MWh



Electric Appliances are dramatically more efficient – 3 to 10X

Electricity gets cleaner every year

2.5 B

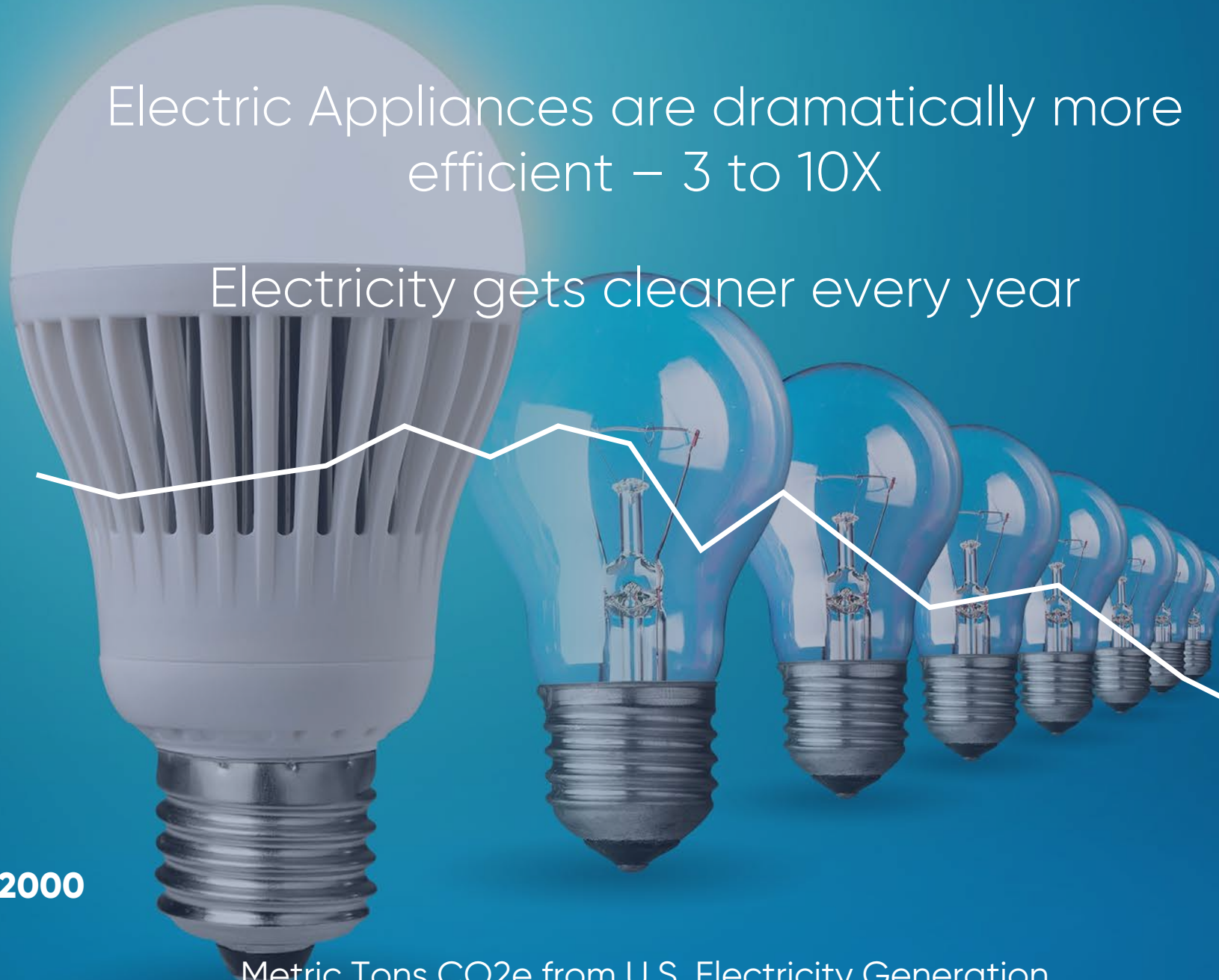
2.0 B

1.5 B

2000

2018

Metric Tons CO<sub>2</sub>e from U.S. Electricity Generation

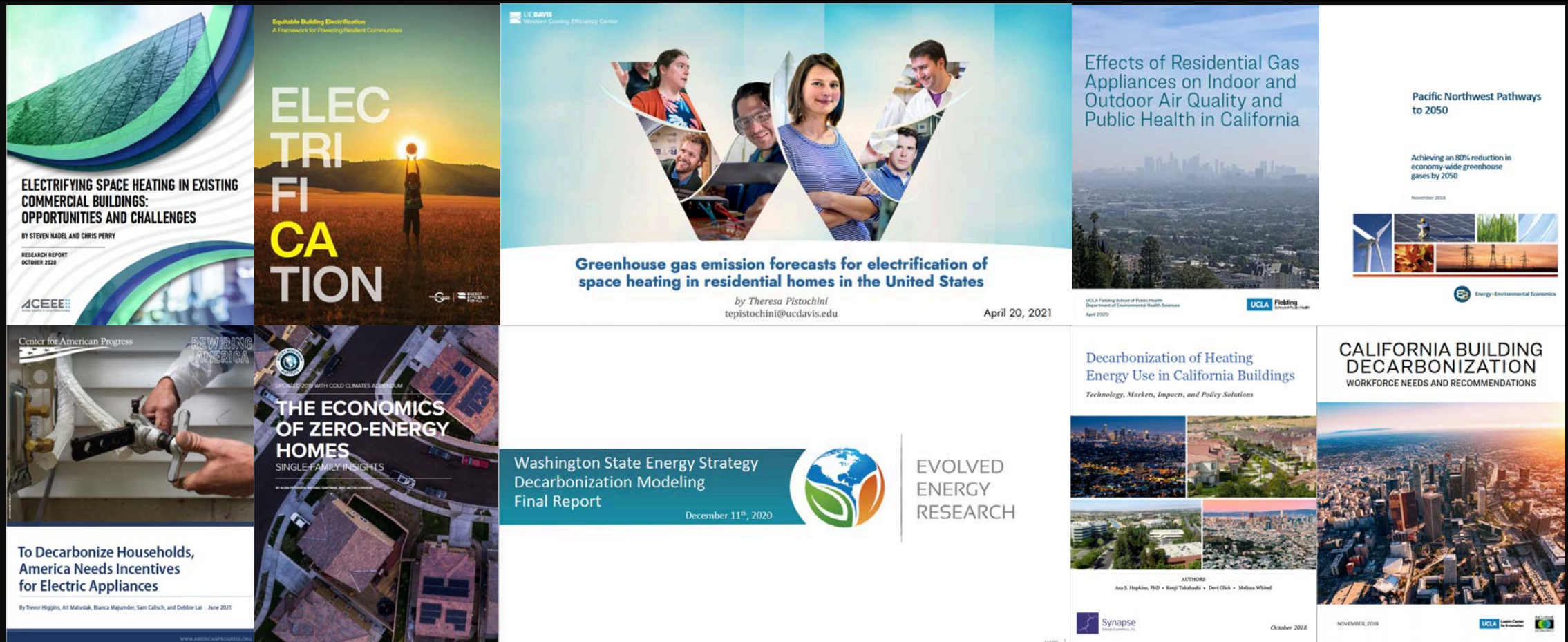


# Electrify Everything

A sustainable future where the wind and sun powers **ALL** our primary energy needs



Over 15 studies in the last 4 years all conclude that electrification is the most effective and lowest cost way to decarbonize buildings





Electricity  
**3-5 Tons CO<sub>2</sub>e/yr**



Gas Car  
**4-8 Tons CO<sub>2</sub>e/yr**



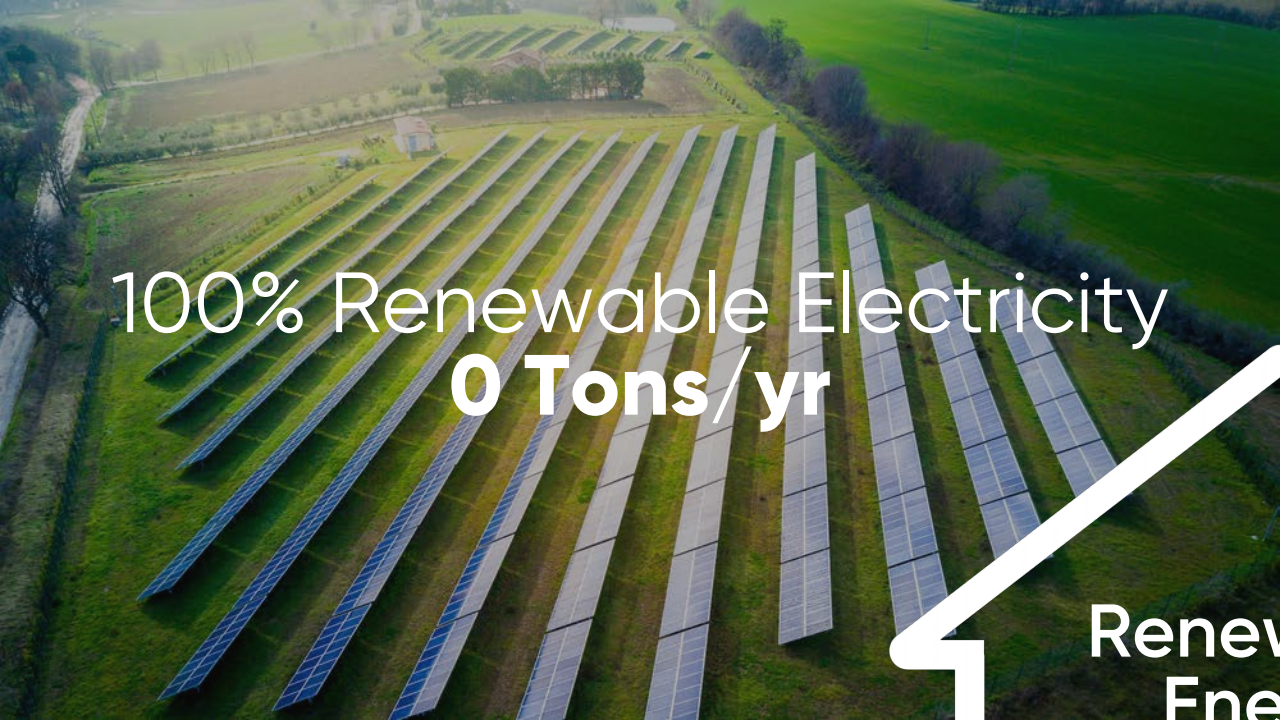
Efficiency  
Strategies  
-20%



Gas Furnace  
**4-8 Tons CO<sub>2</sub>e/yr**



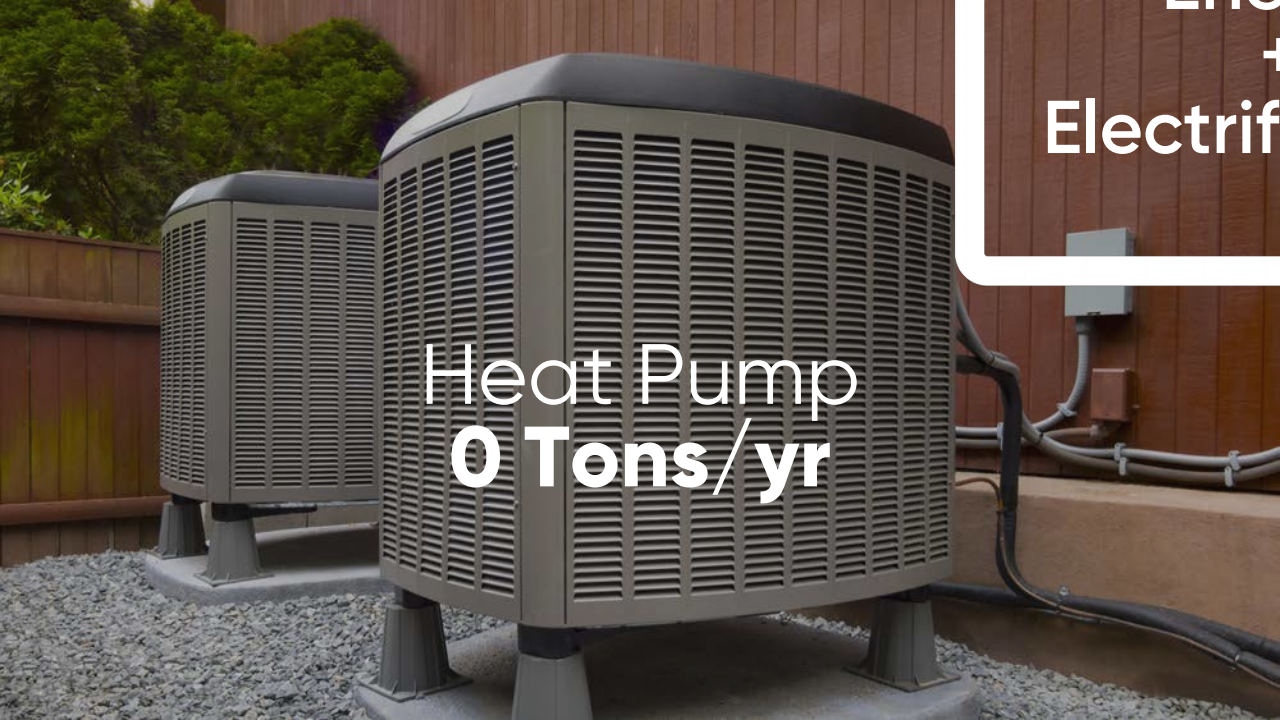
Gas Water Heater  
**1-3 Tons CO<sub>2</sub>e/yr**



100% Renewable Electricity  
**0 Tons/yr**



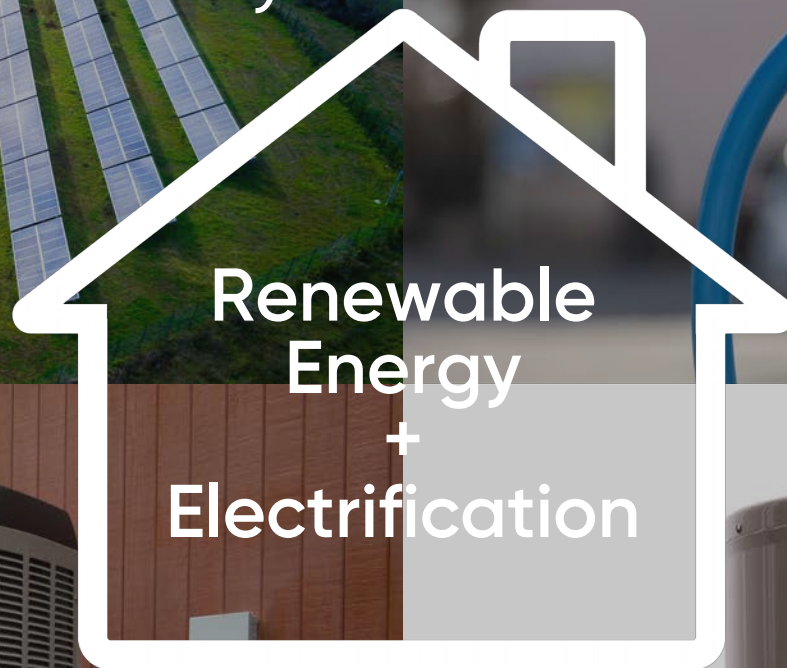
EV  
**0 Tons/yr**



Heat Pump  
**0 Tons/yr**



Heat Pump Water Heater  
**0 Tons/yr**



Renewable  
Energy  
+  
Electrification



Typical Home  
Energy Emissions

20–30 Tons CO<sub>2</sub>/yr

\$4,000/yr



Renewable Energy  
+ Electrification

0 Tons CO<sub>2</sub>/yr

\$3,000/yr

# Advantages of All Electric Homes



## Performance

More comfort and a better living experience

## Air Quality

Healthier indoors and outdoors

## Lower Cost of Operation

Ultra High Efficiency

## Sustainability

Answering the challenge of our times

# Essential Electric Technologies

Ultra High Efficiency – High Performance – Low Carbon

Heat Pump  
Water  
Heater



Heat Pump  
Space  
Heating/AC



Induction  
Range/  
Cooktop



Electric  
Fireplace  
Insert



Heat  
Pump  
Dryer



# Heat Pumps

Makes ice even when  
your kitchen is hot



# Heat Pump Water Heater

Lowest cost and lowest carbon hot water



3X more energy efficient than other systems  
Draw heat from ambient air  
Best in unconditioned space  
Quieter than gas power vent models  
Internet connectivity / demand response





## Heat Pump Water Heater

- Ambient air is pulled into unit and heat is absorbed by the the refrigerant
- Compressor increases the temperature of the refrigerant to heat water
- Cool air is discharged into the space or through ducting to the outside

# Water Heating Costs

\$900



Electric Storage  
.90 UEF

\$620



Electric Tankless  
.99 UEF

**\$1,100**



Gas Storage  
.70 UEF

\$1,400



Gas Tankless  
.90 UEF



**Electric Heat Pump**  
3.88 UEF



**\$489/yr**



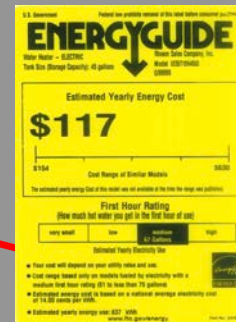
**\$417/yr**



**\$271/yr**



**\$229/yr**



**\$117/yr**

# Water Heating Costs



# Major Manufacturers

## 10 Year Warranties

Rheem



AO Smith



Bradford White



Sanco (CO2)



# Heat Pump Space Heating/AC

More comfort and cleaner air

Heating and Cooling with one system

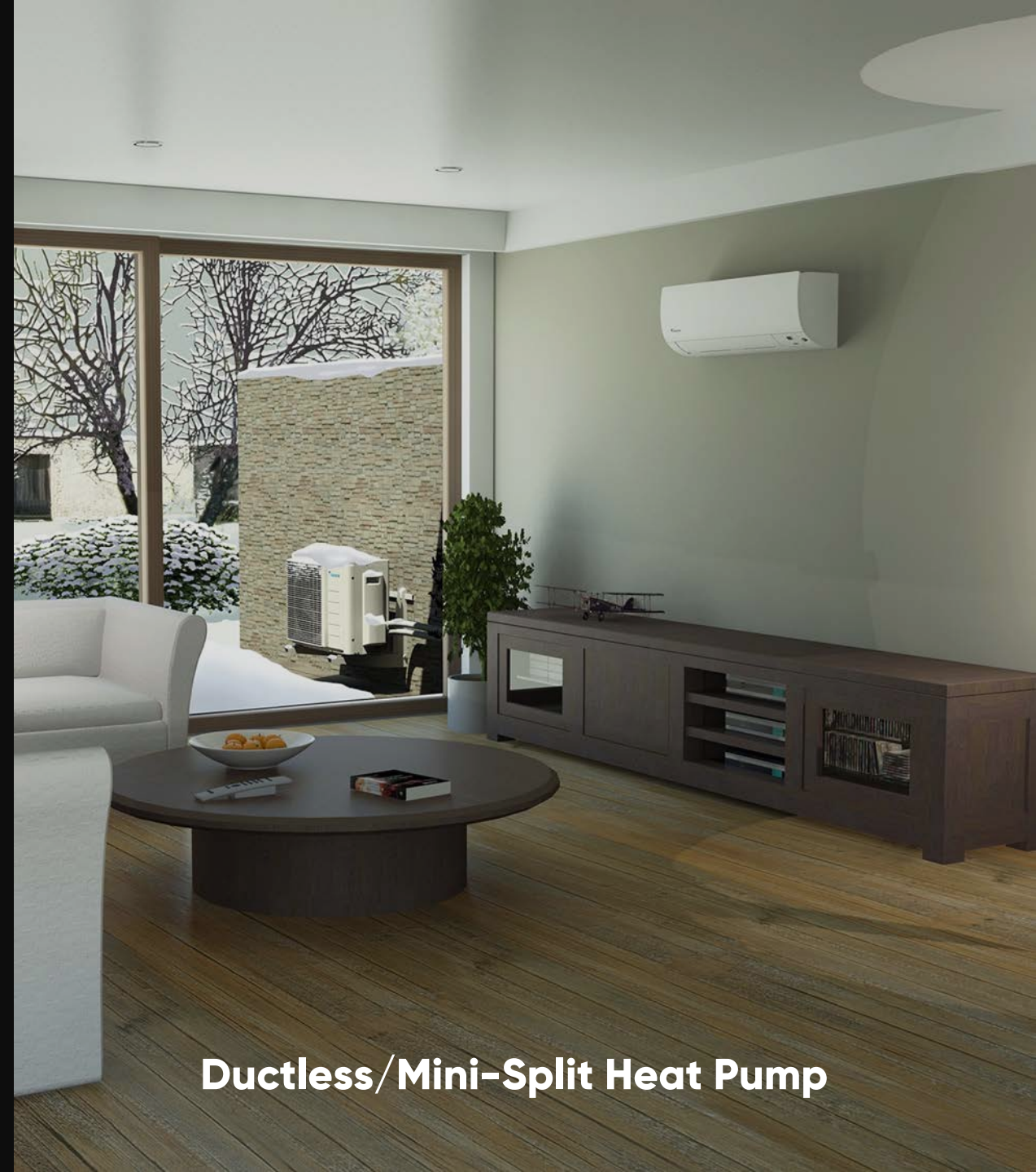
More constant temperatures

More continuous air movement

More air filtration

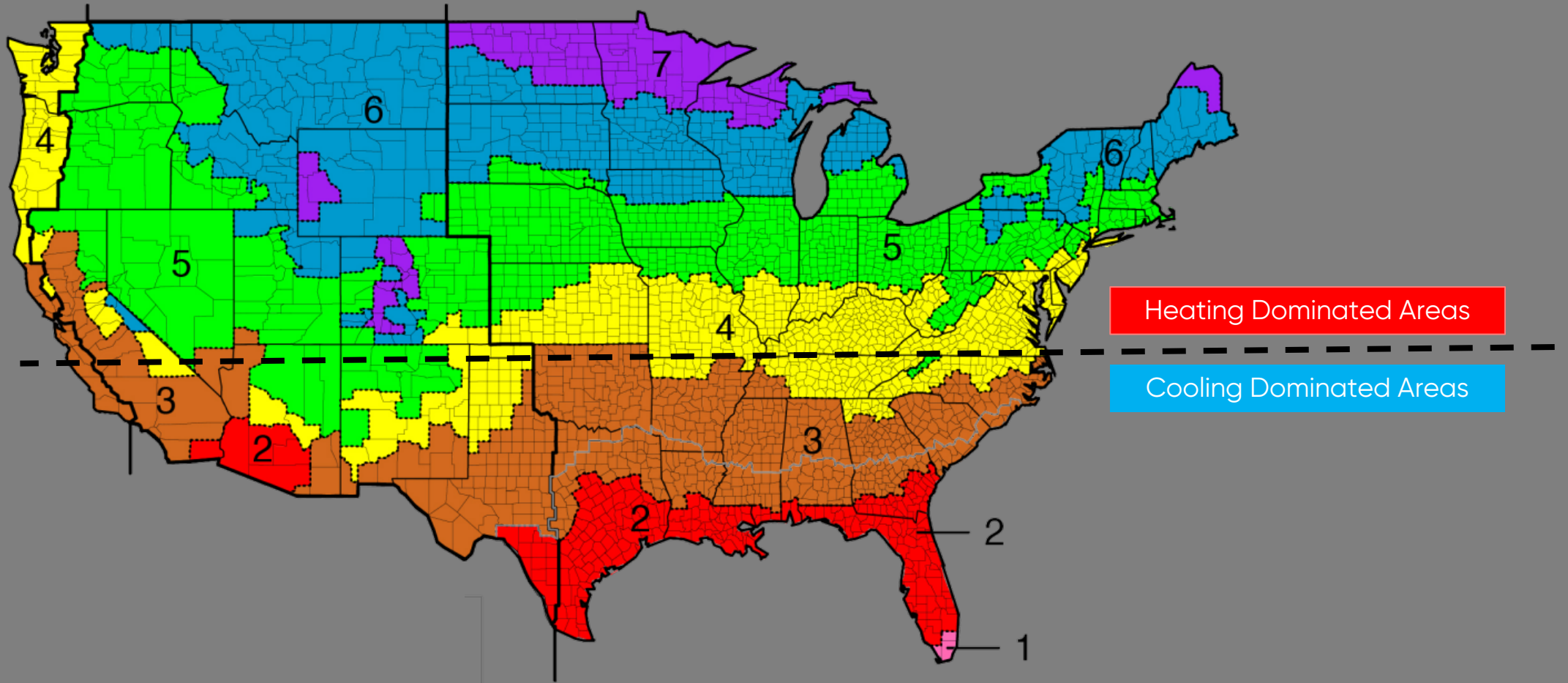


**Ducted/Central Heat Pump**

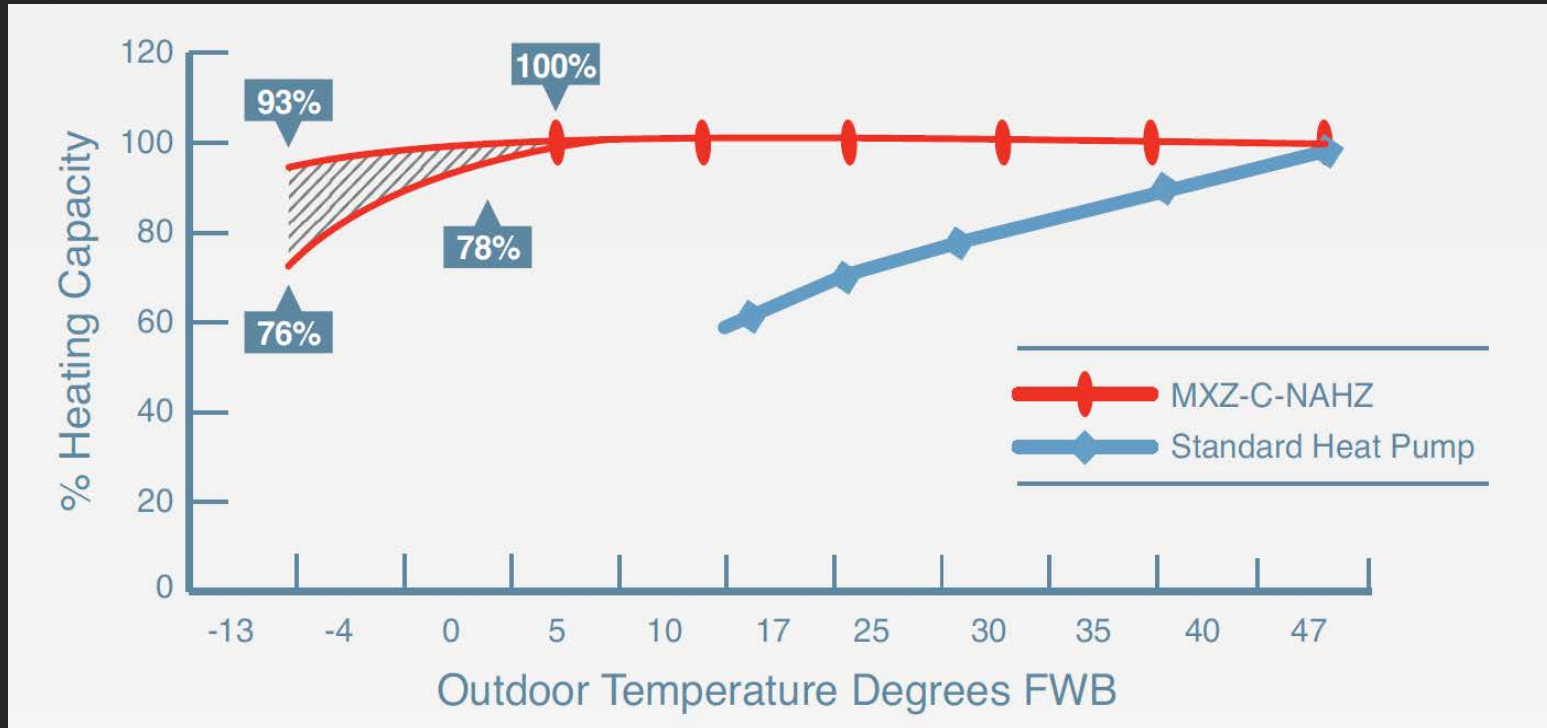


**Ductless/Mini-Split Heat Pump**

# Will heat pumps work in colder climates?



# Cold Climate Heat Pumps



- Purpose built to excel at heating
- 75% -95% capacity at -13° F (no backup needed)
- Inverter compressors and cold climate programming
- Intelligent defrost cycles and drainpan de-icing
- Higher up front cost/lower operating costs than conventional HP



# Induction Cooking

More control / Superior air quality

Precise temperature control  
Faster heating and cooldown  
Much easier to clean  
Safer – cool to the touch  
ZERO CO and NO2 emissions  
No leaking methane



# Magnetic Induction Technology

Glass Surface

Steel or Cast Iron Cookware  
(not Aluminum or Copper)

Digital Controls  
/Knobs

Copper  
Magnetic coils



# Superior Performance

Time to Heat 8 quarts of Water



**17.8 min**



Electric  
Resistance



**18.6min**



Natural  
Gas



**9.3 min**



Electric  
Induction

# Major Manufacturers

Samsung  
\$1,100



LG  
\$3,000



Café  
\$4,500



Bosch 36"  
\$6,000



# Electric Fireplace Inserts

Temperature control and Versatility

Thermostats for temperature control

No venting required

110Volts

Safer – no residual heat

Variety of sizes and styles

Realistic flame options

# Heat Pump Dryers

High efficiency, no venting

ENERGY STAR most efficient rating  
75% less energy

No venting required  
Slightly longer drying time  
Typically smaller units



# Trusted Suppliers

All the major brands are invested in electrification

 **DAIKIN**

 **TRANE**

**KitchenAid®**



**Amana®**

**LENNOX**

**FRIGIDAIRE®**

*American  
Standard*

**Carrier**

**JENN AIR®**



**AC Smith**

 **YORK®**

**WOLF™**

**Goodman®**

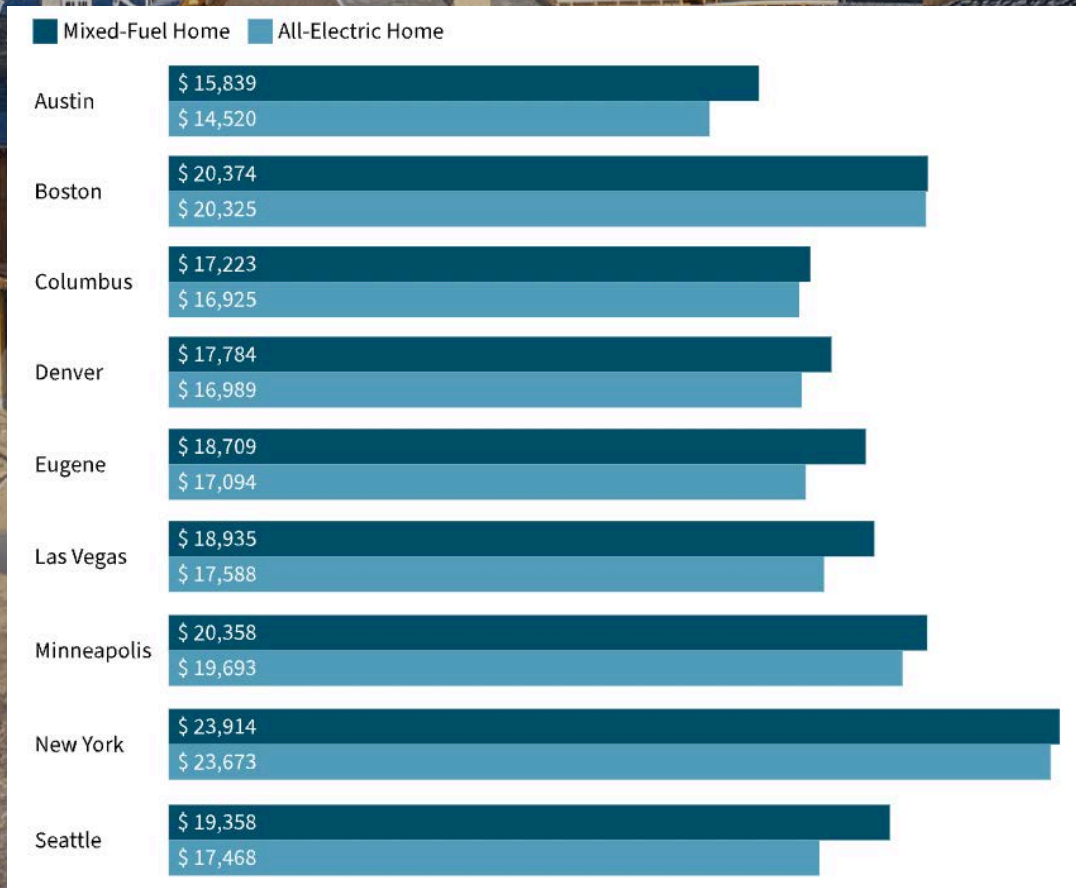
 **MITSUBISHI  
ELECTRIC**

**SAMSUNG**

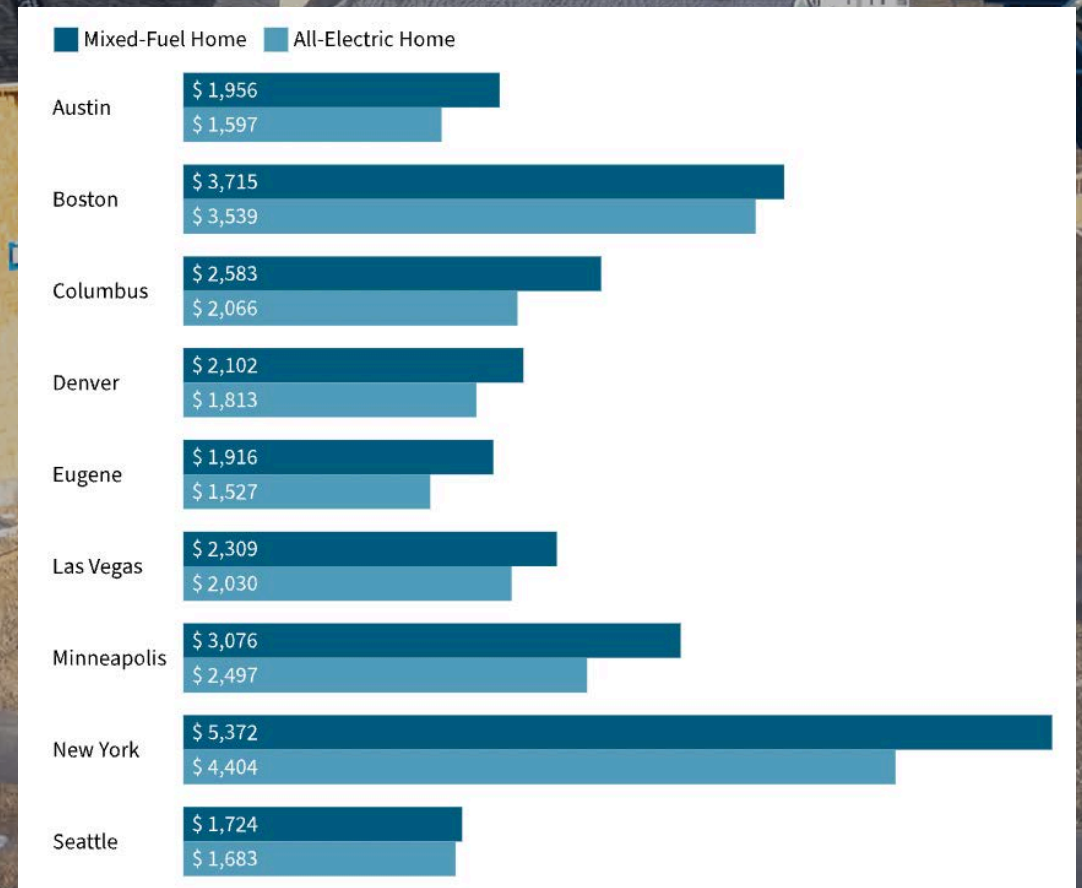
# All-Electric Homes

## Lower cost to build and operate

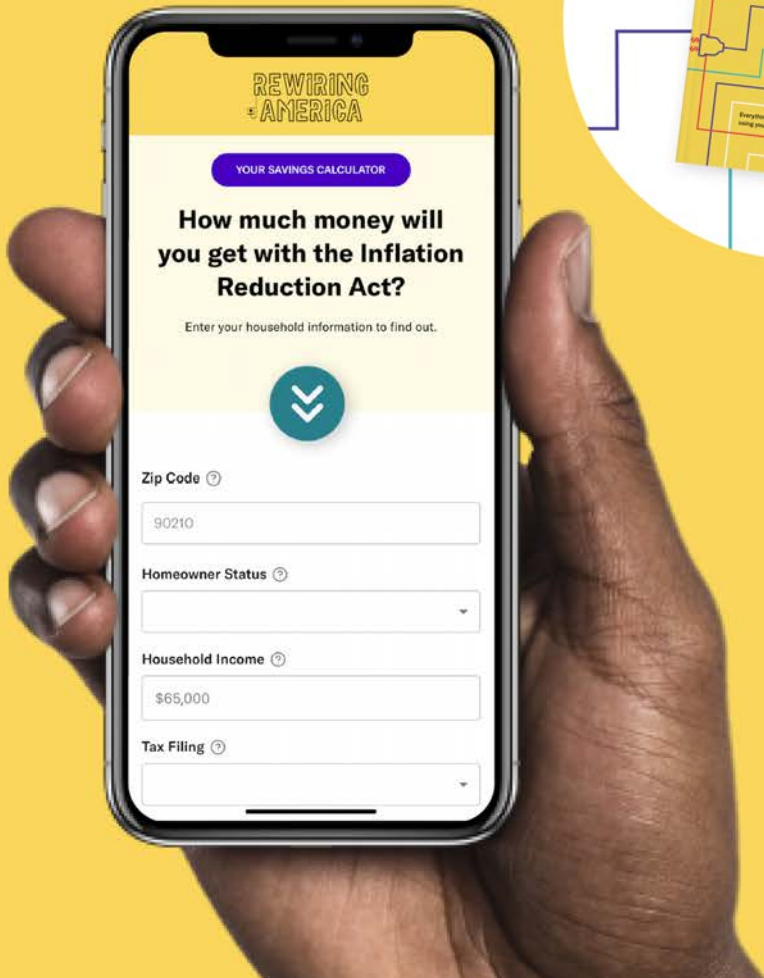
### 5% Lower Upfront Appliance / Systems Cost



### 14% Lower Total Annual Operating Cost



# REWIRING AMERICA



## The Inflation Reduction Act

**Consumer Rebates: HEEHRA & HOMES**

**Consumer Tax Credits: 25C & 25D**

**New Energy Efficient Home Credits: 45L**

**Workforce & Manufacturing Programs**

## **Consumer Electrification Rebates: HEEHRA**

**\$4.5B in direct rebates for electrification, up to \$14,000 per household**

**Designed for lower/moderate income households:**

→ **100% of cost of electrification for households <80% AMI**

→ **50% of cost of electrification for households 80–150% AMI**

**Point-of-sale rebates for product + install costs of up to:**

- **\$8,000 for a heat pump**
- **\$4,000 for electrical panel upgrades**
- **\$2,500 for rewiring**
- **\$1,750 for a heat pump water heater**
- **\$1,600 for basic weatherization**
- **\$840 for a heat pump clothes dryer**
- **\$840 for an electric or induction stove**
- **+ \$500 installer incentive**

**Applies to new construction** as long as the homebuyer/tenant meets the income criteria. Rebates must be passed through to the homebuyer.

**Will be finalized at the State level – ETA later this year**

## **Consumer Efficiency Rebates: HOMES**

**\$4.3B in rebates, up to \$8,000 per LMI household and \$4,000 otherwise**

Rebates of:

- \$2,000 for 20-35% energy savings
- \$4,000 for >35% energy savings
- Rebates doubled for LMI households
- Includes both single-family & multifamily (per unit)

Max amount covered:

- Up to 50% of project costs for households >80% AMI
- Up to 80% of project costs for households <80% AMI

Rebates cannot be stacked together for the same piece of equipment (HEEHRA & HOMES), but rebates can be stacked with tax credits

**Does not apply to new construction, since it relies on measuring energy consumption before & after upgrades.**

**Will be finalized at the State level – ETA later this year**

## **Consumer Electrification Tax Credits: 25C**

**Tax credit of up to 30% of the cost of electrification & energy efficiency upgrades, up to \$3,200 per year**

Designed for households who have tax liability (middle/high income)

Annual credit for heat pumps (HPs) and heat pump water heaters (HPWHs) capped at \$2,000

Annual credit for other upgrades capped at \$1,200

- \$600 for electrical panel (if installed in conjunction)
- \$1,200 for weatherization
- \$150 for energy audit
- \$600 for energy properties other than HP/HPWH

Annual credit limit resets every year

**Applies to existing homes.** Must be the taxpayer's residence and originally placed in service by the taxpayer.

**Available January 1, 2023**

## **Consumer Solar/Storage Tax Credits: 25D**

**Tax credit of up to 30% of the cost of solar and battery storage**

Credit already exists, but increased back to 30% and extended to 2035, and battery storage included

Remains at 30% through 2032, then steps down to 26% for 2033 and 22% for 2034

Non-refundable: benefits households with tax liability

Can be taken for storage or solar individually

**Applies to both new construction and existing. Must be the taxpayer's residence and originally placed in service by the taxpayer.**

**Available January 1, 2022**

## **Builder Energy- Efficient Home Tax Credits: 45L**

**Tax credit of up to \$5,000 for new energy-efficient homes available to developers upon sale**

Base amounts:

- \$500/unit for multifamily meeting ENERGY STAR New Construction
- \$1000/unit for multifamily meeting Zero Energy Ready Homes (ZERH)
- \$2,500 for single-family meeting ENERGY STAR New Construction
- \$5,000 for single-family meeting ZERH

5x the amount for multifamily units if prevailing wage requirements are met:

- \$2,500/unit for multifamily meeting ENERGY STAR New Construction
- \$5,000/unit for multifamily meeting ZERH

**Applies to new construction and major renovations and likely can be braided with HEEHRA or 25C.**

**Available January 1, 2023**

## **The Inflation Reduction Act: Workforce Incentives**

### **HOMES WORKFORCE**

**\$200M for states to develop a workforce training program**

Training & education to contractors involved in energy  
efficiency or electrification upgrades

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### **HEEHRA INSTALLER REBATES**

**\$500 installer incentive rebate for a qualified electrification project**

All other rebates in HEEHRA must be passed through to household

## The Inflation Reduction Act: Manufacturing Incentives

### DEFENSE PRODUCTION ACT

IRA increases DPA budget by \$500 million to bolster the domestic manufacturing of heat pumps

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### MANUFACTURING TAX CREDITS: 48C

Investment tax credit for facilities manufacturing clean energy technology  
Baseline 6%, increases to 30% if project meets labor requirements

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### LOAN PROGRAMS OFFICE

\$3.6 billion to guarantee loans up to \$40 billion in principal amounts



## Case Study:

Going Street Commons  
Portland, OR



11 Homes  
Earth Advantage  
Net Zero Ready Certification  
Ducted Heat Pump / AC  
HEPA air filtration system  
Heat Pump Water Heater  
Induction Range  
Rooftop Solar ready



## Case Study:

Cully Green all Electric  
Neighborhood  
Portland, OR



23 Homes  
Ductless Heat Pump / AC  
Heat Pump Water Heater  
Induction Range  
EV Charging  
Rooftop Solar – 6 kW systems



## Case Study:

Portland Houseworks  
Homes  
Portland, OR



5 Homes  
Ductless Heat Pump / AC  
Heat Pump Water Heater  
Induction Range



## Case Study:

Mason St Townhomes  
Portland, OR



14 Homes  
Ductless Heat Pump / AC  
Induction Range



## Case Study:

Ichigo All Electric Homes  
Reed's Crossing, OR



22 Homes  
Earth Advantage  
Net Zero Certified  
Ducted Heat Pump / AC  
80 gal Heat Pump Water Heater  
Electric Fireplace  
Induction Range  
EV / Solar Ready

# Thank You!



## electrify now

*More information, tips, trusted resources and discounts at:*  
[electrifynow.net](https://electrifynow.net)



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# Thank You

For more information, please visit [EnergizeCT.com/passive-house](https://EnergizeCT.com/passive-house)  
or email [PassiveHouseTrainingCT@icf.com](mailto:PassiveHouseTrainingCT@icf.com)