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 or email PassiveHouseTrainingCT@icf.com
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)

<table>
<thead>
<tr>
<th>Incentive Timing</th>
<th>Activity</th>
<th>Incentive Amount</th>
<th>Max Incentive (Per Unit)</th>
<th>Max Incentive (Per Project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Construction</td>
<td>Feasibility Study¹</td>
<td>Up to 100% of Feasibility Study Costs</td>
<td>N/A</td>
<td>$5,000.00</td>
</tr>
<tr>
<td></td>
<td>Energy Modeling²</td>
<td>75% of Energy Modeling Costs (Before 90% Design Drawings)</td>
<td>$500.00</td>
<td>$30,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% of Energy Modeling Costs (90% Design/50% Construction)</td>
<td>$250.00</td>
<td>$15,000.00</td>
</tr>
<tr>
<td>Post Construction</td>
<td>Certification³</td>
<td>Up to 100% of Certification Costs</td>
<td>$1,500.00</td>
<td>$60,000.00</td>
</tr>
</tbody>
</table>

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 or call 1-877-WISE USE for more details.

Brought to you by Energize Connecticut

Proud Sponsors of Eversource, CNG, SCG, UI
The future of high-performance, all-electric homes starts here.
<table>
<thead>
<tr>
<th></th>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single Family (Detached Dwellings)</td>
<td>Single Family (Detached Dwellings)</td>
</tr>
<tr>
<td>Total UA Alternative Compliance or HERS Index Score</td>
<td>Total UA ≥ 75% better than 2021 IECC or HERS Index Score ≤ 55</td>
<td>Total UA ≥ 15% better than 2021 IECC or HERS Index Score ≤ 45</td>
</tr>
<tr>
<td>Heat pump for space heating</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Space Conditioning</td>
<td>Optional</td>
<td>Required</td>
</tr>
<tr>
<td>Connectivity &amp; Controls</td>
<td>Optional</td>
<td>Required</td>
</tr>
<tr>
<td>Heat pump for water heating</td>
<td>Required</td>
<td>Optional</td>
</tr>
<tr>
<td>Hot Water Distribution</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Envelope Infiltration Rate (ACH)</td>
<td>ACH ≤ 2.5</td>
<td>CFA &gt; 850Hz2: ACH50 ≤ 4.0</td>
</tr>
<tr>
<td></td>
<td>CFA &lt; 850Hz2: ACH50 ≤ 5.0</td>
<td>CFA &gt; 850Hz2: ACH50 ≤ 4.0</td>
</tr>
<tr>
<td>Duct Leakage Rate (CFM)</td>
<td>2021 IECC code minimum requirements</td>
<td>All ductwork must be located in conditioned space</td>
</tr>
<tr>
<td>Balanced Ventilation Systems</td>
<td>Optional</td>
<td>Required</td>
</tr>
<tr>
<td>Induction Cooking</td>
<td>Optional</td>
<td>Required</td>
</tr>
<tr>
<td>Electric Vehicle Readiness</td>
<td>Required</td>
<td>Required</td>
</tr>
</tbody>
</table>

**ALL-ELECTRIC HOME INCENTIVE STRUCTURE**

<table>
<thead>
<tr>
<th></th>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family</td>
<td>$7,500</td>
<td>$10,000</td>
</tr>
<tr>
<td>Single Family Attached</td>
<td>$3,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Multifamily</td>
<td>$1,500</td>
<td>$2,500</td>
</tr>
</tbody>
</table>

Next steps you can take...
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Go to EnergizeCT.com or call 1-877-WISE USE for more details.

Brought to you by Eversource  CNG SCG UI  Proud Sponsors of Energize Connecticut Part of the AVANGRID Family
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.

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.
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)


“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

50%
40%
30%

1940 1960 1980 2000 2020
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.
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, Massachusetts, Maryland, New York, New Jersey, Maine, DC
Connecticut Sources of GHG Emissions

- Transportation: 37%
- Natural Gas/Fuel Oil: 27%
- Industrial: 19%
- Residential Buildings: 19%
- Natural Gas/Coal: 9%
- Electricity: 82% from burning fossil fuels

Connecticut Department of Energy and Environmental Protection GHG Inventory 2018
Good News:
Wind and solar are now the lowest cost sources of new energy

2009 $/MWh
- Nuclear: $118-192
- Coal: $66-152
- Solar: $32-42
- Wind: $28-54
- Gas CC: $44-68

2019 $/MWh
- Solar: $359
- Wind: $135

Notes:
- Wind $135
- Solar $359
Electric Appliances are dramatically more efficient – 3 to 10X

Electricity gets cleaner every year

Metric Tons CO2e 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 CO2e/yr
Gas Furnace: 4–8 Tons CO2e/yr
Gas Water Heater: 1–3 Tons CO2e/yr
Gas Car: 4–8 Tons CO2e/yr

Efficiency Strategies: -20%
100% Renewable Electricity
0 Tons/yr

EV
0 Tons/yr

Renewable Energy + Electrification

Heat Pump
0 Tons/yr

Heat Pump Water Heater
0 Tons/yr
Typical Home Energy Emissions

20-30 Tons CO2/yr

$4,000/yr

Renewable Energy + Electrification

0 Tons CO2/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 powervent models
Internet connectivity / demand response
Heat Pump Water Heater

- Ambient air is pulled into unit and heat is absorbed by 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

From Home Depot website and Energy Guide Labels - 50 Gallon or equivalent

Electric Storage: $900
- Electric Storage: $489/yr
- Electric Tankless: $417/yr
- Gas Storage: $1,200
- Gas Tankless: $271/yr
- Gas Tankless: $229/yr
- Electric Heat Pump: $1,700 ($900)
Water Heating Costs

From Home Depot website and Energy Guide Labels - 50 Gallon or equivalent, Oregon utility carbon intensity values for electricity and natural gas.
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
Will heat pumps work in colder climates?

- Heating Dominated Areas
- Cooling Dominated Areas
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

- Electric Resistance: 17.8 min
- Natural Gas: 18.6 min
- Electric Induction: 9.3 min

from Frontier Energy: Residential Cooktop Performance and Energy Comparison Study, July 2019 - 17,000 BTU gas burner
Major Manufacturers

- **Samsung**
  - Price: $1,100

- **LG**
  - Price: $3,000

- **Café**
  - Price: $4,500

- **Bosch 36”**
  - Price: $6,000
Electric Fireplace Inserts
Temperature control and Versatility

Thermostats for temperature control
No venting required
110 Volts
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
All-Electric Homes
Lower cost to build and operate

5% Lower Upfront Appliance /Systems Cost

<table>
<thead>
<tr>
<th>City</th>
<th>Mixed-Fuel Home</th>
<th>All-Electric Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin</td>
<td>$15,839</td>
<td>$14,520</td>
</tr>
<tr>
<td>Boston</td>
<td>$20,374</td>
<td>$20,325</td>
</tr>
<tr>
<td>Columbus</td>
<td>$17,223</td>
<td>$16,925</td>
</tr>
<tr>
<td>Denver</td>
<td>$17,764</td>
<td>$16,989</td>
</tr>
<tr>
<td>Eugene</td>
<td>$18,709</td>
<td>$17,094</td>
</tr>
<tr>
<td>Las Vegas</td>
<td>$18,935</td>
<td>$17,588</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>$20,356</td>
<td>$19,693</td>
</tr>
<tr>
<td>New York</td>
<td>$23,914</td>
<td>$23,673</td>
</tr>
<tr>
<td>Seattle</td>
<td>$19,356</td>
<td>$17,468</td>
</tr>
</tbody>
</table>

14% Lower Total Annual Operating Cost

<table>
<thead>
<tr>
<th>City</th>
<th>Mixed-Fuel Home</th>
<th>All-Electric Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin</td>
<td>$1,956</td>
<td>$1,597</td>
</tr>
<tr>
<td>Boston</td>
<td>$3,715</td>
<td>$3,539</td>
</tr>
<tr>
<td>Columbus</td>
<td>$2,583</td>
<td>$2,066</td>
</tr>
<tr>
<td>Denver</td>
<td>$2,102</td>
<td>$1,813</td>
</tr>
<tr>
<td>Eugene</td>
<td>$1,916</td>
<td>$1,527</td>
</tr>
<tr>
<td>Las Vegas</td>
<td>$2,309</td>
<td>$2,030</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>$3,076</td>
<td>$2,497</td>
</tr>
<tr>
<td>New York</td>
<td>$5,372</td>
<td>$4,464</td>
</tr>
<tr>
<td>Seattle</td>
<td>$1,724</td>
<td>$1,683</td>
</tr>
</tbody>
</table>

From RMI- The Economics of Electrifying Buildings: Residential Construction
The Inflation Reduction Act

Consumer Rebates: HEEHRA & HOMES

Consumer Tax Credits: 25C & 25D

New Energy Efficient Home Credits: 45L

Workforce & Manufacturing Programs
$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
$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.
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
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
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
- $1,000/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
HOMES WORKFORCE

$200M for states to develop a workforce training program

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

HEEHRA INSTALLER REBATES

$500 installer incentive rebate for a qualified electrification project

All other rebates in HEEHRA must be passed through to household
**DEFENSE PRODUCTION ACT**

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

---

**MANUFACTURING TAX CREDITS: 48C**

Investment tax credit for facilities manufacturing clean energy technology

Baseline 6%, increases to 30% if project meets labor requirements

---

**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:
Ichijo 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!

More information, tips, trusted resources and discounts at: electrifynow.net
Thank You

For more information, please visit EnergizeCT.com/passive-house or email PassiveHouseTrainingCT@icf.com