Propane Education & Research Council

Heating Solutions Powered by Propane

PGANE Summer Meeting 2023
6-13-2023

Bryan Cordill
Director of Residential Business Development
PERC

ENERGY FOR EVERYONE
propane



Vocabulary Lesson

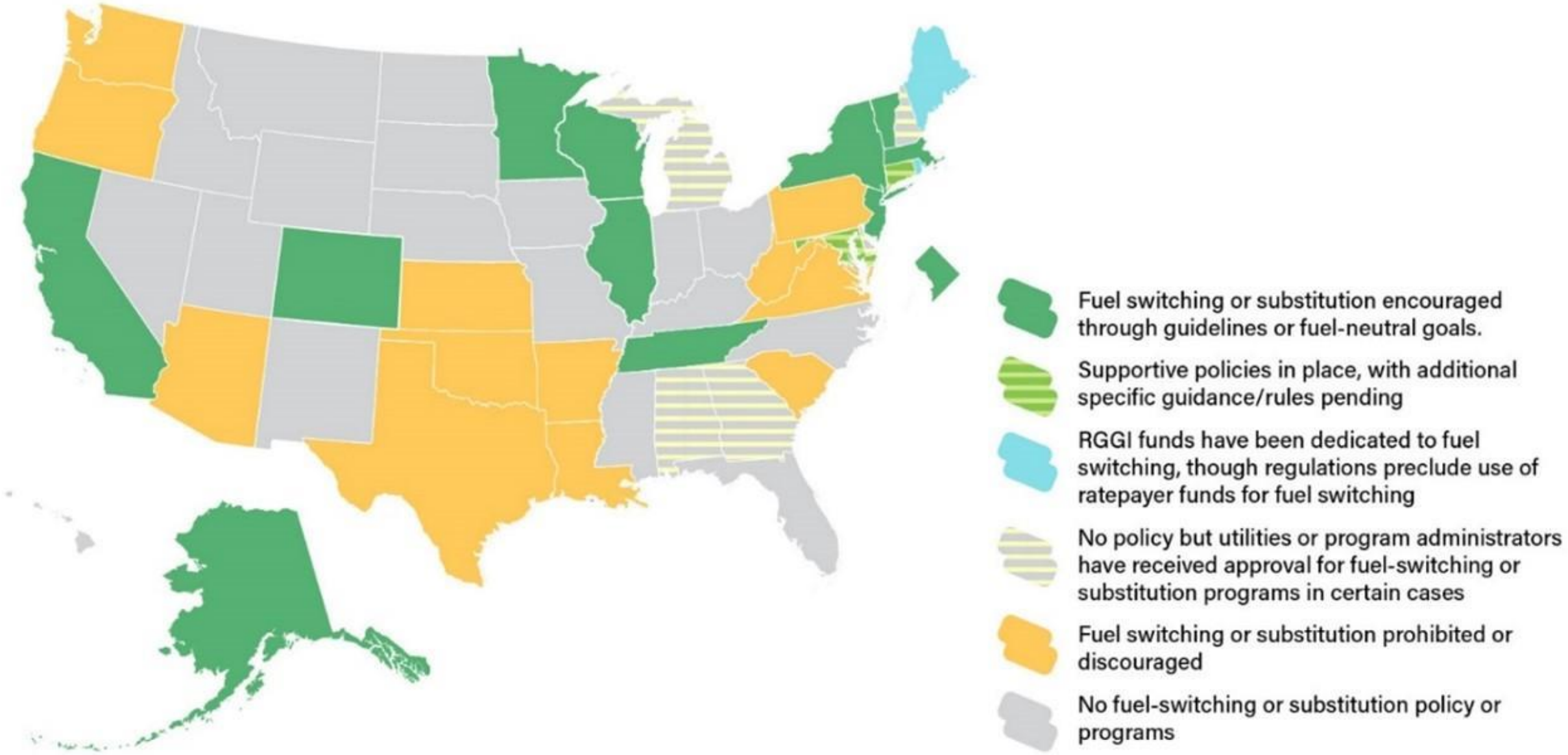
- Air Source Heat Pump (ASHP)
- Ground Source Heat Pump (GSHP)
- Ductless Mini-split Heat Pump
- Ducted Heat Pump
- Air to Water Heat Pump
- Cold Climate Heat Pump (CCHP)
- Heat Pump Water Heater (HPWH)



External Forces Driving the Conversation

- Inflation Reduction Act of 2022 (IRA) came monumental investment toward energy security and climate change action. $369 billion will make its way through state and federal agencies to promote clean energy resources and energy efficiency technologies, including heat pumps.
- Starting in January 2023, the U.S. Department of Energy implemented new minimum efficiency metrics and related standards that require HVAC manufacturers to shift to producing more efficient air conditioning (AC) and heat pump (HP) equipment.
- Environmental Protection Agency (EPA) published a proposed change in the ENERGY STAR labelling program, where it would sunset the ENERGY STAR label for furnaces and central air conditioners.

Status of Fuel Switching Programs 7-22



The Maine Monitor Story

"because she's ready to switch to heat pumps, which can provide heating or cooling at two or three times the efficiency of electric baseboards and with 60% lower carbon emissions than oil, according to Efficiency Maine."

"Government rebates of up to $2,400, with new tax breaks coming soon, help with up-front heat pump installation costs that can range above $10,000."

"This is a real highlight of our climate action," said state Climate Council chair Hannah Pingree. The state aims to have 130,000 homes using one or two heat pumps by 2030 and 115,000 more using "whole-home" heat pump systems, meaning the devices are their primary heating source.

"During the shoulder seasons, you can definitely use a heat pump. When it's wicked cold out, then you'd probably turn on your backup fuel. That's not the official line of Efficiency Maine Trust, but a physical and engineering reality," said energy attorney Dave Littell

Making it normal to heat a home with hot water.

2022 Propane Construction Incentive Program Results

2022 PROPANE CONSTRUCTION INCENTIVE PROGRAM RESULTS

1,000+ HOMES INCENTIVIZED
by the program

Builders across
19 U.S. STATES PARTICIPATED
in the program

$1,000,000 AWARDED
to construction professionals

More Comfort and Fewer Emissions

Appliances powered by propane are more efficient, reducing home energy costs while increasing comfort. Plus, homeowners are comfortable knowing that propane is an environmentally friendly energy, producing far fewer emissions than other energy sources.

In 2022, the program helped to
ELIMINATE 18,000,000 lbs. OF CO_2e

High-efficiency propane-fueled fireplaces can achieve
EFFICIENCY RATINGS ABOVE 90%

Propane appliances produce
52% LESS GREENHOUSE GAS EMISSIONS
compared to electric equivalents

A propane-fueled furnace's
EXPECTED LIFE IS UP TO 50% LONGER
than an electric heat pump's

Adding Up the Impact

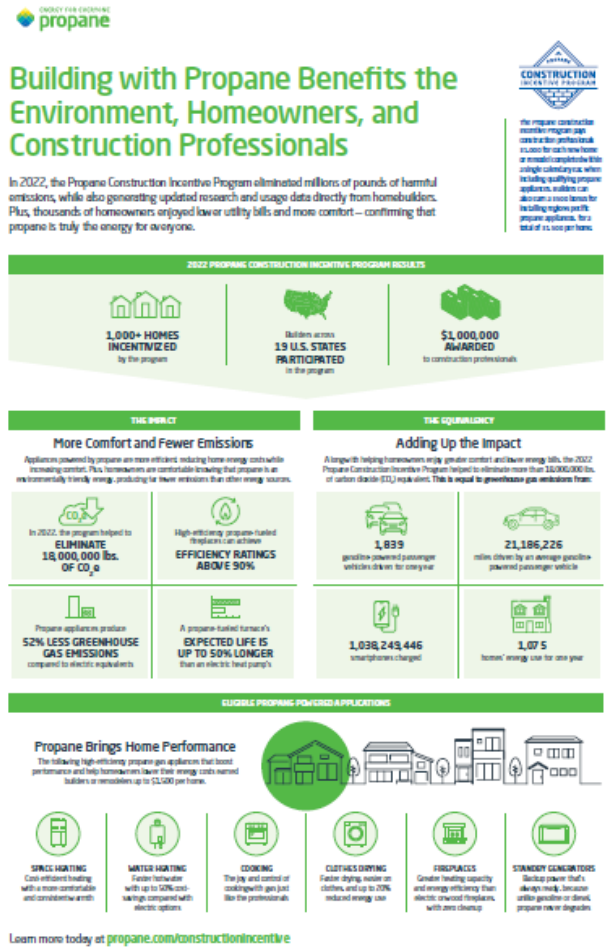
Along with helping homeowners enjoy greater comfort and lower energy bills, the 2022 Propane Construction Incentive Program helped to eliminate more than 18,000,000 lbs. of carbon dioxide (CO_2) equivalent. **This is equal to greenhouse gas emissions from:**

1,839
gasoline-powered passenger vehicles driven for one year

21,186,226
miles driven by an average gasoline-powered passenger vehicle

1,038,249,446
smartphones charged

1,075
homes' energy use for one year



What Can Propane Marketers Do

- Support your local HVAC and plumbing contractors.
  - Partner to offer solutions with them.
- Be sure your customer knows you want to keep them
  - Oil to propane conversions
  - Higher efficiency equipment
  - Hard to electrify homes
- Stay up to date with technology
  - PERC Update
  - Build with Propane Newsletters

Technology That is Here Today

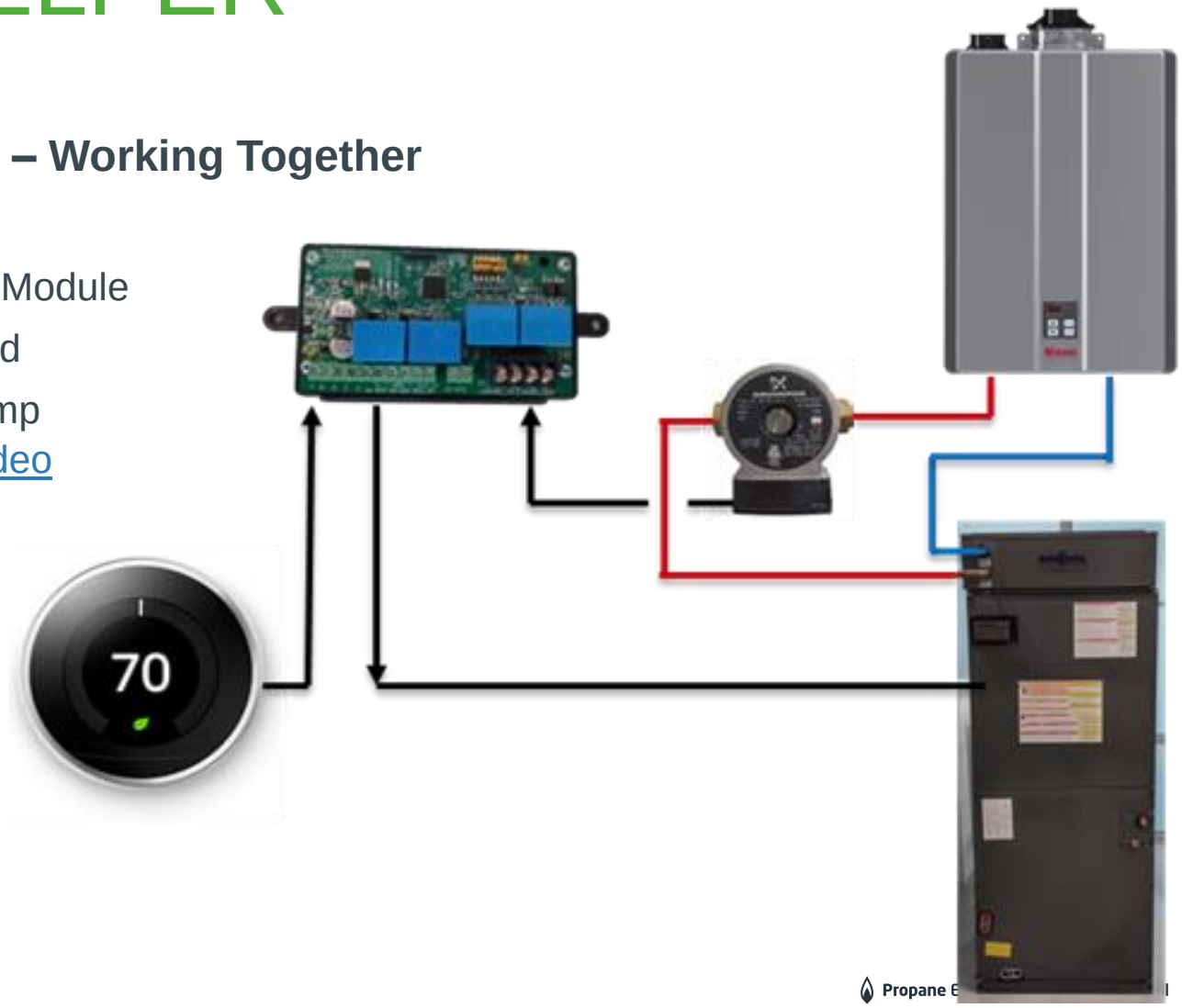
- **HeatPump Helper**

Introducing the HEAT PUMP HELPER

Four Components – Working Together

- Bindus AQUECOIL
- Rinnai Control Module
- Plumbing Board
- Circulation Pump

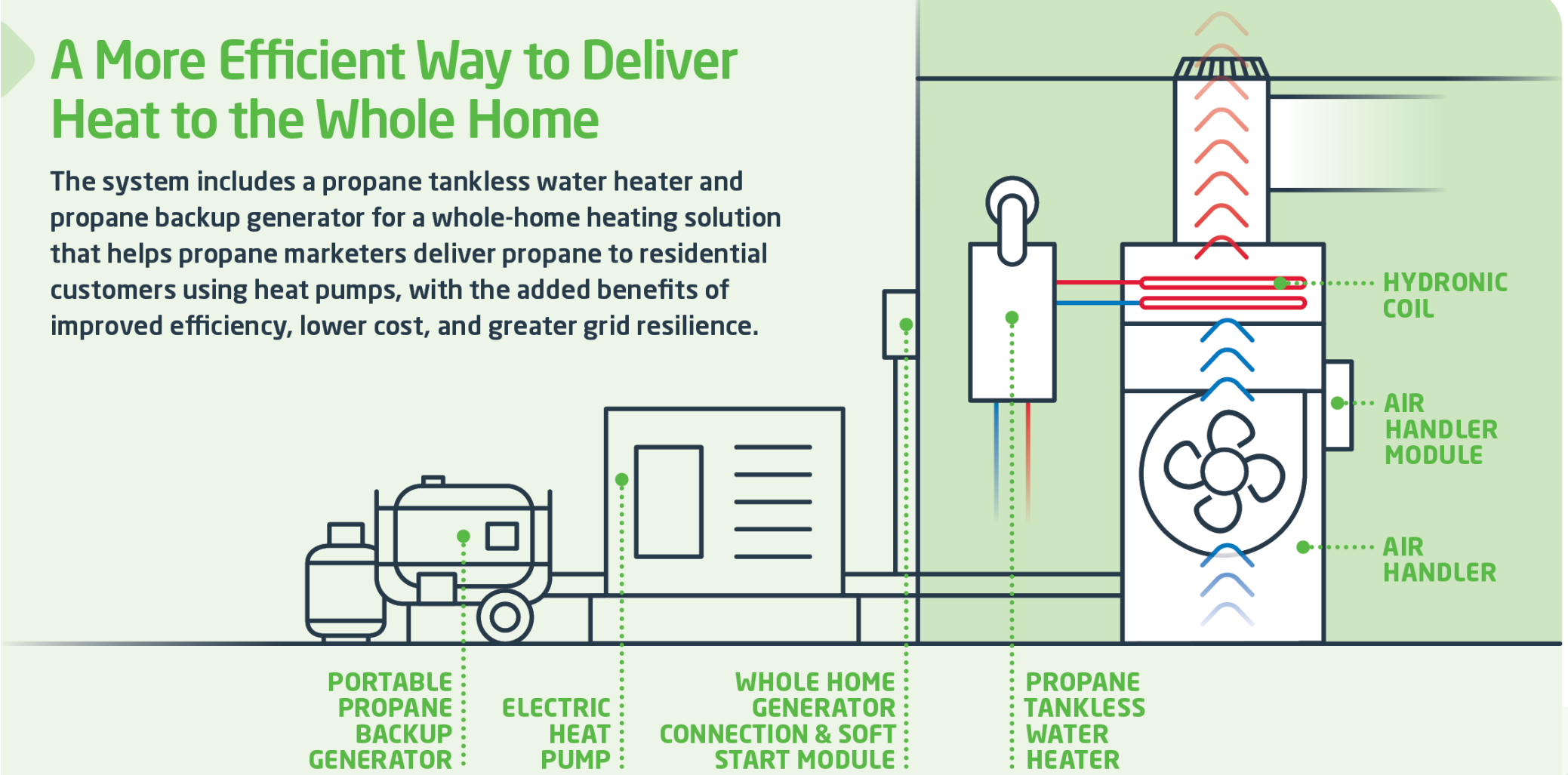
[Watch Video]



Hybrid Heat Pump Solution

A More Efficient Way to Deliver Heat to the Whole Home

The system includes a propane tankless water heater and propane backup generator for a whole-home heating solution that helps propane marketers deliver propane to residential customers using heat pumps, with the added benefits of improved efficiency, lower cost, and greater grid resilience.

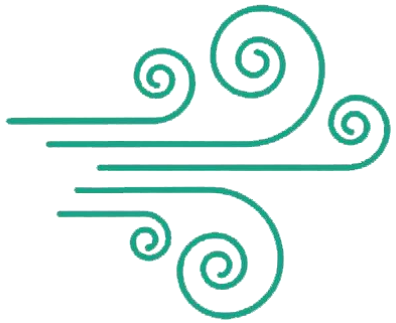


Technology That is Here Today

- HeatPump Helper
- **Anesi Gas Heat Pump**



How the Thermally-Driven Heat Pump Works



Thermal Energy from Air

0.5 Btu

Energy Source

- Natural Gas
- Propane
- Hydrogen
- Renewable Gas
- Fuel Oil/Bio-diesel
- Solar-thermal

1.0 Btu



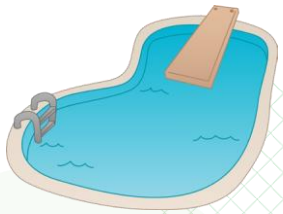
1.5 Btu Warm Heat



Space Heating



Water Heating



Pool Heating

High efficiencies result from extraction of "free" heat in the air: 33% delivered energy is renewable

Starting Point: Thermally Driven Heat Pump – "80K"

Space Heating | Water Heating | Combi

- Heat-Driven: gas, propane, hydrogen, bio-fuel
- AFUE: 140%*
- COP_{gas} = 1.45*
- Air to Water
- Condensing
- 4:1 Modulation
- Refrigerant GWP = 0 (H_2O / NH_3)
- NOx Emissions: meets South Coast AQMD
- Minimum Ambient Operating Temp: -40°F (-40°C)
- Maximum Supply Water Temperature: 150°F (65°C)
- All combustion and venting outside
- ETL Listed

** Standard Rating Points: 47°F (8°C) ambient air, 120°F (49°C) supply water*



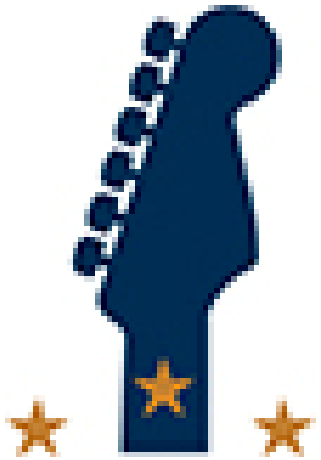
Technology That is Here Today

- HeatPump Helper
- Anesi Gas Heat Pump
- **Smart Watt Boiler**



Custom Builder

“We’re eager to show how companies and products can work together to meet stringent stretch code requirements,” Albert explains. “The HERS rating must be 55, which we were able to reach based on the estimated performance of the insulation, windows and air exchange systems. Once we included the components we plan to include in house, we were able to get to a HERS rating of 45.”



THE HOUSE THAT BLUES BUILT

Technology That is Here Today

- HeatPump Helper
- Anesi Gas Heat Pump
- Smart Watt Boiler
- **Robur GAHP**



Robur GAHP-AR

- 5 Tons Cooling
- 120,400 BTU/h heating
- 126% efficient
- Does not require extensive electrical upgrades
- Clover Corporation in East Hartford CT is local distributor.



Technology That is Here Today

- HeatPump Helper
- Anesi Gas Heat Pump
- Smart Watt Boiler
- Robur GAHP
- **Ecopower mCHP**



Ecopower mCHP

- 4.4 kWh electrical
- 47,000 BTU’s of heat
- Blackstart project funded by PERC in progress.

Can be operated thermally or electrically led (with buffer tank)



Make it normal to heat a home with hot water.

Questions?

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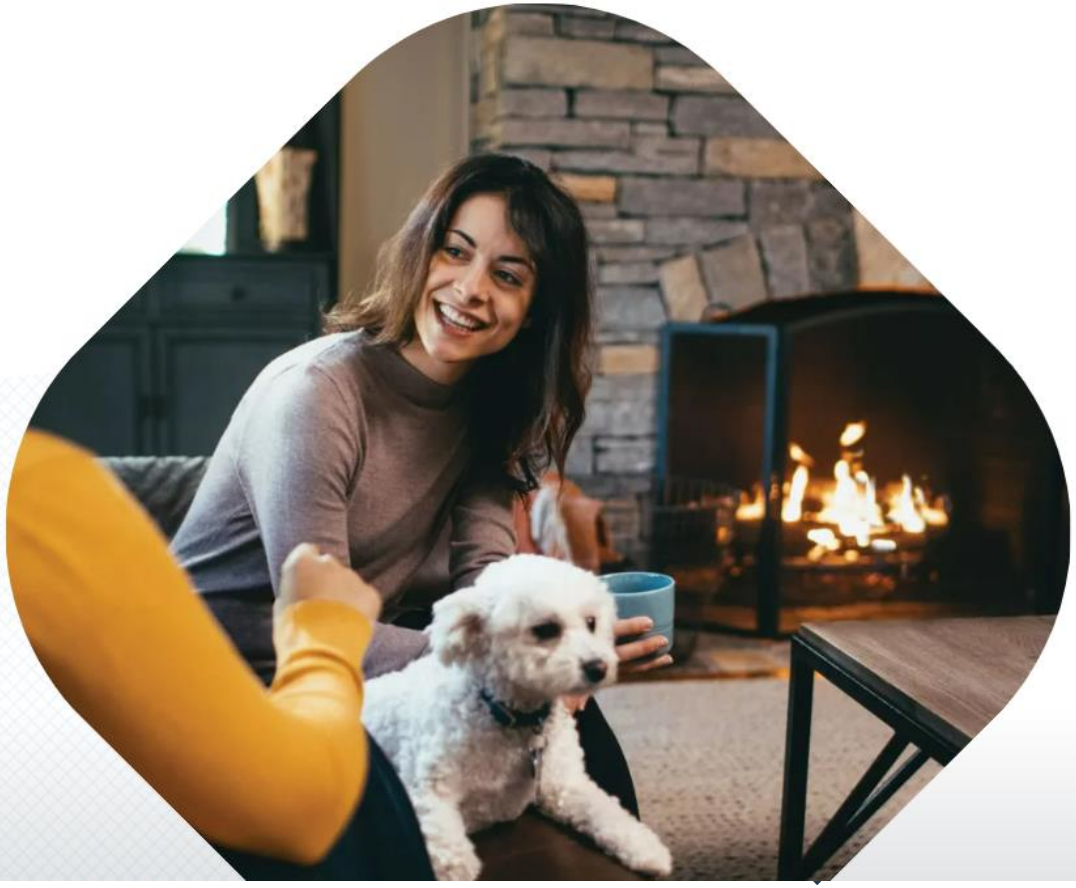
ABOUT PERC | NEWS | FOR PROPANE PROVIDERS | LEARNING CENTER | RESOURCE CATALOG | CART | MY ACCOUNT

for my home | for my business | products | about propane | safety | environment | where to buy

Energy for Everyone

Propane is the most reliable energy for everyone.



Customer Resources

Reaching Zero Net Energy Goals with Propane

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NATIONAL EDITION

Using propane appliances, you can significantly lower a home's energy consumption, making it easier to achieve Zero Net Energy (ZNE) goals and deliver premium performance to homeowners. It's why propane should be a part of every builder's ZNE strategy.

THE ZNE HOME
Produces as much energy as it uses. Builders achieve this by increasing a home's energy efficiency, then adding renewable energy sources such as solar.

THE ZNE READY HOME
Is incredibly energy efficient, and can reach Zero Net Energy status by using propane appliances and adding renewable energy.



MEASURING ENERGY USES: SITE VS. SOURCE

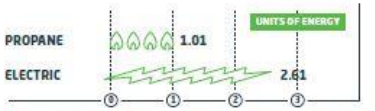
Site: LESS ACCURATE
Measures only energy used at the house. Doesn't account for upstream losses or energy production.



Site: MORE ACCURATE
Measures energy use starting at the source, including the energy required to extract and process fuel.



SOURCE ENERGY RATIOS



It takes 2.61 units of electricity to produce and deliver one unit of energy to a home, versus just 1.01 for propane. Propane wins hands down.

*This data is based on national averages, it may be different in your area.

MEASURING ZNE PROGRESS
The Home Energy Rating System (HERS®) Index is used to measure efficiency. The lower the score, the better.



3 WAYS TO LOWER YOUR HERS SCORE

Focus on the building's envelope:
1. Insulation quality
2. Insulation quantity
3. Air sealing
4. Window performance
5. House orientation

Include high-efficiency propane appliances:
6. Propane furnace
7. Propane water heating
8. Propane cooking
9. Propane fireplace
10. Propane clothes dryer

Trim other energy use:
11. Energy Star appliances
12. LED lighting
13. Energy monitoring devices.



PROVEN RESULTS
Using propane and other strategies including solar cells, this home earns $343 annually selling excess energy.
- 1,912 square feet
- Super insulated
- 96% efficient propane tankless water heater
- R-5 triple-pane windows
- HERS without solar: 34
- HERS with solar: -21

OTHER PROPANE BENEFITS
Propane is not only energy efficient, it lowers first costs and emissions. It is also highly effective in any area of the country for a variety of temperatures.

FIRST COSTS
Of high-performance systems:
- Propane Furnace & AC: $11k
- Ground Source Heat Pump (GSHP) Closed Loop: ~$34k

67% FEWER EMISSIONS
With a propane tankless water heater compared with electric storage tank models.

LEARN MORE ABOUT ZNE BUILDING AND PROPANE
Find out how to achieve your Zero Net Energy goals, and how to lower a home's HERS score with propane appliances at **Propane.com**.

Propane Education & Research Council

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The Truth About Gas Stoves & Air Quality

Talking points to help craft your response to negative news

Recent headlines have appeared regarding local gas bans in new construction, along with studies and editorial pieces claiming that gas stoves fill homes with pollutants, negatively impacting indoor air quality. While primarily directed at natural gas, these pieces highlight fights taking place throughout city and state governments that encompass all gas – including propane.

The following key talking points have been developed to help you craft a response where needed, quickly and accurately.

1. **According to the California Air Resources Board (CARB), cooking reduces indoor air quality, no matter what kind of stove is used.** Replacing gas stoves with electric stoves would not eliminate indoor air quality concerns – and the cost of switching millions of home stoves from gas to electricity would be staggering.
2. **Better ventilation is the answer to air quality concerns.** CARB recommends using a high-efficiency range hood or exhaust fan, a solution far more practical for most Americans than converting from gas to electric. Lacking a range hood or vent fan, opening windows or exterior doors while cooking is advised, along with having a qualified technician inspect your stove every year.
3. **Electricity is very inefficient, delivering only 32% of energy used from generation to the home.** Most gas appliances are already incredibly efficient – upwards of 93% or better in some appliances, with propane delivering 99% of generated energy to the home.

FURTHER FACTS ABOUT AIR QUALITY
The differences between electric, natural gas, and propane

- **The EPA does not list gas stoves as significant contributors to indoor air quality or health hazards.** Gas stoves have long been preferred by professional chefs and home cooks should have that same choice at home – including cooking with propane.
- **Indoor air quality** can be improved with simple actions like regularly changing the air filter on home HVAC systems and having appliances checked by qualified technicians.
- **Unlike natural gas, propane contains no methane, thus not directly contributing to global warming.**
- **60% of all electrical power generation in the United States comes from burning natural gas or coal.** Electrification of everything will take more than 20 years and cost about $20-$25 trillion.
- **Clean and renewable energy like propane can accelerate decarbonization today.** Plus, renewable propane, derived from the processing of agricultural biomass, has a low carbon intensity and is ideal for use in the same applications.



To learn more, watch our video on indoor air quality and gas cooking at **propane.com/environment/myth-busting**



Watch: 4 propane cooking myths debunked

Paul and Susan Kadilak show why the propane gas range is still the king of the kitchen.

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One thing homebuilders and interior designers can agree on is that the kitchen is the heart of the home. They're giving this space more thought and consideration because it's evolved to accommodate more than cooking: It has become a place for entertaining, as well. Take the island as an example. It's not only where food is prepped but also where it's served.

And if the kitchen itself has a star, it's the cooking range. But this appliance sparks heated debates: On one side, proponents of gas ranges champion precision and versatility. On the other, advocates for electric cooktops cite air quality concerns and efficiency.

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