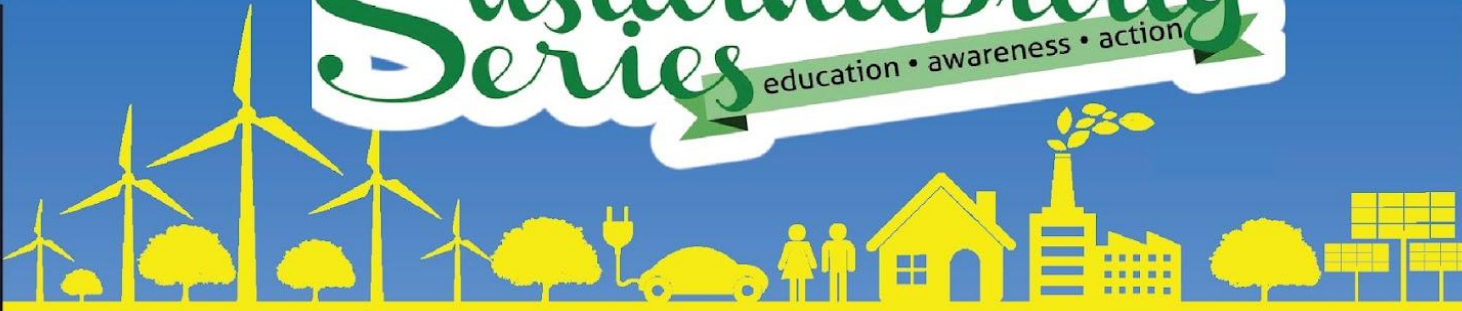


# Sustainability Series

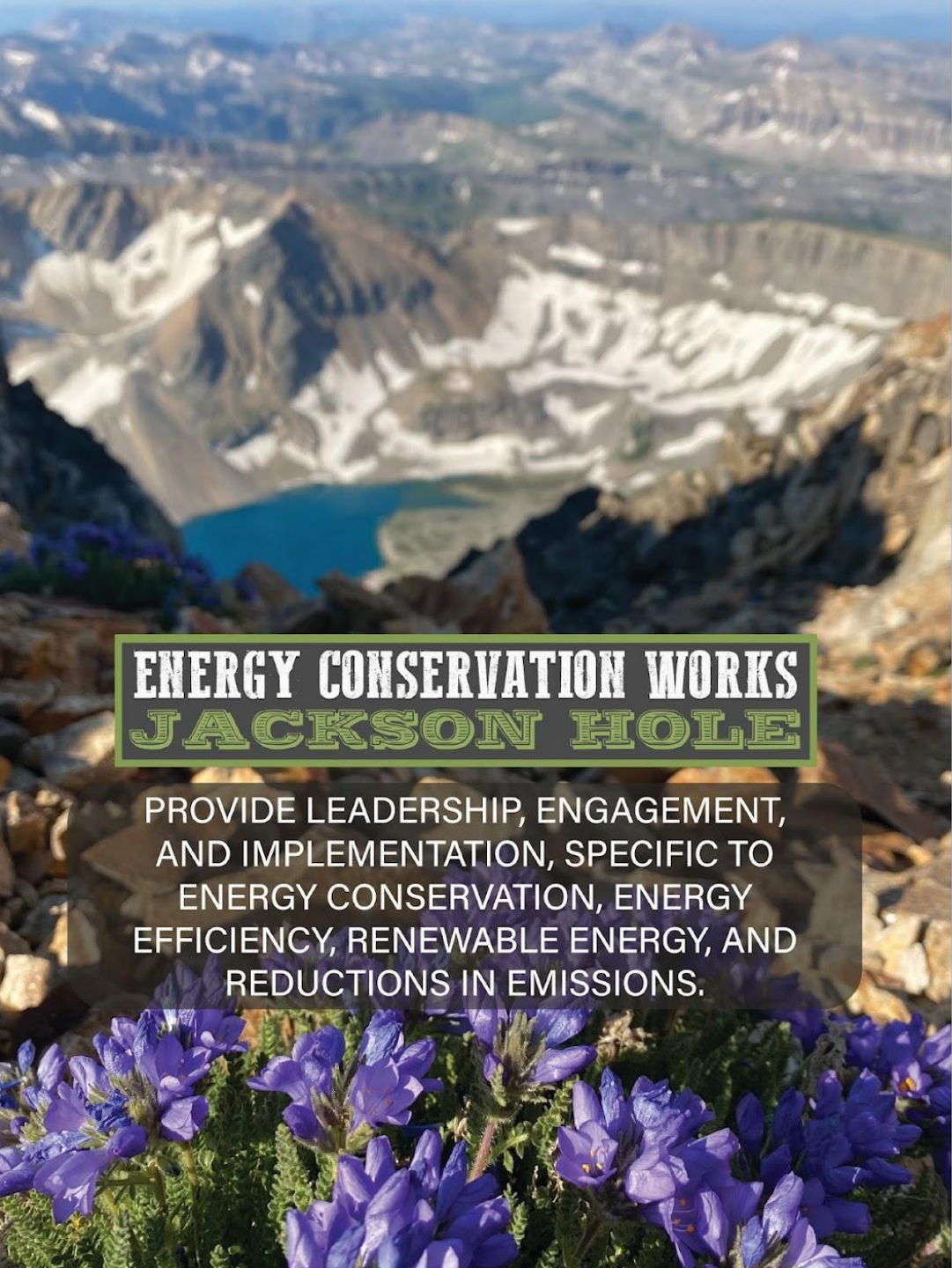
education • awareness • action



## Strategies for Home Efficiency: What's up with Heat Pumps?

**Thursday, April 18th, 12:30 - 1:30 pm**  
**Teton County Library, Ordway Auditorium (A)**

Heat Pumps: What are they, is it right for my home, what incentives are out there, and how can I get started? During this lunchtime event, you will learn heat pump basics, why people are putting heat pumps in their homes, heat pump benefits, and incentives to help with upfront costs - investment tax credit update to 30% of project costs, Lower Valley Energy rebates, ECW's 1.5% financing program, and upcoming Inflation Reduction Act rebates from the state - it's never been more affordable to take advantage of energy efficiency projects for your home. The time is now to start learning about heat pumps!



## ENERGY CONSERVATION WORKS JACKSON HOLE

PROVIDE LEADERSHIP, ENGAGEMENT,  
AND IMPLEMENTATION, SPECIFIC TO  
ENERGY CONSERVATION, ENERGY  
EFFICIENCY, RENEWABLE ENERGY, AND  
REDUCTIONS IN EMISSIONS.

# Organizational Overview



CEO + 1 BOARD MEMBER



+ 1 COUNTY COMMISSIONER

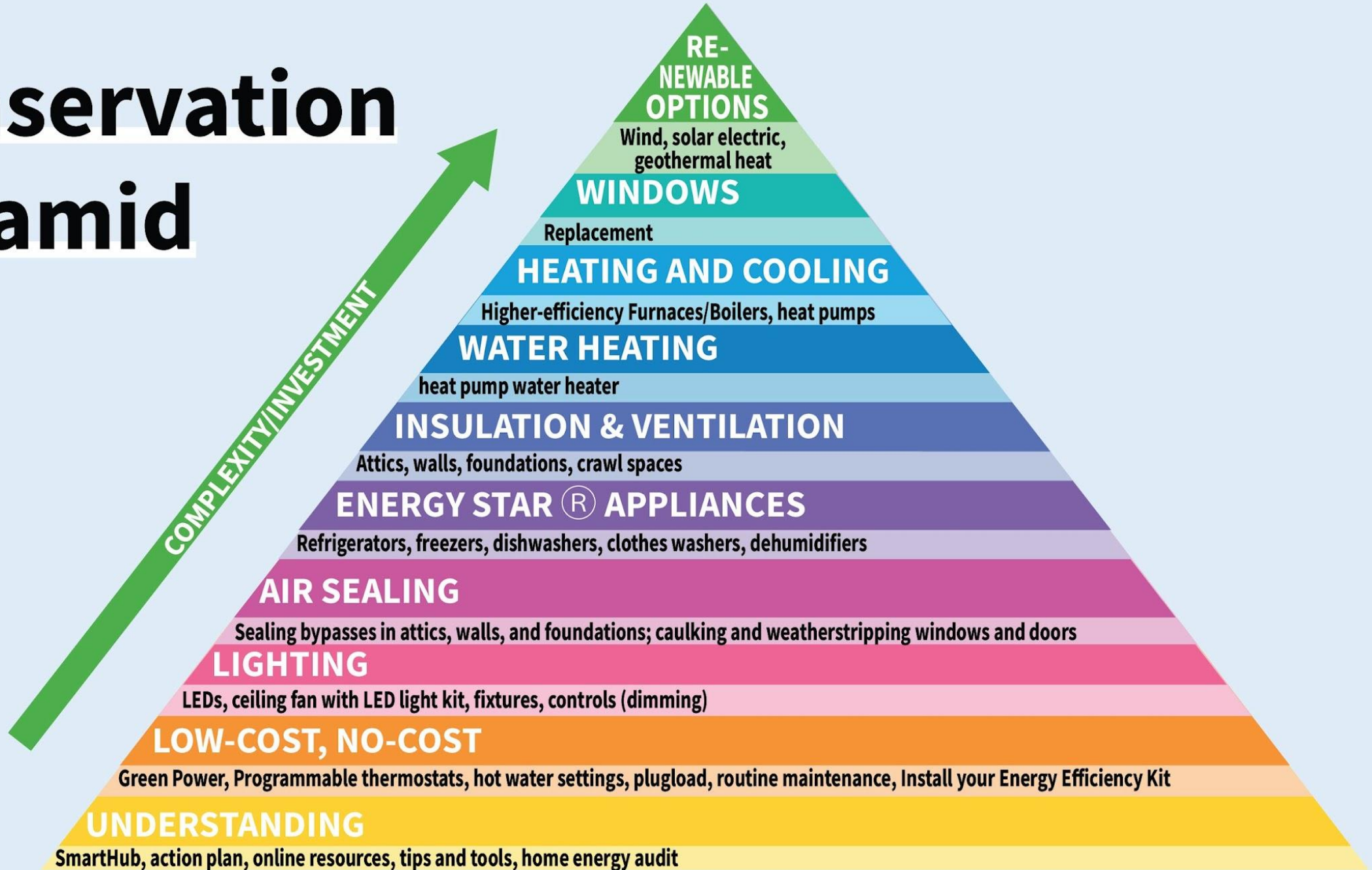


+ 1 TOWN COUNCIL MEMBER



+ 5 CITIZEN BOARD MEMBERS

# Conservation Pyramid





MEP | ENGINEERING | INSTALL

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## **Air Source Heat Pumps and Heat Pump Technology**

Presented by: Jim Bob Schell, P.E.

# Types of Heat Pumps for Space Heating



**Air-to-Water**



**Air-to-Air**



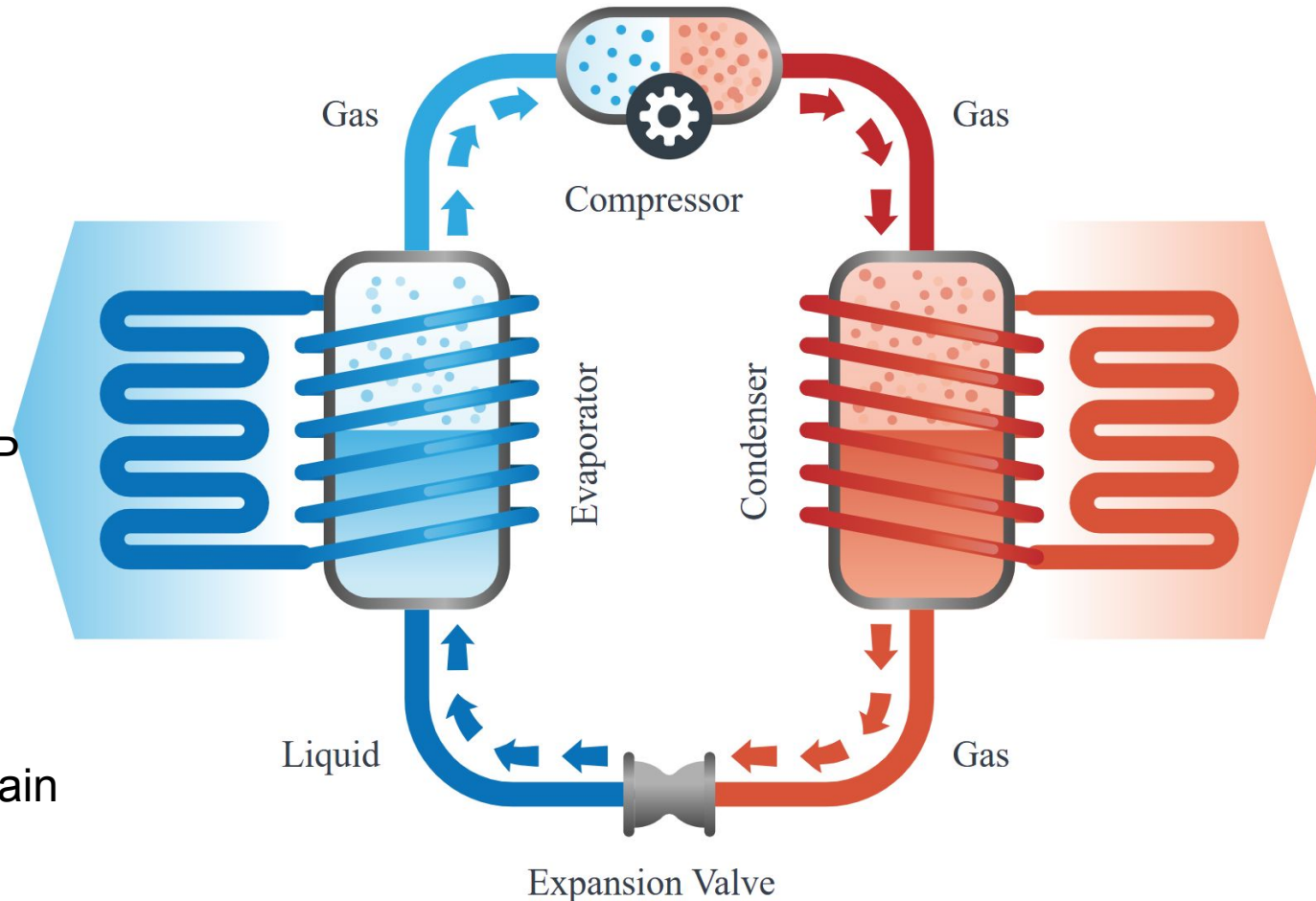
**Water-to-Water**



**Water-to-Air**

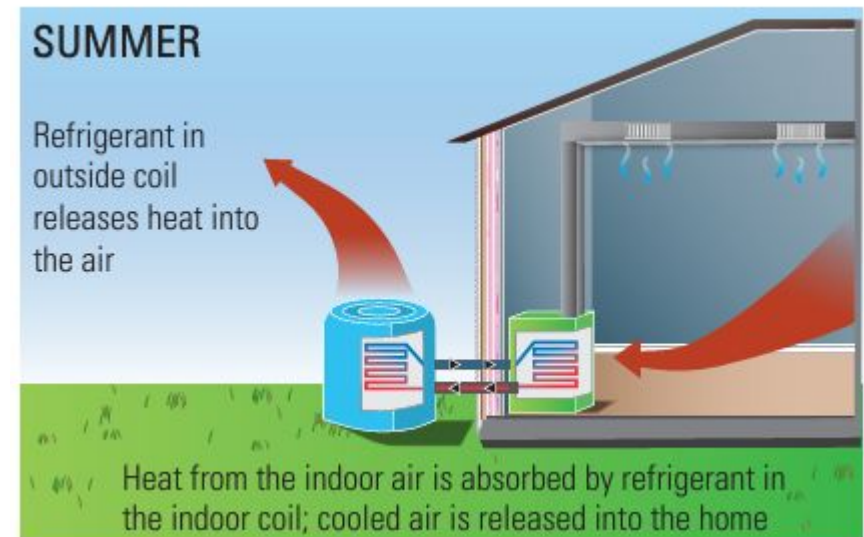
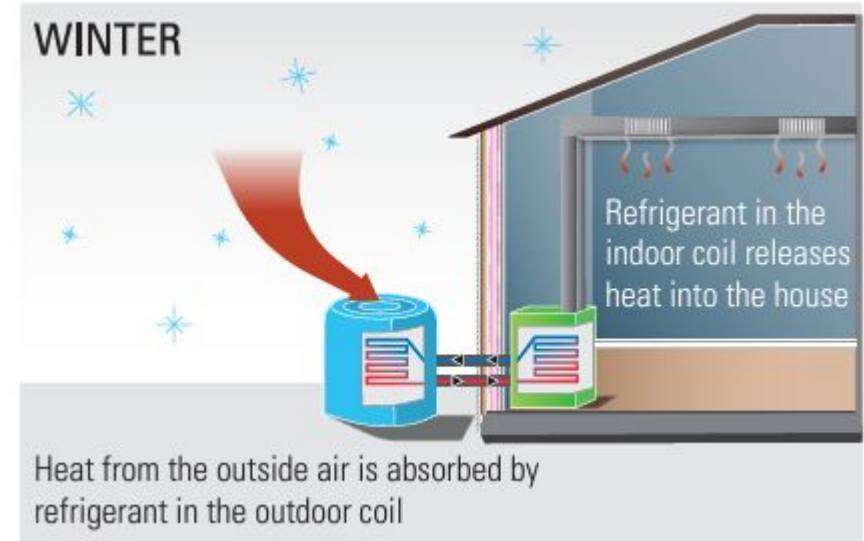
# How Heat Pumps Work

- ❑ Heat Pumps Move (Pump) Heat
- ❑ Utilize Refrigeration Cycle
- ❑ Phase Change is Critical
- ❑ Reversing allows for the process to go in both direction and is a key distinction between ASHP and traditional air conditioners
- ❑ Heat exchange can occur between Air, water, ground sources, but the general principles remain



# Air-to-Air

- ❑ Uses air as heat transfer medium
- ❑ Works in both heating and cooling
- ❑ Reversing valve is key
- ❑ In Cooling Heat is transferred from indoors to outdoors, even when warmer outside
- ❑ In Heating, the process is reversed, and Heat is transferred from outdoors to indoors, even at low temperatures



# Ducted vs. Ductless

- ❑ Multiple types of systems of ASHP's
- ❑ Traditional Ducted systems with an indoor air handler and ducted forced air is common
- ❑ Ductless options include:
  - Mini splits (wall mounted)
  - Floor and ceiling mounted
  - Recessed ceiling cassettes
- ❑ You can mix and match
- ❑ Ductless systems are good for retrofits and remodels

## Ductless HVAC Options



Wall Mounted



Vertical Air Handler



Ceiling Suspended



Floor Mounted



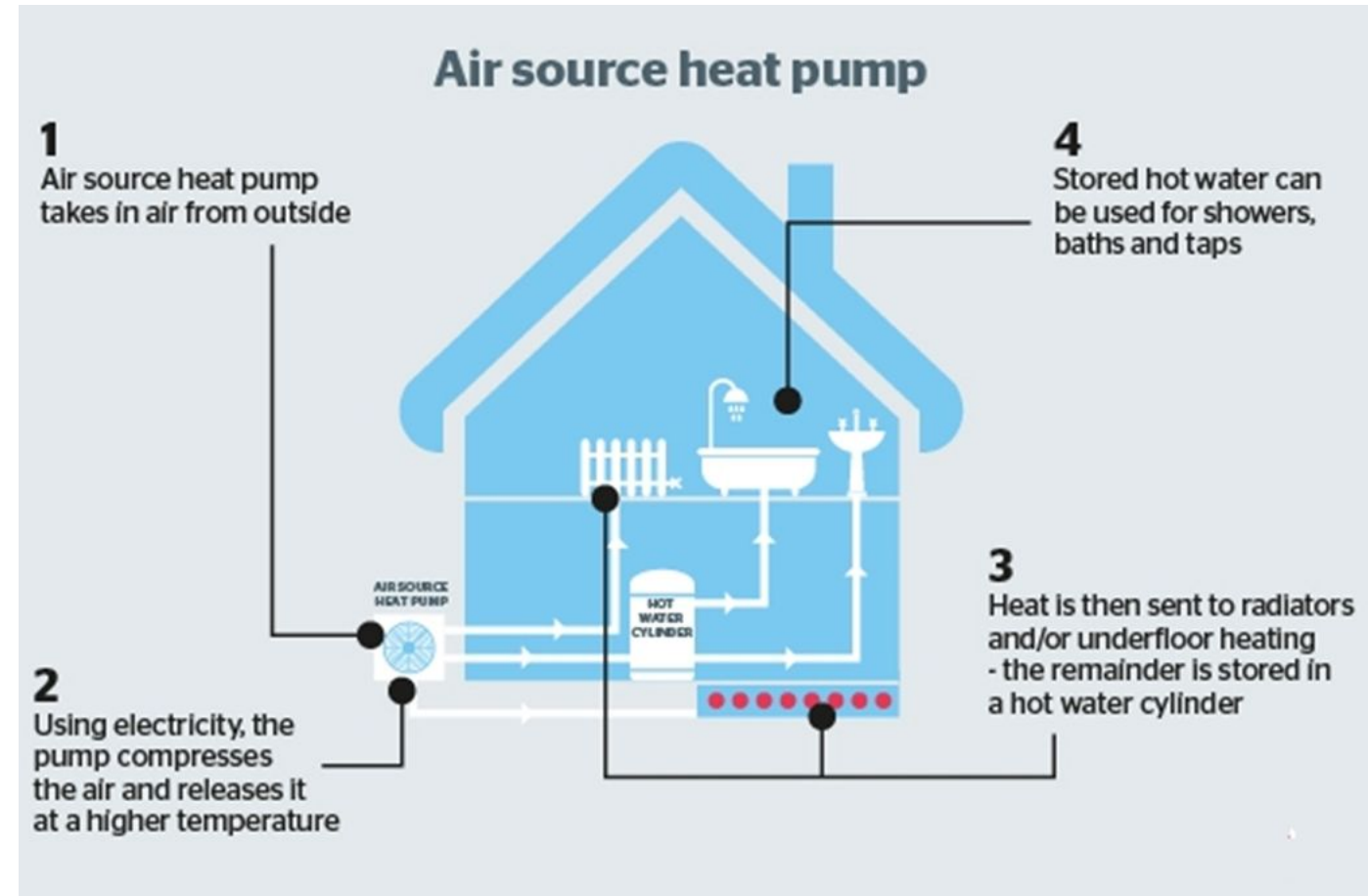
Recessed Ceiling Cassette

\*National averages from Angi cost guides. January 2023.



# Air-to-Water

- ❑ Air is the exterior heat transfer medium
- ❑ Water is interior heat transfer medium
- ❑ Air to Water systems are used for hydronic heating (and cooling) systems
- ❑ May be retrofitted to existing hydronic systems



# Pros and Cons of Air Source Heat Pumps

## Pros

Offers both heating and cooling

High efficiency

COP ~ 2.5

HSPF ~ 8.5 - 10

SEER ~ 16

Can be used in retrofits

Likely lower total energy utility bills

LVE electricity is low cost and low emissions

## Air source heat pump

✓  
**Pros**



✗  
**Cons**

## Cons

Higher upfront costs (than traditional AC)

Limited by outdoor conditions

In Teton County, WY, backup heating is required

Resistance to new technologies in the industry

e<sup>1</sup>

ELEMENTAL TO YOUR ENVIRONMENT

# Case Studies: System Costs

## Ducted System

*National Renewable Energy Laboratory (NREL)  
& Lawrence Berkeley National Laboratory (LBNL) Case Study*

**Low-efficiency**

**\$9,000**

**Medium-efficiency**

**\$20,000**

**High-efficiency**

**\$24,000**

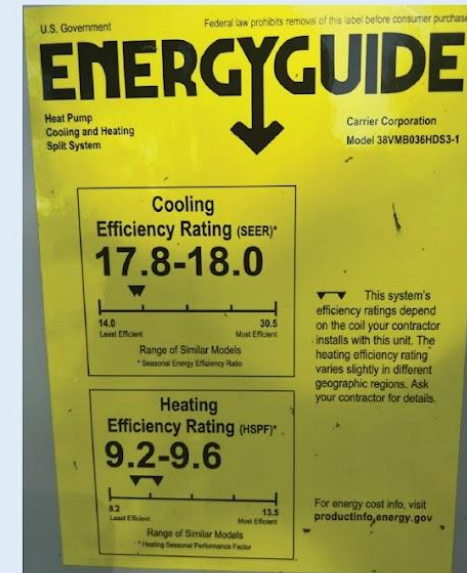
*\*Replacement electric resistance HVAC systems can cost between \$5,000 - \$12,000, based on the system and labor costs to install.*

## Mini-Split (Ductless)

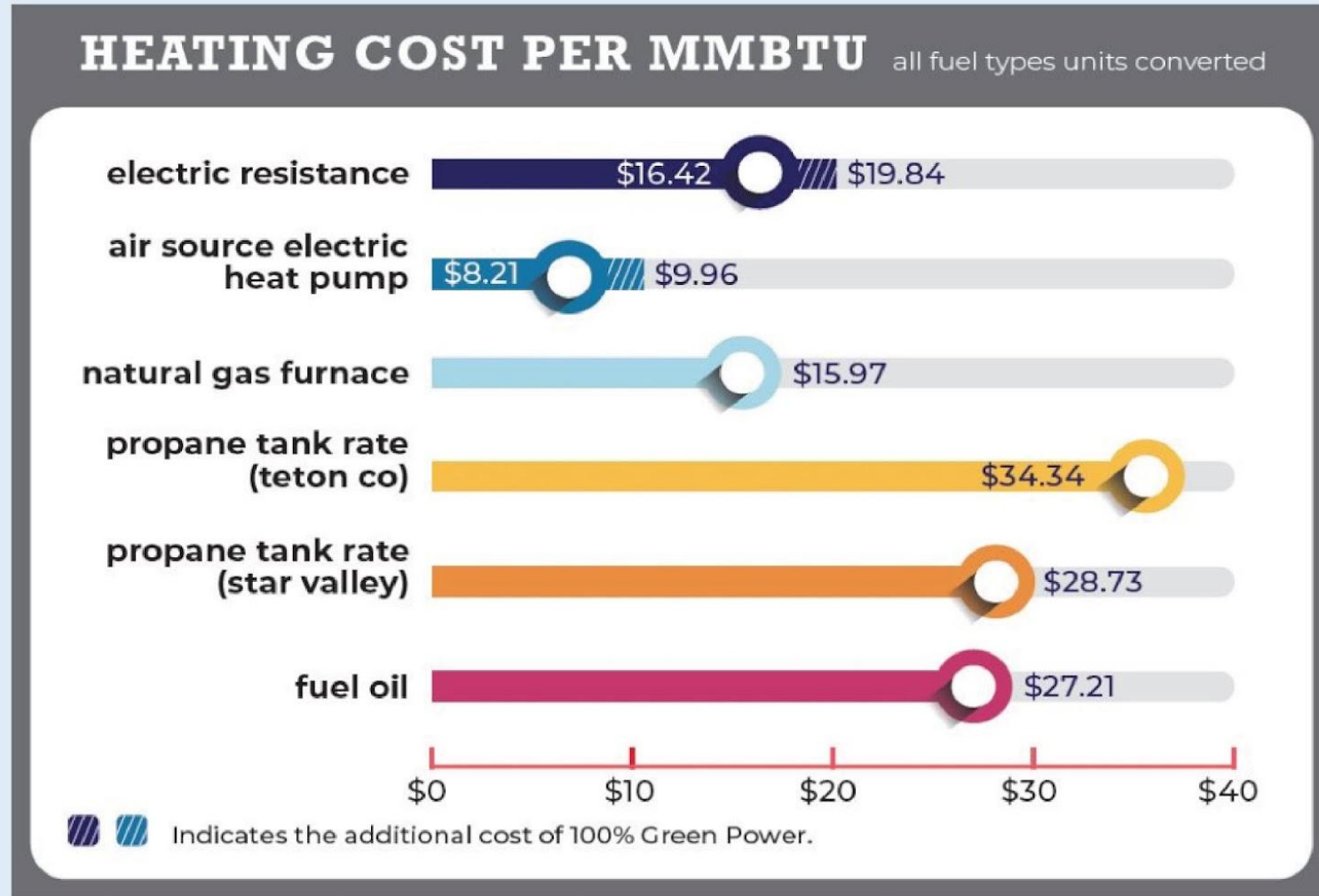
*Local Case Study*

**1 Outdoor Unit, 2 Indoor Units**

**\$11,320**



# LVE's Fuel Comparison Chart



# Incentives



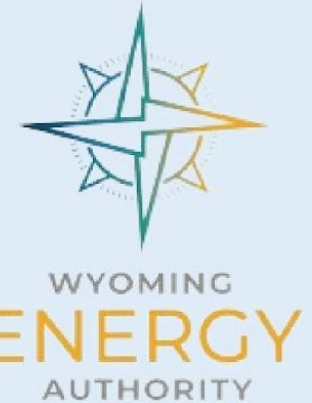
**ECW 1.5% Home  
Loan Program**



**LVE Rebates**



**Tax Credits**



**\*Wyoming IRA  
Rebates  
Opportunity**

# ECW's 1.5% Home Loan Program

## Allowable Projects

- Weatherization including caulking, weather stripping, and air sealing
- Increased, improved insulation
- Electronic /Wi-Fi connected thermostats
- Electric Vehicle fueling equipment
- Heat Pumps
- Windows & Doors
- Solar panels and solar hot water heaters

✓ UP TO \$25,000

✓ 1.5% INTEREST RATE

✓ UP TO A 5-YEAR TERM

✓ NO CREDIT CHECKS, JUST 12 MONTHS OF ON-TIME LVE PAYMENT HISTORY.

*\*Special projects with verifiable energy savings will be reviewed on a case-by-case basis.*

# Case Studies: ECW Heat Pump Financing

## Ducted System

*National Renewable Energy Laboratory (NREL) & Lawrence Berkeley National Laboratory (LBNL) Case Study*

### Low-efficiency

\$9,000 → \$159/month

### Medium-efficiency

\$20,000 → \$346/month

### High-efficiency

\$24,000 → \$416/month

## Mini-Split (Ductless)

*Local Case Study*

### 1 Outdoor Unit, 2 Indoor Units

\$200/month ← \$11,320

*\*All estimated loan payments were calculated at the maximum loan term of 5 years.*



# LVE Rebates

## Available Rebates

- Energy Audit
- Insulation
- Thermostats
  - Line Voltage Thermostats
  - Smart Thermostats
- Heat Pumps
  - Ground Source Heat Pumps
  - Ductless Air Source Heat Pumps
  - Ducted Air Source Heat Pumps
  - Heat Pump Water Heater
- Windows & Doors

To download rebate forms, visit:  
[www.lvenergy.com/energy-efficiency/conservation-residential/](http://www.lvenergy.com/energy-efficiency/conservation-residential/)

*\*To qualify for LVE rebates, you must have electric heat as your primary heat source.*

# **LVE Heat Pump Rebates**

**Ducted System**

**\$800-\$900 rebate**

**Mini-Split (Ductless)**

**\$650 rebate**

*\*To qualify for LVE rebates, you must have electric heat as your primary heat.*

# Tax Credits

## Available Energy-Efficiency Tax Credits

- Energy Audit
- Insulation
- Heat Pumps

\*\$2,000 maximum per year for qualified heat pumps, biomass stoves or biomass boilers

- Heat Pumps
- Heat Pump Water Heater
- Biomass stoves or hot water boilers
- Windows & Doors
- Central air conditioners
- Smart Thermostats
- Natural gas, propane, oil water heaters
- Electric panel (panelboard, sub-panelboard, branch circuit, or feeders)

30% of project costs or up to a maximum per project amount

For the most up-to-date information, visit:  
<https://www.irs.gov/credits-deductions/energy-efficient-home-improvement-credit>

# **Tax Credits for Heat Pumps**

**Ducted System**

**Mini-Split (Ductless)**

**\$2,000 tax credit**

*\*\$2,000 maximum per year for qualified heat pumps, biomass stoves or biomass boilers*

# Wyoming IRA Rebates Opportunity

<b>Available IRA Rebates</b>	<b>&lt;80% AMI</b>	<b>80 - 150% AMI</b>
Heat Pump for HVAC	<b>\$8,000</b>	<b>\$4,000</b>
Heat Pump Water Heater	<b>\$1,750</b>	<b>\$875</b>
Insulation, Air Sealing & Ventilation	<b>\$1,600</b>	<b>\$800</b>
Electric Wiring	<b>\$2,500</b>	<b>\$1,250</b>
Electric Load service center	<b>\$4,000</b>	<b>\$2,000</b>
Electric Stove, Cooktop, Oven, or Heat Pump Clothes Drier	<b>\$840</b>	<b>\$420</b>

# WY IRA Rebates for Heat Pumps

**Ducted System**

**Mini-Split (Ductless)**

**\$4,000 - \$8,000 rebate**

*\*Dependent on your Area Median Income. <80% AMI: \$8,000. 80% - 150% AMI: \$4,000.*

# **Putting the Incentives Together...**

# Putting the Incentives Together

Ducted System

**Low-efficiency** *ECW Financing*  $\rightarrow$   $\$159/\text{month}$  + *LVE Rebate*  $\$800-\$900$  + *Tax Credit*  $\$2,000$  = *Total \$\$ Back*  $\$2,800-\$2,900$   
 32 % project costs

**Medium-efficiency**  $\rightarrow$   $\$346/\text{month}$  +  $\$800-\$900$  +  $\$2,000$  =  $\$2,800-\$2,900$   
 14 % project costs

**High-efficiency**  $\rightarrow$   $\$416/\text{month}$  +  $\$800-\$900$  +  $\$2,000$  =  $\$2,800-\$2,900$   
 12 % project costs

**Mini-Split (Ductless)**  $\rightarrow$   $\$200/\text{month}$  +  $\$650$  +  $\$2,000$  =  $\$2,650$   
 23 % project costs

+ <i>IRA Rebate</i> $\$4,000-\$8,000$	= <i>Total \$\$ Back</i> $\$4,800-\$9,000$ 53% - 100% project costs
+ $\$4,000-\$8,000$	= $\$4,800-\$10,900$ 24% - 55% project costs
+ $\$4,000-\$8,000$	= $\$4,800-\$10,900$ 20% - 45% project costs
+ $\$4,000-\$8,000$	= $\$4,650-\$10,650$ 41% - 94% project costs



# Mini-Split Case Study

Home Square Ft: 1,603 *Single-Family; 3-bedrooms, 1 bathroom*

Previous Heating: electric, radiant heating

Cost of the system: \$11,320

\$4,226: Outdoor unit

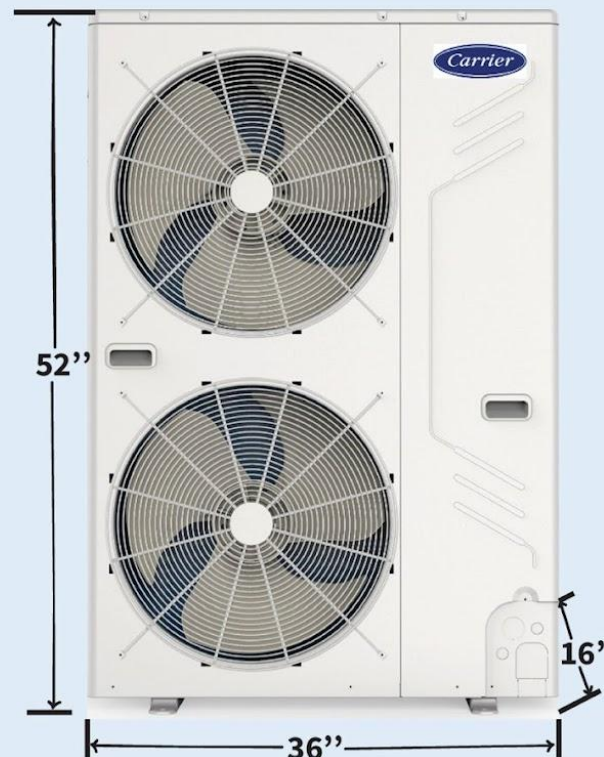
\$3,049: Indoor units (2)

\$815: Add. equipment

\$2,200: Labor

\$1,209: Start-up,  
commissioning & warranty

- ✓ ECW loan financing
- ✓ LVE rebate
- ✓ Tax credit eligible



**OUTDOOR UNIT**



**INDOOR UNITS (2)**

“Having the heat pump through the winter was a dream. They kept our house warm even on the cold days and they run very efficiently and quite they also were very easy to have installed.”

**Questions?**

*In the meantime...*

## **Contact us for additional questions**

**ECW**

**[programs@energyconservationworks.org](mailto:programs@energyconservationworks.org)**

**307-264-2355**

**Energy-1**

**[jschell@energy-1.net](mailto:jschell@energy-1.net)**

**LVE**

**[amyw@lvenergy.com](mailto:amyw@lvenergy.com)**

**307-739-6045**