

Oregon Department of **ENERGY**

Heat Pumps 101

Senate Committee on
Housing and Development

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OREGON DEPARTMENT OF ENERGY

Leading Oregon to a safe, equitable, clean, and sustainable energy future.

Our Mission

The Oregon Department of Energy helps Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

What We Do

On behalf of Oregonians across the state, the Oregon Department of Energy achieves its mission by providing:

- A Central Repository of Energy Data, Information, and Analysis
- A Venue for Problem-Solving Oregon's Energy Challenges
- Energy Education and Technical Assistance
- Regulation and Oversight
- Energy Programs and Activities

HOW HEAT PUMPS WORK

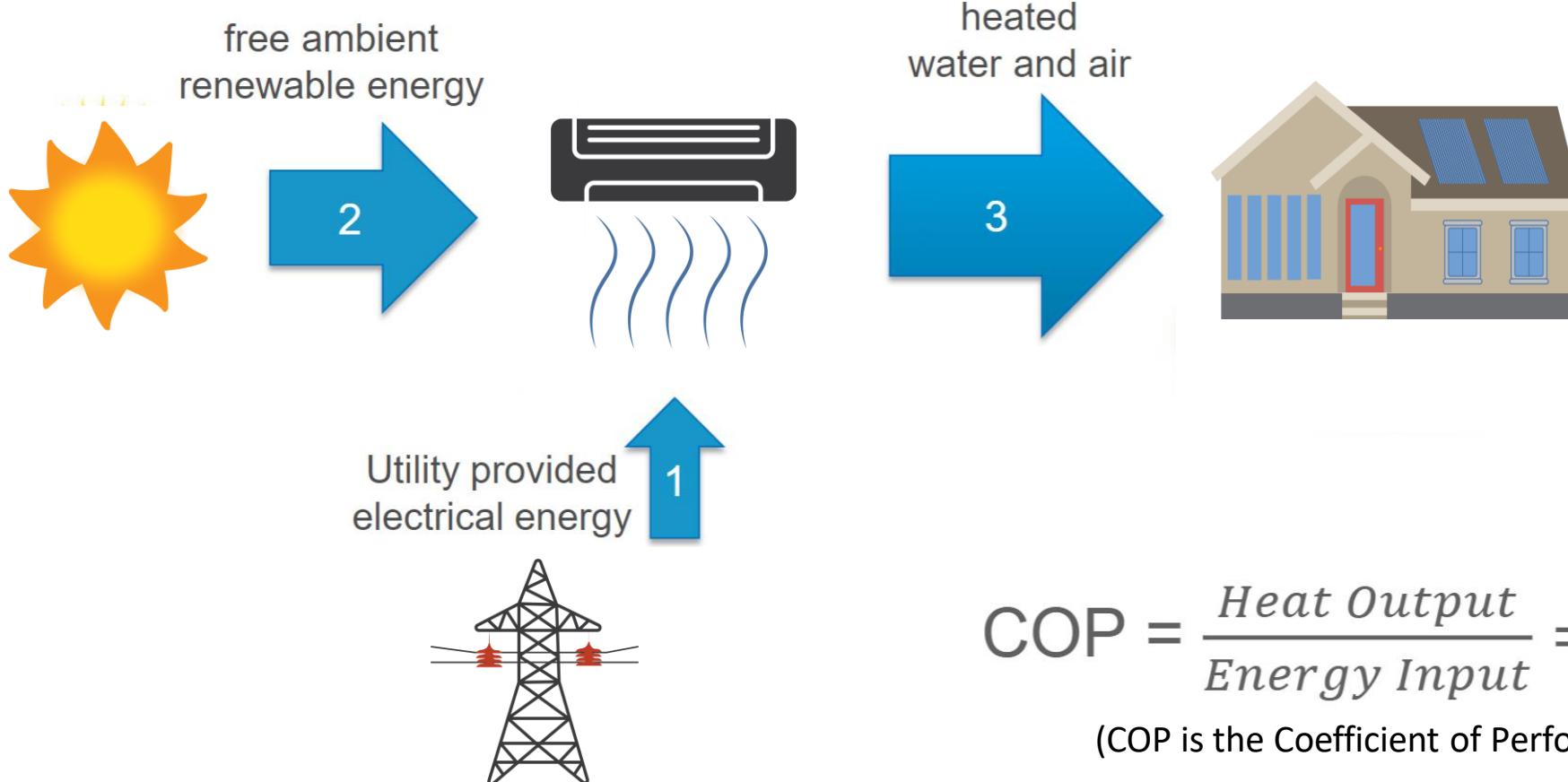
Heat pumps move heat, rather than create it.

- Heat pumps can remove heat from inside the building when in cooling mode
- They can collect and transfer heat into the building in heating mode
- Heat pumps operate like regular air conditioners when in cooling mode



AIR SOURCE HEAT PUMP

in heating mode



$$\text{COP} = \frac{\text{Heat Output}}{\text{Energy Input}} = \frac{3}{1} = 3.0$$

(COP is the Coefficient of Performance)

HEAT PUMP PERFORMANCE

Heat pump performance is temperature dependent:

- When it is cold outside, heat pumps must work harder to heat the building.
- When it is hotter, heat pumps must work harder to cool the building.
- Heat pumps operate most efficiently in mild climates and work effectively in a wide range of climate zones.

COMMON TYPES OF HEAT PUMPS

Air Source Heat Pumps

- Ducted or ductless versions - called mini-split heat pumps.
- Often the least expensive and most installed type of heat pump system

Ground Source Heat Pumps

- Utilizes the relatively constant ground temperature near the building to be heated. Typically, higher in capital costs to install but efficiently transfer heat and tend to have lower operating costs than air source heat pumps.

Water Source Heat Pumps

- Only suitable when a source of water with a relatively consistent temperature is available close by the building to be heated and cooled. Typically, higher in capital costs to install but efficiently transfer heat and tend to have lower operating costs than air source heat pumps.

Absorption or Gas-fired Heat Pumps

- Relatively new type of heat pump for residential systems that utilizes heat as the energy source, from a variety of sources.

HEAT PUMP BENEFITS

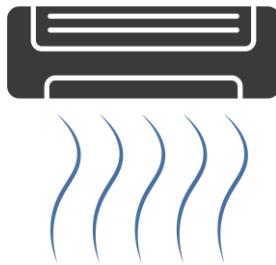
- Approximately **50% energy use savings** for air-to-air heat pumps when compared with electric resistance heat, and typically provide savings when compared with combustion fuel-fired heating systems (though savings vary depending on the local cost of fuel).
- With increasingly renewable electricity supply, **heat pumps can reduce greenhouse gas emissions** associated with building heating with compared with the use of combusted fuels.
- Heat pumps can economically provide **both heating and cooling in one system**.
- **Reliability:** heat pumps are comparable to other types of combustion fuel-fired heating systems in terms of life and maintenance needs.

Considerations for Heat Pump Installations

- Capital costs
- Existing infrastructure
- Temperature range during which the heat pump will operate
- Learning curve for owner/operators



CONTACT INFO & HELPFUL LINKS



More on Heat Pumps:

ODOE Website: [Energy Efficient Devices](#)

USDOE Website: [Heat Pump Systems](#)

2020 BER: [County Profiles](#)

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