



Tools for Electrification: Domestic HW via Heat Pumps

Why Heat Pumps for Domestic Water Heating

Heat pumps are the only viable **carbon-free solution** for domestic water heating on the market.

They burn **zero fossil fuels** at the building level to heat domestic water while doing it up to **10 times more efficiently**.

They help to achieve **NYC 80x50 sustainability** and **electrification** goals.

Why Heat Pumps for Domestic Water Heating

For Example: **Multifamily Housing**

- Existing building stock utilizes low-efficiency methods that burn fuel oil or natural gas.
- DWH accounts for 22% of GHG emissions in multifamily buildings.
- Multifamily represents over 40% of building area in NYC and 30% of all GHG in NYC.

How Do We Currently Heat Hot Water

Electric Resistance



Gas/Oil Furnace



What is Different about Heat Pumps

Everything! You need to forget what you learned about water heating.

What Makes DWHPs Different

Two reasons.



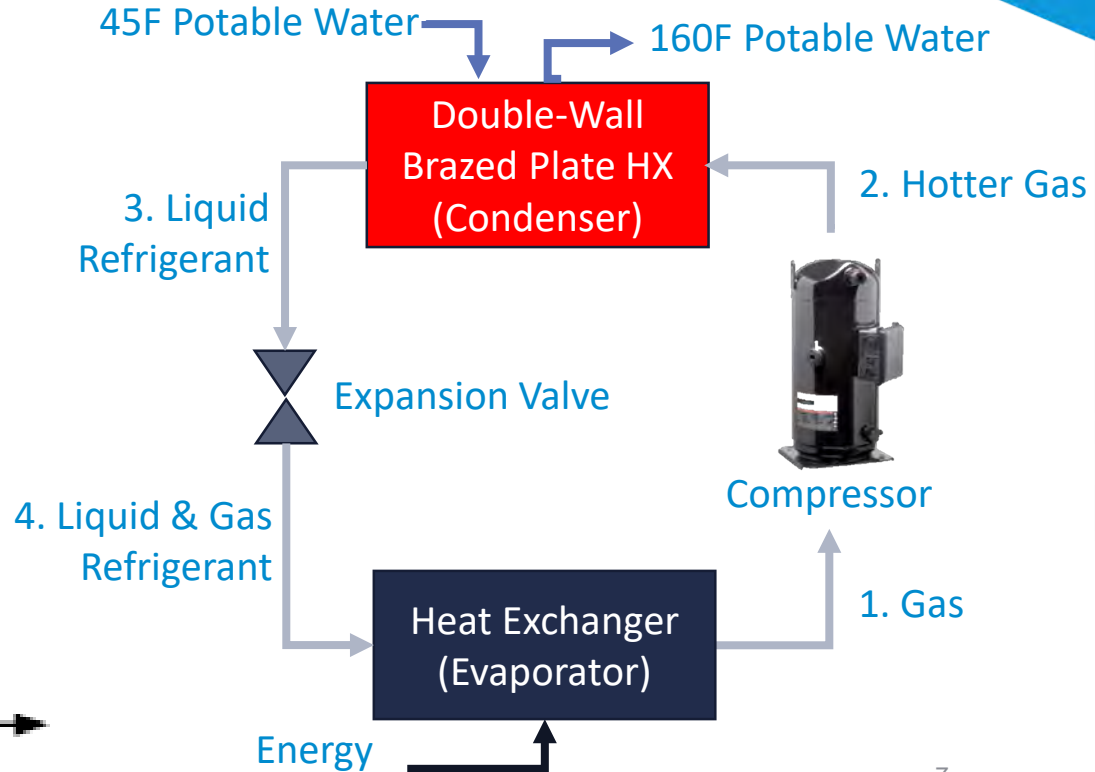
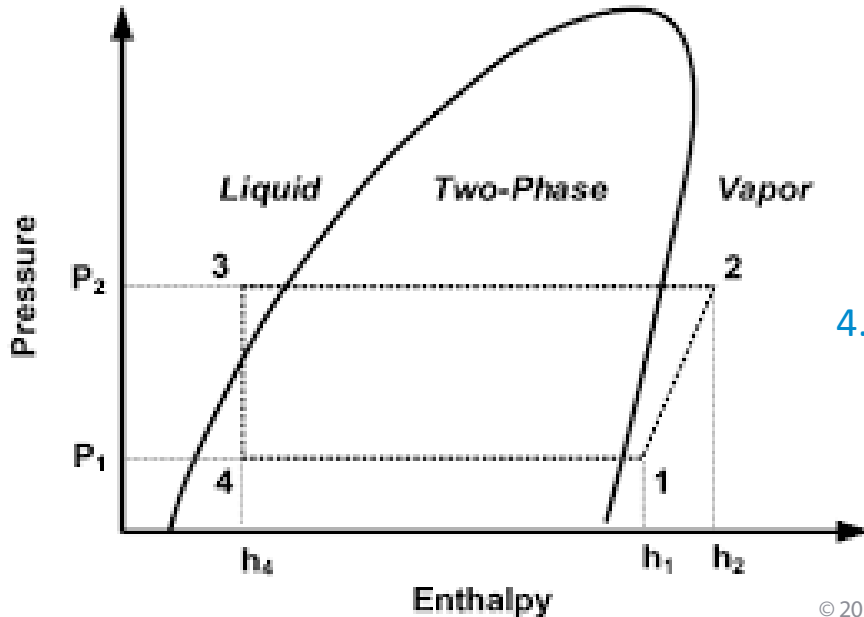
Vapor Compression Cycle

An apparatus for heating or cooling (such as a building) by transferring heat via mechanical means from or to an external reservoir (such as the ground, water, or outside air).

Heat Pump Technology

Meaning heat pumps get energy from a free source.

Vapor Compression Cycle



How We Currently Heat Water

Fossil fuels: 82% to 95% efficient

Electric resistance: 100% efficient

Combustion Efficiency

$\frac{\text{BTU Input} - \text{BTU Stack Loss}}{\text{BTU Input}} \times 100\%$

BTU Input



Equations for Efficiency

HVAC Efficiency

Gross BTU Output

Gross BTU Input

X 100%

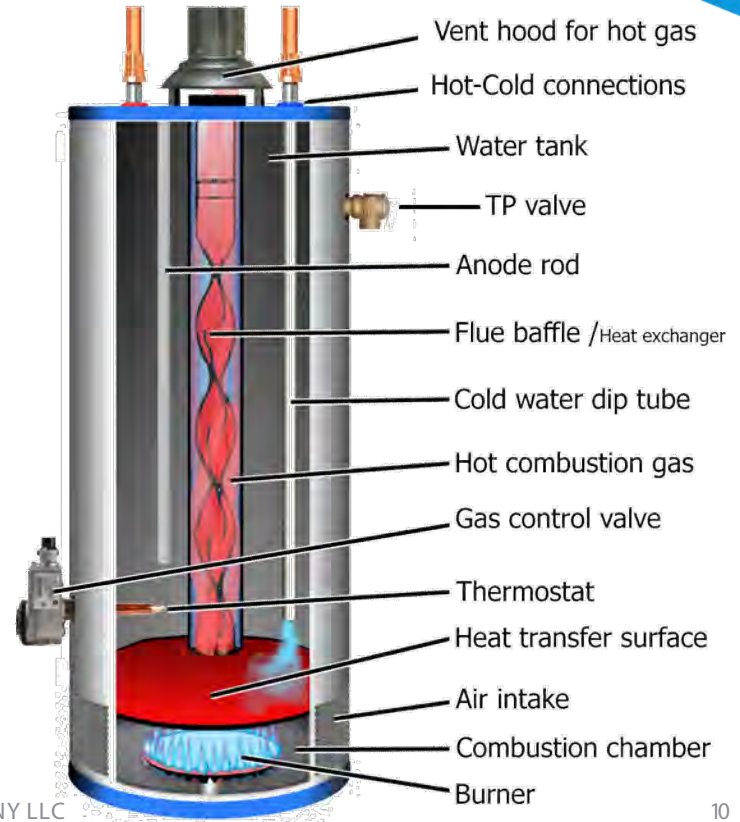
Coefficient of Performance

COP = $\frac{\text{BTU Output}}{\text{BTU Input}}$

How We currently Heat Water?

Fossil Fuels – 0.95 COP

Electric Resistance – 1.0 COP



What About Domestic Water Heat Pumps

Domestic Heating COP = 4 to 5

With No Carbon Emissions

Coefficient of Performance

$$\text{COP} = \frac{\text{BTU Output}}{\text{BTU Input}}$$



DHW Heat Pumps are the Future

Heating COP = 4-5

Cooling COP = 2-5

Combined COP = 6-10

Carbon Output = 0.85

At power plant, based on 5 COP, 50 MBH output

Heating COP = 0.9

Cooling COP = 0

Combined COP = N/A

Carbon Output = 2.95 kg/hr

At water heater, based on 0.9 COP, 50 MBH heater

We hope you join us at our breakout session

You can also continue the conversation with us at
booth #8