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Heat Pumps Beyond Standard HVAC: Process Heat, Wastewater and Heat Recovery

October 28, 2026

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Speakers



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- University of Missouri Engineering Graduates
- 15+ years at Trane – Public sector and high energy use focus



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Agenda



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- **Why Look Past Standard HVAC?**
- **Heat Pumps and High-Temp Heating Applications**
- **Wastewater Treatment Strategies**
- **Case Study**
- **Funding Mechanisms**
- **How to Get Started?**
- **Q&A**



Why Look Past Standard HVAC?



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- Large energy consumers are needing to offset rising energy spends by looking beyond standard comfort conditioning.



Energy Costs Are Rising – Lower
Operating Costs



Higher Efficiency Machines



Lower Carbon Impact – Electrification
Support



Heating & Cooling in **ONE** System

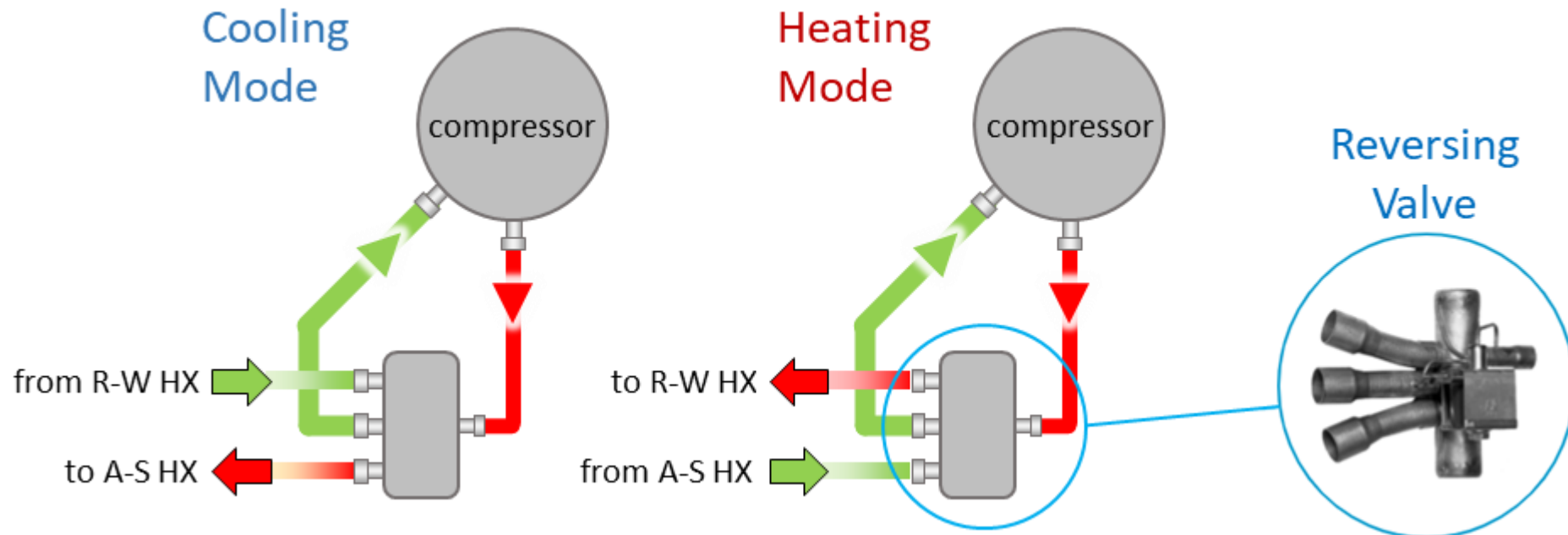


Heat Pump: How It Works



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- A heat pump with a reversing valve is a unit which allows the evaporator and condenser to switch roles by reversing the flow of refrigerant within the circuit.
- Heat pumps **move** heat rather than generating it, so they can be up to **3X** more efficient than other forms of electric heating.
- Heat pumps come in a wide range of sizes and are available in water source and air source versions.



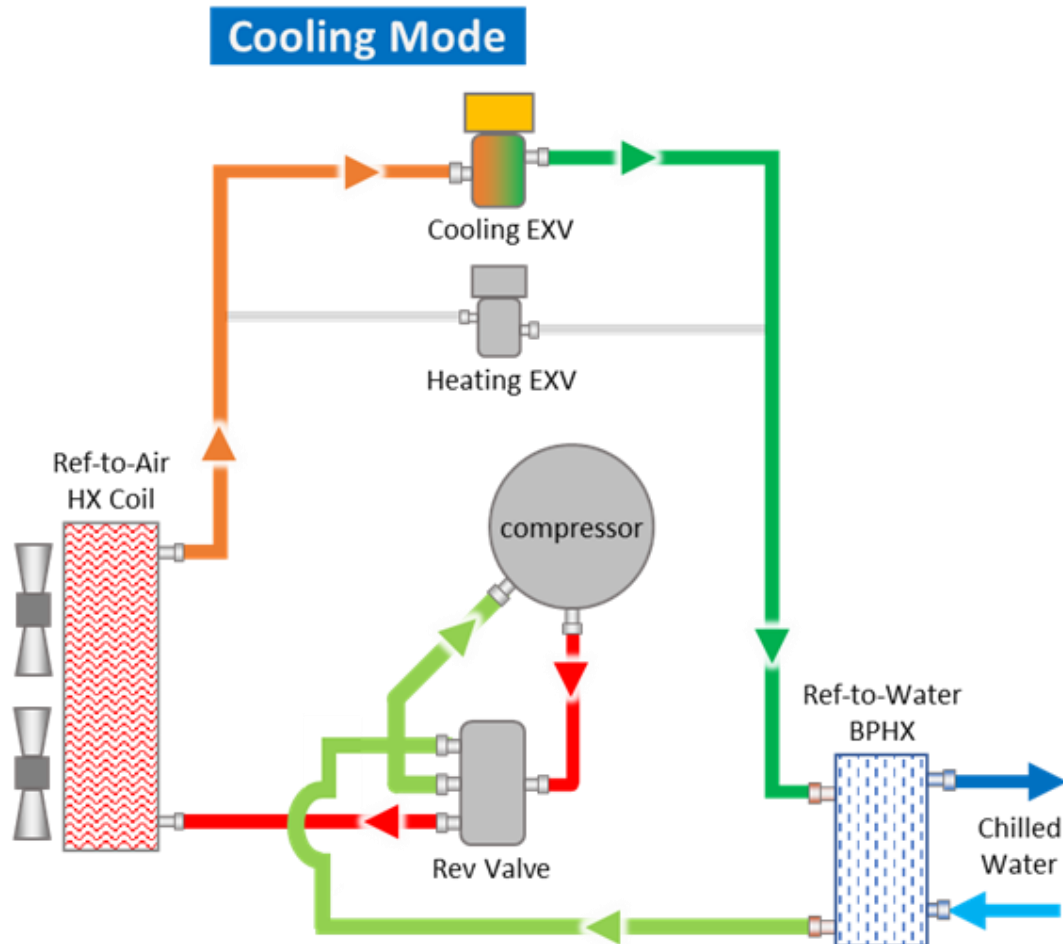
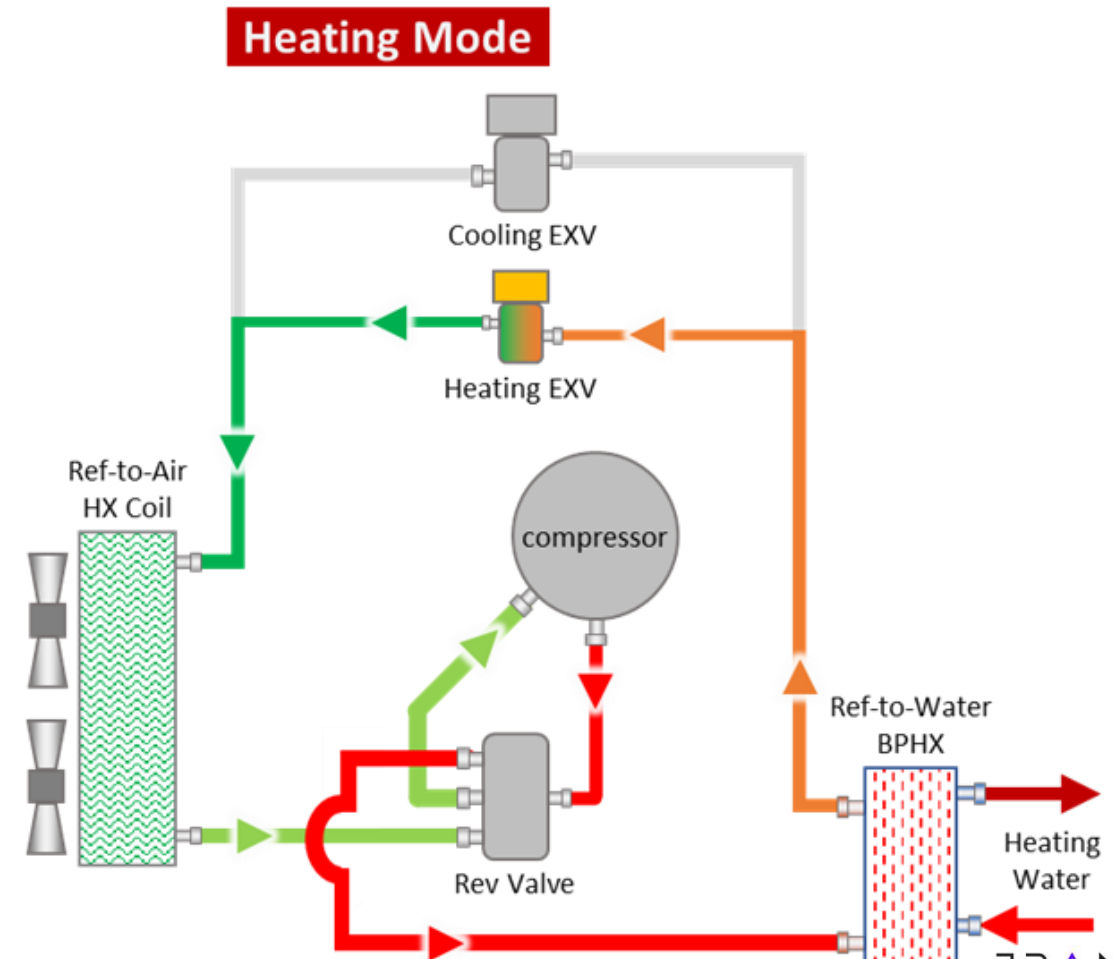


Heat Pump: How It Works



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- Evaporator and condenser have switched roles when the unit is put into heat pump mode:





Heat Pump Chillers

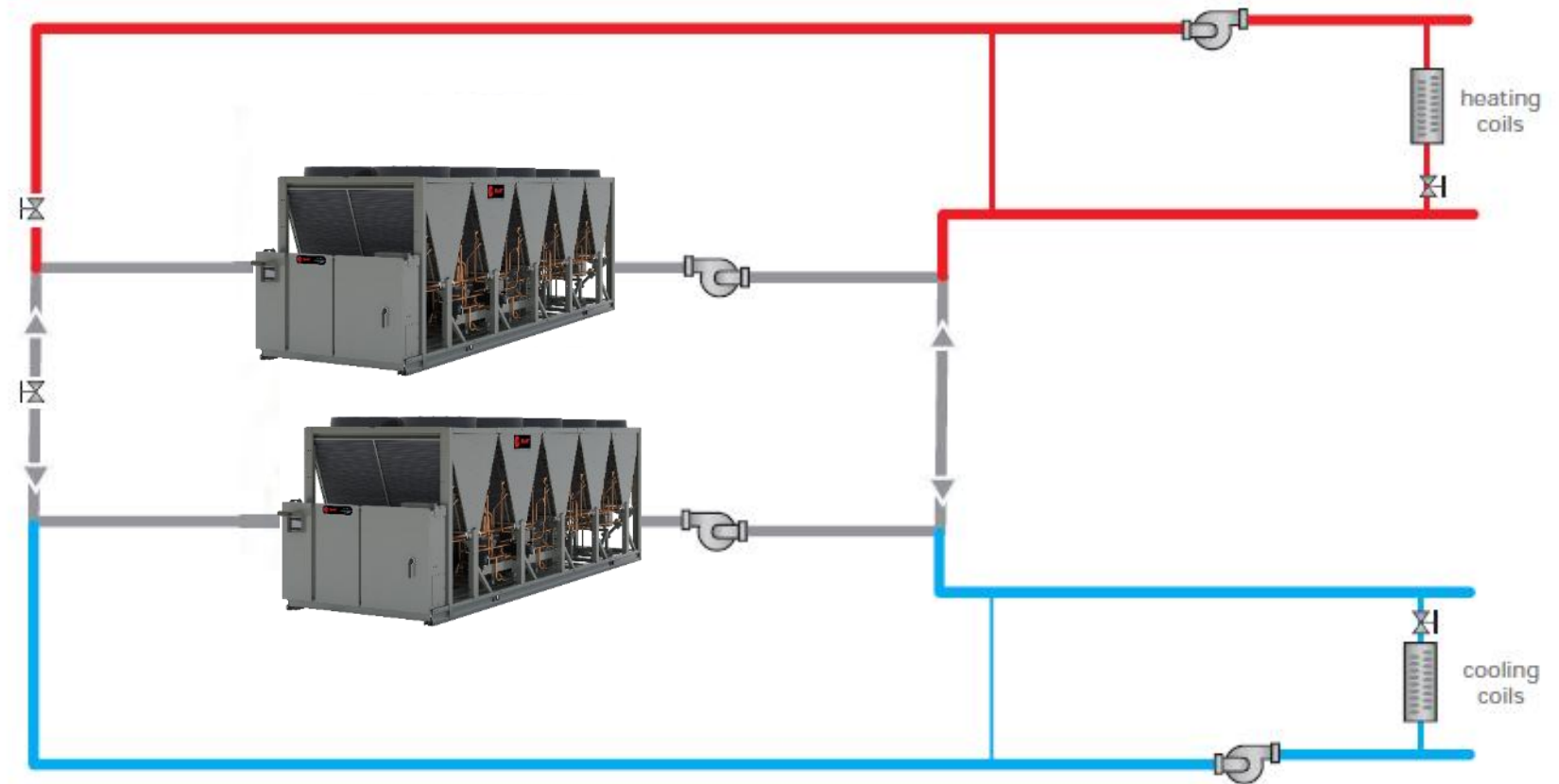


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- Air-cooled systems replace a boiler, chiller and cooling tower combo with a single plant.
- Where does this make sense?

Units installed in 2-pipe designs are heat pumps that utilize reversing valves, allowing the unit to operate in cooling OR heating mode

Any simultaneous heating and cooling operation is achieved by multiple units operating at the same time





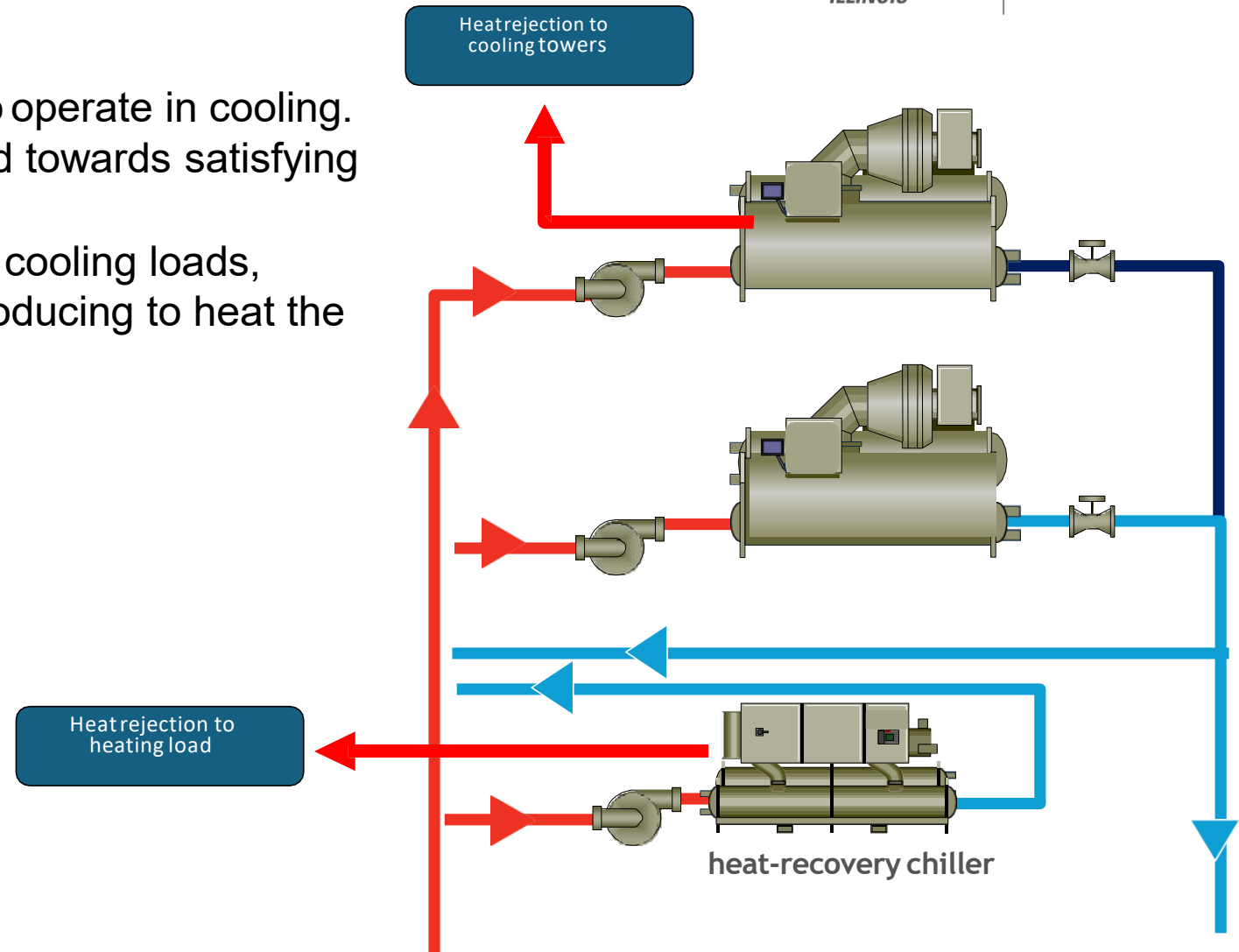
Heat Recovery Chillers

- A heat recovery unit's primary purpose is to operate in cooling. A portion or all of its condenser heat is used towards satisfying heating loads.
- Where there are simultaneous heating and cooling loads, recover wasted heat that your system is producing to heat the building!

Heat recovery captures and uses waste heat. We can do better than running chillers and boilers at the same time.



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High-Temperature Process Heat



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Dual Condenser Applications

- A second condenser bundle that can be used to recover heat when needed

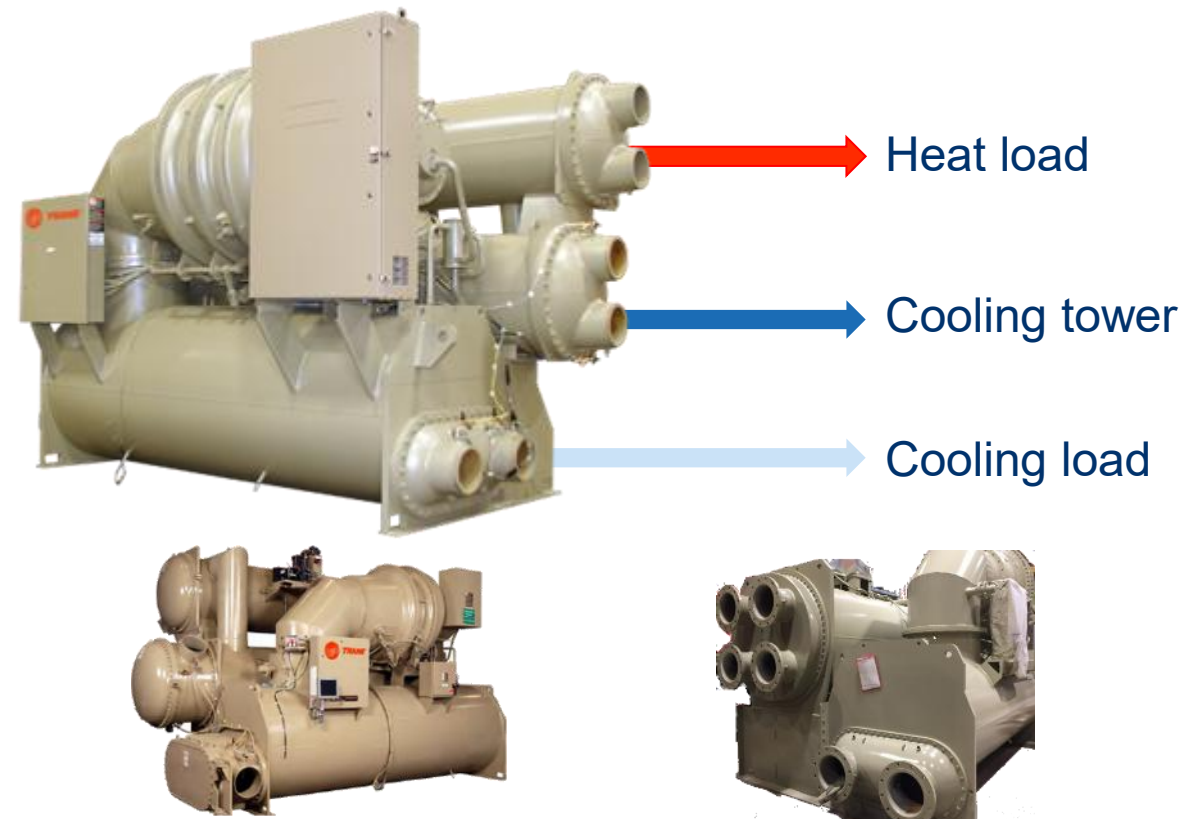
- Recover heat you already own
- Simple controls and installation
- Pre-heat, re-heat or just heat

Heating Temperatures

- CVHE/CVHF (200-1900T)
 - Up to 115F
- CVHH/CDHH (800-4200T)
 - Up to 140F
- Max Lift : 75-80F

Common Applications

- Hospitals
- Resorts
- Pools
- Campus heating
- Dehumidification





Wastewater Treatment



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Reclaim Heat from Wastewater Prior to Treatment

- Where warm wastewater is available in sufficient quantity, the excess heat can be integrated into on-site heating or industrial processes.
- Transfer heat between wastewater and clean water (used for HVAC) through heat exchangers without concern of mixing the streams.
- Heat pumps can be utilized to further boost the recovered heat to higher temperatures to address space heating or domestic hot water needs.
 - Can also feed the recovered heat directly into the buildings heating network to supplement the existing heating equipment.

Benefits:

- Energy savings
- Lower emissions (if displacing carbon-intensive heating)
- Sustainability



Case Study



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Chicago's James C. Kirie Water Reclamation Plant & University of Illinois at Chicago

- Chicago's Water Reclamation District partnered with the University to provide building cooling and heating sourced from wastewater.
- The effluent has an average temperature of 55F – similar properties to that of a ground source system.
- The heat pump system will transfer heat from the building loads to the effluent in the summer and take heat from the effluent to heat buildings in the winter.
- The heat pump system will serve a 10,000 square foot administration building and is expected to reduce HVAC costs by 50%.



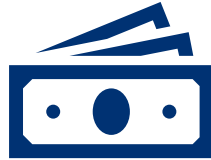
Source: [Heat Pump Systems Use Wastewater to Lower HVAC Costs | WaterWorld](#)



The Funding Stack



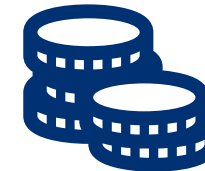
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Utility Rebates



State Programs



Federal Tax
Credits

Order Matters:

- Ameren Illinois pre-approval must happen before equipment purchase or start of construction.
- Federal credit basis is typically reduced by utility incentive received, so sequence and documentation matter for tax filing.
- Public entities get the biggest advantage: they can access federal credits through direct cash payment.



Ameren Illinois Incentives



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- Standard: HVAC measures including ground and air source heat pumps.
- Custom: projects that don't fit standard, such as waste heat recovery, large HVAC and process work.
- Pre-approval required for custom, specialized and larger standard projects (over \$10K incentive).
- Public sector rates can be higher than private on some measures.
- Feasibility studies and retro-commissioning are also offered.

Trane is not a tax advisor. Incentives shown are subject to change, including state budget finalization. Confirm eligibility with qualified tax professional or program administrator



State Programs



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- Illinois Energy Now / DCEO Public Sector Program: standard and custom rebates for local government, schools, community colleges and universities served by Illinois utilities including Ameren Illinois.
 - Historically, incentives under \$150,000 are paid as rebates and above \$150,000 is calculated per kWh and then saved.
- Illinois EPA runs dedicated Energy Efficiency at Wastewater Treatment Plants program through SEDAC and the Illinois Sustainable Technology Center.





Federal Incentives (IRA / Section 48)



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- Geothermal Heat Pump ITC: 6% base credit, up to 30% with prevailing wage and apprenticeship requirements.
- Additional bonus credits: Up to 10% for domestic content, up to 10% for energy communities, stacking toward a possible 50%.
- Geothermal and thermal energy storage credits available through 2034.
- Both public and private entities are eligible.
- IRS pre-filing registration is required.

County presented \$2 million check for Randolph County Care Center





How To Get Started



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Load and waste heat audit: identify actual heating and cooling loads, and where waste heat exists on site.



Engage a qualified partner to evaluate which applications fit your facility; not every site will be a good match for process heat, wastewater recovery or heat recovery chillers.



Feasibility study: right-size equipment, confirm temperature and capacity requirements against actual loads.



Run the energy and economic model comparing electric operating costs against current fuel cost for your site's rate structure.



Identify incentive / funding opportunities early in the process and follow pre-approval / pre-registration guidelines.



Questions?



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