



# Trane Chiller-Heaters

All-electric, all-weather comfort.





# Plugging in for a more efficient, reliable and low-carbon future

Electrification represents transformative progress in the effort to decarbonize and reduce greenhouse gas emissions. And now it's at the doorstep of buildings across North America.

Electrification of heat introduces a new paradigm for commercial HVAC systems. There is no one-size-fits-all approach. Building owners need to determine how best to incorporate electrified solutions that provide the right balance of performance and sustainability to achieve their goals while providing an energy-efficient, comfortable indoor environment.

### Can chillers help solve the electrification challenge?

Absolutely, because most Trane chillers provide gas-free, electrified heat. And Trane is leading the way in system design for chiller-heater systems. Electrification of heat begins with equipment, and Trane has one of the industry's largest portfolios of electrified HVAC equipment and technology.

### Why electrify heating?

Buildings are major consumers of fossil fuels and a significant source of greenhouse gas emissions. While building owners have taken many steps to improve energy efficiency, electrification can accelerate that trend by significantly cutting or eliminating altogether the use of fossil fuels for building HVAC—and the resulting emissions.



These benefits have made electrification an increasingly popular regulatory goal and a business priority for many companies:

- 47 states and 9 provinces in Canada so far have established incentives for using heat pumps in buildings.<sup>1</sup>
- 13 states have incentives in place for all-electric heating.<sup>2</sup>
- More than 20 states have enacted mandatory decarbonization efforts for buildings.<sup>3</sup>
- For many commercial customers, including 92% of S&P 500 companies, decarbonization is a part of their own ESG and net-zero carbon goals.<sup>4</sup>

1. <https://www.enclivenergy.com/>  
2. Federal Climate Policy 106: [The Building Sector, Resources for the Future 70](#)  
3. <https://www.cesa.org/projects/100-clean-energy-collaborative/guide/table-of-100-clean-energy-states/>  
4. <https://www.ictsd.org/how-many-companies-have-sustainability-reports/>

## Comprehensive solutions for successful electrification of heat

Trane supports the successful transition to electrified chiller heating by applying our expertise in HVAC system design. This is more important than ever, because the consequences of poor heating system performance are potentially more significant than cooling system faults.

Controls, too, have an important role to play. Trane's Symbio® unit controls integrate seamlessly with Trane and non-Trane building management systems to optimize efficiency and ensure comfort in both heating and cooling seasons. With networked, connected controls, you can access your equipment for 24/7 monitoring, remote maintenance, and easily view data. Implementing Chiller Plant Control, part of our Tracer Controls suite of systems applications, will ensure you get the most out of your system from Day 1.

The full Trane chiller portfolio integrates with Tracer® SC+ and its embedded suite of pre-engineered applications that help the complete system to work more efficiently.

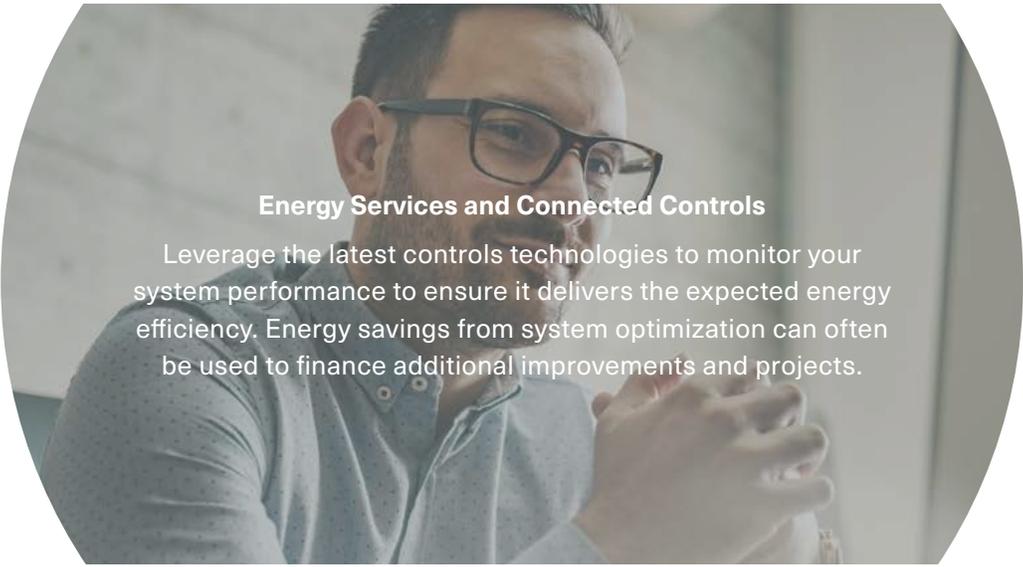


After installation, ongoing service is essential to keeping performance finely tuned. Trane's service organization understands the nuances of electrified system performance, and how to maximize the benefits of electrification over the long term.



### **Electrified HVAC Systems**

Design an electrified system tailored to your needs and goals, selecting from a comprehensive, industry-leading portfolio of products.



### **Energy Services and Connected Controls**

Leverage the latest controls technologies to monitor your system performance to ensure it delivers the expected energy efficiency. Energy savings from system optimization can often be used to finance additional improvements and projects.



### **HVAC and Intelligent Services**

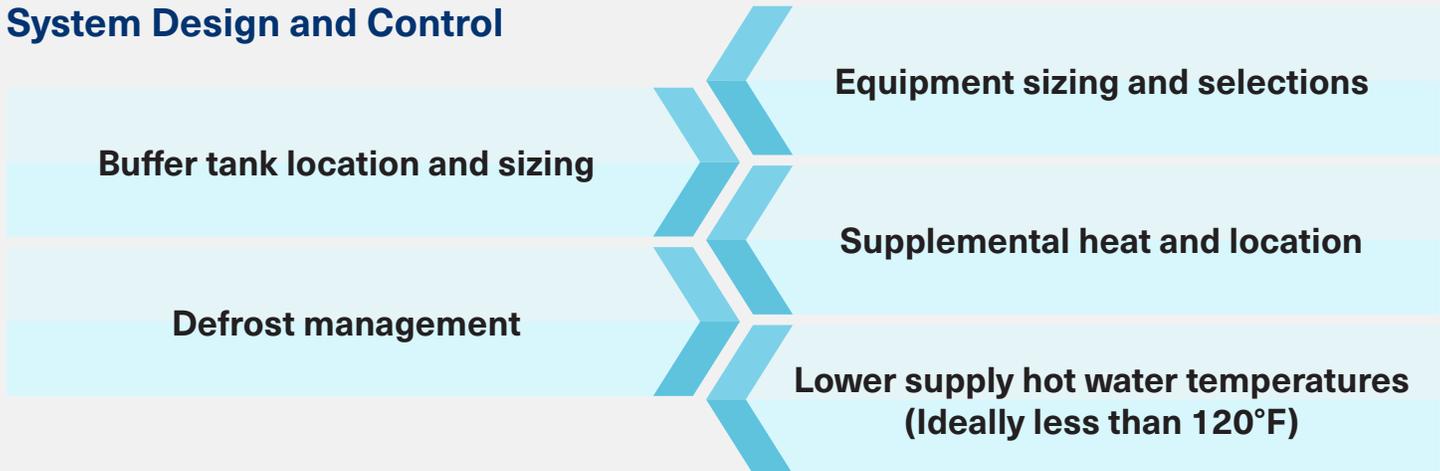
Maintain reliable and efficient electrified heating through proactive system maintenance from your factory-trained local Trane service team. Trane helps you use system data and analytics for performance optimization, and to prove your decarbonization progress.

## A holistic approach to electrification

Electrification of heat is a paradigm shift for most commercial HVAC systems. There are important system design issues to consider in determining the best solution to fit a customer's specific needs and goals.

### Considerations for a successful electrified hydronic heating plant using chillers

#### System Design and Control



## Trane: A complete approach from a complete solution

A comprehensive chiller-heater solution from Trane provides guidance on how to apply chiller-heaters for reliable, cost-effective, energy-efficient options to cool and heat facilities while reducing carbon emissions. It also supports indoor air quality (IAQ) objectives because it can be applied to fit with many central air-handling and dedicated outdoor air systems, as well as zone terminal products such as fan coils, unit ventilators, sensible cooling units and VAV terminals.

Trane Comprehensive Chiller-Heater Systems deliver what building owners need:



**Flexibility**—to satisfy diverse heating and cooling loads and comply with electrification regulations and sustainability objectives.



**High performance**—by exploiting significant improvements in heat pump heating to enable buildings to function better and reduce carbon emissions.



**Reliability**—by managing equipment capabilities to reduce the impact of defrost on system performance and enabling cold climate operation.



**Lower cost of ownership**—by reducing equipment and energy costs while increasing efficiency and reliability for building owners.

## Let's look at the options

Depending on business needs and local climate, the ideal system may be all-electric or a hybrid system that includes a gas-fired boiler as an extreme cold-weather backup. Trane designs each system for its specific conditions and needs, and provides the chiller, air-side equipment and controls. If applicable, we'll factor a boiler into the optimal system design and control strategies, too.

### Chiller solutions for electrification

Any one of the following options deserves a deeper dive. But for now, let's take a summary look at what electrified heating may look like in a building.

#### 1. Incorporate heat recovery

Adding heat recovery to a unit is an efficient and simple way to electrify heat, because heat recovery recycles heat that would normally be wasted in the cooling process and instead uses it to heat the building. Heat recovery units are set to the cool water set point. So, as long as there is a demand for cooling, the unit can also provide heat.

#### 2. Switch to heater mode

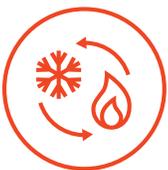
When a building is heating dominant, water-cooled chillers may be controlled to the hot water set point to operate primarily as heaters instead. This may be true for industrial applications, or comfort systems where buildings have more heating loads than cooling loads. In this setup, chillers provide cooling as a useful byproduct.

#### 3. Add a heat pump

Heat pumps have become the optimum choice of electrified heat for many building applications because of their lower energy consumption and operating costs. Trane has air-to-water (air-source) and water-to-water (water-source) heat pumps.

#### 4. Innovate with storage source heat pumps

Thermal energy storage is known for storing cooling but can also store and recover yesterday's waste heat to deliver heating tomorrow. Instead of rejecting heat outside through cooling towers, waste heat can be stored, recovered and reused in the building.



#### What makes a heat pump special?

Heat pumps move heat from one location to another. Since it takes less energy to transfer heat than to create it, this approach results in energy and cost savings. Because heat pumps move heat rather than generate it, heat pumps can be up to three times more efficient than other forms of electric heating.<sup>5</sup>

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5. Trane Self-Paced Learning. Decarbonization/Electrification of HVAC Systems

# Trane Chiller-Heaters for Electrification

Trane has one of the industry's broadest portfolios of HVAC technology including chillers that can provide heating or cooling for all-electric systems. We have electrified heating equipment designed to function reliably and efficiently throughout North America's range of temperature zones.



## Heat Recovery, Heaters and Non-Reversible Heat Pumps

Heat recovery chillers use existing heat that would otherwise be wasted in the cooling process, making it one of the most efficient forms of heating available. Heat recovery units are set to the cool water set point. So, as long as there is a demand for cooling, the unit can also provide heat.

When a building is heating dominant, water-cooled chillers may be controlled to the hot water set point to operate primarily as heaters instead. A water-cooled chiller configured as a heat pump can heat and cool, resulting in a highly efficient, carbon-free source of heating and cooling for a building.



*Water-cooled chillers may also be referred to as heat pumps since they can move energy to heat the spaces within the building*

## Air-source



### **Air-cooled chiller – Model CGAM**

Capacity from 20-130 tons cooling, 25% partial heat recovery

- Hot water up to 158°F
- Easy to install
- Simplified service



### **Thermafit™ modular air-cooled units – Models AMC and AMT**

Capacity from 15-80-ton modules, up to 800-ton banks, full heat recovery

- Hot water up to 165°F
- Offers true redundancy
- Different levels of efficiency
- Full free cooling
- Easy to expand up to 10 modules
- Small footprint

## Water-source

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### **CenTraVac® centrifugal chiller – Models CVHE and CVHF**

Capacity: 200-1900 tons cooling

- Hot water up to 125°F
- Max lift of 75°F
- Low GWP, low pressure refrigerant
- Premium efficiency
- High-lift versatility



### **CenTraVac® centrifugal chiller – Model CVHH**

Capacity: 800-2,000 tons cooling

- Hot water up to 140°F
- Max lift of 80°F
- Low GWP, low pressure refrigerant
- Premium efficiency
- High-lift versatility



### **Series® R water-cooled helical rotary chiller – Model RTWD**

Capacity from 80-250 tons

- Hot water up to 140°F
- Max lift of 100°F
- Low GWP, low pressure refrigerant
- Water-to-water heat pump
- High-lift versatility
- Precision temperature control



### **Optimus® water-cooled helical rotary chiller – Model RTHD**

Capacity from 125-430 tons

- Hot water up to 114°F
- Max lift of 100°F
- Low GWP, low pressure refrigerant
- Compact size
- AFD option
- Competitive installed cost



### **Agility® centrifugal magnetic bearing chiller – Model HDWA**

Capacity from 125-430 tons

- Hot water up to 140°F
- Max lift of 90°F
- Low GWP, low pressure refrigerant
- Compact footprint-fits through double door
- Efficiency, with variable speed, magnetic bearing, 2-stage compressor, economizer



### **Thermafit™ modular water-cooled unit – Models MWC and MWT**

Capacity from 15-80 tons cooling, up to 800-ton banks, 216-1140 MBh heating

- Hot water up to 165°F
- Easy expandability
- Energy storage
- Extreme flexibility
- Simplified service
- Small footprint/easy access

# Reversible Heat pumps

## Cooling or heating

A key enabler for decarbonization, Trane heat pumps use a reversing valve to move energy in two directions to provide electrified heating or cooling. Because they don't generate heat and simply move heat, they can be up to three times more efficient than other forms of electrified heating.



## Air-source



### New from Trane

#### Ascend® Air-to-Water Heat Pump – Model ACX

140 to 230 tons cooling, 1500 to 2500 MBh heating

The centerpiece of Trane's commercial heat pump portfolio is the new Ascend® Air-to-Water Heat Pump model ACX.

- Complies with ANSI/ASHRAE/IES 90.1-2019
- Part of the Ascend chiller product line for simplified service
- Hot water up to 140°F
- 100°F water at 0°F



### New from Trane

#### Thermafit™ modular air-to-water heat pump – Model AXM

Each 30T unit provides 390MBh, can combine up to 10 units

The modular heat pump which brings buildings into the future of sustainable comfort is the new Thermafit Air-to-Water Heat Pump model AXM.

- Hot water up to 140°F
- 130°F at 0°F
- Offers true redundancy
- Easy to install and expand in tight spaces

**Vapor injection super-heating for reliable cold-weather comfort**

## Water-source



#### Thermafit™ modular water-to-water heat pump – Model WXM

Water-to-water heat pump

Capacity: 15-80 tons cooling up to 800-ton banks, 270 to 1120 MBh heating

- Hot water up to 140°F
- Easy to expand; up to 10 modules per bank
- Small footprint
- Ideal for applications with nearby cold-water sources, such as a lake, ground water, or wastewater

## Multipipe Units

### Simultaneous heating and cooling

Multipipe units can provide simultaneous cooling and heating because they can be controlled to both the heating and cooling set points.

### Water-source

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#### **Multipipe Unit – Model MWS**

Capacity from 30-60 tons cooling; 1275-2690 MBh heating

- Hot water up to 120°F
- Easy to expand, 3-8 modules per bank
- Six-pipe design features three independent water loops; fluids from different loops do not mix
- Saves space by combining heating and cooling duties and eliminating glycol mixing
- Provides up to 135°F leaving water temperature to support year-round heating
- Ideal for geothermal applications

## Thermal Energy Storage Tanks

### Heating and Cooling

Thermal energy storage has been and will continue to be a key tool to decarbonize. Because thermal energy storage can capture and store thermal energy for heating and cooling, thermal energy storage provides optimal flexibility to reduce summer and winter peak demand, optimizes resiliency and lowers operating cost.



#### **CALMAC® Thermal Energy Storage Tanks**

**Models 1082C, 1098C, 1105C, 1190C, 1220C, 1320C, 1500C**

Modular design to fit a wide variety of projects from houses of worship to district cooling systems

- Reduces summer and winter demand electrical peaks
- Reduces heating and cooling costs
- Allows for rightsizing of major heating and cooling refrigerant components
- Increases renewable generation utilization by up to 50%<sup>6</sup>

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6. ASHRAE Research Paper 1607. 2018.

## Design support and expertise to simplify design

Electrification of heat brings new kinds of system components and system design requirements into the mix. Trane has a full complement of resources to support design, equipment specification and selection to ensure you get the right equipment to meet your needs. We've also developed some pre-engineered solutions for different application scenarios to help get you started.



**Trane's Heating with Compressors Applications Manual** provides virtually everything you need to know about heating with chillers.



**Design and analysis tools** from Trane help you select the equipment you need. They also provide system design resources, system analysis tools and various calculators, including LEED compliance to aid in system design decisions.

## Join us in making a difference.

Trane understands the electrification journey you're on because we're decarbonizing as part of our own sustainability objectives. As part of Trane Technologies, we are committed to reducing one gigaton—one billion metric tons—of carbon emissions (CO<sub>2</sub>e) from our customers' footprint by 2030.

### Uniquely positioned to lead a movement to reduce greenhouse gas (GHG) emissions

#### Accelerate Clean Technologies



CLEAN200™

**#66** Corporate Knights Clean200 list of public companies ranked by green revenue

**20 million+** metric ton reduction in the use phase emissions of our products since 2014

#### Addressing System Energy Efficiency

##### Holistic Solutions

Connecting, monitoring and automating a building's entire mechanical system to operate in the most efficient way possible

##### Strategic Electrification of Heating

Innovating new solutions to remove fossil fuels on-site and help our customers be resilient in what's set to be a tumultuous decade

#### Transitioning Out of High GWP Refrigerants

**By 2030** we will fully transition out of high GWP refrigerants, ahead of regulation

**30+** countries (most of which do not have regulations in place) where our next-generation chillers can be purchased

Learn more at [trane.com](https://trane.com)



Trane – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit [trane.com](https://trane.com) or [tranetechnologies.com](https://tranetechnologies.com).

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