



Pool Environment Optimization in Canada's Climate Zones

Design Considerations for Canadian Climate Zones

With eight distinct zones, Canada offers a remarkable diversity of climates across its extensive geographical landscape. Factors impacting its varied climate include its size and its topographical diversity from mountains to forests, plains and coastal regions.

Some areas are moderated by nearby large bodies of water, including the Atlantic and Pacific Oceans, the Great Lakes, and the Arctic Ocean. The country's extensive north-south latitude also plays a role as does its different air masses including polar, maritime and continental.

Understanding the climate systems that impact Canada is crucial to identifying the right solution for a commercial pool environment, whether for a Nordic spa plunge pool and hot tub or for a community pool in a recreation center.

Pool Environments: Design Considerations

Pool environments nearly always require heat energy. This is due to the evaporation of water; the temperature of the air inside the room is typically 25C+. The humidity level in a pool environment needs to address the needs of multiple occupants.

If the air is too dry, for example, a swimmer may feel too chilly when they step out of the pool while guests cheering on swimmers during a competition may welcome a cooler environment.

Swimmers will feel the “wet bulb temperature in a space.” This can be considered like a “wind chill” temperature. Even a pool at a hot temperature, may have a cold “wind chill temperature”. Fixing this can also lead to energy savings as it may allow your system to not work as hard. It’s also important to consider that humid air can lead to mold and microbial growth and impact HVAC equipment life.

Canada's Climate Zones



More Splash and Sizzle

Market research by [IBISWorld](#) shows that multifunctional pools can increase facility usage by up to 30 percent, driving higher revenue and customer satisfaction.

Fun Fact | Swimming's Health Benefits

According to Swimming Canada, swimming can improve mental health and promote wellbeing as it can: reduce loneliness, release endorphins, boost dopamine and serotonin levels, relieve tension and stress and promote higher self-esteem. [Source](#), page 9

Options for Solving Humidity Challenges

Options for optimizing the humidity level include outdoor air systems, mechanical dehumidification and heat recovery solutions.

Outdoor Air Systems Dehumidification

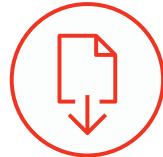
Outdoor air (OA) units can provide drier outside air to control pool room humidity levels. This makes dehumidification effects weather dependent. While in some climates, this may provide proper humidity control year-round, it does not work in all climates. Also, typically, the amount of OA required is greater than the minimum ventilation, leading to high energy costs in conditioning the excess OA.

Mechanical Dehumidification

If your OA is too humid to allow for dehumidifying year-round dehumidification or you want to reduce energy costs, you will need to consider other types of dehumidification.

Mechanical dehumidification usually consists of a cooling coil that dries out the air then reheats the air to a temperature that is suitable for the space. Without the reheat, the supply temperature (the temperature supplied to the space as it leaves the duct) can lead to draftiness.

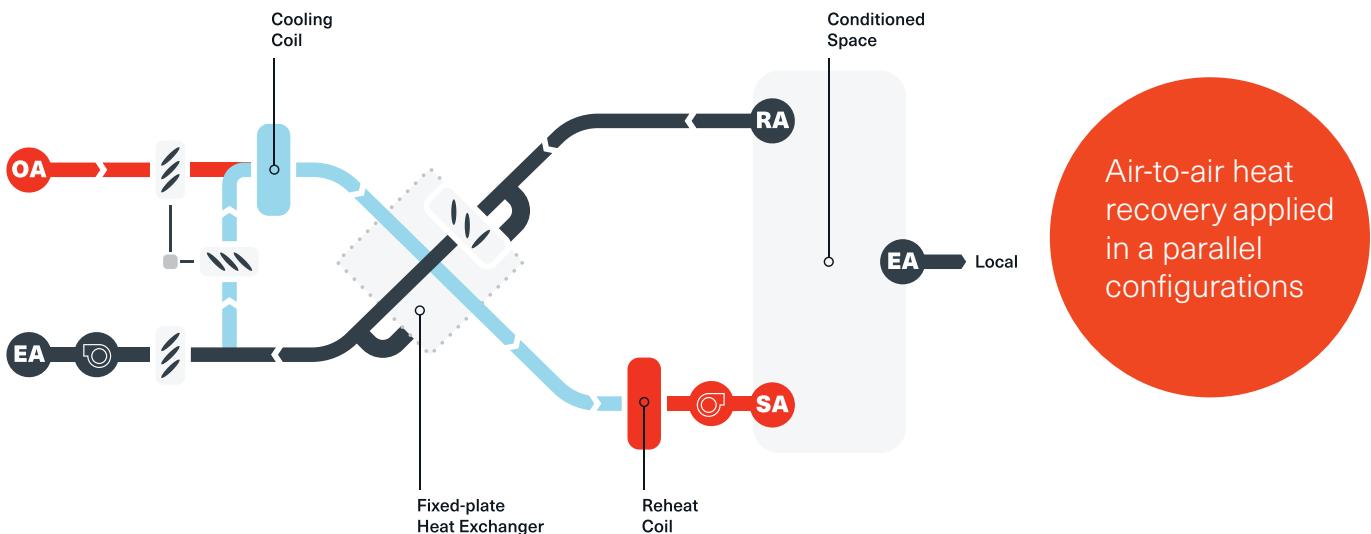
**Check out our Applications
Engineering Manual
on Dehumidification**



Heat Recovery Options

A heat recovery system can be used to maintain consistent temperature and humidity levels while helping to increase energy efficiency, lower operating costs and environmental impact.

These systems can also help extend equipment life by reducing the load on primary heating and cooling systems and help you meet building codes and standards. They can be integrated into new or existing HVAC systems, making them a versatile application. Consider both air-side heat recovery systems and refrigerant heat-recovery systems. The choice between air-side and refrigerant heat recovery systems depends on the specific needs and constraints of the application.

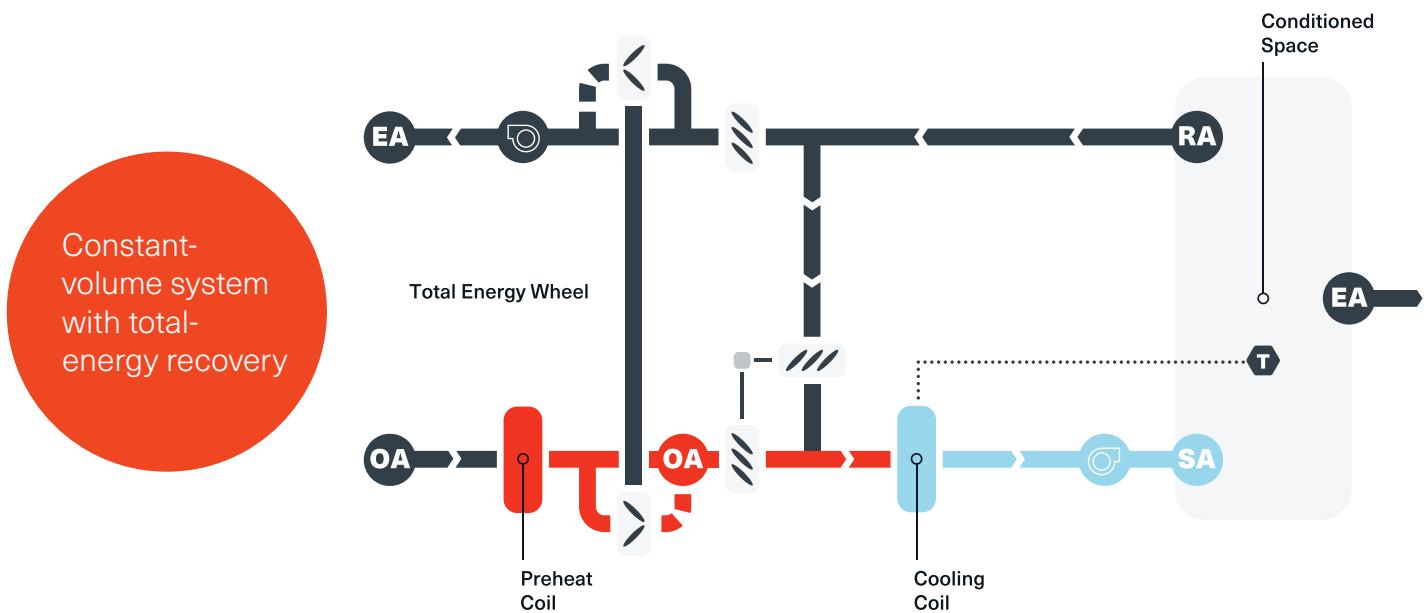


Air-Side Heat Recovery Systems

Air-side heat recovery systems typically involve the transfer of heat between air streams, often using heat exchangers like rotary wheels or plate heat exchangers. These systems are often favored for their simplicity, cost-effectiveness, and ability to manage humidity and improve indoor air quality.

They do not involve the use of refrigerants which can simplify installation and maintenance. These systems are designed to improve energy efficiency by recovering waste heat from the air and using it to heat outside air, reducing the cost to condition outside air.

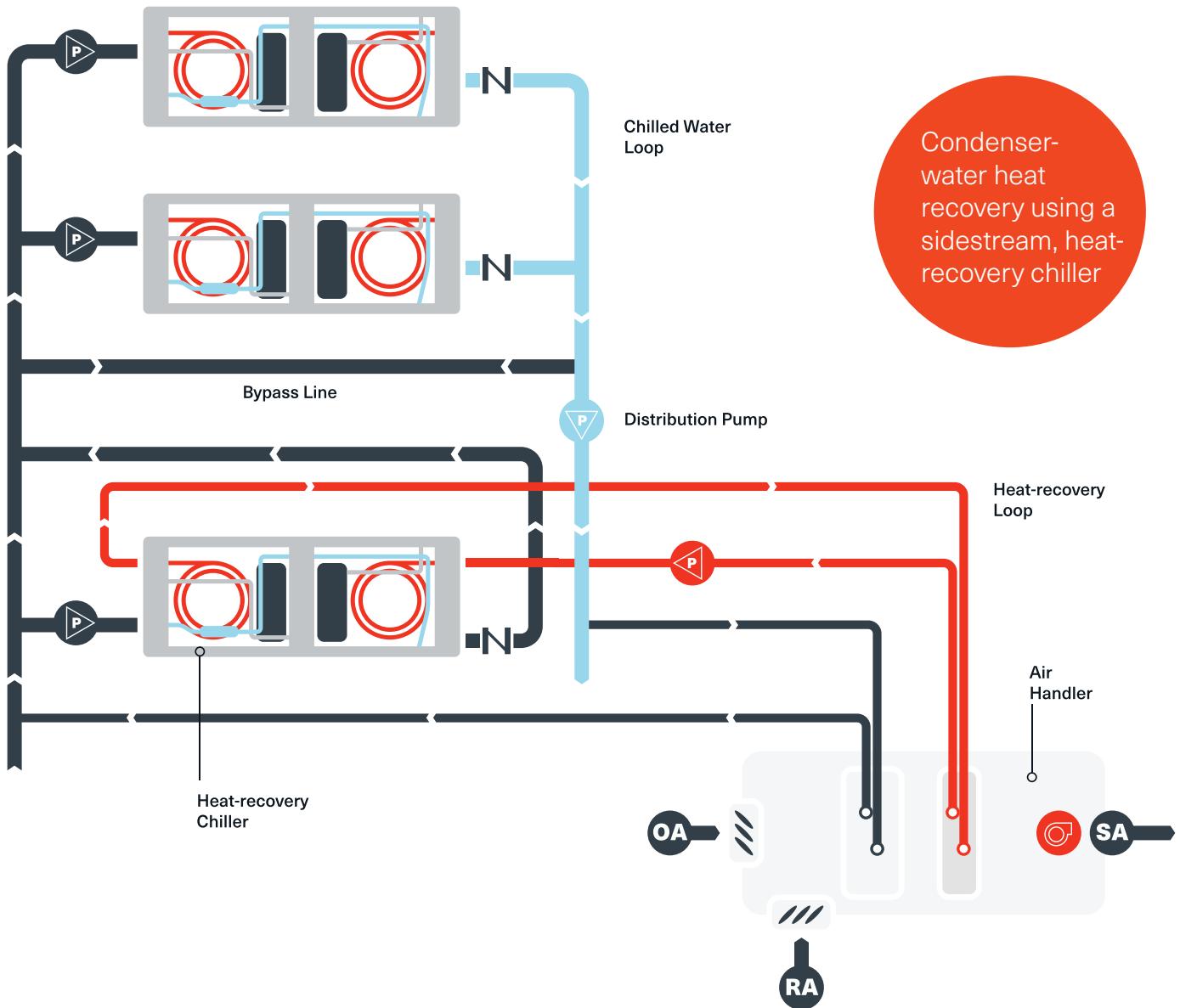
One challenge to these systems is if the existing equipment does not have exhaust and outdoor air streams near each other.



Refrigerant heat recovery options

Refrigerant heat recovery involves the transfer of heat within the refrigerant cycle using components like heat recovery condensers. Refrigerant heat recovery for pools involves capturing waste heat from refrigeration or air conditioning systems and using it to heat pool water.

These heat recovery systems offer higher efficiency in certain applications, compact design, and the ability to recover higher-grade heat as well as heat from multiple sources, making them suitable for more specialized or demanding environments. This can be an efficient and cost-effective way to maintain pool temperatures, especially in facilities like recreational centers, gyms and even hotels. Heat recovery options also can be more flexible when added to existing systems.



Growth of Nordic Spas

A Nordic spa involves alternating between hot and cold treatments to promote relaxation, improve circulation, and enhance overall well-being. Interest in Nordic spas is growing quickly as evidenced by a Jan. 2025 article in [Style at Home](#) highlighting “9 Nordic Spas to Visit Across Canada.”

About the Author

Chase Hayden has been with Trane for 10 years, contributing to the design, installation, and operation of complex commercial HVAC systems, including solutions for pool and specialty environments. He holds a mechanical engineering degree from the University of Calgary and is a Professional Engineer registered with APEGA. Chase is also an associate member of the CSA B52 committee, Canada's primary refrigeration standard.



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