



## COST SAVINGS FREE-COOLING APPROACHES

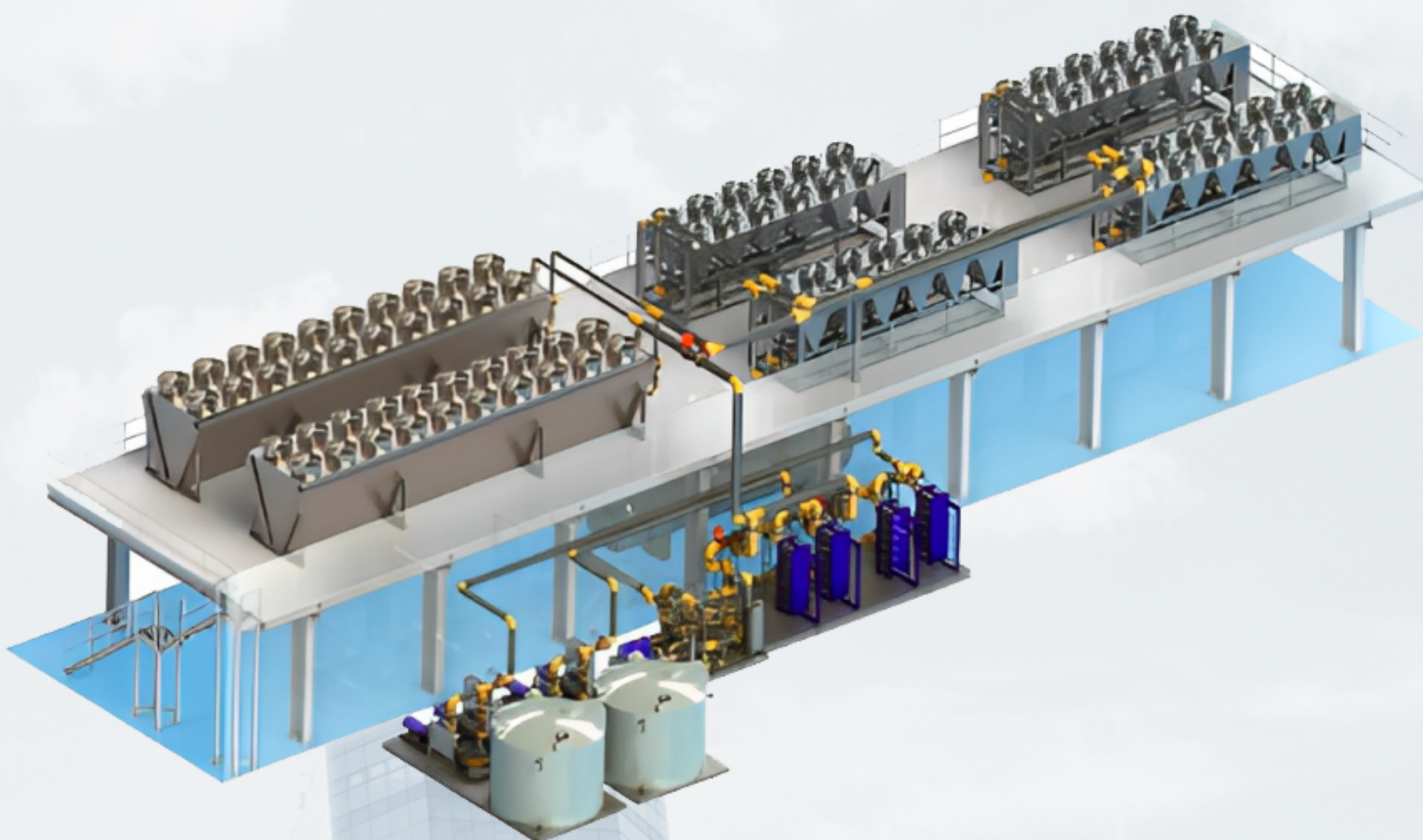
### FREE COOLING APPROACHES

Free Cooling is a fast, effective, economical method for low external air temperatures. It can be used to assist in cooling water for industrial temperature control applications or in HVAC systems.

In many parts of the country, a cooling system can use cooler outdoor temperatures to cool a facility or process, without the use of additional equipment or actual mechanical cooling. This is known as free cooling, and many factors can affect the type and amount of free cooling provided. These factors include temperature, humidity, time of day, and the amount of cooling needed.

### CHILLER EVAPORATOR TO TOWER WATER

One of the most common methods to benefit from free cooling comes from chiller applications. Heat exchangers transfer heat between the cooling tower water and the chilled water. When the temperature of the water from the cooling tower is colder than the desired chilled water temperature, compressors can be staged off and automatic valves in the chiller water and refrigerant circuits can control the new flow path.



A Free Cooling system can be installed in series or in parallel with the chiller system's evaporator so that in lower ambient conditions, partial or 100%, Free Cooling can be achieved. This method of operation, depending on the ambient temperatures can produce a reduction in energy costs of up to 70%. As the ambient air temperature drops below the process return water temperature, the benefits of Free Cooling can begin to be realized. As the ambient temperature drops 3°F to 5°F below the required process supply water temperature total Free Cooling can be achieved taking over from the chillers' compressors providing an environmentally friendly and cost-effective approach to process and HVAC cooling.

### FREE-COOLING from Air Cooled Heat Exchangers

In a free cooling setup with ACHEs, the chilled water is pumped through a heat exchanger that is exposed to the outside air. The ambient air, typically drawn through fans, passes over the heat exchanger tubes, absorbing heat from the chilled water and cooling it down. The cooled water is then recirculated back into the chilled water system to provide cooling for the building or process.

### Cooling Tower Plate and Frame Heat Exchanger

During periods when the outdoor air temperature is sufficiently cool, the chilled water system can take advantage of free cooling by bypassing the chiller and using a cooling tower with a plate and frame heat exchanger. The cooling tower circulates water through a heat exchange process, where heat from the water is transferred to the air, and the cooled water is then recirculated back to the system, saving a substantial amount of energy.



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