

Reuse of Cooling Tower Blowdown at Commercial and Municipal Buildings



Covering over 520,000 square feet, the San Jose McEnery Convention Center is the largest convention center in Silicon Valley. In keeping with the City of San Jose's Green Vision and Climate Smart sustainability plans, the Convention Center implemented several environmental initiatives including:



Recycling and beneficial reuse of wastewater



87% of waste generated from the facilities is diverted from landfills by being recycled, repurposed or composted



Composting services



Applied for LEED silver certification by the U.S. Green Building Council



First ChargePoint America electrical vehicle charging stations in San Jose

The Green Vision/Climate Smart goals include recycling and beneficial reuse of wastewater and the Convention Center has undertaken initiatives to reduce its water footprint through its central cooling loop.

Cooling tower systems are often the largest single water use in municipal buildings. In many cases, the cooling tower can consume as much as 40% of a building's total water footprint. Most of the water consumption is due to evaporative losses and, there is also a significant quantity of water drained to the sewer during blowdown. Blowdown is water drained from the system to prevent the concentration of dissolved solids in the water cycled thru the cooling tower from reaching levels that cause scaling of the equipment. Capture and reuse of this blowdown presents a novel opportunity to conserve water as well as buffer the escalating cost of water and wastewater discharge.



The San Jose Convention Center uses a 2500- ton, triple cell induced draft cooling tower with a circulation rate of 7500 gpm. The daily blowdown rate varies based on the outside temperature but can average around 6,000,000 gallons per year. This water is otherwise wasted to the sewer and replaced with fresh water.

San Jose Convention Center relies upon the expertise of its water treatment specialist, EAI Water, for its chemical treatment programs and service of boilers, chillers, and HVAC closed loops. In addition to formulating their own product line of chemicals, EAI Water also fabricates packaged water treatment units including softeners, engineered resin, and reverse osmosis, ozone, and chlorine dioxide generator systems. Based on their knowledge of cooling towers, EAI Water engineered a membrane-based solution for the Convention Center to capture and reuse the blowdown water within their cooling tower while maintaining the chemistry of water essential for optimal cooling operation.

EAI Water designed and fabricated a reverse osmosis (RO) system that processes all the blowdown water from the cooling tower and reclaims greater than 50% of this wastewater for reintroduction into the makeup water supply. Reverse osmosis is a filtration process that uses a thin film membrane to remove the dissolved solids accumulated in the cooling tower water.



The water treatment chemical program itself also reduces the consumption of water by maximizing the number of times the water can be cycled through the cooling tower. The program is fully-automated to control the frequency of blowdown based on conductivity of the dissolved solids in the water. The RO system is operated in synergy with the water treatment chemistry and is automated to meet the fluctuating demand of the cooling loop.

As a result, this initiative alone will reduce the water footprint of the Convention Center by saving an estimated 3,000,000 gallons of fresh water per year.

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