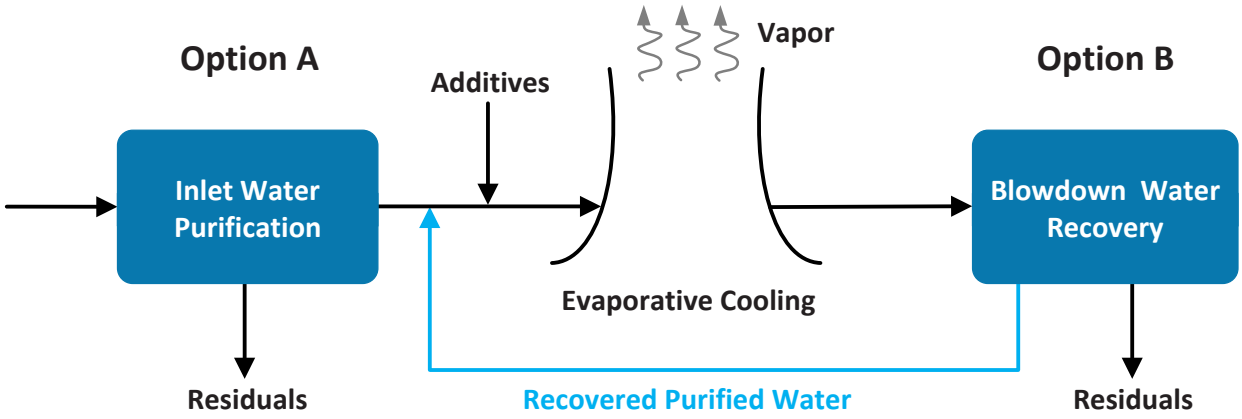
Data Center Water Reduction & Recovery

Increase Cooling Cycles, Water Efficiency, and Treat Blowdown

Saltworks offers cooling tower optimization solutions across industries, including data centers, power, chemicals, and manufacturing. Our solutions can help you:

- Optimize water and energy balance for cost effective and sustainable water use.
- Option A: Purify and condition inlet water to increase evaporative cycles.
- Option B: Recover water from evaporative cooling blowdown.
- Evaluate incremental water recovery options by assessing costs, energy consumption, and risks.



Complete, Modular, Off-Site Commissioned Solutions

Saltworks specializes in the design and delivery of cost-effective and high recovery water systems. Our modular and intelligently automated systems are off-site constructed, pre-commissioned, and ready for rapid install and start-up.

Treat inlet water to reduce total dissolved solids (TDS) and chlorides to boost evaporative cycles. Treating evaporative cooling blowdown or reverse osmosis (RO) brine necessitates advanced expertise to address the presence of complex organics and scaling ions. Our engineers will work with your team to assess processing options, and economic analysis of alternatives.

Xtreme-RO process unit

BrineRefine stir-tank reactor

SaltMaker evaporative crystallizer

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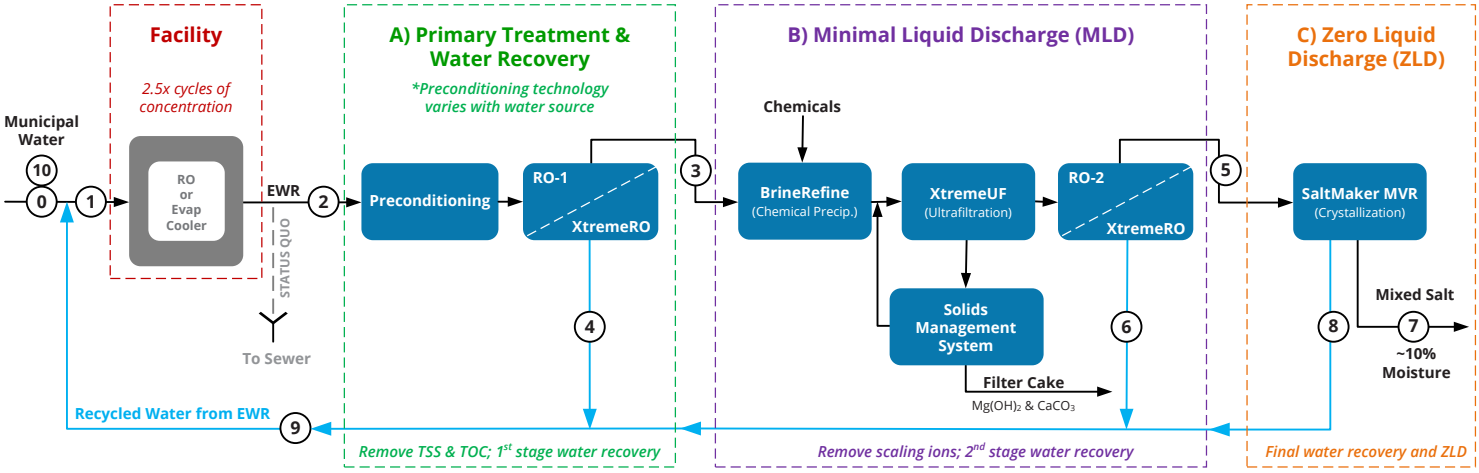
Data Center Water Recovery Case Study

The case study below represents a 200 MW data center's evaporative cooling water consumption. It illustrates blowdown treatment system recoveries for each successive stage of enhanced water recovery (EWR). Results for this case show that cooling system water consumption can be reduced by up to 40% via an effective treatment and recycling program.



Enhanced Water Recovery (EWR) Options with Incremental Recovery and Cost

A) Robust preconditioning to protect RO-I may be required if evaporative cooling is upstream. Saltworks specializes in protecting and enabling RO systems in severe applications.

B) MLD will result in ultra high water recovery; however, a high salinity, low volume brine will require discharge from site. Check sewer regulations and/or if trucking to a receiver is possible (i.e., blending at a WWTP or industrial site). Saltworks specializes in high-recovery MLD membrane systems and can support brine discharge option assessments or tailor your MLD system to meet discharge limits.

C) ZLD is the pinnacle of industrial desalination offering maximum water recovery and zero liquids discharged but carries the highest cost. Saltworks provides complete and intelligent ZLD systems across industries. First we aim to help clients avoid ZLD through analysis, options, and strategies such as above.

Data Center Water Consumption		0	1	2	3	4	5	6	7	8	9	10
		Municipal Water Intake Before EWR	DC Inlet	DC Discharge	RO-I Brine	RO-I Permeate	RO-II Brine	RO-II Permeate	SaltMaker Salts	SaltMaker Distillate	Total Water Returned	Municipal Water Intake After EWR
Flow Rate	m3/day	12,500	12,500	5,000	1,000	4,000	63	949		61	4,993	7,507
	gpm	2,294	2,294	917	183	734	12	174		11	916	1,377
Total Dissolved Solids	mg/L	600	600	1,500	7,676	300	80,360	500		300	339	600
ZLD Solids (10% Moisture)	tonne/day								5.6			
Water Recovery	%					80.0%		98.7%		99.9%		
Make-Up Water Reduction	%					32.0%		39.6%		40.1%		

EWR: High Level Performance Summary					
Option	Make-Up Water Reduction	Blended Energy (kWh/m3)	Blended Cost ($USD/m3)*	Blended Cost ($USD/kgal)*	Notes
A) Primary Membrane Concentration	32.0%	4.0	$0.75 - $1.50	$2.84 - $5.68	Note A
B) Minimal Liquid Discharge	39.6%	4.8	$1.50 - $3.50	$5.68 - $13.25	Note B
C) Zero Liquid Discharge	40.1%	5.4	$2.75 - $5.00	$10.41 - $18.93	Note C

*Blended cost is indicative and includes CapEx (15 yr, 12%) and OpEx.

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