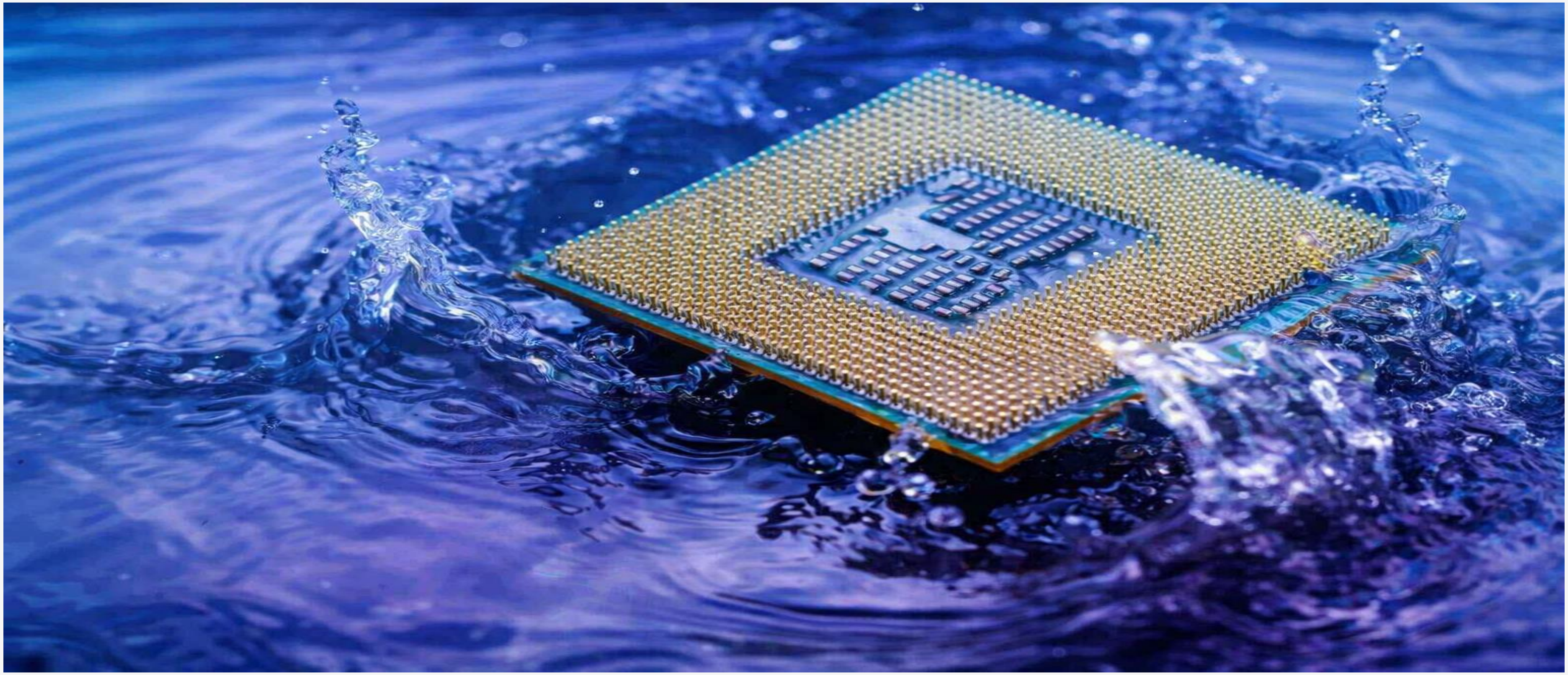
The AI Chip Boom Is Driving a Multi-Billion Dollar Water Infrastructure Opportunity



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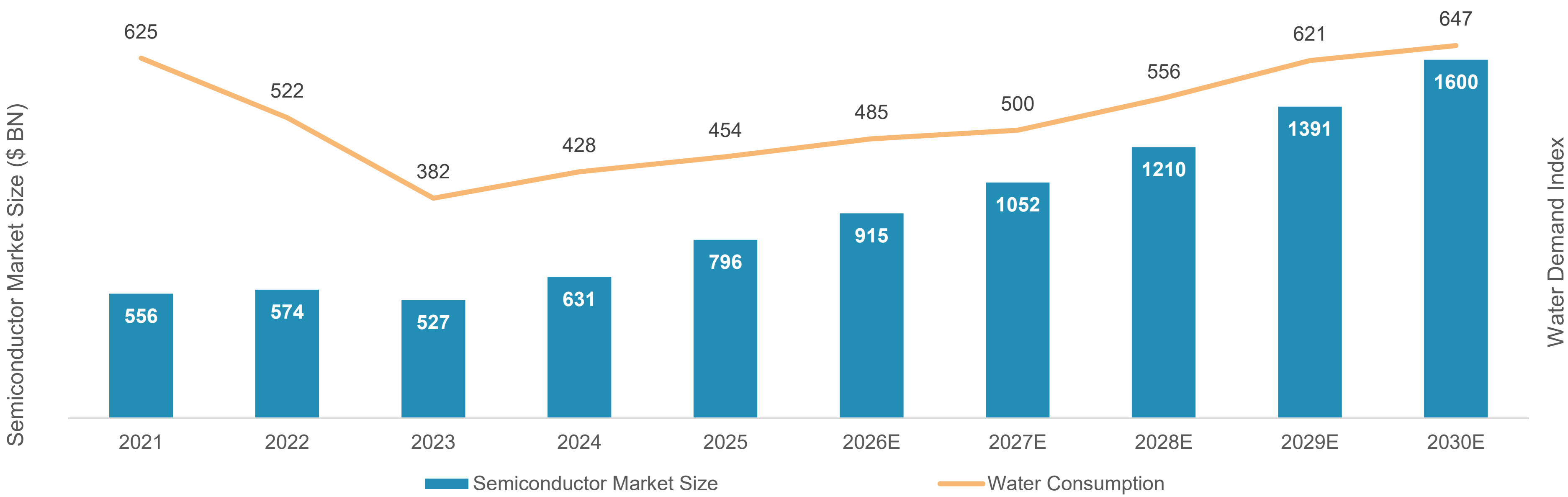
Semiconductor Expansion Is Driving Structural Demand for Ultra-Pure Water Infrastructure

As semiconductor production scales to support global demand, water consumption is rising rapidly. Advanced chip manufacturing requires large volumes of ultra-pure water for wafer fabrication processes such as cleaning, etching, and lithography. With a single advanced fab consuming water equivalent to a city of 30,000–50,000 people, water infrastructure is becoming a critical enabling layer of the semiconductor ecosystem.

$1T+ market	100+ fabs	~8,400 liters	~20–40M liters / day
Expected global semiconductor market by 2030E	Expected globally by 2030E	Water required per 300-mm wafer	UPW consumption by advanced semiconductor fabs

Indexed Water Demand vs Semiconductor Market Growth

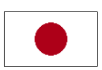


Source: TechInsights, WSTS and McKinsey

Fab Expansion Is Concentrated in Water-Stressed Regions

Expansion of semiconductor fabrication across water-stressed regions is increasing reliance on advanced ultrapure water (UPW) systems. As new fabs scale production and process complexity rises, chipmakers are investing in water recycling, treatment, and purification infrastructure.

~$2 bn annually	~70–80% recycled	>50% of fabs	~20% of Fab Cost
Semiconductor industry's spending on water treatment systems	Water reused in advanced semiconductor fabs	Located in water-stressed regions	Allocated to water, utilities, and infrastructure systems

Country	Company	Investment Plans	Water Stress
	Intel	>$100B long-term US investment plan including Ohio mega-fab and Arizona expansion	
	TSMC	~$65B investment for three advanced fabs under US CHIPS incentives	
	TSMC	Continuous ~$40B annual capex to maintain leading-edge manufacturing capacity	
	SMIC	$150B+ state-backed semiconductor investment programs across multiple phases	
	Samsung	~$230B long-term semiconductor cluster investment around Yongin	
	JASM	>$20B total investment in two semiconductor fabs producing 12–28nm and future advanced chips	
	Intel	~€30B investment to build two leading-edge chip fabs under the EU Chips Act	

Source: Company announcements, government semiconductor investment programs (e.g., CHIPS Act), and industry reports on fab expansions and water stress exposure.

Public Companies Benefiting From Semiconductor Water Demand

Company	UPW Relevance	Value Chain Role	Key Projects / Investments
Veolia Water	Provides integrated UPW treatment systems, wastewater recycling, and lifecycle services for semiconductor fabrication facilities	UPW systems EPC and lifecycle services	$550M water treatment facility for major US semiconductor fab
Evoqua Water Technologies	Engaged in UPW purification, point-of-use systems, water reclaim, and wastewater treatment for semiconductor fabs	Fab-grade UPW systems and services provider	UPW system installation for Silanna Semiconductor LED fab (Australia)
DuPont	Supplies advanced membranes, ion-exchange resins, and filtration technologies critical for ultrapure water production in semiconductor fabs	UPW membranes and ion-exchange resin supplier	Reverse-osmosis membrane deployment at Taiwan semiconductor fab for water recycling
Organo	Designs and supplies ultrapure water production and recycling systems for semiconductor fabs	Semiconductor UPW system engineering and plant supplier	UPW system supplier for TSMC new semiconductor fab in Taiwan
Ecolab	Provides ultrapure water technologies and water circularity solutions for semiconductor fabs	UPW technologies and circular water solutions provider	$1.8B acquisition of Ovivo Electronics UPW business
Kurita	Provides ultrapure water production systems, treatment chemicals, and process solutions for semiconductor manufacturing facilities.	UPW treatment chemicals and system solutions provider	Developed digital UPW systems and semiconductor water-reuse solutions

Source: Company reports, press releases, and industry disclosures on semiconductor ultrapure water solutions and projects.

Aranca Takeaway

Key Drivers

ESG Compliance

Stricter environmental norms and disclosure requirements make wastewater treatment mandatory, driving sustained capital and operating expenditure by fabs.

Process Complexity

Advanced semiconductor nodes increase chemical intensity and wastewater complexity, raising demand for sophisticated treatment and monitoring solutions.

Fab Expansion

Global semiconductor capacity build-outs structurally increase demand for ultrapure water, wastewater treatment, recycling, and reuse infrastructure.

Water Scarcity

Fabs in water-stressed regions require high reuse rates and onsite recycling to ensure uninterrupted production and regulatory compliance.

Regulatory Enforcement

Stricter environmental regulations mandate water purity, recycling, and discharge standards, driving semiconductor fabs to invest in advanced UPW treatment solutions.

Semiconductor Yield Protection

Advanced wastewater treatment prevents contamination and disruptions, protecting semiconductor yields and making water quality a production-critical investment.

Risks

Capex Cyclicality

Semiconductor downturns or delayed fab investments can temporarily defer wastewater projects, impacting order inflows and near-term revenue visibility.

Project Delays

Permitting issues, construction delays, or fab timeline changes can postpone wastewater system commissioning and slow revenue recognition.

Execution Complexity

Large, customized wastewater projects carry execution risk, including cost overruns, integration challenges, and margin volatility during ramp-up phases.

Aranca Takeaway

Investment Consideration	Potential Winners	Potential Losers
Utility Positioning Water utilities may benefit from rising demand and stronger pricing power as water scarcity becomes increasingly apparent globally.	**Water Utilities** Water utilities are planning substantial capital expenditures this decade to upgrade aging infrastructure, improve efficiency, and address rising water demand requirements.	**Desert-State Data Centers** Real estate investment trusts with significant exposure to water-stressed regions may face regulatory and operational challenges
Technology Solutions Companies developing water-efficient cooling technologies may see rising adoption and expanding market opportunities as industries seek sustainable solutions.	**Cooling Technology** Companies specializing in liquid and immersion cooling technologies may benefit from rising adoption as traditional cooling systems face efficiency constraints.	**Project Delays** Companies failing to adopt water-efficient cooling technologies risk significantly higher operational costs as water scarcity intensifies and regulatory pressures increase globally.
Geographic Diversification Data center operators with facilities in water-abundant regions may have competitive advantages over those concentrated in drought-prone areas.	**Water Infrastructure** Technology companies providing water management and efficiency solutions for data centers may benefit from rising demand as sustainability priorities increase.	**Traditional Cooling Providers** Large, customized wastewater projects carry execution risk, including cost overruns, integration challenges, and margin volatility during ramp-up phases.

500+	2500+	120+	80+
Strong, professional team across multi-disciplinary domains	Global clients	Sectors and sub-sectors researched by our analysts	Countries where we have delivered projects

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