



The Next Evolution of Data Center Efficiency: Water Conservation

QTS' comprehensive water strategy reduces data center water usage

Sustainability has been a corporate priority for large enterprises for some time now. While energy efficiency and carbon footprints have been the primary focus, water consumption and efficiency are gaining attention as the world faces a water crisis. According to the UN's [World Water Development Report 2022](#), the combination of agriculture, industrial uses and increasing populations—among other factors—is depleting groundwater. The UN also notes that [efforts to improve environmental conditions](#)—including water scarcity—are not happening fast enough.

To ease this intensifying water crisis, businesses and the general population need to do their parts. This includes data center operators. While data centers are widely recognized as large consumers of energy, they also utilize a lot of water to cool the massive quantity of computing equipment that operates within the facilities. Without proper cooling, these systems can overheat and shut down, introducing downtime for customers.

Conventional data centers rely on evaporative cooling models to remove heat from the data center. While these solutions are energy-efficient, they use water. According to [one source](#), a typical data center can consume up to 5 million gallons of water daily. That is enough water to fill almost 8 Olympic-sized swimming pools every day. With more than [8,000](#) data centers in the world—2,700 of which are in the U.S.—that equates to a lot of water. And, that number will only grow as data center operators and hyperscalers build more facilities to support escalating digitalization.

As data center development projects enter new communities and expand their presences within existing communities, there is rising concern over how these facilities will impact water supplies, especially in areas that are already water stressed. To be good neighbors, data centers need to adopt water conservation strategies that minimize their water consumption.

The QTS Water Strategy

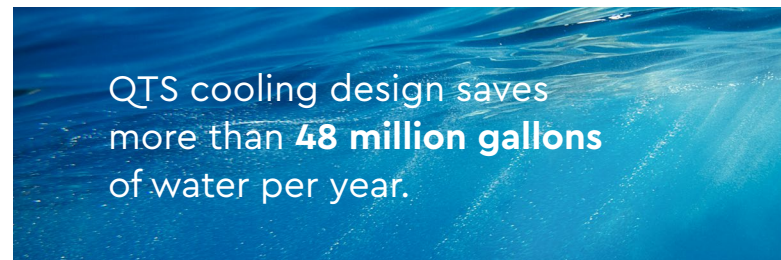
As a leader in data center sustainability, QTS has developed a multi-pronged approach to target water inefficiencies within its portfolio of global data centers and support the environment and the communities in which it operates.

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In 2018, QTS established a goal to conserve an average of 15 million gallons of water per year. After reaching this goal within just a couple of years, the company created a new goal in 2022, to reduce water usage effectiveness (WUE) by 5% annually. Using the industry standard [Green Grid methodology](#), WUE measures how much water a data center uses to cool



its equipment, providing a standardized calculation by which organizations can consistently measure water efficiency and progress. To achieve this goal, QTS has implemented a series of water conservation practices across its growing fleet of data centers.



What is WUE?

Water usage effectiveness (WUE) measures the how efficiently water is used in a facility.



$$\text{WUE} = \frac{\text{Annual Water Usage (liters)}}{\text{IT Equipment Energy Consumption (kilowatt hours (kWh))}}$$

The QTS Cooling Design

To improve its overall efficiency, QTS developed its Freedom standard building design, a best-in-class, highly efficient data center model that the company will use for all new data center builds. This go-forward blueprint features QTS' proprietary minimal water cooling design. Its mechanical design utilizes a low-pressure pumped refrigerant system that uses outside air economization to remove heat without using water. The system also employs economization when outdoor temperatures are below the return air temperature.

By minimizing the use of water to cool Freedom data centers, QTS' cooling system saves more than 48 million gallons of water annually¹—the equivalent of water use from 2,200+ U.S. homes per year. And because they utilize minimal water to cool IT loads, QTS Freedom data centers deliver a WUE of 0.

In 2023, nearly half of its facilities utilize the innovating cooling design, with plans to grow this number rapidly in the coming years, putting the number of Freedom builds well above its legacy data centers to deliver greatly improved water conservation in the areas the company is expanding into.

MINIMIZING WATER STRESS WITHIN ITS COMMUNITIES

When choosing locations for new facilities, QTS engages in a comprehensive due diligence process and risk analysis. Access to renewable energy and water scarcity within an area are two major considerations. Many regions that offer solar- and wind-generated power are [water stressed](#) with water demand exceeding supply. Unlike other data centers that need to pull water resources from these already strained areas to cool their facilities, QTS' Freedom design requires no water for cooling to greatly limit its water requirements. This can save considerable amounts of water given the scale and magnitude of its facilities.

A WATER POSITIVE USE CASE IN PHOENIX

QTS is currently constructing a facility in drought-ridden Glendale, Arizona on acreage that was previously used for agricultural purposes, which required significant groundwater for irrigation. By replacing this agricultural site with a facility that uses no water for cooling, QTS is creating a water positive scenario to support this water-stressed community.

Legacy Solutions

While QTS is committed to its Freedom Design for all new builds, it also operates legacy facilities that

1. Blackstone Real Estate Income Trust, 2022 ESG Highlights



do not utilize this design. To conserve water across its entire fleet of data centers, QTS has implemented various water-saving and reuse practices at these sites.

RAINWATER COLLECTION SYSTEMS

QTS utilizes rainwater collection systems in its Atlanta and Piscataway data centers, saving more than 65 million gallons of water in nine years in Atlanta and more than 50 million gallons in six years in Piscataway. This water-reuse model collects water off the roof of each facility and funnels it into a storage tank. In Atlanta, the collected water is used in the facility's evaporative cooling system to minimize its reliance on municipal water. In the Piscataway facility, rainwater is used to irrigate the facility's landscaping.

RECLAIMED WATER PROGRAMS

QTS has also invested in reclaimed water programs at its Santa Clara, CA; Fort Worth, TX; and Netherlands data centers. By purchasing recycled water that has been treated to make it suitable for industrial use, QTS avoids using drinking water to support its cooling processes. In the Netherlands, QTS purchases recycled water from a private company, while the data center operator partners with the municipalities to procure reclaimed water in Santa Clara. This model offers additional efficiencies as the water requires a less intensive cleaning than drinking water. In Fort Worth, the facility actually captures clean industrial wastewater for reuse within the facility.

Circulating water requires a significant upfront effort, including committing to purchase the water, retrofitting the facility to tie into the vendor's cleaned water-delivery systems, and ensuring a distinct separation between drinking water and industrial water sources.

WELL WATER

QTS also uses well water for non-potable purposes, where it can. By pulling water directly from a well, rather than using drinking-quality municipal water, QTS eliminates unnecessary water cleansing efforts—including the time and energy required to complete

this process to meet the health standards for drinking water.

Philanthropic

QTS has a philanthropic element to its water strategy. As part of the company's success-based giving program, it has partnered with [World Vision](#), a world leader in humanitarian efforts, to sponsor two success-based programs that provide clean drinking water to individuals and communities in need in central Africa.

With its first program, QTS provides clean drinking water to three people for every 100 kilowatts of customer-contracted power, continuing the donation for the life of the contract. In 2022, QTS and its customers provided more than 13,000 people with clean water.

QTS' second program focuses on its largest customers, funding a water point in a developing country for each 12+ MW contract. In two years, QTS and its customers have subsidized the drilling of 11 water points across Kenya, Burundi, Ghana and more, providing thousands of people in impoverished countries with a lifetime supply of water.

Additional Partnerships

QTS' commitment to sustainable practices also strengthens its water-efficiency efforts. By committing to sourcing renewable energy, QTS strengthens its water-reduction strategy as wind and solar energy sources do not utilize water to produce electricity. QTS has signed long-term contracts for solar- and wind-generated energy in multiple states, including Texas, Chicago, New Jersey and Georgia, sourcing and

By pairing renewable energy with its Freedom design, QTS creates a virtually **water-free data center.**



increasing amount of its power from renewable energy sources. By pairing renewable energy with its dry-cooling system, QTS creates its Water Freedom data center, a facility that uses almost no water onsite.

Committed to Transparency

QTS is also dedicated to full transparency around its conservation efforts and results through its [ESG report](#) and SDP Sustainability Dashboard. The customer-tailored dashboard offers customers insight into their environmental impacts, including their deployments' power and water consumption, carbon footprints, and the WUE and PUE of the data centers.

Conclusion

Balancing its water stewardship with its ability to run a financially and operationally sustainable business requires intentional effort. QTS has taken calculated steps to address the water crisis by integrating water efficiency into its sustainability practices across its data center portfolio. From the mechanics of its data centers to its efforts in the community, QTS is going the extra mile to incorporate water-efficiencies and circularity into its operations. With plans to grow exponentially in the coming years to provide enterprises with the access to infrastructure necessary to support the growing demands of a digital world, the company is steadfast in minimizing its impact on the environment and the natural resources of its communities.

ABOUT QTS

QTS Realty Trust, LLC is a leading provider of data center solutions across a diverse footprint spanning more than 9 million square feet of owned mega scale data center space within North America and Europe. Through its software-defined technology platform, QTS is able to deliver secure, compliant infrastructure solutions, robust connectivity and premium customer service to leading hyperscale technology companies, enterprises, and government entities. QTS is a Blackstone portfolio company. Visit QTS at www.qtsdatacenters.com, call toll-free 877.QTS.DATA or follow on Twitter [@DataCenters_QTS](#).