

Modern datacenter water conservation and reuse

Modern datacenters use water for cooling, humidification, and more. As technology evolves and more datacenters are required in the future, this water consumption must be sustainable.

At Microsoft, we're supporting sustainability by expanding practices like modern datacenter cooling methods, rainwater harvesting capabilities, water reuse facilities, and atmospheric water generation techniques. ([Learn more about modern datacenter cooling methods.](#))

As we continue to innovate our datacenters, we're looking to improve our Water Usage Effectiveness (WUE)—a metric used to compare water usage between datacenter regions in a similar climate (Figure 1).

$$\text{Microsoft datacenter WUE} = \frac{\text{Annual liters of water used for humidification and cooling}}{\text{Total annual kWh used to power IT equipment}}$$

Figure 1: Microsoft datacenter WUE equation

Microsoft will reduce the water intensity of our direct operations and replenish it in water-stressed regions where we work.¹



Driving toward water positivity by 2030

By 2030, we will be water positive, meaning **we will replenish more water than we use.**¹ We'll do this by putting more water back in stressed basins than we consume globally across all basins. The amount of water returned will be determined by how much water we use and how stressed the basin is.

¹2021 Environmental Sustainability Report



Providing for local communities

Through our water reuse initiatives, **we're piloting ways to furnish water to local communities.** To achieve our water conservation goals, we research how water conservation and reuse initiatives can benefit nearby areas before implementing these systems.

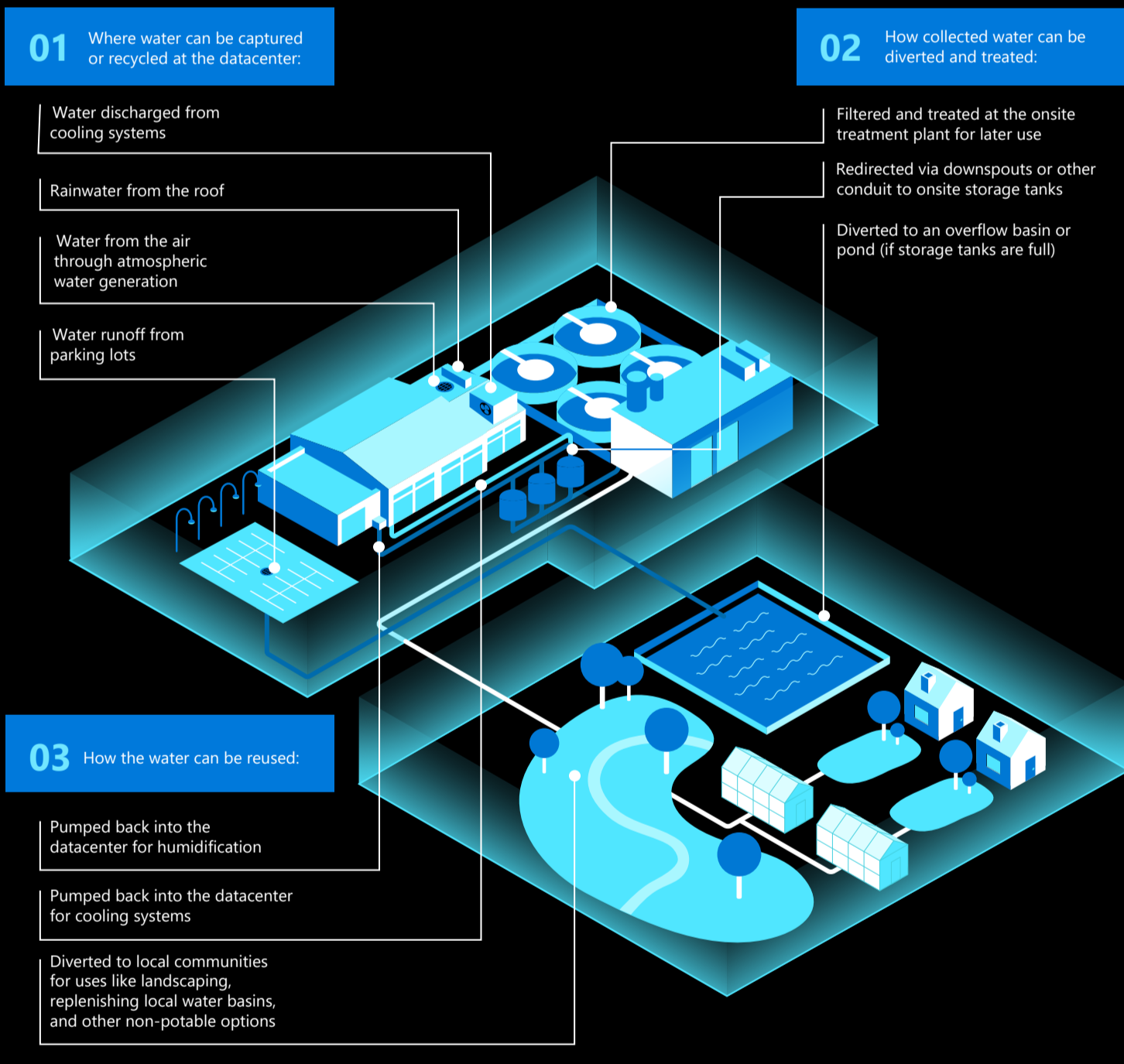
Learn more about Microsoft water conservation goals in our [2021 Environmental Sustainability Report](#).

Considerations include:

- Average rainfall.** Generally, rainwater harvesting is best suited for regions that experience high amounts of rainfall on a yearly average. Capturing water in regions where rainfall is sporadic or low can cause unforeseen complications in the local ecosystems.
- Proximity.** Our initiatives will target datacenters close to neighboring communities that can make use of the water. Some datacenters may be located too far for there to be a meaningful impact.
- Present need.** Some communities may already be making efficient use of rainwater, reducing the benefit from our water conservation initiatives.

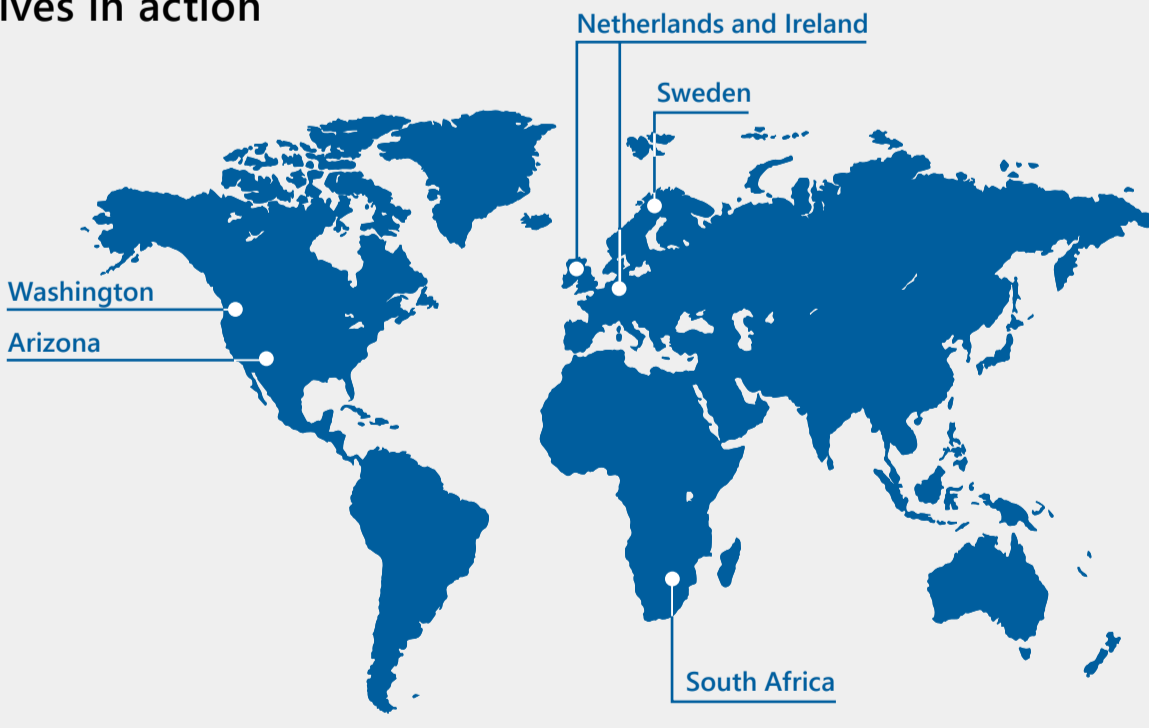


The three phases of water conservation and reuse*



*Please note that not all water conservation and reuse scenarios are used in all of our datacenters.

Initiatives in action



Washington

In our West US 2 datacenter region, Microsoft contributed \$31 million toward the Quincy Water Reuse Utility (QWRU), which opened on June 30, 2021. This treatment facility, the first of its kind in Washington state and over 10 years in the making, processes water for reuse by local industries, including datacenters. QWRU creates a closed-loop system, so wastewater isn't discharged to the environment, and decreases the need for potable water required for datacenter cooling.

QWRU will save an estimated 380 million gallons of potable water per year—enough for 5,450 people.

([Learn more about water reuse in our Washington region Quincy facility](#))

Sweden

Microsoft has implemented a rainwater harvesting system at our datacenter region in Sweden to provide the water required for humidification. The water is captured, treated, and stored—all on site. Other potential uses for the harvested water include onsite cleaning, plumbing, irrigation, and more.

([Learn more about rainwater harvesting in our Swedish region](#).)

Arizona

In our new datacenter region in Arizona, we can use the water discharged from our cooling systems to give back to the local community. We also take advantage of free air cooling rather than using water for more than half the year. We use adiabatic cooling the rest of the time.

([Learn more about our water initiatives in Arizona](#).)

South Africa

In South Africa, we use atmospheric water generation to collect water out of the air to fill storage tanks for use in cooling our datacenters. These systems function as industrial dehumidifiers.

([Learn more about atmospheric water generation in our South African region](#).)

Netherlands and Ireland

In both the Netherlands and Ireland, we're investigating and piloting turning up the heat in our datacenter regions. The higher server inlet temperatures will reduce cooling hours and water use.

([Learn more about our water initiatives in the Netherlands and Ireland](#).)

Moving forward sustainably

Microsoft believes technology can help people everywhere build a more sustainable future. Explore our sustainability tools, resources, and products.

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