

# STATE OF THE WATER INDUSTRY 2021

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## Basic Water Facts

All life on Earth depends on and largely consists of water. Water, more than energy, fuels the existence of human society. Despite that the world's total water supply is about 332.5 million cubic miles, over 96 percent is saline. Of all the total fresh water supply, over 68 percent is locked in ice and glaciers and another 30 percent is deep in the ground<sup>1</sup>. Fresh surface water resources that human can easily access, such as rivers and lakes, only constitute about 22,300 cubic miles, about 1/150th of one percent of the total water on Earth<sup>2</sup>. Water, although ubiquitous, is a non-renewable, irreplaceable resource.

The distribution of water resources on Earth is extremely uneven. 60% of the world's total fresh surface water resources is concentrated in just nine countries: U.S., Canada, Brazil, Russia, China, Indonesia, India, Colombia and the Democratic Republic of the Congo. Among the nations with the most abundant water resources, the per capita water consumption is still widely diverse. For example, the North America region has 8% of the world's population and 15% of the global water supply. In contrast, China has 21% of the world's population but only 7% of the global water supply.

The scarcity in accessible fresh water is becoming a more severe threat to the prosperity and sustainability of all human societies. Currently, 40% of the world's population lives in water-stressed areas. The number is expected to increase to 50% by 2025, with 1.8 billion people living with absolute water scarcity<sup>3</sup>. The world population is expected to grow from 7.4 billion in 2017 to 9.9 billion in 2050, adding tremendous risk of water stress. Along with other mega trends, such as urbanization, modern agriculture and industrialization, human activities have multiplied demands for water consumption. Water contamination from the industrial production and extreme weathers (draughts and

floods) due to climate change also put the very limited water resources in danger.

The economic and societal ramifications of water scarcity are severe. The World Bank estimates a total loss of 6% of GDP by 2050 for countries in the belt that stretches from West Africa through the Middle East, South Asia to Japan<sup>4</sup>. Decreasing water supplies exacerbate political tensions, destabilize nations, and contribute to armed conflicts. In recent years, we have seen tragic flows of refugees and immigrants driven out of their own countries by wars, domestic conflicts, and economic deteriorations. Many of these are the consequences of long-term droughts that have turned lands to deserts that people are unable to farm.

As a result, in July 2010, the UN General Assembly recognized water and sanitation as a basic and universal human right<sup>5</sup>. Clean water and sanitation are also the 6th of the United Nations' 17 Sustainable Development Goals (SDGs) for the 2030 agenda<sup>6</sup>. Water is at the heart of milestone agreements such as the Sendai Framework for Disaster Risk Reduction and the 2015 Paris Agreement.

## The Demand for Water

Unrelenting population growth and economic development will continue pushing the demand for water beyond its natural limits.

Agricultural irrigation consumes the most water by far, using 70% of the world's fresh water supply and in many cases — extremely inefficiently. Industry consumes 20% and individuals consume 10%. There are still lots of water lost from leaky pipes: about 15-20% of water in industrialized countries and 20-40% in developing countries. In the U.S., half of the 2.2 million miles of drinking water pipes installed dated back to the early and mid-20th century. Water utilities only can replace about 0.5% of them every year.

As fresh water becomes scarcer, major consumers must upgrade their water systems or face constrained profitability and economic growth. Industrial water demand is growing even faster than agriculture. Semiconductor manufacturing, for example, requires 2-4 million gallons of ultrapure water every day.

Taken together, trillions of dollars need to be spent to repair, upgrade, and build water infrastructure worldwide over the coming decades.

## Water Industry in United States

Americans use more water per person than almost anywhere else in the world — more than triple that of China and 15 times more than Denmark. Domestic water use has been incredibly high in the driest western states. For example, Arizona residents consume 147 gallons a day compared to the 51 gallons in Wisconsin<sup>7</sup>. But the extreme droughts have forced water use to trend downward. The droughts in the U.S. western states began in 2001 and could last for decades as climate change affects weather and water cycles. More than 70 million people (40% of the U.S. land area) are affected by this historic drought<sup>8</sup>. "Drought is on the verge of becoming the next pandemic and there is no vaccine to cure it," states Mami Mizutori, United Nations Special Representative for Disaster Risk Reduction.

In the latest survey by American Water Works Association (AWWA)<sup>9</sup>, 54% of the water professionals say their utility's access to capital is as good as or better than any time in the past five years. Rate increases are their top funding source; and the greatest need is for infrastructure upgrades. 57% say their utilities are prepared to meet long-term water supply demands.

The top remaining concerns for the water industry include replacing aging infrastructure, obtaining financing for capital improvements, and the availability of long-term water supplies because of drought, climate variability and extreme weather events. To address some of these challenges, President Biden proposed an ambitious infrastructure plan which includes an unprecedented \$111 billion to upgrade U.S. water infrastructure. These include: \$45 billion to replace all lead pipes and service lines; \$56 billion to modernize aging drinking water, storm water, and wastewater systems; \$10 billion to monitor and remediate PFAS chemicals in drinking water and upgrade small rural and household water systems; and \$5 billion to store water in Western states.

## Water Investment Landscape

Water has long been considered a safe, long term investment in companies that have strong balance sheets. Over the past few decades, water companies have been characterized by their slow, steady growth — a "tortoise", rather than a "hare." However, it is still well expected that today's global water market will only get larger. The total market size is estimated to be \$100 billion in the U.S. and \$500 billion worldwide.

The major segments in water industry include water utilities, water treatment technologies, water infrastructure, water efficiency improvement, and water monitoring.

## Water Utilities

Although utilities comprise only 10% of the world's publicly traded water stocks, their reaches ultimately extend to all companies in the water value chain because utilities are their most reliable customers. Even in hard times, utilities must spend on goods and services necessary to maintain uninterrupted and regulatory-compliant services.

Water utilities represent 40%-50% of the \$100 billion U.S. water market. Most are small municipal systems that serve fewer than 3,000 people. Larger, publicly-traded water utilities have long been core investments because of their stability and the fact that they enjoy a virtual monopoly in the regions they operate. They are doing well in both good and bad times because people need to use, more or less, the same amount of water regardless of economic conditions. The regularly increased rich dividends level out the price fluctuations and play a large role in stock total returns.

## Water Treatment Technologies

This segment includes companies that disinfect drinking water, treat wastewater, and desalinate sea water.

Because of health and security risks associated with traditionally-used chlorine treatments, U.S. water utilities are transitioning to more advanced non-chemical technologies, such as ultraviolet light, ozone and activated carbon.

Companies that install these technologies have higher margins and recurring revenues from membrane replacement. UV disinfection, for example, is a cost-effective alternative to chlorine, which has a \$500 million world market, growing 15-20% a year.

There are a slew of new pollutants that are expensive and difficult to remove from drinking and wastewater, for example the pharmaceuticals, pesticides, flame retardants, and microplastics.

Although wastewater treatment is the standard practice in U.S.; only 5% of the world's wastewater is treated, which leaves significant room for growth. Industrialized countries are shifting from treating water to re-using it for agricultural irrigation and industrial use.

Desalination is important in water scarce areas — particularly in the Middle East, a financially secure region that can afford the technology — to make drinking water from seawater and brackish water, and for wastewater treatment. Although the 10 largest plants are in the Middle East, there are roughly 17,500 desalination plants in 120 countries serving over 150 million people.

## Water Infrastructure

One of the biggest investments driving the water industry is maintaining and upgrading infrastructure — the pipes, pumps, valves, and tanks that make water systems work. The segment is growing around 10% a year, according to the research by Canaccord Genuity.

Pumps and valves are widely used in the water industry in applications such as desalination and wastewater treatment. New, important technologies can detect damage before a pipe leaks, save valuable water and alleviate the need for complete replacements. Over \$50 billion will be spent over the next 10 years on trenchless technologies and another \$50 billion shifting from iron and steel to plastic pipes.

## Water Efficiency Improvement

Meters conserve about 15% of water by giving users feedback on how much water they use. They are an increasingly important tool for homeowners and industries alike, and also help utilities locate leaks before they turn into expensive problems. Utilities are quickly replacing standard water meters on customers' homes and businesses to access this information.

Modern irrigation technologies, such as micro and drip irrigation use 30-70% less water, minimize soil salination, and boost crop yields by 20-90%. Less than 5% of China's irrigated land employs this technology so far.

## Water Monitoring

Testing and monitoring water quality is important for all segments of the water industry, as well as for agriculture and other industries. According to Bluefield Research, it is a fast-growing space with the highest opportunity. Spending on digital water hardware, software, and services is expanding at 7% a year.

The abilities to pinpoint abnormalities in the system, remove chemicals from discrete locations, or find leak before it implodes, enable targeted cost-effective solutions. Random testing that can identify biological and chemical agents in the water system is now crucial for homeland security. The trend toward water reuse also leads to demand for water-testing. In the U.S., utilities are required to test for 93 known contaminants, but still a much smaller number than the total number of chemicals in the water system. The trend is toward regulating a much longer list of chemicals, especially in Europe. China is also beginning to adopt a monitoring regulatory system.

## The Latest Development

There are a few trends going on within the water industry:

- Tightened regulations, such as zero discharge and water re-use policies.
- Advanced filtration techniques that can filter more complex contaminants and replace chemicals for water treatment.
- Measuring water consumption to increase efficiency.
- Higher water prices and mechanisms such as trading water rights and water pollution rights.
- Continued industry consolidation, resulting in dominance of a few conglomerates.

In San Diego County, home of the world's largest desalination plant, water customers are paying at least \$2140 per square foot of water for the next 30 years. And that's to supply just 10% of their water. Since 2014, contracts for reuse have surpassed those for desalination. Recycling water is much less expensive, less energy-intensive and much better for the environment. Not only is water recycling less expensive than desalination, but it also reduces the need to invest in more production capacity, and importantly, it turns wastewater treatment plants from cost centers to profit centers. Instead of a municipality paying for wastewater treatment, it *gets paid to sell recycled water*.

Collecting and storing rainwater is another important trend. According to Pacific Institute, capturing storm water is even cheaper at \$590 per acre-foot<sup>10</sup>. Several startups are developing ways to increase water supplies in areas of drought by literally pulling water from the air - from fog, dew and mist<sup>11</sup>.

Some other startups are advancing easy, inexpensive ways to monitor water for pollutants. Similar to a home testing kit, a drop of water can be placed on a card to get test results within 10 minutes. Still others are developing devices that can prevent algae blooms, and even space satellites are being used to find underground leaks in water pipes.

## The Water-Energy Nexus

Water and energy industries are closely related. The energy industry is the world's second largest water consumer after agriculture. Hydroelectricity, nuclear power, coal, and natural gas all require enormous, stable quantities of water to operate. For example, electricity generated from coal consumes 7% of the world's freshwater. In China, the number is 20%<sup>12</sup>. However, almost half of the world's coal plants are located in water-stressed regions. In contrast, energy from solar and wind requires very little water. As a result of the intensified global scale water scarcity problem, renewable energy is increasingly viewed as a crucial alternative for a water-constrained world.

In arid Arizona<sup>13</sup>, for example, if solar supplied just 20% of its energy, 15 billion gallons of water would be spared, enough for 90,000 homes. In 2015 alone, the U.S. saved in total about 73 billion gallons of water through the use of wind energy<sup>14</sup>.

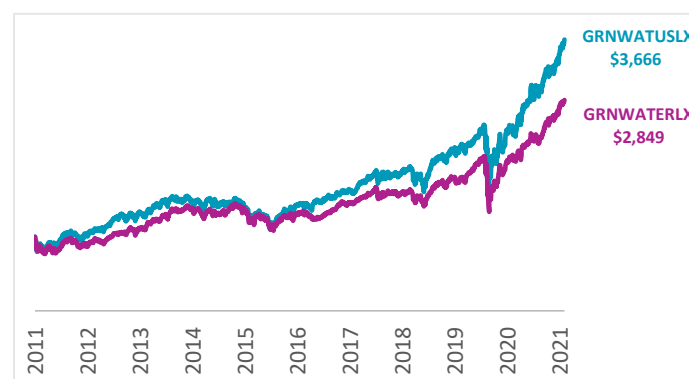
## Water Investment with Nasdaq

Nasdaq provides the opportunity to track the water market through two indexes: The Nasdaq OMX US Water Index® (GRNWATUSL®) and the Nasdaq OMX Global Water Index® (GRNWATERL®).

The Nasdaq OMX US Water Index (GRNWATUSL) is designed to track the performance of U.S. companies with businesses that conserve and purify water for homes, businesses, and industries. The index securities must be classified as participating in the Green Economy as determined by SustainableBusiness.com LLC., listed on any of the four major U.S. exchanges<sup>15</sup>, and satisfying the minimum market cap and liquidity requirements<sup>16</sup>. The index securities are evaluated annually in June and rebalanced quarterly with a modified liquidity weighting methodology<sup>17</sup>.

The Nasdaq OMX Global Water index (GRNWATERL) is the global version of GRNWATUSL index. Most of the index requirements are the same except that securities must be listed on an index-eligible global stock exchange. Both GRNWATUSL and GRNWATERL indexes are members of the Nasdaq OMX Green Economy Sector Index family.

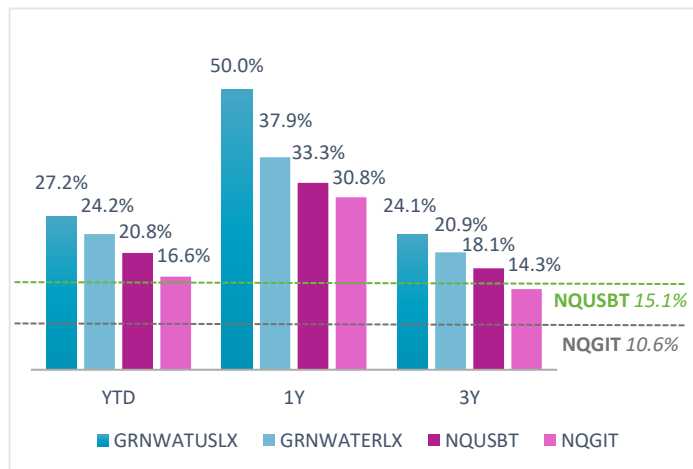
### Nasdaq OMX Water Indexes with \$1000 investment on market close July 26, 2011 (As of Aug. 31, 2021)



Source: Nasdaq

Since the inception (both launched on July 27, 2011), the Nasdaq OMX US Water TR index (GRNWATUSLX) and the Nasdaq Global Water TR index (GRNWATERLX) have realized average annual returns of 13.7% and 10.9%, respectively<sup>18</sup>. These numbers are slightly less than the Nasdaq US Benchmark TR Index (NQUSBT), which has an average annual return of 15.1% during the same period. However, as water has emerged as one of the popular thematic sustainable investment ideas, their stocks largely outperformed the US and Global (Nasdaq Global TR Index – NQGIT) benchmarks in the most recent years.

**Last Three Years Performance of Nasdaq OMX Water Indexes (As of Aug. 31, 2021)**



Source: Nasdaq

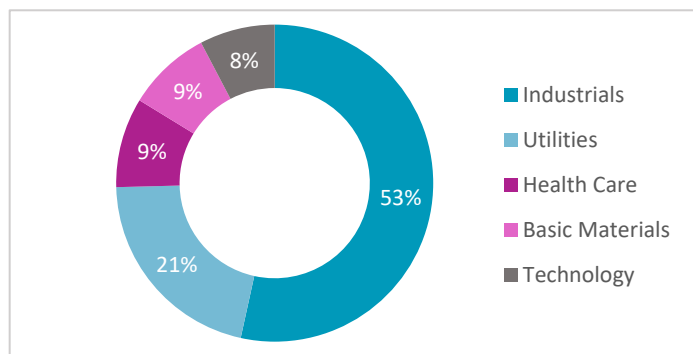
**Water Index and Benchmark Performance (July 26, 2011 to Aug. 31, 2021)**

Period	GRNWATUSLX	GRNWATERLX	NQUSBT	NQGIT
YTD	27.2%	24.2%	20.8%	16.6%
1Y	50.0%	37.9%	33.3%	30.8%
3Y	24.1%	20.9%	18.1%	14.3%
5Y	20.5%	16.7%	18.2%	14.5%
Inception	13.7%	10.9%	15.1%	10.6%

Source: Nasdaq

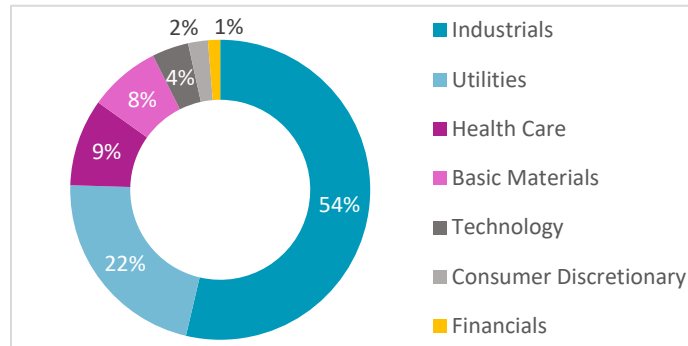
From the sector exposure prospective, Industrials and Utilities are the top two ICB sectors in the Nasdaq OMX US Water index, followed by Healthcare, Basic Materials and Technology. Nasdaq OMX Global Water index has a very similar sector exposure pattern with the same top 5 rankings and followed by Consumer Discretionary and Financials.

**Nasdaq OMX US Water Index: Sector Exposure (as of Aug. 31, 2021)**



Source: Nasdaq

**Nasdaq OMX Global Water Index: Sector Exposure (as of Aug 31, 2021)**



Source: Nasdaq

**Top 5 Securities in the Nasdaq OMX US Water Index (as of Aug. 31, 2021)**

Company Name	ICB Subsector	Weight
WATERS CP	Electronic Equipment: Control and Filter	9.19
DANAHER CP	Medical Equipment	9.15
AMERICAN WTR WRKS CO	Water	8.44
ROPER TECHNOLOGIES	Software	7.69
ECOLAB INC	Chemicals: Diversified	7.51
<b>Top 5 Total Weight</b>		<b>41.98</b>

Source: Nasdaq

**Top 5 Securities in Nasdaq OMX Global Water Index (as of Aug. 31, 2021)**

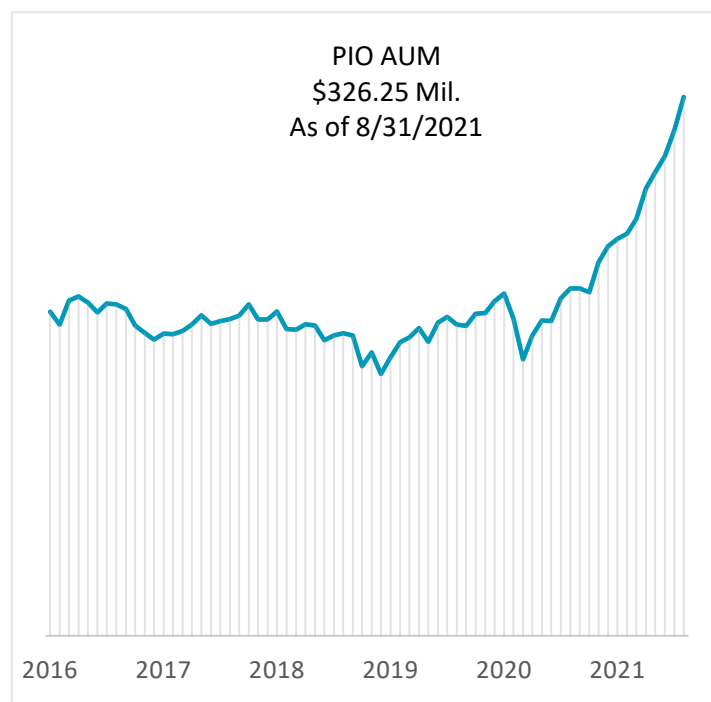
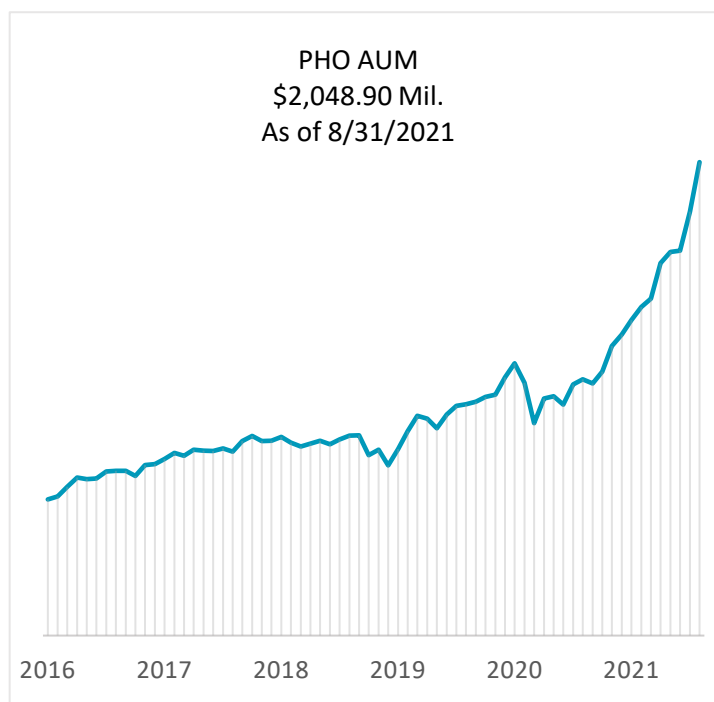
Company Name	ICB Subsector	Weight
DANAHER CP	Medical Equipment	9.40
ECOLAB INC	Chemicals: Diversified	7.72
Ferguson Rg	Industrial Suppliers	7.03
Geberit N	Building, Roofing/Wallboard and Plumbing	7.00
PENTAIR PLC.	Electronic Equipment: Pollution Control	6.30
<b>Top 5 Total Weight</b>		<b>37.45</b>

Source: Nasdaq

Invesco offers ETFs tracking the Nasdaq OMX US Water Index and the Nasdaq OMX Global Water Index through the Invesco Water Resources ETF (PHO) and the Invesco Global Water ETF (PIO), respectively. The two ETFs have seen very strong asset growth in recent years.

ETF Name	ETF Ticker	Benchmark Index
Invesco Water Resources ETF	Nasdaq: PHO	GRNWATUSL, GRNWATUSLX
Invesco Global Water ETF	Nasdaq: PIO	GRNWATERL, GRNWATERLX



**PHO and PIO AUM in the Last Five Years (as of Aug. 31, 2021)**

Source: FactSet

## Conclusion

The scarcity in accessible fresh water is becoming a more severe threat to the prosperity and sustainability of all human societies. The World Bank estimates a total loss of 6% of GDP by 2050 for countries facing the water problem. Trillions of dollars need to be spent to repair, upgrade, and build water infrastructure worldwide over the coming decades.

U.S. is among the countries with the freshest surface water resources around the world<sup>19</sup>, but still faces severe draught problem in its western states. Part of President Biden's infrastructure plan, about \$111 billion, will be used to upgrade the U.S. water infrastructure.

The total size for water industry is estimated to be \$100 billion in the U.S. and \$500 billion worldwide. The major segments in water industry include water utilities, water treatment technologies, water infrastructure, water efficiency improvement, and water monitoring. In this article, we discussed, one by one, the major trends in every water segment, as well as the latest development in water industry.

In the last part of the article, we introduced two Nasdaq water indexes: The Nasdaq OMX US Water Index (GRNWATUSL) and the Nasdaq OMX Global Water Index (GRNWATERL). Invesco offers ETFs tracking both indexes, the Invesco Water Resources ETF (PHO) and Invesco Global Water ETF (PIO), which are actively traded on the Nasdaq Exchange and have seen strong asset growth in recent years.

<sup>1</sup> [https://www.usgs.gov/special-topic/water-science-school/science/how-much-water-there-earth?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/special-topic/water-science-school/science/how-much-water-there-earth?qt-science_center_objects=0#qt-science_center_objects)

<sup>2</sup> <https://www.usgs.gov/media/images/distribution-water-and-above-earth-0>

<sup>3</sup> Reported by World Health Organization.

<sup>4</sup> High and Dry: Climate Change, Water, and the Economy

<sup>5</sup> [https://www.un.org/waterforlifedecade/human\\_right\\_to\\_water.shtml](https://www.un.org/waterforlifedecade/human_right_to_water.shtml)

<sup>6</sup> <https://sdgs.un.org/goals/goal6>

<sup>7</sup> <https://www.propublica.org/article/killing-the-colorado-what-you-need-to-know>

<sup>8</sup> <https://droughtmonitor.unl.edu/>

<sup>9</sup> <https://www.awwa.org/Professional-Development/Utility-Managers/State-of-the-Water-Industry>

<sup>10</sup> <http://pacinst.org/publication/cost-alternative-water-supply-efficiency-options-california/>

<sup>11</sup> [https://thewaternetwork.com/\\_/water-waste-water-management/article-FfV/10-tech-solutions-to-tap-the-world-s-water-supply-6aNOhZ8mBz4eZmlUtQH30w](https://thewaternetwork.com/_/water-waste-water-management/article-FfV/10-tech-solutions-to-tap-the-world-s-water-supply-6aNOhZ8mBz4eZmlUtQH30w)

<sup>12</sup> <http://www.greenpeace.org/international/Global/international/publications/climate/2016/The-Great-Water-Grab.pdf>

<sup>13</sup> <http://www.azcentral.com/story/money/business/energy/2015/11/20/months-before-solar-rates-case-heard-fight-public-support/76045600/>

<sup>14</sup> <http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=8609>

<sup>15</sup> Nasdaq Stock Market, New York Stock Exchange, NYSE American, or the CBOE exchange.

<sup>16</sup> The security must have a minimum worldwide market capitalization of \$50 million and a minimum three-month average daily trading volume of \$250 thousand.

<sup>17</sup> The index caps the top five (5) weighted securities at 8% and the remaining at 4%. Please refer to index methodology document ([https://indexes.nasdaqomx.com/docs/methodology\\_GRNWATUSL.pdf](https://indexes.nasdaqomx.com/docs/methodology_GRNWATUSL.pdf)) for detailed discussion.

<sup>18</sup> As of August 31, 2021

<sup>19</sup> United States is ranked #3 with the most freshwater resource (<https://www.worldatlas.com/articles/countries-with-the-most-freshwater-resources.html>)

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