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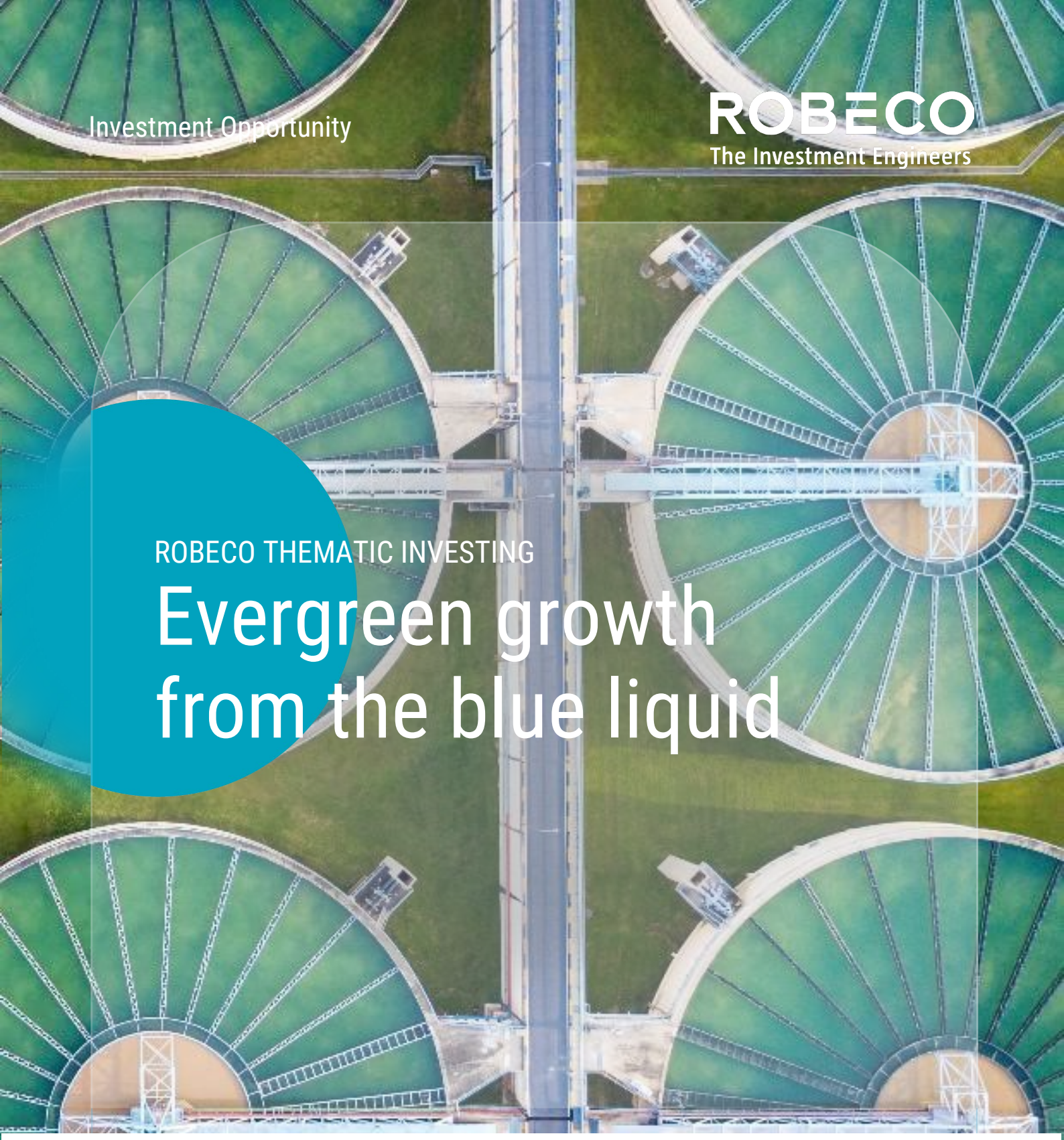

ROBECO THEMATIC INVESTING

# Evergreen growth from the blue liquid

- Economic growth increasingly dependent on clean water resources
- Multiple drivers underpin long-term demand for water solutions
- Cross-sector exposure provide diverse channels of growth and alpha

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# What makes water an appealing long-term investment?

**Water is already a finite resource, and urbanization, industrialization, and digitization are stretching supplies even further. Add to these, climate change, increasing pollution, and more stringent regulations, and it is easy to see why demand for water services will remain elevated in the decades to come.**

## Limited liquidity

With freshwater flows so ubiquitous, many in industrialized nations are easily lulled into the idea that water is a limitless resource. Renewable, yes; limitless, no.

Though water covers 70% of the Earth's surface only a small fraction of that (3%) is freshwater; the rest is seawater or semi-salty brackish water that is hospitable to some organisms but hostile to millions of others, including humans. Subtracting the freshwater frozen in ice caps, glaciers and icebergs leaves less than 1% for use.[1]

That slim fraction will be stretched even further as water withdrawals from industries and populations increase along with pollution and contamination stemming from complex chemicals and floodwaters. Experts warn that global freshwater demand will exceed supply by 40% by 2030.[2]

## Urbanization and aging infrastructure

Over 56% of the world's population (4.4 billion) already live in urban areas, a figure that is expected to increase to nearly 70% by 2050. [3] One in four cities globally already experiences water insecurity.[4] Such accelerated growth will mostly be confined to developing markets and will require the build-out of completely new plants to purify drinking water for residents as well as treat used municipal and industrial wastewater. All of this while also making agricultural irrigation more water efficient.

Meanwhile, in many developed urban centers, the infrastructure that treats, stores, pumps, and transports water supplies is woefully outdated and prone to leaks and contamination that add to water stress. US water systems have been neglected for decades resulting in a backlog of repairs. A 2020 study from the American Society of Civil Engineers found an annual investment of USD 109 billion would be needed to address needs and protect water supplies.[5]

Water challenges are not exclusive to the US. Negative news flows continue to stream from England and other parts of the UK where decades of underinvestment have led to a series of high-profile shortages, sewage spills and water quality issues.[6] In addition, more than a third of EU country territories are exposed to water stress during the year, including Belgium, Germany, and Luxembourg.[7]

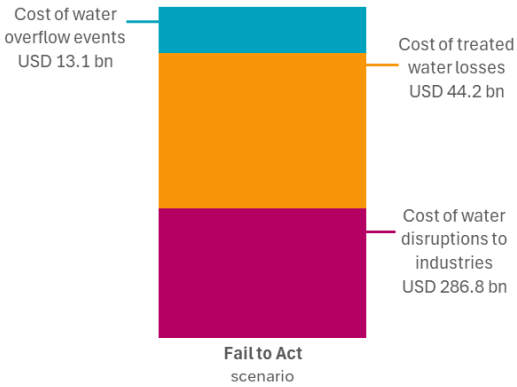
According to a 2024 study, EUR 255 billion in investments were needed to ensure adequate water supplies for growing populations and critical growth industries in the EU through 2030.[8]

## Industrialization

More than 80% of global GDP is generated in cities, meaning water demand from increased urbanization and industrialization are inextricably linked. Though agriculture accounts for 70% of water consumption in developing countries, industry takes the biggest share in the developed world.[9] From 2020 to 2050, worldwide demand for industrial water is expected to outpace growth in demand for other freshwater uses.[10]

Water is an essential input across traditional economic sectors from energy, chemicals, and textiles to food processing, pharmaceuticals and construction. In the US, water service disruptions are estimated to have cost water-reliant industries USD 63 billion in 2024. Without action, this is expected to rise to USD 287 billion in less than two decades (See Figure 1).[11]

Figure 1 – Cost of water loss and disruptions in the US




The 20-year cumulative economic cost of water losses due to water service disruptions in the US (2023-2043).
Source: US Water Alliance / American Society of Civil Engineers, The Power of Investment in Water, 2024.

## AI and $H_2O$

Meanwhile, data centers – the backbone of the new digital economy – also require massive amounts of water. Large amounts of ultrapure water are also needed to clean and rinse delicate layers of silicon wafers from which semiconducting chips are manufactured. Higher powered chips, loaded with more transistors and circuits, generate concentrated heat, increasing the water demand of data centers which use it to cool air (evaporative) and hardware (liquid cooling). Analysts expect water scarcity to be a key risk to the chip and tech hardware industry in the decade ahead. S&P predicts poor water supply management could lead to extensive production losses, making investments in water-saving technologies mission critical for companies in these sectors.[12]

More importantly, many data centers and chip foundries are in deserts where land and financial incentives are plentiful, but water is not. Water deficits are compelling industries and municipalities to fund large-scale public projects such as reservoir construction and ocean-water desalination plants, as well as onsite investments such as recycling technologies and water-efficient equipment.

## Pollution

Clean water supplies are increasingly threatened by higher rates of contamination as industrial and population wastewater volumes rise. Harmful algal bacteria, which destroy aquatic life and water purity, flourish in stagnant water fed by higher rates of nitrogen and other nutrients in agricultural runoff water.

Economic growth and industrialization mean municipal and industrial waste contain higher volumes of heavy metals, organic materials, and toxic chemicals. Moreover, from fertilizers and fabrics to pharmaceuticals, personal care products and packaging, increasing product complexity and manufacturing processes are producing new classes of chemicals and microparticles which require new treatment methods to breakdown and flush out.

## PFAS

Regulations targeting a specific group of chemicals known as PFAS (per- and polyfluoroalkyl substances) are also driving demand for water-related services. The versatility and durability of these synthetic materials (e.g., anti-stick, waterproof and heat-resistance) make them popular for industrial and household products. But these 'forever chemicals' don't degrade easily and are a toxic threat to humans, wildlife and the environment. Regulations are tightening globally, but especially in the US and EU. In early 2024, the US EPA issued stricter limits on PFAS levels in drinking water and industrial wastewater. The EU's Drinking Water Directive also restricts PFAS concentration levels in tap water across its 27-member states. Some countries have gone even further: Germany, Denmark and Sweden have set even more restrictive PFAS metrics.[13]

Investments in advanced water-filtering technologies are needed to reduce PFAS levels, including granular activated carbon (GAC), ion exchange resins, and high-pressure membranes (e.g., reverse osmosis).

Figure 2 - PFAS testing, treatment and removal systems

Industrial scale PFAS testing installation at a utility plant.
Source: Hazen and Sawyer.

Given their toxic status means companies are now required to prevent their discharge as well as clean-up in the environment. This is creating substantial demand for water companies offering clean-up and restoration services of waterways and soils of contaminated sites. One study found that in the US state of Minnesota alone, removing and destroying PFAS from wastewater could cost between USD 14 billion and USD 28 billion over 20 years.[14]

## Climate change

Heat and drought increase evaporation and diminish the ability of arid regions to replenish surface and ground reserves of freshwater. A heatwave in 2022 left half of England's reservoirs at dangerously low levels.[15] In addition, excess water from frequent and extreme flooding means more investments are needed for stormwater infrastructure to reduce structural damage and prevent raw sewage from mixing with clean water supplies.

Moreover, higher temperatures not only intensify direct water consumption for things like agricultural irrigation, they also intensify indirect water consumption. For example, more water is needed to cool thermoelectric power plants (i.e., nuclear reactors, steam-powered turbines) for electricity in periods of peak ventilation and air-conditioning use.

# Why is demand for water services increasing?

**The scale and costs of storms and floods as well as heat waves and droughts are rising, underscoring the need for water-related investments that protect populations and water supplies. Meanwhile, water is inextricably linked to future economic growth, prompting unprecedented investments from both public and private players.**

## Intensifying storms, expanding flood zones

In Europe, intense flooding caused an estimated USD 20 billion in total economic losses in 2024, one of the costliest on record.[16] No region was spared as catastrophic rains fell across the continent including Spain, Germany and much of Central/Eastern Europe. In the US, climate change was blamed for the intensities of Helene and Milton, back-to-back hurricanes that hit the Southeastern US in 2024 causing an estimated USD 100 billion in damage.[17]

Figure 3 – Stormwater management

Stormwater drainage infrastructure in Singapore to catch and channel flood waters away from urban areas toward natural and manmade reservoirs. Source: ArcGIS database.

Economic costs will continue to rise as economic growth, industrialization, and migration result in asset concentration in urban areas. A report from the UK Environment Agency indicated one in four properties in the UK could be at risk of flooding by 2050 and that ratio could accelerate with rising urban development on floodplains.[18] Cities in South Asia are struggling with increasing run-off water especially in coastal and low-lying areas as urban sprawl meets climate change and heavier rainfalls.[19]

Worse still, climate change means extreme storms and flash flooding are more frequently occurring in traditionally 'low risk' areas that lack stormwater infrastructure.[20]

## Intensifying heat

With each passing year a new heat record is broken, with 2024 registering as the hottest year on record.[21] Meanwhile, heat waves and droughts are becoming more severe and more frequent. In the last three decades through 2020, more than three-quarters of the Earth's land experienced drier conditions and areas classified as drylands expanded by an area larger than Canada.[22] This is also a major factor in larger and fiercer wildfires which threaten densely populated urban areas.

Heat waves and droughts are also becoming more widespread. Even traditionally cooler climates are confronting extreme temperatures more frequently. In the UK, temperatures topped 40°C for the first time on record in 2022.[23] Temperatures reached nearly 50°C when a heat dome settled over parts of Canada and the US Pacific Northwest in 2021.[24]

This is driving not only water scarcity and land degradation threatening agricultural production and food security but also economic development. Over the past few years, India has rationed water not just for irrigation but for power plants, industries and communities, seriously jeopardizing not just health but economic growth.[25] Mumbai, India's most populous city, is spending USD 500 million for one of the world's largest water treatment plants.[26] At the national level, the government also plans to triple wastewater recycling to 70% by 2030.[27]

Figure 4 – Wastewater treatment plant

Example of a wastewater treatment plant to clean sewage and waste from industrial, commercial, and residential users for recycling or discharge into waterways. Source: Hydrotech Group.

## Intensifying public funding

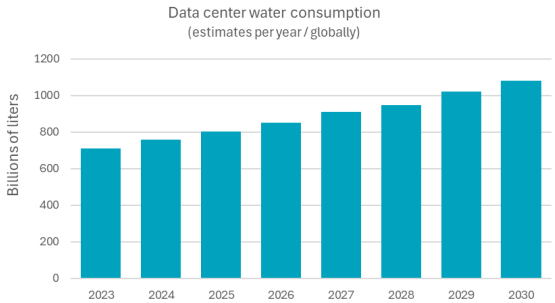
Recognizing the danger, the US passed the Bipartisan Infrastructure Law committing nearly USD 50 billion in federal funding for infrastructure projects to help ensure clean drinking water, wastewater treatment and stormwater management.[28] In addition, states and local authorities are also pushing public investments to expand and fortify water infrastructure especially those benefiting from federal efforts to reshore manufacturing of chips and electric vehicles, including Texas, Arizona, Nevada, Oregon and New York (see section, The reshoring wave).[29]

In 2023, Spain also announced plans to allocate more than EUR 23 billion to update and expand its water infrastructure (the largest ever) to comply with several European water laws. Spending will be allocated across sanitation and purification measures, flood risk management, irrigation systems, desalination plants, and water recycling among other projects.[30]

## Private sector investments

Private sector water investments are also increasing from companies seeking to ensure water supplies to maintain tech supremacy and growth. Water usage of Microsoft, Meta, and Google have all jumped along with their hyperscaler data center activities.[31] In 2023, US data centers consumed more than 300 billion liters of water.[32] AI demand is expected to drive up water withdrawal to as much as 6.6 trillion liters by 2027 (half of the UK's annual water consumption).[33]

Figure 5 – Data center water consumption




Estimates of data center water consumption globally based on water drawn from utilities, ground and water sources. Source: Bluefield Research, Financial Times, Robeco.

The 'Big Four' of data centers (Microsoft, Google, Meta and Amazon) have all pledged to replenish more water than they consume in the regions where they operate, which means investments in water technologies from testing and purification technologies to wastewater treatment, recycling and reuse to operating efficiency solutions such as water-cooling systems, as well as using AI to detect leaks.

## The reshoring wave

Water companies from across the water value chain stand to benefit from federal incentives to build and reshore critical manufacturing industries to US soil. The CHIPS Act directly promotes the build-up of semiconductors but given their high-water dependence it will indirectly promote water companies.

The US isn't the only country investing in water to support the build-out of next generation manufacturing. Germany's largest microelectronics cluster, known as 'Silicon Saxony,' in Dresden announced a EUR 630 million project to expand water supplies and wastewater treatment to its growing Big Tech industries, particularly semiconductors.[34]

## Biodiversity mandates

Protecting biodiversity is critical for keeping the Earth's natural systems in balance. Animal species living in freshwater have suffered an 83% decline in regions worldwide.[35] To stem the loss, in 2024 EU leaders passed the Nature Restoration Law which set mandatory targets for restoring EU land and sea areas. The law and similar initiatives globally will create demand for wastewater management and water quality testing services so that industries can bring effluent waters to quality standards before discharging it back into the environment.

Restoring wetlands, which naturally filter pollutants, will also be critical which will require companies specialized in environmental engineering to build drainage systems and redirect waterways. The US Water Resources Development Act signed into law in January 2025 authorizes federal funding for water projects, including flood control and ecosystem restoration.[36]

Figure 6 – Nature-based solutions for flooding and biodiversity


Engineers reshape and restore slopes on riverbeds to improve water-flows, enhance flood control and improve biodiversity. Source: Tetra Tech, 2025.

# What's compelling about Robeco's water strategy?

**Strategic foresight, enduring leadership, diversified exposure and a successful performance track record are just a few things that make the Robeco Sustainable Water strategy a compelling investment opportunity.**

## Strategic foresight, focused research and asset growth

Launched in 2001, the Robeco Sustainable Water strategy was one of the first investment strategies to recognize the risks and opportunities related to water scarcity. Moreover, the strategy's benefits from the long-standing leadership and in-depth research of a dedicated water team. Investment analysis goes well beyond sector coverage, focusing on entire value chains within the water theme.

The team's investment acumen benefits from close collaboration with our broader thematic and fundamental equity investment teams, which offer cross-sector and cross-regional insights and knowledge sharing. Strategic foresight, insightful research, and strong team collaboration has helped capture attractive performance and grow the strategy's assets to their current EUR 3 billion.[1]

## Diversified alpha opportunities

The strategy invests along the entire water value chain, providing cross-sector exposure across a wide-range of water solutions, thereby offering broad diversification relative to an increasingly concentrated and tech-tilted global market. Its exposure includes utilities that provide the heavy infrastructure and distribution networks needed to ensure clean water supplies for industrial, commercial and residential consumers. It also includes companies that collect and treat industrial-scale effluent and hazardous waste so that water can be safely reused, stored or discharged to the environment.

Through its investments in cutting-edge water testing and analytics companies, the strategy gains exposure to sectors requiring high water-quality standards including textiles, chemicals, food and beverages. Moreover, it has exposure to both defensive healthcare and pharma stocks as well as high-growth sectors such as biotechnology and Big Tech, all of which need ultra-pure water for production processes.

Figure 7 – The Water Strategy's Investment clusters

**Utilities** – includes private utilities and companies that provide water and wastewater infrastructure and auxiliary services to ensure freshwater supplies and wastewater management to commercial, residential and industrial customers.

**Quality & analytics –** includes companies providing instrumentation and testing analytics needed to detect contaminants and other impurities. It also includes point-of-use treatment, and critical maintenance services that enhance the efficient use of water supplies.

**Capital goods & chemicals** – includes companies focused on pipes, valves, pumps and other equipment for water extraction, transmission, distribution to residential, commercial, agricultural and industrial users. It also includes providers of treatment chemicals and systems to ensure water quality is fit for intended purpose.

**Construction & materials** – includes companies providing water meters, indoor plumbing, bathroom and kitchen fixtures as well as water heaters, boilers and filtration systems. It also includes companies involved in engineering and construction of water infrastructure, cleanup and ongoing maintenance of contaminated sites as well as projects that mitigate pollution, flooding and biodiversity loss.

On a broader scale, increasingly sophisticated instrumentation and treatment technologies are also needed to detect and filter toxic contaminants such as microplastics and PFAS chemicals, so that water supplies meet more stringent regulatory standards. Their indestructible nature as well as decades of widespread use in many industries means that PFAS cleanup and remediation efforts will be a decades-long undertaking impacting virtually the entire manufacturing sector.

The strategy also invests in firms providing the environmental engineering services needed to build drainage systems to control stormwater surges and urban flooding as well as restore natural wetlands to combat water pollution, climate change and biodiversity loss. Through investments in

[1] **Past performance is no guarantee of future results. The value of your investments may fluctuate.** Source: Robeco, assets under management rounded to the nearest billion. Data as of 31.12.2024.

companies providing water meters, indoor plumbing, bathroom and kitchen fixtures as well as water heaters, boilers and filtration systems, the strategy has exposure to buildings and construction end-markets. These enable efficient water use efficiency in industry commerce and residential markets.

## High-conviction strategy

Water is a high-demand resource needed for a productive society, economy and environment. Mitigating water stress by keeping these competing demands in balance forms the core of the water strategy's investment thesis. We are convinced of the long-term growth potential of this thesis and strive to execute a pure approach – investing in companies whose revenues and future growth are linked to solutions that improve clean water supplies, reduce water loss, and enhance water efficiency to communities, industries, and the natural environment.

We do not invest in water-related companies whose business models are incompatible with our thesis. For example, hydropower is driven by energy supply and demand and directly contributes to electricity production, not enhancing water supplies. In addition, hydropower infrastructure tends to disrupt natural water flows which contributes to biodiversity loss.

Moreover, bottled water, which contributes to plastic pollution that degrades the quality of water supplies, is another example of a business model that is incompatible with the strategy's thesis. We also avoid investments into water-rights allocations, which suffer from a lack of strict governance mechanism and benefit from water scarcity rather than providing a solution against it.

## Positively contributing to SDGs

The strategy's strong focus on companies mitigating water scarcity and contributing to clean, safe and sustainable water supplies also enables it to have meaningful and measurable positive impact across multiple SDGs.

These include SDG 6 (Clean water and sanitation), SDG 3 (Good health and well-being) and SDG 12 (Responsible consumption and production) among others. Robeco uses a proprietary framework that measures the performance of the water strategy's holdings using water-specific KPIs in order to ensure they are positively contributing to relevant SDGs. The SDG Framework's overall design is closely aligned with the UN SDGs underlying targets and its overarching principles.

Figure 8 – Contributing to multiple SDGs


Source: Robeco, 31 December 2024.

Important Note: Use of the United Nations Sustainable Development Goals (SDG) icons shall only serve explanatory and illustrative purposes and may not be interpreted as an endorsement by the United Nations of this entity, or the product(s) or service(s) mentioned in this document. The opinions or interpretations shown in this document hence do not reflect the opinion or interpretations of the United Nations.

## Sustainable active ownership

Finally, the strategy benefits from the voting and engagement activities of Robeco's award-winning Active Ownership team, which drives awareness, education and action among and within companies on the risks and opportunities of addressing sustainability issues within their operations and markets.

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