



Sector and company

performance
insights

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To find case studies of impacts, risks and actions please go to <https://www.cdp.net/en/research/global-reports/global-water-report-2017>.

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Sector summaries

Investor interest in water issues is greater than ever before.

When CDP's water program was launched in 2009, 137 investors signed the request to companies for the disclosure of water-related information. Now in its eighth year, 639 institutional investors with US\$69 trillion in assets back the request for water information, which is sent to thousands of companies in eight sectors each year.

These sector summaries allow investors to compare key metrics across sectors and assess their strengths and weaknesses. Investors can use this information to integrate water issues into corporate valuation, support company engagement efforts and facilitate improved disclosure and action.

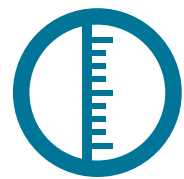
Water is a local issue. Risks are complex and can impact different sectors in very different ways, which can make company evaluation and engagement a daunting challenge. There are six key management behaviors that investors should expect of any company: Transparency; Governance; Measuring and monitoring; Risk assessment; Targets and goals; and Supply chain engagement. The importance of these behaviors is explained in more detail overleaf. Raising these questions to companies in sectors exposed to water risk can assist with company evaluation and spark the right conversations in company management.



Transparency



Governance



Measuring and monitoring



Risk assessment



Targets and goals



Supply chain engagement



Transparency

Does the company respond to your request for information via CDP?

Some companies report some water-related metrics in their sustainability reports, but this information is often incomplete and not comparable. CDP offers the only platform for companies to disclose all material water-related information in a standardized format. Disclosing via CDP enables a company to better understand its risk exposure, identify actions to mitigate these risks and seize a competitive advantage.



Governance

Does the company have board-level oversight of water issues?

Water governance must be in the boardroom of every major corporation in the world. By providing board members with the information and tools to plan for a transition to a water-secure world and by publicly monitoring progress, water stewardship can become part of companies' modus operandi.



Measuring and monitoring

Does the company regularly measure and monitor all water aspects?

As the saying goes, what gets measured gets managed. Robust water accounting data is necessary to inform business planning and forecasting as well as risk identification and response. Companies should regularly measure all water aspects: withdrawals, discharges, quality, consumption, and employee and local access to WASH (Water, Sanitation and Hygiene).



Risk assessment

Does the company conduct a comprehensive risk assessment at the river basin level across direct operations and supply chain?

Water issues differ greatly from one river basin to another. A company considering its water use alongside the physical, regulatory, social, environmental and temporal context within which it and its suppliers operate, has a far greater chance of understanding and enhancing its resilience.



Targets and goals

Has the company set or achieved targets and goals that reflect a company-wide commitment or strategy?

Companies must set and achieve ambitious targets to reduce impacts on water availability and quality. Many companies are demonstrating the desire to simultaneously reduce water impacts while increasing their growth. By ensuring these transformational goals are aligned with the water-related needs of the basins upon which they rely, companies can ensure they are playing their part in achieving a water-secure future.



Supply chain engagement

Does the company request key suppliers to report on water use, risks and management?

Companies that leverage their procurement power can drive change at greater pace and scale through supply chains. By requesting water-related information from suppliers, purchasers can gather a more complete picture of their water risk exposure, and incentivize sustainable behavior among suppliers.

So, how have companies performed on these key management behaviors in 2017?

The heatmap below provides performance by sector, marking in green the best performers relative to other sectors. In most cases, there is significant room for improvement.

	Consumer Discretionary	Consumer Staples	Energy	Health Care	Industrials	Information Technology	Materials	Utilities	CROSS-SECTOR AVERAGE
Transparency	38%	48%	27%	48%	43%	74%	54%	37%	46%
Governance	68%	73%	62%	66%	68%	64%	78%	73%	70%
Measuring and monitoring	53%	70%	57%	69%	46%	65%	73%	67%	63%
Risk assessment	19%	31%	22%	21%	9%	15%	19%	31%	20%
Targets and goals	66%	64%	46%	59%	44%	50%	57%	58%	56%
Supply chain engagement	48%	50%	8%	47%	29%	57%	33%	40%	41%

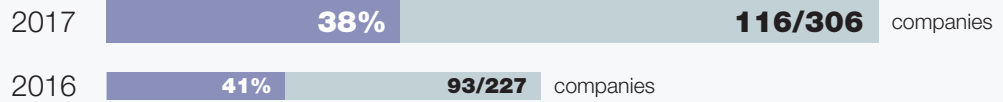
CDP **investor signatories** have access to the world's largest database of quantitative and qualitative metrics on climate change, water, and forest risk commodities, along with award-winning sector research reports. Additionally, CDP **investor members** gain access to bespoke analysis of CDP data, a modelled emissions database, prioritized access to one-to-one meetings with report authors, speaking engagement invitations and CDP events.

To find out more about CDP's water data and the benefits of being an investor signatory and member please [visit our website](#).



Consumer Discretionary

Response rate



How is water material to the Consumer Discretionary sector?

- Water is used in the direct operations of many companies in the Consumer Discretionary sector, which spans a range of activities and products from automotive manufacturing to household durable goods and textiles & apparel. In textiles, water is used for dyeing and bleaching among other things, as well as for cooling, cleaning and painting processes.
- Companies in this sector can face reputational risks due to the potential for water pollution if wastewater is not properly treated. For example, the textiles industry uses thousands of chemicals in its processes, while wastewaters from auto manufacturing can be contaminated with metals, oils and grease, flammable liquids, and paint residuals.
- Water risks along the supply chain are also an important consideration for this sector: textiles companies rely on water for the irrigation of crops such as cotton, and for the irrigation of animal feedstock for leather production. Automotive manufacturers require water to produce component materials such as steel and rubber.

Performance against key management behaviors

	Consumer Discretionary	Cross-sector average	Comment
Transparency	38%	46%	Over 300 companies from the Consumer Discretionary sector are requested to disclose water-related information, but just over 100 respond, the third lowest response rate across sectors. This means major retailers, automobile and textile manufacturers may be failing to recognize the significance of water to their business, and the fundamental importance of transparency on these issues.
Governance	68%	70%	The sector is slightly below the cross-sector average for board-level oversight, but still outperforms several other sectors. In a small vanguard of 22 companies (19%), the highest responsibility for water sits with a C-suite officer. Investors should encourage water governance at the highest levels of management to ensure integration of water stewardship into business strategy.
Measuring and monitoring	53%	63%	Poor performance here is a cause for significant investor concern given that 77% of companies in this sector report that good quality freshwater is either 'vital' or 'important' for operations. Investors should ask questions about company procedures for measuring and monitoring withdrawals, discharges, consumption and WASH services.
Risk assessment	19%	20%	Consumer Discretionary companies are slightly below average when it comes to conducting robust risk assessments. Although 81% say that water risks are assessed, just 26% of these assessments cover direct operations and the supply chain, and even fewer are conducted at the river basin level. This is concerning given the significant water risks faced in this sector, such as reputational risks from water pollution.
Targets and goals	66%	56%	Encouragingly, this sector outperforms all other sectors in the setting of targets and goals. The most common aim is to reduce water consumption, which likely relates to the high levels of freshwater dependence. Investors should encourage long-term, ambitious goals for all companies.
Supply chain engagement	48%	41%	Consumer Discretionary is among the top three best performing sectors for this metric, with many companies requiring regular supplier reporting. But still more than half of respondents do not ask suppliers to report on water management practices. Of those that don't, 26% considered supplier engagement to be 'important but not an immediate business priority'. Considering the notoriously complex supply chains of hoteliers, auto and textile manufacturers, investors should help to raise supplier engagement up the corporate agenda.



How water can impact on valuation

Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>Caesar Entertainment has identified an opportunity for cost savings through improving its water cooling systems. Its cooling water projects aim to increase the use of recycled water, potentially saving tens of millions of gallons per site per year. Payback for these projects is typically under 2 years and project costs vary by property, but can cost over US\$100,000 each. For example, a project at one site cost around US\$50,000 and reduced water use by 11 million gallons annually.</p>
	<p>W9.1a</p> <p>Linkages and tradeoffs between water & other environmental issues</p>	<p>Burberry Group has begun procuring cotton through the Better Cotton Initiative (BCI). The BCI trains farmers to use water efficiently, care for the health of the soil and natural habitats, reduce use of the most impactful chemicals and promote decent work. In Peru, a three-year farmer training program came to completion in March 2017, with farmers reporting a 14% increase in yields and lower environmental impacts, such as a 69% reduction in chemical pesticide use. Farmers also reported a reduction in irrigation, as their practices are becoming more water efficient. Burberry has a target to procure 100% more sustainable cotton by 2022.</p> <p>Nissan Motor Co., Ltd. found that more than 20 times as much water was used in its upstream supply chain than by Nissan itself. To address this, the company is seeking to minimize the volume of newly extracted natural resources for vehicle production and seeking alternative sources for fresh water. The company built a rainwater reservoir for process water in facilities in high water risk regions such as Mexico and India.</p>
Capital investment	<p>W3.2c&d</p> <p>Risk and response</p>	<p>General Motors have found that its non-renewable groundwater wells in the Santiago river basin in Mexico are showing signs of water stress, as some need a day to recover after low flow. With increased production from GM and other manufacturers developing operations in the local area there is concern that adequate well water will not be available in the future. In response, GM will install a near Zero Liquid Discharge system to recycle plant water for reuse at an estimated cost of US\$10 million.</p>
		<p>Municipal waste water treatment costs in Drakenstein and Stellenbosch Municipalities increased by 10% which increases Distell Group Ltd.'s operating costs. In response, the company constructed a new wastewater treatment plant at its Adam Tas facility in Stellenbosch at a cost of US\$3 million. The plant will pre-treat the waste water before discharging to sewer to reduce treatment charges.</p>
Volume of units sold	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>Woolworths Holdings Ltd. experienced supply chain disruption due to drought and unprecedented heat in the Breede-Gouritz river basin. This has affected irrigation rights and impacted the availability and price of fruit for the past three years. In response, Woolworths has engaged with public policy makers, other stakeholders in the river basin, and suppliers. In total, response strategies have cost the company US\$7.5 million. Woolworth Holdings aim to replicate learnings from this project in other water-stressed areas to make farmers more resilient to future climate shocks.</p>



Tightening regulations in China are increasing challenges for business. Our recent survey of 85 Chinese textile manufacturers found that 88% had to upgrade their factory to avoid being shut down and over half have invested upfront CAPEX of more than US\$300,000 (RMB 2 million) for the upgrades.

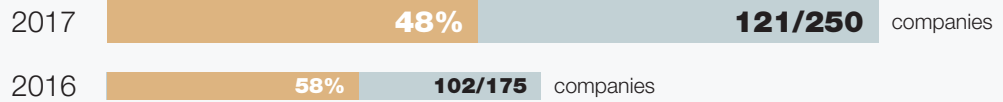
Dawn McGregor, China Water Risk





Consumer Staples

Response rate



How is water material to the Consumer Staples sector?

- Water is an essential ingredient in the products produced by companies within this sector, covering the manufacturers and distributors of food, beverages and tobacco and producers of non-durable household goods and personal products.
- One of the most substantive risks for companies in this sector lies with the agricultural supply chain. The agricultural sector accounts for some 70% of the world's water consumption, as high-quality water is required for irrigation and the production of feed for livestock. Excessive or poor application of fertilizers and pesticides can lead to nitrate and phosphorus run-offs, polluting waterways and contaminating groundwater.
- For beverage companies, high quality water is a not just an essential ingredient but necessary for brewing, fermenting, distillation and cleaning. For example, cleaning water can account for as much as 70% of overall water use in soft drinks manufacturing.¹

Performance against key management behaviors

	Consumer Staples	Cross-sector average	Comment
Transparency	48%	46%	The sector performs slightly above average for disclosure, but still over half of the 250 companies requested for water-related information do not respond and 12 formally decline to participate. As one of the most water-intensive sectors, investors should engage all companies to be transparent on the water issues they face.
Governance	73%	70%	Consumer Staples outperforms the cross-sector average for board-level oversight of water. However, just 26% of companies entrust responsibility of water to C-suite officers, with the majority leaving this responsibility to an environment or sustainability manager. Given water's fundamental importance to the sector, investors should expect to see buy-in at the highest levels of corporate governance.
Measuring and monitoring	70%	63%	It is encouraging that a clear majority of companies measure and monitor water withdrawals, discharges, consumption and WASH services. However, monitoring of water discharges lags behind. Companies should recognize the equal importance of tracking discharge volumes and treatment methods.
Risk assessment	31%	20%	The Consumer Staples sector is the joint-best performer for this metric, but the overall percentage is still too low. While 45% conduct risk assessments that cover direct operations and supply chain and 42% conduct risk assessments at the river basin level, just 31% do both. Investors should emphasize that comprehensive risk assessments that take local context into account are more likely to accurately gauge exposure to water risks.
Targets and goals	64%	56%	This sector is the second-best performer on this metric. Sustainable agriculture is one of the most common goals, with companies implementing farmer training programs and sustainable irrigation techniques. Reduction of product water intensity is the most common target, but investors should push for more ambitious, long-term action where initial water intensity targets have been met easily.
Supply chain engagement	50%	41%	Supply chain disruption is the second most reported risk for this sector, yet half of respondents are not proactively engaging with their suppliers. Price and supply shocks to agri-commodities due to water issues can be a major threat to business continuity, and investors should expect companies to have excellent oversight of water in the value chain.

How water can impact on valuation

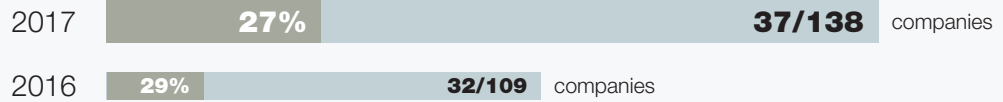
Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>McCormick & Company expect prices of raw materials to rise by about 10 to 20% in the areas of South Pacific Basin, where severe dry conditions have impacted growing conditions. In response, the company has set up support projects for farmers to teach them good agricultural practices including improving irrigation techniques. McCormick have also partnered with drip irrigation providers to supply farmers with modern irrigation systems at a subsidized rate.</p>
		<p>Associated British Foods suffered a financial impact of almost US\$25 million due to two consecutive years of below-average rainfall in the Pongola-Umzimkulu river basin in South Africa. The company's sugarcane quality and yield were negatively affected: the 2015/16 sugarcane crop closed at 4 million tons – approximately one million tons less than the 10-year average – and the cane contained a lower percentage of sugar.</p>
		<p>PepsiCo Inc. experienced higher operating costs due to an increase in water prices in the US. Pepsi responded by implementing site-specific targets. By the end of 2015, the company had reduced its water use per unit of production by almost 26% compared to 2006, exceeding the company's reduction target of 20%. Pepsi's water efficiency programs saved the company approximately US\$19 million in 2015 compared to the 2006 run rate. However, as these savings could be negated by future price increases, Pepsi is currently working on new water efficiency targets.</p>
	<p>W8.1a&b</p> <p>Targets and goals</p>	<p>The Kellogg Company is on track to achieve its goal for 100% of its in-scope suppliers to measure water use and water quality metrics through the Kellogg Grower Survey by 2020 from a 2015 baseline. Kellogg cites this as a key goal to ensure continuity of supply for agricultural ingredients.</p>
	<p>W1.3a</p> <p>Proportion of suppliers requested</p>	<p>L'Oréal asked 31 suppliers to disclose water-related information via CDP's supply chain program. Suppliers were selected according to their water impact factors: water consumed during the production of supplied goods such as aluminum tubes and palm oil derivatives; whether production sites were located in water-stressed areas; and the significance of the volume purchased from suppliers. In 2016, 23 organizations responded, representing 28% of all direct spend. Customized water-performance profiles based on suppliers' CDP responses are used for L'Oréal's annual review of suppliers to identify areas for progress.</p>
Capital investment	<p>W6.4a</p> <p>Changes to water-related CAPEX or OPEX</p>	<p>Danone reported a 49% increase in its water-related CAPEX and a 20% decrease in its water-related OPEX. The company's increase in CAPEX was driven by a goal to meet high quality standards for wastewater discharge and achieve water consumption reduction targets.</p>
	<p>W3.2c&d</p> <p>Risk and response</p>	<p>In 2016, Coca-Cola European Partners (CCEP) invested over US\$3 million to improve plant water efficiency across sites in the UK, France and Belgium. This included projects such as installing air rinsers, recycle and reclaim systems, and electro-chemically activated water cleaning. Based upon a 1% limit on water supply in areas of water scarcity, CCEP estimates that these measures help to protect against impacts to production that could generate potential losses of US\$4 million or more.</p>
Volume of units sold	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>UK consumer durables company Reckitt Benckiser aims to increase revenue and help reduce water use in water-scarce countries by expanding sales of products that require less water per dose. For example, the company's liquid handwash product typically uses 60% less water than conventional handwash products due to properties that allow for easier rinsing. In India alone, total net revenue from liquid handwash in 2016 was US\$53 million.</p>
		<p>In the clinics and pharmacies of Clicks Group Ltd. stores, it is a regulatory requirement for pharmacists and nurses to have access to warm, clean water to wash hands to prevent the spread of disease. As such, freshwater scarcity could force the closure of these clinics and pharmacies, and the closure of one store in the Clicks business unit can cost around US\$6,000 per day. Clicks Group is exploring alternative freshwater sources at an average cost of US\$3,000 per store and considering implementing a complete black water system², at a cost of approximately US\$325,500.</p>

2. Blackwater is used to describe wastewater containing feces and urine.



Energy

Response rate



How is water material to the Energy sector?

- ▼ The extraction of hydrocarbons produces large volumes of water. Smart, safe management of this produced water is both a business opportunity (in that the water can be reinjected for an improved field recovery factor) and a regulatory necessity (in that water contaminated with hydrocarbons must be properly treated).
- ▼ For some production techniques such as hydraulic fracturing and oil sands, large volumes of water are essential for the recovery of the resource. Companies should have robust systems for measuring and monitoring this water use, and be aware of water quality and availability issues in the basin.
- ▼ Downstream operations such as refining and petrochemicals require water for cooling and steam generation. For this reason, plants are often located near water bodies and rely on these resources for the success of their business.

Performance against key management behaviors

	Energy	Cross-sector average	Comment
Transparency	27%	46%	The Energy sector has demonstrated the lowest response rate of all sectors since the inception of CDP's water program. Investors should expect greater transparency from oil and gas majors given the large volumes of water these companies manage on a daily basis, and the well-documented potential for water pollution.
Governance	62%	70%	The sector is significantly below average for board-level oversight, despite 76% of companies reporting that water is integrated into business strategy. Climate change is now a common topic at the AGMs of energy companies. Investors should ensure that water issues also reach the highest levels of management in these companies.
Measuring and monitoring	57%	63%	The Energy sector deals with large volumes of water daily, and 73% report that freshwater is vital or important to operations. But like other sectors, energy companies have not reached sufficient levels of monitoring of water discharges. Monitoring of water consumption and employee WASH provision is also surprisingly low given that refineries are water-intensive, and employee health and safety is paramount.
Risk assessment	22%	20%	43% of companies in this sector conduct water risk assessment at the river basin level, beating the cross-sector average, but just 19% conduct an assessment that covers both direct operations and supply chain. Energy companies must get a more complete picture of risks across the value chain, and investors should urge energy companies to factor all these elements into their risk assessments.
Targets and goals	46%	56%	With less than half of companies setting a water-related target or goal, the sector has not yet woken up to the opportunity that water presents. For example, increasing rates of water recycling and reuse of produced water can improve the field recovery factor and reduce reliance on freshwater resources. Investors should ask if targets for reducing water intensity per barrel of oil equivalent have been set. Just 2 companies reported having these in place.
Supply chain engagement	8%	41%	The Energy sector has by the lowest rate by far for engagement with the supply chain on water issues. This is concerning, as suppliers to Energy companies such as machinery manufacturers can also be exposed material water risks. Investors should engage with Energy companies to urgently step up efforts to better understand risks across the entire value chain.

How water can impact on valuation

Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W6.2a</p> <p>How water has positively influenced business strategy, especially location planning and site expansions</p>	<p>Canadian oil & gas producer, Enerplus Corporation, evaluates potential water sources in the initial planning stages of new projects and site expansions to ensure that sufficient, economically feasible water supply is available for both immediate development and the overall development areas life cycle. Only areas with economically viable water supply will be developed.</p> <p>Core Laboratories initially invested in its Calgary based facility to reduce the water that is used to cool equipment. This resulted in a 65% reduction in water usage and annual cost savings of over US \$100,000. The approach has since been expanded globally to its other laboratories, helping to reduce water consumption between 43% and 63%.</p>
	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>Portuguese energy company Galp Energia SA identified an opportunity for cost savings and improving environmental performance at its two main downstream sites, the Sines Refinery and the Matosinhos Refinery, as these sites accounted for about 88% of Galp Group's water consumption. The company invested in water recycling and efficiency to reduce fixed costs and reduce the impact of company activities on water resources at a local and regional level. In 2016, Galp recycled more than 2 million m³ of water, around 20% of the total water consumption of the entire Galp Group. The measures that have been implemented in Sines Refinery allowed the recirculation of around 1.28 million m³ in 2016, representing savings of about €565,000. Matosinhos Refinery reused about 742,000 m³ of water, yielding savings of approximately €267,000.</p>
	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>OMV AG reports that its Produced Water Treatment Plant at the Suplacu de Barcau oilfield in Romania did not meet the applicable standards. The treated, produced water discharged to surface water exceeded the maximum allowable limits for several indicators. Although the fine for exceeding the discharge consent was negligible, the overall financial impact is significant: the company is investing US\$19 million for a new Produced Water Treatment Plant.</p>
Capital investment	<p>W3.2c&d</p> <p>Risk and response</p>	<p>Enbridge reports that the risk posed by a spill or leak from its Liquid Pipelines network to a watercourse could result in significant negative impacts to brand image. These impacts could also contribute to delays from regulators in permitting and approving future projects, customer transport disruption and potential litigation. In 2016, US\$750 million was spent on programs that help Enbridge maintain system fitness and detect leaks across operations in Canada and the U.S, including US\$18.5 million on leak inspection and survey programs. Over the last three years, investment has totaled more than US\$2.88 billion.</p>
Volume of units sold	<p>W1.1</p> <p>Dependence on water</p>	<p>Australian oil and gas company Oil Search reports that sufficient amounts of high quality freshwater are vital to the success of the organization. While Oil Search oil and gas processing facilities do not require water to operate, water is required to support drilling operations. Water is also needed for drinking and emergency services at support and base camps. Indirectly, local communities rely on the same freshwater sources and any water restriction could have detrimental health and humanitarian impacts and affect stability and security in the region, potentially disrupting Oil Search operations.</p>



The industry can help alleviate water shortages and create a new resource for other industries through the development of recycled water.

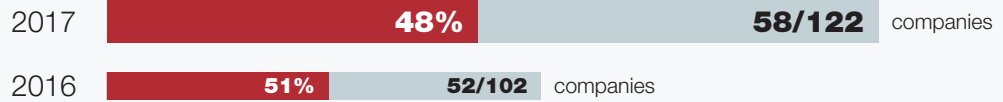
The water challenge: Preserving a global resource,
a joint study by Barclays PLC and the Columbia Water Center





Health Care

Response rate



How is water material to the Health Care sector?

- For pharmaceuticals, biotechnology and life sciences companies, water plays a critical and varied role as a reagent, solvent and cleaning agent, and companies often require high quality and ultra-pure water in the production and delivery of products.³
- The provision of water, sanitation and hygiene (WASH) for healthcare employees and patients is paramount. Delivery of these services can be affected by drought and flood and lead to the shutdown of operations.
- Monitoring water discharge quality is also a key consideration as companies must comply with regulations concerning the removal of pharmaceutical compounds from discharged water.
- The water-energy nexus is often explicit in the Health Care sector as hospitals and manufacturing plants require cooling systems that can vary in their water and energy efficiency. Companies may have to trade off emissions reductions goals against efforts to reduce water consumption.

Performance against key management behaviors

	Health Care	Cross-sector average	Comment
Transparency	48%	46%	Nearly half of requested Health Care companies disclose water-related information via CDP, with nine A list responses. However, there are still many pharma giants that do not respond to the investor request for information. Investors should encourage companies to follow their peers and disclose.
Governance	66%	70%	High quality water is a key production input for many companies in this sector and it is vital that water governance is in every boardroom to ensure responsible and sustainable water management throughout the value chain. Interestingly, only 57% of Health Care companies report opportunities related to water, the lowest of all sectors. Capitalizing on opportunities can go hand-in-hand with the financial focus of boards, and there is ample room for improvement in this sector.
Measuring and monitoring	69%	63%	Investors should expect more water accounting within the Health Care sector, as 93% of respondents report freshwater as important or vital for direct operations—the highest percentage of all sectors. Water plays a critical and varied role across operations in the Health Care sector. Companies are often subject to strict regulations, and the provision of WASH for healthcare employees and patients is key.
Risk assessment	21%	20%	Hospitals and pharmaceutical facilities are often heavily reliant on the river basins in which they operate. But just 36% of risk assessments are conducted at the river basin level, and only 33% cover direct operations and supply chains. Investors should expect companies to bring these three elements into one robust risk assessment.
Targets and goals	59%	56%	In the Health Care sector, there is excellent scope for companies to dramatically reduce water consumption by improving processes and developing water-efficient products. Companies should also set goals to reduce the pollution potential of their products. At present, the most common targets include reducing water withdrawal and consumption, while the top goal is engaging with suppliers on water.
Supply chain engagement	47%	41%	Over half of Health Care companies do not request water information from their suppliers. Investors should expect much greater levels of supplier engagement, as water is a material issue for many Health Care suppliers. This sector has the highest percentage (84%) of respondents stating that freshwater is important or vital for their indirect (value chain) operations.

³ SUEZ (2017) Ultra-pure water use in semiconductor and pharmaceutical industries. [Online] Available: suezwaterhandbook.com/processes-and-technologies/treatment-and-conditioning-of-industrial-water/process-water-including-ultrapure-water/ultra-pure-water-used-in-semiconductor-and-pharmaceutical-industries

How water can impact on valuation

Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>Mediclinic International operates 10 hospitals in the Berg-Olifants river basin in South Africa, a river basin heavily impacted by drought. The company has developed emergency contingency plans to mitigate possible water disruptions, at a cost of US\$233,000. Plans include drilling additional boreholes to provide sufficient water for operations, commissioning water delivery trucks, and stocking bottled water for patients. Additionally, Mediclinic has worked with the City of Cape Town's water and sanitation directorate to exchange information and collaborate on response strategies. Mediclinic has also launched extensive employee and patient awareness campaigns on water conservation.</p> <p>When local government in the Godavari river basin temporarily cut municipal water supply up to 60% due to severe and continued drought conditions in the area, Johnson & Johnson was forced to truck water from an alternative water source to its operations. In addition, the company began a project to segregate combined wastewater streams and treat them separately, in order to recycle part of the water for non-product critical water use.</p>
	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>The ISO50001 standard helped Biogen Inc.'s Hillerød facility in Denmark to identify water efficiency projects. For example, reducing water use in the manufacturing process from 3,500 m3 to below 3,250 m3 per batch could deliver cost savings of approximately US\$125,000 per year.</p> <p>In 2016, Biogen collaborated with a contracted manufacturing partner to improve the manufacturing process of a molecule that is the foundation for a medicine Biogen is developing to treat a rare but debilitating neurological disease. The collaboration resulted in 49% reduction in water usage for the process as well as improving product performance, such as the purity of the active pharmaceutical ingredient (API)."</p>
Capital investment	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>GlaxoSmithKline reported regulatory demand in the Ganges-Brahmaputra river basin to increase water recharge to aquifers to 200% of water used. In response to the changes, the company invested US\$648,000 in equipment to enable aquifer recharging and rainwater harvesting on site and for the local community.</p>
	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>Novartis identified an opportunity for cost savings by reducing water consumption and increasing quality of effluent at its manufacturing site in Turkey. By installing a reverse osmosis-ultrafiltration system at a cost of US\$600,000, Novartis reduced water use in cooling systems by almost 70%.</p>
	<p>W6.4a</p> <p>Changes to water-related CAPEX or OPEX</p>	<p>Takeda Pharmaceuticals reported a 66% decrease in CAPEX and a 22% decrease in OPEX. Last year, Takeda improved its drainage facilities to prepare for situations of water-related emergency -- this explains the decrease in CAPEX. Its OPEX reduced as a result of newly updated drainage facilities.</p>
Volume of units sold	<p>W3.2c&d</p> <p>Risk and response</p>	<p>Netcare Limited report that interruptions to water supply in South Africa could impact its ability to provide quality health care to patients, which may have a negative financial impact on business as well as placing the health of patients at risk. In response, the company is investing US\$4.5 million in water tanks that will allow for a 48-hour back up supply of water.</p>



Water is vital for the success of Roche's operations. Almost all processes in chemical, biotech, pharmaceutical and diagnostic manufacturing involve water as a reagent, solvent or cleaning agent. Roche believes a healthy working environment is vital for successful business and therefore its employees should have unlimited access to sufficient amounts of water that meets the quality necessary for drinking, cooking and sanitation. Roche expects the same of its suppliers.





Industrials

Response rate



Why is water material to the Industrials sector?

- ▼ The Industrials sector covers the production of capital goods: engines and machinery, building products and electrical equipment, as well as transporting and distributing these products. Primary water use is therefore linked with manufacturing processes, cooling and cleaning. For example, the washing of machinery parts before assembly.
- ▼ Water issues can also impact Industrials companies in an indirect way. For example, drought and extreme precipitation can damage transport infrastructure and increase maintenance costs and delivery times.

Performance against key management behaviors

	Industrials	Cross-sector average	Comment
Transparency	43%	46%	The understanding of water use and management in the Industrials sector is still nascent. Six A-list companies are setting the example, but still the majority of the 261 major companies requested do not disclose via CDP. Investors should engage these companies.
Governance	68%	70%	The Industrials sector is slightly below the cross-sector average. Given that this sector has the lowest percentage of companies completing many key indicators below, investors should engage with and encourage companies in this sector to strengthen water governance throughout their businesses models.
Measuring and monitoring	46%	63%	A key focus area for investors: among all sectors, Industrials has the lowest percentage of companies tracking withdrawals, discharges and consumption. Additionally, the sector has the highest proportion not evaluating water dependency, with 10% of Industrials companies reporting this.
Risk assessment	9%	20%	The Industrials sector scores the lowest of any sector for conducting a robust water risk assessment. Clearly, respondents have not grasped the importance of including both direct operations and supply chain in risk assessments and the pollution impacts that they or their suppliers could have at the river basin level.
Targets and goals	44%	56%	Industrials has the lowest rate of target and goal setting across all sectors. Investors should expect companies to have an ambitious public commitment to improving their water management in place. In so doing, companies can achieve cost savings via water and energy efficiency. It is laudable that the Industrials sector has the highest number of goals around providing access to WASH in local communities.
Supply chain engagement	29%	41%	As the second lowest of all sectors, this performance should be a red flag for investors. Industrials is a sector in which supply chains are complex and often rely on the water-intensive extraction industry for raw materials, for example aluminum, rubber and steel.



Cooling water is vital for our business and the sustainability of our activities and represents the major use of water. Both our flat glass and pipe activities need furnaces at very high temperatures, and sufficient amounts of accessible water to cool them. If water is no longer available, equipment could be damaged and activities interrupted.



How water can impact on valuation

Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>In May and June 2016, unusually heavy rains in the Seine and Loing river basins in France caused large-scale flooding, affecting twenty of Saint-Gobain's industrial and distribution sites and costing approximately US\$3.5 million, a significant portion of which was linked to property damage. Saint-Gobain had already established a Business Continuity Plan before the flooding, which allows the company to anticipate and put in place an efficient crisis unit, in order to reduce the closing time and the loss of revenue. In this instance, most affected sites reopened within less than a week.</p> <p>Union Pacific Corporation report that drought in select locations in the USA affected operations. Locations experiencing drought are more vulnerable to fires which cause damage to its tracks, bridges and right of ways. Additionally, the soil consistency in locations experiencing drought can impact infrastructure reliability. To address the fire risk and ensure timely response, Union Pacific works with hundreds of local, municipal and volunteer fire departments to prevent fires along railroad right of way. The company uses spark shields when welding and even uses snow blowers to aid in removal of dry vegetation.</p>
	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>The price of water has increased by 96% in Romania in the last four years, resulting in significant year-on-year production cost increases for ASSA ABLOY. For example, its three plating lines consume up to 72,000 cubic meters of water per year and when two new plating lines were needed for numerous water re-circulation solutions were explored to save on consumption. Implementing a demineralization technology using ion exchange resins meant that ASSA ABLOY Romania could re-circulate up to 90% of the water consumed, making it possible to install two new plating lines and save US\$58,600 per annum. The solution has a payback period of 1.5 years.</p>
Capital investment	<p>W3.2c&d</p> <p>Risk and response</p>	<p>Taisei Corporation report that a significant change in precipitation in Japan would drive up operating costs, for example in preparing special materials and additional labor for draining water out from its construction sites. In response to the risk, the company is investing between US\$5 million and US\$11 million per year across its 1,200 construction sites in Japan on waterproof equipment and to drainage for sudden extreme rainfalls.</p>
	<p>W6.4a</p> <p>Changes to water-related CAPEX or OPEX</p>	<p>Barloworld reported a 50% increase in its water-related CAPEX between 2015 and 2016 as they invested in water recycling, treatment and rainwater harvesting infrastructure. The investments were made in support of the company's Vision 2020 target of a 10% improvement in water withdrawal intensity by 2020 from a 2015 baseline year. Meanwhile, drought in certain regions negatively impacted volumes of rain water harvested and increased volumes of water withdrawals from municipal sources, contributing to a 19% year on year increase in OPEX.</p>
	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>As part of Stanley Black & Decker, Inc.'s water reduction targets, all facilities are required to upload water reduction project details into an Environment, Health and Safety web platform. 79 projects were added to the 2016 tracking system, including harvesting rain water for gardening and toilet flushing, installation of water saving taps and waterless urinals. This management method is expected to decrease operational costs by US\$30,000 per year, with an investment of US\$71,000. Starting in 2016, the company is also funding ECOSMART sustainability projects with long term returns on investment, that would not be approved under a standard financial approach.</p>
Volume of units sold	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>Japanese electrical equipment and machinery company Kubota Corporation report that severe drought in Thailand caused a substantial decline in the sales of compact tractors and engines, forcing them to adjust production volumes.</p>



Information Technology

Response rate



How is water material to the Information Technology sector?

- Manufacturers of semiconductors and other precision technologies such as printed circuit boards rely on large quantities of water, much of which has to be ultra-pure in quality. Producing ultra-pure water is energy intensive, which carries its own water requirements.
- Furthermore, data centers rely on cooling water to prevent overheating. As storage and processing infrastructure becomes increasingly concentrated there is a growing need for cooling water. Air cooled data centers represent a major opportunity for water efficiency in the sector, but energy requirements must be considered.
- Wastewater from semiconductor manufacturing can contain harmful chemicals such as gallium arsenide and indium arsenide. Contamination have been recorded in areas of Taiwan where there is a concentration of semiconductor manufacturing plants.⁴ Heat pollution to water resources can also cause significant damaged to local biodiversity if the heated water from the cooling systems of large data centers is discharged back into the catchment.

Performance against key management behaviors

	Information Technology	Cross-sector average	Comment
Transparency	74%	46%	The sector should be commended for demonstrating the highest levels of transparency across sectors. IT companies have demonstrated this commitment to transparency year on year, consistently outperforming other sectors.
Governance	64%	70%	Improving water governance is a critical next step for this sector, as it has the second lowest percentage of companies with board-level oversight on water. Given the critical importance of water for cooling data centers, and ultra-pure water for semiconductor manufacturing, water should be firmly present in the boardroom of IT companies.
Measuring and monitoring	65%	63%	As the Information Technology sector often relies on high quality water for operations, it is encouraging to see a majority of companies in this area measuring and monitoring water data and performing above the cross-sector average.
Risk assessment	15%	20%	Water contamination and changes in water supply are significant risks to the Information Technology sector. As the second-lowest performing sector in this KPI, IT companies must strengthen their water risk assessment processes to understand their vulnerability to water impacts.
Targets and goals	50%	56%	Only half of reporting companies in this sector have incorporated water related goals or targets, indicating significant room to integrate water into business key performance indicators and management. Top targets include reducing consumption and product water intensity, while a top goal is watershed remediation.
Supply chain engagement	57%	41%	Information Technology is the best performing sector on supply chain engagement. Several major IT companies use CDP's supply chain program to request water-related information from key suppliers that range from data center providers to semiconductor manufacturers.

⁴ Chen et al. (2006) "Gallium, Indium, and Arsenic Pollution of Groundwater from a Semiconductor Manufacturing Area of Taiwan" in *Bulletin of Environmental Contamination and Toxicology*. 77 (2) 289-296.

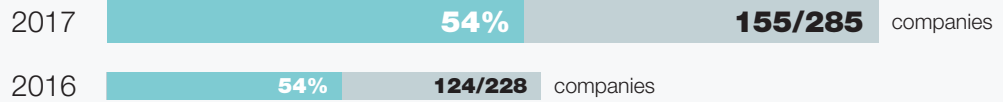
How water can impact on valuation

Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>Yahoo Inc.'s Compute Coop air-cooled data center design uses over 90% less water than conventional water-cooled data centers. For roughly 200 hours out of the year during hot and humid conditions, Yahoo uses a direct evaporative cooling system. Typically, the system generates no or minimal wastewater, resulting in savings from both avoided cost of water and avoided cost of wastewater disposal. The company estimates the resulting savings to be about US\$150,000 per year at its Lockport facility in New York. Should costs of water and wastewater increase in the future or prove more expensive in other locations, savings will likely increase.</p>
	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>In the Dongjiang river basin in South China, LG Display has invested US\$1.7million into a new wastewater disposal facility to comply with legal standards on Chemical Oxygen Demand of discharged wastewater.</p>
Capital investment	<p>W6.4a</p> <p>Changes to water-related CAPEX or OPEX</p>	<p>Over the course of 2016, Intel invested more than US\$12 million in water conservation projects, many of which also delivered energy savings. This represents approximately four times its water-related CAPEX for 2015. Its water OPEX increased slightly as a result of increased water withdrawals.</p>
		<p>Tech Mahindra reported a 15% increase in its water-related CAPEX and a 62% decrease in its water-related OPEX. This year, Tech Mahindra's capital expenditures have been for installation of water recycling systems, water sensors, sewage treatment and rain water harvesting plants, and water quality reports.</p>
Volume of units sold	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>HP Inc sites in California were subject to a mandatory 20% reduction in water consumption due to local drought. The restrictions lasted 6 months up to a year depending on the site. Similar restrictions were imposed on sites in Sao Paulo. While the overall financial impact in California was minimal because the company hit water reduction targets and incurred savings due to the decreased water use, in Brazil, HP experienced electricity rate increases of 90% because the country relies so heavily on hydroelectric power.</p>
	<p>W3.2c&d</p> <p>Risk and response</p>	<p>STMicroelectronics International NV faces a risk of water supply disruption due to flooding in Malaysia. In 2014 and 2015, Malaysia experienced flooding which stopped local pumping at the distribution station. Having sufficient amounts of clean fresh water available is vital to ST's operations - this therefore represents a physical risk which may halt or slow production, depending on the gravity of the flood. ST is responding by developing flood emergency plans and investing in and maintaining infrastructure at a cost of over US\$100,000. ST has put a Business Continuity Plan in place, which was coordinated at the corporate level and implemented and customized at each site. The plan consists of three phases: (1) assessment of business risk; (2) emergencies preparedness; and (3) disaster recovery.</p>
	<p>W8.1a&b</p> <p>Targets and goals</p>	<p>LG Corporation set a group-wide target for reduction in consumptive volumes, motivated by cost savings. The company committed to reducing its water intensity (measured as use quantity/sales amount) by 30% by 2020 compared with 2009. LG Innotek has adopted this same goal, and has exceeded the target timeline by already reducing the water intensity target by 20% in 2016. LG Innotek has reported that this initiative could save US\$9.6million in water costs.</p> <p>SK Hynix committed to a goal of reducing its water usage, motivated by cost savings. They committed to recycle processed wastewater and optimize water usage in cooling towers. Through these efforts, they saved 11,000 tons of water per day in 2016 which was associated with cost savings of US\$417,230 in water costs and US\$2,640,000 in wastewater treatment chemicals.</p>



Materials

Response rate



How is water material to the Materials sector?

- ▶ The materials sector is very diverse, covering mined materials, chemicals, forest & paper products and construction materials.
- ▶ In mining, water is used during extraction, mineral processing and in the transport of excess slurry. Mining and mineral processing is also energy intensive, and water is often required to produce this energy. Water is needed for other processes such as dust suppression, cooling and employee requirements on site. Water pollution from Acid Mine Drainage (AMD) is a significant risk, even after the lifetime of a mine.
- ▶ The chemicals sector is highly water intensive: water is used primarily for cooling purposes (90%) but also as a raw material, in cleaning, transport, as a solvent and as part of the final product. The sector faces the risk of spillage of hazardous chemicals which can affect the quality of local water resources.
- ▶ For the pulp & paper industry, water is used to create the pulp, flush away unwanted impurities. Industrial effluent from mills can contain toxic and non-biodegradable organic materials.

Performance against key management behaviors

	Materials	Cross-sector average	Comment
Transparency	54%	46%	This is the second-highest response rate after Information Technology, but is static year-on-year. Many Materials companies are advanced in their water management and reporting, with 15 making this year's water A list. Those not yet disclosing must follow suit.
Governance	78%	70%	Materials companies beat all other sectors on board-level oversight of water issues and 91% report that water is integrated into business strategy. In 21 companies, more than any other sector, the responsibility for water issues lies with the CEO. It is appropriate that in this water-intensive sector water issues permeate the highest levels of governance.
Measuring and monitoring	73%	63%	Encouragingly, the Materials sector is the best performer on measuring and monitoring all aspects of water use. Discharges in particular must be carefully monitored due to the risk of Acid Mine Drainage.
Risk assessment	19%	20%	The sector demonstrates close-to-average performance on this metric, but should be leading the way for risk assessment at the river basin level, particularly mining companies, which can have large impacts on local hydrology and communities.
Targets and goals	57%	56%	Given strong performance in other areas, Materials companies should step up the ambition of their targets and goals. For example, most companies report targets for a baseline year of 2015 and a target year of 2016. Just 16 companies have set target years out to 2025 and beyond.
Supply chain engagement	33%	41%	This below-average performance should be a cause for concern for investors, as reputational risks from water pollution are present up and down the value chain, from the extraction of ores to the use phase of chemicals. Materials companies must consider how suppliers use water to gain a complete picture of risk exposure.

How water can impact on valuation

Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>In 2016 drought conditions caused a water shortage at Gold Fields Limited's South Deep gold mine in South Africa. The mine's three reverse osmosis plants had reduced water purchase costs for the company by up to US\$12,000 per month, but the drought during 2015 and 2016 meant that two of the three reverse osmosis plants were shut down. This increased water purchase costs by approximately US\$120,000 during 2016. In response, Gold Fields installed additional pipelines to better balance the water on site and established a water supply agreement with another mining company in the region, Sibanye Gold. Gold Fields could now be impacted by Sibanye's plans to close the Ezulwini mine.</p>
	<p>W9.1a</p> <p>Linkages and tradeoffs between water & other environmental issues</p>	<p>Swiss chemicals company Firmenich SA reported that the energy required to treat and discharge waste water is contributing to its Scope 1 and 2 carbon emissions. To address this, they are taking action to reduce the energy used on wastewater by reducing its overall water use and investing US\$15 million to renewable energy projects and targets within wastewater facilities.</p>
Capital investment	<p>W6.4a</p> <p>Changes to water-related CAPEX or OPEX</p>	<p>BHP Billiton report a US\$1.9 billion investment in a desalination plant in Chile, with the aim of securing a sustainable long-term water supply in a water-scarce region.</p> <p>Japanese chemicals company Asahi Kasei saw its water-related CAPEX increase by 81% from the previous year, owing mainly to three investments: a project for improving the enclosing bunds of the Hori River, Miyazaki, Japan; an investment in wastewater treatment facility at a textile mill in China in anticipation of more stringent regulations; and an investment to strengthen the treatment capacity of the wastewater treatment facility at a plant in Shizuoka, Japan. The company's OPEX increased by 9% due to biennially-scheduled repairing.</p>
	<p>W3.2c&d</p> <p>Risk and response</p>	<p>German flavor and fragrance producer Symrise AG is investing in new equipment and technology to increase synthetic menthol production as an alternative to natural mint oils. The company has invested some US\$12 million in recent years, with a further US\$47 million approved before 2020. By meeting the future demand for menthol with synthetic counterparts instead of water-intensive natural mints, Symrise reduces its indirect water footprint and impact on groundwater resources.</p>
Volume of units sold	<p>W4.1a</p> <p>The opportunities water presents the organization and strategies to realize them</p>	<p>British chemicals company Johnson Matthey invested just under US\$28 million in new sales opportunities, the most advanced being JM's Water Technologies business. The company anticipates that the Water Technologies business will deliver sales of around US\$2 million in 2017.</p> <p>In 2016, Swiss company Syngenta AG invested US\$1.3 billion in the research and development of new products that will help plants to tolerate drought. This technology will enable farmers to produce high yields in dry conditions or with limited irrigation. Products include seed treatments, hybrid GM seeds, and crop regulator products that promote growth of finer roots that better enable plants to reach water and nutrients in drought prone areas. These new products represented 10% of sales in 2016.</p>



Water is critical to the mining sector's ability to provide the minerals and metals needed in everyday life. Even the most water-efficient mining operation is vulnerable to water risks when the needs of other water users in the catchment are not taken into account.

The International Council on Mining and Metals





Utilities

Response rate



How is water material to the Utilities sector?

- ▼ The Utilities sector is heavily dependent on water for cooling, and, in the case of hydroelectric generation plants, for power generation itself. For this reason, thermal power plants are often located near water bodies and companies rely on these resources for the success of their business.
- ▼ Water usage and risk exposure will often depend on the power generation source used by the power plant, and even fuels not typically associated with large water use can be water intensive. For example, depending on the cooling technology used, water withdrawals and consumption for Concentrated Solar Power can be of the same order as conventional power plants, while carbon capture and storage can almost double a plant's water withdrawals and consumption.
- ▼ Utilities face reputational risk from the impact that activities can have on local water resources. For example, in many regions regulations dictate that plants must discharge water at the same or similar temperatures as those at which they withdrew it. Reservoirs and dams can also affect aquatic life and the hydrologic cycle.

Performance against key management behaviors

	Utilities	Cross-sector average	Comment
Transparency	37%	46%	The Utilities sector reported some of the highest financial impacts from water, and yet the disclosure rate is well below average. Given that 81% of utilities report that water is 'important' or 'vital' for operations, investors should expect to see greater transparency.
Governance	73%	70%	Despite outperforming the sector average for board level oversight, utilities have more to do on water governance. Just 23% have a publicly available, company-wide water policy that includes direct operations, supplier best practice and acknowledges WASH. Investors should work with utilities to understand their water policy.
Measuring and monitoring	67%	63%	Utilities outperform the average, but they are lagging behind on monitoring the quality of discharges. Thermal plants withdraw and discharge large quantities of water for cooling and the temperature of discharges is strictly regulated in many regions.
Risk assessment	31%	20%	Utilities are the joint best performer for river basin-level risk assessments covering direct operations and supply chain, and by far the best performer for conducting risk assessments at the river basin level (48%). This is appropriate as facilities in this sector are often large in scale and their impacts on local aquatic ecosystems can be significant. However, investors should press for more companies to achieve this standard of risk assessment.
Targets and goals	58%	56%	The most common goal in this sector relates to watershed remediation, habitat restoration, and ecosystem preservation, as many companies are bound by regulations to conserve the basins in which they operate. However, investors can encourage more ambitious targets on reducing water intensity and implementing water-efficient cooling systems.
Supply chain engagement	40%	41%	Leading companies in this sector report that they get a more complete picture of risk exposure by asking suppliers for water information, sometimes via a self-assessment. This engagement is vital, given the water-dependence of certain fuel stocks such as coal and biofuels.

How water can impact on valuation

Potential impact of water on valuation	CDP data points to watch	Company examples
Operating costs	<p>W3.2c&d</p> <p>Risk and response</p>	<p>In 2016, the State of Ceara in Brazil implemented an emergency tax on water, drastically increasing EDP- Energias de Portugal S.A.'s operating costs. EDP mitigated the risk by diversifying its portfolio in terms of both energy technology and geography, and the company plans to invest US\$1.4 billion per year between 2016 and 2020. EDP is also investing US\$32,000 in its State of Ceara site to increase water efficiency and work with local government to minimize the impact of regulatory restrictions.</p>
	<p>W7.1a & c</p> <p>Fines and penalties</p>	<p>Exelon faced an enforcement order of US\$2.1 million at its PHI (Pepco) Benning Service Center in Washington D.C. due to alleged violations of metal limits of the National Pollutant Discharge Elimination System for stormwater discharges. Pepco has acted to resolve the issue by paying a civil penalty of US\$1.6 million, and investing in new infrastructure across the property. The investments include metal absorbing filters at more than 90 storm drain inlets, a covered warehouse for the storage of off-line transformers and other electric equipment, and a new storm water treatment system using filtration technology to be fully operational by the end of 2017. Pepco will also design and construct a new storm water retention structure at the facility to eliminate the storm water discharges from one of the two permitted discharge points into the Anacostia River.</p>
Capital investment	<p>W6.4a</p> <p>Changes to water-related CAPEX or OPEX</p>	<p>ACCIONA SA reported a 464% increase in water-related CAPEX in 2016 compared to 2015 due to investment in a new water treatment business. OPEX increased by 52% over the same period mainly due to a higher volume of business by the company in the field of water treatment and management.</p>
		<p>Endesa reports a 142% increase in water-related CAPEX for projects including the upgrade of discharge treatment systems and construction of fish ladders. OPEX increased slightly due to analysis of waste and liquid discharges, maintenance of hydraulic and waste water treatment systems and groundwater monitoring.</p>
		<p>NRG Energy Inc report that its water CAPEX increased by 344% due to the completion of several large stormwater and wastewater projects in 2016 to address environmental regulations.</p>
Volume of units sold	<p>W1.4a</p> <p>Detrimental impacts relating to water over the reporting year</p>	<p>CMS Energy Corporation report that new federal regulations affecting cooling water intake systems and effluent limits in process waters may require infrastructure investments of US\$104 million at its JH Campbell and DE Karn facilities in the St. Lawrence, Lake Michigan and Lake Huron river basins. These new regulations are being challenged in the courts, and reconsidered by the EPA, creating regulatory uncertainty regarding what might ultimately be required and when to comply with these regulations.</p>



Water is absolutely essential for cooling at our solar thermal energy facilities in the Tajo river basin in Spain. Failure to provide the minimum water flow required for the cooling system would force the plant to shut down.

ACCIONA S.A.



Key indicators by sector

Key Indicators	Consumer Discretionary	Consumer Staples	Energy	Health Care	Industrials	Information Technology	Materials	Utilities	Total
Total respondents	116	121	37	58	111	96	155	48	742
Public respondents	83	95	28	54	81	77	120	42	580
Non-public respondents	33	26	9	4	30	19	35	6	162
Total requested	306	250	138	122	261	129	285	129	1620
Response rate	38%	48%	27%	48%	43%	74%	54%	37%	46%
Water accounting									
Respondents that report water withdrawals	82%	90%	73%	90%	73%	90%	89%	85%	85%
Respondents that report water discharge	78%	82%	70%	83%	67%	85%	86%	85%	80%
Respondents that verify (>50%) total volume of water withdrawal data by source for at risk facilities	20%	31%	24%	24%	11%	23%	32%	40%	25%
Respondents that verify (>50%) water discharge quality data by destination for at risk facilities	13%	20%	22%	19%	5%	18%	23%	40%	18%
Respondents that regularly measure and monitor more than 50% of all water aspects*	53%	70%	57%	69%	46%	65%	73%	67%	63%
Current state									
Respondents that have experienced detrimental water-related business impacts in the reporting year	20%	39%	16%	9%	15%	5%	31%	40%	23%
Respondents that require key suppliers to report water use, risks and management	48%	50%	8%	47%	29%	57%	33%	40%	41%
Water risk assessment									
Respondents that have evaluated how water risks could impact business growth over the next year or more	80%	86%	71%	76%	81%	82%	82%	93%	82%

Key indicators by sector (continued)

Key Indicators	Consumer Discretionary	Consumer Staples	Energy	Health Care	Industrials	Information Technology	Materials	Utilities	Total
Respondents that undertake a comprehensive company wide risk assessment that covers both direct operations and supply chain	29%	45%	19%	33%	29%	35%	37%	40%	35%
Respondents that undertake water risk assessments at the river basin scale	31%	42%	43%	36%	21%	24%	37%	48%	34%
Respondents that factor estimates of future potential regulatory changes at a local level into their water risk assessments	57%	64%	70%	64%	55%	61%	76%	83%	65%
Respondents that factor local communities into their water risk assessments	71%	69%	76%	72%	59%	68%	84%	85%	72%
Water risks & opportunities									
Respondents exposed to risks in either direct operations or supply chain	16%	19%	38%	12%	14%	17%	29%	38%	21%
Respondents exposed to risks in direct operations	9%	13%	38%	12%	11%	13%	27%	38%	18%
Respondents exposed to risks in supply chain	7%	6%	0%	0%	3%	4%	2%	0%	3%
Respondents exposed to risks in both direct operations and supply chain	35%	57%	24%	38%	34%	39%	37%	33%	39%
Respondents that identify opportunities	67%	75%	73%	57%	68%	68%	77%	83%	71%
Governance & strategy									
Respondents with board level oversight of water policy, strategy or plan	68%	73%	62%	66%	68%	64%	78%	73%	70%
Respondents with a publicly available, company-wide water policy that includes direct operations, supplier best practice and acknowledges WASH	28%	31%	14%	16%	24%	27%	19%	23%	24%

Key indicators by sector (continued)

Key Indicators	Consumer Discretionary	Consumer Staples	Energy	Health Care	Industrials	Information Technology	Materials	Utilities	Total
Respondents that align public policy position with water stewardship	9%	11%	11%	9%	7%	5%	21%	19%	12%
Respondents with water integrated into their business strategy	79%	83%	76%	76%	74%	80%	91%	85%	82%
Respondents whose water CAPEX and OPEX increased year on year in the last reporting period	15%	14%	8%	5%	10%	17%	12%	15%	13%
Compliance									
Respondents subject to penalties, fines and/or enforcement orders	13%	26%	30%	10%	17%	10%	22%	29%	19%
Total reported fines	\$10,579,981	\$972,644	\$4,205,598	\$10,219	\$1,203,735	\$62,045,171	\$5,621,957	\$1,478,570	\$86,117,876
Targets & goals									
Respondents with targets and goals in place	66%	64%	46%	59%	44%	50%	57%	58%	56%
Respondents reporting targets with quantitative actions to manage water resources	11%	11%	3%	14%	19%	18%	11%	4%	12%
Respondents reporting qualitative goals leading towards improved water stewardship	8%	8%	19%	9%	10%	15%	18%	8%	12%
Linkages & trade-offs									
Respondents that have identified any linkages or trade-offs between water and other environmental impacts	55%	68%	54%	60%	48%	56%	69%	79%	61%

Key indicators by geography

Key Indicators	Australia	Canada	France	Germany	Japan	South Africa	Taiwan	Turkey	United Kingdom	USA
Total respondents	18	22	21	26	183	42	20	23	46	190
Public respondents	16	18	16	15	123	35	12	17	43	152
Non-public respondents	2	4	5	9	56	4	8	6	3	34
Total requested	61	56	41	42	355	63	34	61	76	379
Response rate	30%	39%	51%	62%	52%	67%	59%	38%	61%	50%
Water accounting										
Respondents that report water withdrawals	89%	95%	81%	85%	80%	83%	85%	70%	83%	84%
Respondents that report water discharge	94%	95%	86%	88%	84%	93%	100%	87%	89%	92%
Respondents that verify (>50%) total volume of water withdrawal data by source for at risk facilities	11%	18%	52%	19%	18%	48%	60%	30%	39%	20%
Respondents that verify (>50%) water discharge quality data by destination for at risk facilities	11%	5%	43%	19%	12%	19%	60%	17%	24%	9%
Respondents that regularly measure and monitor more than 50% of all water aspects*	61%	82%	48%	73%	66%	62%	75%	78%	54%	53%
Current state										
Respondents that have experienced detrimental water-related business impacts in the reporting year	28%	41%	38%	12%	7%	64%	15%	13%	30%	24%
Respondents that require key suppliers to report water use, risks and management	39%	5%	52%	42%	34%	26%	60%	22%	43%	47%

Key indicators by geography (continued)

Key Indicators	Australia	Canada	France	Germany	Japan	South Africa	Taiwan	Turkey	United Kingdom	USA
Water risk assessment										
Respondents that have evaluated how water risks could impact business growth over the next year or more	67%	68%	71%	54%	59%	71%	80%	74%	72%	70%
Respondents that undertake a comprehensive company wide risk assessment that covers both direct operations and supply chain	33%	18%	57%	46%	31%	43%	55%	9%	43%	31%
Respondents that undertake water risk assessments at the river basin scale	33%	27%	71%	31%	29%	20%	39%	47%	43%	32%
Respondents that factor estimates of future potential regulatory changes at a local level into their water risk assessments	83%	73%	71%	69%	56%	52%	65%	70%	67%	67%
Respondents that factor local communities into their water risk assessments	89%	86%	86%	69%	68%	62%	60%	70%	70%	75%
Water risks & opportunities										
Respondents exposed to risks in either direct operations or supply chain	17%	45%	24%	23%	17%	33%	15%	22%	28%	16%
Respondents exposed to risks in direct operations	11%	45%	19%	12%	14%	33%	10%	22%	24%	12%
Respondents exposed to risks in supply chain	6%	0%	5%	12%	3%	0%	5%	0%	4%	4%
Respondents exposed to risks in both direct operations and supply chain	39%	27%	38%	12%	38%	48%	55%	35%	41%	37%
Respondents that identify opportunities	67%	68%	76%	54%	65%	79%	65%	70%	74%	72%
Governance & strategy										
Respondents with board level oversight of water policy, strategy or plan	72%	73%	81%	85%	82%	86%	75%	74%	89%	51%

Key indicators by geography (continued)

Key Indicators	Australia	Canada	France	Germany	Japan	South Africa	Taiwan	Turkey	United Kingdom	USA
Respondents with a publicly available, company-wide water policy that includes direct operations, supplier best practice and acknowledges WASH	28%	18%	48%	31%	23%	35%	11%	35%	39%	23%
Respondents that align public policy position with water stewardship	22%	14%	14%	15%	3%	14%	45%	9%	13%	13%
Respondents with water integrated into their business strategy	83%	86%	86%	81%	73%	83%	90%	87%	85%	86%
Respondents whose water CAPEX and OPEX increased year on year in the last reporting period	0%	5%	14%	8%	12%	25%	22%	26%	11%	10%
Compliance										
Respondents subject to penalties, fines and/or enforcement orders	28%	36%	38%	15%	4%	17%	15%	0%	20%	31%
Total reported fines	\$1,108,653	\$2,827,902	\$10,337,321	\$345,140	\$34,653	\$130,494	\$64,000,000	n/a	\$717,952	\$8,408,907
Targets & goals										
Respondents with targets and goals in place	39%	32%	71%	54%	46%	60%	65%	78%	65%	62%
Respondents reporting targets with quantitative actions to manage water resources	56%	41%	76%	58%	62%	69%	90%	83%	78%	72%
Respondents reporting qualitative goals leading towards improved water stewardship	50%	68%	81%	69%	60%	69%	70%	65%	80%	68%
Linkages & trade-offs										
Respondents that have identified any linkages or trade-offs between water and other environmental impacts	72%	59%	67%	54%	48%	67%	60%	74%	74%	61%

Investor signatories and members

639 financial institutions with assets of US\$69 trillion were signatories to CDP's 2017 water questionnaire, dated February 8th 2017.

Key: **2016 Water members in blue and bold**

CDP investor signatories have access to the world's largest database of quantitative and qualitative metrics on climate change, water, and forest risk commodities, along with award-winning sector research reports. Additionally, CDP investor members gain access to bespoke analysis of CDP data, a modelled emissions database, prioritized access to one-to-one meetings with report authors, speaking engagement invitations and CDP events.

3Sisters Sustainable Management LLC

AB

Aberdeen Asset Management

ABRAPP - Associação Brasileira das Entidades Fechadas de Previdência Complementar

Achmea BV

ACTIAM

Active Earth Investment Management

Addenda Capital Inc.

AEGON-INDUSTRIAL Fund Management Co., Ltd

AGF Investment Inc.

AK PORTFÖY YÖNETİMİ A.Ş.

Alberta Investment Management Corporation (AIMCo)

Alberta Teachers Retirement Fund

Alecta

Align Impact LLC

Alliance Trust

Allianz Global Investors

Allianz Group

Alquity Investment Management Ltd

Altira Group

AMF

AmpegaGerling Investment GmbH

Amundi AM

ANBIMA – Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais

Antera Gestão de Recursos S.A.

APG Group

Appleseed Fund

Apsara Capital LLP

Arabesque Asset Management

Arisaig Partners

Arjuna Capital

ASM Administradora de Recursos S.A.

ASN Bank

Assicurazioni Generali Spa

ATI Asset Management

Atlantic Asset Management Pty Ltd

ATP Group

Ausbil Investment Management

Australian Ethical Investment

AustralianSuper

Avaron Asset Management AS

avesco Financial Services AG

Aviva Investors

Aviva plc

BAE Systems Pension Scheme

Baillie Gifford & Co.

BaltCap

Banco Bradesco S/A

Banco BTG Pactual SA

Banco Comercial Português SA

Banco da Amazônia S.A.

Banco do Brasil Previdência

Banco do Brasil S/A

Banco Popular Espanol S.A.

Banco Sabadell

Banco Santander

Banesprev – Fundo Banespa de Seguridade Social

Bank J. Safra Sarasin AG

Bank of America

Bankhaus Schelhammer & Schattera AG

Bankinter

Banque Libano-Française

Barclays

Barncancerfonden

Basellandschaftliche Kantonalbank

BASF Sociedade de Previdência Complementar

Baumann and Partners S.A.

Bayern LB

BayernInvest Kapitalverwaltungsgesellschaft mbH

BBC Pension Trust Ltd

BBVA

Becker College

Bedfordshire Pension Fund

Beetle Capital

Bentall Kennedy

BioFinance Administração de Recursos de Terceiros Ltda

Blom Investment Bank

Bluebay Asset Management LLP

Blumenthal Foundation

BM&FBOVESPA

BMO Global Asset Management

BNP Paribas Investment Partners

Boston Common Asset Management, LLC

BP Investment Management Limited

Brasilprev Seguros e Previdência S/A.

Breckinridge Capital Advisors

British Airways Pensions

British Columbia Investment Management Corporation

Brown Advisory

BSW Wealth Partners

BT Financial Group

BT Investment Management

CAAT Pension Plan

CAI Corporate Assets International AG

Caisse de dépôt et placement du Québec

Caisse des Dépôts

Caixa Econômica Federal

Caixa Geral de Depósitos

Caja Ingenieros Gestión, SGILC

California Public Employees' Retirement System (CalPERS)

California State Teachers' Retirement System (CalSTRS)

California State University, Northridge Foundation

Calvert Investment Management, Inc

Canada Pension Plan Investment Board (CPPIB)

Canadian Labour Congress Staff Pension Fund

Candriam Investors Group

CAPESESP

Capital Innovations, LLC

Capricorn Investment Group

CareSuper

Carnegie Fonder

Caser Pensiones E.G.F.P

Cathay Financial Holding

Catherine Donnelly Foundation

Catholic Super

CBRE Group, Inc.

Cbus Superannuation Fund

CCLA Investment Management Ltd

Investor signatories and members (continued)

Celeste Funds Management
Central Finance Board of the Methodist Church
CERES-Fundação de Seguridade Social
Change Investment Management
Christian Brothers Investment Services Inc.
Christian Super
Christopher Reynolds Foundation
Church Commissioners for England
Church Investment Group
Church of England Pensions Board
Cleantech Invest AG
ClearBridge Investments
CM-CIC Asset Management
Columbia Threadneedle Investments
Comgest
Comite syndical national de retraite Bâtirente
CommInsure
Commonwealth Bank of Australia
Commonwealth Superannuation Corporation
Compton Foundation, Inc.
Confluence Capital Management LLC
Connecticut Retirement Plans and Trust Funds
Conser Invest
CPR AM
Crayna Capital, LLC
Credit Agricole
CTBC Financial Holding Co., Ltd
Cultura Bank
CUT POWER AG
Daegu Bank
Daesung Capital Management
Daiwa Securities Group Inc.
Dana Investment Advisors
de Pury Pictet Turretini & Cie S.A.
Degroof Petercam
DekaBank Deutsche Girozentrale
Delta Lloyd Asset Management
Demeter Partners
Deutsche Bank AG
Development Bank of Japan Inc.
DLM INVISTA ASSET MANAGEMENT S/A
DNB ASA
DNR Capital
Domini Impact Investments LLC
Dongbu Insurance
DoubleDividend Management BV
Doughty Hanson & Co.

Earth Capital Partners LLP
East Capital AB
Ecofi Investissements - Groupe Credit Cooperatif
Ecofin Limited
EdenTree Investment Management
Edmond de Rothschild Asset Management
Edward W. Hazen Foundation
EEA Group Ltd
EGAMO
Ekobanken - Din Medlemsbank
Elan Capital Partners
Element Investment Managers
ELETRA - Fundação Celg de Seguros e Previdência
Elo Mutual Pension Insurance Company
Environment Agency Pension fund
Environmental Investment Services Asia
Epworth Investment Management
Equilibrium Capital Group
equinet Bank AG
Erste Asset Management
Erste Group Bank AG
Essex Investment Management Company, LLC
ESSSuper
Ethos Foundation
Etica SGR
Eureka - Real Assets
Eurizon Capital SGR S.p.A.
Evangelical Lutheran Church in Canada Pension Plan for Clergy and Lay Workers
Evangelical Lutheran Foundation of Eastern Canada
Evangelisch-Luth. Kirche in Bayern
Evli Bank Plc
FACEB – Fundação de Previdência dos Empregados da CEB
FAELCE – Fundacao Coelce de Seguridade Social
FAPERS- Fundação Assistencial e Previdenciária da Extensão Rural do Rio Grande do Sul
Federal Finance
FIDURA Private Equity Fonds
FIM Asset Management Ltd
FIM Services
Finance S.A.
Financiere de l'Echiquier
FIPeCq - Fundação de Previdência Complementar dos Empregados e Servidores da FINEP, do IPEA, do CNPq
First Affirmative Financial Network
First State Superannuation Scheme
First Swedish National Pension Fund (AP1)

Florida State Board of Administration (SBA)
Folketrygdfondet
Folksam Ömsesidig Sakförsäkring
Fondation de Luxembourg
Fondo Pegaso
Fonds de Réserve pour les Retraites – FRR
Formuesforvaltning AS
Foundation North
FRANKFURT-TRUST Investment Gesellschaft mbH
Friends Fiduciary Corporation
Fukoku Capital Management Inc
FUNCEF - Fundação dos Economistas Federais
Fundação AMPLA de Seguridade Social - Brasiletros
Fundação Atlântico de Seguridade Social
Fundação Banrisul de Seguridade Social
Fundação Chef de Assistência e Seguridade Social – Fachesf
Fundação Corsan - dos Funcionários da Companhia Riograndense de Saneamento
Fundação de Assistência e Previdência Social do BNDES - FAPES
FUNDAÇÃO ELETROBRÁS DE SEGURIDADE SOCIAL - ELETROS
Fundação GEAP Previdência
Fundação Itaipu BR - de Previdência e Assistência Social
FUNDAÇÃO ITAUBANCO
Fundação Itaúsa Industrial
Fundação Rede Ferroviária de Seguridade Social – Refer
FUNDAÇÃO SANEPAR DE PREVIDENCIA E ASSISTENCIA SOCIAL FUSAN
Fundação Sistel de Seguridade Social (Sistel)
Fundação Vale do Rio Doce de Seguridade Social - VALIA
FUNDIÁGUA - FUNDAÇÃO DE PREVIDENCIA COMPLEMENTAR DA CAESB
Futuregrowth Asset Management
GameChange Capital LLC
Gemway Assets
Generation Investment Management
Genus Capital Management
German Equity Trust AG
Global Forestry Capital S.a.r.l.
Globalance Bank
GLS Gemeinschaftsbank eG
GMO LLC
GOOD GROWTH INSTITUT für globale Vermögensentwicklung mbH
Good Super

Investor signatories and members (continued)

Government Employees Pension Fund ("GEPP"), Republic of South Africa
GPT Group
Great Lakes Advisors
Greater Manchester Pension Fund
Green Alpha Advisors
Green Cay Asset Management
Green Century Capital Management
Green Science Partners
GROUPAMA EMEKLİLİK A.Ş.
GROUPAMA SİGORTA A.Ş.
GROUPE OFI AM
Grupo Financiero Banorte SAB de CV
Grupo Santander Brasil
Hannon Armstrong Sustainable Infrastructure Capital, Inc
Harbour Asset Management
Harrington Investments, Inc
Hauck & Aufhäuser Asset Management GmbH
Hazel Capital LLP
Healthcare of Ontario Pension Plan (HOOPP)
Helaba Invest Kapitalanlagegesellschaft mbH

Hermes Fund Managers

HESTA
HIP Investor INC.
Holden & Partners
HSBC Fundo de Pensão Multipatrocinado

HSBC Holdings plc

Humanis
Hyundai Marine & Fire Insurance Co., Ltd.
Hyundai Securities Co., Ltd.
IBK Securities
IDBI Bank Ltd
Iguana Investimentos
Illinois State Board of Investment
Ilmarinen Mutual Pension Insurance Company
Impax Asset Management Group plc
Industrial Bank of Korea
Industrial Development Corporation
Inflection Point Capital Management
ING Group
Insight Investment Management (Global) Ltd

Instituto Infraero de Seguridade Social - INFRAPREV

Instituto Sebrae De Seguridade Social - SEBRAEPREV
Integre Wealth Management of Raymond James
IntReal KAG
Investec plc

Investing for Good
Irish Life Investment Managers
Itaú Asset Management
Itaú Unibanco Holding S.A.
Jantz Management LLC
Janus Henderson Investors
Jessie Smith Noyes Foundation
JMEPS Trustees Limited
JOHNSON & JOHNSON SOCIEDADE PREVIDENCIARIA
Johnson Private Wealth Management
JPMorgan Chase & Co.
Jubitz Family Foundation
Jupiter Asset Management
Kagiso Asset Management
Kaiser Ritter Partner Privatbank AG (Schweiz)

KB Kookmin Bank
KCPS and Company
KDB Asset Management Co., Ltd.
Kepler Cheuvreux
KEVA
KeyCorp
KfW Bankengruppe
Killik & Co LLP
Kiwi Property Group

KLP

Korea Technology Finance Corporation
KPA Pension
La Banque Postale Asset Management
La Financiere Responsable
La Francaise AM
Laird Norton Family Foundation
LBBW Asset Management Investmentgesellschaft mbH
LD Lønmodtagernes Dyrtdisfond

Legal and General Investment Management

Legg Mason, Inc.

LGT Capital Management Ltd.
LGT Capital Partners
Light Green Advisors, LLC
Limestone Investment Management
Liontrust Asset Management PLC
Living Planet Fund Management Company S.A.
Lloyds Banking Group
Local Authority Pension Fund Forum
Local Government Super
LocalTapiola (LähiTapiola)
LOGOS PORTFÖY YÖNETİMİ A.Ş.

London Pensions Fund Authority

Lothian Pension Fund
LUCRF Super
Ludgate Investments Limited
Maine Public Employees Retirement System
MainFirst Bank AG
MAMA Sustainable Incubation AG
MAPFRE
Maple-Brown Abbott
Marc J. Lane Investment Management, Inc.
Martin Currie
Maryknoll Sisters
Maryland State Treasurer
Mediobanca
Meeschaert Gestion Privée
Mellon Capital Management
Mendesprev Sociedade Previdenciária
Mercer
Merck Family Fund
Mercy Investment Services, Inc.
Mergence Africa Investments (Pty) Limited
Merseyside Pension Fund
MetallRente GmbH
Metrus – Instituto de Seguridade Social
Metzler Asset Management GmbH
MFS Investment Management
Midas International Asset Management
Miller/Howard Investments
Mirae Asset Global Investments Co. Ltd.
Mirae Asset Securities
Missionary Oblates of Mary Immaculate
Mistra, The Swedish Foundation for Strategic Environmental Research
Mitsubishi UFJ Financial Group, Inc.
Mitsui Sumitomo Insurance Co., Ltd
Mizuho Financial Group, Inc.
MN
Mongeral Aegon Seguros e Previdência S.A.
Montanaro Asset Management Limited
Morgan Stanley
MTAA Superannuation Fund
Nathan Cummings Foundation, The
National Australia Bank
National Bank of Canada
National Grid Electricity Group of the Electricity Supply Pension Scheme
National Grid UK Pension Scheme

Investor signatories and members (continued)

National Treasury Management Agency
 National Union of Public and General Employees (NUPGE)
 Natixis SA
 Natural Investments LLC
 Nedbank Limited
 Needmor Fund
 NEI Investments
 NEST - National Employment Savings Trust

Neuberger Berman

New Alternatives Fund Inc.
 New Amsterdam Partners LLC
 New Forests
 New Mexico State Treasurer
 New Resource Bank
 New York City Comptroller on behalf of the NYC pension funds

New York State Common Retirement Fund (NYSCRF)

Newground Social Investment
 Newton Investment Management Limited
 NGS Super
 NH-CA Asset Management
 Nikko Asset Management Co., Ltd.
 NN Group NV
 Nomura Holdings, Inc.
 NORD/LB Kapitalanlagegesellschaft AG

Nordea Investment Management

Norfolk Pension Fund

Norges Bank Investment Management (NBIM)

North Carolina State Treasurer
 Northern Ireland Local Government Officers' Superannuation Committee (NILGOSC)
 NorthStar Asset Management, Inc.
 Northward Capital
 Notenstein Privatbank AG
 Oceana Investimentos ACVM Ltda
 OceanRock Investments Inc.
 Oddo & Cie
 Office of the Vermont State Treasurer
ÖKOWORLD LUX S.A.
 OMERS Administration Corporation
 Ontario Teachers' Pension Plan
 OP Wealth Management
 Opplysningsvesenets fond (The Norwegian Church Endowment)
 OPSEU Pension Trust (OP Trust)
 Oregon State Treasurer

Osmosis Investment Management

Overlook Investments Limited

P+(DIP/JOEP)
 PAI Partners
 Park Foundation
 Parnassus Investments
 Pax World Funds
 PCJ Investment Counsel Ltd.
 Pensioenfonds Vervoer
 Pension Protection Fund
 Pensionsmyndigheten
 People's Choice Credit Union
 Perpetual Investments
 PETROS - Fundação Petrobras de Seguridade Social

PFA Pension

PGGM
 PGIM
 Phillips, Hager & North Investment Management Ltd.
 PHITRUST
 Pictet Asset Management SA
 Pioneer Investments
 Piper Hill Partners, LLC
 PKA
 Pluris Sustainable Investments SA
 PNC Financial Services Group, Inc.
 Porto Seguro S.A.
 POSTALIS - Instituto de Seguridade Social dos Correios e Telégrafos
 Presbyterian Church (USA)
 PREVHAB PREVIDÊNCIA COMPLEMENTAR

PREVI Caixa de Previdência dos Funcionários do Banco do Brasil

PREVIG Sociedade de Previdência Complementar
 Previnorte - Fundação de Previdência Complementar
 Priests of the Sacred Heart, US Province
 Progressive Asset Management, Inc.
 Province of St. Joseph of the Capuchin Order
 Provinzial Rheinland Holding
 Psagot Investment House Ltd
 PSP Investments
 Q Capital Partners Co. Ltd
 QBE Insurance Group
 QIC
 Quilter Cheviot Asset Management
 Quotient Investors LLC
 Rabobank Group
 Raiffeisen Fund Management Hungary Ltd.

Raiffeisen Kapitalanlage-Gesellschaft m.b.H.

Railpen Investments

Rathbone Greenbank Investments

RBC Global Asset Management

Real Grandeza Fundação de Previdência e Assistência Social

REI Super
 Reynders McVeigh Capital Management
 Rhode Island General Treasurer
 River Twice Capital Advisors, LLC

Robeco

RobecoSAM AG

Robert & Patricia Switzer Foundation

Rockefeller Asset Management

Rose Foundation for Communities and the Environment
 Royal Bank of Scotland Group
 Royal London Asset Management
 RREEF Investment GmbH
 Ruffer LLP
 Russell Investments

Sampension KP Livsforsikring A/S

Samsung Fire & Marine Insurance
 Sanlam
 Sanso Investment Solution
 Santa Fé Portfolios Ltda
 Santam Ltd
 Sarasin & Partners
 SAS Trustee Corporation

Schroders

SEB Asset Management AG
 Sentinel Investments
 Service Employees International Union Benefit Funds
 Seventh Swedish National Pension Fund (AP7)
 Shinhan Bank
 Shinhan BNP Paribas Investment Trust Management Co., Ltd
 Shinkin Asset Management Co., Ltd
 Siemens Kapitalanlagegesellschaft mbH
 Signet Capital Management Ltd
 Sisters of St Francis of Philadelphia
 Sisters of St. Dominic of Caldwell NJ

Skandinaviska Enskilda Banken AB (SEB AB)

Smith Pierce, LLC
 SNW Asset Management
 Social Impact Investing, Wells Fargo Private Bank
 Social(k)
 Sociedade de Previdência Complementar da Dataprev - Previdata

Investor signatories and members (continued)

Società reale mutua di assicurazioni
Societe Generale
Socrates Fund Management
Solaris Investment Management

Sompo Holdings, Inc

Sonen Capital LLC
Sopher Investment Management
South Yorkshire Pensions Authority
SouthPeak Investment Management
Spring Water Asset Management, LLC
Sprucegrove Investment Management Ltd
Standard Chartered
Standard Life Investments
Standish Mellon Asset Management

State Street Corporation

StatewideSuper

Stewart Investors

Stockland

Strathclyde Pension Fund

Stratus Group

Sul América Investimentos Distribuidora de Títulos e Valores Mobiliários S.A.

Superfund Asset Management GmbH

Sustainable Capital

Sustainable Development Capital LLP

Sustainable Insight Capital Management (SICM)

Svenska Handelsbanken

Svenska Kyrkan, Church of Sweden

Svenska Kyrkans Pensionskassa

Swedbank

Swift Foundation

Sycomore Asset Management

Syntrus Achmea Asset Management

T.GARANTİ BANKASI A.Ş.

T.SINAI KALKINMA BANKASI A.Ş.

Tasplan Super

TD Asset Management (TD Asset Management Inc. and TDAM USA Inc.)

TD Securities (USA) LLC

Telluride Association

Telstra Super

Terra Alpha Investments LLC

Terra Global Capital, LLC

TerraVerde Capital Management LLC

TfL Pension Fund

The Brainerd Foundation

The Bullitt Foundation

The Children's Investment Fund Foundation

The Church Pension Fund

The Clean Yield Group

The Council of Lutheran Churches

The Daly Foundation

The Joseph Rowntree Charitable Trust

The Korea Teachers Pension

The New School

The Pension Plan For Employees of the Public Service Alliance of Canada

The Pinch Group

The Russell Family Foundation

The Sandy River Charitable Foundation

The Sisters of St. Ann

The Sustainability Group

The United Church of Canada - General Council

The University of Edinburgh Endowment Fund

The Wellcome Trust

Third Swedish National Pension Fund (AP3)

Thomas Schumann Capital

Tobam

Tokio Marine & Nichido Fire Insurance Co., Ltd.

Toronto Atmospheric Fund

Trillium Asset Management, LLC

Triodos Bank

Tri-State Coalition for Responsible Investment

Trusteam Finance

Tundra Fonder

Turner Investments

UBS

UniCredit

Union Asset Management Holding AG

Union Investment Privatfonds GmbH

Unionen

UNISON Staff Pension Scheme

UniSuper

Unitarian Universalist Association

Unity College

Universities Superannuation Scheme (USS)

University of California

University of Massachusetts Foundation

University of Toronto

University of Toronto Asset Management Corporation (UTAM)

University of Washington

Vancity Group of Companies

Veris Wealth Partners

Veritas Pension Insurance

Vexiom Capital, L.P.

VicSuper Pty Ltd

Victorian Funds Management Corporation

VIETNAM HOLDING ASSET MANAGEMENT LTD.

Vinva Investment Management

Vision Super

Voigt & Collegen

Vontobel Holding AG

Voya Investment Management

Waikato Community Trust

Walden Asset Management, a division of Boston Trust & Investment Management Company

Walter Scott & Partners Limited

WARBURG - HENDERSON Kapitalanlagegesellschaft für Immobilien mbH

Washington State Investment Board

Water Asset Management, LLC

Wespath Investment Management

West Midlands Pension Fund

West Yorkshire Pension Fund

Westfield Capital Management Company, LP

Westpac Banking Corporation

WHEB Asset Management

White Owl Capital AG

Whitley Asset Management

Woori Bank

Xoom Capital

York University

Youville Provident Fund Inc.

Yuanta Financial Holdings

Zevin Asset Management

Zurich Cantonal Bank