THE BIG DROP

The untapped potential of water on decarbonisation

PA

Bringing Ingenuity to Life

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FOREWORD

The world is awash with corporate commitments to cut carbon. These are critical to move towards net zero but have acted as a distraction from action on our most precious resource of all – water.

Not only that: water is becoming scarcer. According to a United Nations report, the world will face a water deficit of up to 40 per cent by 2030.[1] It's a stark statistic. At PA, we want to expand the narrative from scarcity alone to the overlooked opportunity of the relationship between water and carbon.

This water-carbon nexus is underlined by some startling statistics. Take semiconductor microchips, which are used in computers, smartphones, cars and much more. In just three months, a semiconductor fabrication plant can consume 927 million gallons of fresh water, produce nearly 15,000 tons of waste (most of it hazardous) and use 561m kilowatt-hours of energy – equivalent to the annual electricity consumption of 153,000 UK or 52,000 US homes.[2] Now imagine the direct and indirect carbon consequences of each and every aspect of the water lifecycle across the value chain – whether it's moving, treating or heating water.

We believe there are clear and underexplored opportunities to better utilise water while simultaneously reducing the carbon impact: achieving the big drop. Our research explores how leaders can do this through four actions:

1. Understand your water and decarbonisation challenges and opportunities.
2. Determine greener ways to access water.
3. Innovate for water and energy efficiency.
4. Green your core business strategy and partner for everything else.

Acting with urgency now will create an ongoing, virtuous circle. Because consumers want brands with sustainability at their heart and will spend more on sustainable products. Organisations able to demonstrate they're doing the right thing can grow and command higher margins. In turn, these profits will fuel further sustainable innovation.

By addressing the impact of water on decarbonisation, leaders have an opportunity to better ensure supply chain continuity and their ability to do business, as well as their right to do business at all. This will ensure they deliver profit while protecting people and our planet.

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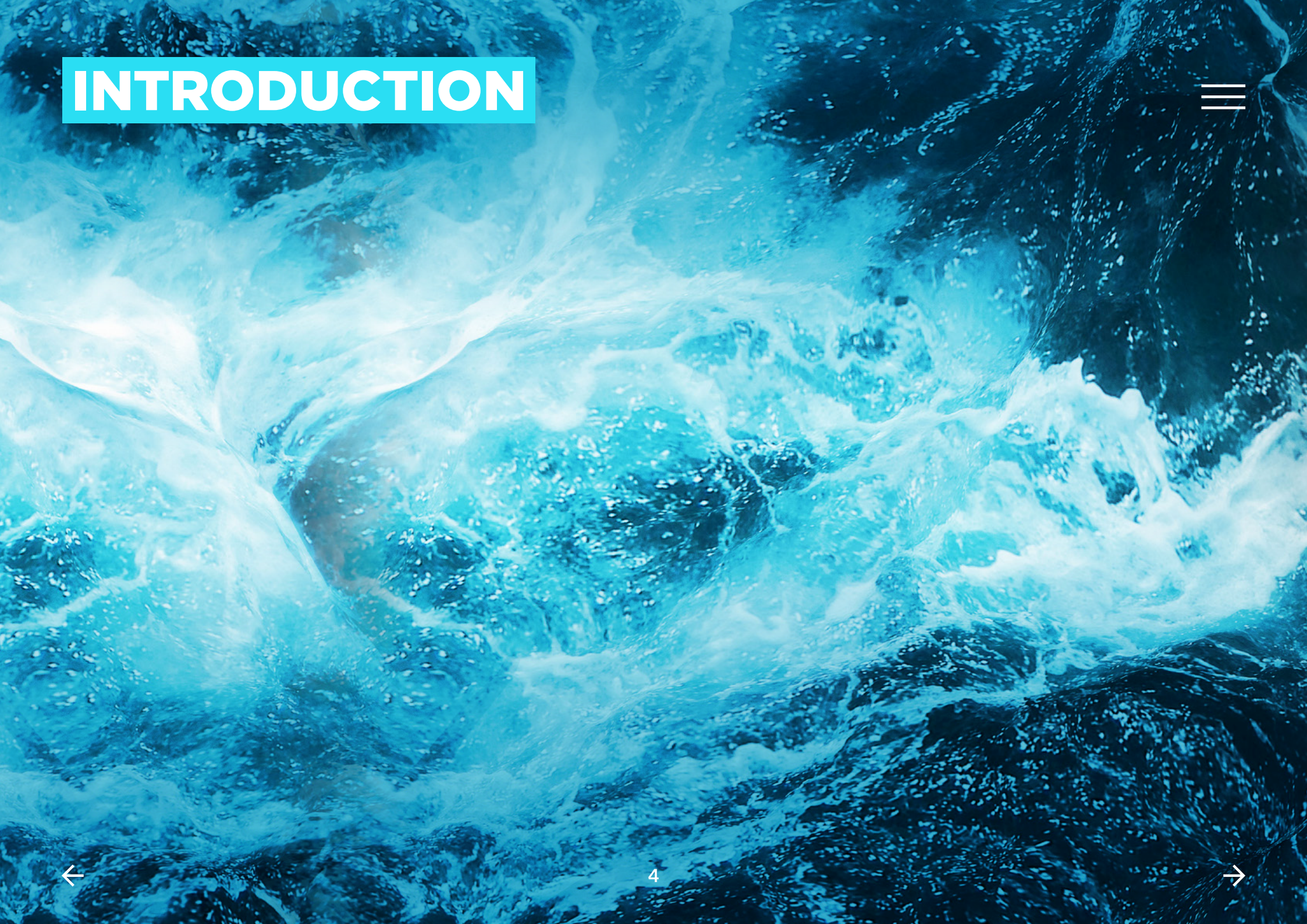
Energy and Utilities, PA

INTRODUCTION



IT'S TIME TO CAPTURE THE WATER-CARBON OPPORTUNITY

Many industries use fresh, clean water to develop and manage products and services throughout their lifecycle. From receiving and integrating raw materials to finishing and shipping products, water is the current that makes the global economy flow. Without an ample supply of fresh water, organisations will experience significant supply chain shocks.

We all know water is needed and inherently good. But the use of water can be complex and problematic. Whether sourcing and treating water, moving it from one place to another, in processing water or returning it to source, the entire lifecycle casts a significant carbon shadow. Because all water use requires energy – and it's this that creates the nexus between water and carbon emissions.

It takes 14 litres of water to make one cup of coffee – generating up to 60.27kg of carbon depending on how you take your brew.[3] If you're wearing jeans and a t-shirt, their production will typically consume between 20,000-40,000 litres of water and a lifetime carbon output of 48kg of CO_2.

As organisations expand, the water-carbon relationship becomes increasingly complex. While most businesses typically prioritise local water sourcing, demand soon outstrips supply. Environmental regulations and the demands of others often forces organisations to source water from further afield. This increases the economic and environmental cost of conveyance, and energy usage. So, the scarcer water becomes, the higher the energy (and so CO_2 emissions) required to access it. This is why the relationship is so enormously variable and tricky to address.

The water-carbon nexus becomes even more intricate and urgent when you factor in ambitious global net zero targets. As fossils fuels are phased out, green energy sources like hydrogen will significantly increase water use – creating difficult trade-offs. The push for hydrogen could create a 20% increase in demand for water by 2050.

A smarter way to think about the water-carbon nexus

At PA, we believe organisations can protect our most precious resource and reduce the related carbon footprint by thinking about water use in a cleaner, greener, smarter and more collaborative way. This will ensure organisations' own survival and that of our planet. It will also help deliver the United Nations (UN) Sustainability Development Goals (SDGs) and action the Paris Agreement.

This means thinking about accessing water in greener ways – such as through desalination or re-use – and reducing the amount of water needed. Our research suggests that organisations could save 86 billion cubic metres of water between now and 2030, equivalent to the yearly water consumption of Japan, and a reduction in greenhouse gas (GHG) emissions of 12 million tonnes – equivalent delivering up to a quarter of the cuts required to achieve the Paris Agreement targets.[4]

So how can businesses reduce the risk around water scarcity? How can they use less water? How can they create value from water? What's the best way to get coherent data of the overall carbon footprint of water? What are the technologies to access water without creating more carbon? And how can they dispose of wastewater more efficiently? Organisations will have to tackle these difficult questions in every part of what they do.

UN SDGs relating to water and the Paris Agreement

The Paris Agreement aims to limit the global temperature increase to at least two degrees Celsius, preferably 1.5 degrees Celsius, compared to pre-industrial levels, with businesses and citizens challenged to help meet these goals.

Our research

The easy wins on carbon reductions have most likely already been made. Addressing water efficiency and access to water more holistically across the ecosystem is complex, but also more rewarding in the long-term. The time to act is now, so we commissioned this research to:

- Understand where organisations are now and what they can achieve with more urgent and focused action
- Explore business awareness of the water-carbon nexus
- Investigate key policies, targets and supply chain measures in place and the barriers to doing more.

Our conviction is that the results of this study can inform the business cases that will address water use to meet stretching climate change targets, creating real change.

Our approach

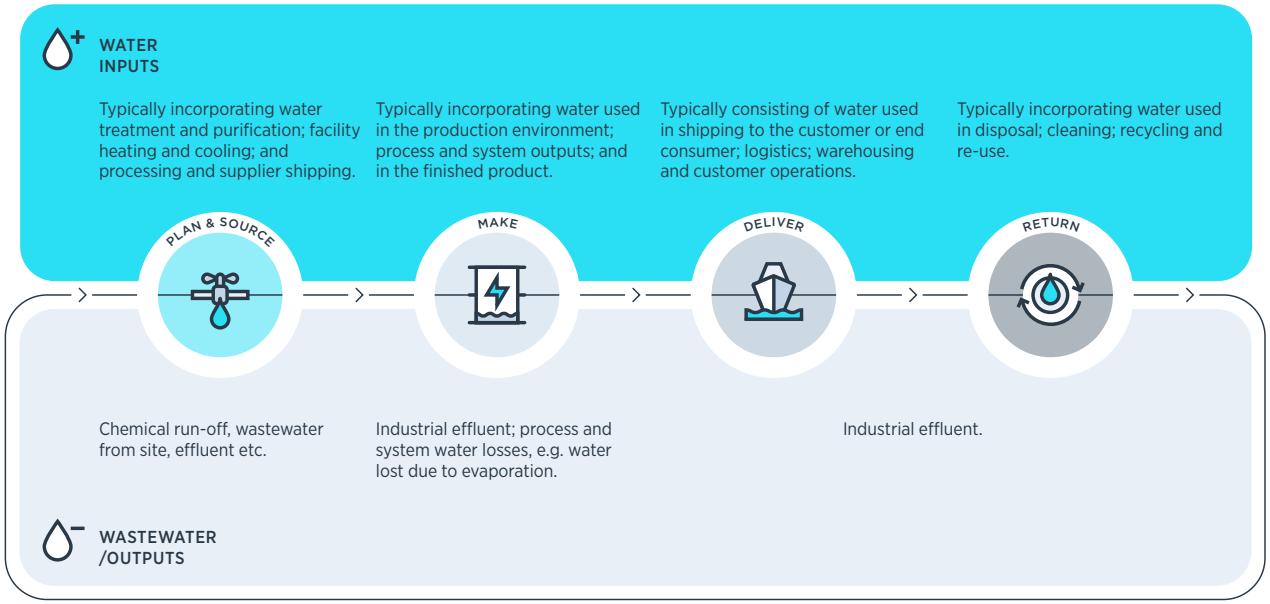
We conducted in-depth qualitative research with leaders from organisations across sectors where water demand is intensive: drinks, fast-moving consumer goods (FMCG), high-tech manufacturing, manufacturing, and pharmaceutical, operating across Africa, the US, South America, the UK, the Nordics and Australasia/Asia. We also surveyed water companies. Half of these organisations had annual revenues of at least £1 billion.

We focused on high-quality insight from leaders who understood their organisational water consumption and their wider supply chain. We looked across each organisation's value chain to examine water use across four common processes: plan & source; make; deliver; and return.

Of the 73 organisations surveyed, 52 were large multi-nationals. These respondents inform the bulk of our analysis. For additional analysis and comparison, we surveyed 21 organisations of smaller revenue sizes to ascertain whether the challenges were the same and to unearth new opportunities that are yet to fully scale.

For full details, see the Methodology section.

Overview of water inputs and outputs across a typical value chain



KEY FINDINGS

THE OPPORTUNITY IS IMMENSE. AND SO IS THE COST OF INERTIA

Every organisation we spoke to told us they thought it would be possible to improve water efficiencies by at least five per cent – with some estimating much more.

The potential impact is massive. As we explore later, it hints at an opportunity of organisations across our surveyed sectors collectively saving more than 86 billion cubic metres of water by 2030 – the yearly water consumption of Japan. This would result in reducing greenhouse gas emissions by 12 million tonnes.

These reductions could provide up to 25% of the cuts needed to meet the 1.5°C global temperature climate goal. We believe significant further work will be needed in the corporate sector to fully take water-related carbon mitigation issues into account.

Awareness is lacking – and action is yet to translate into impact

The vast majority of people we spoke to (81%) said that organisations should be transparent and held accountable for their carbon emissions from water use.

But all too often, knowledge is lacking. Just one fifth of respondents (22%) are extremely aware of the relationship between water and carbon. This needs to change.

While awareness can be improved, this pales in comparison when it comes to translating awareness into action, with organisations facing a raft of challenges:

- only 60% of respondents said their organisation monitors carbon emissions from water use
- two thirds (66%) said their organisation has policies aimed at reducing the carbon emissions associated with water use
- 68% are yet to understand their organisations' water usage importance by region/country
- 39% are yet to understand where water usage is highest across their supply chain.

Significant further work will be needed to take water-related carbon mitigation issues fully into account. With targeted action, organisations could work towards a more positive human future.

> **Organisations need to increase public awareness of the urgency of the water crisis**
>
> Survey respondent

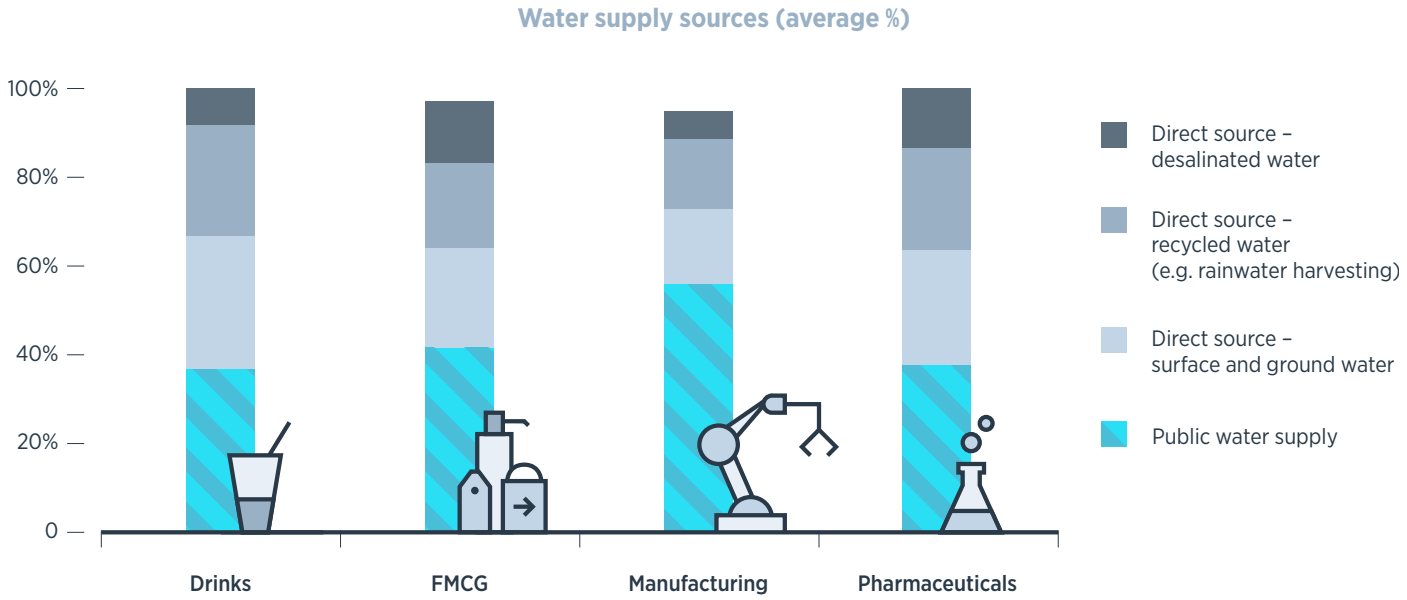
Many businesses don't know where to focus – and that's just one barrier

Over a third of businesses (38%) say it's too difficult to know where to target action to achieve the biggest reduction in water usage and the associated carbon footprint. Another 46% have to make trade-offs in their sustainability targets, where other sustainability activities are prioritised over improvements to the use of water.

Other barriers included the low uptake of new technologies, difficulties accessing the right data from across the supply chain, and a lack of incentives and/or support from government.

Technology innovation creates new ways to access water

Organisations are still leaning heavily on public water supplies, with the majority of respondents (46%) using this as their primary source. Later, we explore the options open to ambitious leaders, such as through green desalination.




WHERE BUSINESSES
ARE NOW

Many are monitoring and reporting water usage – but more can be done

Most large organisations confirmed they keep a close track of water usage, though one in 10 (9%) are yet to do so. One quarter of respondents (24%) told us they're not monitoring or aware of water usage across their supply chain. Yet measurement is a vital pillar of progress. Without the right understanding, leaders will be unable to identify their priority areas and where their most significant opportunities exist.

Most monitoring happens across direct operations (67% say this receives significant focus), followed by downstream (38%) and upstream (29%). Pharmaceutical companies were most likely to have a significant focus on upstream (supply chain) water efficiencies – and are also giving the most attention to direct operations. Drinks companies were giving most focus to downstream (consumer) water usage.

> **We are putting a lot of emphasis on making preventative investments that improve resilience to, and so to reduce the costs of, future disasters**
>
> Survey respondent

The water-carbon link isn't well understood

More than one quarter (28%) of leaders were either not at all aware or only slightly aware of the relationship between water and carbon. Just 60% of respondents (40%) said their organisation monitors carbon emissions from water use. And 66% said their organisation has policies aimed at reducing the carbon emissions associated with water use in their organisation. This leaves significant room for improvement.

There are plenty of drivers to do more

Water scarcity and environmental reporting regulations are the key motivation for our respondents setting or acting on water sustainability targets, with 29% ranking water scarcity as a factor – making it the leading motivator.

Perceived water scarcity by region

When asked to identify the regions they believed to be under most water-scarcity pressure, respondents identified challenges across multiple continents. It underlines the need for organisations to map and assess water needs by specific regions in collaboration with others. This is particularly true when organisations are competing for the same water sources. And even more important when these firms are exposed to the impact of climate disasters impacting supply chains locally and globally.

When it comes to policy, environmental reporting requirements are the biggest influence on water sustainability targets (63% said it was influencing targets). Managing risk, consumer preferences and business dependencies also featured prominently as drivers of change.

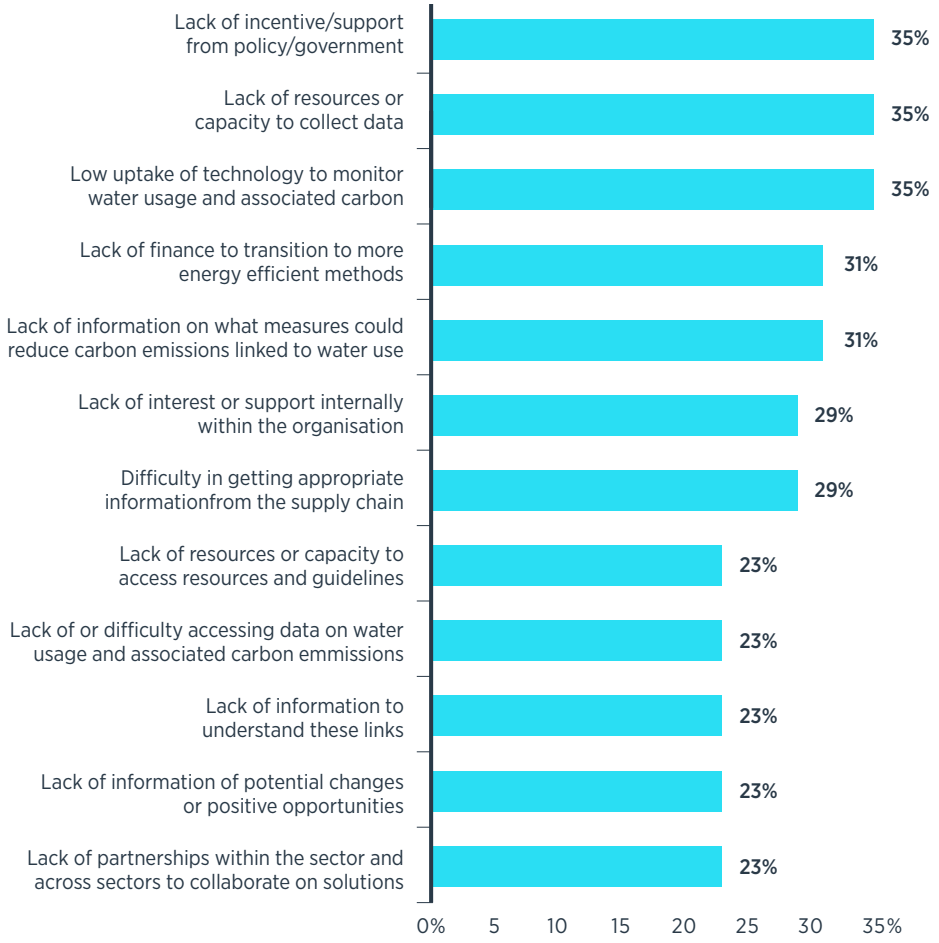
Technology and data are the biggest barriers

Over one third (35%) of leaders highlighted the low uptake of technology as a barrier to monitoring water usage and its link to carbon emissions, equal with a lack of resources. Data-related challenges included the inability to share data, disincentives for data sharing, poor quality data and the incompatibility of datasets.

Without adequate data, it will be hard to make real progress. But we often find that leaders are unsure of which data points to pursue and prioritise. As a minimum, there should be water scarcity data overlayed against infrastructure planning across the value chain. Leaders should also have a view of water quality paired with carbon and chemical usage.

Respondents reported that financing can be a barrier to scaling up physical technology innovation. With access to the right capabilities and expertise, such as co-ordinated and focused end-to-end engineering expertise, organisations would be better placed to both secure financing and to optimise its impact.

Barriers to reducing water usage and associated carbon emissions



Collaboration is key to solving water and carbon challenges

Advanced organisations understand that the key to the water-carbon nexus – and tackling water scarcity – is to collaborate. When asked to report on collaboration efforts, respondents spoke of an increasing desire to collaborate with others, including local providers, water filtration companies, technology start-ups and policymakers.

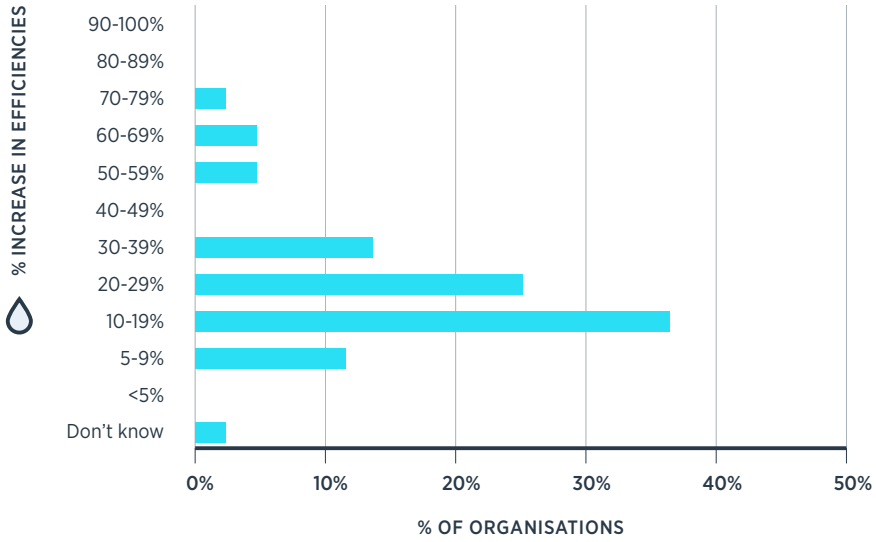
We believe there are more collaboration opportunities than most businesses realise, and they're more essential than ever. Ofwat, the Water Services Regulation Authority for England and Wales, has invested in a £200 million Innovation Fund to encourage water companies and their partners to pursue innovation that benefits customers, society and the environment. So far, the competition has attracted initiatives covering carbon reduction, wastewater treatment and flexible local water supply schemes.[5]

NEW OPPORTUNITIES

The potential for reducing water usage – and associated carbon – is huge.

Almost every business we spoke to told us there was potential to achieve water efficiencies by at least five per cent, with the majority (36 per cent) saying they could increase water efficiency by 10-19%.

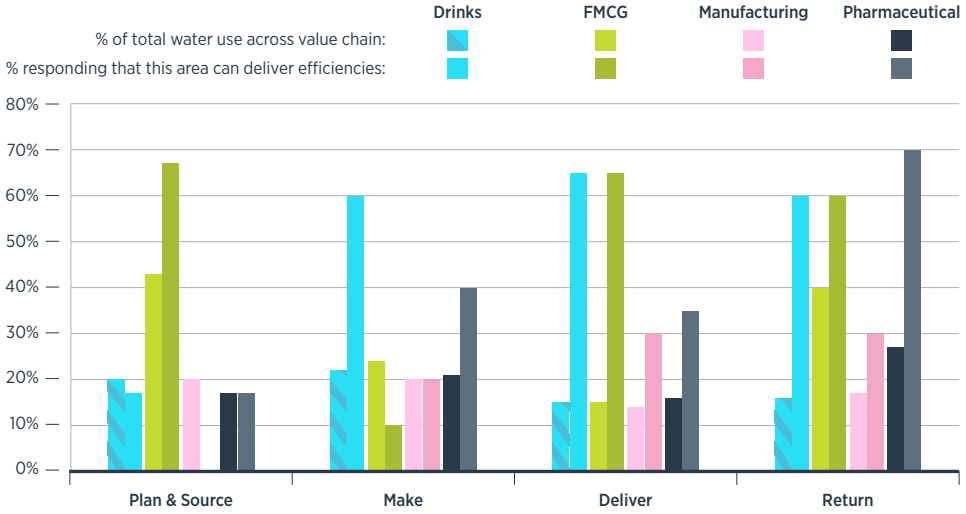
Estimated water efficiency savings



Where do leaders see most opportunity?

We asked respondents to report on water use across four parts of their value chain. Across all sectors, there was most potential in the 'make' part of the value chain – with around a third saying they foresaw water efficiencies there.

Water usage and estimated savings across value chain



Any % total water use remainder account for via 'I don't know' or 'other usage'.

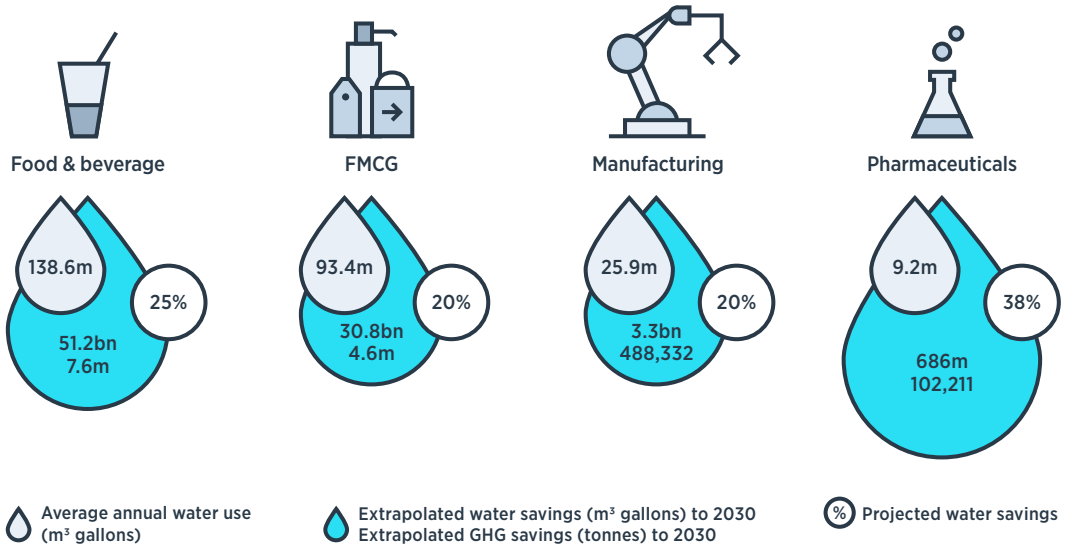
The 'make' process is where most water is used. Across these four processes, leaders also told us there were significant opportunities to reduce, reuse or recycle wastewater. Over half (57%) saw this potential in 'plan and source', 46% in 'make', followed by 'returns' (41%) and 'deliver' (28%).

Cumulative impact against climate response goals

To understand how the water efficiency targets indicated by our respondents translate to wider water-carbon reductions, we identified average water usage from published company reports (dating no further back than 2019) of the four largest global organisations in these sectors.

Using the UK Government's most recent GHG emission factors for water use as an indicative benchmark, we then worked out potential GHG emission savings across the sector based on the mean water savings anticipated across the sectors.[6]

Extrapolated water and GHG impact



*Food & beverage used as the closest proxy for respondents from the Drinks sector.

> **We are introducing new techniques to reuse the wastewater we are generating. We are trying to get back as much water as we can before dumping**
>
> Survey respondent

Across all sectors (excluding high-tech manufacturing, where sector figures weren't available to uprate the average score), the total water saving would result in reducing GHG emissions by more than 12.8 million tonnes.

Reducing water use in this way can help companies contribute to reaching global climate targets. For example, to reach the 1.5°C global temperature climate goal, businesses need to cut GHG emissions by 7.6% every year between now and 2030. Reducing water could provide up to a quarter of those cuts.

RECOMMENDATIONS

HOW TO MAKE PROGRESS FAST

Our analysis shows the enormous opportunity for organisations – but also the complex challenge of deciphering the relationship between water and carbon.

To progress further, faster, it's imperative that leaders treat water as a high priority area of opportunity: to access water in greener ways; to use less water; and to reduce the carbon footprint from water use.

This means thinking at all levels, from boardroom to extended supply chain, about the holistic impact of the water-carbon relationship, and taking four bold actions to achieve results:

1. Understand your water and decarbonisation challenges and opportunities.
2. Determine greener ways to access water.
3. Innovate for water and energy efficiency.
4. Green your core business strategy and partner for everything else.

1. Understand your water and decarbonisation challenges and opportunities

Map your ecosystem to understand where you are now

Assessing and unlocking value from the water-carbon nexus calls for an understanding of water and related energy usage at both a granular and holistic level. This begins with an appreciation of the link between water needs (volume and quantity) and the corresponding energy use, as well as the opportunities to change and improve these. Such change requires the ability to access and analyse data in new and different ways across products, processes, plants, geographies and industries, among other variables.

The right data strategy, capabilities and skills can help you understand which aspects of your water usage generate the largest carbon footprint, and where there is most potential for efficiencies and new approaches. This will inform what water means to your business and its strategy. Your data should identify not just direct water-carbon links but indirect impacts as well, such as the way a product is used. For instance, leaders can gain valuable insight from a view of water quality paired with carbon and chemical usage.

With water use rarely occurring in isolation, leaders can identify further opportunities for change by measuring usage across the value chain. Mapping the ecosystem also enables organisations to identify and connect with other innovators to achieve greater impact. This will inform what water means to your business and its strategy.

Get to grips with the trade-offs

If you want to access water in effective ways without unintended carbon consequences, you'll need to plan for and manage the impact. You need to understand the trade-offs of any water-related actions you take – from local ecology to your supply chain partners, through to other industries vying for the same water and the final outcome for the end user.

For example, it's estimated there will be a 50% increase in energy consumption by 2035 – and an associated 85% increase in water consumption by the energy industry – due to the increased reliance on desalination, large-scale water transfer via pumping, and increased collection of wastewater. There are also other potential sustainability trade-offs. The use of green desalination produces waste hyper-brine, which needs to be dealt with in an environmentally-friendly way, and the UN has warned of rising levels of this waste.[7] Crucially, these trade-offs will be less frequent when you consider water and decarbonisation together. This will enable you to design solutions fit for multiple purposes with one investment.

Think location, not just technology

Businesses can't build their way out of water-carbon challenges unless they carefully consider geography. For instance, many heavy industries are looking to green hydrogen, but the most cost-effective regions for hydrogen are low on water resources.

Consider where you build new infrastructure with a consolidated view of the water-carbon nexus. It might not be in the same places as the past. Future site selection will depend on a view of inputs and impacts: rainfall and drought, groundwater depletion, social factors, glacial melt and more. Data-based decision-making, including predictive analytics, will be critical in evaluating such situations. One size does not fit all; one litre of water in one geography does not cost the same in terms of carbon and $ value as in another geography. So you'll need to factor in scaled-up-yet-localised technology solutions.

You'll also gain clarity and purpose from aligning your business strategy with doing the right thing for society and the planet.

Define your focus area and commit to action

Narrowing down your water-carbon focus for relevance to your core business strategy means a greater likelihood of you being able to action it. You'll also gain clarity and purpose from aligning your business strategy with doing the right thing for society and the planet. A defined focus means identifying the part of the value chain where you can have most impact; either water efficiency or water access in scarcity. For instance, large-scale manufacturers will need to consider how to scale up their own energy and water supplies to de-risk business. Consumer brands will need a greater focus on redesigning products containing less water, and educating consumers about the broader water and carbon consumption contained in a given product or service.

2. Determine greener ways to access water

Think beyond fresh

Driven by urbanisation, population growth, the move away from fossil fuels and the increasing frequency of climate-related disasters, water demand is only going to increase, with resulting carbon consequences. In the very near future it'll be vital to access water in new ways. Water innovators are working hard to create more usable water, whether that's converting wastewater into reusable water or providing new water sources at the point of need by making greywater potable.

With so much of the world's water found in oceans, desalination – and green desalination in particular – is an obvious route to more usable water. The energy used to produce it is currently up to 23 times that used for conventional water, which increases costs, chemical pollutants through reverse osmosis, and decreases usability. However, the technology is always improving, with Desolenator recently developing a system that uses solar power to desalinate seawater.

Be ambitious and investigate the new and existing solutions that could slot into your water and carbon strategy.

Help scale start-up technologies

Be ambitious and investigate the new and existing solutions that could slot into your water and carbon strategy. The technology to make major leaps already exists, but there is often low uptake of these technologies and they need to be scaled at pace. There are a number of examples potentially ripe for scaling. The WaterPod device is a sustainable desalination pod that runs on solar power and converts seawater into drinkable water. Treading the water's surface, it transforms seawater into fresh water. The device is self-cleaning and made from recycled plastic materials. In the US, Electrolytic Technologies has developed on-site chlorine generation, eliminating costs and risk from the transportation of chemicals to water and wastewater treatment plants. And in India, Fluid Robotics has developed in-pipe robotic mapping and assessment tools to detect leaks in distribution systems.[8]

Leaders should be working to technology roadmaps that keep a close eye on the value potential of emerging and scaled technologies. Our Global Innovation and Technology Centre has also helped scale-up numerous initiatives across sectors, from vaccine refrigeration technology and the design of ventilators, through to helping Water Source use the Internet of Things (IoT) and digital technologies to provide safe, clean drinking water to remote communities.

3. Innovate for water and energy efficiency

Invest in technology for efficiencies

The water-carbon nexus is broader than water efficiency, but efficiency still has the potential to drive significant gains. With the help of IoT, AI, machine learning and analytics, water innovators can push the boundaries of what is possible as they design new solutions in a planet- and pocket-friendly way.

For instance, a Digital Twin – a virtual replica of a physical asset – can be used to predict water usage, identify gaps and faults, boost performance and perform scenario-based planning for water efficiencies. The nature of this technology allows for solutions to be tested without putting people, profit or the planet at risk.

Predictive analytics can secure supplies and supply chains based upon increasing climate-related events.

Innovate for impact: five key areas

Water-carbon innovation and thinking must be based on joined-up thinking. In our survey, all sectors identified the production part of the process as needing most water input. But only one sector, drinks, identified it as the place most ripe for efficiencies. Targeted innovation will be key to innovating for impact.

For example, our work in this space suggests that precision farming and precision fermentation are set to have a major impact on water and carbon in the agriculture and drinks sectors.

Leaders should also be looking for opportunities that are yet to be seized. This is where they'll benefit from thinking holistically about their innovation goals across the five key areas of sustainability – water, carbon, packaging, products and waste – to unearth the areas of maximum impact.

WATER | CARBON/NET ZERO | PLASTICS & PACKAGING | CIRCULAR DESIGN & PRODUCTS | WASTE VALORISATION

Take inspiration from consumer brands

The consumer sector is ahead of the curve when it comes to delivering water efficiencies in design and product – from reducing water in refills to redesigning products altogether. Other sectors should be looking for existing approaches and technology that can be scaled up, and for new learnings and best practice. For example:

- British soft drink company Britvic acquired Aqua Libra Co – a startup whose device creates boiling, chilled, sparkling and flavoured water at the point of consumption, reducing water usage. In a similar way, large corporates like Pepsi are talking about adding flavour at the point of dispense rather than production
- In 2020, Kraft Foods undertook improvements such as better thermal and process management and the installation of industrial heat pumps at one of their processing plants, saving them 53 million litres of water and US$250,000 in water and energy costs per year.[9]

Factor circular thinking into your plans

Water and carbon should be considered as part of the circular economy – an opportunity to recover the embedded value from everything once it's used. Value can be obtained, for instance, from substances once regarded as contaminants in water, with ammonia used to produce ammonium sulphate fertiliser. Return/reverse logistics technologies could have a major impact. Product passports can track the provenance of products, with sensors able to track their usage and condition. This gives manufacturers better oversight of the product lifecycle, enabling them to repair, recycle or dispose of articles in the most cost-effective way.

Technologies that can replace fossil fuels also come into play. In Western Australia, the state government is backing an innovative project to produce renewable hydrogen and graphite from wastewater.[10] This is important as the shift to hydrogen is set to intensify water and potentially energy usage – the former by up to 20%.[11] Another option for hydrogen would be to use the ammonia from wastewater streams through catalytic cracking. High level estimates suggest at least 18,000 tonnes of hydrogen (in the UK) could be produced via this method each year, and the potential could be double this.

4. Green your core business strategy and partner for everything else

Place consumer education at the heart of your strategy

Environmental reporting requirements, managing risk and consumer preferences all figured prominently as drivers for organisations to focus on the water-carbon link. The rise of the conscious consumer is, we believe, set to increase demand from the consumer side. People are increasingly aware of the wider impact of their product and services choices.

So while many consumers still view water as 'free' to use, despite the costs of sourcing, moving, treating and using it in production, this will soon change. Brands and water providers should play their part by educating consumers about how much water is used for common processes, such as manufacturing jeans, producing fast fashion or making coffee.

This will be a crucial way to build trust, include consumers in decision-making and demonstrate a desire for change. And with this knowledge, conscious consumers can make different choices, helping to drive change more quickly.

Look for localised partnerships

The traditional approach of different organisations competing for the same water, or only thinking of their own water needs, has to end. Where competition is defined by the customer today, resource (scarcity) will command how we define competition tomorrow – meaning competition will become about water supply.

To address this, imagine instead if major water users in geographical areas worked together in a systems-based approach, collectively striving for the lowest energy demand and environmental impact. On the East Coast of India, for example, are a number of large-scale representatives from each of our surveyed sectors. These organisations will have their own targets and technologies. By connecting and scaling both digital and physical innovation and approaches across the region, organisations in water scarce areas could drive greater change.

Whether it's connecting green desalination to more efficient irrigation, or more efficient storage linking up with green wastewater treatment and re-use solutions, there are an abundance of possibilities to ensures water is used in an efficient, circular way.

By regularly disclosing comparable, consistent and quantifiable information, businesses competing for resource in a catchment area can identify water risks across their value chains, bring that risk into decision-making, and identify greater opportunities for system optimisation.

Consider geographical hubs – but look at the local impact carefully

With technologies like hydrogen, aggregated hubs may develop in response to the opportunities for end-to-end hub supply chain decarbonisation. Locally-produced hydrogen could be deployed as a fuel for industrial activity (i.e. cement, glass, oil refining), but also for onsite ground service vehicles and operational fleet servicing hubs. This clustered hub approach would reduce overall impact on the water industry but could create a more localised and aggravated effect.

Hydrogen will require decisions on the balance between the water industry, the energy industry, and the environmental, industrial and commercial sectors. Clarity will be needed on where the policy responsibility for hydrogen sits and how that is managed through cross-organisation governance. And for its full potential to be recognised, hydrogen must feature in national and regional planning.

Realising the full potential of hydrogen will call for dialogue and collaboration between the water industry, the energy industry, and the environmental, industrial and commercial sectors.

CONCLUSION

IT'S TIME TO ACT

Our exploration of the water-carbon nexus shows they can no longer be considered in isolation.

Leaders need to take a broader view of the relationship between the two. This should inform focused progress towards greener ways to access water, smarter water and energy use, and wider partnering across the ecosystem.

With industry partners optimising what they each can do individually, then coming together to add value and create end-to-end solutions that benefit all, so much more can be achieved.

The big carbon drop will only come through cleaner, greener, smarter water use. Progress here can help to not just deliver net zero but to start taking us towards zero carbon. It's time to be the change and create a positive human future.

Talk to our experts to get going.

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METHODOLOGY

We conducted qualitative research with leaders from organisations in the following sectors: drinks, fast-moving consumer goods (FMCG), high-tech manufacturing, manufacturing, and pharmaceutical.

They operated across Africa, the US, South America, the UK, the Nordics and Australasia/Asia. We also surveyed water companies. Half of our respondents had annual revenues of at least £1 billion. We looked across each organisation's value chain, to examine water use across four common processes: plan and source; make; deliver; return.

The bulk of our findings were based upon the results of in-depth analysis of 52 respondents from larger multi-nationals. We also factored in observations from additional analysis of 21 organisations of smaller revenue size (below £10m) to ascertain whether the challenges were the same and to unearth further opportunities.

To understand how the water efficiency targets indicated by our respondents translated to wider water-carbon reductions, we identified average water usage from published company reports (dating no further back than 2019) of the four largest global organisations in these sectors. We extrapolated the approximate sector impact using an uprate factor based on the share of market revenue of companies in each sector. Then, we calculated potential GHG emission savings across the sector using the UK Government's most recent GHG emission factors for water use as an indicative benchmark.

To calculate how these extrapolated water efficiencies could contribute to climate goals, we used the UN's Environment Programme estimate that reaching the 1.5°C global temperature climate goal will call for emissions between 2020 and 2030 to be cut by 7.6% each year. Water-related energy use makes up approximately 5% of global GHG emissions, so reducing water by 20-38% will reduce emissions by 1-1.9%.[12] This reduction could then contribute 13-25% of each company's 7.6% GHG emissions reduction.

The extrapolated data was designed to provide an indication of potential efficiencies, conscious of the number of variables and unknowns. For instance, the specific water use GHH emission factor may vary across region and sector, and this may change over time depending on intensity of water use and if energy decarbonises over time.

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