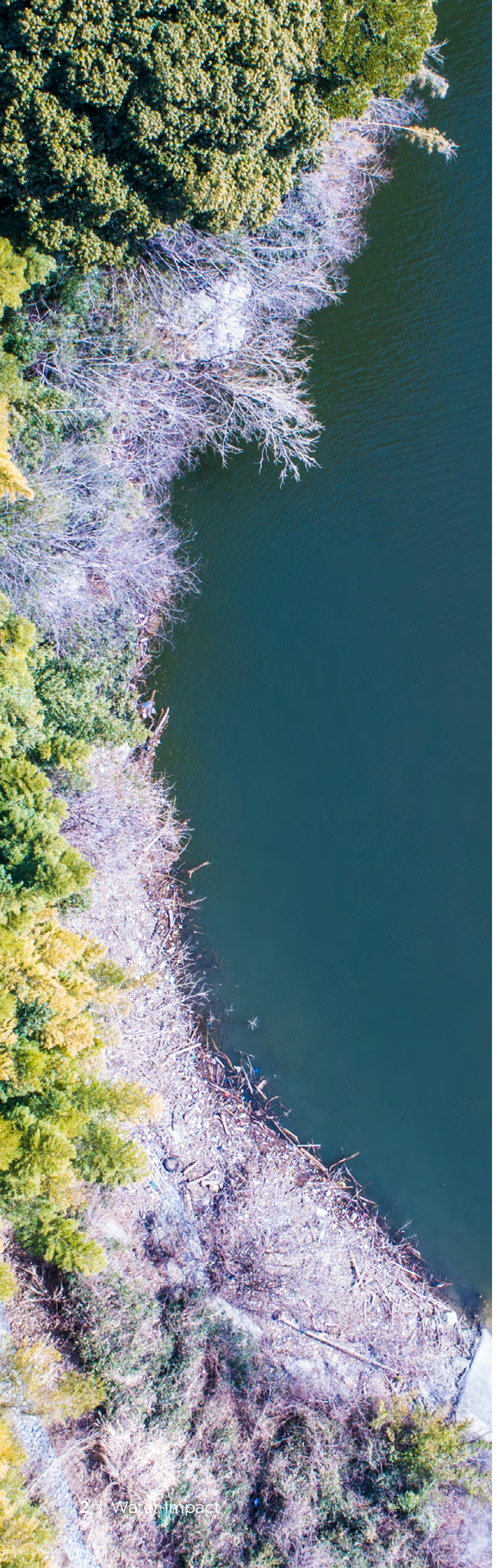
IMPAX Asset Management

AP7

Water: from a systemic and unpriced risk to a measurable opportunity with positive impact



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FOREWORD FROM AP7

Climate change, access to water and loss of biodiversity have become existential threats and politicians have been forced to collaborate on a global scale. But the financial sector and businesses must also contribute if we are to have a chance of success.

One vital contribution from companies is supplying products and services that can solve some of the most intractable sustainability problems the world faces. For the financial sector, the question is how to evaluate these contributions. The most interesting and lasting effects are in the real economy rather than the portfolio.

At present, not enough is known of the effects of investment decisions on the real economy. Transparent reporting of real effects is a first step for investors to be able to evaluate the societal impact of their investments and better understand corporate governance considerations.

Since the launch of the United Nations' Agenda 2030, investors have become increasingly interested in contributing to the Sustainable Development Goals (SDGs). A few years ago, AP7 initiated an internal project to develop more reliable and accessible methods to demonstrate the societal benefits of both corporate governance and investments. Impax was also awarded a green power mandate after a thorough procurement process to find the best partners in the field.

In this study we have teamed up with Impax to investigate what impact portfolio companies have on water availability, and how we as investors could support increased transparency and improved water stewardship. Water is of particular interest since the Goal on water, SDG 6, is regarded as one of the non-negotiable Goals that form the basis for sustainable development.[1] Sustainable development requires reliable and continuous access to clean, fresh water. From an impact perspective, water availability is very much linked to the local context.

The study's key finding was that currently there are only a few standards or globally agreed frameworks to measure water impact. None of the studied open-source frameworks captured all the elements required to produce a full and holistic view of water impact. What's more, the frameworks focus mainly on water quantity and do not put sufficient focus on water quality and pollution. Therefore, investors must engage with companies and standard setters to improve reporting by companies. In this report, a roadmap for investor dialogue is presented.

Another major finding was that best-practice companies develop site-level stewardship in collaboration with other corporations and actors to capture local water circumstances. There is a need for innovative water solutions, and company boards and executive management must treat water as a strategic issue.

In conclusion, this study suggests that there is currently not enough publicly available information for investors to assess the real-world impacts of their investments on water availability, making it difficult to accurately assess water-related risks. It presents opportunities for investors to become involved through active ownership and investing in companies that provide water solutions.

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[1] https://www.youtube.com/watch?v=e-dwko8L1E8

EXECUTIVE SUMMARY

Water is vital to life, to virtually every business in the world and to all sectors of the economy. As a result, it is one of the most heavily regulated industries globally. Yet at the same time, water is also a systemic and unpriced global challenge with significant economic and societal risks. Too often water is overlooked in sustainability and risk assessments, and water data reporting is well behind climate reporting in terms of the amount and quality of disclosure.

This is despite the fact that water issues are the main way in which climate change manifests itself; through drought, flooding and sea-level rise, severely affecting individuals, society and businesses globally.[2] Today, more than 2 billion people live in areas experiencing high water stress, but as population grows, water demand rises and the adverse effects of climate change increase, up to 3.2 billion people will suffer severe water scarcity by 2050.[3] These impacts are compounded by sea level rise, extreme precipitation, coastal storms and severe water pollution .

Companies providing water solutions are critical to tackling global water challenges, which creates investment opportunities; Impax has been identifying and investing in water solutions for more than two decades. There are three key areas of investment opportunities – water infrastructure, water treatment and water provision.

Water innovation, technology and solutions are critical to the global economy. They add value and impact, and companies and investors need to give them greater emphasis as well as paying attention to risk management and water stewardship. Like many other areas of the economy, the digital revolution is opening up new opportunities to make an impact.

Measuring and reporting water impact would give investors decision-useful information on water risks and would highlight the positive impacts of water solutions, but current water impact reporting practices fall short. Most of the focus on water issues is on mitigating negative impacts, not on the positive actions that can be taken. Yet it is vital that companies act positively and pro-actively, and that this positive impact is measured. Water needs to become much more of a strategic issue than it has been to date.

Water impact is more complex and harder to quantify than, for instance, carbon and requires local context in terms of issues such as the availability and quality of water. Water impact methodologies are relatively new and lack the profile of their climate change counterparts, even though water and climate are closely linked issues. Measuring impact properly is vital because it helps to drive investment to the right places and the required technologies.

Yet there are few standards or globally agreed frameworks to measure water impact. It is expressed in a range of different metrics mostly focused on risk mitigation and water stewardship, rather than a "net" impact perspective that reflects local water context. We need common water impact indicators so that water impacts can be compared and aggregated across different investments, and assessed at portfolio level.

To get a full, decision-useful picture of water impact, it is important to consider three different elements – water withdrawals, positive water solutions and local water circumstances. But none of the open-source frameworks include all three of these elements and there is a lack of comparability in the data that does exist.

Water is already heavily regulated in much of the world and regulators play a vital role in establishing the rules that both protect scarce water resources and ensure acceptable quality levels, particularly of drinking water. Much more is however required in regulating especially chemical water pollution in most parts of the world. But the corporate sector also has an important part to play. Companies that directly withdraw, supply, use and/or treat water play a key role in understanding, preserving and enhancing water resources, particularly in areas where regulations are weakly or inadequately enforced. Companies whose technologies or services improve water management can make a major indirect contribution to effective water management, through collaborations among the water users within a watershed.

Investors can have significant positive water impact and have an important role to play in funding these solutions and engaging with the companies they invest in to improve their water stewardship. They also need to advocate for increased transparency in water disclosure, better quality data and frameworks that are fit for purpose, and "investment grade" policies.

[2]https://www.unwater.org/water-facts/climate-change/. [3]https://public.wmo.int/en/resources/united_in_science

1. INTRODUCTION

In the autumn of 2018, Swedish public pension fund Sjunde AP-fonden, "AP7" and Impax Asset Management, "Impax", partnered to investigate how best to assess, measure and report on water impact.

Water is of particular interest to both organisations; Impax has been investing in companies providing water solutions for more than two decades, including through funds based on its dedicated thematic Water strategy. It has reported on positive water outputs in its annual Impact Report and was already planning to provide more granularity and local context for its clients. AP7, meanwhile, has identified water as one of three systemic environmental risks but at the same time has recognised it as its "least known top priority".

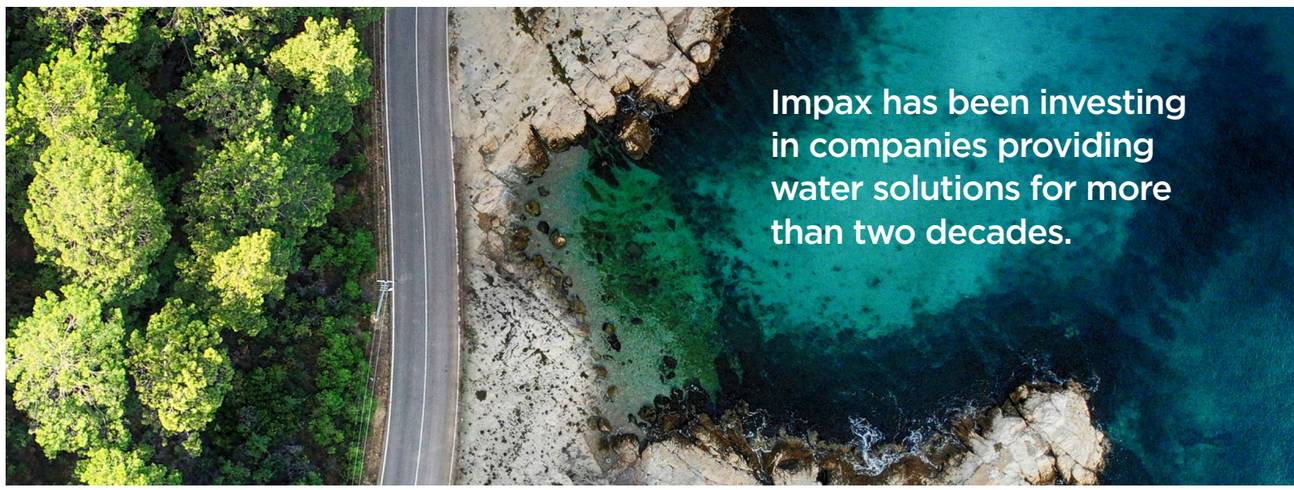
This report and the partnership between AP7 and Impax offer an investment practitioner's perspective that will contribute to the investment industry's understanding of water as a sustainability and impact topic.

The report focuses on water solutions and effective water impact measurement and provides practical learnings, case studies and recommendations.

The central topics the report seeks to address are:

- Current status and context
- Water innovation and solutions
- Measuring water impact: current methodologies
- Measuring water impact: towards decision-grade metrics and reporting
- The role of investors

We have engaged with leading water companies and water organisations to identify existing gaps, to create case studies of water companies and of water experts. The report presents a case study of "net" water impact measurement, including the local water context. It also includes practical observations and lessons learned throughout the partnership project on water impact measurement and guidelines for effective engagement.



2. CURRENT STATUS AND CONTEXT

Water covers more than 70% of the world's surface, but almost all of it is sea water – just 2.5% of the world's water at any one time is fresh water. Some of this is readily available in lakes and rivers, but much of it is found underground in aquifers or is locked in glaciers and icecaps.

Water is in constant movement between the oceans, icecaps and freshwater sources through the water cycle, including the water that we extract and use for our own purposes. Water in the oceans and rivers evaporates into the atmosphere and falls back to earth as rain. Global water resources are not evenly distributed – Canada has water in abundance compared to Israel, for example. That means that strategies for water must be very location-dependent – improving water efficiency or increasing supplies will have much more impact and create much more value in Israel than in Canada.

Water's importance and scarcity mean that it is one of the most heavily regulated sectors of the economy, with rules covering areas including the amount can be abstracted, how wastewater must be treated, quality thresholds and pollution levels. As technology advances, and knowledge and public awareness increase, many countries are introducing more stringent water and wastewater quality standards to tackle issues such as micropollutants. And growing scarcity is increasing moves to reuse wastewater after treatment.

Greater understanding is also leading to regulatory regimes covering entire watersheds, in order to tackle pollution sources such as agricultural run-off and stormwater. The European Union's Water Framework Directive, for example, requires member states to prepare River Basin Management Plans, including for international river basins. However, water continues to be a systemic and largely unpriced global challenge, with significant economic and societal risks.

Current patterns of rainfall and water availability are being increasingly disrupted by the impacts of climate change, including drought, floods, extreme rainfall, more algal blooms and sea level rise. According to the UN,[4] by 2025, 1.8 billion people are expected to be living in countries or regions with absolute water scarcity and two-thirds of the world population could be under water-stress conditions.

Necessity being the mother of invention, one consequence of this uneven distribution of water resources is that water-stressed countries such as Israel and Singapore are home to a number of innovative water solutions companies. There is generally an increasing understanding that innovation and water technology solutions are critical for solving the current and future challenges relating to water.

Figure 1: Global trends and challenges driving long-term growth in water solutions

GLOBAL TREND	RESPONSE
Demand for clean water outpaces supply	Water scarcity is a top risk identified by governments, corporations, and academia[5]
Required investment in global infrastructure	US$7.5 trillion projected spending globally over next 15 years in water infrastructure[6]
Tightening global water regulation	US$300 billion directed to address water pollution by China's Water Ten Plan[7]
Adaption to changing weather patterns	Increasing incidence of both drought and flooding cause investment requirements in water systems
Innovation and evolving technology	New technology and upgrades to existing systems create further investment opportunities

[4]UN-Water | Coordinating the UN's work on water and sanitation. [5]http://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf. [6]McKinsey Global Institute | Bridging Global Infrastructure Gaps – June 2016. [7]China Water Risk | New Water Ten Plan to Safeguard China's Waters

3. WATER INNOVATION AND SOLUTIONS

This section will further examine the importance of water innovation and solutions and will introduce the water solutions and technologies which are critical for solving the global water challenges discussed. Water solutions also enable the measurement of positive water impact, which will be discussed in detail in this report.

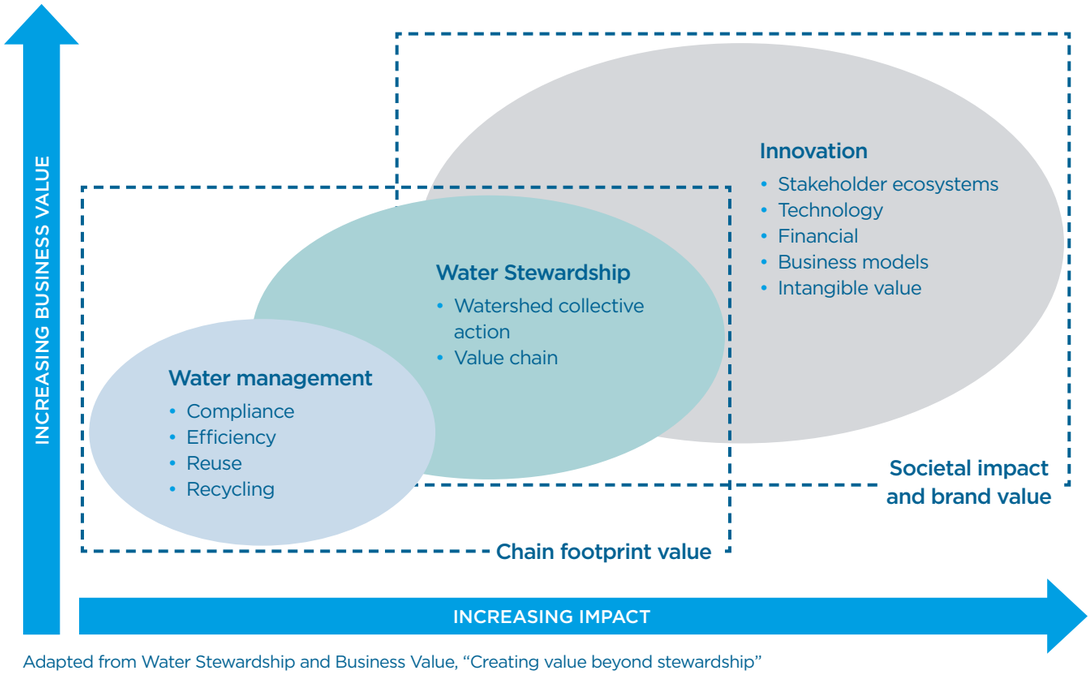
Water solutions provide higher value-add and impact than water stewardship and management

Most companies and investors view water primarily in terms of risk, compliance, management and stewardship. But recent water initiatives and reports by CDP Water[8] and The Water Foundry[9] have highlighted that incremental water efficiency improvements alone will not solve the worsening water challenges. There is a critical need for investment in water innovation, technologies and solutions and for water to be seen as a strategic issue.

The latest CDP Water report[10] found that reported water risks could cost companies up to US$301 billion; while water responders reported that it would cost around US$55 billion to mitigate those risks through strategic investment in water solutions. In other words, the cost of inaction could be more than five times higher than the cost of mitigating water security risks.

Will Sarni, who leads The Water Foundry, argues in his book *Water Stewardship and Business Value – Creating Abundance from Scarcity*[11] that it is more important to develop innovative water technologies and solutions than to rely on incremental management and stewardship in tackling water issues. Corporates and investors should focus more on water innovation, as it adds more value and is more impactful, as illustrated in this infographic:

Figure 2: Value and impact of water activities



Adapted from Water Stewardship and Business Value, "Creating value beyond stewardship"

Sarni argues that companies that are water dependent (operational materiality) and those whose business model centres around water (strategic materiality) should consider water as a strategic issue. Compliance-driven management, stewardship and "CSR" approaches to water will not ensure water security in the future. Importantly, issues that are part of corporate strategy tend to get accurately valued and priced, for example through the use of shadow pricing. This is important for water, for which pricing is almost always artificially capped due to regulation, and does not accurately reflect water demand and supply at the watershed level.

[8]https://www.cdp.net/en/water. [9]https://www.waterfoundry.com/. [10]CDP_Water_analysis_report_2020.pdf. [11]Water Stewardship and Business Value: Creating Abundance from Scarcity

Impax's approach to investing in water solutions

Impax has been identifying and investing in water solution companies for more than two decades and has developed a water technology and solutions taxonomy.

Water solution companies provide or operate technologies, infrastructure and services to supply, manage and treat water for industrial, residential, utility and agricultural users. Impax classifies companies in three main groups: water infrastructure; water treatment and efficiency; and water utilities.

1. WATER INFRASTRUCTURE	2. WATER TREATMENT	3. WATER UTILITIES
Companies that supply products (including speciality pipes, pumps, valves, actuators, hydrants and meters) and services to enhance water infrastructure systems. This includes products or services that help to reduce water use, to substitute products with higher water intensity, and to manage water demand through the use of meters.	Companies that design, develop, manufacture, distribute and/or install technologies or facilities for separating and purifying water to meet environmental standards. This includes but is not limited to membrane, ultraviolet, desalination, filtration, ion exchange, and biological treatment.	Companies that operate water treatment and supply infrastructure, providing potable water or wastewater and sewage services.

This categorisation has enabled Impax to create a broad and evolving investment universe of water solution investments spanning diverse end-markets from consumer to industrials sectors globally, as set out in the following graphic.

The evolving landscape of water solutions

Water reuse
Treated waste water used to refill depleted aquifers easing groundwater stress

Desalination
Efficient and more cost effective conversion of seawater into fresh water

Leak detection
Technological advances in leak detection: less water lost, longer pipe life, lower operating costs

Flow measurement
Hardware and software applications for improved measurement and distribution efficiency

Flow efficiency
New technologies disrupting pump markets; utilities investing for energy savings

Smart irrigation
Increased crop yields and efficiency of water use; use of solar power

Treatment, testing and diagnostics
UV disinfection, ozone treatment, handheld instrumentation

Water conservation
New systems reduce consumer water use: home technologies including dual flush

Automated meter reading
Improved water management and real time monitoring; encouraging more efficient use

Data and software
Water industry using big data to map inefficiencies and to develop solutions

Source: Impax Asset Management

Artificial intelligence and machine learning allow utilities to better manage extreme weather events such as excess rainfall.

The River Ouse breaks its banks in the historic centre of York, UK

The new drivers of water solutions – technology and digitalisation

Digitalisation and the use of smart data is increasing rapidly in the water sector. There is a growing use of smart monitoring technology to identify and tackle faults before they happen, reducing downtime and unexpected disruptions to supply. Artificial intelligence and machine learning can also allow utilities to better manage extreme weather events such as excess rainfall that leads to floods, as well as wastewater and water leaks.

These developments are bringing digital specialists into the water sector. For example, water data company Innovyze was acquired by software specialist Autodesk in February 2021. This merger of water and software expertise will enable data modelling and predictive analyses for cost-effective and sustainably designed water distribution networks, water and wastewater treatment plants and flood protection systems for 3,000 water utility and engineering consultancy customers. This is a trend we believe will continue in the future.

Overall, where companies provide solutions to unmet societal needs, like water security through savings, treatment and provision, it is possible to measure the positive impact they have. The following two case studies provide examples of water solutions and how their impact can be measured. The following chapters of the report will dive deeper into measuring water impact and how the current frameworks and measurement can become more decision useful.

Xylem Inc

Xylem is a Fortune 1000 global water technology provider that offers a broad portfolio of products and solutions delivering positive water impact across the water cycle.

- Water source: testing and monitoring water bodies, including those in high-risk areas
- Transporting water: supporting the movement of water from source, or untreated wastewater, in an efficient manner, ensuring a lower carbon footprint
- Stormwater management: aiding communities to develop resilience to flooding and providing disaster relief
- Treatment: protecting the environment and safeguarding the health and safety of communities through the effective treatment of wastewater
- Efficient use of water: offering solutions to ensure less water is lost and less energy is required for users of water

Xylem's products help customers solve water scarcity, increase water systems' resilience to climate change and other environmental challenges, and address water affordability issues by treating and managing scarce water resources, especially 'non-revenue' water – water that has been treated but fails to reach the end user because of leaks, theft or poor metering. One in every six gallons of treated water is lost in this way in the US and in developing markets; non-revenue water losses range from 10-60%. The company is helping its customers to make their capital investments more efficient by offering software-enabled products and services.

In 2019, the company pivoted its sustainability commitments to an impact-based framework.

Xylem measures the impact of its products, services and solutions by tracking the reduction of non-revenue water, the treatment of water for reuse, the prevention of polluted water from entering local waterways, and the reduction of the carbon footprint from water transport, metrology, and treatment applications.

Facing a lack of common industry definitions and metrics that would allow it to demonstrate impact, Xylem developed its own framework, in consultation with the Sustainability and Health Initiative for Net Positive Enterprise (SHINE) of the Massachusetts Institute of Technology (MIT), which has provided review and validation of the overall approach, measurement and calculations.

Linde's aim to enable safe drinking water for 250 million people through the use of its products has been exceeded, with the company enabling the delivery of safe drinking water to more than 325 million people.

Linde plc

Impact measurement for water applications – enabling access to potable water for 290 million people.

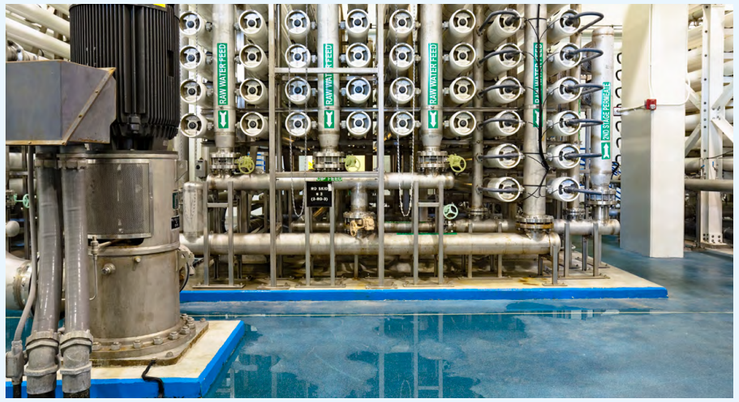
Linde gases help disinfect and demineralize water

Linde is a leading global industrial gases and engineering company, with several Linde gases and technologies offering a range of solutions for drinking water, seawater, wastewater and industrial water. As a result, it has a significant water impact, reflected in its target to enable safe drinking water for 250 million people through the use of its products. It exceeded the target, enabling the delivery of safe drinking water to more than 325 million people. This case study focuses on gases used to enable the provision of safe drinking water. Oxygen (O_2) to ozone (O_3) production enables lower-quality water sources to be converted to drinking water. CO_2 (purified from by-product wastes) is provided for remineralisation in desalination, increasing availability of drinking water.

A methodology for measuring socio-economic impact

Linde uses the World Business Council on Sustainable Development (WBCSD) Measuring Socio-economic impact: A guide for business methodology, which defines five steps towards impacts – inputs (e.g. money spent), through activities (e.g. products or services, training provided), outputs (e.g. volumes sold, people reached), outcomes (e.g. changes in the lives of the target population) and impacts (i.e. goal-level changes in the lives of the target population or future generations with respect to factors such as health status, income level, educational level).

While inputs, activities and outputs are within the scope of the firm, a company's influence can be less direct for outcomes and quite indirect for impacts, even though these may be what matter most for society. To determine what mattered most and the specific goals for water impacts, Linde turned to the UN SDGs. In UN SDG 6 – to "Ensure availability and sustainable management of water and sanitation for all", target 6.1 is: "By 2030, achieve universal and equitable access to safe and affordable drinking water for all[12]."



Reverse osmosis filters

Linde uses the WBCSD steps to show how its water applications help to deliver SDG target 6.1. The company reports that it enabled potable water to reach ~3.6% of the global population in 2020.

Reflections on impact measurement

Today's customers, investors and employees want to work for, buy from or invest in a company that yields both good financial returns and has an overall positive impact on society, the economy and the environment. Investors look to Linde to show that it is part of the solution to some of the world's greatest challenges – that its applications bring a positive impact to society.

This clear narrative on water benefits helps describe Linde's business model and values, but it is not reflected in sustainability reporting standards or ESG accounting systems. Impact measures are also excluded from ESG and national accounting systems.

Further, there is no consensus on how to evaluate impact in relation to some combination of the scale of the company and related global challenges.

[12] https://www.un.org/sustainabledevelopment/water-and-sanitation/

4. MEASURING WATER IMPACT: CURRENT METHODOLOGIES

Water impact accounting methodologies are relatively new and are significantly less advanced than their greenhouse gas (GHG) emissions equivalents. This is partly because investors and broader stakeholders pay less attention to water, even though there is a strong climate link to water stress, which currently represents a material risk to many sectors and activities. Another likely reason is the artificially low price most users pay for water – actual water availability is not effectively reflected in water prices.

In addition, water impact accounting is complex and goes well beyond one single metric, unlike GHG emissions accounting. To measure carbon impact, a company must only determine how many tonnes of carbon dioxide-equivalent (tCO2e) it emits or avoids. For water, it is more complicated because of the significance of locations and their hydrological status. It does not really matter where a tonne of carbon is emitted or avoided – it is location-neutral – but a litre of water wasted or saved in one location is of significantly different value and impact to one wasted or saved somewhere else. Water is global issue, but it is a local one too.

Why does water impact measurement matter?

There are several benefits to measuring and reporting impact:

- It helps to define environmental baselines for a technology (in the absence of standards)
- It helps to establish a market for water solutions, make it better known or understood
- It highlights the investment opportunity and technology, and can attract capital and investment
- It provides concrete demonstration of the activities and solutions of companies
- It provides decision-useful insights relating to the risks and/or opportunities of a company

It is important that establishing baselines and assumptions and that the calculations of impact are transparent, robust and preferably externally assured or verified. This means that, for instance, water efficiency savings cannot be measured against a historical baseline but must be measured against the current and relevant baseline, to avoid "blue washing" or misleading impact reporting.

The EU Green Taxonomy[13] and its third strand, *"The sustainable use and protection of water and marine resources"* and the related technical criteria, expected to be published in 2022, are likely to help to standardise water solution baselines.

Current water impact frameworks

A review was conducted focusing on current water impact accounting frameworks to find commonalities and differences and identify where gaps exist. Under the UN Sustainable Development Goals, water is covered by SDG 6: "Ensure access to water and sanitation for all", which highlights the importance of water access and availability for the transition to a sustainable economy. There are currently a small number of developed water frameworks, but no standards or globally agreed-upon frameworks to measure water impact.

Indicators of water impact

Using common impact indicators for companies means that water impact can be compared and aggregated across a number of different investments and assessed at a portfolio level. However, measuring water volumes alone does not mean that the data is decision useful. Other qualitative and non-volumetric complementary indicators that are specific to the activity need to be considered to determine real-life water impact.

The most common water indicators in the water frameworks analysed were:

- Water withdrawn/extracted (Ml/year) (volumetric)
- Water saved (Ml/year) (volumetric)
- Drinking water provided (Ml/year) (volumetric)
- Wastewater treated (Ml/year) (volumetric)
- Water quality (qualitative/quantitative)
- Localised water stress (qualitative/quantitative)
- Number of people with access to clean water (complementary)
- Number of people with access to sanitation services (complementary)
- Ecosystem-related indicators (company-specific) (complementary)

These indicators or types of indicators, a mix of quantitative and volumetric indicators, qualitative indicators, and complementary indicators, are where most overlap lies between the frameworks.

[13]https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en

Frameworks for assessing water impact

Water impact frameworks are not as common or as developed as carbon emission frameworks and they are more complex. In this review a number of water frameworks were assessed, largely based on their breadth and relevance in terms of water indicators covered. The review examined both open and closed source frameworks. Many are developed by research organisations and some by regulators. The emphasis was on water frameworks that are focused on water impact, not water from an ESG reporting or risk perspective.

The table below describes the water frameworks examined and the water indicators they included.

Figure 3: Assessment and summary table of current water frameworks

FRAMEWORK	WATER WITHDRAWN/ EXTRACTED (ML/ YEAR)	WATER SAVED (ML/YEAR)	DRINKING WATER PROVIDED (MI/YEAR)	WASTEWATER TREATED (ML/YEAR)	WATER QUALITY	POLLUTION MITIGATION	# OF PEOPLE W ACCESS TO CLEAN WATER	# OF PEOPLE W ACCESS TO SANITATION SERVICES	LOCALIZED WATER STRESS	ECOSYSTEM-RELATED INDICATORS
WRI VWBA		x	x	x			x	x	x	x
Ceres		x		x			x		x	
HSBC		x		x			x	x		x
Green Bond Principles		x	x	x			x	x		x
Frontiers	x			x			x	x		x
EPA			x							x
ISO 14046 2014	x		x		x				x	
WHO							x	x		
EEA			x	x						x

Gaps identified and conclusions regarding current water impact frameworks

- None of the existing frameworks fully reflects the role of listed companies providing water solutions; the focus is often on water projects and on measuring positive water stewardship within those projects (e.g. WRI VWBA)
- Frameworks tend to focus on water projects and corporates, not on investors in water solution providing companies
- Some of the relevant frameworks which can be used in making decisions are not open-source or accessible (e.g. ISO)
- None of the open-source frameworks include all three elements required to produce a full picture of water impact:
  - Water withdrawals (risks, dependencies)
  - Positive water solutions (opportunities, technologies)
  - Local hydrological conditions (overlayed on both the risks and opportunities)
- The frameworks have generally little focus on water quality and pollution
- Local water circumstances, a complex, but highly critical and specific aspect of water impact measurement, are not emphasised in most frameworks
- Where local water context is considered, WRI Aqueduct[14] is mostly the reference indicator
- The complementary indicators of access to clean water and sanitation services, and ecosystem-related indicators are well represented in many of the frameworks

Further, there may be indicators missing. For instance, it might be relevant to measure the carbon emissions emitted and avoided from a water investment, in light of the link between carbon and water impacts, especially relating to energy use and savings in the water value chain, a topic that is outside the scope of this report.

The Water Council case study looks at an existing best practice framework for water stewardship.

[14]Water framework source data in Annex

The Water Council

Towards a smart innovative application of water technology and water stewardship

The Water Council (TWC) is a non-profit organisation dedicated to solving critical global water challenges by supporting innovation in freshwater technology and driving those new solutions to the industries that need them.

Although its initial focus was on using technology to address water issues, a partnership with the Alliance for Water Stewardship (AWS) made it realise that water stewardship is just as important as championing the best new water technologies.

Three waves of corporate recognition for water as a material risk and management thereof

While many companies might not consider themselves in the water business, virtually every industry needs fresh water to operate. In the food & beverage, chemical, pharmaceutical, microelectronics, textiles & apparel, and consumer goods sectors, water is a material issue operationally and/or in the supply chain. That is one reason why these sectors were first movers in adopting stewardship practices and embracing water as a key material sustainability risk for the business.

Drivers to action for these water-intensive sectors include:

- Local stakeholder pressure at site level over time leads companies to recognise how watersheds are impacted locally
- The global Covid pandemic acutely highlighted the fragility of resource management in complex supply chains
- The emergence of ESG and investor pressures

First movers recognise the importance of transparent and credible disclosure of water stewardship built on credible, transparent action within their operations and in collaboration with supply chain partners and local watershed users.

There are still some significant laggards in these industries. TWC finds that it is not because they do not recognise the importance of water. Rather, they find it difficult to address as water issues may reside deep in their supply chains, beyond their direct operational control.

The next tier in water stewardship are the fast followers. In the past there has been a misplaced emphasis on CSR type reporting that is not tied to strategic action. TWC recommends that the starting point should be the hard work of water stewardship, not reporting.

Water solution companies are not 'big water-dependent withdrawers' and thus are not known as strong reporters or water stewards historically, but they still have water-related risks. Water solution companies are not first movers, nor fast followers, but rather the third wave. Often, they have recently published their first ESG/ sustainability report and may have previously focused on more obvious sustainability areas and 'low-hanging fruit' solutions, and only now can move on to the water issue, which is a lot harder to address. For companies where water may not be as material operationally, it may still be important from a strategic perspective: if a company's business is linked directly or indirectly to water-related activities or where downstream markets regard water as material, focusing on water impact is in the interest of the company.

Best practice: The symbiosis between site-level water stewardship and the positive impact of water solutions

Site-level water stewardship is the clear winner in terms of best practice. Yet for site-level stewardship to be effective, management at the corporate level must understand how and where water is material throughout its operations and supply chains.

Measuring and managing operational water impact alongside the overall lifecycle impact of products and services is crucial. Measuring positive impact allows companies to work with others and improve water stewardship collaboratively, both where they operate and where products are sold.

While many companies might not consider themselves in the water business, virtually every industry needs fresh water to operate.

5. MEASURING WATER IMPACT: TOWARDS DECISION-GRADE METRICS AND REPORTING

Impax has been measuring and reporting the positive environmental impact of its investments since 2015. The impact metrics used, which are externally assured, include net carbon emissions, renewable energy generation, materials recovery and recycling and water treatment, savings and provision.

Full details can be found in the Impact @ Impax 2020 report[15].

Data for these metrics come from companies' annual reports, sustainability reports, CDP reporting (for carbon and water data) and through engagements with companies.

Due to a lack of data and other impediments, all impact metrics measured and reported, apart from carbon, have been 'output' metrics. The lack of data also means that the water impact metric has been bundled together with several sub-metrics: water savings, treatment and provision.

The three water metrics (measured in megalitres) commonly used in the reporting by Impax's water solution investee companies are:

1. **Water saved**
2. **Water treated**
3. **Water provided**

1 Water saved

'Water savings' or the 'avoidance of water use' arise from activities or solutions designed to reduce the demand for water, to use it more efficiently and to reduce water losses and waste.

Of the three water impact metrics used, 'water saved' can have the most unambiguous impact; a litre of water saved or usage avoided will be positive in most circumstances, although the exact degree of positive impact will depend on local water availability and quality.

Products and services that save water include pipes, valves and pumps that improve flow management, temperature and pressure monitoring, thereby increasing efficiency and lowering overall usage. However, we have found the "water saved" metric to be the most elusive and challenging to define. The devices and technologies are used in many different applications and in numerous different end markets, making it difficult to attribute their use and deployment to water savings specifically. For that reason, we find it difficult to make robust assumptions for this impact metric.

Examples of water solutions, with quantifiable **Water savings** benefits and data are:

- Water meters
- Leak detection solutions
- Efficient irrigation equipment
- Substitutes to water intense products

2 Water treated

'Water treatment' brings water to a quality appropriate for a specific end use. End uses may include, but are not limited to, drinking water and domestic use, industrial water supply, irrigation, river flow maintenance, water recreation or discharge to the environment.

Water treatment is critical in many water-intense activities globally, especially where water availability or water quality is weak or compromised. Examples include the mining and pulp and paper industries, where water is process-critical, especially with mining often taking place in the most arid areas of the world. In order to avoid, for instance, trucking millions of litres of water to mining sites, water treatment and recycling in a closed loop is required.

Water treatment companies also build desalination plants to convert seawater to fresh water in the most water stressed regions in the world, such as the Middle East. While desalination helps to alleviate fresh water stress, it can also have significant negative environmental impacts.

Environmental testing and monitoring companies are a subset of water treatment firms. Water pollution is becoming an ever-larger problem, not least in relation to so-called PFAS,[16] or "forever chemicals" that are exceedingly hard to remove from groundwater and the environment and are severely damaging to all living organisms.

There are few publicly listed pure play water treatment and treatment equipment companies, but they tend to quantify and report the amount of water they treat every year, which is typically significant amounts. Water utilities also report annual water treatment (and type of treatment, by end use, such as industrial or drinking water). They report separately on water provision.

Examples of water solutions, with quantifiable **Water treatment** benefits and data are:

- Water testing and monitoring (water pollution mitigation)
- Treatment of ballast water (ultra-violet treatment)
- Water appliances (water filtration and purification)
- Water drainage and storm water management
- Water utilities (treatment of drinking, grey and wastewater)
- Desalination plants

3 Water provided

'Water provision' is the supply of water by public utilities, commercial organisations, community endeavours or by individuals, usually via a system of pumps and pipes.

Water provision is what water utilities do. Distributing treated drinking water to households and businesses and removing grey water, wastewater and sewage for treatment prior to safe discharge, as well as providing sludge for waste to energy, are critical services. An important aspect of these services is keeping track of the water performance indicators for water utilities, measured by the percentage of leaked or lost water (non-revenue water). Leakage rates can be 20-30% and represent economically and environmentally significant losses, as the non-revenue water tends to have been already treated to drinking water standards.

The US, for example, has around 2.2 million miles of water pipelines, managed by water utilities. A major water main breaks on average every two minutes, with 2 trillion gallons of treated water lost every year at an estimated cost of US$7.6bn, according to the American Society of Civil Engineers, ASCE.

Water utilities report the most significant quantities of water treated and provided, reflecting not only their central role in the water value chain, but also their highly regulated status, which requires a high level of performance transparency and reporting.

Examples of **water solutions**, with quantifiable water provision metrics and data, include:

- Water utilities (treatment of drinking, grey and wastewater, and water provision and distribution)
- Multi-utilities (treatment of drinking, grey and wastewater and water provision and distribution)

All three water impact metrics play critical roles in the water solutions value chain.

[15] https://impaxam.com/wp-content/uploads/2020/09/impax_impact_environmental_impact_report-2020.pdf

[16] https://www.epa.gov/pfas/basic-information-pfas

Water impact assessed at a high-level: the heat map

At Impax we have found heat maps helpful in framing impact analysis, as a first, high-level step in the analysis. They provide a useful overview of activities, sub-sectors or companies and relevant or expected outcomes and impact metrics. Heat maps enable the setting of a high-level framework for the expectations of impact exposure and highlight where to look for metrics and analyse impact.

Figure 4: The water impact heat map

	WATER WITHDRAWAL	WATER SAVED	WATER TREATED FOR DRINKING	WATER TREATED FOR OTHER USES & DISCHARGE	WATER PROVISION	POLLUTION MITIGATION / QUALITY	LOCALISED WATER CONTEXT[14]
WATER INFRASTRUCTURE							
Buildings & Industry Equipment							
Network Equipment							
WATER TREATMENT AND EFFICIENCY							
Efficiency							
Filtration & Advanced Solutions							
Testing and Monitoring							
Traditional Treatment							
WATER UTILITIES							
Utilities							

Water risks / dependency	High	Moderate	Low
Water opportunities / solutions	High	Moderate	Low
Local water stress / context	High	Moderate	Low

The water heat map highlights the three main water technology and solutions areas and their sub-sectors. It colour codes the extent of exposure to the expected water risks (red) and opportunities for the water solutions and sub-sectors (blue) and adds the local water context (yellow) that companies need to assess.

For a more complete "real-life" water impact picture and for investment decision usefulness, all three main elements of the water heat map should be known and ideally quantified.

It can be noted that water utilities have both the highest water withdrawals, the broadest positive water solutions and most exposed to the local hydrological conditions.

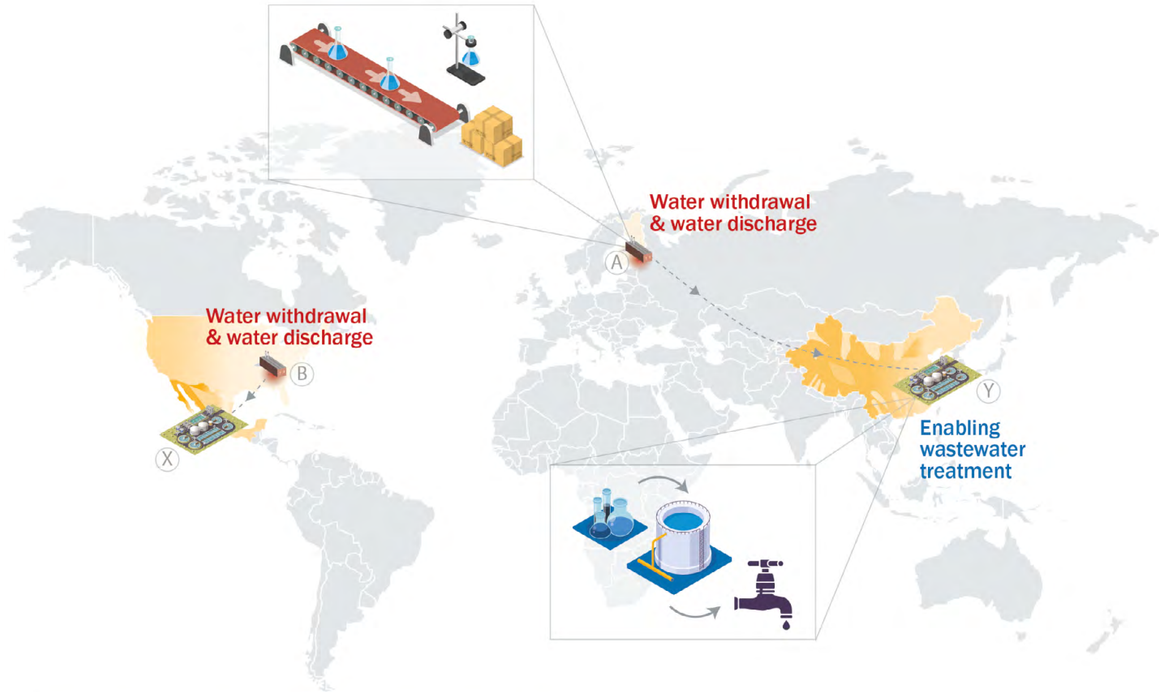
Decision-useful water impact data

Impact measurement identifies the positive and negative effects of business activities on the environment and society. If data is available and robustly measured, it can provide a full picture of the risks, opportunities and real-life impacts of activities. The water heatmap illustrates the three main areas of information required to form a more complete and decision-useful picture of a company's water impact:

1. Water withdrawal (direct, indirect and water stewardship)
2. Water savings, treatment or provision (positive outputs from products and services)
3. Overlay of localised hydrological context and conditions (water availability and quality)

Figure 5 illustrates a Finnish water treatment company and some of its production sites, primarily in Finland and the US, where the bulk of water usage and withdrawals take place, as well as some of its water treatment locations, which tend to be in areas with more challenged water conditions and within water intense activities, often requiring water treatment, recycling or closed-loop water systems.

Figure 5: Water impact: water withdrawals, treatment and the local hydrological context

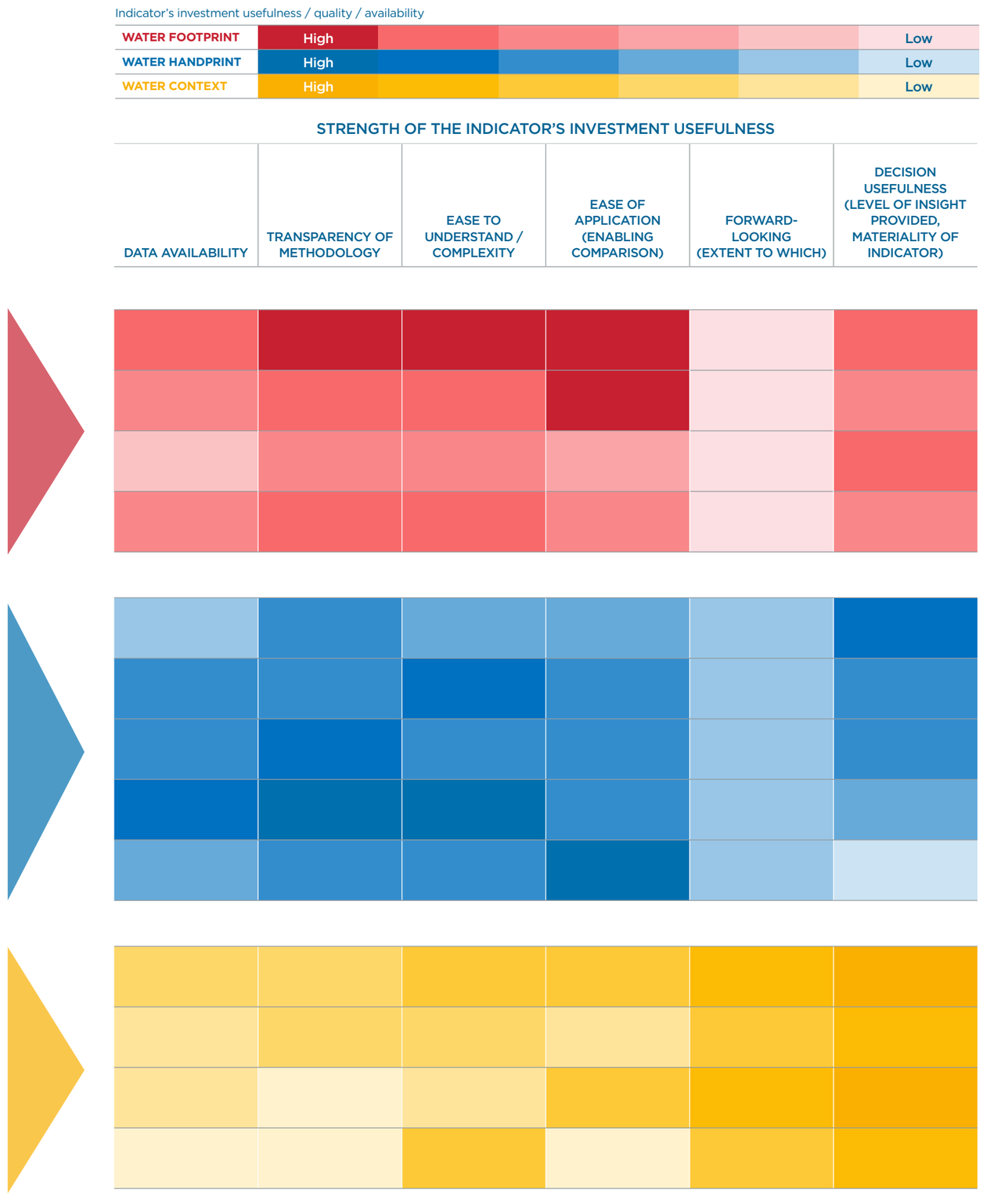


Water impact metric dashboard

We have developed a dashboard for a closer assessment of the most relevant water impact metrics, across "water footprint," "water handprint" and "water context." These are assessed for their primary use and characteristics such as data availability, decision usefulness and complexity. The dashboard is inspired by a metric framework by ETH, the Swiss Federal Institute of Technology. The ETH framework divides metrics into three larger categories: accountability, quality and usability.[17] We have further broken down the three into six characteristics to assess the strength and usability of the metrics.

Figure 6: Water impact metric dashboard

METRICS (UNIT)	PRIMARY USE OF METRIC
WATER FOOTPRINT	
Direct Water **withdrawal** (total) - operational (volume)	Direct company water dependency or intensity.
Direct Water **withdrawal** from recycled sources - operational (%)	Company use of regenerative water sources (i.e. less reliance on freshwater resources).
Indirect Water withdrawal - supply chain (volume)	Indirect company water dependency or intensity embodied in the products/ services procured by the company.
Direct Water **discharged** / returned back to environment at similar or improved quality vs baseline - operational (%)	Net direct company water dependency or intensity in consideration of the discharge quality - [withdrawal-discharge = consumption].
WATER HANDPRINT	
Water **saving** (volume)	Positive environmental/societal benefits of the use of a company's products/services enabling water savings (i.e. increased water effiency, lower consumption).
Water **treatment** for drinking purposes (volume)	Positive environmental/societal benefits from use of a company's products/ services for treatment of water for the provision of clean drinking water (i.e. increased water quality).
Water **treatment** for other uses and before discharge back into the environment (e.g. pollution mitigation (volume)	Positive environmental/societal benefits from use of a company's products/ services for treatment of water for other uses and before discharge back into the environment (e.g. pollution mitigation).
Water **provision** (volume)	Positive environmental/societal benefits of water utilities' services in the provision of water to residential and industrial end-users.
Energy saving (MWh)	Positive environmental/societal benefits from use of a company's products/ services for water impact translating to energy savings.
WATER CONTEXT	
Contextualised water **withdrawal** (volume, localised scarcity, current & forward-looking)	Company water dependency or intensity in the context of current and forecasted future local water availability at the point of **withdrawal.**
Contextualised water **withdrawal** (volume, localised quality, current & forward-looking)	Company water dependency or intensity in the context of current and forecasted future local water quality at the point of **withdrawal.**
Contextualised positive water **impact** (volume, localised scarcity, current & forward-looking)	Positive environmental/societal benefits of the use of a company's products/ services water impact in the context of current and forecasted future local water availability at the point of **impact.**
Contextualised positive water **impact** (volume, localised quality, current & forward-looking)	Positive environmental/societal benefits of the use of a company's products/ services water impact in the context of current and forecasted future local water quality at the point of **impact.**



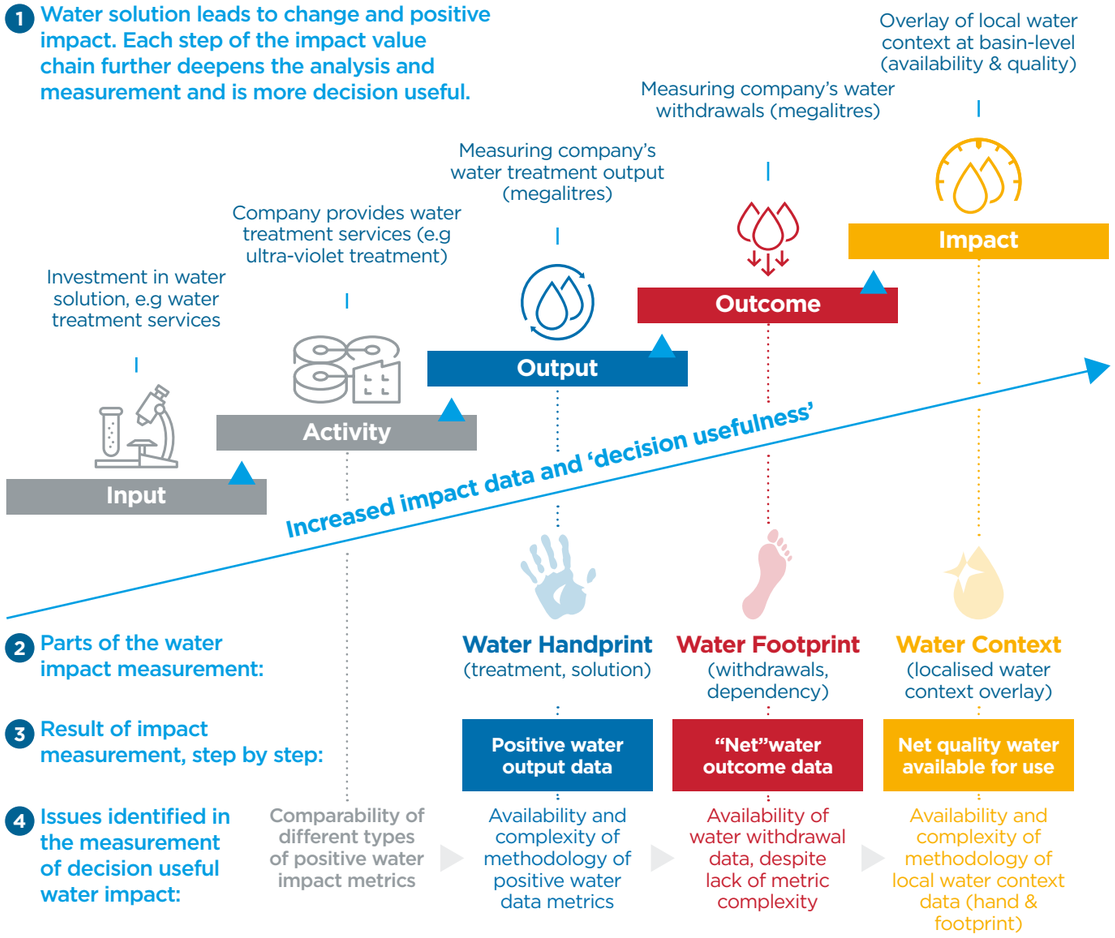
[17]Taming the Green Swan: How to improve climate-related financial risk assessments - Research Collection (ethz.ch)

The main takeaways from the dashboard is that basic metrics such as water withdrawals, both direct and indirect are important and decision useful, but not as widely available as they should be. On the water handprint side, water savings is important and decision useful, but the methodologies are highly complex, hence availability is low. In the water context area, water quantity is a very useful and much easier metric to obtain and measure than water quality. It is very location-specific whether water quantity or quality is more important. In general, both are becoming more important, due to increasing water scarcity and increasing water pollution. The overall conclusion is that all three elements are needed to provide a full picture of a company's water status (risks and opportunities) and for the analysis to be optimally decision useful.

A practical assessment of water impact measurement

A Theory of Change framework can be used to put the impact metrics into practical use. It illustrates the impact value chain, starting with initial activities and achieving greater information and insights regarding the water impacts and ultimately with complete, decision-grade information that may be quantified and reported. Integrating these three separate steps can yield highly decision useful "net quality water available" data. This data can then be used to assess how many people, households or businesses have access to safe water. This is the ultimate impact data that really matters at a societal level: real-life impact.

Figure 7: Water Impact Value Chain: A water investment example (water treatment company)



Source: Impax Asset Management

The graphic illustrates a hypothetical example of an investment in a water treatment company. It identifies, firstly what data is needed for a full picture of water impact, what each step in the chain contributes and results in and finally where the current gaps and practical challenges for effective measurement of water impact reside in the water impact value chain.

Two main challenges inhibit investors' water impact measurement and reporting:

1. **Data availability:**
   - Lack of basic *water withdrawal* data, leading to difficulty measuring dependencies and "net water impact"
   - Lack of *positive water impact measurement and data*
   - Lack of *localised water data and context* (localised *scarcity*, impacted by limited *supply or competing demand, and quality)*

Companies and investors have overlooked water withdrawal data. The availability of that data is often poor, both for direct water withdrawals in operations and indirect water withdrawals in supply chains, which prevents the understanding of companies' water risks, dependencies and "net water impact".

There is a lack of corporate reporting of data relating to positive water outputs, which makes it difficult to consistently quantify positive water impact and for investors to identify solution providers that stand to benefit from solving global water challenges.

The lack of positive water data often stems from the difficulty of measuring water impact, particularly the amount of water saved, because water solutions are used in various different applications and in diverse end markets. Data relating to local water context (scarcity, quality and competing users or polluters) at the point of withdrawal from a watershed as well as during a product's or service's use phase is critical information for water impact measurement, but scarcely measured or reported. Water quality metrics in particular are unavailable, which is explained at least in part by the lack of definitions of water quality.

2. **Methodological issues**
   - Lack of comparability of the water impact metrics and the underlying activities
   - Calculating "net water impact"

All water impact metrics are distinct and necessary. Water saved can seem like the "deepest blue" water impact, but it has less impact where water is abundant or where water is available but is heavily polluted. In that case water treatment is likely to have much more of an impact. It is not possible or appropriate to rank them; their importance is heavily dependent on the local water context.

In most cases the water impact metrics are strongly interlinked, i.e. both treatment and provision of water are required for the services by water utilities. In particular locations, there may be a rank or priority for a water solution or metrics, but not globally, universally or at the investment portfolio level. It is important to report on the various water impact metrics separately.

"Net water impact" can potentially be useful for high-level comparisons of water impact, but we recommend that withdrawals and positive water impact be assessed and reported separately for transparency. This is also important as water savings and withdrawals can occur at very different locations, times and in very different contexts and "netting" is hence not appropriate.

Water impact best practice framework

We looked for useful corporate water impact frameworks and tools that help highlight best practices and guide corporates to address water from a holistic net impact perspective, and that is investment decision useful.

Guidelines mainly address water dependency and risk mitigation; we have gathered best practice approaches into a framework based on our own experience with water impact measurement and reporting, as well as insights gained throughout this project. The framework adds internal water governance and external water stewardship to the "net water impact" aspects discussed earlier in this chapter.

Figure 8: Corporate water impact best practice framework

Internal water governance

1. Ensure oversight by assigning responsibility for water-related issues to the board and executive leadership
2. Integrate water into the business strategy, product design, capital and financial planning
3. Use shadow water pricing for water project NPV calculations
4. Link compensation to water impact performance targets
5. Establish a water management system and seek certification by reputable accreditation bodies

Net water impact

Water Footprint
withdrawal - consumption

1. Disclose robust water withdrawal data
2. Assess and disclose supply chain exposure to water security
3. Disclose relevant and comprehensive water data (company reports, CDP)
4. Set absolute water use reduction targets
5. Map and disclose water use at water stressed sites (availability and quality)
6. Scenario analysis of water stress (value at risk)
7. Set forward-looking context-based water use reduction targets

Water Handprint
saving – treatment – provision

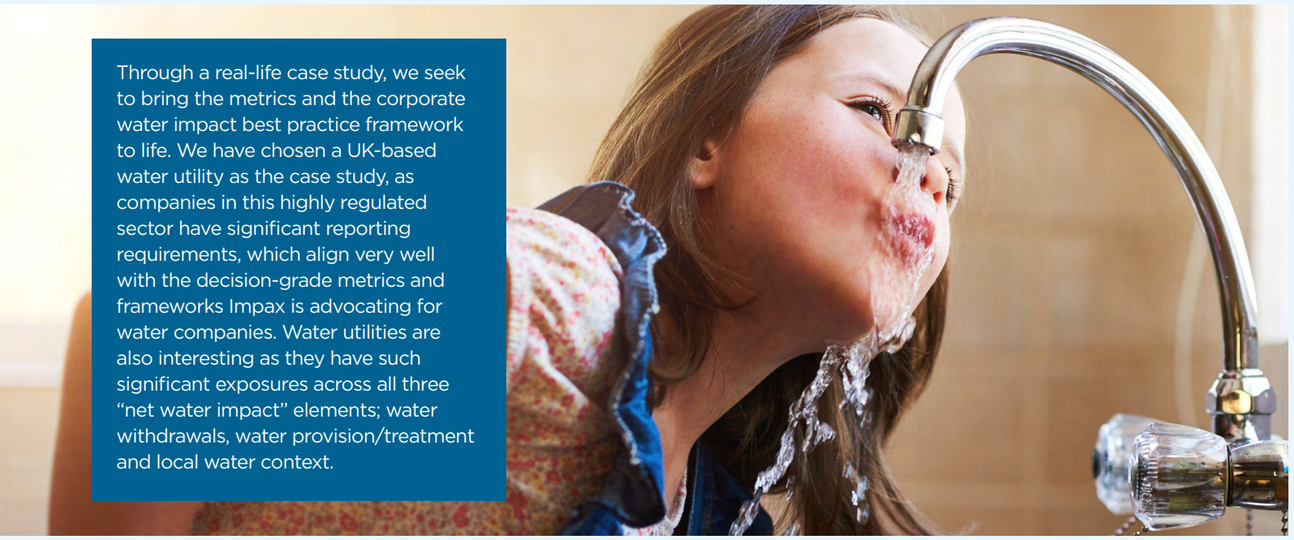
1. Define water solution and establish robust impact baseline
2. Measure positive impact data from water solution products or services
3. Disclose supporting information (assumptions, data sources)
4. Quantify and disclose the positive water impact (saving, treatment, provision)
5. Report on the local context of water impact in major regional end markets
6. Set longer-term strategic water impact performance goals, e.g. for regenerative water management or net positive water impact

Assess water context at basin-level: current and future
Water **Footprint** & **Handprint**

External water stewardship

1. Engage with other water users in the local watershed
2. Participate in initiatives to share knowledge, build understanding on best practices and foster industry collaboration, progress and standard setting

Source: Impax Asset Management



Through a real-life case study, we seek to bring the metrics and the corporate water impact best practice framework to life. We have chosen a UK-based water utility as the case study, as companies in this highly regulated sector have significant reporting requirements, which align very well with the decision-grade metrics and frameworks Impax is advocating for water companies. Water utilities are also interesting as they have such significant exposures across all three "net water impact" elements; water withdrawals, water provision/treatment and local water context.

Severn Trent plc

Severn Trent is a prime example of progressive water stewardship processes and reporting. As a significant water utility company based in the central United Kingdom, 4.6 million households and businesses rely on Severn Trent to provide, treat, and dispose of their water.

The company provides approximately 730 billion litres of water annually and has signed a pledge to reach carbon-zero emissions and use only renewable energy by 2030. Severn Trent also consistently provides regular information on their operational activities, maintaining high water reporting standards across a series of metrics that align with several categories of the *Water Impact Metric Dashboard* and the *Corporate Water Impact Framework*.

This case study contextualises positive and negative water impacts from a local water utility's perspective in a temperate and developed region with complex water quality and quantity indicators. Severn Trent operates in two primary catchments: The River Severn and Trent Valley Basin.

Water quantities are assessed annually in each basin to establish a sustainable withdrawal rate for water provision. Average precipitation levels are expected to remain at similar levels in this region after accounting for climate change, while seasonal variations are likely to increase winter rainfalls and reduce summer rain (Environment Agency, UKCP 2018).

Water quality issues are of great importance in this region. Britain has improved its ecological status over the past several decades although it still faces issues of pollution and habitat disruption.

Top contributors to surface water and groundwater impacts in the United Kingdom[18]

- Chemical pollution
- Altered habitats resulting from morphological changes
- Nutrient pollution
- Organic pollution
- Altered habitats resulting from hydrological changes
- Acidification

Anthropogenic pressures, such as temperature increases, nitrate pollution, changes in river structures, abstraction, and introduced species, have materially affected water quality in several sub-regions throughout Severn Trent's operational region. The firm counteracts these water body issues through a sequence of conservational management programmes designed to enhance local ecological and hydrological systems. These include natural solutions such as establishing wildflower meadows and restoring bogs, moors, and peatland. The Aqueduct Water Risk Atlas helps us to decipher where water quality and quantity issues lie and therefore where interventions can be most impactful.

[18]European Environment Agency, 2018

Governance

The *Corporate Sustainability Committee* (a Board Committee) has oversight of Severn Trent's key non-financial risks. A portion of the CEO's incentive-based remuneration is linked to Environment *Outcome Delivery Incentives* ("ODIs") related to the company's mission to "improve the environment we live in". Severn Trent plans its capital expenditure and strategic decisions over a twenty-year period to ensure that water use falls within its region's water availability parameters. Furthermore, Severn Trent has incorporated the philosophy that it is in the best interest for an integrated water utility company like Severn Trent to maintain good environmental standing into its strategic water resources plan by reducing phosphorus-levels in treated water discharge throughout 2,100 km of river land within which it operates. This aligns with the company's regulatory obligations and reporting.

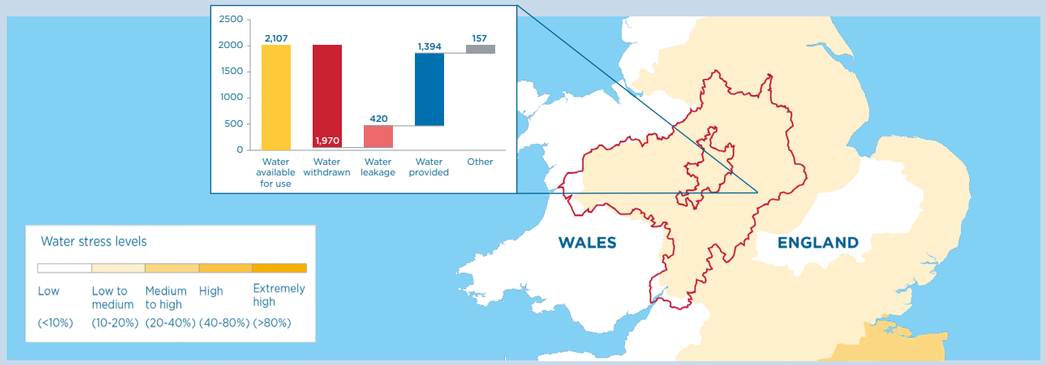
Contextualised net water impact

Water provision

Severn Trent provides 434 litres of water per day to each of its 4.6 million customers in the Severn Trent Coverage Zone in the River Severn and Trent Valley Basin catchment areas. The company divides its water provision operations into fifteen water resource zones based on the uses and provision source in each sub region as well as to account for the historical infrastructure in place for each region. Each zone records its water provision, availability, leakage, and consumption metrics on an annual basis to allow Severn Trent to manage its water resources and allocate funds towards capital maintenance and expenditure.

Water impact can be regarded as a function of water withdrawal versus regional availability by using a waterfall graph as seen on the chart below. This allows us to examine the degree of abstraction within the water availability boundaries outlined by the Environment Agency. The withdrawal figure may then be broken down into further categories such as *provided water*, *leaked water;* and *other*, which includes water lost in the treatment process.

Figure 8: Current Overall Water Risks (incl Water Quantity + Quality Risks) in 2019, Overlayed on Severn Trent Coverage Zone



Source: Aqueduct Risk Atlas, 2019.[19]

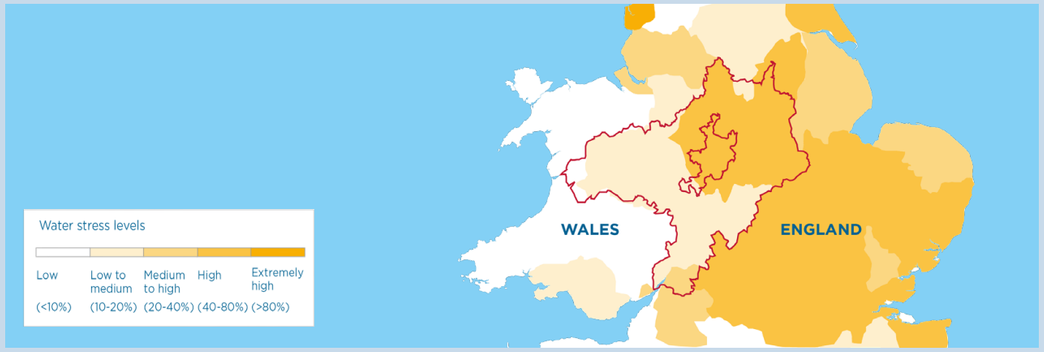
Included in the overall water risk overlay, the Severn Trent provision and treatment region falls along an area of moderate present physical water quantity risk. The physical water quantity risk overlay is a function of aggregating a series of weighted **present** water quantity risk indicators including water stress, depletion, interannual variability, groundwater table decline, flood risk, and drought risk. The principal concept communicates issues relating to the magnitude, probability, and impact of areas with too little or too much water.

Also included in the overall water risk overlay is an Aqueduct water quality indicator offering a high-level estimation of how fit a river basin is to provide basic drinking water if it is treated. Like most regions in Europe and North America, Severn Trent's coverage zone currently faces relatively low water quality risk, while higher risks are prevalent throughout the tropics.

It is also insightful to consider forecasted **future** water stress which demonstrates regions where competition for water resources by human actors will be greater than water availability. Greater risks are found in the northern half of Severn Trent's coverage zone, most of which lies along the Trent river basin. Many physical volumetric water scarcity risks in the United Kingdom stem from a higher likelihood of summer droughts resulting from climate change and increased projected water consumption.

[19]The Aqueduct water risk indication tool demonstrates the approximate level of physical quantity and quality stressors associated with the local catchment basins by assessing a series of climatic and anthropogenic pressure variables based on scientifically agreed upon weightings and applies an updated risk value to sub-regions globally. It is a helpful tool for high-level guidance and forecasting, although more specific studies can be helpful for understanding localized water issues in a given context.

Figure 9: Future forecasted Water Quantity Risks in 2040 (Business as Usual scenario), Overlayed on Severn Trent Coverage Zone



Source: Aqueduct Risk Atlas, 2019

As shown below, baseline withdrawal generally falls within the boundaries of sustainable availability throughout all regions in the coverage zone, except for Nottinghamshire which is slightly overdrawn. Overall, the company operates within the local water availability, however the table and figures illustrate that the local and overall net water availability margins are thin.

Figure 10:

	REGION	UNIT	BASELINE WATER WITHDRAWAL	WATER LEAKAGE	WATER PROVIDED ('CONSUMED')	WATER AVAILABLE FOR USE	WATER WITHDRAWAL AS % OF AVAILABLE
1	Strategic Grid	Megaliters / Day	1,296.0	272.0	912.0	1,303.0	100%
2	Bishops Castle	Megaliters / Day	2.1	0.6	1.3	4.9	43%
3	Chester	Megaliters / Day	26.4	2.9	21.1	28.0	94%
4	Forest & Stroud	Megaliters / Day	44.3	15.0	26.5	44.6	99%
5	Kinsall	Megaliters / Day	4.5	1.1	3.1	4.8	93%
6	Mardy	Megaliters / Day	3.1	0.9	1.6	3.7	84%
7	Newark	Megaliters / Day	11.4	1.8	8.7	18.5	62%
8	North Staffs	Megaliters / Day	126.0	29.4	88.1	129.7	97%
9	Nottinghamshire	Megaliters / Day	238.9	45.6	169.8	236.5	101%
10	Rutland	Megaliters / Day	8.1	1.9	5.9	10.0	81%
11	Ruyton	Megaliters / Day	4.4	1.6	2.5	5.1	86%
12	Shelton	Megaliters / Day	112.7	24.0	80.2	126.9	89%
13	Staffordshire	Megaliters / Day	23.7	5.4	16.6	24.2	98%
14	Whitchurch & Wem	Megaliters / Day	9.4	3.0	5.9	10.6	89%
15	Wolverhampton	Megaliters / Day	59.1	14.4	41.1	66.7	89%
Total - all areas covered by SVT		Megaliters / **Day**	**1,970**	**420**	**1,384**	**2,017**	**98%**
		Megaliters **Annually**	719,167	153,183	505,160	736,161	

Severn Trent Water Provision Analysis by Region. Source: Severn Trent

Marking a stark contrast to the low water risk in the Aqueduct Risk Tool as outlined above, indicators from the Environment Agency tell a different story relating to chemical and ecological water quality throughout the Severn and Trent river basins: All water bodies in each basin fail the 'chemical status' test which highlight chemical pollution in the region, while the ecological status is largely moderate or poor in each region (Environment Agency, 2020). This demonstrates the complexity and variability involved in assessing relative water quality datasets (as further highlighted below right).

In sum, a water quality model incorporating nitrate and chemical pollution thresholds would be more helpful for most regions in England, while a quantitative hydrological budgeting model could be more applicable in for instance southern Spain where physical volumetric water scarcity is a greater issue.

Water treatment

Severn Trent treats over one billion litres of wastewater annually, with an aim to reduce wastewater pollutants by 50% by 2025. To convey the example of complexity in water reporting, we can look to Birmingham which retrieves and discharges water from various different sources to service its provision needs. About 320Ml/d of water is transferred over 100km by gravity from a naturally filled raw water reservoir complex in mid Wales to two raw water reservoirs adjacent to one of the UK's largest water treatment works. The flow is augmented from an additional river offtake at the River Severn. Here the water is treated to drinking water standard before being provided to 1.2 million people across the 'second' city.

Stewardship

The company's restoration team is introducing natural solutions such as naturalised channels or brooks that maintain environmental flows that are fundamental to achieving a 'good' ecological status. The Battlefield Brook, for example, travels above over-abstracted groundwater sources and naturally replenishes it through natural percolation of a proportion of the brook's streamflow.

Further to water body restoration projects, the STEPS programme (Severn Trent Environmental Protection Scheme) offers grants to farmers for practices that generate less runoff pollution. This payment for ecosystem services is expected to grant £5 million annually and negate £74 million in water treatment costs. Grants are offered based on localised farmer needs and the common pursuit of biodiversity outcomes. They can include rainwater harvesting equipment to water course fencing as well as natural solutions such as agricultural wetlands and sedimentation ponds.

Conclusions

Severn Trent is an example of a firm with a strong sustainability mandate that is continuing to improve its water reporting standards. While additional information could be offered publicly relating to regional water quality issues and stress maps, the company provides updated and detailed provision metrics to inform investors and the public of the net impact of its operations. In further iterations of its sustainability reports, Severn Trent can include more extensive quantitative datasets on a localised basis to accurately portray the positive and negative impacts it generates. This case study demonstrates the regional nuances associated with water utility operations and therefore the challenges and opportunities in reporting water impacts in a material manner.

The challenge in weighting water quality risks

Water quality is among the most challenging dimensions of understanding regional water risk. Unlike water quantity and general stress risks that rely on an intuitive function of volumetric water flow and terrestrial storage capacity, water quality models can include hundreds of variables that can be weighted differently based on the intention of the model.

The goal of achieving a high standard of water quality can refer to several different meanings, each with separate outcomes. Water quality can translate to a water body's capacity for treatment for drinking water provision, its recreational uses, or its ecological status. In addition to the complexities arising from the lack of a common definition, water quality is also subject to significant spatial and temporal variability. For example, quality can be especially degraded over several months of the year when fertilizer runoff is high.

These challenges lead to inconclusive water quality data overlays due to a lack of consensus on the definition and weighting of water quality models, and instead require more in-depth analysis at the sub-catchment basin scale.

6. THE ROLE OF INVESTORS

There has been progress in corporate reporting on material sustainability issues and impact in general, but also in relation to water, but much more is still required for reported data to be complete and decision useful. Investors have an important role to play in advocating for improved transparency and for reporting frameworks and data that are fit for purpose. Investors can also have positive impact through their investment decisions. This section will examine the role of investors in achieving positive water impact.

Investor impact through investing in water solutions companies

Investors in listed companies providing water solutions can contribute to the development and growth of the sector in the following ways:

- Identifying companies providing water solutions and adding them to robustly defined investable water universes and portfolios. This may help support and establish a market for water solutions. This matters as the cost of inaction on water is more than five times higher than the cost of acting through innovation and solutions, says a recent CDP water report.[20]
- Quantifying robust water impact metrics and methodologies and highlighting the best performers.

Water solution providers have significant positive impact through their products and services. Investors in companies providing solutions to unmet environmental and societal needs, like water, are well positioned for the transition to a more sustainable economy and are likely to see higher growth and strong long-term financial returns.

Investor impact through engagement with water companies

Investors can influence water companies through individual or collaborative engagements, proxy voting or shareholder filings on water.

Corporate engagement priorities on water[21]:

- Internal water governance (especially shadow water pricing, incentives)
- Consistent water withdrawal data by location
- Operational efficiency management and targets
- Positive water impact data from products and services
- Location-data of company assets and facilities
- Location-based hydrological context and condition data
- Linking water to financial aspects, calculating e.g. Value at Risk (VaR)

Engaging with investee companies is key to turning the tide towards solving water challenges. Existing investor guidelines for engaging with companies on water in the broader sense tend to address companies exposed to water risks and how they can mitigate them. One such example is the Water Response Engagement Questions provided in the Ceres Investor Water Toolkit.[22]

Investor engagement guidelines relating to impact data and reporting are lacking. We have gathered some practical engagement approaches that we have found useful in engaging with companies on impact data:

Water impact engagements - specific considerations

Materiality

Where water use or dependency is high, the case for materiality is relatively clear. However, in cases where water is not operationally material (given low consumption volumes and often near-zero water costs), it may still be important from a strategic perspective: where a company's business is linked directly or indirectly to water-related activities, their downstream markets are likely to regard water as material. Water can be both operationally and strategically material.

Importance of definitions

In an environment where standards and baselines are lacking and data and information gaps are often bridged with assumptions and estimates, a company's own underlying definitions and assumptions are crucial alongside impact measurements to lend context, explanation and clarification. In impact measurement, context is key, especially further in the "impact value chain", where qualitative, narrative, and contextual "data" and information becomes more prevalent and relevant.

Local context & location data

Water use and water impact need to be examined relative to the local water context at the point of withdrawal and impact. Water use in water-stressed regions is to be considered separately and likewise any positive impact achieved through products and services needs to be put in perspective of the local context in the end markets. Companies should be encouraged to increase their transparency on location-specific data to facilitate decision-grade net water impact data.

End market complexities

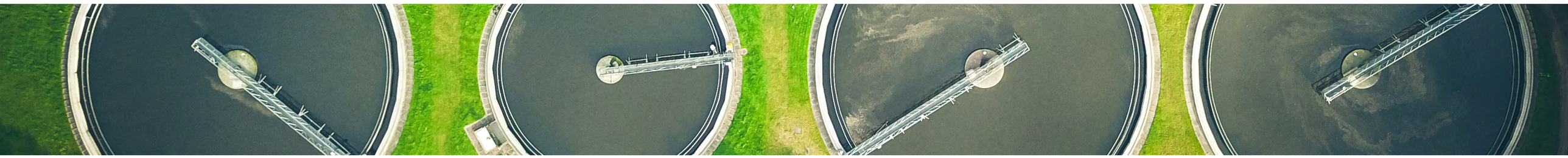
Water companies often point to their broad applications and diverse end markets as barriers for measuring the impact of their solutions. In those instances, we find it helps to adopt a pragmatic approach: End market complexities should not be a deterrent. Impact assumptions and estimates can help bridge complexities: average efficiency rates or impact ranges may still provide a highly insightful initial assessment.

Interactive dialogue

When companies are not measuring and reporting on water impact, it can be helpful to approach companies with our preliminary data or impact assumptions and ask for companies' feedback on it, instead of simply asking the company to "report on water impact".

Benchmarking

It is useful to emphasise to companies how important positive impact reporting has become to investors and other stakeholders. It can be effective to highlight peer companies reporting on water impact and which methodologies and reporting frameworks have been used.



[20] CDP_Water_analysis_report_2020.pdf [21] As per the components of the "Corporate water impact best practice framework" on page 18.

[22] https://www.ceres.org/resources/toolkits/investor-water-toolkit

Investor impact through engagement with reporting framework organisations

Reporting frameworks shape the data that companies measure and report, they play a highly significant role in what corporate sustainability reporting looks like. There is a proliferation of sustainability frameworks and in the last years there have been efforts to harmonise some of them, as well as formal consolidation. There is also increasing focus on integrating material sustainability aspects into corporate financial reporting. Through direct individual or collaborative engagements, participation in working groups and through consultation processes, investors can influence reporting frameworks by asking for:

- **Expansion and clarification of the definitions of materiality to include not just operational materiality, but also consider strategic materiality.** This would ensure that companies that are critical in the water value chain are required to be more transparent in reporting water data.
- **Metrics and reporting of water extraction and withdrawal, by location.**
- **Inclusion of metrics relating to solutions, opportunities and positive impact in reporting frameworks.** Research points to the economic importance of using technology and solutions in tackling global water challenges, incremental water stewardship alone is not sufficient. Sustainability frameworks should increasingly recognise this.[23]
- **Attention to the decision usefulness, quality, comparability and accountability of metrics and data.** For water this would require net water impact data and the all-important local hydrological condition or context data to determine the net quality water available. Qualitative, narrative or contextual data and metrics can be highly decision useful and should not be overlooked.
- **Consideration of the intersectionality of issues and metrics.** Water is often overlooked in corporate reporting, but it is highly interlinked and relevant in the context of both climate and biodiversity, areas of more investor and corporate attention. Joined-up, intersectional thinking can avoid the unintended oversight of an important area, such as water.
- **Focus on reporting framework guideline quality.** Framework data and metric requirements and methodologies are most important, however reporting guidelines can be highly influential and play an important educational part. Guidelines can describe the direction of travel, with future aspirational reporting and metrics, enabling corporates to recognise best practice and future reporting requirements.

Investor impact through advocacy with policy makers

Asking policy makers for clear, long-term "investment grade" water policies and reporting requirements is particularly timely. Good public policy is crucial – the Clean Water Act in the US has been enormously influential, for example.

Current policy advocacy priorities on water:

- Water quality/pollutant regulation
- Water quality/pollution reporting standards (especially PFAS, medical traces, nitrates)
- Water pricing reflecting local water supply/demand and quality
- Water pricing reflecting type of end-user and withdrawal volumes
- Mandating reporting of water extraction by location
- Regional and national "green taxonomies" (feed-back)

Many countries and regions, notably the EU are establishing taxonomies for "green" investments.[24] Investors should provide insights that enable the taxonomies to aid decision-making and avoid unintended consequences and political interference that could undermine the taxonomy and risk further "green washing".

Policy advocacy can be conducted through direct individual or collaborative engagement, participation in working groups, activity in industry membership organisations and through formal consultation processes.

[23]TCFD, the Taskforce on Climate-related Financial Reporting has been leading in explicitly including climate opportunities in the reporting requirements. [24]A member of the Technical Expert Group (TEG) says the forthcoming water element of the EU Sustainable Finance Taxonomy is set to follow a similar process to the climate element of the taxonomy; the most water-intensive sectors in Europe will be identified, leading to an assessment of the respective enabling solutions. Eligible activities are likely to sit in similar types of categories: 1) Activities with a low water footprint, 2) Transitioning activities where water efficiency is increasing, and 3) Activities that enable water objectives to be met, the solution providers. The process will use science to establish how best to meet EU environmental targets. A member of the TEG cautions that water indicators are not yet developed and expects to see more use of qualitative metrics.

General good practices for policy advocacy:

1. Establish potential for win/win solutions, i.e. identify areas where policy makers are seeking to mobilise private capital where the de-risking of investment decisions will also reduce delivery risk for policy makers.
2. Offer insights into how decisions on allocation of capital are made in order to build shared understanding about role of policy in influencing those decisions, thereby building trust that investors aren't looking for government handouts.
3. Willingness to roll up sleeves and engage in detail of how to address challenges faced in individual sectors.

Investor impact through water impact reporting

The aim of water impact measurement is to provide a concrete demonstration of the activities and solutions of investee companies. Additionally, in-depth impact analysis can become highly decision useful. It goes well beyond being a mere reporting exercise.

Priorities for further developing water impact measurement and reporting:

- Methodologies and data for measurement of water savings
- Obtaining and connecting water foot- and handprint data to local water conditions
- Definitions, methodologies and data relating water quality

Investors can have positive water impact by engaging with companies, reporting framework organisations, industry organisations and policy makers relating to impact measurement and data as well as reporting best practices, bringing investor and practitioner insights and perspectives into impact measurement and reporting.

7. CONCLUSIONS AND NEXT STEPS

Water is vital to life and to virtually every business in the world. Yet it is also a systemic and unpriced global challenge with significant economic and societal risks.

There is a slowly growing recognition of the risks relating to water and that incremental efficiency improvements are not sufficient, especially as climate change increases global water challenges. Addressing water risks requires strategic focus, innovation, technology and solutions.

This strategic focus on water is important for both businesses that require water for their operations and for those with business models and activities centred around water.

Activities that are part of corporate strategy tend to get accurately valued and priced, which is something water is lacking today. Water prices are held artificially low in most places due to regulation and as a result, they do not accurately reflect true water supply and demand.

Water solution companies treat, provide and save water. Their positive water output (the "water handprint") can be measured, as can water withdrawal data (the "water footprint") and data on local hydrological conditions. Integrating these three separate datasets can yield highly decision-useful *net quality water available* data. This data can then be used to assess how many people, households or businesses have access to safe water. This is impact data that really matters.

However, water data is not widely available, particularly information on local hydrological conditions and water quality, which is not even clearly defined today. This needs to change rapidly, as chemical water pollution in particular is becoming better understood and the magnitude of the challenges is becoming clearer and regulators' focus on this area is increasing.

We have been able to find a small number of companies that follow what we view as water best practice, with strong internal water governance, measurement and reporting of decision-grade net quality water data, as well as strong external water stewardship with key stakeholders. Severn Trent, featured in our case study, is one example of this.

The most advanced water companies today develop site-level stewardship with other water users in a local watershed, collaborating on water savings, pollution control and even regenerative practices.

We believe investors can have significant positive water impact in a number of ways – by investing in water solutions, engaging with companies and reporting framework organisations, policy advocacy with regulators and policymakers, as well as through rigorous water impact measurement and reporting.

Further analysis and work are required in the following areas:

- Water quality impact measurement, including urgently needed definitions and baselines.
- How water interacts with climate change (physical climate risks) and biodiversity loss, and how these can be taken into account in future water impact measurement.
- The robustness and pathways of emerging water initiatives such as net positive and regenerative water impact by 2050, likely inspired by the net zero carbon initiatives. These are positive initiatives that are introducing net positive water and regenerative water principles. However, where targets are very long-term, the right methodologies and pathways become critical for success.
- When water impact data is strategically and/or operationally material and highly decision useful, the next step is financial quantification and inclusion in corporate financial reporting.

Following this joint-research project, Impax will enhance its water impact reporting by:

- More explicitly including water withdrawal data in the annual impact measurement
- Reporting "net water impact" with added narrative
- Separating out the positive water metrics (saving, treatment, provision)
- Analysing and adding where possible a location-specific hydrological data overlay
- Focusing on water quality and ways to improve data and reporting on this metric

8. ANNEX

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WATER IMPACT FRAMEWORKS

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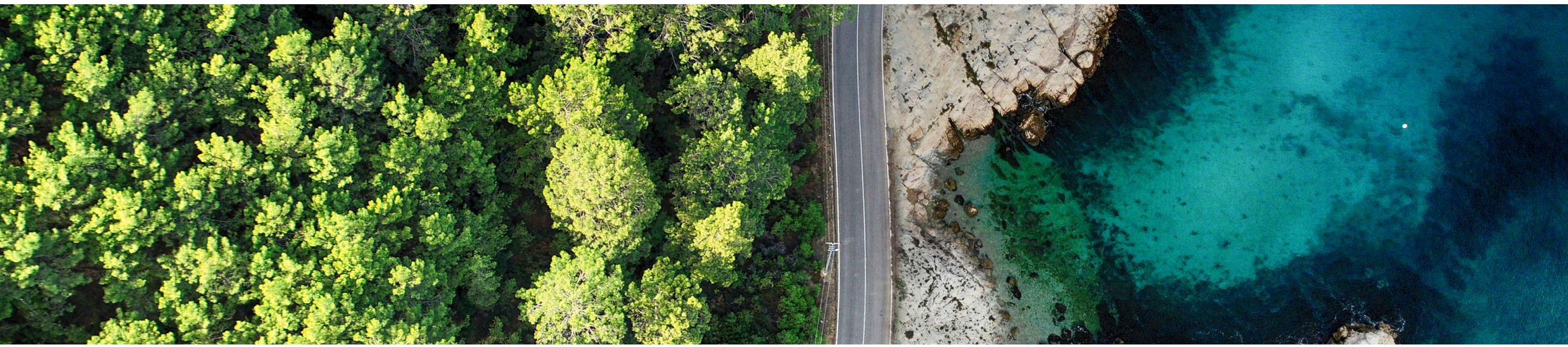

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