The Green Bond

Your insight into sustainable finance

05 September 2024

Investing in water

SEB

In this issue

Investing in water

Letter to the reader

Dear reader,

A little more than 10 years ago, a visit to The Hague marked the beginning of a new journey. It started with a meeting and a pitch to the Dutch Water Bank (NWB). Since then, our engagement with water at SEB has only deepened. Over the years, we have brought investors to water management sites across the Netherlands and introduced the Dutch Water Authorities to investors around the world. Acting as the intermediary, we've had the privilege to observe, learn, and advise.

Building on these foundations, in 2017, we were invited to join the establishment of "Financing Valuing Water," a group of institutional investors now backed by USD 17tn in AUM. This experience has further cemented our belief that water is the next carbon. Here's why:

1. According to UNESCO, USD 1tn in annual investments is needed to achieve SDG 6 (clean water and sanitation).
2. Global Water Intelligence estimates USD 12.6tn will be required by 2035 to meet global water needs.
3. Water infrastructure efficiency is alarmingly low—Europe's non-revenue water (inefficiency in distribution) sits at 25%, while the U.S. is above 20%. In contrast, Tokyo has achieved just 3%.
4. Proactive water management is far more cost-effective than reactive measures. For instance, Singapore's investment in a solid water infrastructure has cost a relatively modest amount (low double digit USD bn), while Houston, unprepared for Hurricane Harvey, faced USD 125 bn in damages.
5. Cities like Cape Town faced the threat of "Day Zero"—a potential water shutdown—but avoided it by investing USD 600mn in infrastructure improvements and mobilizing public engagement.

In short, the need for water investments is immense, and private capital must play a significant role to meet this challenge. The economic case for water infrastructure is often compelling, so why is it not happening at scale?

We've identified a series of economic and governance deadlocks—where competing priorities, lack of coordination, or ownership issues are hindering progress. We believe private capital can help unlock some of these barriers. However, for any collaboration between the public and private sectors to succeed, the governance framework must address the human rights mandate entrusted to public servants and the historical concerns about private sector greed.

To offer further insights into our findings, we are fortunate to have contributions from our colleagues and water experts Åsa Knudsen Sterte, Anne Kristin Kästner, and Orianne Böye addressing regulations and investment needs, Jessica Mattsson reporting on the financial performance of the SEB water basket, as well as input from Global Water Intelligence (GWI) on the broader macro landscape. Theo Kinnersley and I will also share how we spent 12 weeks in the bank's basement this summer, defining our view on the future of water finance to make a solid recommendation to the bank on how to navigate.

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Enjoy your reading,

Christopher Flensborg

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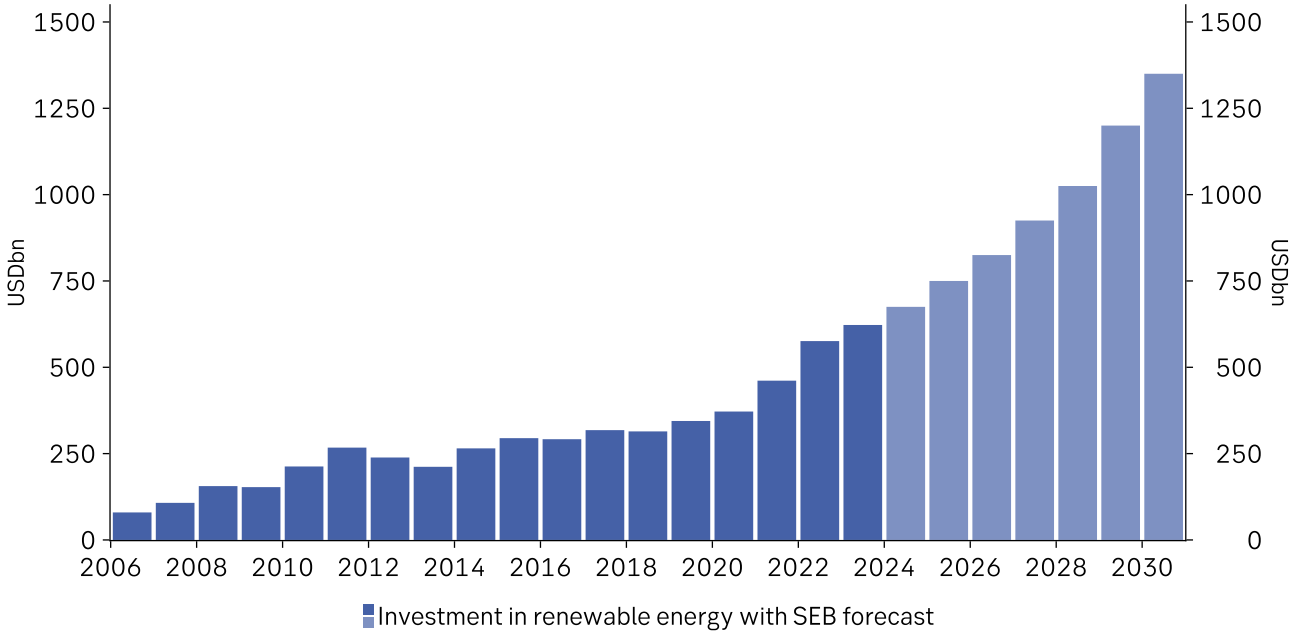
Transition update

The unstoppable transition

The energy transition is still driven by powerful technological forces. China remains far ahead, but Europe and the US need more aggressive policy support to catch up. New AI-driven capital equipment and advances in battery technology will accelerate the transition in the coming years.

Figure 1 Investment in renewable energy with SEB forecast



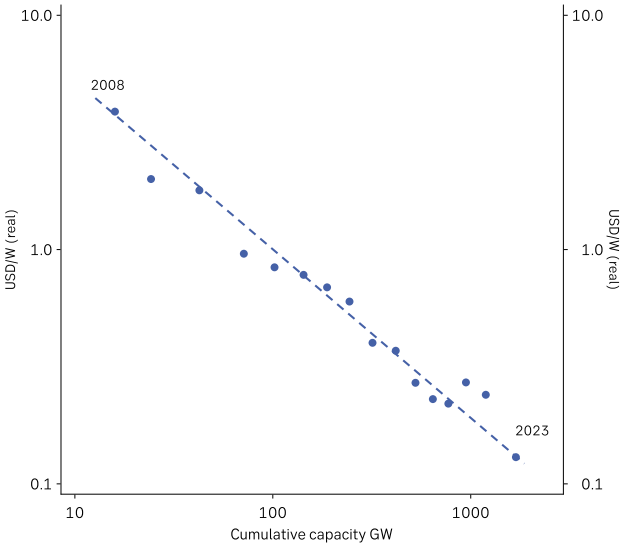
Source: BloombergNEF, SEB

Short term doubts, long term drivers intact

It is fair to say that over the past 1-2 years doubts have crept in about the clean energy transition after the surge in investments from 2020-2022 gave way to flatlining in 2023-2024. In our view, this is likely noise driven by a change in political priorities. The long-term underlying drivers remain as powerful as ever, however the reason why we think the green energy transition is unstoppable has never been about the politics – it was always about the revolutionary technological potential of renewable energy.

When an incumbent technology is replaced by a new and better technology, the driver is invariable a combination of falling prices and improving quality as the new technology scales. This learning curve mechanism is illustrated in Figure 2, that shows how the cost of solar energy collapses as the installed capacity increases. This is similar to Moore's law for computer chips and provides a powerful anchor.

Figure 2 Solar cost and capacity learning curve



Source: BloombergNEF, SEB

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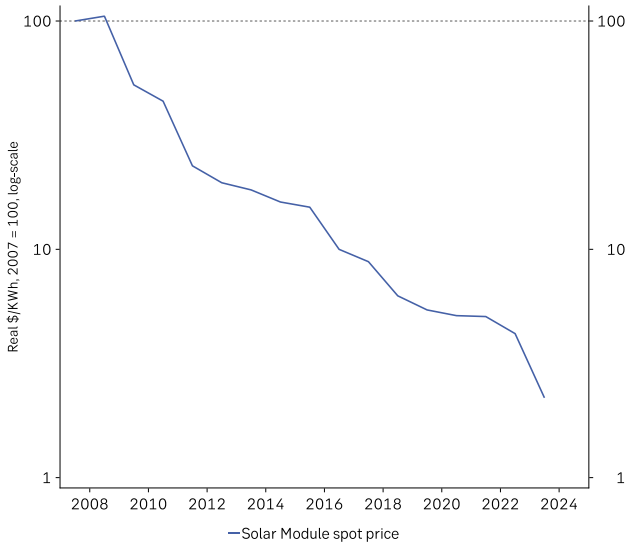
The result of the learning curve process is illustrated in Figure 3, which shows that the cost of producing solar energy has been reduced by 98% over the past 15 years, and there is no indication of a break in this pattern as volumes have picked up. If anything, the rate of decline has accelerated after the pandemic shock.

Figure 3 Solar panel prices

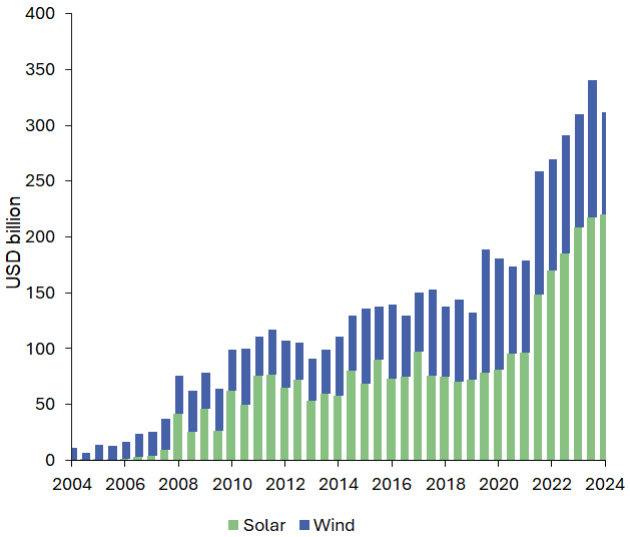


Source: BloombergNEF, SEB

Investments in solar dominate wind

Figure 4 shows the global investments in solar and wind power over the past 20 years. Throughout most of the period, investments in wind and solar were roughly of the same magnitude. This pattern changed around 2021 and almost all of the growth in investments since then have been in solar. Initially, the surge was powered by utility scale solar PV projects, but the past few years have seen a clear shift towards small-scale solar PV projects.

Figure 4 Global investments in renewable energy



Source: BloombergNEF, SEB

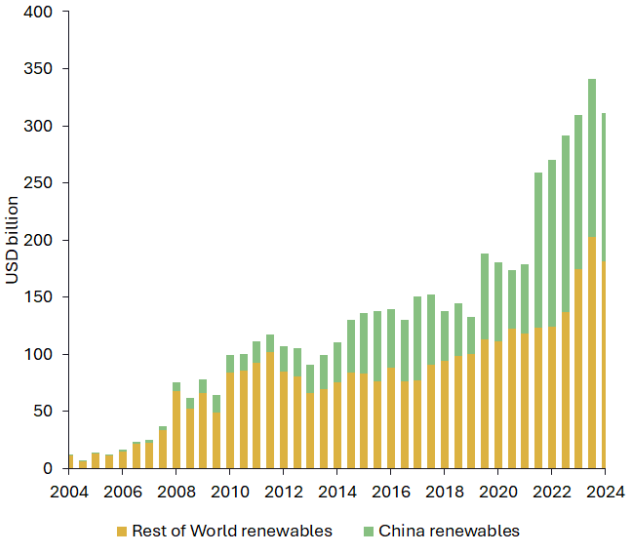
The ability to deploy decentralized energy production was always a key advantage for solar relative to wind in terms of diffusion. This difference is increasing because solar technology tends to become smaller and more modular over time, while wind installations become bigger and more capital intensive. Thus, solar is less dependent on large investment projects requiring a lot of capital. We expect the slowdown in growth rate of investments in solar that we have seen over the past few years to pick up again.

China's advantage to widen further

Solar's competitiveness is also supported by China's excess capacity, which pushes prices down in global markets, whereas wind power is more regionally fragmented. This is a reflection of China's increasing dominance, when it comes to deploying clean energy technologies.

Figure 5 shows that even though China was perhaps a little late in entering the renewable space, they have since ramped up investment faster than the rest of the world and is currently investing almost the same amount every year as the rest of the world combined. The learning curve effect also explains why costs are falling faster in China than in the rest of the world, as production is being scaled faster as part of the government driven effort to reach peak carbon emissions by 2030.

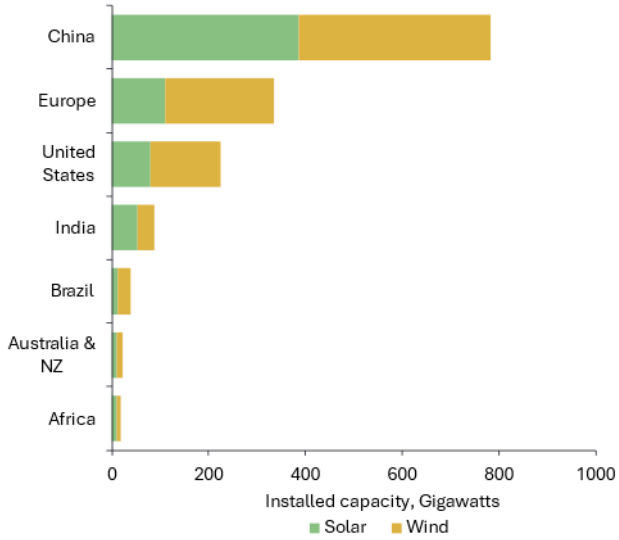
Figure 5 Investment in renewable projects China vs RoW



Source: BloombergNEF, SEB

The result is evident in Figure 6, which shows the total installed capacity of wind and solar power across regions. China's current capacity of 783 GW is more than twice as large as the total capacity in Europe and the US. Moving beyond the big three regions, there is an even wider gap as developing economies remain far behind, with capacity at a fraction of what China can deliver. This remains an area where investors can make a real difference in the speed of the transition by deploying capital.

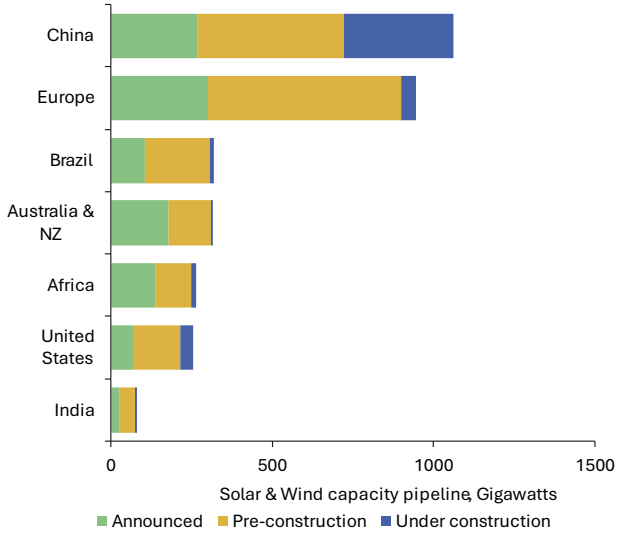
Figure 6 Installed wind and solar capacity



Source: BloombergNEF, SEB

In recent years, both Europe and the US have launched policy initiatives aimed at closing the gap to China, but so far it still looks like China is ahead of the curve. Figure 7 shows the pipeline of wind and solar capacity that are planned or underway for the coming years. Here Europe has caught up to some degree with China, but with one notable caveat. Only 4.6% of the close to 1000 GW planned capacity expansion in Europe is actually under construction compared to 32% in China.

Figure 7 Wind and solar pipeline



Source: BloombergNEF, SEB

In the US, the pipeline does not point to a major ramp up of US investments in clean energy. There is only 255 GW in the renewable capacity pipeline, where 15% is under construction. Again, we note the same difference. The pipeline is larger in Europe than in the US, but the amount that is under construction is virtually the same. One explanation could be that it takes longer to execute a project, so they spend longer time in the pipeline in Europe.

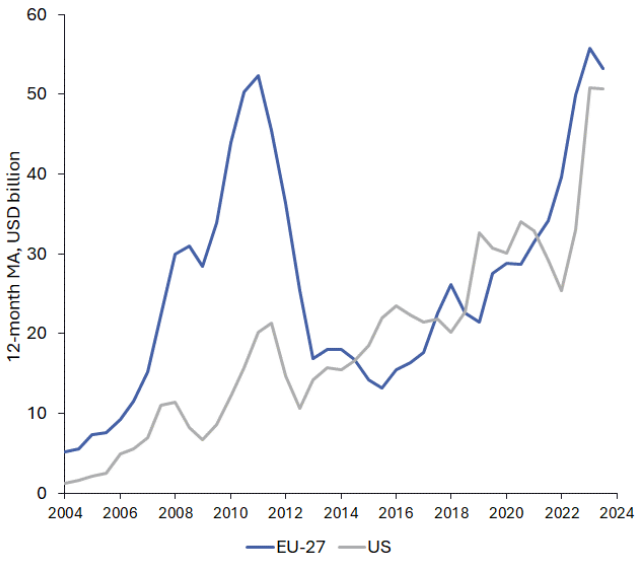
What can the US and Europe do?

No matter how you cut it, the bottom line remains the same: China has a larger installed base and will add more capacity than any other region in the next few years. There are signs of improvement. As Figure 8 shows, renewable energy investment has reached all-time highs in both Europe and the US, even though they remain far below Chinese levels. Catching up with China will require policy support, and both regions face significant challenges.

A recent study[1] from the American Association for the Advancement of Science covering more than 1500 policy initiatives to reduce emissions in 41 countries from 1998-2022, found that there was no silver bullet. The best results came from a combination of subsidies, taxes (like carbon taxes) and regulations (like emission standards). The impact of combined policies was larger than the sum of the parts.

Until now, Europe and the US have chosen to excel in different parts of this policy mix. In the US, the emphasis has been on subsidies, while regulation and pricing face bigger political challenges. In Europe, the emphasis has been on regulation and taxes, while the EU is constrained in its ability to fund subsidies and direct investment.

Figure 8 Investment in solar and wind projects



Source: BloombergNEF, SEB

In the US, the open-ended nature of the IRA does provide long-term support in the shape of subsidies, but no new

[1] Climate policies that achieved major emission reductions: Global evidence from two decades | Science

initiatives have been passed since 2022 and the November election will determine if more are coming.

If the Republicans take the White House, new initiatives are unlikely and in a 'red sweep' with a Republican Congress, parts of the IRA could be rolled back. On the other hand, if current Vice President Harris becomes president, the IRA is likely to continue in its current shape, but major new initiatives probably require that the Democrats also control Congress. Regardless of the outcome, we expect the US to expand renewable energy capacity over the coming years for pure economic reasons, with most of the decisions made at state level. We also expect bipartisan support for the parts of the IRA that support the local supply chain for electrification.

Nonetheless, the November election is likely to be important. Unlike Europe, the cost of fossil energy in the US is not subject to large-scale taxation, which means it takes longer for renewable energy to become competitive. US consumers can buy a litre of petrol for less than one dollar, while a German consumer must pay USD 1.88. More ambitious regulation and increased public investment in energy supply and grid infrastructure could accelerate the process.

Europe's problem remains the lack of central funding for subsidies and direct investment at the EU level, combined with budget constraints at the national level, which has forced policies to focus on regulation and taxation. This has not only slowed the transition, but also made the policies less popular with voters.

The incoming EU commission has promised the next step in the New Green Deal within 100 days. The plans appear to revolve around an EU 'Clean Industrial Deal' aiming to accelerate the transition among energy users. The plan includes non-financial initiatives like making planning, permissions and tendering easier, which is useful, but hardly radical. However, there are also plans to scale up and prioritize 'investment in clean energy infrastructure and technology', maximize public investment and leveraging and de-risking private capital under the lead of the European Investment Bank.

This may point towards an approach with more funding and less regulation, similar to the US approach and perhaps even more aggressive when it comes to direct support for expanding the supply of clean electricity. Without EU funding, national funding constraints are likely to continue holding investment back.

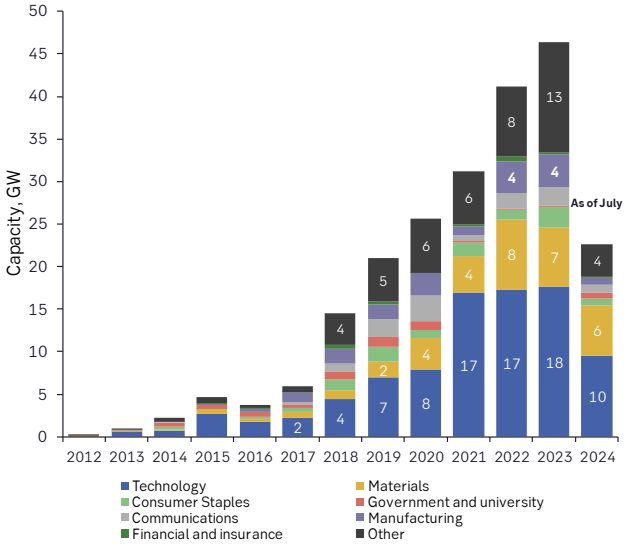
Germany in particular has legal constraints that limit the public sector's ability to invest and subsidies for renewable energy already on the rise as the market price of energy has normalized after the 2022 energy crisis. Next year's national elections in Germany are likely to be important for the future energy policy of Europe and it may be difficult to enact major policy initiatives ahead of the event.

New sources of electricity demand

The growing need to secure energy supply by technology companies has been evident over the past decade, but it accelerated with the emergence of generative AI and the surge in datacentre investment around 2020.

Figure 9 shows that when expansion of datacentres exploded, so did the number of power purchase agreement (PPA) deals by technology companies. Mining companies are also emerging as a major source of demand for clean electricity, most likely because of the rise of electrified and now also autonomous mining equipment. Over the past four years, technology and materials companies account for more than half of all PPA deals.

Figure 9 Global PPA volumes by offtaker



Source: BloombergNEF, SEB

In 2024 the story is no different as big Tech companies account for most of the PPAs, but we also note Rio Tinto are just behind Microsoft in secured capacity. Within the next five years new AI-enabled capital equipment types will start to scale. Autonomous mining equipment is already starting to be deployed and will be followed by autonomous drones, vehicles and humanoid robots.

Common to all of them is that they require enormous amounts of datacentre capacity and must be powered by electricity themselves. This suggests that the private sector will be an even more important source of financing for clean electricity investment.

Energy users to benefit from better batteries

The falling cost of electricity will eventually make electrification inevitable. However, better batteries will be key to accelerating the process, both as storage due to the

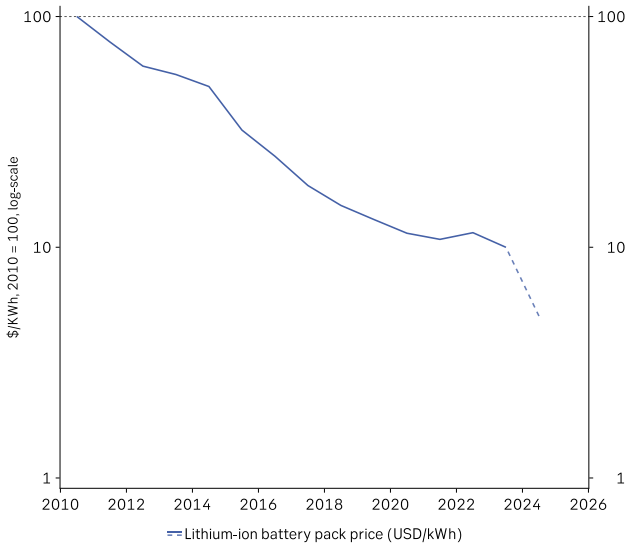
intermittency of clean energy output and because batteries are turning out to be the key connection between primary energy supply and electrification of energy using sectors.

Battery technology exhibits the same disruptive learning curve effect as renewable energy: prices fall as volumes increase, and importantly also with improving quality as prices decline. Quality in the sense that the battery not only becomes cheaper but also smaller and lighter at the same time; this is key to expanding the use of batteries because it reduces the amount of energy that is used.

Electric vehicles are a good example: current versions offer competitive performance only for large vehicles due to the weight of the batteries used, which means the cars are heavy and use a lot of electricity. Smaller, cheaper batteries not only reduce the price of the vehicles we have today, but also open for smaller, more energy-efficient vehicles at even lower prices.

Both trends are evident in the latest data from BloombergNEF. The cost of battery power has declined by 94% since 2010 (Figure 10), but there has also been a vast improvement in the energy density (amount of energy a battery contains compared to weight or size) of batteries compared to current levels.

Figure 10 Battery prices



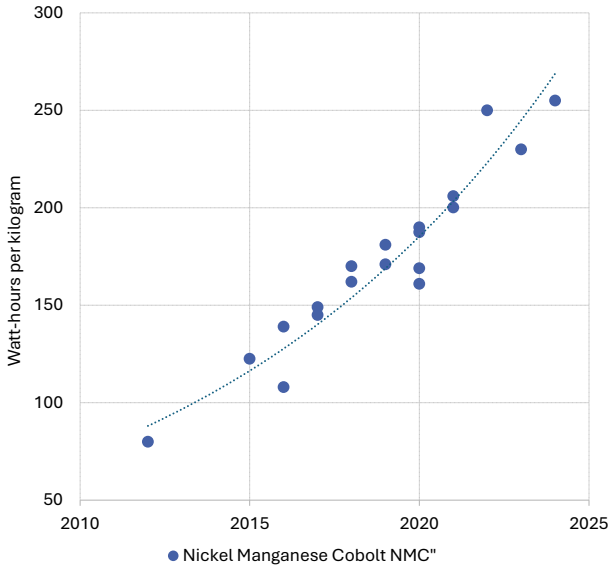
Source: BloombergNEF, SEB

The higher the energy density is, the smaller and lighter the battery must be to provide the same power – provided you can manage the increased incendiary risk. Figure 11 shows the exponential improvement for Nickel-Manganese-Cobolt batteries. New battery technologies are underway that extend this curve. The latest Chinese EV models already offer range of more than 1000 km, the next challenge is to reduce the size and weight of the cars to penetrate the small car segment where volumes are highest – we expect EVs to dominate that space within 2-3 years, at which point market forces take over.

This development has profound implications for the electrification process. First, it will accelerate the transition away from ICE vehicles – within a few years, both price and range will tip decisively in favour of EVs that will also serve as grid storage. Smaller, lighter and cheaper batteries will open more sectors for electrification, especially since there is still limited evidence of a similar learning curve effect for less energy-efficient alternatives such as green hydrogen.

One example is aviation. Chinese battery producer CATL has test-flown a 4-ton civil electric aircraft and expects to release an 8-ton civil electric aircraft in 2027 to 2028. The aircraft uses CATL's Condensed Battery, which has an energy density of up to 500 Wh/kg in a single cell, twice the energy density of current mainstream EV batteries. Prototypes of battery-powered airplanes are also underway in other parts of the world. Just a few years ago, battery technology would not have suggested that this would be possible even over 5-10 years.

Figure 11 Historical battery-pack energy density



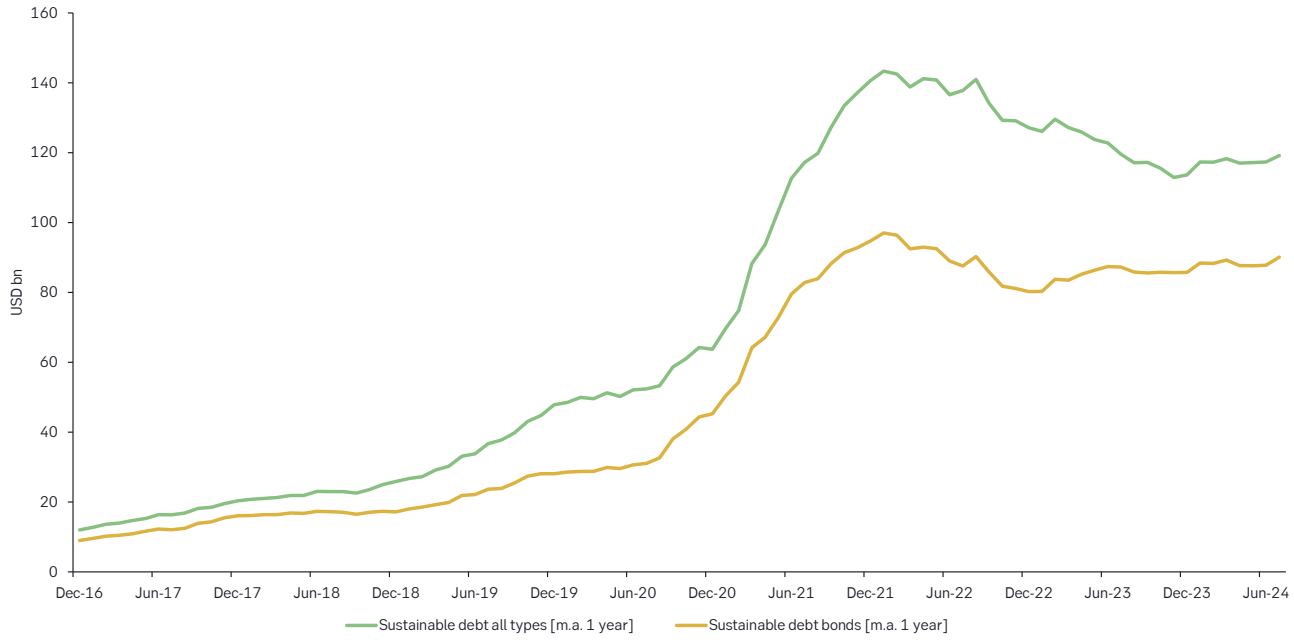
Source: BloombergNEF, SEB

Sustainable finance market update

Light at the end of the tunnel

The sustainable debt market in 2024 has so far reached USD 926bn driven by a strong growth in North America, Oceania and by Supranational institutions. Sustainability-linked bonds continue to struggle and a third of European SLBs have either missed or are on track to miss their sustainability targets with large differences between sectors.

Figure 12 Rolling sustainable debt transaction average



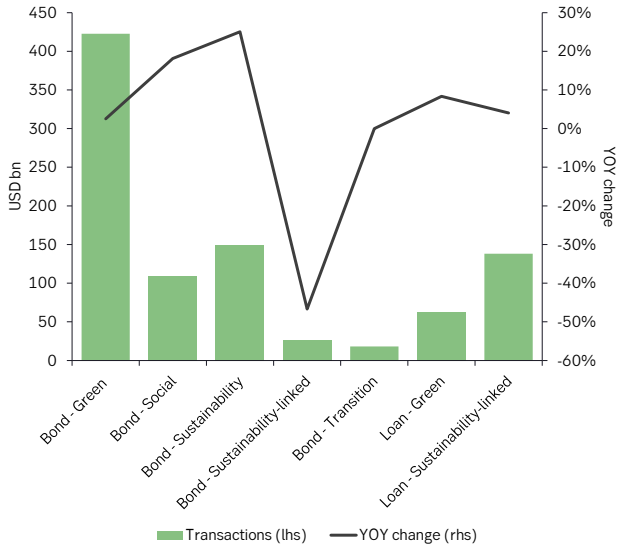
Source: SEB, BloombergNEF 31 July 2024

Sustainable finance market continues to recovery slowly

New sustainable bond and loan transactions between January and July 2024 reached a total of USD 929bn. This is almost 70bn – or 8% – above the same period last year, and just below new sustainable bond transactions in the first seven months of 2022.

Green bonds lead the sustainable finance market in 2024 with new issuance amounting to USD 423bn only up 2.5% YOY. Sustainability bonds have reached USD 149bn so far this year, up 25% compared to last year. Sustainability-linked bonds continue to decline, with new issuance falling by almost 50% to just USD 26bn until July. Social bonds have grown by 18% YOY to USD 109bn. A total of USD 18bn in transition bonds have been issued so far in 2024. Both green and sustainability-linked loan transactions have seen slight YOY improvements of 8% and 4%, respectively.

Figure 13 Sustainable debt transactions by product



Source: SEB, Bloomberg 31 July 2024

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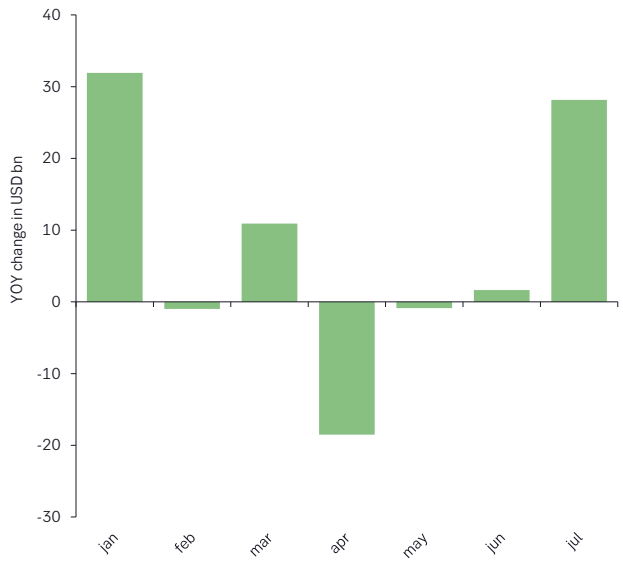
Sustainable bond market

After strong growth in the first quarter of 2024, the market for green, sustainable, social and sustainability-linked bonds suffered a decline in the second quarter. Figures for July now shows that growth has returned.

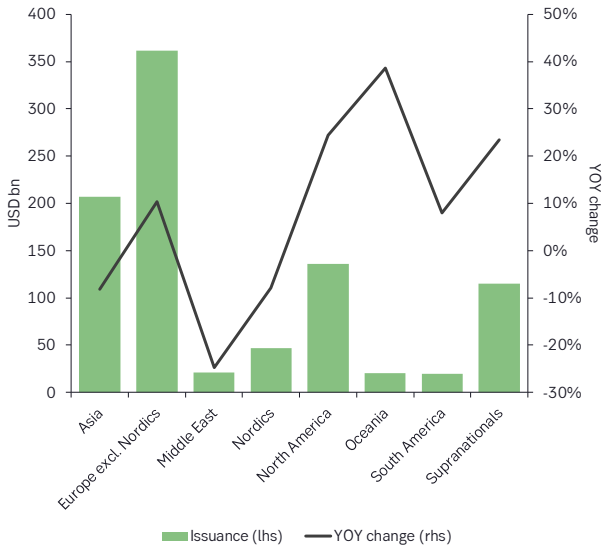
Figure 14 YOY change in sustainable bond issuance



Source: SEB, BloombergNEF 31 July 2024

At the regional level, sustainable bonds continue to grow in the western hemisphere with issuance increasing by 10% in Europe, 24% in North America and 39% in Oceania. Supranational institutions have seen a notable uptick in new sustainable bond issuance by 23% to USD 115bn so far in 2024. However, Asia has seen an 8% YOY decline in new sustainable bond issuance.

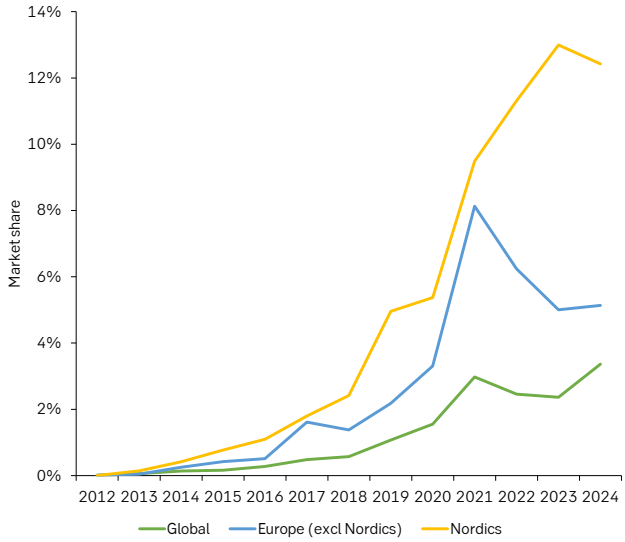
Figure 15 Sustainable green bond issuance by region,



Source: SEB, BloombergNEF 31 July 2024

While the global fixed income market is still down 20% YOY in terms of new bond issuance, sustainable bonds have increased their market share to 3.4%. However, in Europe, sustainable bonds are still trailing past records. Outside the Nordics, sustainable bond market share is well behind where it was in 2021 and 2022, and in the Nordics, the share is stagnating at 12.4%.

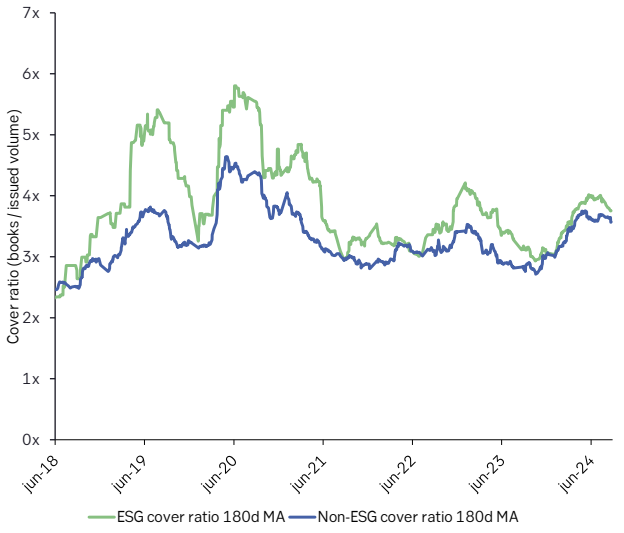
Figure 16 Sustainable bond market share by region



Source: SEB, BloombergNEF, Bloomberg 1 August 2024

The overall bond market is currently characterized by significant overdemand from investors which has led to increasing bond cover ratios in the past twelve months. In this sellers' market, the gap in excess demand between sustainable and non-sustainable bonds has closed compared to previous years.

Figure 17 Cover ratio of ESG-labelled vs Non-ESG-labelled EUR-denominated IG bonds

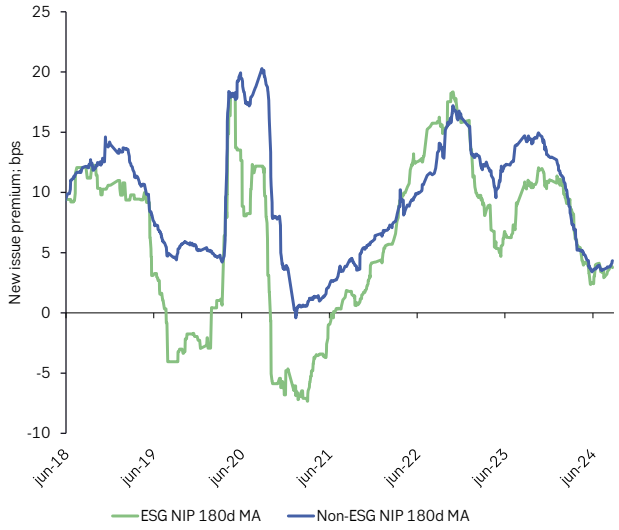


Source: SEB, Bloomberg 26 August 2024.

Strong investor demand is also reflected in a tightening of new issuance premiums of sustainable and non-sustainable bonds alike. Furthermore, the greenium – i.e the willingness

of investors to except lower yields for sustainable bonds – appears to have vanished over the last six months. In summary, demand in bonds – including sustainable ones – is increasing, with improved pricing for issuers.

Figure 18 ESG-labelled vs Non-ESG-labelled NIP of EUR-denominated IG bonds

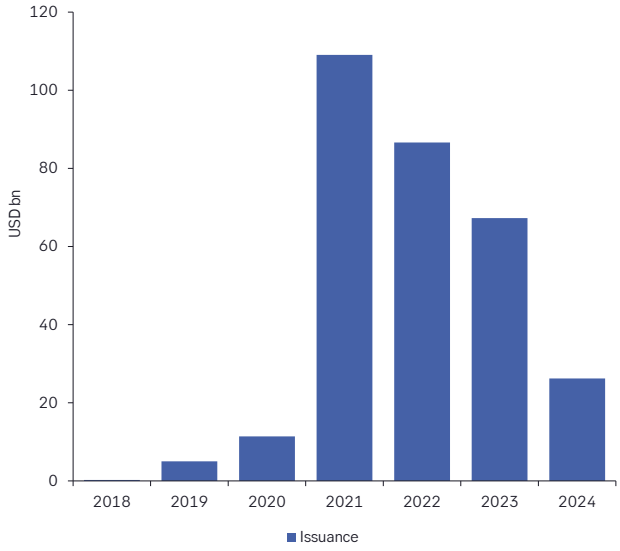


Source: SEB, Bloomberg 26 August 2024

Sustainability-linked bonds: A market update

Sustainability-Linked Bonds (SLBs), which link a bond's financial characteristics to sustainability targets, grew rapidly in issuance following the market's inception in 2019. Since a peak of over USD 100bn in 2021, however, issuance volumes have steadily declined.

Figure 19 SLB issuance volume



Source: SEB, Bloomberg NEF 31 July 2024

SLBs link to one or more Key Performance Indicators (KPIs), such as greenhouse gas emissions. Each KPI has a corresponding Sustainability Performance Target (SPT) which must be met to avoid a financial penalty such as an increased coupon or redemption price. To determine whether the step-up has been triggered, the SPTs are measured at a defined target date set out at issuance of the bond, otherwise known as the target observation date.

As the market reaches its fifth birthday, some SLBs have already reached their target observation dates, and at least three issuers have triggered step-ups due to failure to meet their sustainability performance targets. While these step-ups represent the issuers' failure to reach their sustainability goals, some have been attributed to external factors, and in other cases the failures have given the market some comfort that the product is working as intended, with the requisite level of ambition.

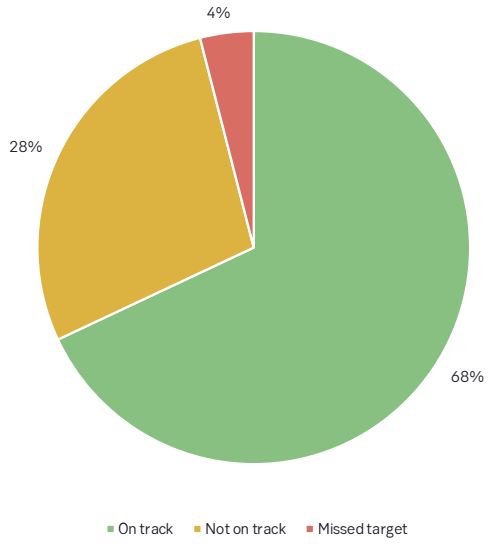
Progress in the European SLB market

While any failure of an SLB to meet its target is widely reported, how can investor assess how issuers are progressing relative to their future targets?

SEB's analysis finds this to be a major challenge in the SLB market. Many bonds are structured such that the first target observation date is more than three years in the future and as such there can be an information gap in terms of tracking an issuer's progress.

To try and plug this gap and assess whether KPIs are on track, SEB assessed the issuers' reported figures against their projected trajectories wherever available, and otherwise, against a linear trajectory.

Figure 20 European SLB KPI progress



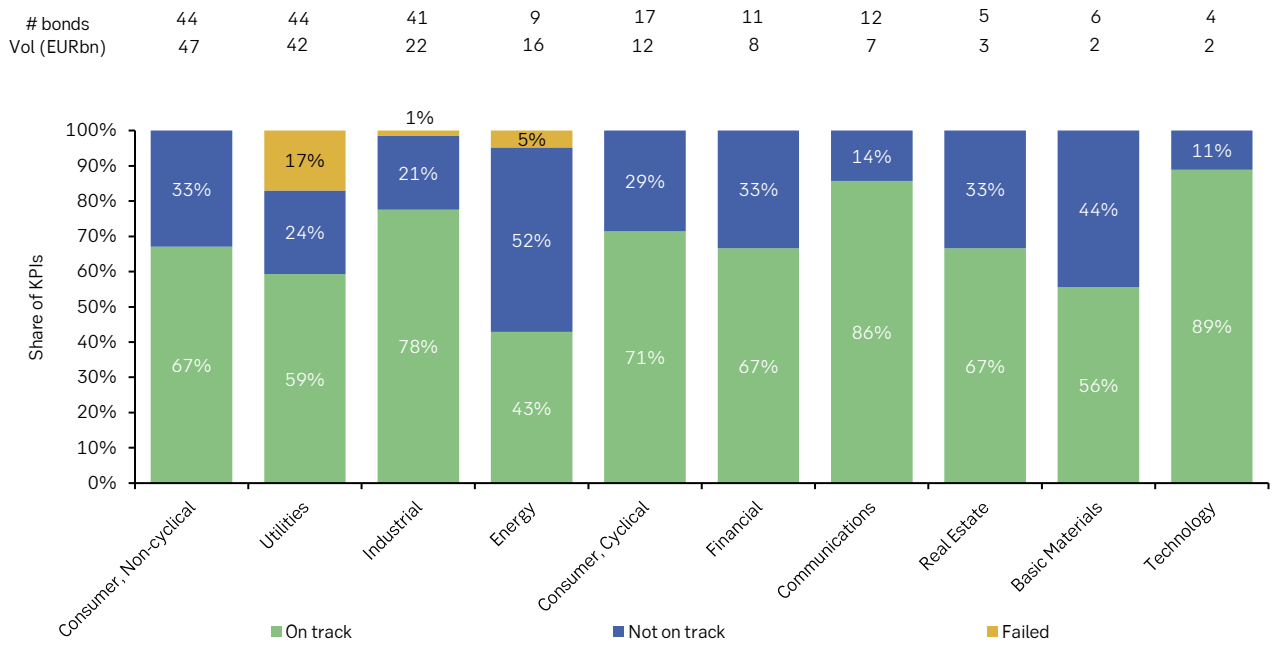
Source: Issuer materials & SEB analysis 6 August 2024. Based on a sample of 192 sustainability-linked bonds comprising 330 KPIs, issued from 2021 to 6 August 2024. Data collected by Vilde Kjos & Marcus Jensen.

Based on a review of 192 European sustainability-linked bonds (EUR 160bn of issuance volume) comprising 330 KPIs, SEB has found that around 28% of sustainability-linked bond KPIs are not on track to meet their sustainability performance targets.

The overall results are similar when compared to the same analysis conducted on European bonds a year ago, where 32% of bonds were not on track, 68% were on track, and 1% had failed.

KPIs that are not on track may not necessarily be a negative indicator, but rather could suggest that issuers have set ambitious targets or have non-public target trajectories which aim to make steeper progress closer to the observation date. Additionally, failures may not always lead to a coupon step-up, as some bonds set the penalty to apply only if multiple targets are missed.

Figure 21 European sustainability-linked bond KPI progress by sector



Source: Issuer materials & SEB analysis 6 August 2024. Based on a sample of 192 sustainability-linked bonds comprising 330 KPIs, issued from 2021 to 6 August 2024.

Some sectors have fared worse than others. Around a third of KPIs assessed within the Consumer Non-cyclical sector, with a total of 44 bonds and EUR 47bn of issuance were found to be off track. While many of these KPIs are related to greenhouse gas emissions, others include unique issuer-specific targets related to food waste or healthcare, with certain issuers accounting for a significant portion of the off-track KPIs.

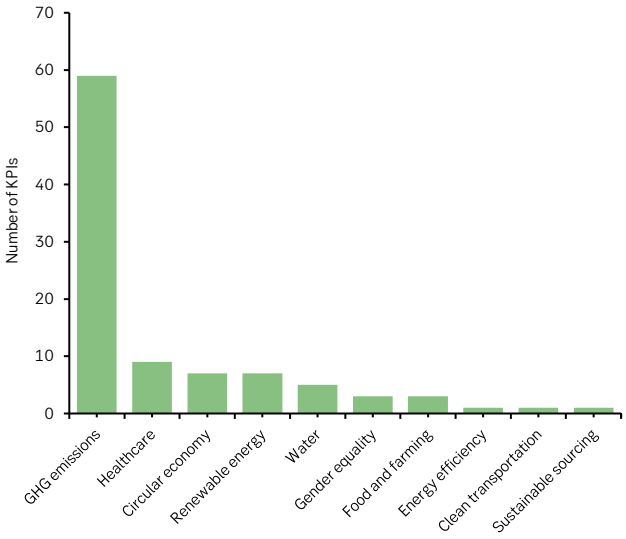
Other sectors such as utilities and energy have been impacted by the energy crisis in Europe following the invasion of Ukraine and have struggled with meeting emissions-related targets in subsequent years. This has been a continuing trend, as the utilities and energy sectors had a notably high share of KPIs that were off track in a SEB analysis conducted a year ago. The high number of failed KPIs included in the utilities sector can be attributed to Enel, as a failure on a 2023 scope 1 emission target triggered a 25 bps step-up on 10 SLBs, resulting in a penalty of around EUR 83mn.[2] Failure could be partially attributed to the energy crisis and macroeconomic situation in Europe. Despite the failure, Enel has since issued new SLBs under a 2024 updated framework, with KPIs based on scope 1 greenhouse gas emissions intensity related to power generation.

Our analysis shows that the majority of KPIs that are not on track to meet their targets are related to greenhouse gas emissions. This reflects the wider market, as KPI types utilized overall are overwhelmingly related to emissions. Of the emissions related KPIs that are off track, combined scope 1 and 2 KPIs are most common, followed by scope 3 KPIs. This also reflects the overall market, where scope 1 and 2 emissions related KPIs are most common among emissions related KPIs, and underscores the challenge for many companies of managing their scope 3 emissions effectively enough to commit to an ambitious public target. One positive development is that the number of KPI's

[2] Bloomberg Intelligence, 23 April 2024. Nine of the SLBs with failed targets are included in the study.

including Scope 3 targets has increased steadily from 2021 to 2024.

Figure 22 Type of KPIs not on track to meet SPTs

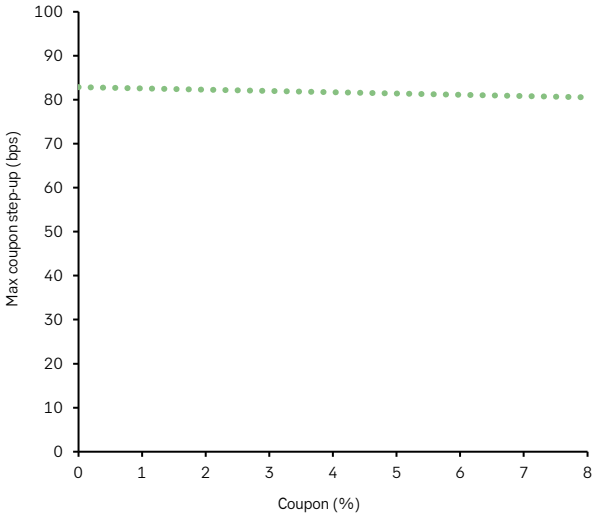


Source: Issuer materials & SEB analysis 6 August 2024.

Consequences of failing to meet targets

What are the consequences of failing to meet an SPT? A widely discussed criticism of the SLB market is that the step-up does not always represent a material penalty to the issuer. An evaluation of the step-ups in a sample of 128 SLBs finds a disjuncture between the maximum size of the step-up and the bond's coupon, rating, and tenor. Despite this criticism and discussion around what constitutes an "appropriate" step-up, the consensus to use 25 bps seems to be borne out in the data analyzed.

Figure 23 Fixed coupon vs maximum coupon step-up over the bond lifetime for European EUR SLBs



Source: Issuer materials & SEB analysis 6 August 2024. Includes European EUR-denominated fixed-coupon SLBs

Additionally, a lack of consistent disclosure means it is often a manual and complicated process to identify the potential maximum cost of a step-up, given the target observation date, date of the first step-up payout, and periods to maturity with a higher coupon. It is also often unclear how step-ups will be addressed in cases where bonds are called prior to the target observation date.

SLBs going forward

The ongoing development of the SLB market provides valuable case studies on both achievements and failures, offering insights on how the product functions in practice, as well as the underlying drivers for a company's sustainability progress.

Furthermore, while a bond-by-bond analysis is time consuming and often requires target trajectory assumptions, the SLB product allows for an additional level of engagement between issuers and investors. For example, in cases where issuers are off track, understanding the drivers behind, for example, an unexpected increase in Scope 1 and 2 emissions, allows investors to assess their position in the bond, and potentially accept a "failure", along with a higher coupon, when they can see an issuer is taking remedial action to address the issue.

Given the SLB market is still relatively young, there is still a limited number of bonds that have reached their first target observation date. As we reach these milestones more frequently, this will become a good test of investors' appetite to continue to hold "failed" bonds, and how this effects the pricing of the bond in question.

These cases highlight both the strengths and weaknesses of the product and call for a greater need for transparency and consistency. As the market continues to mature, upcoming guidance from organizations such as ICMA and the EU aim to drive progress towards standardization and data transparency.

Sustainable finance regulation update

A focus on water regulation in the EU

Rising global awareness of water challenges is driving stricter EU regulations, prompting significant investments in infrastructure, pollution control, and advanced treatment technologies. These regulations are expected to create substantial opportunities for innovation and private investment in the water sector.

As the challenges of too much, too little water, and too poor water are climbing upwards on the global awareness agenda, we see increased regulatory pressure aiming to mitigate these challenges. As highlighted in the water market outlook (see later article in the report), tightening regulation is one of the key drivers behind the expected growth and investment opportunities we see in the water sector the coming years. To identify all relevant regulations is a challenge of its own. Water services are generally a public responsibility subject to regional laws and governance but may also be affected by other regulations as an integral part of both industry and agriculture. Therefore, we here limit our scope to some recently adopted EU regulations that we believe will have the greatest impact on the water sector within Europe in the coming years. We try to extract some key features of the regulations, illustrating timelines for implementation and expected impacts, to give some further guidance on where and when to find these opportunities.

Summary of key take aways further explored below:

- **Massive investments expected from public water and wastewater utilities.** Outdated and under dimensioned infrastructure causes leaking pipes, sewer overflows and urban runoffs. This will require investments in leakage detections, retrofitting, replacement and expansion of pipes, pumps and valves. Stricter standards for pollutants will require installations of more sophisticated treatments to deal with PFAS, nitrogen and phosphorous as well as micropollutants. Adding to this, there is a great need for automation to monitor and manage water flows and pollutants in an efficient way. The need for these upgrades may not be news to anyone in the water sector, but with the new revised regulations, these investments will be enforced by mandatory reporting, minimum/maximum threshold levels and set dates for compliance. This will put financial pressure on the public utilities and push up water tariffs. Some countries utilize EU-funding where available, but we also expect to see opportunities for private capital.
- **Increased producer responsibility for water pollutants will drive industry investments and innovation.** To incentivize pharmaceutical and cosmetic companies to develop alternative products and to invest in their own treatment facilities, a "polluter pays" scheme is implemented in the wastewater directive covering the majority of the micropollutant treatments costs, unless the company can prove limited impact from their products. Adding water related metrics and performance levels for the 75 000 industrial and agricultural entities covered by the revised industry emissions directive will force investments in equipment for more efficient water consumption and reuse as well as advanced treatment facilities to limit emissions.
- **Sustainable finance disclosure regulations increase transparency** and make it easier to identify how companies deal with water related risks and opportunities which support lenders and investors to make informed investment decisions.

Sectoral legislation driving investments

(Revised) Drinking Water Directive (DWD) (EU) 2020/2184
This is the EU's main law on drinking water and concerns the access to and the quality of water intended for human consumption to protect human health. Some of the most important features and impacts of the directive are:

- Maximum thresholds for PFAS in drinking water, forcing water utilities to invest in sufficient treatment facilities.
- Requirements for materials in contact with drinking water set by the European chemicals agency (ECHA). The first list will, among other things, affect different

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materials used for water infrastructure such as pipes and taps from 2027 and forward, impacting any company providing such equipment.
- Requires Member States (MS) to assess water leakage levels from larger water utilities and report this to the European Commission. The Commission will also set maximum leakage thresholds that member states need to act on if not complying. This will force utilities to invest in techniques to measure and detect the leakages as well as fixing them. To meet a growing problem, this directive is intended to improve investments in the maintenance and renewal of drinking water infrastructure needed in many regions of Europe and is expected to be one of the important investment drivers for water utilities.
- Utilities are required to perform risk assessment and develop risk management programs on their catchment areas, water supply system, and domestic distribution system. This will guide on types and likelihood of risks (floodings, droughts, pollution) as well as support investment decisions.
- The regulation also requires disclosures targeting consumers regarding leakage rates, treatment technologies, and ownership structure of their utility. This should increase public awareness, putting further pressure on utilities regarding wise water governance.

(Revised) Urban Wastewater Treatment Directive (UWWTD, 91/271/EEC)

The wastewater treatment directive aims to protect the environment from adverse effects of wastewater discharges from urban sources and specific industries. Under the current directive, member states are required to ensure that wastewater from all Wastewater Treatment Plants (WWTPs) above 2 000 population equivalents (pe) is collected and treated according to EU minimum standards and to apply secondary treatment on the wastewater collected. If discharging wastewater into sensitive areas, defined by set criteria, a third step of treatment is required for further reductions such as those of nitrogen and phosphorus.

As of today, 98% of EU wastewaters are adequately collected and 92% adequately treated according to the threshold valid at the time.[3] An evaluation showed that further measures are needed to address pollution from even smaller plants, to mitigate storm water overflows, to mitigate micropollutants in wastewater and address the fact that the sector is one of the largest consumers of energy in the public sector.

A provisional agreement of the revised directive was reached in January this year and is formally adopted by the Parliament. It has yet to be formally adopted by the council and published in the EU Official Journal before entering into force. With the disclaimer that we have not seen the final regulation we base our observations communications referring to the provisional agreement. Some of the most important features and impacts expected from the revised directive are:[4,5]

- Expanding the scope of WWTPs that needs to collect and treat wastewater
- Member states need to produce integrated urban wastewater management plans to address sewer overflows and urban runoffs. The existing infrastructure built 50-70 years ago often lacks sufficient drainage due to the increased size and density of cities. Another challenge is the prevalence of combined stormwater and wastewater pipes, which are sensitive to heavy rainfalls. The Netherlands, Poland and Italy are EU-countries where the share of combined pipes is larger than 60%. [6]
- Stricter standards for nitrogen and phosphorous removal are stepwise implemented to all WWTPs and require that all larger wastewater utilities will need to install tertiary treatment facilities and medium sized utilities if it discharges it to sensitive areas.
- Introducing a requirement of a fourth step of treatment (quaternary treatment) to remove micropollutants in larger WWTPs. However, 80% of the cost for this additional monitoring and treatment will be passed through to the emitters. In line with the polluter pays principle, a system of extended producer responsibility (EPR) targeting pharmaceutical and cosmetic products will be implemented. Producers can be relieved from the EPR obligation if they can demonstrate that the quantity of the product they place on the market is below tons per year or that the substances in their products are rapidly biodegradable in wastewater or do not generate micro-pollutants in wastewater at the product's end of life. This is expected to drive the relevant industries to innovate alternative products and to invest in treatments themselves to tackle the pollutants before released to the WWTPs.

[3] Urban wastewater council and parliament reach a deal on new rules for more efficient treatment and monitoring

[4] https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)739370

[5] Urban wastewater council and parliament reach a deal on new rules for more efficient treatment and monitoring

[6] GWI Sewer security building resilient water infrastructure

- Energy neutrality target is set at the national level by 2045 meaning that the plants must produce as much renewable energy as they consume. To ensure progress towards this goal, the directive mandates regular energy audits with intermediate targets to gradually reduce energy consumption and increase renewable energy production.

(Revised) Industrial Emissions Directive (IED, 2010/75/EU)

The industrial emissions directive (IED) is the main EU instrument regulating pollution from around 57 000 high-emitting industries and large pig and poultry farms. In the revised IED (IED 2.0) the scope is increased to include 75 000 installations (including around 3 000 landfills, 100 metal mining sites, and 20-30 giga-batteries factories) and water considerations are also added.[7] Some of the main features and expected impacts for water would be:

- Mandatory environmental management systems (EMS) will require all facilities to report metrics such as water consumption and reuse, while binding environmental performance limits will set the requirements for such metrics. Exact levels for these performance limits will be set in sector-specific best available technique reference (BREF) documents, for which a revision process will begin this year. The process of revisions and agreeing on conclusions usually needs some time, depending on the sector the new levels should not be expected to apply before 2027-28.[8] For some sectors this may have significant impact. Pulp & paper, for example, is one of the highest water-consuming industries in Europe, yet its BREF does not at present set a performance level for water consumption.[9]
- The EMS must also include a "transformation plan" that details how an industrial company will transform its installations to fit a climate-neutral, circular economy by 2050.
- Compliance with the directive is a condition for obtaining permits to operate. Interaction with relevant WWTPs is an explicit requirement in the directive as the industry facility must ensure that its emissions do not impede WWTP operations or recovery operations. Any incidents or accidents that affect a drinking water resource or a WWTP operations must report that to the operator.
- Stronger controls of compliance are strengthened with more powers granted to competent authorities to suspend non-compliant installations and infringements can lead to fines of at least 3% of the legal owner's annual EU turnover.
- A digital Industrial Emissions Portal for public access will replace the existing European Pollutant Release and Transfer Register (E-PRTR) enhancing transparency and identification of pollution sources including those to water.

Table 1 EU water regulations and associated impacts

Extracts of Regulations and Dates of Application *Non-Exhaustive	2024/25	2026	2027	2028	2030	2035	2040	2045
(Revised) Drinking Water Directive (DWD) Adopted in 2020, entered into force in 2021 and transposed into national law by 2023. a. Requirements for PFAS levels in drinking water b. Requirements for materials in contact with drinking water set by the European chemicals agency (ECHA), with a list of allowed substances to be revised every 15 years. c. MS to assess water leakage levels from suppliers that produce more than 10,000 m^3 of drinking water per day or supply more than 50,000 people and report to Commisison d. Utilities to perform risk assessment and risk management programs on their catchment areas, water supply system and domestic distribution system every 6 years.	***b)* 2024:** ECHA first list of allowed substances published	***a)*** EU maximum limits on PFAS ***c)*** MS to assess and report water leakage levels.	***b)*** ECHA list of allowed substances applies ***d)*** First year for utilities to perform risk assessment and management programs	***c)*** Commission to adopt leakage level threshold.	***c)*** MS exceeding leakage level threshold to present an action plan.			
(Revised) Urban Waste Water Treatment Directive Widens the scope of utilities impacted and tightens the requirements compared to previous version: a. Requires sewage collection and secondary treatment for plants larger than 1000 p.e.(previous 2000 pe) b. MS to produce integrated urban wastewater management plans to address sewer overflows and urban runoff reviewed every 6 years. c. Requires tertiary treatment for removals of nitrogen (N) and phosphorus (P). d. Requirement for quaternary treatment to remove micropollutants. e. Extended Producer Responsibility scheme f. Net energy neutrality target at a national level for the wastewater stepwise implemented	**Sep/Oct -24:** Expected publication in the EU Official Journal and enter into force and published in		-Regulation expected to be transposed into national law (within 30 months from entering into force). ***e)*** Implementation of EPR Scheme within 3 years after enter into force		***f)*** 20% renewable energy	***a)*** MS to ensure plants in scope to collect and treat urban wastewater ***b)* 2033:** wastewater management plans for plants ≥ 100 000 pe. ***f)*** 40% renewable energy	***b)* 2039:** wastewater management plans for plants between 100 000 pe.and 10 000 in risk areas ***d)* 2039**: Plants ≥ 150 000 pe P(0,5 mg/l or 90% removal), N(8 mg/l or 80% removal) ***f)*** 70% renewable energy	***d)*** Plants between 10 000 pe and 150 000 pe P(0,7 mg/l or 90% removal), N(10 mg/l or 80% removal) ***e)*** All plants ≥ 150 000 pe and based on a risk assessment for plants between 150 000 pe and 10 000 pe ***f)*** 100 % Renewable energy.. Maximum allowed share of energy purchased externally 35%
(Revised) Industrial Emissions Directive Expands scope of installations included in the directive and adds water related considerations to consider. a) Mandatory environmental management systems (EMS) with binding performance limits for all IED-regulated facilities audited every 3 years b) Transformation plans included to EMS c) BREF determining pollution levels d) Establishment of Industrial Emissions Portal	Adopted in Apr 2024, entered into force 4th Aug	Transposed into national law by June	***a)*** Operators shall have prepared, implemented, and undergone first audit for the EMS by 1 July	***d)*** First reporting to Industrial Emissions Portal	***b)*** Transformation plans	***d)*** Mandatory e-permitting		
c) Revision process for performance limits in sector-specific Best available Technique Reference (BREF) starts 2024. Drafting should note take more than 4 years , compliance at the lates four years after publication date								

Source: SEB

[7] Q&A- IED entry into force

[8] Revised Industrial Emissions Directive

[9] https://www.globalwaterintel.com/articles/european-emissions-drive-targets-industrial-water

Sustainable finance disclosure regulation support informed investment decisions

There are three sustainability disclosure regulations in EU that are interlinked and complementary:

- The Sustainable Finance Disclosure Regulation (SFDR) requires investors to disclose how they integrate sustainability into their investment decisions, including for the entity to report on Principle Averse Impact (PAI) indicators, 14 mandatory and 31 voluntary. The PAI reporting has been in force since 2023 but due to lack of data from the underlying companies, the portfolio coverage has been rather low but is expected to improve with better company reporting (see below). The regulation including the indicators is currently under review, but any changes is expected to further align with CSRD.
- The Corporate Sustainability Reporting Directive (CSRD) requires corporates to perform a materiality analysis and report on pre-defined KPI's on areas identified as material. CSRD is adopted but not tested yet as the first year of scope is the financial year 2024 for the largest companies. We expect that this regulation will have a significant impact on the awareness of water related risk and opportunities, both with investors and the companies themselves. If water shows to be important in the materiality analysis, the company needs to report on water policies, targets and metrics as illustrated in Table 2.
- The EU taxonomy can be regarded as a supporting tool to both investors and companies as it provides definitions and thresholds to define when an economic activity can be classified as sustainable and hence taxonomy aligned. Gradually implemented, now with all six environmental objectives in place, water related activities are present in all of them as exemplified in Table 2.

Table 2 Overview of regulations and disclosures

Regulation	Disclosures
SFDR Principle Adverse Impact (PAI) indicators •30 Jun- 23. Entity level disclosure	**Mandatory:** Emissions to water **Voluntary:** Water usage and recycling; Investments in companies without water management policies; Exposure to areas of high-water stress
CSRD E3 Water and marine resources (WMR) **When and who:** FY -24 largest companies (subject to NFRD) FY-25 : Company fulfilling at least two of the following criteria: at least 250 employees/ EUR 50m net turnover/ EUR 25m balance sheet FY- 26: Listed SMEs where company fulfils at least two of the following criteria: 250-10 employees/ EUR 50m-900k net turnover/ EUR 25m-450k balance sheet Voluntary opt-out for the first two years possible	E3-1 Policies related to WMR E3-2 Actions and resources related to policies and targets **Metrics and targets** E3-3 Targets related to WMR E3-4 Water consumption for own operation b) total water consumption in m3 c) total water consumption in m3 in areas at material water risk, including areas of high-water stress; c) Contextual information for a-b E3-4 Information to support SFDR reporting a) total water recycled and reused in m3 b) total water recycled and reused in m3 c) contextual information for a-b. d) Information on water intensity: (E3-4 (a) per net revenue on own operations. E3-5 Potential financial effects from WMR related impacts, risks and opportunities
Taxonomy, non-exhaustive examples of objectives and subcategories **When:** Same application timeline as CSRD, taxonomy being a reporting tool.	**Sustainable use and protection of water and marine resources:** -Manufacture, installation and associated services for leakage control technologies -Water supply, urban wastewater treatment and sustainable urban drainage systems -Nature based solutions for flood and drought -Provisions of IT/OY driven solutions for leakage reduction **Climate Change Mitigation & Adaptation** -Construction, extension and operation & Renewals of water/wastewater collection and supply system/treatment **Transition to a Circular Economy** -Production of alternative water resources for purposes other than human consumption

Source: SEB, SFDR Regulatory Technical Standards Annex 1, European Sustainability Reporting Standards ESRS 3, commission delegated regulation (EU) 2023/2486,

Around the regulatory corner

The European Commission's 2024-2029 strategic agenda includes a focus on strengthening water resilience across the EU, though specific regulations are yet to be determined.[10] Meanwhile, global concern over PFAS is prompting regulatory action, with the European Chemicals Agency (ECHA) considering a proposed blanket ban on PFAS, initiated by several European countries. This proposal targets industrial effluents, shifting responsibility to producers rather than wastewater utilities. Due to the difficulties in removing and destroying PFAS, such a ban could significantly impact industries, driving investments in technological innovation.[11]

[10] https://www.consilium.europa.eu/media/4aldqfl2/2024_557_new-strategic-agenda.pdf

[11] The recent adoption of federal PFAS thresholds in drinking water has caused a debate in USA on the costs of utilities to comply. The American Water Works Association challenges the standards in a D.C. appeals court claiming that the new rule is likely to require from USD 37.1 to USD 48.3 bn of capital investment in the next five years compared to corresponding US EPA estimate of USD 15 bn. Considering the market size of USA, this debate is likely to influence policy makers and industry globally.

Water investment: The silent necessity

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Water: the overlooked investment opportunity

Water will emerge as the biggest global investment theme over the next decade. It is a big claim. Especially, when one considers the transformational power and economic impact of artificial intelligence. Will water – which has been with us since the origin of planet– really move markets more than Moore's Law?

The fact that it sounds so unlikely is a big part of the reason it will happen. We are just not paying enough attention to water. It underpins the whole of life on this planet. It defines our civilization and our economy, and it is changing. Each degree that the global temperature rises puts 7% additional moisture in the air, but that is not all. The additional heat puts more energy into the water cycle polarizing our experience of precipitation, creating overwhelming storm events and savage droughts. It changes some of the fundamental norms on which we base our calculation of risk in the economy.

Climate change, AI, and water security

It goes without saying that the cost to the global economy of climate change is greater than the cost of all of our efforts to avert it. What is less understood is that this cost largely falls on our management of water. Global Water Intelligence undertook an analysis of the insured losses since 1980 relating to weather and climate events. It showed that 69% of them relate to the water cycle. Our response to this is likely to skew even further towards water investment. We can spend money to manage water, but we cannot so easily spend to manage wind speeds or air temperatures.

However, there is more to the water investment theme than climate change. Take, for example, this much heralded revolution in artificial intelligence. It is very much powered by water, and it will not happen if we cannot address the challenge of growing water insecurity.

Taiwan, where most of the advanced chips that are required to drive forward the cutting edge of artificial intelligence has short rivers and very little capacity for water storage. It is extremely vulnerable to drought. It matters because the process of manufacturing silicon wafers is extraordinarily water intensive. After, each layer of etching chips needs to be washed with substantial amounts of high purity water, and as the chips get smaller the science of purifying and monitoring that water becomes more extreme. Both quantitatively and qualitatively it is a potential barrier to the continued delivery of Moore's Law.

Furthermore, when we move down the AI supply chain into the datacentres where the silicon is put to work, we find that water is also a crucial raw material. That is because with every advance in the scale of chips, comes the need to cool them more efficiently. Cooling is one of water's superpowers. The latent heat of evaporation of water is 2,260kJ/m3. Nothing can compare to this in terms of cooling efficiency. It means that you can think of water almost like an energy source for the data centre industry. Again quantity, quality and location matter, and in an increasingly water insecure world, it is going to attract investment.

Investment strategies in water

The truth is that growing the economy, growing cities and growing populations are all powered by growing the quality and quality of water we use at specific locations. Climate change, pollution and growing consumption are making it less dependable. We as occupants of planet earth are going to have to spend a lot more on guaranteeing our water security over the next decade than we have over the past

century. So, what does that mean in terms of investment strategy?

Global Water Intelligence calculates that the total amount of capital employed in delivering water security will rise from USD 3.8tn in 2024 to USD 12.6tn in 2034 if the investment industry fully engages with the challenge that lies ahead.[12] Broadly it can be divided into five areas:

1. *Infrastructure:* Currently, most of the infrastructure we rely on to manage water (USD 3tn's worth) is on the public balance sheet. Only USD 320bn is privately held.[13] In order to protect our cities against the growing frequency of floods and droughts, we probably need to build an additional USD 4.2tn's worth of infrastructure in the next decade. Doing this will involve a significant increase in private investment fixed assets. Delivering this will involve the development of new financial models. These might include insurance funds investing in flood protection schemes to reduce their exposure to catastrophic losses or specialist water efficiency businesses investing in upgrading water distribution networks in exchange for a share of the value of the water saved.
2. *Agriculture water:* Farmers are responsible for 70% of water use, but they rarely pay anything for the water they use. There are two main opportunities in this. The first is investment in efficient irrigation systems and technologies that deliver just the right amount of water at the right time to cultivate the crop. The second is agricultural water rights ownership. This is currently only possible in the Western United States and parts of Australia where appropriative water rights exist. Together the capital employed in these agricultural water strategies can be expected to grow from USD 210bn in 2024 to USD 380bn in 2034.[14]
3. *Water solutions and technology:* This is important. There is currently around USD 290bn of private and public equity employed in companies which sell water technologies and solutions. We expect this to grow to USD 1.4tn.[15] That is because there is so much to do. It is not just about developing unconventional water resource technologies such as desalination and water reuse. It is also about digital technologies that optimize infrastructure and green solutions that use nature to solve water problems. We are also seeing new water technology markets being opened by the broader need for climate resilience. For example, oil field water delivery systems are being adapted to deliver massive quantities of water for firefighting.
4. *Corporate water:* The biggest opportunity for investors is in the way in general business and industry responds to water security. Much of this opportunity will play out in the way water risk impacts the profitability of companies which are most exposed to the growing unpredictability of water. We are already seeing this in the mining sector, where huge developments such as the Tia Maria copper mine in Peru have been held back by water security concerns, and the Brazilian iron ore miner Vale saw a tailings dam washed out by weeks of intense rain killing 270 people and wiping USD 19bn off the company's share price. There is also an opportunity in investing in companies which tap into the market for water secure products such as seed varieties which use less water and microchips designed to generate less heat. GWI predicts that as concerns about climate change switch from mitigation to adaptation, we will see the USD 30tn ESG investment sector build an interest in water. Currently, there is less than USD 1bn pursuing this theme. By 2034, we project this to grow to around USD 3.2tn.[16]
5. *Impact:* this is a highly underdeveloped investment sector. However, bringing in more private capital to help deliver safe water and sanitation to low-income communities has become a major priority for the World Bank and other concessionary lenders. Together with growing interest in public private partnerships to develop water related conservation assets, we expect the capital tied up in water impact strategies to reach USD 100bn by 2034.[17]

Altogether, these five strategies represent a bold vision for the future of water investment. Even if they are not engaging the financial markets today, at some point, they will become unavoidable. That is the nature of water. It is the silent necessity.

[12] Global Water Intelligence: Investing in a water-secure future
[13] Ibid.
[14] Ibid.
[15] Ibid.
[16] Ibid.
[17] Ibid.

Private capital and water security

Meeting the USD 12.6tn investment demand

Global investment in water infrastructure is expected to rise, with an estimated USD 12.6tn needed over the next decade to address urgent challenges like water scarcity, flooding, and pollution. Effective management and significant private sector involvement are essential to modernize infrastructure and ensure water security, as current efforts remain fragmented and underfunded.

The global demand for investment in water infrastructure and management is set to surge, driven by a confluence of factors including population growth, urbanisation, increased wealth, and aging infrastructure. GWI estimates that USD 12.6tn will be required globally in the next 10 years to meet the pressing needs of water access, wastewater handling, stormwater management, and adaptation to drought and flooding. The urgency for these investments is underscored by a changing climate, and the increasing frequency of severity of droughts and floods. The physical challenges are exacerbated by fragmented water management structures and chronic underinvestment into water infrastructure.

Despite that we have the technical solutions, knowledge of application, and that we, with active management, can (for the most part) manage water, our way of managing water is predominantly reactive rather than proactive. Often, we fail in the timely re-allocation of resources and a coordinated holistic appreciation of how water should be managed – due to the fact the management of water is typically delegated to where its application is occurring, be that regionally or sectoral. However, when hit by the consequences of mismanagement, the localised (and often severe) impacts of water crises demand immediate action.

Looking at the investment needs to manage water, as well as the acceleration of water related events (and their cost), we foresee that the public sector will need private capital to be much more actively engaged. This is complex, historically we have tried to activate private capital several times, in Europe and certain emerging markets, and the results have often failed the ambitions (to be mild). There has been a lack of integrity, solid governance structures, as well a sensible cap on the ability for the private sector to drain the investments.

The physical challenges

Water challenges can be succinctly described in six words: too little, too much, too dirty. Humans, governments, and businesses are increasingly having to deal with reduced freshwater access, severe flooding events, and polluted water supplies.

Too little:

Only 0.5% of water on earth is useable freshwater18 and an estimated 4.4 billion people lack safe drinking water.19 Climate change (including temperature rise and increasingly severe droughts), population growth (20% increase by 2050[20]), reduced groundwater recharge due to urbanization (80% of the population will live in cities in 2050[21]) as well as overexploitation of water resources are exacerbating challenges surrounding water scarcity.

Access to clean water is critical for survival, directly and indirectly – 70% of the global freshwater withdrawals are used for agriculture.[22] Most industries are dependent on water, making water essential for business continuity and security – this is especially relevant in Europe, where 57% of water withdrawal is for industrial use.[23] Water usage across industries is immense and restricted access to clean freshwater can cause disruption in production (both in operations and through the supply chain), as well as decreased output. Water scarcity can limit the operation of power plants – affecting the supply, efficiency, and cost of energy. As an example: record droughts in 2022 led to reduced hydro, thermoelectric, and nuclear power output in the EU[24.] further increasing already elevated power prices, stressing both households and industries.

Too much:

It is estimated that 1.8 billion people (23% of the world's population) face significant flood risk. Floods can be divided

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into coastal floods, river floods, flash floods (pluvial floods), and compound floods (both sea and rivers). Disastrous floods and their impacts are increasing in severity, duration, and frequency, primarily driven by population growth in flood-prone areas[25] and by climate change.[26] Urbanization increases surface runoff and, therefore, increases the risk of flooding – land cover changes, drainage alterations, and deforestation also have the same effect. [27]

Flooding can cause factories to become inoperable leading to delays in production as well as severe damage to capital goods, machinery, and product / stock. Flooding of transportation and other critical infrastructure can greatly disrupt transport routes and supply chains – impacting production and distribution, which ultimately leads to a loss in productivity and revenue for affected businesses. Globally, floods accounted for nearly a quarter of economic losses due to natural disasters between 1998 and 2017.[28] In Europe, floods are the most common and most costly natural disaster[29] - the 2021 flooding in Germany cost USD 40bn.[30]

Too dirty:
Globally, 80% of the world's wastewater, of which 28% originated from industry[31], is discharged into the environment without treatment or reuse.[32] Unsafe water causes more deaths than war and all other forms of violence combined.[33] Water stress is intensifying as water bodies face greater contamination from nutrients, pathogens from human waste, plastics, and chemicals from personal care products. Water pollution is often divided into "point-source pollution" (caused by a single, identifiable source), such as a factory or wastewater treatment plant, and "nonpoint-source pollution" (caused by multiple diffuse sources) such as runoff carrying oil, trash and chemicals. Point-source pollution is easier to regulate compared to nonpoint-source pollution.

There are various forms of water pollution, such as chemical (including microplastics, metals, fertilizers and pesticides), pharmaceutical, thermal pollution, biological pollution, as well as emerging pollutants (such as "forever chemicals" or PFAS) – all of which degrade the water quality, making it harmful to humans and/or the environment. Different industries pollute in different ways and some industries (such as pharmaceuticals and electronics) require ultrapure water (extremely high-quality water) as an input. Industries can invest in wastewater treatment technologies to recycle more of their water, this reduces their water risks both by addressing water stress and by staying ahead of potential wastewater regulatory developments.

Compounding effects:
When a water crisis occurs, it involves one (or more) of these three elements. These elements are, unsurprisingly, interlinked; for example, drought and arid ground can increase the risk of flash flooding under intense rainfall, pollution of water supplies results in a lack of usable water, and the flooding of factories and wastewater infrastructure leads to pollution the pollution of groundwater.

Structural challenges

Aging and inadequate infrastructure, as well as fragmented water management are two examples of the major structural challenges which exacerbate our water challenges and delay action.

Aging and inadequate infrastructure:
Aging infrastructure and inadequately designed systems add to the problems of too little, too much, and too dirty water. Leaks are common in water supply systems, where inefficiencies in the EU average at 25%[34] (non-revenue water) and 20% in the US.[35] Similar challenges arise on the wastewater side, where heavy rainfall can overwhelm combined sewer systems and old wastewater treatment plants – resulting in the discharge of untreated wastewater into natural bodies of water. This challenge is especially topical in the UK, where in 2023, raw sewage was discharged for 3.6 million hours into England's rivers and

[18] https://www.un.org/en/climatechange/science/climate-issues/water
[19] https://www.science.org/doi/10.1126/science.adr3271
[20] Population- United Nations
[21] https://www.weforum.org/agenda/2022/04/global-urbanization-material-consumption/
[22] https://www.unwater.org/publications/un-world-water-development-report-2023
[23] https://www.fao.org/aquastat/en/overview/methodology/water-use
[24] Not enough water- European Commission
[25] Visser-Petersen-Ligtvoet-On-the-relation-between-weatherrelated-disaster-impacts (lse.ac.uk)
[26] How climate change is making record-breaking floods the new normal (unep.org)
[27] Anthropogenic climate change has changed frequency of past flood during 2010-2013 | Progress in Earth and Planetary Science (springer.com)
[28] d5098392-en.pdf (oecd-ilibrary.org)
[29] Floods - European Commission (europa.eu)
[30] German Floods Cost a Record $40 Billion, Munich Re Estimates - Bloomberg
[31] Technology status and trends of industrial wastewater treatment: A patent analysis - PubMed (nih.gov)
[32] Wastewater A Resource that Can Pay Dividends for People, the Environment, and Economies, Says World Bank
[33] Water Pollution Definition - Types, Causes, Effects (nrdc.org)
[34] file (eureau.org)
[35] Coronavirus Impacting Clean Water Agencies; Local Utilities and Ratepayers Need Assistance (nacwa.org)

seas.[36] Resulting in a GBP 96bn investment pipeline forecast for 2025-2030.[37]

Fragmented water management:
Typically, water management responsibilities are divided amongst multiple agencies and jurisdictions, leading to fragmented and inefficient management practices and no centralized ownership to coordinate and integrate planning. This lack of coordination can lead to reactive, as opposed to proactive approaches. Better management of water would enable better collection and management of data, as well as an improved regulatory framework.

The challenge is technically solvable

Inefficiencies are much lower when water is critical or well-managed; Tokyo has non-revenue water levels of 3%[38] and Århus 6%.[39] The criticality of water management in the Netherlands, Singapore, and Israel has shaped them into global leaders in the space.

Technical water solutions have been developed over many decades and some are now being integrated digitalization trends (such as IoT, AI and machine learning, GIS and remote sensing, digital twin technology, and blockchain technology). Digitalization can optimize resources when upgrading aging water infrastructure – where much of the investment need is located. Some solutions can address multiple issues, such as stormwater storage – which help protect flooding by storing stormwater, which can then be reused in times of water stress. A more comprehensive overview of technical solutions can be found in the Water Market Outlook of this issue.

Water impacts are local

Climate change, due to its often-intangible local effects, has faced delays in action as stakeholders debate ownership and responsibility. Although water faces some similar structural challenges, unlike with climate change, the impacts of water-related crises are visible and immediate – with localized solutions addressing localized issues. Not only are the impacts tangible, but they are severe; water scarcity, flooding, and contamination demand immediate and decisive action – delays and deferrals could have devastating consequences. Water crises disrupt lives and economies in real-time, compelling swift responses from governments, businesses, and communities alike. Hence, we don't expect to see the same delays in the ramp up of water investments, as we have seen for climate investments.

The need for investment

85% of annual spending in the water sector still comes from the public sector and private sector participation is far lower less than other infrastructure sectors (such as power, telecommunications, transport).[40]

A history of chronic underinvestment has resulted in infrastructure that is insufficient to handle the growing volumes of wastewater and stormwater, or to adequately remove the many different types of pollutants that enter our water supply.

The ongoing underinvestment in water infrastructure and adaptation is creating a growing investment debt in the water sector, this trend is comparable to the investment deficits we see for the climate transition.

The role of private capital

The financial sector has a pivotal role in mobilizing the capital needed to address these challenges. Investments in water infrastructure offer not only social and environmental returns but also the possibility of stable, long-term financial performance. As the world grapples with the impacts of climate change and water scarcity, the demand for resilient sustainable water management solutions will only grow, presenting significant opportunities for investors committed to supporting global water security.

The role of private capital, in the re-allocation of resources for water infrastructure and management, will mirror the pivotal role it has played in driving decarbonization efforts over the past decade. Just as private capital has been instrumental in financing the transition to a low-carbon economy, it will be essential in addressing the global water challenges we face by 2050.

In the decarbonization journey, private investors have catalyzed change by funding renewable energy projects, energy efficiency improvements, and green technologies. Similarly, in the water sector, private capital will be crucial in financing the modernization of aging infrastructure, securing water access, the implementation of advanced wastewater treatment technologies, as well as stormwater management / adaptation solutions. These investments will not only address immediate water security needs but also be healthy investments and support long-term sustainability goals.

Private capital will also play a key role in scaling up innovative solutions for water scarcity, such as desalination,

[36] How much raw sewage is released into rivers and the sea, and what are the rules? (bbc.com)
[37] Water companies propose largest ever investment | Water UK
[38] 05【本論文】Perpetual Challenge for Zero Non-Revenue Water Rate (tokyo.lg.jp)
[39] Reducing urban water loss - Aarhus Vand
[40] Scaling up finance to ensure a water-secure future for all (worldbank.org)

advanced water treatment technologies, and smart water management systems.

In essence, private capital will be essential in driving the necessary re-allocation of resources towards sustainable water management - just as it has been in the global push for decarbonization. By aligning financial prudence with the urgent need for water security, guiding the public sector on how to activate private capital, and enabling robust healthy collaborations for a more sustainable and resilient future, financial advisors can reinforce their relevance for both private and public clients.

The diverse aspects of water challenges will necessitate a range of financial solutions, each with an appropriate platform to house them. Identifying payment willingness, assessing payment capabilities, and ensuring bankability for non-subsidized projects will be crucial steps in this process. Navigating the complexities of permits, environmental considerations, technical performance, and legal frameworks will demand a structured and systematic approach.

Currently, we lack the necessary instruments to fully engage private participation in water investments. Developing products that enable this participation, creating portfolios to house these products, as well as systemizing and scaling the products will be essential steps forward. This is a journey – a journey that will require the mobilization of people, mandates, and systems. During our deep dive into water, we have identified several key actions and are actively engaging with investors and borrowers to advance these efforts.

Blended finance:
Blended finance is a key tool policymakers can use to stimulate private market participation into the water sector. Public-private partnerships (PPPs) can help de-risk large-scale water projects and enable capital to flow to where it is needed most.

There are some recent examples, of successful blended finance models, which showcase their effectiveness. The Inflation Reduction Act in the USA, earmarking over USD 350bn to combat climate change[41], focusing on clean energy, energy efficiency, and reducing greenhouse gas emissions—all while attracting businesses and creating jobs. Similarly, the EU's Recovery and Resilience Facility (RRF) has earmarked approximately EUR 250bn for "green" investments.[42]

Looking at the water; the public sector can be effective by leveraging public-private partnerships (PPPs) to de-risk large-scale water projects. These partnerships will be vital in ensuring that capital flows to where it is needed.

In conclusion

Though we possess the technologies and expertise to address these issues, our efforts are currently poorly coordinated and lack the necessary scale to effectively tackle the challenges, hence, the large investment requirements. The core question is whether private finance can play a role in unlocking some of the deadlocks currently withholding the investments needed to upgrade our water systems. We believe private capital can – and should – plat a pivotal role. At SEB, we are committed to doing our part and we welcome our clients to engage in financing and investment discussions to help drive a more sustainable and resilient water future.

[41] Inflation Reduction Act Programs to Fight Climate Change by Reducing Embodied Greenhouse Gas Emissions of Construction Materials and Products | US EPA

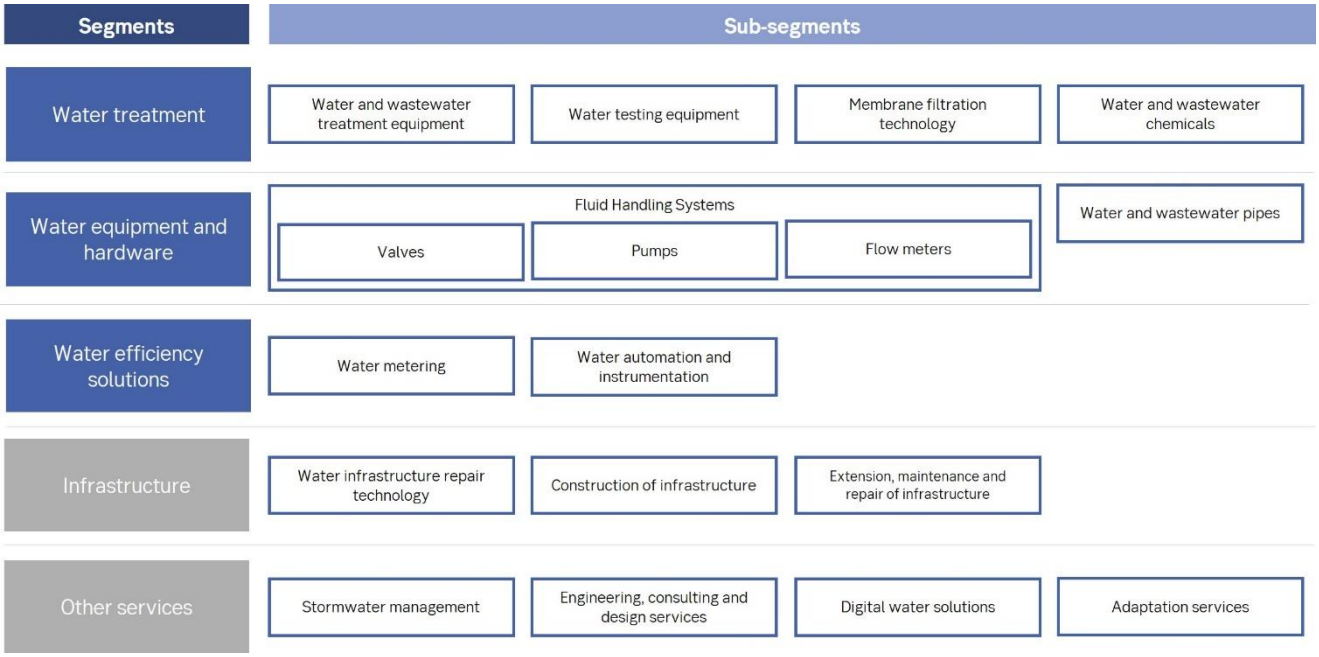
[42] REPowerEU and revision of national recovery plans (europa.eu)

A water market outlook

Where we see the opportunities

The global water crisis, driven by urbanization, aging infrastructure, and climate change, is creating urgent demand for innovative water management solutions. Key investment opportunities lie in water automation, filtration, and efficiency technologies, which are expected to see significant growth in the coming years.

Figure 24 Mapping of the water sector



Source: SEB Climate & Sustainable Finance

The world is facing a severe water crisis, with nearly four billion people experiencing severe water scarcity for at least one month per year. In Europe, approximately 30% of the EU population experiences water stress annually. Worldwide it is estimated that about 700 million people could be displaced due to extreme water shortages by 2030. In this context, the water sector is at a critical juncture, with converging factors driving the urgent need for innovative water management solutions.

New sustainable rapid urbanization is placing immense pressure on water related facilities, particularly in Asia and Africa. Concurrently, aging infrastructure exacerbates these challenges, with 30% of global water lost through leaks.[43] At the same time, industrial growth and technological advancements are increasing demand for clean or purified water, while climate change—marked by frequent droughts and extreme weather—compounds water scarcity and disrupts its availability. This situation intensifies the need for conservation, reuse strategies, and resilient water management systems. Public awareness and stringent regulations are also pushing for sustainable practices and greater accountability in water quality, reuse, and loss reduction. Together, urbanization and population growth, industrialization and new technologies, and regulations are some key drivers for the water market.

To understand potential investment opportunities in the face of these large water challenges, we mapped the entire water sector as shown in Figure 24. One can slice and dice the sector in different ways, we focused on five large segments (to the left), which can then be further divided into sub-segments often defined by a specific use case or technology. Segments that offer solutions to water quality and reuse challenges could see large demand growth in the coming years, which – in our eyes – should make them particularly interesting for investors. This article explores the market outlooks for three main segments of the water

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sector, namely Water Treatment, Water Equipment and Hardware, and Water Efficiency Solutions (marked in blue). All market growth estimates in this article are the result of an in-depth literature review done by SEB Climate & Sustainable Finance of publicly available market research. By using intervals of market size estimations to average growth expectations from different sources, we created solid estimates for the next decade.

Key take-aways

We realize that the water sector and its different sub-segment can be quite complex and technical, which is why we want to start with our key findings before presenting our research in-depth. The table below shows an overview of the biggest market growth opportunities in the water treatment, water efficiency solutions, and water equipment and hardware segments. The fastest growing sub-segments that investors should keep an eye on are water automation and instrumentation as well as membrane filtration technology. Both markets are small today but projected to grow with a CAGR of 10% and 8% respectively.

Water automation and instrumentation encompasses advanced technologies that optimize and monitor water treatment, distribution, and management with minimal human intervention. This includes data analytics, IoT, and hydro-automation systems. Membrane filtration technologies are extensively used in water and wastewater treatment, as well as in industries producing pharmaceuticals, or food and beverages.

Table 3 Global Average expected CAGR and forecasted market size of each sub-segment, sorted by CAGR (%)

Sub-segment	Expected CAGR (%)	Forecasted market size (billion USD) *[year]*
Water Automation and Instrumentation	10.0%	54.4 *[2033]*
Membrane Filtration Technology[44]	8.3%	36.3 *[2032]*
Water Metering	7.8%	14.7 *[2030]*
Water Infrastructure Repair Technology	6.6%	185.8 *[2032]*
Water and Wastewater Pipes	6.4%	120.9 *[2032]*
Flow Meters	6.2%	16.1 *[2032]*
Water and Wastewater Treatment Equipment	5.4%	96.1 *[2032]*
Water and Wastewater Valves	5.2%	16.4 *[2032]*
Water Testing Equipment	4.6%	7.2 *[2032]*
Water and Wastewater Pumps	4.4%	85.6 *[2033]*
Water and Wastewater Chemical	3.9%	43.5 *[2030]*

Source: SEB Climate & Sustainable Finance

Looking back at market growth over the last decade, some sub-segments continue their trajectory and their expected CAGR is not much different than their historic CAGR. Most parts of the water equipment and hardware sector fall in this category, where growth is mainly dependent on infrastructure development or updates and cannot be scaled as fast. On the other hand, fairly new technologies that are applicable on a larger scale are picking up. The water efficiency solutions segments is showing the greatest acceleration in market growth, fuelled by the technology's ability to save usually "lost" water.

Conducting this research has shown that, for many of the water-related challenges we are facing, technological solutions are available - investments just need to be scaled up. Herein lies a great opportunity for investors and water technology companies as well. For in-depth information on the three different segments, please continue reading.

1. The Water Treatment Sector

Currently, only 11% of domestic and industrial wastewater is being reused. One major challenge is that industrial wastewater frequently contains heavy metals, toxic chemicals, and excess nutrients, requiring specialized treatment processes.[45] Rising water scarcity, population growth, and urbanization, combined with regulatory pressures are increasing the demand for treatment solutions to manage and reuse wastewater. Increasing concerns about health impacts of water pollution and waterborne diseases are further accelerating market growth.

The overall water and wastewater treatment market, including treatment chemicals, equipment and services for

[36] https://www.weforum.org/agenda/2024/01/technology-innovation-zero-water-waste-future/

[44] This forecast can include membranes used for applications other than water. With the available research, it was impossible to isolate the market outlook for water filtration membranes only.

[45] These breakthrough technologies can lead us to a zero-water waste future | World Economic Forum (weforum.org)

purifying and managing water quality is expected to reach USD 617.81bn by 2032, growing at an expected CAGR of 7.5% between 2023 and 2032.[46] The market is split in the following sub-segments:

- Filtration and media equipment used in wastewater treatment, drinking water purification, and various industrial applications,[47] constitutes the largest segment in the water treatment sector, notably due to their versatility and widespread utility. Membrane filtration technologies are projected to grow at an 8.3% CAGR (2023-2032).
- Chemicals constitute another major segment in water treatment, valued at USD 33.31bn in 2023, with a projected annual growth rate of 3.8% from 2023 to 2030. Coagulants and flocculants, which dominate this segment, are primarily used to accelerate sedimentation and remove suspended solids.[48]
- The global water and wastewater treatment equipment market comprises of machinery and technology for water purification and quality management, such as e.g. filtration systems and sludge removal. It is projected to grow at a 5.4% CAGR from 2023 to 2032.
- Water testing equipment, though a smaller market segment, is expected to grow at an annual rate of 4.6% from 2022 to 2032, driven among others by the need to assess treatment effectiveness and ensure compliance with regulatory standards.

Overall, treatment technologies are anticipated to experience significant expansion as they address the need for enhanced treatment levels and increased treatment volumes. Next generation technologies include advanced oxidation processes (AOPs), which utilize potent oxidants such as ozone and hydrogen peroxide to degrade pollutants at the molecular level. Forward osmosis (membrane), activated carbon filters, UV light and electrodialysis are other technologies to consider as an investor in this sector.[49]

2. The Water Equipment and Hardware Sector

Construction and development in the water sector drives the demand for all kinds of water equipment and hardware, from pipes to pumps and measurement technologies. Main drivers are the need to meet rising treatment standards and manage increased volumes of both water and wastewater. Additionally, aging infrastructure heightens the need for equipment replacement and increases capacity requirements to keep pace with population growth and industrialization. The equipment and hardware sector can be split into the following sub-segments:

- The global market for water and wastewater pipes, encompassing their production, distribution, and installation holds a significant share within the broader water equipment sector.[50] From 2012 to 2021, water and wastewater pipes experienced a compound annual growth rate (CAGR) of 4.0%, with expectations for accelerated growth at 6.4% CAGR from 2021 to 2032. This growth is notably driven by the need to replace aging pipe systems, which significantly contribute to the USD 14bn cost of non-revenue water (NRW) for utilities and can lead to water pollution.
- The water pump market, crucial for irrigation, water supply, wastewater management, and sewage processing, is expected to grow at a CAGR of 4.4% from 2023 to 2033. This growth is fueled by global water scarcity, rising demand for efficient solutions like desalination, and increased use in agriculture. Additionally, expansion in construction, oil & gas, manufacturing, and mining industries, along with the ability of pumps to manage floodwaters and mitigate damage drives demand.
- Water valves are essential for controlling flow and pressure in industrial and treatment processes and enhance water purity, reduce clogging, and improve system reliability. Projected to grow at a 5.2% CAGR from 2022 to 2032, this segment benefits from regulatory requirements that drive demand for valves to improve efficiency, enable leakage detection, and ensure compliance. Keep an eye on the rise of smart and automated valves.
- Flow meters and sensors, vital for measuring and regulating the flow of liquids and gases, are expected to grow at a 6.2% CAGR from 2023 to 2032. This growth is fueled by the increasing demand for precise fluid measurement driven by industrial automation in water treatment and the oil and gas sectors. Regulatory requirements for accurate measurements in pharmaceuticals and food and beverage industries, along with leak reduction regulations, further boost market demand. Additionally, rapid urbanization and the shift towards smart urban water management are driving the need for advanced flow metering solutions, with applications also extending to water efficiency solution.

[46] Water and Wastewater Treatment Market Size, Report [2032] (fortunebusinessinsights.com)
[47] What is Water Filtration? | Wastewater Digest (wwdmag.com)
[48] Water Treatment Chemicals Market Size, Share Report, 2030 (grandviewresearch.com)
[49] Top Advanced Water Treatment Technologies | H2O Global News
[50] Water and wastewater pipes represent about half of the total global pipe market.

Technologies for water infrastructure repairs are technically not part of the equipment and hardware sector. However, those technologies are crucial for maintaining and enhancing water delivery, resource management, and flood protection, which is why we wanted to highlight them in this article. These technologies encompass methods for assessing, replacing, rehabilitating, and repairing water systems. The market is expected to grow at a CAGR of 6.6% from 2022 to 2032, primarily driven by aging infrastructure with high leakage rates.

3. The Water Efficiency Solutions Sector

Solutions for water efficiency and management are projected to grow significantly as private and public actors seek to reduce costs by minimizing non-revenue water and improving manufacturing efficiency. Upcoming regulatory pressures, particularly regarding leak reduction, are also driving this growth. Overall, the water sector is rapidly embracing new technologies for connectivity, automation, and data analytics, with utilities and industrial firms increasingly adopting digital solutions to enhance operations. Global spending on digital solutions in the water and wastewater utility sector is expected to grow 8.8% annually, from USD 25.9bn in 2021 to USD 55.2bn by 2030.[51] It seems the question is not if the water industry will go digital, but how fast, by which utilities, and with what impact and opportunities.[52] We have focused on two sub-segments in water efficiency solutions:

- Water metering, or measuring water consumption, is crucial for efficient water management and cost control. It is the largest segment of the global digital water market. The water metering market is projected to grow at a 7.8% CAGR from 2023 to 2030. The primary technologies in this segment are automated meter reading (AMR) and advanced metering infrastructure (AMI). AMR, which uses remote reading for efficiency, currently leads the market. However, AMI, which provides real-time data collection and integrates with smart grids, is expected to double its market share in Europe and North America from 2021 to 2027, offering enhanced capabilities for detailed data analysis and improved system management.
- Water automation and instrumentation utilizes advanced technologies to optimize and monitor water treatment, distribution, and management with minimal human intervention. The rising demand for water conservation, stringent regulations, and the need for efficient water management in both industrial and urban environments are driving the adoption of IoT, data analytics, and hydro-automation systems. This growth is reflected in the segment's projected average CAGR of 10.0% from 2023 to 2033. The distributed control system (DCS) is a market leader, offering centralized control, enhanced reliability, and real-time monitoring to boost operational efficiency.

[51] Digital Water - Bluefield Research

[52] Digital Water - Bluefield Research

Water as an equity investment

Water-related equity investments have shown strong performance, with the SEB water basket delivering a 27% return since March 2023. Bluetech companies have outperformed water utilities, emphasizing the potential of water technologies. As global focus on water issues grows, water is expected to remain a key sustainable investment theme.

Figure 25 SEB water equity basket performance

Source: SEB, Bloomberg

Unlocking Opportunities in the Emerging Water Investment Market

Water is emerging as a compelling and significant theme in sustainable investing. We continue to identify large investment opportunities within the field, driven by growing recognition of water as a scarce resource and the urgent need to expand and modernize water infrastructure worldwide to combat and adapt to climate change. This awareness can be seen not only in the tightening of water regulations but also in the increase of government spending worldwide. Simultaneously, we see investors trying to capture those opportunities. As of now, the investment universe for an equity investor interested in water is quite small, but nevertheless worth having a look at.

In March 2023, SEB put together a first small-scale equity basket focused on water infrastructure and water technologies together with a research piece where we argued that there is an investment case for water. The basket holds 19 companies and has a systematic overrepresentation of companies with a high contribution to the water theme, with over 70% of total revenues contributing to solving water-related challenges. A five year back-test of the basket showed that it outperformed both a market index and a broader water index during the period.

How has the actual financial performance of water equities looked recently?

In the September 2023 issue of the Green Bond report, we wrote a follow-up piece about water investments. In that article, we argued that Bluetech is the most interesting sub-theme within water investments. Like Greentech, Bluetech is an umbrella term for technologies used to mitigate water issues, such as water shortages and pollution. We argue that there is an investment case for Bluetech companies and expect them to provide investors with attractive returns over the coming years. In this short article, we will dig deeper into this question by analyzing the performance of the SEB water basket from March 2023.

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During this time, the SEB water basket delivered a total return of 27%, with the first half of 2024 being especially strong. Despite rising costs and inflationary pressures, water equities have managed to maintain a stable financial performance, reflecting their essential role in both developed and emerging markets. This has also potentially been driven by increasing global awareness of water-related risks and the need for increasing investments.

Comparatively, the broader market index has also performed well during the period, generating an excess return of 7% compared to the SEB water basket. A large part of that difference in performance compared to the broader market can be explained by water utilities performing poorly during the period. The three water utility companies in the basket had an average return of – 14.6% during the period. Underlying reasons for this set back are inflationary pressures, tightening regulations and bad weather which has all restricted company profits during the period. On top of this, an emerging need across the sector for additional equity injections has also helped to put pressure on the water utility companies' share performance.

As discussed in the September 2023 issue of the green bond, while water utilities are amongst the most common companies to include in water equity portfolios, they are also the ones that need to pay for a large part of the needed water investments. We are currently seeing governments and companies around the world increasing the commitments, regulations and spendings related to water improvements. Together, we believe that these commitments will lead to growing CAPEX investments and spendings by owners and operators of water infrastructure. In line with the past year's performance, we would hence expect higher spending and more regulatory uncertainty for the listed water utility companies also in the future. However, we continue to see opportunities for companies providing products and services focused on water technologies to reap the largest benefits from the increased focus on water also going forward.

If we instead compare the performance of the SEB water basket with the broader S&P global water index, the basket outperformed the index and generated an excess return of 3.8%. The main differences between the basket and the index are that (1) we are not investing in companies outside North America and Europe, (2) the index has a higher exposure to the utilities sector, (3) weights are set differently as the SEB water basket weights are only based on water exposure and not on sector or market capitalization, and (4) we apply a number of additional sustainability screening rules compared to the index. The exclusion of some geographies may explain part of the outperformance, especially since Asian water companies in general had a weak performance during the period. However, the most likely reason for the outperformance is the difference in exposure to water utilities. The S&P global water index have a 36.8% exposure to the sector, while the SEB water basket's exposure to the utilities sector is only 16%. Important to note here, is that the difference in exposure to a specific sector was not deliberately made as we did not actively reduce exposure to specific sectors in the construction of the basket. Instead, the different sector exposure is a direct result of the additional sustainability screening rules and that weights were set based on water exposure.

When comparing to other sustainability themes, water investments have also held up well during the period. In contrast to water, clean energy stocks have had a weak performance over the past year, despite the long-term outlook for clean energy remaining positive. Reasons for this performance have, for example, been renewable energy developers facing challenges such as project delays and fluctuating energy prices. Comparing the SEB water basket with the Bloomberg GS Clean Energy Index, the SEB basket outperformed the index by 31% during the period. Overall, it seems that water equities may provide a more stable alternative for sustainable investments, particularly in times of market uncertainty.

To summarize, water-related equity investments has proven itself as an interesting investment theme during the last one and a half years. Water investments have combined stable financial returns with the potential to help solve one of our most pressing societal challenges. Within the water theme, Bluetech companies have generally performed better than water utilities and we continue to see water technologies as the most interesting investment theme going forward. As the necessary future investments into water are large and the focus on the theme is only increasing, we would expect water to stay a highly relevant sustainable investment theme in the future as well.

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