White paper

Water the investment risk?

Assessing the water dependency risk in selected Nordic listed companies

Executive summary

This white paper explores the water dependency risk of Nordic listed companies with a market cap above DKK 4 billion, their exposure to water stressed areas and how they are responding to water-related risks.

To identify and analyse companies' water-related dependency risks we use a combination of data that describes companies' business activities and the revenue generation, nature materiality data, asset location data as well as data on water stressed locations around the world. We further utilize data that enables us to understand how companies are responding to water-related risks.

We assess the companies using the four steps within the LEAP framework (Locate, Evaluate, Assess, Prepare), which is recommended by the Taskforce on Nature-related Financial Disclosures (TNFD).

We believe these insights can support both investors and companies to understand water-related risks. We further believe that the LEAP framework can be used as an inspiration for other investors to understand their water-related risk exposure which can enable them to integrate this knowledge into their efforts within inclusion, active ownership and exclusions.

These are the key findings:

1. **Locate:** Out of the 319 Nordic listed companies with a market cap above DKK 4 billion, 65 Nordic companies were identified as having business activities with potentially high or very high water dependencies. These companies represent 75% of the total revenues generated by the 319 Nordic listed companies, equivalent to DKK 1,817 billion, highlighting the financial significance of water as a production input.

2. **Evaluate:** Among those 65 companies, 39 were found to have operations located in high or extremely high water-stressed regions. Danish companies account for the largest share of this exposure. Geographically, Nordic companies are most exposed to water stress in the United States, followed by India. This step reveals that while water dependency is widespread, the geographic concentration of risk is uneven, and future scenarios suggest that exposure is likely to increase.

3. **Assess:** While some of the 39 companies are taking steps to manage their water risk, many are not. Fewer than half of the companies have not yet disclosed whether they are measuring, mitigating, or preparing for water-related risks. This gap between exposure and action signals a key opportunity for investors to engage on disclosure, governance, and target-setting.

4. **Prepare:** These findings can support investors in several ways from identifying holdings with water risk exposures and informing engagement strategies, to integrating water risk into portfolio construction and screening. Ultimately, the data can be used to support more resilient and forward-looking investment decisions.

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Introduction:

Why water risk matters for investors

The World Economic Forum's Global Risk Report from 2025 shows that 27 countries, including France, Spain, India, Mexico, and South Africa, have listed water supply shortages as one of their top five risks over the next two years.[1] This concern is well-founded. The Stockholm Resilience Centre reports that the planetary boundary for freshwater has been crossed, meaning we are already in a zone of increasing risk.[2] In other words, water scarcity is not a future scenario, it's a current reality.

Today, more than 4 billion people live under water-stressed conditions for at least one month of the year, and by 2050, global water demand is expected to rise by 20–25%. At that point, 31% of global GDP is projected to be exposed to high water stress[3]. These are not just humanitarian or environmental issues; they are material financial risks that investors must understand. We are already seeing the consequences and how water scarcity can disrupt industrial operations. Tesla's $5.7 billion gigafactory in Berlin faced months of delays due to protests over groundwater use, impacting timelines, costs, and the company's share price[4]. Constellation Brands, the American brewing company, took a $660 million write down after abandoning plans for a brewery in a water-stressed area of Mexico[5]. In 2024, Antofagasta was forced to invest $1.5 billion to shift to seawater use at one of its Chilean mines due to worsening freshwater scarcity.[6]

According to the World Resources Institute (WRI), water stress can also lead to energy outages, agricultural losses, food insecurity, and broader impacts on public health and economic stability[7] and they provide three main factors that drive growing water stress:

1. Population and economic growth, which has more than doubled global water demand since 1960.
2. Underinvestment in water infrastructure and unsustainable water policies.
3. Climate change, which reduces water availability. The UN estimates that each 1°C rise in temperature may cause a 20% drop in renewable water resources.

These trends are not just about how we ended here they also point to what lies ahead. Population and economic growth are expected to continue, putting further pressure on water systems. This may lead to increased investments in water efficiency, creating opportunities for investors, but also to tighter regulation, which could expose companies operating in water-stressed regions to operational and compliance risks.

In the context of climate change, investors face two broad scenarios. If the world fails transition and does not meet the 1.5°C target, physical water risks will increase. If society does manage the transition, it is expected that regulatory and market shifts will follow. In both cases, understanding water risk will be essential.

This white paper applies the LEAP approach, recommended by the Taskforce on Nature-related Financial Disclosures (TNFD), to assess corporate water-related dependency risks. We apply it to listed Nordic companies with a market cap above DKK 4 billion[8] corresponding to 319 companies.

Our aim is to provide investors with inspiration as to how water dependency risk may be assessed to decide on appropriate actions. Whether through active ownership, better risk analysis, or more informed capital allocation, we deem water to be a critical factor that deserves attention in today's investment landscape.

[1] *https://reports.weforum.org/docs/WEF_Global_Risks_Report_2025.pdf*
[2] *Planetary boundaries - Stockholm Resilience Centre*
[3] *25 Countries Face Extremely High Water Stress | World Resources Institute*
[4] *https://assets.bbhub.io/professional/sites/24/BNEF_Nature-Risk.pdf*
[5] *https://assets.bbhub.io/professional/sites/41/Scarcity-Rising-How-Water-Shapes-Sectors-and-Investments.pdf*
[6] *https://assets.bbhub.io/professional/sites/41/Scarcity-Rising-How-Water-Shapes-Sectors-and-Investments.pdf*
[7] *25 Countries Face Extremely High Water Stress | World Resources Institute*
[8] *ISS ESG Market CAP: 01-05-2025.*

The LEAP approach to water-related risk

This white paper is structured around the LEAP approach, a framework recommended by TNFD for identifying and assessing nature-related risks and opportunities. We apply the LEAP approach specifically to understand how companies are exposed to water-related risks in their direct operations.

LEAP stands for Locate, Evaluate, Assess, and Prepare, and provides a step-by-step method to systematically analyze nature dependencies and impacts:

1. **Locate:** Identify where a company's activities interact with ecosystems, in this case water dependencies in direct operations. This includes mapping revenues generated from various business activities and their dependency on water.

2. Evaluate: Understand the materiality of water dependency by identifying the global locations of company assets and mapping these against areas of water stress. This spatial analysis helps determine whether company operations are situated in regions facing high water scarcity or poor water quality, providing a foundation for understanding potential exposure.

3. Assess: Analyze how companies are responding to their water-related risks. This includes examining whether they have risk management strategies, disclosure practices and water targets.

4. Prepare: Identify strategic actions companies and investors can take to mitigate water-related risks, strengthen resilience, and capture opportunities. This may include investments in water efficiency, nature-based solutions, or improved disclosure practices.

Using the LEAP approach supports a consistent and comparable assessment framework aligned with global good practices.

Locate:
Identifying potential water dependency in direct operations

The first step of the LEAP approach, Locate, focuses on identifying where a company's activities interact with ecosystems. In this white paper, we apply this step to understand water dependency in direct operations, using a combination of company revenue data from FactSet and nature data from ENCORE.

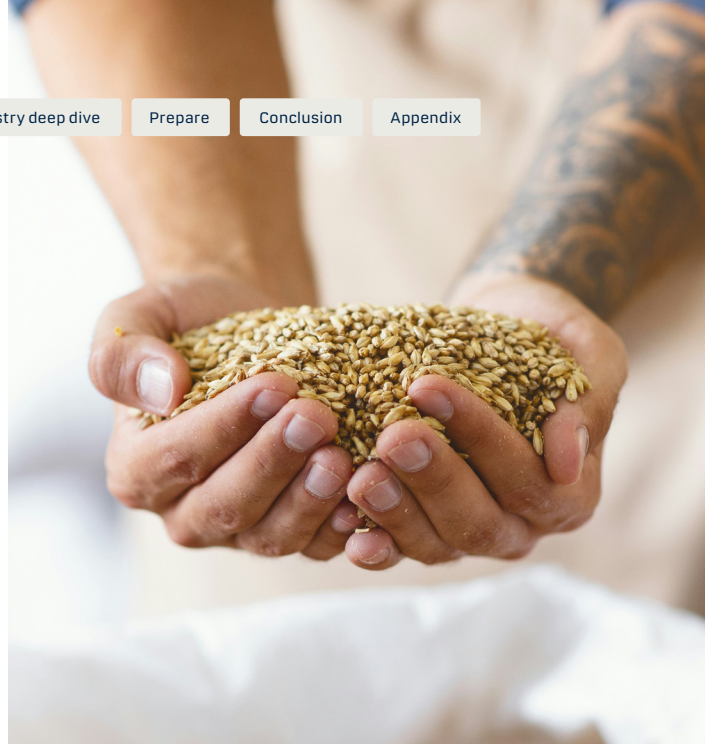
To locate water-related exposure, we analyze companies' revenue streams by business activity and link these to water dependency levels. This allows us to determine how much of a company's earnings are generated from water-intensive operations.

Our analysis of listed Nordic companies with a market cap above DKK 4 billion reveals that:

- 65 companies were identified as having business activities that potentially have high or very high-water dependencies.
- These 65 companies account for 75% of the total revenues generated by the 319 Nordic companies equivalent to DKK 1,817 billion.

Notably, several companies show close to or full revenue exposure to water-dependent operations. For example, Nordic companies within the pharmaceutical, brewery and fishery industry all generate close to 100% of their revenue from activities with high or very high-water dependency. Even companies with partial exposure within food production and forestry may face risks depending on their operational footprint and location.

This mapping provides a foundation for understanding where potential water dependency is concentrated and which companies may be particularly exposed to water scarcity, regulatory pressures, or reputational risk.



Evaluate:

Mapping and quantifying water dependency in high-stress regions

The second step in the LEAP approach, Evaluate, builds directly on the Locate phase by adding a critical geographic layer to the analysis. While the Locate step identified water-dependent activities, the Evaluate step focuses on where these dependencies occur and how exposed they are to current and future water stress.

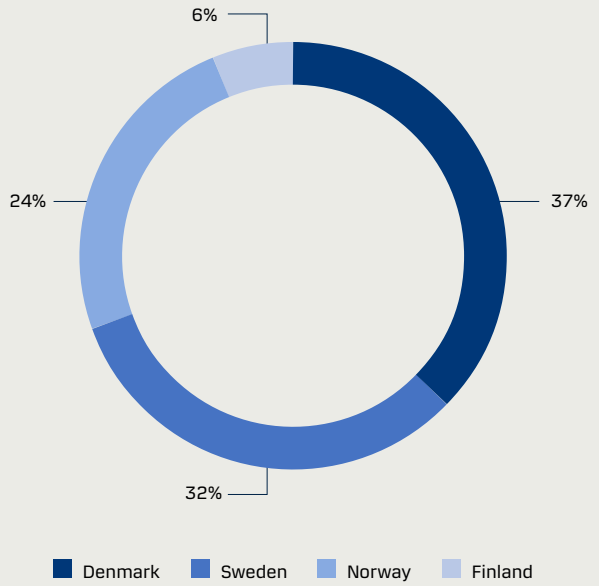
To answer this, we overlay company site data with global water stress maps from WRI's Aqueduct 4.0 platform. This spatial mapping allows us to assess whether operational sites are located in high or extremely high water-stressed areas, helping us evaluate how exposed companies really are.

A closer look at Nordic companies

Out of the 65 listed Nordic companies with water dependencies, 39 companies were identified as having operations in high or extremely high water-stressed areas. These companies account for an estimated 70% of the 319 listed Nordic total revenue, or roughly DKK 1,700 billion, linked to water-stressed geographies. Notably, some companies have more than 10 sites each located in water-stressed regions.

The analysis reveals a country-level divide. Danish companies account for 37% of Nordic water risk exposure, followed by Sweden (32%), Norway (24%), and Finland (6%). This highlights how exposure varies even within the domicile of the Nordic companies with highest water risk exposure.

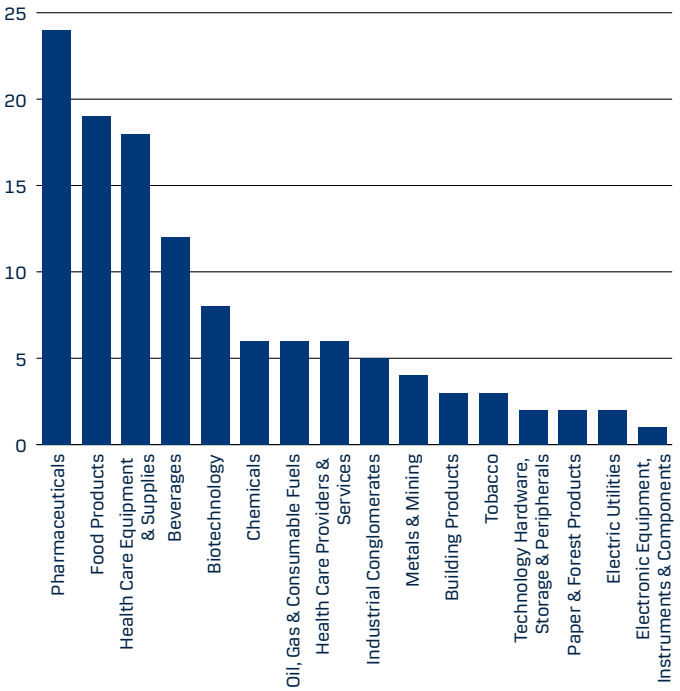
Figure 1: Countries with highest water risk exposure in the Nordics



By sector, companies with exposure to water stressed areas the pharmaceuticals, food production, and biotechnology industries were found to be most exposed. These industries rely heavily on clean and reliable water sources for manufacturing, processing, and hygiene, making them particularly vulnerable to supply disruptions or tightening regulations.

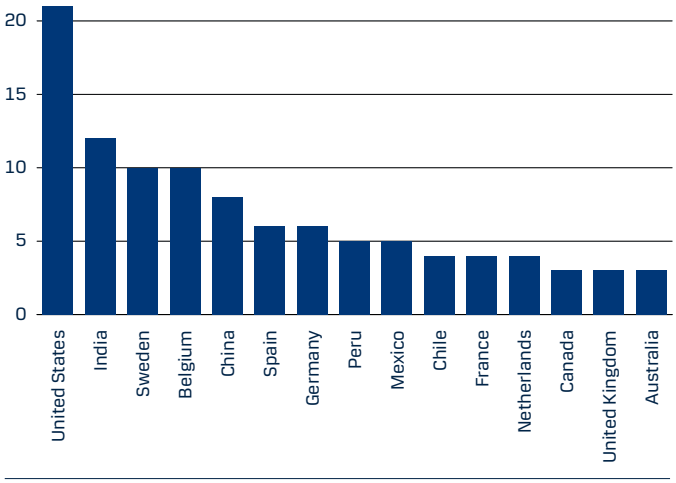
Figure 2: Industries exposed to high water stressed areas

Amount of facilities in water stressed areas



From a geographical perspective, Nordic companies are most exposed to water stress in the United States, followed by India, Sweden, Belgium and China. This highlights the global nature of water risk, as companies headquartered in relatively water-secure Nordic countries may still operate in regions with severe stress. These international exposures can affect everything from supply chain continuity to cost structures and regulatory compliance.

Figure 3: Country exposure to high water stressed areas



Future scenarios: risk is rising

Using forward-looking modelling from WRI Aqueduct, we can assess how company exposure may shift over time, considering changes in climate, population growth, and regulation. Aqueduct allows users to explore water stress projections under different scenarios. We ran our data on:

- The Optimistic scenario (SSP1 RCP2.6) assumes a world with strong environmental regulation, low population growth, and rapid improvements in technology and water efficiency. Global warming is limited to 1.3–2.4°C.
- The Pessimistic scenario (SSP5 RCP8.5) describes a world with rapid fossil-fuelled development, high population growth, and minimal environmental concern leading to warming of up to 5.7°C.

Each scenario has varying effects on water availability in different parts of the world. When assessing the Nordic companies looking towards year 2080, water risk is expected to increase in the future under both scenarios:

- The number of Nordic companies exposed to high water stress could increase by 10–15%.
- The number of company sites located in high or extremely high water-stressed areas could rise by 15–47%.

This underscores a key finding: today's exposure may understate tomorrow's risk. This makes future scenario analysis not just useful but also increasingly important to assess long-term portfolio resilience in a world where water risk is intensifying particularly as climate change, population growth, and regulation shift the water risk landscape.

Spatial mapping assessment provides a scalable, comparable way to quantify water-related risk across companies and industries and could be useful for investors who want to prioritize engagement, improve the quality of engagements, enhanced due diligence, or portfolio risk management based on location-specific exposure to water stress.

Figure 4:

	Baseline	- Optimistic	- Pessimistic
Number of companies with high or extremely high water stressed areas	39	+10%	+15%
Total sites located in high or extremely high water stressed areas	121	+15%	+47%

Assess:

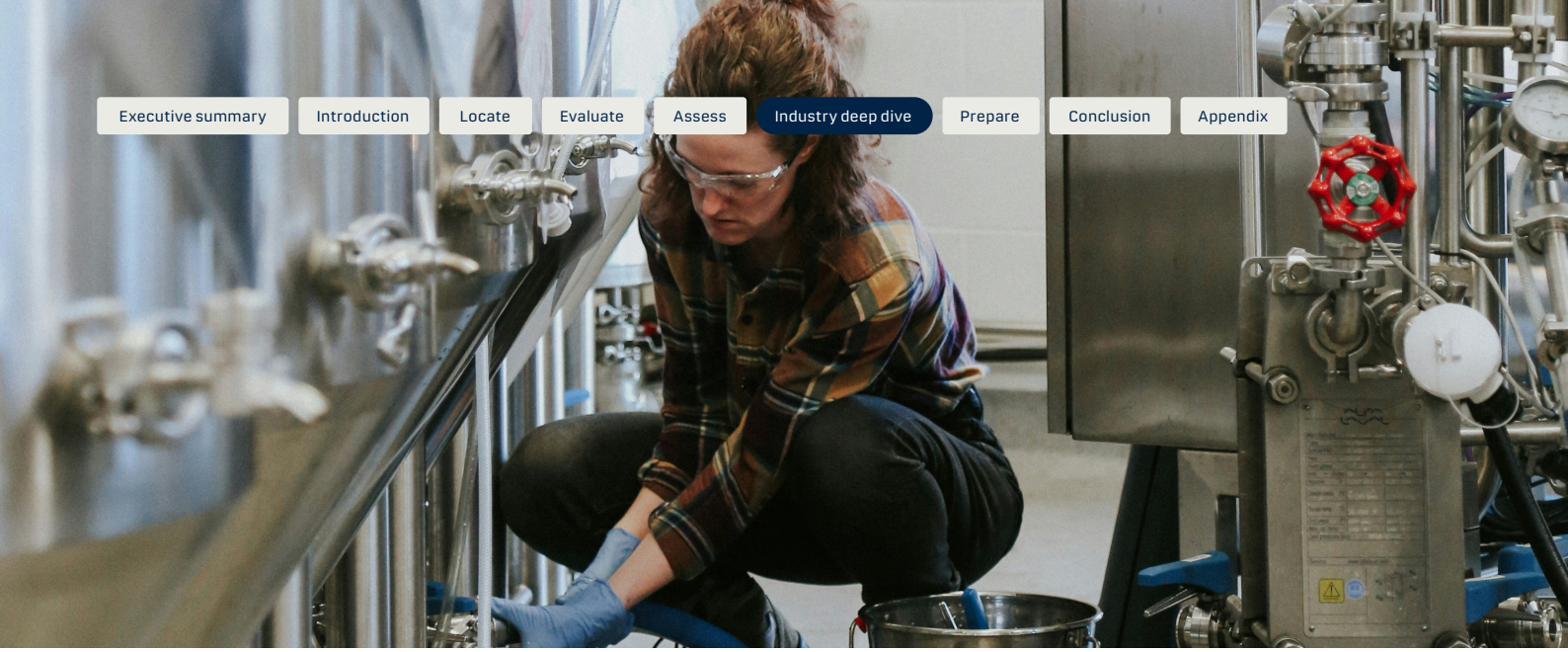
How are companies responding to water-related risks?

The third step in the LEAP approach, Assess, shifts the focus from exposure to response. It helps us understand not just which companies are vulnerable to water stress, but which ones are actually managing the risk. While knowing where companies operate and how water-dependent they are is important, it is the quality of their response that often determines the severity of the risk and the resilience of the business.

To evaluate corporate responses among the Nordic companies, we analysed data from MSCI, CDP, and corporate disclosures, using seven key indicators. Each of these indicators reflects a different dimension of water governance and risk management:

Figure 5:

Data provider	Indicator	Explanation	% of companies
MSCI	Water management policies and practices in place	This shows whether the company has a formal approach to managing water risks across its operations. The existence of policies signals awareness and a basic level of internal risk governance.	41%
MSCI	Board/management oversight	Governance matters. If water is discussed at board or senior management level, it suggests that the issue is integrated into strategic planning and risk frameworks, essential for driving accountability.	59%
CDP	CDP water disclosure	Reporting to CDP indicates both transparency and a willingness to benchmark progress. Companies that disclose are often more advanced in measuring, managing, and reducing their water-related impacts.	54%
CDP	Identification of facilities in water stressed areas	This is a key test of whether companies know their own exposure. Without location-specific insight, companies cannot properly assess physical or regulatory risk and investors cannot price it.	26%
CDP	Water-related targets	Targets are essential for tracking progress and ensuring accountability. They demonstrate whether the company is actively working to reduce its water footprint or improve efficiency.	33%
CDP	Water withdrawals, consumption and discharge disclosure	These metrics are critical for understanding the scale of water use and how it may evolve.	46%
CDP	Forecasting the same or higher waster use	Forecasting higher water use, for example, may raise questions about long-term sustainability in water-stressed regions.	31%



Among the 39 Nordic companies with operations in water-stressed areas, responses remain uneven and incomplete:

- **54%** disclose to CDP Water, while only 41% have formal water policies
- **59%** report board or management oversight, showing strong governance integration
- **26%** have mapped their sites against water stress data
- **33%** have set measurable water targets
- **46%** have disclosed critical water data
- **31%** forecast equal or higher future water use

Even a few companies with 100% water-dependent revenue and multiple sites in stressed areas do not have management oversight, have not consistently disclosed to CDP or set targets. This suggests that exposure does not automatically lead to action.

However, a few companies are beginning to show leadership, disclosing both water withdrawal, consumption and discharged, mapping risk, and committing to efficiency goals. These are more likely to be resilient and better positioned for the physical, regulatory and operational risk ahead.
This analysis highlights a critical gap: exposure is often not matched by management. Even companies with substantial water risk may not be disclosing how they measure, mitigate, or prepare for those risks suggesting an opportunity for engagement, improved transparency, and stronger governance. By assessing these indicators, we can distinguish between companies that are proactively managing water risks and those that are falling behind and take action accordingly.

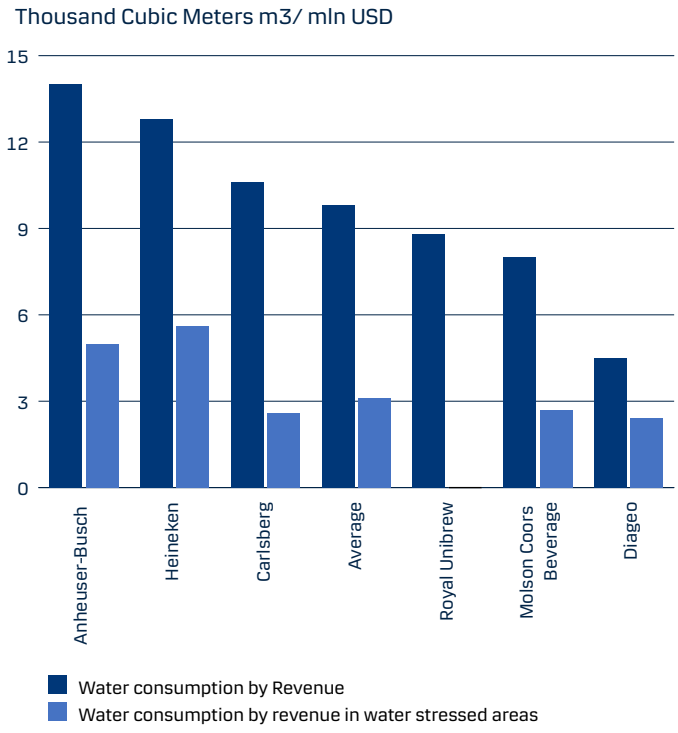
Industry deep dive:

How do Nordic beverage companies compare to their global peers?

To put water-related risk management as well as water risk exposure into perspective, it is useful to benchmark Nordic companies against some of their international peers. To illustrate differences, we deep dive into the beverage sector, where water is a core production input and where companies are transparent and disclose water data. We compared Royal Unibrew and Carlsberg with a few selected global peers such as Anheuser-Busch, Heineken, Molson Coors Beverage, and Diageo.[9] [10]

[9] *We based our analysis on the latest data published in corporate sustainability reports.*
[10] *Diageo is not directly comparable to the other companies selected as they primarily produce spirits. In 2025 they reported that 16% of their net sales is generated from beer, primarily Guiness.*

Figure 6: Water consumption by revenue



A comparison of water consumption per unit of revenue highlights clear differences across the global beverage sector. Anheuser-Busch and Heineken stand out with the highest water use intensities, consuming 14.0 and 12.8 thousand cubic meters of water per million USD revenue, respectively, whereas Carlsberg reports a slightly higher water use intensity than average. Molson Coors Beverage and Royal Unibrew report lower water intensities than average for the peer group.

However, when narrowing the focus to water consumption in water-stressed areas, the picture changes. Royal Unibrew report that 0.04% of their water withdrawals are from water-stressed regions, while their peers show considerable exposure. For example, Heineken and Anheuser-Busch each report more than 5,000 m³ per million USD revenue from high-stress areas, suggesting potential operational and regulatory vulnerability, whereas Carlsberg reports around 2,600 m³ per million USD revenue from high-stress areas, which is below average for the peer group.

This indicates that the two Nordic beverage companies may be less exposed geographically compared to their global peers. On governance and disclosure, both Carlsberg and Royal Unibrew report having water management policies and board-level oversight, aligning with peers such as Diageo, Molson Coors, and Anheuser-Busch. All of them also report to CDP on water-related risks.

Figure 7:

	Water to beer ratio - target	Water to beer ratio in water stress areas - Target	Target year
Anheuser-Busch	2.5	2.0	2025
Heineken	2.9	2.6	2030
Carlsberg	2.0	1.7	2030
Molson Coors Beverage	2.8	2.8	2025
Royal Unibrew	2.5	No target	2030
Diageo	30% reduction	40% reduction	2030

Where Carlsberg diverge is on target-setting. Carlsberg distinguishes itself with the most ambitious water-to-beer ratio target in water-stressed areas, aiming for just 1.7 hectolitres per hectolitre of beer, lower than targets from Heineken (2.6), Molson Coors (2.8), and Anheuser-Busch (2.0). Royal Unibrew has not set any targets for water stressed areas as they do not have exposure to any water-stressed areas. However, they have in the beginning of 2025 set a target to reduce water intensity from 3.2 hectolitres of water per hectolitre of beverage produced to 2.5 by 2030.

In summary, this industry snapshot for beverage companies show that Nordic companies have a lower physical exposure to water stress, and among the selected peers Carlsberg demonstrates leadership in efficiency and target-setting.

From an investment perspective, peer analysis helps identify leaders and laggards, both in terms of exposure and management quality. It reveals where companies face elevated operational or regulatory risks, and whether they are responding appropriately. Such benchmarking may also strengthen engagement strategies by enabling more targeted and evidence-based dialogues with companies.

Prepare:

Acting on water-related risk insights

The final step of the LEAP approach, Prepare, focuses on how investors can respond to water-related risks and opportunities. Once dependencies have been identified, exposures mapped, and corporate responses assessed, the next step is to use that information to guide decisions and drive action.
This stage aligns well with the principle of double materiality:

- **Financial materiality:** How do water-related risks impact the company and its financial performance?
- **Impact materiality:** How do the company's activities impact water systems and society?

By understanding both dimensions, investors can better prepare for a future shaped by increasing water scarcity, regulation, and stakeholder expectations.

The insights from this analysis can support investors in multiple ways across portfolio construction, stewardship, and risk management.

From an inclusion perspective, the information helps identify companies that are heavily dependent on water and operate in areas facing high water stress. These companies may be more vulnerable to operational disruptions, regulatory pressure, or reputational issues. The findings can also be used to run scenario analyses under different climate conditions or compare companies within a sector to highlight those that are leading or lagging in managing water-related risks. This approach can even be applied to private equity investments, where data is often harder to obtain.

For active ownership, the results make it easier to prioritize which companies to engage with and to shape more focused engagement dialogues. By knowing whether a company has assessed its water risk, disclosed water use, or set relevant targets, investors can tailor their questions and drive more effective stewardship. In some cases, the insights may also support proxy voting decisions or feed into broader engagement research.

Finally, the information can be used in a screening and exclusion process. For example, it can be combined with data on water-related controversies to flag companies that are both exposed and underperforming on water risk management. This enables investors to screen out the riskiest holdings or apply a more precautionary approach. In short, these insights can be used not only to understand risk but to act on it.

Conclusion

In our assessment, water-related risk is financially material and in most cases under-addressed by Nordic listed companies.

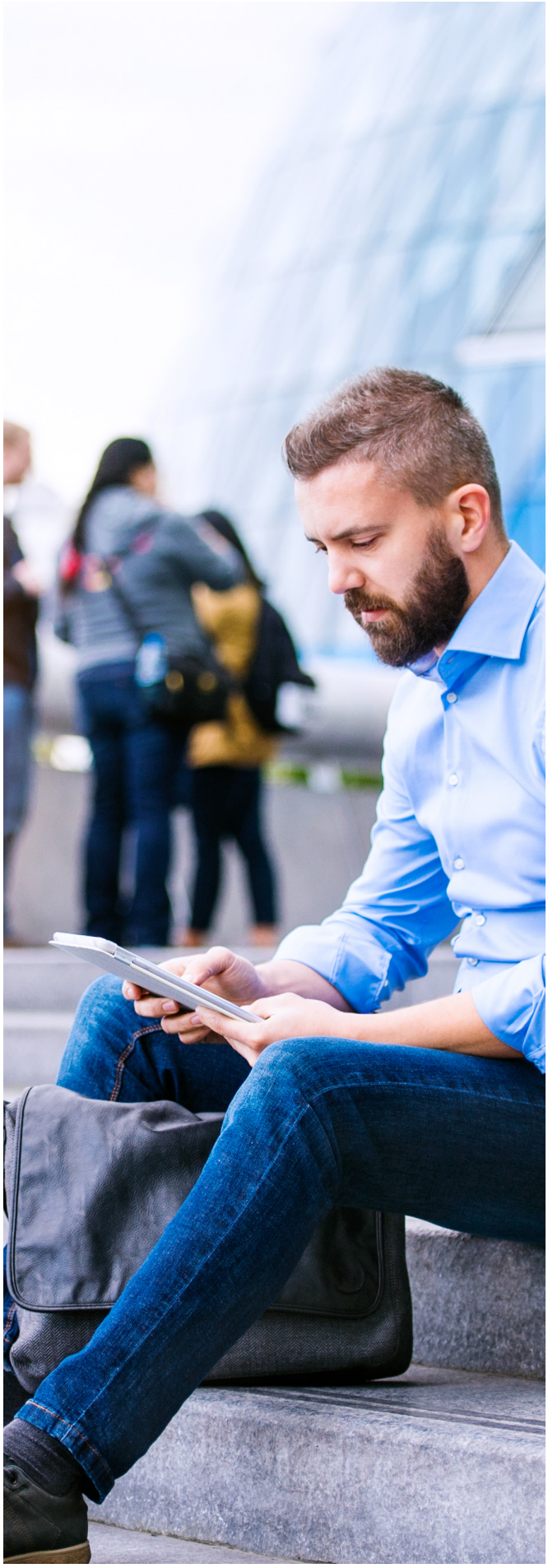
Our analysis of 319 Nordic companies shows that 65 of them generate revenue from water-dependent activities, representing 75% of the 319 Nordic-listed company revenues. Among these 65, 39 companies operate in regions classified as having high or extremely high-water stress. Despite this exposure, in our view, only a minority of companies have acknowledged these risks or implemented adequate measures to mitigate them. Fewer than half have set measurable water targets, and just a quarter have mapped their sites against water stress data. This mismatch between risk and response reveals a blind spot and could be relevant to explore further.

By applying the LEAP approach, we offer a practical and replicable method for identifying and managing water-related risk. The Locate step highlights which companies depend on water. The Evaluate step shows where these dependencies are located and how severe the local water stress is. The Assess step reveals the extent to which companies are managing their risks through governance, disclosure, and target-setting. Finally, the Prepare step outlines how investors can act on these insights through capital allocation, stewardship, and risk screening.

Looking forward, water stress is set to intensify as water demand is expected to increase, as increasing temperatures, population growth, and regulation may reshape the global risk landscape. Our scenario analysis indicates that both the number of companies exposed to water stress and the number of high-risk sites will likely increase, even under optimistic assumptions. This means that today's exposure is likely to grow unless addressed.

This creates both a risk and an opportunity. Those who act now will be better positioned to avoid downside shocks and identify emerging leaders in water resilience. Those who do not risk being left high and dry.

Nordic companies are not yet waterproof. But with the right tools, data, and investor engagement, they can be. This paper offers a concrete starting point for that journey.



Appendix

List of data sources:
The analysis in this white paper is based on a combination of publicly available datasets, company disclosures, and third-party data providers. The following sources were used:

- ENCORE – Scientific assessment of sector-level water dependency.
- CDP – Self-reported corporate data on water-related risks, disclosures, and targets
- MSCI ESG – Indicators on water management policies, governance structures, and corporate disclosures
- ISS – Market capitalisation data used for company selection
- FactSet – Business activity segmentation and share of revenue linked to specific operations
- WRI Aqueduct 4.0 – Global water risk mapping under baseline and future climate scenarios
- Company site data – Location information collected from company websites, public documents, and news sources through OpenAI (ChatGPT).

These sources were combined to assess corporate water dependency, geographical exposure to water stress, and the quality of company responses.

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