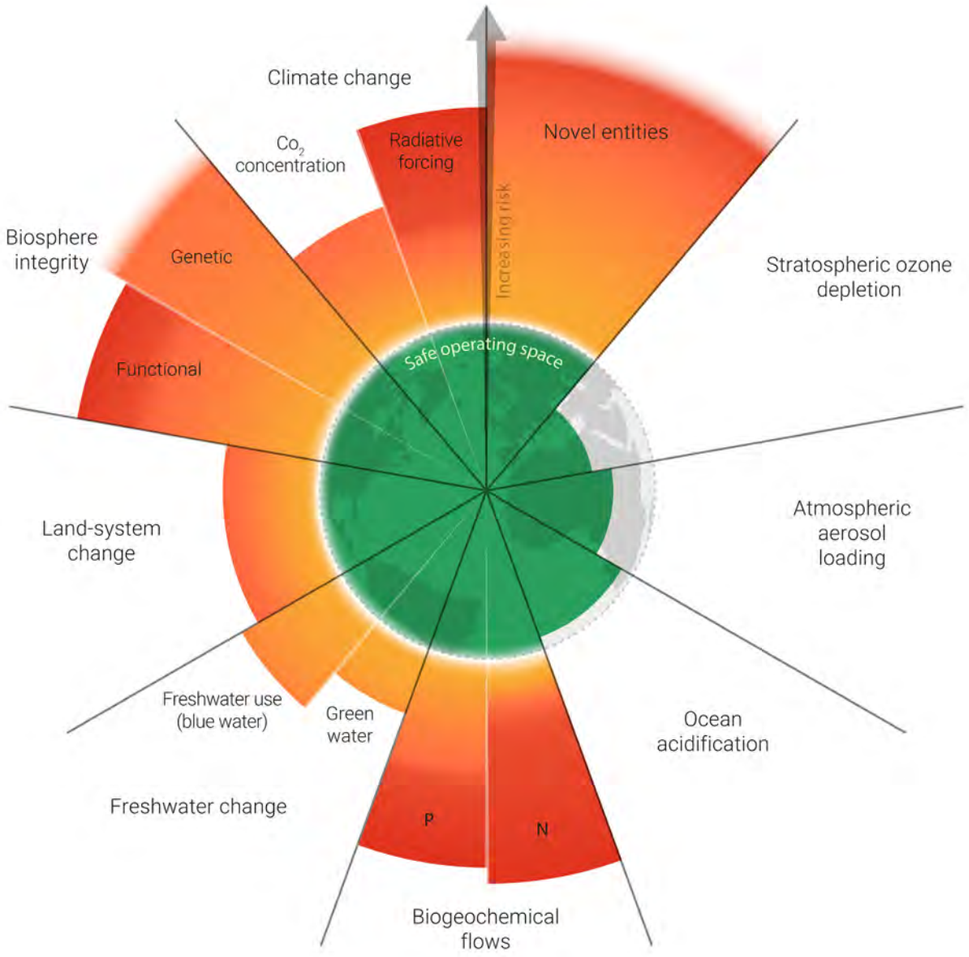
# Planetary boundaries report

2025

Investing to solve
global challenges

SUMMAEQUITY




**About this report**
This report marks a continued step in Summa's systematic approach to addressing climate and nature, following last year's Climate and Nature Report. We now use the planetary boundaries framework to structure our analysis and actions.

The purpose of this annual publication is to provide clear, evidence-based insight into our progress on pushing planetary boundaries back into safe operating zones. We appreciate the contributions from our portfolio companies, external advisors, friends, and the Summa team.




1. Stockholm Resilience Centre. (n.d.)



# Table of contents



# 1. Introduction

The planetary boundaries concept defines nine critical Earth system processes that regulate the stability of our planet. Staying within these boundaries ensures a safe operating space for humanity's continued development.

## 2024 – a year of extremes

2024 marked an unprecedented year of environmental disruption, with six of the nine planetary boundaries now breached. 2024 was the hottest year ever recorded with global temperatures exceeding the critical 1.5°C threshold. Extinction rates of plant and mammal species also reached historic heights, underscoring the increasing pressure on ecosystems and raising the risk of irreversible tipping points. The planet's resilience to human-made impacts is declining, and urgent action is required.

Despite these challenges, promising progress continues across sectors with high mitigation potential. Renewable energy adoption surpassed growth projections, and new investment opportunities are emerging in areas capable of pushing planetary boundaries back within safe operating zones.

## Summa's commitment to the planetary boundaries

Solving global challenges stands at the core of Summa's mission, and the planetary boundaries define the most pressing environmental issues facing our world. In 2024, we advanced our contributions across three key pillars:

**1. Investing to solve global challenges**
We completed seven new investments during the year. Several of these directly support planetary boundaries, including:

- The merger of NG Group and Fortum Recycling & Waste, establishing a leader in circular economy solutions and reducing the release of novel entities through depollution technologies.
- Bollegraaf enables the transition towards a circular economy through recycling machinery.
- EA Technology is a critical enabler of grid maintenance for renewable energy integration.
- Nutris, a frontrunner in plant-based protein innovation, supporting a more sustainable food system.

**2. Future-proofing companies**

- We increased science-based targets (SBTi) coverage across the portfolio from 5% to 54% by fair value. Two of our largest emitters, NG Nordic and Milarex, validated their SBTi targets in 2024.
- We also carried out a comprehensive assessment of climate risks under multiple scenarios, confirming relatively low risk exposure across the portfolio.
- Additionally, we expanded nature-related impact assessments to cover the full value chain and began mapping nature dependencies across portfolio companies.

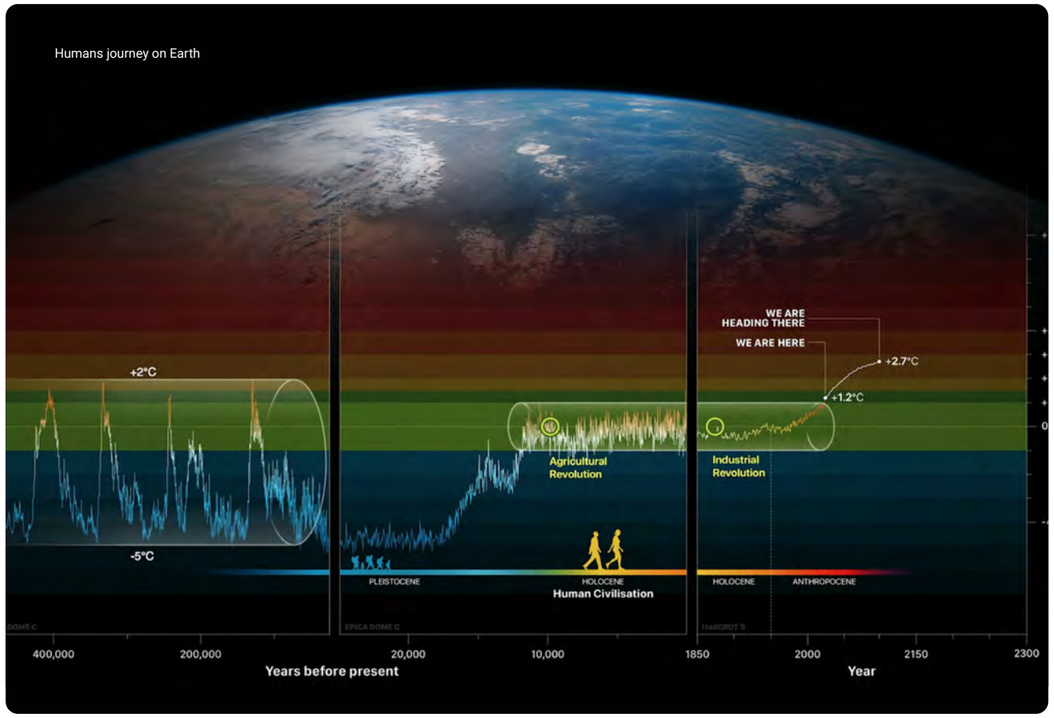
**3. Advancing knowledge**

- Summa supports the development of Earth System Impact (ESI) metrics through on-going collaboration with the Stockholm Resilience Centre. The initiative aims to create standardized tools for assessing and reporting impacts on planetary boundaries.

**1. Investing to solve global challenges**

**2. Future-proofing companies**

**3. Advancing knowledge**




The "**corridor of life**", a concept shaped by Earth system scientist Johan Rockström, defines the narrow range of environmental conditions that have enabled human civilization to flourish. This corridor represents the safe climatic conditions within which agriculture, urban development, economic systems, and stable societies have emerged and thrived.

For over 10,000 years, humanity has existed within a period of remarkable climate stability. Global average temperatures have remained around 14°C, fluctuating by no more than ±0.5°C. This stability has been critical: it allowed predictable seasons, fertile lands, and reliable freshwater cycles — the very foundations of civilization.

From a longer-term perspective, over the past 3 million years, Earth's climate has never exceeded +2°C above pre-industrial levels. This makes the current trajectory of global warming — with projections ranging from +2.5°C to +3°C or more by the end of the century — deeply alarming. Such levels of warming would push Earth's climate into unprecedented territory, outside the known corridor that supports large-scale human societies.[2]

Crucially, there is no scientific evidence suggesting that a world of 9 billion people — the projected global population by mid-century — can live with health, dignity, and equality outside this corridor. Exceeding it risks destabilizing ecosystems, collapsing food systems, displacing millions due to sea level rise and extreme weather, and intensifying resource conflicts.



2. Rockström, J., Gupta, J., Qin, D. et al (2023)



**Figure 01**
World map of tipping points[3]


## Approaching Earth's tipping points

As humanity pushes planetary boundaries further into critical zones, the risk of irreversible ecosystem collapses increases. Several large-scale subsystems—known as tipping systems—are vital for regulating climate, hydrological cycles, and ecological diversity. Well-researched examples include the West Antarctic Ice Sheet, the Atlantic Meridional Overturning Circulation, and the Amazon Rainforest.

These ecosystems are governed by feedback loops that accelerate change once disturbed. Current anthropogenic pressures such as deforestation, greenhouse gas emissions, and resource extraction, are pushing them toward critical thresholds, or tipping points. Beyond these thresholds, even minor overshoots can lead to abrupt, irreversible shifts. Because these ecosystems are interconnected, the collapse of one can trigger cascading effects that compound stress across planetary boundaries.[4]

The impacts would be severe: loss of biodiversity, rising sea levels, and significant shifts in global precipitation and heat patterns.[5] These shifts would have broad economic consequences, including threats to food and energy security, disrupted supply chains, and damage to infrastructure.[6]

3. Potsdam Institute for Climate Impact Research (n.d.) 4. Möller, T., Högner, A. E., Schleussner, C. F., et al. (2024) 5. Möller, T., Högner, A. E., Schleussner, C. F., et al. (2024)
6. Marsden, L., Ryan-Collins, J., Abrams, J., & Lenton, T. (2024)





# 2. The state of planetary boundaries in 2024

## Six of the nine planetary boundaries have already been breached, increasing the risk of crossing critical tipping points. Yet, change is happening at an unprecedented pace.

Developed from the insight that human activities can push these systems beyond safe limits, the framework identifies thresholds for each process—such as climate change, biodiversity loss, and nutrient cycles—to define a "safe operating space" for humanity. The outcomes enable a comprehensive view of the Earth's health status, thereby bridging local and global efforts, and recognizing the complex interdependence of its systems.[7]

- Climate change
- Biodiversity loss
- Land-systems change
- Nitrogen/phosphorus cycle
- Freshwater use
- Chemical pollution
- Ozone depletion
- Ocean acidification
- Aerosol loading

7. Caesar, L., Sakschewski, B., Andersen, L. S., Beringer, T., Braun, J., Dennis, D., Gerten, D., Heilemann, A., Kaiser, J., Kitzmann, N. H., Loriani, S., Lucht, W., Ludescher, J., Martin, M. A., Mathesius, S., Paolucci, A., te Wierik, S., & Rockström, J. (2024)

## 2.1 Planetary boundaries in critical conditions

Global average temperatures in 2024 exceeded 1.5°C above pre-industrial levels, marking a critical moment in our efforts to mitigate climate change. While El Niño contributed to the warming, the dominant drivers remain anthropogenic greenhouse gas emissions and the reduction of aerosol cooling.[8] Atmospheric carbon dioxide concentrations hit a new record of 422ppm[9], fuelled by persistent increases of global greenhouse gas emissions. There is now concrete evidence to suggest that even as El Niño fades, we may have entered a period of sustained warming of 1.5°C or more.[10]

Despite the scientific consensus and mounting climate impacts, policy responses remain insufficient. Full implementation of current national pledges would yield only a 10% emissions reduction by 2030, far below the 42% required to stay below 1.5C. Instead, the world is currently on track for 3.1C (range 1.9 – 3.8) of warming by 2100.[11]

While climate change poses an unprecedented risk to human society, the broader state of nature is also in critical decline. The IPBES Global Assessment reports that over a million animal and plant species are threatened with extinction due to human activities.[12] Wildlife populations have decreased by an average of 73%[13] and current extinctionrates are up to 100 times higher than natural background levels seen in the fossil record.[14] The degradation of ecosystems and loss of biodiversity are now recognised as one of the top three global risks with significant potential impact over the coming decade.[15]

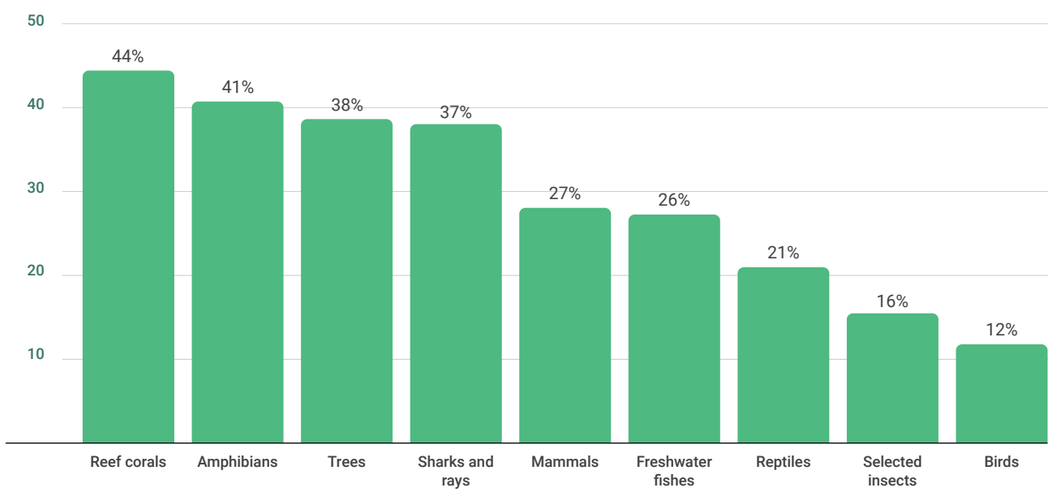
Land-System Change represents another major transgression. Driven by agriculture, wildfires, and logging, the world's forests—particularly in temperate and tropical regions—have been steadily declining. Roughly 37% of tree cover loss since 2000 is permanent and has resulted in nonforest land such as agriculture, mines, or infrastructure. While the remaining loss was likely to be temporary, regeneration and redevelopment of ecosystem functions can be a lengthy process, and not all ecosystems are guaranteed to recover fully.[16]

The boundary related to Freshwater Change has also been crossed. Alterations to river flows, soil moisture, and groundwater recharge have intensified since the late 19th century. These changes undermine water security and the stability of aquatic ecosystems. As water becomes more unevenly distributed and less predictable, concerns are mounting over the long-term sustainability of freshwater systems crucial to human well-being and food production.

Nitrogen and phosphorus cycles have been heavily disrupted by fertilizers in industrial agriculture causing. This has caused widespread ecological damage, including water pollution, harmful algal blooms, oxygen-depleted dead zones in lakes and oceans, and general ecosystem degradation. The impacts are most pronounced in industrialized regions but are increasingly affecting developing countries too.[17]

Finally, the unchecked proliferation of synthetic chemicals, plastics, and genetically modified organisms is above safe levels. Chemicals production has increased 50-fold since 1950, and is set to triple again by 2050.[18] Many of these substances are released into the environment without sufficient testing or regulation. Their long-term effects are often unknown, but they can be toxic, persistent, and disruptive to ecosystems.[19]

**Figure 02**
Threatened with extinction?[20]
Share of assessed animal/plant species threatened with extinction within selected groups (as of Oct. 2024)






8. Copernicus Climate Change Service. (2025) 9. Climate Action Tracker. (2024) 10. Bevacqua, E. et al. (2025) 11.Climate Action Tracker. (2024) 12.Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. (2021) 13. WWF. (2024) 14. Ceballos, G., Ehrlch, P. R., Barnosky, A. D., García, A., Pringle, R. M., & Palmer, T. M. (2015) 15. BloombergNEF. (2024) 16. World Resources Institute. (n.d.). Forest loss. 17. Caesar, L., Sakschewski, B., Andersen, L. S., Beringer, T., Braun, J., Dennis, D.,



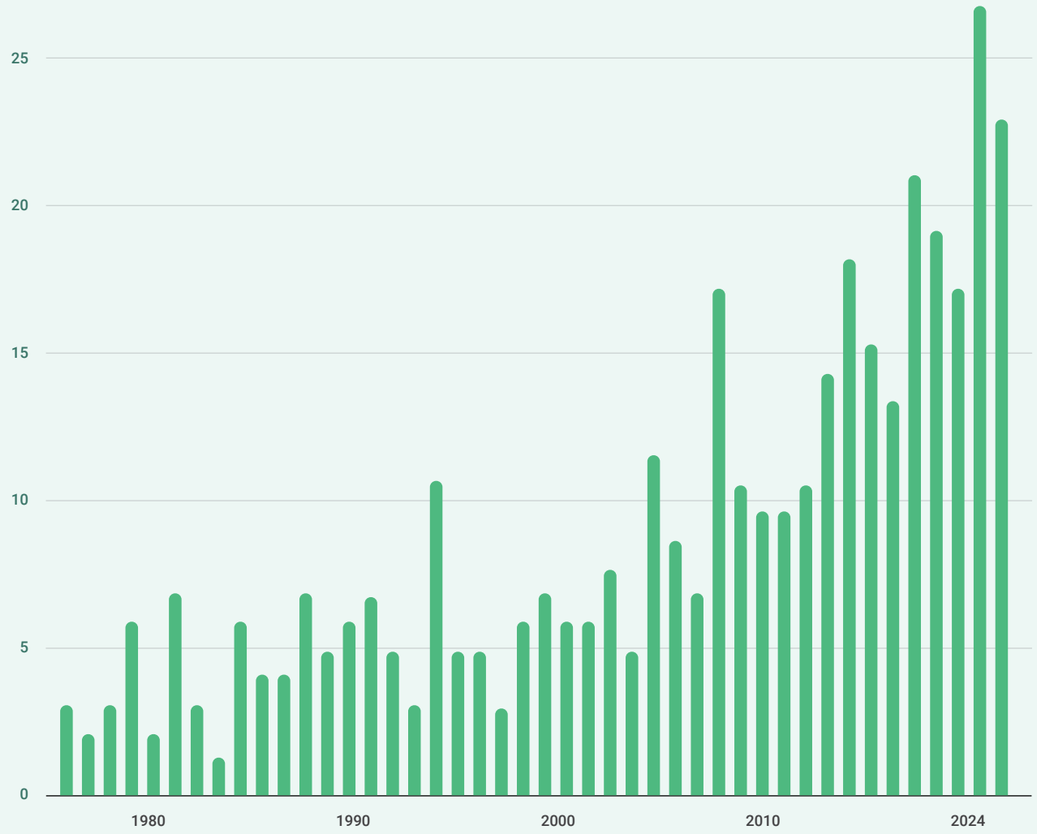
Gerten, D., Heilemann, A., Kaiser, J., Kitzmann, N. H., Loriani, S., Lucht, W., Ludescher, J., Martin, M. A., Mathesius, S., Paolucci, A., te Wierik, S., & Rockström, J. (2024) 18. Stockholm Resilience Centre. (18.01.22) 19. Caesar, L., Sakschewski, B., Andersen, L. S., Beringer, T., Braun, J., Dennis, D., Gerten, D., Heilemann, A., Kaiser, J., Kitzmann, N. H., Loriani, S., Lucht, W., Ludescher, J., Martin, M. A.,Mathesius, S., Paolucci, A., te Wierik, S., & Rockström, J. (2024) 20. IUCN (2025)

## 2.2 Socio-economic consequences of unstable earth systems

2024 showed that planetary boundaries risks are no longer theoretical: they are a present threat. Extreme weather events are growing in frequency and severity, impacting lives and businesses globally. In the United States, 24 such events caused damages exceeding USD 1 billion each.[21] Over the past 30 years, climate-related damages have totaled USD 4.2 trillion and resulted in nearly 800,000 deaths.[22] As temperatures rise, economic shocks are set to intensify. Global GDP could decline by 3.2% in a 1.5°C scenario, and by 10–17% if temperatures reach 3°C.[23]

The scale and severity of risk increase when considering the essential services ecosystems provide to societies and economies. An estimated USD 58 trillion—or approximately 55% of global GDP—is moderately or highly dependent on ecosystem services.[24] These services regulate climate, purify water, store carbon, and deliver benefits that are often excluded from traditional economic assessments.[25] Sectors such as logging, fishing, tourism, and farming rely directly on nature and face increasing threats from ecosystems degradation. Food security is also at risk due to factors such as soil erosion, land degradation, and the decline of pollinators.[26] Between 2000 and 2010, biodiversity loss and ecosystem degradation led to annual GDP losses of USD 2–4.5 trillion.[27] The World Bank projects that continued decline of natural systems will cost the global economy USD 2.7 trillion annually until 2030.[28]

**Figure 03**
Climate-related events with at least USD 1 billion dollar damage in the United States [29]





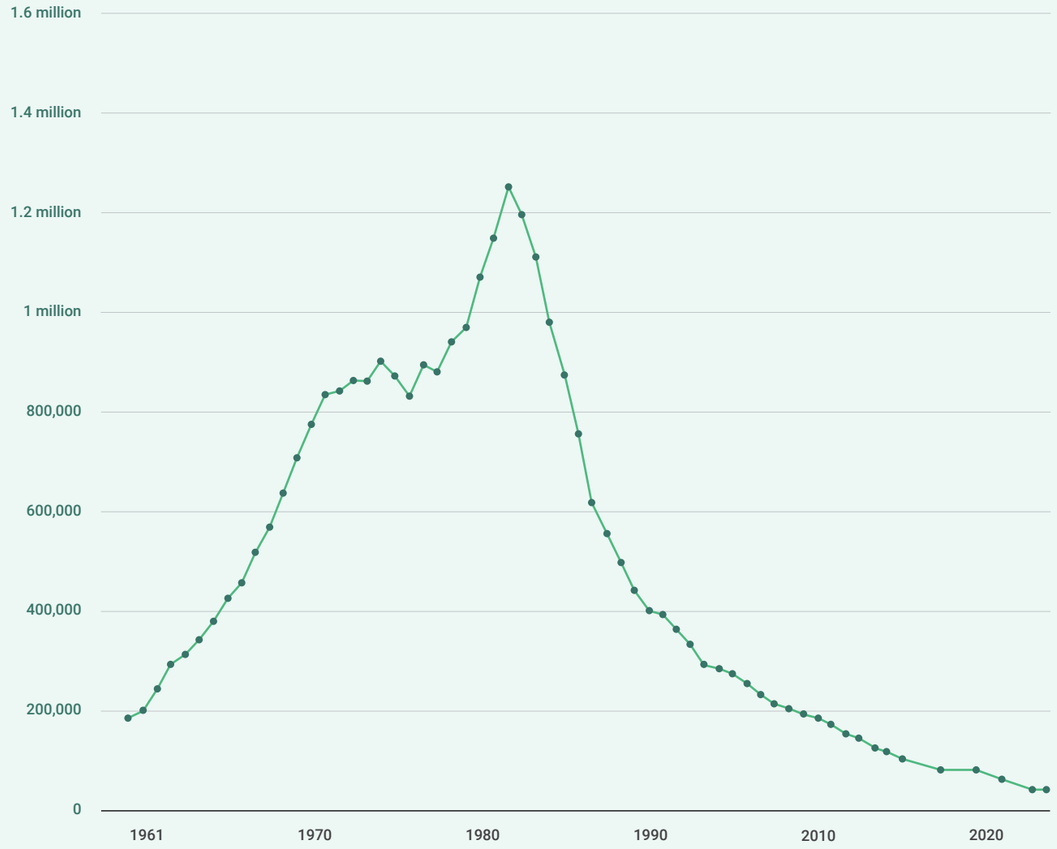

21. Smith, A. B. (2025) 22. Adil, L., Eckstein, D., Kuenzel, V., & Schaefer, L. (2025) 22. BloombergNEF. (2024) 23. Waidelich, P., Batibeniz, F., Rising, J., et al. (2024) 25. UNEP (2021) 26. UNEP (2021) 27. PwC. (2010) 28.World Bank. (2021) 29. Climate Central. (2024)



## 2.3 Change is possible

Yet, there is reason for hope. Humanity has once before proven that reversing environmental damage at scale is achievable. The sharp decline of the stratospheric ozone layer, driven by ozone-depleting substances (ODS) such as halocarbon refrigerants, was once considered irreversible. Prior to 1979, ozone levels below 220 Dobson Units had not been recorded. By September 1994, concentrations had dropped to 73 DU.[30] The ozone layer plays a vital role in shielding life on Earth from harmful ultraviolet (UV) radiation. Without it, UV exposure would rise sharply, increasing health risks such as sunburn and skin cancer.[31]
In response to a 70% decline in the ozone layer over Antarctica reported in 1985, 46 United Nations member states signed the Montreal Protocol to regulate the use of ozone-depleting substances.[32] The agreement created strong incentives for businesses and investors to develop alternatives, and redesign products and equipment. Since then, 99% of controlled substances have been phased out, and scientists report with high confidence that the ozone layer is on a path to recovery, with full restoration projected by 2066.[33] [34]

**Figure 04**
Emissions of ozone-depleting substances, World [35]
– Tonnes

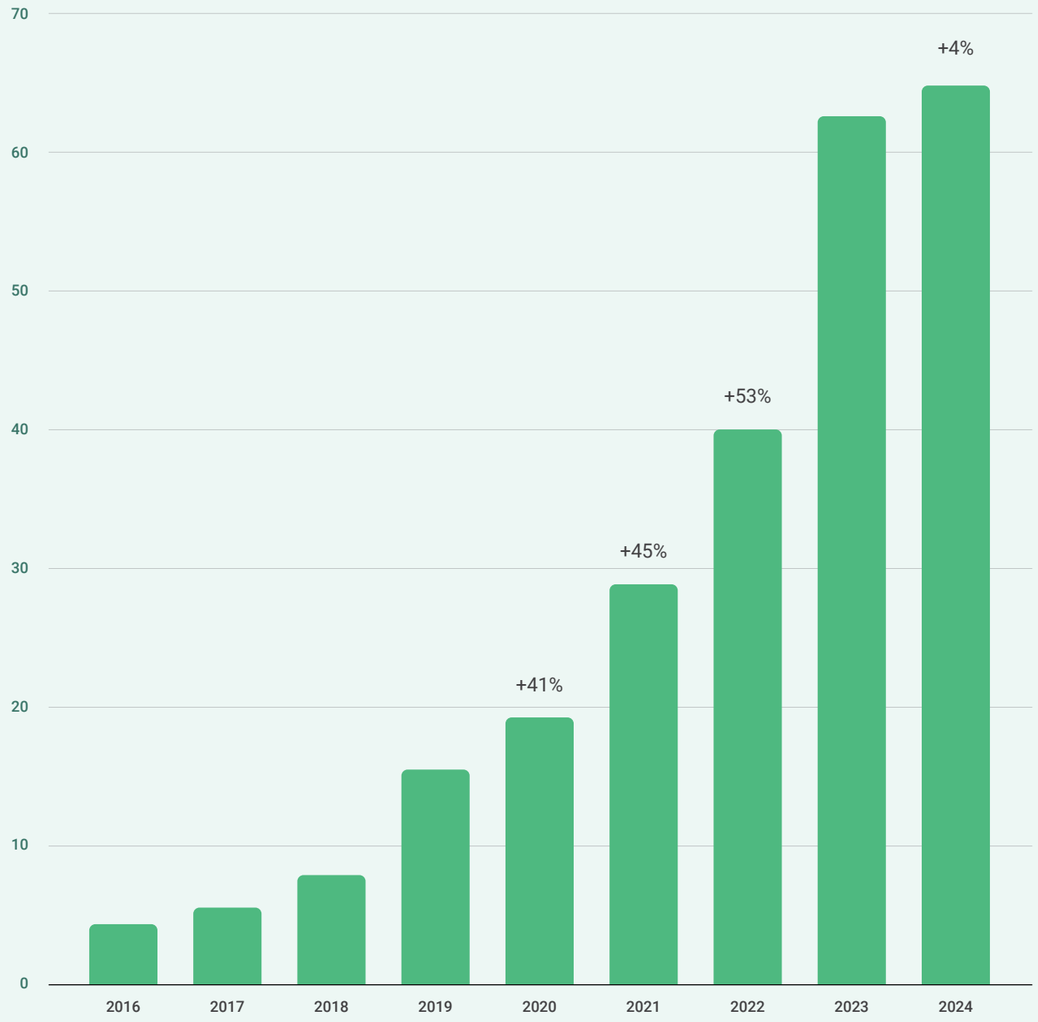



30. NASA Earth Observatory. (n.d.) 31. U.S. Environmental Protection Agency. (n.d.) 32. Chipperfield, M., Bekki, S., Dhomse, S. et al. (2017) 33. European Environment Agency. (2024) 34. NASA Earth Observatory. (2024) 35.Our World in Data. (2024)

## 2.4 Progress outperforming projections

While progress across several critical planetary boundaries remains limited, certain industries and technologies are showing that large-scale change is achievable. Solar capacity has tripled since 2018, with 25% growth in 2023 alone, consistently surpassing projections.[36] In 2024, renewables accounted for 48% of the EU's power mix, contributing to the lowest emissions ever recorded from the European power sector, a 13% decline from 2023.[37] Solar PV investments rose by 30%, while installation costs have declined by 89% since 2010, making solar the most cost-effective option for new electricity generations in most markets. Current growth rates are now in line with the trajectory required to reach net-zero emissions by 2050 under the IEA scenario.[38]

**Figure 05**
EU-27 annual solar PV installed capacity 2016-2024[39]





36. Rosslowe, C., & Petrovich, B. (2025) 37. Eurelectric. (2025) 38. International Energy Agency. (2024) 39. Solar Power Europe. (2024)

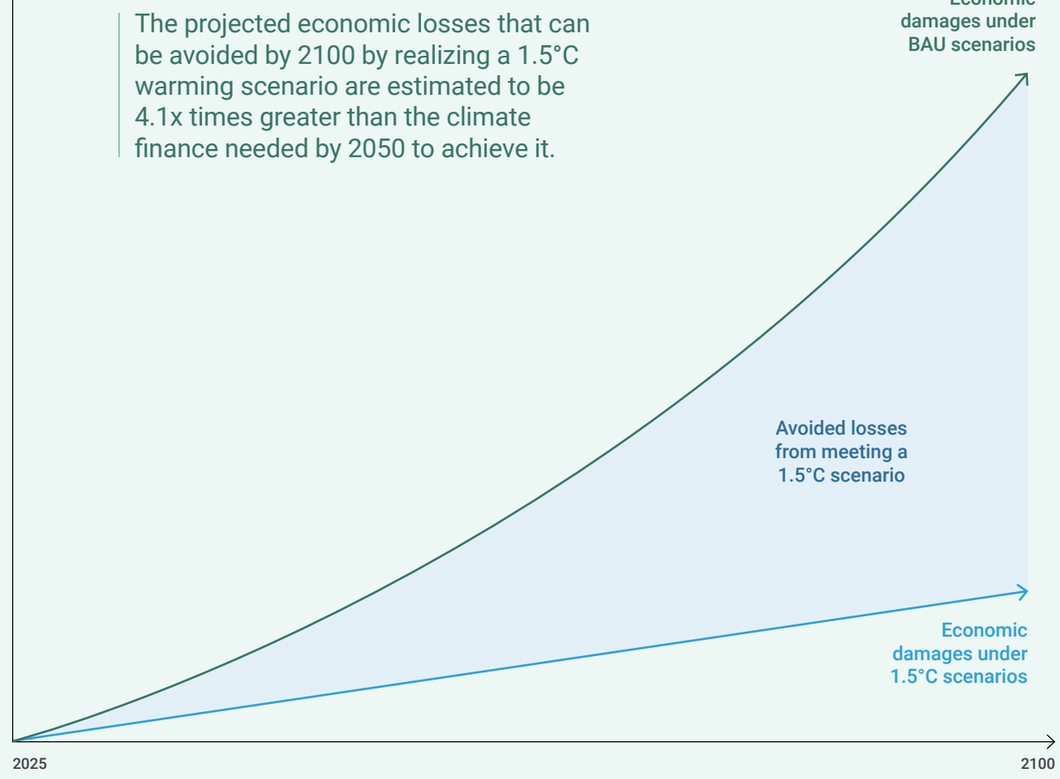


## 2.5 Rationale to invest for the planetary boundaries

Significant investment will be required across other sectors to match the pace of progress seen in renewables. At a macro-economic level, the rationale is clear: the cost of inaction exceeds the investment needed by a factor of 4.1x. Between 2014 and 2023, climate-related damages cost the global economy USD 2 trillion.[40] Under a 3°C warming scenario, annual losses could reach up to USD 38 trillion by 2049, more than twice the European Union's GDP in 2023.[41] Reversing the acceleration of climate risks will require a fundamental transformation of the global economy and rapid scaling of solutions aligned with the planetary boundaries. The transition to a low-carbon economy will demand annual capital investments of up to USD 9.2 trillion.[42] Alongside the imperative to mitigate risks, this transition presents a substantial opportunity: achieving alignment with a 1.5°C scenario could add up to USD 43 trn to the global economy, growing global GDP by 4.4% compared to a business-as-usual trajectory.[43]

**Figure 06**
Meeting climate investment needs will avoid exponential future costs[44]

The projected economic losses that can be avoided by 2100 by realizing a 1.5°C warming scenario are estimated to be 4.1x times greater than the climate finance needed by 2050 to achieve it.

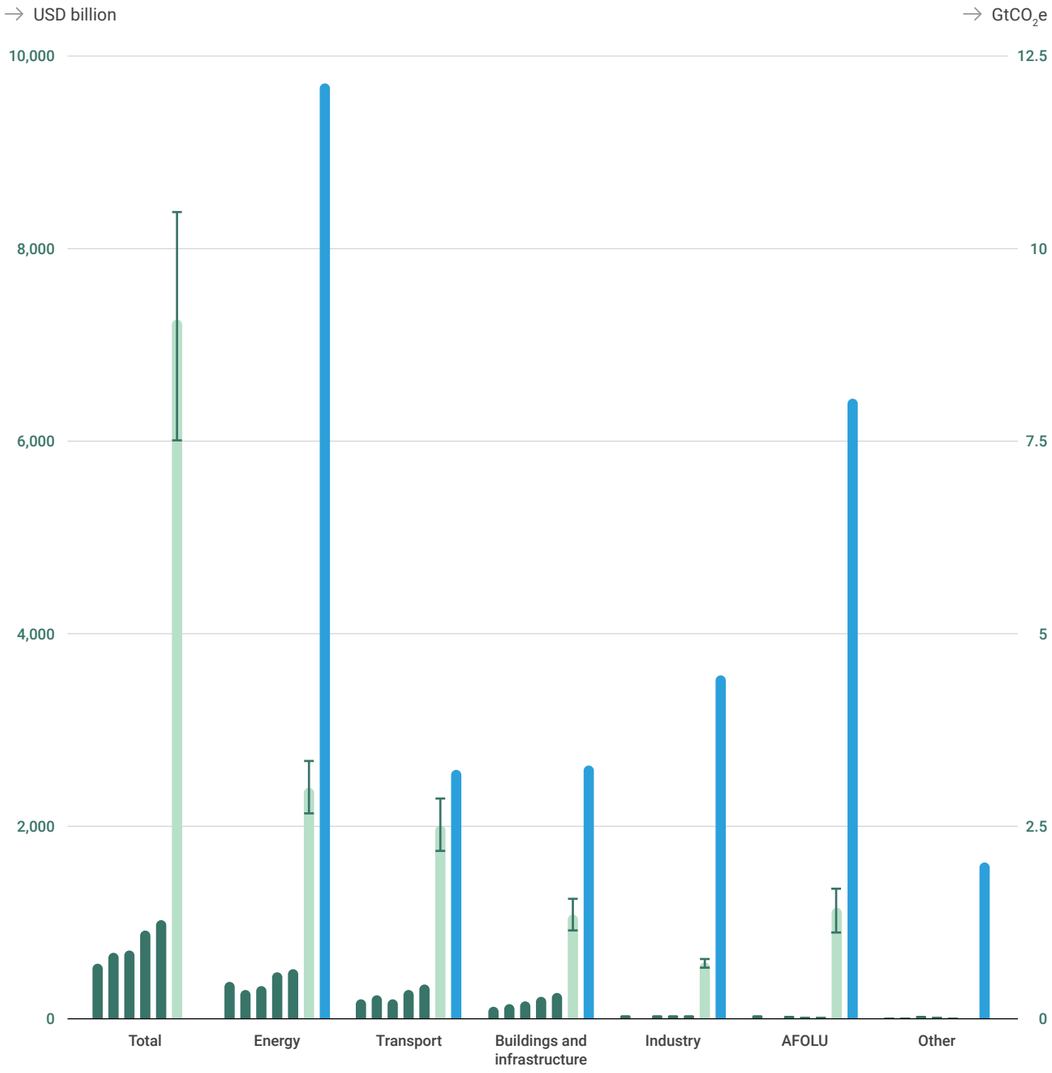



40. Oxera. (2024) 41. Waidelich, P., Batibeniz, F., Rising, J., et al. (2024) 42. Krishnan, M., McKinsey & Company. (2022) 43. Climate Policy Initiative. (2023) 44. Climate Policy Initiative. (2024)

## 2.6 Investment gap in key sectors

Despite the clear economic case, progress toward effective climate action remains slow. High-impact sectors such as energy, transport, buildings, agriculture, and land use show wide disparities in investment levels, reflecting the scale of the challenge. Notably, the sectors with the greatest emissions reduction potential – industry and Agriculture, Forestry and Other Land Use (AFOLU) – also face the widest investment gaps. Bridging these gaps is essential to enable a low-carbon transition and represents a significant opportunity for investors committed to driving systemic change.

**Figure 07**
Energy, industry, AFOLU and waste sectors have high mitigation potential but are starkly underfunded.[45]

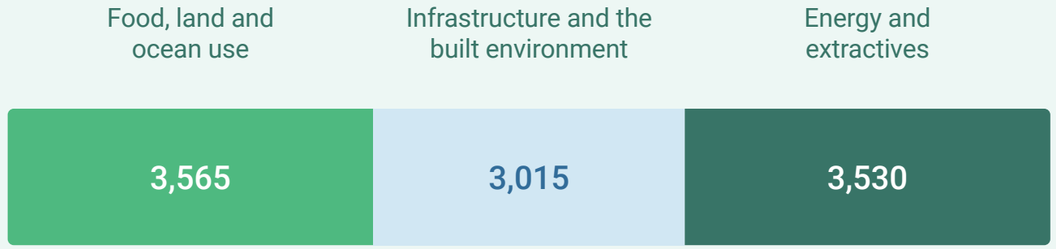




45. Climate Policy Initiative. (2024)

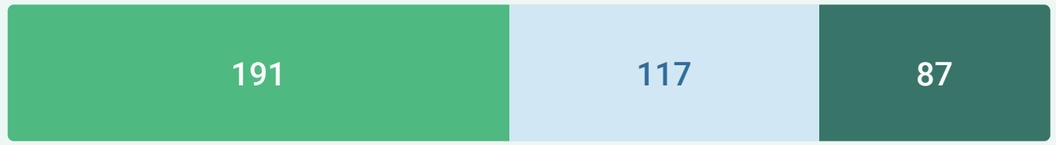


**Figure 08**
15 transitions in the three socio-economic systems could deliver $10.1 trillion of annual business opportunities and 395 million jobs by 2030[46]




**Total business opportunities by system in 2030**
US billions

**Total: 10,110**




**Total jobs by system in 2030**
Millions

**Total: 395**

Climate mitigation is only one part of the broader solution. Investments in biodiversity and ecosystem restoration hold an equally significant economic value and potential. Nature and ecosystem services underpin an estimated USD 58 trillion – or 55% of global GDP.[47] Transitioning the economic system to stop biodiversity loss and land degradation will require up to USD 2.7 trillion in annual investments by 2030 but could generate up to USD 10 trillion in economic value and create as many as 395 million jobs.[48]

Historically, natural assets have been undervalued and insufficiently integrated into financial systems. Unlike conventional investments, ecosystem services often lack clear monetization pathways, limiting the flow of private capital. Despite this, markets such as sustainable food and circularity are already presenting investment opportunities with strong risk-return profiles and positive impacts on the planetary boundaries. Summa's report "Investing in sustainable food and agriculture for a resilient food system and healthier people" [*to be published in June 2025*] highlights the potential for generating substantial additional market value through the transition to a more resilient food system. Technologies such as regenerative agriculture, including cover cropping, and precision farming reduce deforestation and chemical input, directly supporting the planetary boundaries related to land use and biogeochemical flows. Shifts towards alternative proteins and organic food systems can further advance these goals, potentially saving approximately 2.5 billion lives, reducing greenhouse gas emissions by around 75%, and delivering up to USD 600 billion in savings from societal costs and food waste.

Waste-to-resource solutions, including bioenergy production and closed-loop recycling, address waste accumulation and resource overuse, supporting boundaries such as novel entities, including plastics. In Investing in a circular and waste-free Europe, Summa outlines the investment potential of this transition. With EUR 230 billion in investment by 2040, the circular economy could unlock over EUR 1.5 trillion in economic value and reduce sector emissions by 55%.

46. World Economic Forum. (2020) 47. BloombergNEF. (2024 48. World Economic Forum. (2024)





# 3. Summa’s planetary boundaries approach

We invest to solve challenges. That's why we direct our funds towards companies that generate financial returns while making a measurable and meaningful impact on social and environmental issues.

## A systematic approach to address planetary challenges

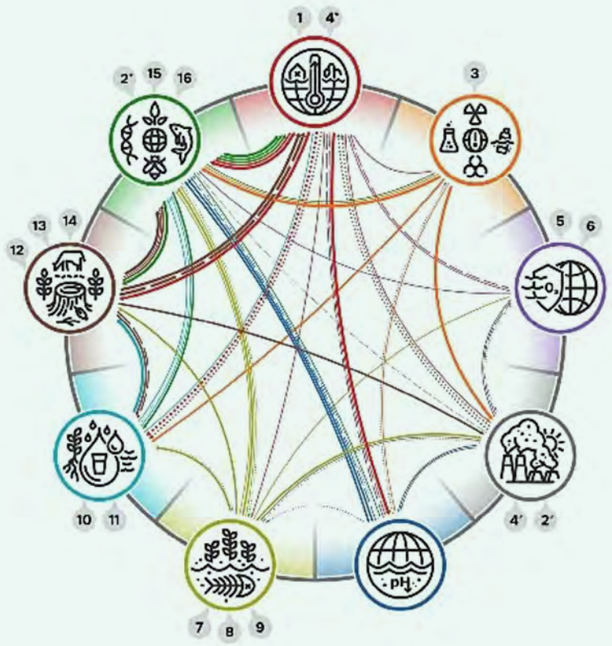
Summa's planetary boundaries approach is grounded in the belief that a stable planet and resilient economy require maintaining Earth's critical systems within their safe operating zones. The planetary boundaries are interconnected, forming a complex web of drivers and feedback loops in which stress on one boundary can intensify pressure on others. Historically, these processes have often been assessed in isolation, risking ineffective mitigation measures and unintended transgressive consequences. Achieving real progress requires a systems-level perspective, recognizing interdependencies and addressing the planetary boundaries collectively.

This understanding informs our approach to planetary boundaries. We strive to integrate our efforts across climate and nature to maximize positive impact, leveraging synergies and avoiding risks of fragmented action. This shift in perspective is guided by our commitment to building resilient portfolios that deliver long-term value for investors while supporting a liveable planet.

Our planetary boundaries approach continues to evolve. Over the past year, we have introduced several new initiatives to our investment process, including more detailed assessments during the pre-investment phase and portfolio-wide mitigation programmes during Summa's ownership. The focus on the planetary boundaries is strengthening our understanding of impact and risk exposure and enables more targeted and effective responses.

Our journey toward fully aligning with the planetary boundaries is still at an early stage. Many existing frameworks remain siloed, addressing individual boundaries in isolation, an approach that has shaped much of our work to date. Moving forward, deeper integration will require refining methodologies to reflect the interlinked nature of Earth's systems, improving metrics to track progress, and fostering collaboration to accelerate learning and action. Through this report and the insights we gain along the way, we aim to contribute meaningfully to that development.

**Figure 09**
The complex net of planetary boundaries processes[49]




1. Emission of non-$CO_2$ greenhouse gasses (other pathways than fossil fuel burning), albedo changes
2. Biomass burning
3. Release of untested synthetic chemicals
4. Fossil fuel burning
5. Emissions of synthetic chlorofluprcarbon molecules
6. N20 release in the atmosphere (in multiple contexts, mainly agriculture)
7. Application of industrially-fixes N to fields as fertilizers
8. Cultivation of N-fixing crops
9. Application of mined P to fields as fertilizers
10. Industrial and household water use
11. Irrigation and agriculture
12. Expansion of livestock grazing
13. Expansion of cropland
14. Expansion of settlements and infrastructure
15. Introduction of invasive species
16. Harvesting biomass



49. Caesar, L., Sakschewski, B., Andersen, L. S., Beringer, T., Braun, J., Dennis, D., Gerten, D., Heilemann, A., Kaiser, J., Kitzmann, N. H., Loriani, S., Lucht, W., Ludescher, J., Martin, M. A., Mathesius, S., Paolucci, A., te Wierik, S., & Rockström, J. (2024)



# Summa's approach in practice

**Our planetary boundaries approach is built on three core pillars:**

### 1. Investing to solve global challenges

Achieving safe operating levels across planetary boundaries requires substantial investment in scalable, high-impact solutions. Summa focuses on sectors positioned for growth in the global transition toward a sustainable economy—one that reverses negative environmental trends and operates within the Earth's ecological limits.

### 2. Future-proofing companies

We aim to build resilient businesses capable of succeeding in a world increasingly shaped by environmental constraints. This means working closely with our portfolio companies to help restore planetary boundaries and strengthen resilience to long-term risks.

### 3. Advancing knowledge

Addressing complex planetary challenges requires strong scientific insight. We support this by partnering with academic leaders and encouraging interdisciplinary collaboration to improve understanding and drive informed action.

Companies that solve challenges represent antifragility. They do well when markets are stable, but they often see increased demand for their services in times of crisis. We focus on companies in growing, resilient industries supported by megatrends, while leveraging our local angle strategically.

## 3.1 Investing to solve global challenges

Since its founding in 2016, Summa has focused on investing to address global challenges. We pursue a thematic investing strategy, working with companies that deliver measurable social and environmental impact alongside strong financial returns. Our approach prioritizes sectors aligned with profitable transition industries, leveraging buyouts, stable cash flows, and localized market insights. Our primary geographic focus is Northern Europe and North America.

Summa's Fund III, totalling EUR 2.3 billion, is classified as an Article 9 fund under the Sustainable Finance Disclosure Regulation (SFDR). This designation requires all investments to contribute to a sustainable objective, meet "do no significant harm" criteria, and comply with minimum safeguards. While fully aligned with these requirements, we also see high-impact potential in transitioning hard-to-abate sectors from "brown" to "green". However, under the current regulatory interpretation of Article 9, such transitional investments face regulatory limitations unless they already meet sustainable investment definitions.

Our investment approach is structured to deliver both significant impact and returns. It begins with identifying global challenges and developing a theory of change. Through rigorous due diligence, we assess how each company contributes to this theory. Once invested, we apply our value creation framework to optimise both financial outcomes and impact delivery.

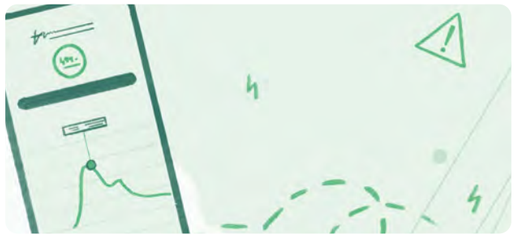




**Figure 10**
Summa's four focus themes:

Circularity

Energy Transition



Sustainable Food

Tech-Enabled Resilience

| Theme | Theory of change opportunity | Source |
|---|---|---|
| **Circularity** | **Waste:** An investment of EUR 230 billion—equivalent to just 1.5% of annual GDP—can unlock over EUR 1.5 trillion in value and decarbonize this sector by 55%. | Please see our report: Investing in a circular and waste-free Europe |
| **Sustainable food** | **Food and Agriculture:** Transitioning to a more resilient food system could drive significant market growth by 2035, while saving approximately 2.5 billion lives, reducing greenhouse gas emissions by around 75%, and cutting societal costs and food waste by USD 600 billion.<br><br>**Aquaculture:** Advancing salmon aquaculture could generate EUR 1 billion in savings through reduced mortality and improved fish quality, close nearly half of the expected feed gap, and reduce $CO_2$ emissions by two-thirds. | Please see our reports: Investing in sustainable food and agriculture for a resilient food system and healthier people *[to be published in June 2025]*<br><br>Investing in sustainable aquaculture for a resilient food system |
| **Energy transition** | **Energy:** Achieving net-zero targets will require average annual clean energy investments of USD 5.6 trillion between 2025 and 2030.[50]<br><br>**Grid:** Power grid infrastructure investments must reach USD 777 billion annually by 2030 to meet global net-zero goals. | BNEFs, Climate Policy Initiative |
| **Tech-enabled resilience** | **Energy transition technology:** All themes and sub-themes in Summa's strategy depend on advanced technologies to scale impact efficiently. From energy-optimizing software platforms to precision agriculture tools, technology enables system-wide transformation. While its impact maybe indirect, its role as an enabler makes it critical to achieving scalable, measurable outcomes. | |

50. BloombergNEF. (2024)

NG Nordic

## **2024 Highlight:** Merger of NG Group and Fortum Recycling & Waste

In November 2024, Summa completed the acquisition of Fortum Recycling & Waste (FRW) through NG Group, creating a leading circular economy player in the Nordics. The merger combines NG Nordic's strengths in upstream collection and material recycling with FRW's specialised downstream capabilities in energy and material recovery, resulting in an integrated platform across the circular value chain.

This strategic combination broadens and deepens the group's positive contribution to the planetary boundaries. By scaling circular waste systems, including collecting, sorting, reuse and recycling, the group reduces dependence on virgin material extraction and production, helping to preserve ecosystems and lower emissions. Studies show that effective recycling supports nearly all planetary boundaries.[51]

FRW's expertise in depollution and hazardous waste treatment also enhances the group's impact on the novel entities' boundary, one of the most critically transgressed planetary systems. With novel entity production rising rapidly, advanced recycling and treatment solutions are essential to decouple pollution from growing waste volumes.[52]

Read more on
→ NG Nordic's website





51. Bachmann, M., Zibunas, C., Hartmann, J. et al. (2023) 52. Persson, L., Carney Almroth, B. M., Collins, C. D., Cornell, S., De Wit, C. A., Diamond, M. L., Hauschild, M. Z., & MacLeod, M. (2022)



# Key figures:

~4

million tonnes of waste handled

830,000

tonnes of hazardous waste handled

1,437,721

potentially avoided GHG emissions (NG Group only)

57%

recycling and material recovery rate (NG Group only)

77%

of NG Nordic's total turnover was both taxonomy -eligible and aligned

## Investing where impact multiplies returns

Our investment process begins with the development of a theory of change for each sub-theme. This framework assesses the state of the global challenge, maps potential solutions, and identifies the associated investment opportunity.

Taking a systems view, the theory of change outlines both direct and indirect outcomes created by a company, thereby positioning the investment within a broader vision for impact. We assess factors such as market potential, technology readiness, and mitigation effectiveness to determine both investment viability and impact scale.

This framework helps us identify companies that can succeed in a future economy shaped by planetary boundaries. Each sub-theme is grounded in its own theory of change, guiding our sourcing towards businesses capable of addressing core challenges while generating strong financial performance. At a macro scale, the investment potential across our focus areas is substantial and can unlock economic value that extends well beyond individual transactions.

The theory of change framework guides the screening process, where each potential investment is assessed against the initial impact thesis. Companies are evaluated against exclusion criteria, and a preliminary assessment of the Do No Significant Harm ("DNSH") criteria is conducted.

## Carefully selecting the best players

Before moving into the due diligence phase, we aim to quantify a target company's potential contribution to the relevant theory of change. This assessment draws on company disclosures, sector analysis, and discussions with management, and is guided by Summa's Impact Scorecard. We evaluate the company's impact contribution, identify potential impact risks, and conduct an initial analysis of climate and nature-related risks and impacts.

Third-party tools are used to model these risks and convert findings into a risk score, helping us assess the company's resilience across different scenarios. The resulting impact score plays a key role in the investment decision-making process.

During due diligence, we build on this foundation with deeper data gathering and analysis. This includes a detailed review of the company's business model, industry dynamics, and the potential influence of sustainability factors on its future outlook. We also assess climate and nature performance and identify opportunities for improvement.

A third-party provider supports this process, helping uncover any potential red flags. Once the analysis is complete, the Investment Committee brings the proposal to the Board of Directors for final consideration.

## Maximizing positive impact during ownership

As an active owner, we see the ownership phase as a critical period to improve business performance and amplify the positive impact of our portfolio companies. Our approach focuses on two core dimensions:

- Enhancing each company's contribution to the theory of change. This is detailed further in the next section.
- Supporting the companies in mitigating negative impacts on the planetary boundaries and building resilience (see Chapter 6 future-proofing companies).

From day one, we partner with the management teams to advance their impact journey. Following acquisition, we engage in discussions around the theory of change and how the business contributes to solving the specific global challenge. Together with management and investment teams, we define KPIs and targets that align closely with the company's core business strategy. We believe that aligning impact and commercial goals generates meaningful synergies that strengthen long-term value creation.

Once our strategy and KPIs are in place, we conduct in-depth impact assessments to develop a monetized view of each company's positive and negative effects, on employees, the environment, and consumers. The goal of impact accounting is to provide decision-makers—asset owners, managers, and senior leaders—with a clear and comparable understanding of a company's influence on key stakeholder groups.

Our assessments are rooted in life-cycle assessment (LCA) methodologies and span a wide set of impact categories across both climate and nature. This enables us to quantify avoided and created impacts, while also identifying any unintended consequences and mitigation actions. For avoided emissions specifically, we follow the guidance set by the World Business Council for Sustainable Development (WBCSD). Our methodology includes two defining elements:

- We apply a hybrid approach, combining attributional LCA data to evaluate the solution and baseline impacts, with consequential principles applied to measure the difference between them.
- We asses a broad spectrum of impacts using LCA and social capital factors, capturing greenhouse gas emissions alongside wider environmental and social effects. This holistic approach helps to surface and manage unintended consequences across the value chain.

While some of our portfolio companies have conducted their own avoided impact assessments, we intend to standardize this process portfolio-wide to ensure consistency, transparency and comparability. A summary of completed assessments and their outcomes is included below.* A more detailed report on Summa's avoided impacts methodology will be published in the course of 2025.



*Detailed overview that addresses the WBCSD's recommendations on "Communicating and reporting avoided emissions" to be published in 2025.



| Company | Avoided emissions ($tCO_2e$) | Solution and reference scenario | Methodology |
|---|---|---|---|
| Nutris | 15,369 $tCO_2e$ | Consumption of plant-based protein instead of whey-protein | WBCSD aligned |
| HOLDBART | 37,114 $tCO_2e$ | Consumption of surplus food products instead of production of new food | WBCSD aligned |
| oda | 9,447 $tCO_2e$ | Efficient transportation and supply chain instead of conventional grocery retail shopping | WBCSD aligned |
| NG Nordic | 1,437,721 $tCO_2e$* | Utilization of recycled materials instead of virgin materials | WBCSD aligned |
| TBAUCTIONS | 1,180,000 $tCO_2e$** | Utilization of second-hand items instead of production of new machinery | In-house, WBCSD aligned** |

*NG Group only, excl. FWM
**Covers 55% of Net Auction Sales. Actual avoided emissions figure likely to be much larger. TBA aims to improve coverage to 70% of total NAS.

Nutris

## Case Study Nutris: Pioneering Plant-Based Proteins for the planetary boundaries

**Background**
Nutris, based in Zagreb, Croatia, is a leading producer of plant-based proteins. In 2024, Summa invested in Nutris through its EUR 2.3 billion Fund III. The company operates a state-of-the-art facility in Novi Senkovac, extracting high-quality protein, starch, and fibre from fava beans. Nutris plays a central role in the shift toward healthier and more sustainable protein sources. The company collaborates with over 500 local farmers to source its raw materials, supporting them in piloting regenerative agricultural practices. Protein isolates, starch, and fibre are used in applications ranging from sports nutrition (as a whey alternative) to plant-based meat is exported to markets across the EU, North America, and Asia. As Europe's first dedicated fava bean protein facility, Nutris advances innovation in low-emission, sustainable nutrition and directly supports Summa's theory of change in the sustainable food transition.

Read more on
→ Nutris' website





**Environmental benefits:**
**Soil health, water, biodiversity and climate**
Through its partnerships with farmers, Nutris supports a supply chain that delivers significant environmental benefits. When combined with regenerative practices, fava bean cultivation provides a lower-impact alternative to dairy-derived whey. Key outcomes include:

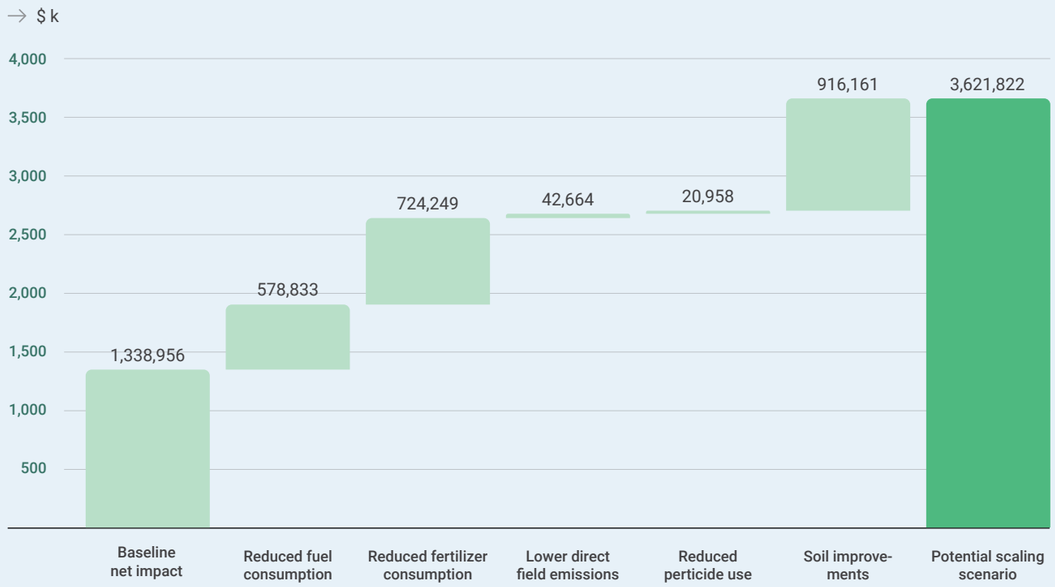
- **Soil Health Improvement:** Cover cropping and reduced tillage boost soil micro-diversity and increase organic content. Fava beans also fix soil nitrogen naturally, reducing the need for synthetic fertilizers and improving long-term soil health.
- **Biodiversity Enhancement:** Crop Diversification creates habitats for pollinators, birds, and other wildlife. Lower reliance on synthetic inputs, such as N46 mineral fertilizer, reduces chemical runoff, helping restore ecological balance and safeguard biodiversity
- **Climate Mitigation:** Fava beans have one of the lowest carbon footprints among plant proteins, generating fewer emissions than whey. Regenerative techniques enhance carbon capture through healthier soil.
- **Water Ecosystem Support:** Regenerative methods improve soil structure, enhancing water retention and filtration. This reduces runoff and protects surrounding aquatic ecosystems.

In partnership with Valuing Impact, Summa and Nutris conducted an impact accounting analysis to model the effect of scaling regenerative practices across all Nutris-supplying farms. Results demonstrate that such a transition could reduce negative impacts in the value chain by approximately 33%. The graph below compares the current net impact baseline, including nutritional impacts on consumers, with the potential future scenario where regenerative agriculture is implemented across all of Nutris' farms. The analysis shows the key drivers of increased impact if regenerative agriculture is implemented across all farms, including benefits from soil improvement and reduced fertilizer consumption.

**Further opportunity**
Nutris' potential for impact increases significantly when its ingredients are used in products that replace meat or dairy. While much of the current outcome replaces whey, for example in sports nutrition, the shift towards plant-based meat and dairy alternatives presents a major opportunity to scale both environmental and health benefits. The model highlights several pathways to enhance impact, through product applications and deeper supply chain engagement.

**Summary**
Nutris demonstrates how technology and agriculture can unite to support ecosystems and climate.
By processing fava beans with Bioptimate technology and engaging over 500 farmers, Nutris delivers high-quality, low-emission protein while advancing sustainable agricultural practices. Its facility in Croatia exemplifies how plant-based innovation can generate positive outcomes for both people and the planet.

**Figure 11**
Nutris – Net impact







# We build resilient companies that can thrive in an economy shaped by the planetary boundaries crisis.

## 3.2 Future-proofing companies

Summa believes that the long-term success of its investments depends on the ability of portfolio companies to reduce their environmental impact and adapt to a low-carbon, nature-positive economy. As an active owner, we support companies through this transition by:

1. Mitigating climate and nature impacts through the implementation of science-based measures designed to prevent further environmental degradation.
2. Identifying and managing risks related to climate change, biodiversity loss, and ecosystem degradation—both physical and transitional—while assessing their potential financial implications for the business.

### Did you know?

**Time value of carbon:**
Summa's emission reduction strategy is guided by the time value of carbon – the principle that earlier reductions yield greater benefits.

Carbon dioxide accumulates and persists in the atmosphere for centuries, making the timing of emissions reductions critical: early mitigation reduces cumulative radiative forcing and lowers the risk of crossing irreversible climate tipping points. Early action also reduces long-term business risks and enhances companies' competitiveness in a low-carbon economy.

## Mitigating adverse impacts

**Summa's climate action program**
Summa's climate action program is designed to support portfolio companies at every stage of their decarbonisation journey. All new portfolio companies participate in the program, with the goal of validating a science-based target within the 18-months ownership. Progress is reviewed annually, with updates made to targets and roadmaps based on measured outcomes.

1. **Measure and report GHG emissions**
   Each company in the portfolio measures its Scope 1, 2, and 3 emissions on an annual basis. These assessments are supported by Summa's Impact Team and external advisors, with a strong focus on ensuring data quality and adherence to the Greenhouse Gas Protocol.
2. **Develop decarbonization roadmap**
   We support management teams in building detailed SBTi-aligned roadmaps that prioritize the most impactful emissions reduction measures. Roadmaps include clear timelines, identified actions, and estimated CAPEX and OPEX requirements that feed into company budgeting.
3. **Set and validate science-based targets**
   Summa has committed to science-based emissions reduction covering 78% of its portfolio by 2028 (by fair value), and 100% by 2030. We help companies set and validate their targets within the first year of ownership, offering hands-on support throughout the process to ensure alignment with SBTi standards.
4. **Implement reduction measures**
   Once targets and roadmaps are in place, the focus shifts to execution. Companies implement actions such as improving energy efficiency, switching to renewables, rethinking product design, and adopting sustainable practices in procurement and waste management. Summa's Impact Team coordinates this work, drawing on internal climate and innovation expertise and leveraging external implementation partners.
5. **Monitor progress and adapt roadmap**
   The summa climate action program follows a continuous improvement model. Changes such as acquisitions may require adjustments to targets or roadmap priorities. Progress is reviewed annually, and roadmaps are updated to keep companies on track toward their decarbonisation goals.

**Figure 12**
Summa's Climate Action Program






**Carbon footprint of our portfolio**
Summa's carbon footprint is primarily driven by emissions linked to our investments (Scope 3.15), which account for 99% of our total emissions. As such, our primary focus is on understanding and managing emissions generated by portfolio companies. Emissions are reported in tonnes of $CO_2$ equivalent ($tCO_2e$), and all investments–both majority and minority–are included in the assessment.

**Insights**
The majority of emissions from Summa's portfolio companies falls under Scope 3, which captures indirect emissions across the value chain. These are not generated through direct operations or energy use but through activities such as purchasing goods and services, the use of sold products, and upstream transportation and distribution—key categories that represent the largest sources of carbon impact.

| Category | Relative share of portfolio emissions % | Absolute emissions ($tCO_2$) |
|---|---|---|
| **Scope 1 and 2 emissions** | 3% | 66,016 |
| **Processing of sold products** | 32.6% | 731,239 |
| **Purchased goods and services** | 24.1% | 541,669 |
| **Use of sold products** | 18.3% | 414,334 |
| **Fuel- and energy-related activities** | 16.7% | 375,175 |
| **Other sources** | 5.4% | 120,627 |

**Emissions by portfolio companies and main activities**
A small number of portfolio companies with material- or energy-intensive value chains accounts for the majority of emissions. NG Nordic, Tibber, Bollegraaf, and Oda collectively account for 76% of portfolio emissions, most of which occur outside direct operations. Notably, the processing and recycling of waste handled by NG Nordic alone contribute 32.5% of total emissions.

| Company | Relative share per company of total portfolio footprint | Company's main emission source | Relative share per activity of the portfolio's total footprint |
|---|---|---|---|
| **NG Nordic (includes only NG Group)** | 39.3% | Processing of waste | 32.5% |
| **Tibber** | 16.5% | Selling electricity | 16.2% |
| **Bollegraaf** | 10.6% | Use of products | 8.6% |
| **Oda** | 9.5% | Purchase of goods | 8.5% |
| **Other companies** | 24.1% | Other activities | 34.2% |

Interpreting absolute emissions data in line with the Greenhouse Gas Protocol requires a contextual understanding of each company's business model and the drivers behind those emissions.

In the case of NG Nordic, waste disposal methods designed to retain material properties and reintegrate them into the circular economy can sometimes lead to higher direct emissions. While landfilling may appear to result in lower in emissions when viewed in isolation, recycling solutions deliver significantly higher avoided emissions, which outweigh NG Nordic's Scope 3 footprint by a factor of 1.6x. For Tibber, the majority of emissions are related to the electricity it brokers. As an energy retailer, Tibber has limited influence over the location-based carbon intensity of electricity. However, the company provides guarantees of origin to customers in key markets and uses its technology platform to drive energy efficiency, support grid flexibility, and encourage on-site renewable adoption.

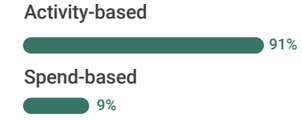
Bollegraaf provides machinery that enables waste sorting and recycling, oftentimes in local contexts where large amounts of waste remain untreated. Similar to NG Nordic, the enabling effects of Bollegraaf's products achieves considerable emissions reduction further down the waste chain.

**Data quality**
Historically, Scope 3 emissions have been calculated using spend-based methods to simplify reporting, though this often compromises data quality and limits actionable insights. To improve accuracy, we support portfolio companies in gathering activity-based data, such as quantities of fuel or raw materials, or sourcing emissions figures directly from suppliers. This enhances the precision of reporting, allowing for more informed decision-making and consistent monitoring.

In 2024, we began assessing data quality across the portfolio's GHG footprint, with a focus on tracking the share of activity-based versus spend-based data. Improvements will be targeted during each annual reporting cycle.

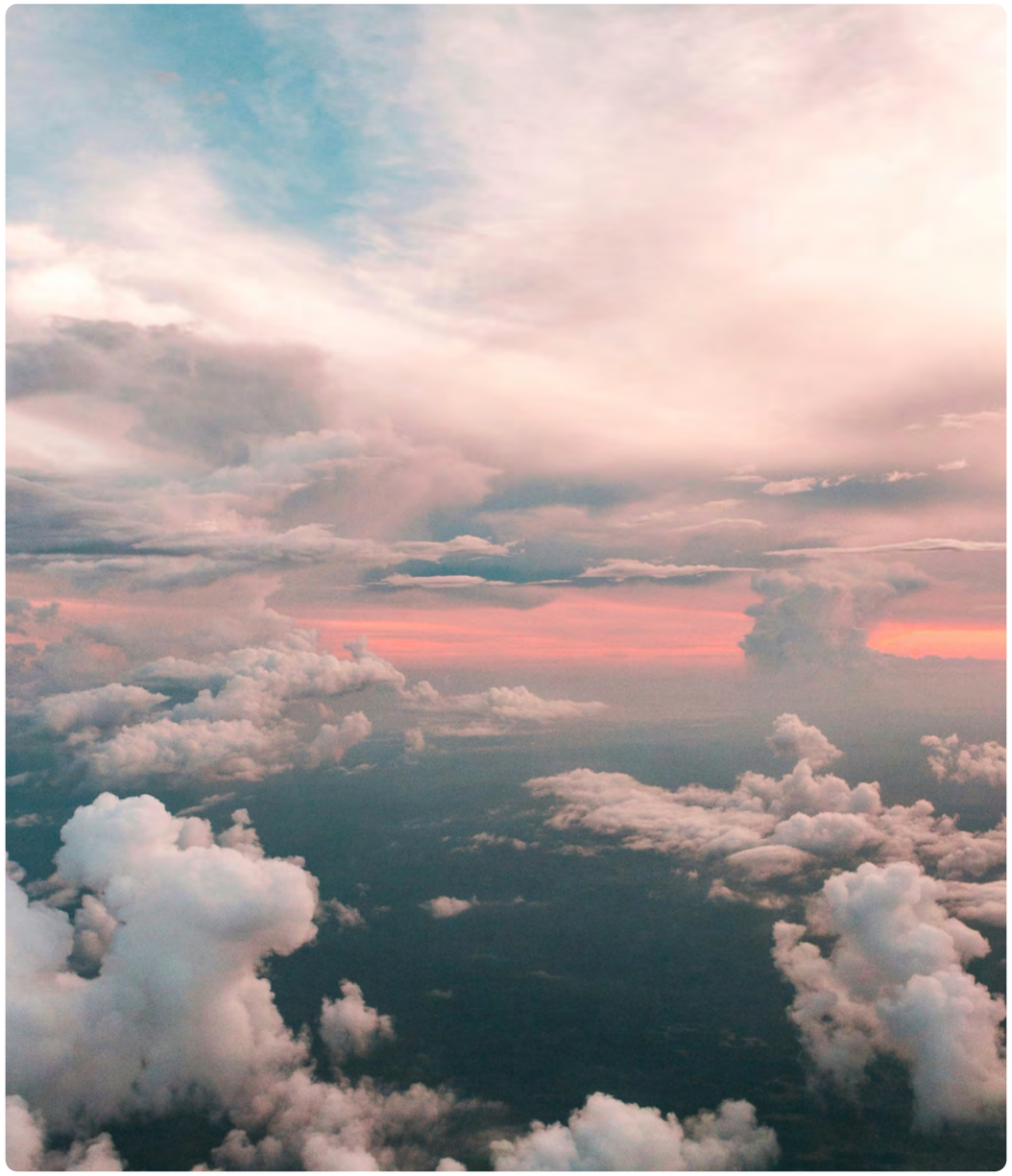
**Breakdown of carbon emissions by data source**

(% of total emissions)



**Summa's own emissions**
Summa's own emissions are primarily driven by purchased goods and services, mostly advisory services, and business travel. Within our own operations, we have committed to transitioning to 100% renewable electricity and reducing Scope 1 and 2 emissions by 90% by 2030. The modest rise in Scope 2 emissions in 2024 is due to improvements in data quality.

| Source | 2023 | 2024 |
|---|---|---|
| **Scope 1** | 0 | 0 |
| **Scope 2** | 11 | 17 |
| **Scope 3: Purchased goods** | 2058 | 1668 |
| **Scope 3: Business travel** | 722 | 601 |
| **Scope 3: Other** | 19 | 19 |

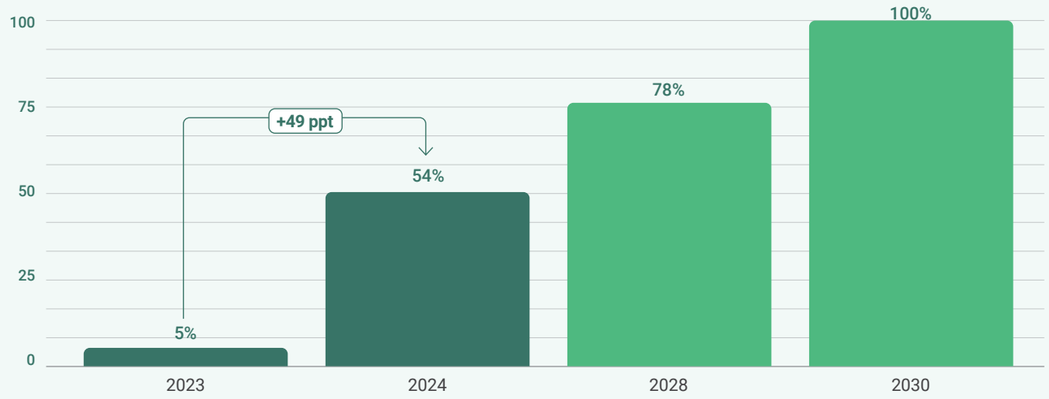






**SBTi status of our portfolio**
All new portfolio companies are expected to validate science-based targets within the first 18 months of ownership. Additionally, SBTi alignment is embedded into the KPI structure of our sustainability-linked revolving credit facility (RCF).

**Figure 14**
Progress on Summa's near-term science-based target




By the end of 2024, seven portfolio companies had validated science-based targets. Since 2023, NG Nordic, Milarex and Intix have received validated targets, while Summa exited SBTi-validated company Sengenics. That increased our SBTi portfolio coverage (by fair value) from 5% to 54%.

This progress also meets the SBTi target requirements set in our Revolving Credit Facility (RCF), which includes a pricing mechanism tied to ESG performance, offering offering reduced rates when targets are met, and increased rates if missed. Only majority-owned companies held for at least 18 months are included in this calculation.

| Fair value coverage in line with RCF methodology | | | |
|---|---|---|---|
| **Year** | **2023** | **2024** | **2025** |
| Coverage | 6% | 76% | – |
| Target | 22% | 33% | 44% |

**Absolute emissions coverage**
In terms of absolute emissions, 47% are now covered by a science-based target, mainly driven by NG Group's and Milarex's targets.

Several additional companies are preparing targets for validation in 2025, with FAST LTA having recently submitted their targets.

| Year | Absolute emissions coverage |
|---|---|
| **2023** | 0.3% |
| **2024** | 47% |

Given the nature of private equity, coverage levels are influenced by acquisitions, exits, new validations, and changing valuations. We will continue to report coverage based on fair value at year-end, while also tracking progress on an ongoing basis.

**Private Markets Decarbonisation Roadmap (PMDR)**
As a member of the Initiative Climat International (iCI), we support the adoption of the Private Markets Decarbonisation Roadmap. The framework enables consistent communication on decarbonisation progress across asset classes. Two portfolio companies, NG Nordic (NG Group target) and Documaster, are already reporting reductions against validated science-based targets.

| | | |
|---|---|---|
| **Not started** | Not started to measure their emissions or plan how to reduce them | **0** |
| **Capturing data** | Reporting emissions data but currently no plan in place to reduce emissions | **14** |
| **Preparing to decarbonize** | Planning to reduce emissions in line with an approach agreed with the GP | **1** |
| **Aligned** | Committed to a decarbonisation plan aligned to a transition pathway | **4** |
| **Aligned to net zero** | Delivering against a net zero plan and operations aligned to science-based target | **3** |





## Nature impacts of the portfolio

Summa continues to increase its efforts to understand the nature-related impacts of its portfolio. While we have tracked proximity to biodiversity sensitive areas for several years, we have expanded our analysis annual evaluations of energy use, land-use change, resource exploitation, pollution, and climate change.

In 2024, we developed a heatmap to visualize impacts across the value chains of all portfolio companies, revealing that energy use, particularly fossil fuels, is the largest driver of non-climate nature impacts. Additional contributors include transportation, electronics manufacturing, and plastic production, which affect biodiversity through water use, soil degradation, and pollution.

The charts below illustrate the impact materiality by value chain activity, ranked using a weighted average score derived from high-impact commodities such as oil, gas, steel, and aluminium.

**Figure 15**
Value chain impact score by activity – *Weighted by share of portfolio involved*

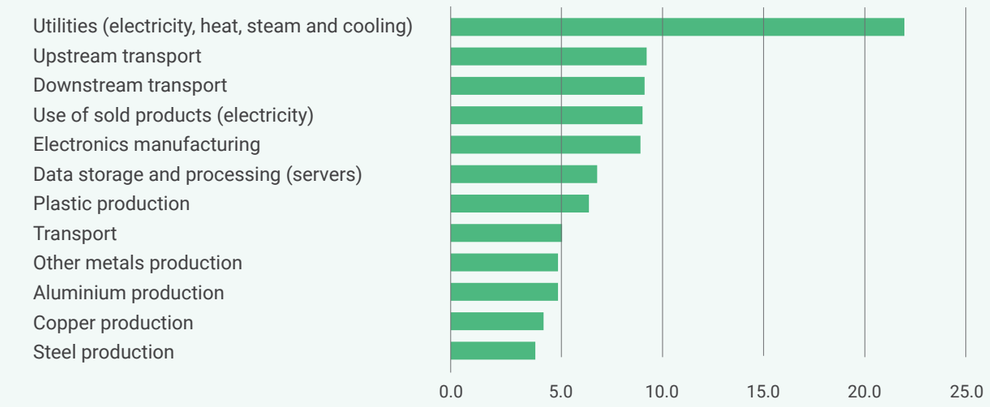



**Figure 16**
Value chain impact score by impact driver – *Portfolio weighted average*

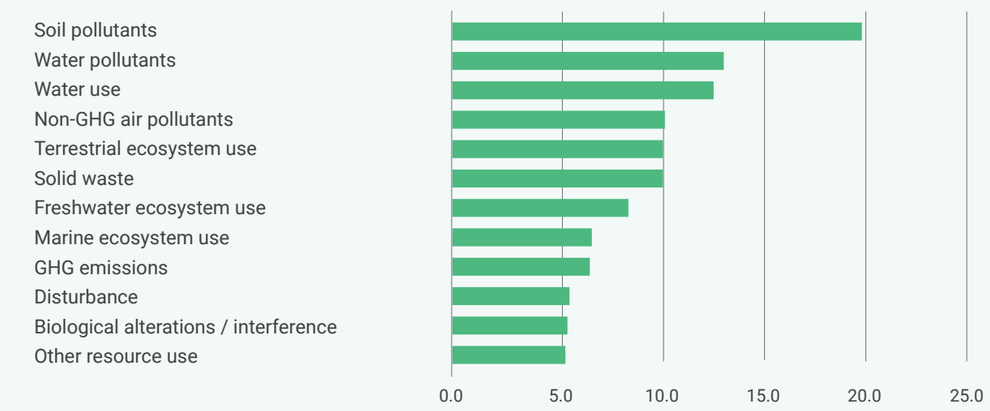


**Figure 17**
Average impact materiality by industry, for the full Summa portfolio

| | | Land/water/sea use change | | | Resource exploitation | | Climate change | Pollution | | | | Invasives and other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Value chain impact scores by industry** | **Share of portfolio** | Terrestrial ecosystem use | Freshwater ecosystem use | Marine ecosystem use | Water use | Other resource use | Climate change | Non-GHG air pollution | Water pollution | Soil pollution | Solid waste | Disturbance | Biological/ alterations interference |
| Construction & Engineering | 5% | 15.0 | 10.5 | 10.0 | 17.0 | 8.0 | 9.5 | 15.0 | 16.0 | 22.0 | 14.0 | 8.5 | 7.0 |
| Electric Utilities | 3% | 11.0 | 9.0 | 7.0 | 14.0 | 6.0 | 7.0 | 11.0 | 14.0 | 23.0 | 11.0 | 6.0 | 6.0 |
| Electronic Equipment, Instruments & Components | 3% | 9.0 | 7.0 | 6.0 | 12.0 | 5.0 | 6.0 | 10.0 | 12.0 | 20.0 | 9.0 | 5.0 | 6.0 |
| Food & Staples Retailing | 2% | 8.8 | 7.9 | 6.2 | 11.5 | 4.5 | 5.8 | 8.7 | 12.0 | 18.5 | 8.7 | 4.7 | 4.3 |
| Food Products | 1% | 6.0 | 6.5 | 6.0 | 9.5 | 4.5 | 6.5 | 7.0 | 9.5 | 17.0 | 6.5 | 3.0 | 5.5 |
| Health Care Providers & Services | 4% | 5.0 | 9.0 | 6.0 | 9.0 | 3.0 | 6.0 | 5.0 | 12.0 | 20.0 | 6.0 | 3.0 | 8.0 |
| Health Care Technology | 15% | 6.0 | 6.0 | 4.0 | 8.0 | 2.0 | 3.0 | 5.0 | 9.0 | 13.0 | 6.0 | 3.0 | 0.0 |
| Internet & Direct Marketing Retail | 7% | 8.0 | 8.0 | 6.0 | 10.0 | 4.0 | 5.0 | 7.0 | 11.0 | 17.0 | 8.0 | 5.0 | 4.0 |
| Life Sciences Tools & Services | 7% | 8.0 | 6.5 | 5.5 | 11.0 | 4.5 | 5.5 | 9.0 | 11.0 | 18.5 | 8.0 | 4.5 | 5.5 |
| Machinery | 4% | 18.0 | 13.0 | 10.0 | 20.0 | 9.0 | 11.0 | 18.0 | 20.0 | 28.0 | 18.0 | 10.0 | 9.0 |
| Multi-Utilities | 23% | 17.0 | 12.0 | 10.0 | 19.0 | 10.0 | 11.0 | 18.0 | 19.0 | 27.0 | 17.0 | 10.0 | 11.0 |
| Software | 12% | 7.0 | 6.8 | 4.8 | 9.0 | 2.8 | 3.8 | 6.0 | 10.0 | 14.8 | 7.0 | 3.8 | 1.5 |
| Technology Hardware, Storage & Peripherals | 5% | 9.0 | 7.0 | 6.0 | 12.0 | 5.0 | 6.0 | 10.0 | 12.0 | 20.0 | 9.0 | 5.0 | 6.0 |

### Mitigating nature impacts

Summa actively engages with portfolio companies to reduce nature impacts. This includes supporting energy optimization and transitioning from fossil fuels to electricity wherever feasible.

Examples include:

1. Milarex, which has introduced recyclable packaging to reduce plastic-related impacts.
2. EA Tehcnology, which has put in place an initiative to eliminate single use plastics.
3. Oda, a Nordic online grocery retailer which, for example, has certified their latest warehouse to the BREEAM environmental standard, and is promoting local suppliers of organic foods.

**Figure 18**
Geographic biodiversity risk assesment of locations in the Summa Porfolio

**Mapping biodiversity impact risk**
To complement the industry based assessment, we also looked at biodiversity pressures near portfolio company sites using data from the WWF Biodiversity Risk Filter.

This analysis helped us understand potential direct impacts on local environments by scoring locations on five nature risk categories. The chart below shows the assessed portfolio locations, color coded by local pressures on biodiversity.

While this does not quantify the impact of our companies specifically, it serves as a a helpful materiality map showing locations which could be prioritized for in-depth assessments in the future, depending on the activity undertaken by the respective portfolio companies.





**Impact accounting for enhanced sustainability insights**
Summa is a vocal proponent of using impact accounting as a tool for comprehensive impact and materiality assessments. In essence, impact accounting is the practice of quantifying all positive and negative results of a company's activities in monetary terms. This allows e.g. nature impacts and social impacts to be assessed using a single unit of measurement, i.e. USD or EUR. In turn, this enables meaningful comparison between e.g. climate impacts and non-climate nature impacts which can aid prioritization and ensure action on the right initiatives.

Through our impact accounting models, companies can evaluate both upstream (supply chain) and downstream (use-phase) effects on nature. These models can provide insights into key biodiversity pressure points at both the company and product levels. For example, the Natural Capital impact assessment for Nutris indicates a net positive effect on land use and climate. This will increase over time as a result of scaling regenerative agriculture practices to cover more of the farms in their supply chain, and in particular if their plant-based proteins can displace proteins from animal sources to a greater extent in the future.

Looking ahead, we will expand our impact accounting efforts to cover a greater share of the portfolio, since this is a promising avenue to quantify nature impacts for companies in all sectors.

While this remains an early-stage effort, we are already seeing companies take meaningful steps toward reducing their nature-related footprint based on what they have learned so far.

| **Nutris natural capital impact** | **LCA impact** | **Monetized nature impact** |
|---|---|---|
| **Air polution** | | **$103,699** |
| Ionising radiation potential (IRP) | 289,244 kBq Co-60-Eq | -$146 |
| Ozone depletion potential (ODPinfinite) | -22 kg CFC-11-Eq | $652 |
| Particulate matter formation potential (PMFP) | -4,512 kg PM2.5-Eq | $158,034 |
| Photochemical oxidant formation potential: ecosystems (EOFP) | 12,766 kg NOx-Eq | -$54,409 |
| Photochemical oxidant formation potential: humans (HOFP) | 12,076 kg NOx-Eq | -$433 |
| **Climate change** | | **$283,668** |
| Global warming potential (GWP100) | -1,968,181 kg $Co_2$-Eq | $283,668 |
| **Human toxicity** | | **-$219,293** |
| Human toxicity potential (HTPc) | 836,578 kg 1,4-DCB-Eq | -$116,341 |
| Human toxicity potential (HTPnc) | 10,779,747 kg 1,4-DCB-Eq | -$102,952 |
| **Land use** | | **$1,487,926** |
| Agricultural land occupation (LOP) | -20,316,482 m2*a crop-Eq | $1,559,068 |
| Terrestrial acidification potential (TAP) | -54,936 kg SO2-Eq | $261,008 |
| Terrestrial ecotoxicity potential (TATP) | 39,982,782 kg 1,4-DCB-Eq | -$332,150 |
| **Resources** | | **-$713,059** |
| Fossil fuel potentioal (TTP) | 1,564,583 kg oil-Eq | -$678,287 |
| Surplus ore potential (SOP) | 150,237 kg Cu-Eq | -$34,772 |
| **Water pollution** | | **$23,377** |
| Freshwater ecotoxicity potentioal (FETP) | -241,673 kg 1,4-DCB-Eq | $8,340 |
| Freshwater eutrophication potential (FEP) | 1,854 kg P-Eq | -$3,297 |
| Marine ecotoxicity potential (METP) | 123,399 kg 1,4-DCB-Eq | -$872 |
| Marine eutrophication potential (MEP) | -6,460 kg N-Eq | $19,205 |
| **Water use** | | **-$79,976** |
| Total freshwater extraction | 874,108 m3 | -$79,976 |
| **Sum of natural capital impact** | | **$886,342** |

## Creating risk resilience

**Planetary boundary risks and impacts on our organization**

Our investment philosophy is rooted in the belief that companies solving global challenges are best positioned to thrive in an economy shaped by planetary limits.

Still, we recognize that our portfolio companies are not immune to risks. Our goal is to identify, mitigate, and, where possible, transform these risks into opportunities. Resilience is central to our strategy. The current state of planetary boundaries presents a significant risk, affecting our firm in two distinct ways:

1. As an investment firm, our office locations are exposed to physical risks. While our strategy focuses on sectors and companies well-positioned to succeed in a transitioning economy, we remain exposed to transition risks. These include regulatory changes and market shifts that can affect overall performance.

2. Our portfolio companies operate globally, and their facilities and supply chains are subject to both physical and transitional risks. If not managed effectively, these exposures can lead to significant financial consequences.

**Climate risk assessment, scenario analysis and modelling**

In 2024, we conducted a comprehensive climate risk assessment across our portfolio to inform future risk mitigation strategies.

The analysis incorporated both qualitative and quantitative approaches, using scenario analysis based on three Shared Socioeconomic Pathways (SSPs), as outlined in the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC):

- SSP1-2.6: Successful transition to a low-carbon economy with net-zero achieved around 2075
- SSP2-4.5: Business as usual and failure to achieve net zero by 2100
- SSP5-8.5: Heavy reliance on fossil fuels causing emissions to triple by 2075

We assess both acute physical risks (e.g. extreme climate events) and chronic physical risk (e.g. sea level rise, long-term temperature increases). The scope covered all operational locations of our portfolio companies, including both owned and leased sites.
A third-party platform, Unwritten, was engaged to carry out a rigorous analysis using high-resolution climate, nature and economic data, science-based probabilistic hazard modelling, and geospatial mapping. Further details, including methodology, data assumptions, and limitations, are available in Appendix 5.2.

Summa's success is inherently tied to the performance of its investments. Accordingly, we assess the potential impact of both physical and transitional risks on portfolio companies and use insights to inform our investment strategy.

We view climate and nature risks as interconnected and interdependent. However, existing assessment tools and reporting frameworks typically address these risks in isolation. Consequently, we present the findings separately, while acknowledging their overlap and mutual influence in our interpretation.

**Physical risks**

Our scenario analysis indicates that Summa's portfolio has limited exposure to physical climate risks under a SSP1-2.6 scenario. Under a SSP2-4.5 and SSP5-8.5 scenario, physical risk exposure increases significantly. The most common risks identified were extreme river flooding and strom surge. More than half of total assets face potential storm surge risk, identified as the most common acute physical threat.

These hazards could lead to facilitiy damage, operations disruption, and supply chains interruptions, each with financial consequences. Concentrating risk management efforts around high-exposure sites will help strengthen the resilience of both companies and assets.

**Interpreting the results**

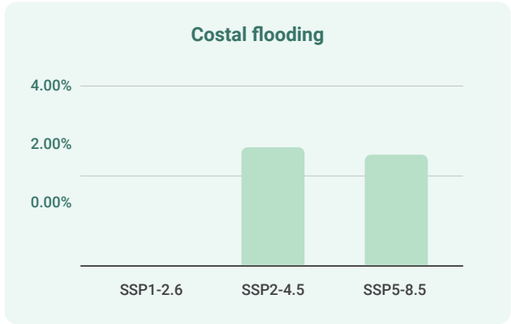
The Shared Socioeconomic Pathways (SSPs) provide the foundation for many of the IPCC's climate projections and are quantified through Integrated Assessment Models (IAMs), tools designed to simulate long-term climate outcomes based on socioeconomic trends.

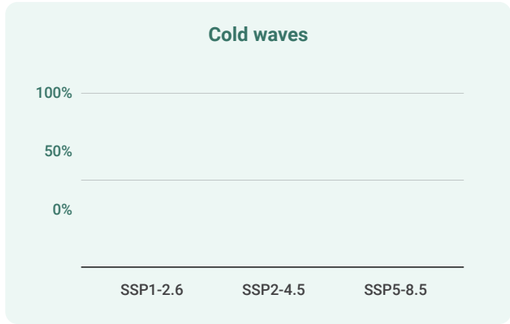
However, statistical and empirical models, which rely on historical data and observed behaviour, often point to higher short- and medium-term risks than IAMs. These models capture nonlinear climate feedbacks and extremes that IAMs may overlook due to their longer time horizons and simplifications. As a result, while our IAM-based SSP scenario analysis suggests relatively low near-term risk, empirical models indicate that actual risk exposure in the short run could be more severe.





**Relative share of portfolio assets exposed to physical climate risks***

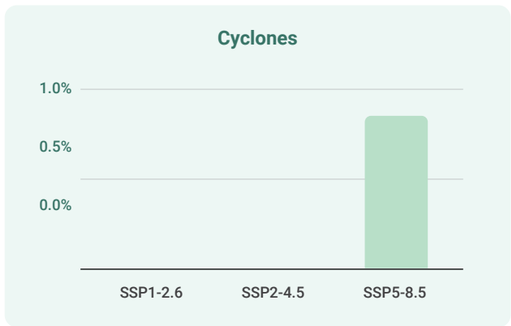


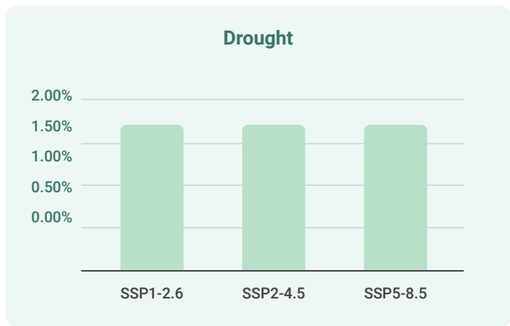



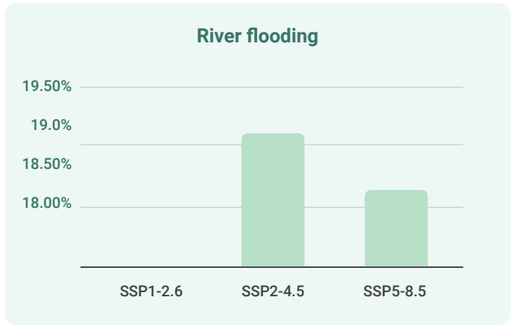


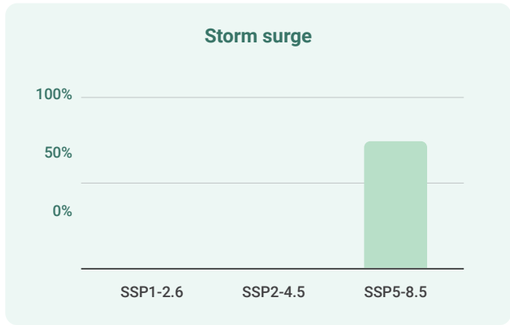





*Not all physical climate risks are modelled in every scenario. To ensure accuracy, we only report validated data and avoid interpolating where gaps exist.

**Transition risks**
Transition risks is an integral part of Summa's investment approach and ongoing ownership strategy. We assess market trends, regulatory developments, technological advancements, and reputational risks during due diligence and throughout the holding period. Please see our investment process for more details.

To complement this, we conduct analysis aligned with the TCFD recommendations, using climate scenarios from the Network for Greening the Financial System (NGFS). These scenarios are used to model the potential impact of the climate transition on company EBITDA, combining trade data, supply chain exposure, and econometric modelling of climate-sensitive commodities like steel. Our analysis focuses on a timeline extending to 2035 and is supplemented by a qualitative assessment of legal, policy, technology, and reputational risks. The analysis is based on numerous open data sources, with data collected and analysed using human-supervised, AI-powered language processing.

The results validate Summa's investment profile:
- Across three NGFS scenarios, our portfolio shows low exposure to market transition risk, with a limited expected impact on EBITDA.
- Under a net-zero scenario, several companies—such as NG Nordic and EA Technology—are expected to see positive revenue effects due to alignment with emerging market demand.

**Nature dependencies**
In addition to understanding nature-related impacts, we assess portfolio companies' dependencies on natural systems such as biodiversity, soil, and water resources.

We use a scoring methodology to quantify these dependencies and evaluate the risk of financial and operational impacts The assessment shows that the biggest portfolio dependency is on water availability, which is medium-high across all value chains except banking, software and retail. We also see significant dependency on air quality, although this is mainly concentrated around three industries; building & engineering services, agricultural produce, goods & services, and diversified construction goods.

Dependency on Biodiversity ecosystem, soil quality and pollination is limited to agriculture, but still represents 10% of investments by fair value.

Going forward, we will use these insights to continue work on a roadmap to support our companies in addressing the most material dependencies and build further resilience.

## Summary

| | |
|---|---|
| Market (Net zero) | Low |
| Market (Below 2°C | Low |
| Market (NDC) | Low |
| Policy | Low |
| Technology | Low |
| Litigation | Medium |
| Reputation | Medium |

Figure 18
Nature dependency per industry for full portfolio

| Dependency score by industry | Share of portfolio | Air quality 1-5 | Water availability 1-5 | Soil quality 1-5 | Pollination 1-5 | Biodiversity ecosystem 1-5 |
|---|---|---|---|---|---|---|
| **Environmental & waste services** | 38% | 2 | 3 | 1 | 1 | 1 |
| **Infrastructure – Green energy** | 3% | 2 | 3 | 1 | 1 | 1 |
| **Medical devices & amenities** | 2% | 1 | 3 | 1 | 1 | 1 |
| **Building & engineering services** | 2% | 4 | 2 | 1 | 1 | 1 |
| **Banking, finance & investment management** | 8% | 2 | 1 | 1 | 1 | 1 |
| **Software (general)** | 10% | 2 | 2 | 1 | 1 | 1 |
| **Consumer necessities supply & retail** | 5% | 1 | 2 | 1 | 1 | 1 |
| **Agricultural produce, goods & services** | 10% | 4 | 5 | 5 | 5 | 4 |
| **Diversified construction goods** | 6% | 4 | 3 | 2 | 1 | 1 |
| **Diversified green electricity generation** | 3% | 2 | 3 | 1 | 1 | 1 |
| **Medicine & biotechnology** | 8% | 1 | 3 | 1 | 1 | 4 |
| **Electrical hardware** | 4% | 2 | 4 | 1 | 1 | 1 |





The chart below shows the dependency scores for each Fund, based on the industries of the underlying assets, weighted by their relative share of all holdings in the fund.

Funds II and III show a low degree of nature dependency on average, with the exception of water availability, where average dependency is medium for all funds.

Fund I approaches medium dependency across several categories – this is mainly due to having a higher share of invested capital tied to food products (i.e. Milarex).

Figure 19
Nature dependency by fund

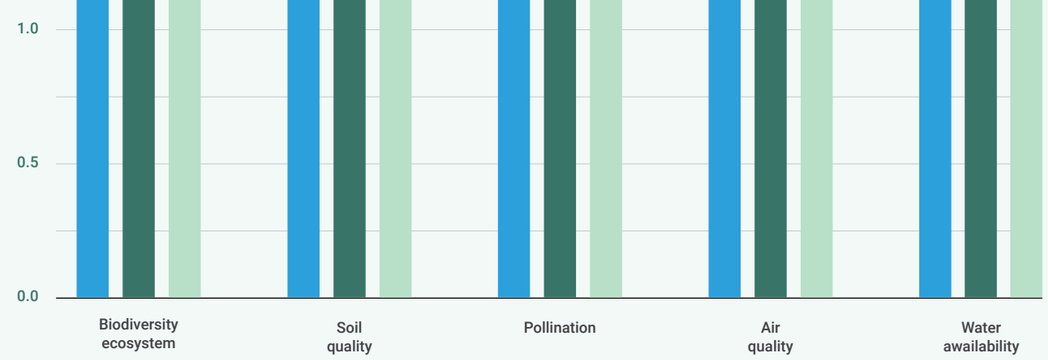


Image: NG Nordic





Summa's planetary boundaries approach is grounded in science – and advancing our understanding is essential to driving meaningful progress.

## 3.3 Advancing knowledge

The planetary boundaries framework provides a robust foundation for assessing Earth's stability, resilience, and life-supporting systems. However, the underlying processes are highly complex and deeply interconnected. Advancing scientific research is essential to improving our understanding of these dynamics, and preventing further disruptions and strengthening societal resilience. Academic institutions and scientists are crucial in researching planetary boundaries, providing the insights essential for designing effective responses. At Summa, we recognize science as the foundation for addressing global challenges.

Our approach to planetary boundaries is rooted in scientific evidence, which guides how we identify impacts, develop mitigation strategies, and evaluate investment opportunities. Consequently, we are committed to supporting scientific research and developing science-based tools in this field. As a private equity firm, we are well-positioned to support the academic community's work. We bring practical experience in directing capital to solutions and partnering with portfolio companies to mitigate impacts. By sharing our insights and data, and actively engaging with academic institutions and peers, we aim to advance scientific knowledge and enhance the understanding of today's challenges.

## Cooperation with academic institutions

Summa has collaborated with academic institutions since the firm's inception. Our partnership with Harvard Business School to develop the concept of Impact-Weighted Accounts (IWA) was driven by our desire to improve our understanding of the environmental impacts of our investments. The research project resulted in the establishment of the International Foundation for Valuing Impact (IFVI), an organization dedicated to advancing standardized impact accounting practices. By 2021, the project had achieved proof of concept, demonstrating both feasibility and value, with more than 20 papers, two dozen pilots, and four published datasets showcasing monetized impact figures for over 6,000 companies.

Summa also collaborates with the Stockholm Resilience Centre, the leading scientific institution behind the planetary boundary framework. Since introducing the framework in 2009, the Centre has continued to publish pioneering research in this field, supporting the work of policymakers and investors alike. Summa supports research streams focussed on the development of an Earth System Impact (ESI) score, a novel metric designed to assess environmental impacts beyond direct greenhouse gas (GHG) emissions.

By incorporating interactions between Earth system processes such as climate change, freshwater use, and land-system change, the ESI score offers a more holistic view of environmental impact. This systems-based approach enables more accurate assessments and supports better-informed, more effective decision-making.

Harvard Business School

Stockholm Resilience Centre | Stockholm University





## Summa impact community

We have established Summa's impact community to foster collaboration across our portfolio companies. The community consists of sustainability leaders who are eager to share experiences and knowledge, discuss recent developments, and innovate new solutions. We regularly host Impact Roundtables on key topics. Our most recent session, held in early 2025, focused on climate action, offering practical tools and guidance to support companies in navigating their decarbonisation journeys. Sustainability leaders from across the portfolio convened to share strategies and lessons from their own operations. Additionally, we actively support the community by sharing updates on regulatory trends, providing practical templates to assist sustainability teams, and encouraging ongoing peer-to-peer dialogue across companies.





# 4. Outlook

## We have reached a pivotal moment in our response to the planetary boundaries crisis.

Continued inaction and further degradation of Earth's systems will, with growing certainty, lead to the irreversible tipping of critical planetary thresholds. While policy timelines may suggest we have 25 years or more to meet global targets, Johan Rockström, founder of the planetary boundaries framework, warns that our true window of opportunity could be as short as five years.

At Summa, our purpose is to solve global challenges. We see significant opportunity to fulfill this purpose—and deliver strong financial returns—by investing in companies that help restore and operate within the planet's safe boundaries. In 2025, we have doubled down on investment themes that demonstrate exceptional impact and returns, with clear, measurable contributions to the stability of Earth's vital systems. Our investment process is grounded in a theory of change approach, beginning with the identification of systemic challenges and the solutions required to address them. This enables us to identify and invest in companies that drive meaningful and measurable progress toward a safe and just operating space for humanity.

In this year's planetary boundaries report, we have refined our approach to better reflect the interconnectedness and complexity of Earth systems. The time for isolated or ineffective mitigation measures is over. We must build and scale companies that not only have a net positive impact, but are also resilient to the escalating risks of a destabilizing planet.

We are making steady progress, particularly toward our Science Based Targets initiative (SBTi) commitment, and we remain fully dedicated to advancing our efforts. In 2025, we will:

- Continue the development of theories of change for our investment themes, and build a strong pipeline in line with the identified investment opportunities
- Implement Summa's Climate Action Program and develop decarbonization roadmaps for all companies setting targets in 2025, as well as for all new acquisitions
- Continue integrating climate and biodiversity risk assessments across all stages of our investment process to strengthen the resilience of our portfolio
- Expand the calculation of avoided emissions across the eligible portfolio to better target and track impact during ownership
- Deepen our collaboration with the Stockholm Resilience Centre to support the development of science-based Earth System Metrics

# 5. Appendix

In 2023, Summa began aligning its climate- and nature-related reporting with the recommendations of the Taskforce on Climate and Nature-related Financial Disclosures (TCFD, TNFD).

## 5.1 TCFD and TNFD recommendations

While we recognize that some recommendations are not yet fully addressed, we believe that structuring our reporting in accordance with these framework—despite current gaps—adds meaningful value. We are committed to deepening this alignment over the coming year, with the goal of fully covering all recommended disclosures across the framework's four pillars.






| Governance | Strategy | Risk management | Targets and metrics |
|---|---|---|---|
| A. Board of Directors | A. Identified impacts, dependencies, risks and opportunities | A. Identification of impacts, dependencies, risks and oppurtunities | A. Metrics for assessing risks and opportunities |
| B. Management | B. Effects on Summa's investment strategies | B. Management of impacts, dependencies, risks and oppurtunities | B. TCFD: Reporting concerning greenhouse gases<br>TNFD: Metrics of nature-related impacts and dependencies |
| C. Human rights | C. Scenario analysis | C. Integration of climate- and nature-related risks into risk management | C. Targets |
| | D. Geographical presence | | |

# Disclose the organization's governance around climate-related risks and opportunities and nature-related dependencies, impacts, risks and opportunities.

## Governance

**The Board's oversight of climate and nature-related impacts, dependencies, risks, and opportunities.**

The Board of Directors of Summa Equity AB (the "Board") is responsible for ensuring adequate principles for addressing the planetary boundaries for Summa. It receives continuous information about Summa's work on impact and sustainability, including issues related to the planetary boundaries, and considers this information in decision-making processes related to the firm's strategy, objectives, and planning. The Summa board has 4 regular meetings per year.

The establishment and oversight of Summa's planetary boundary risks and opportunities are outlined in Summa's Environmental and Climate Change Policy, which has been adopted by the Board. It is reviewed annually or whenever a material change is warranted. The Board is accountable for defining and overseeing the implementation of the principles and objectives in the Environmental and Climate Change Policy. Progress update on the objectives is shared regularly and as part of the recurring Board meetings.

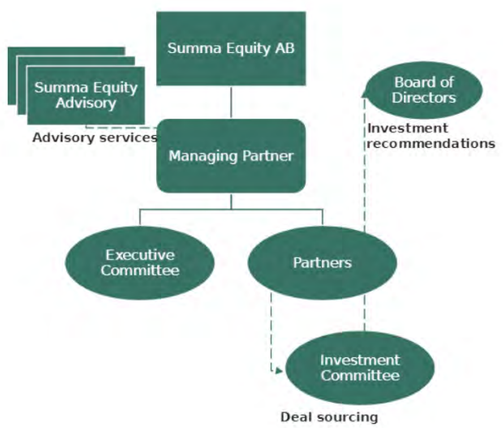
Addressing climate change and nature through impactful investments is a core component of Summa's investment strategy, and consequently thoroughly considered in strategic decisions. In addition, the climate- and nature-related performance of portfolio companies is considered during regular reviews. The Board considers the information on Summa's impact and sustainability work, including the planetary boundaries approach, in decision-making processes related to the firm's strategy, planning and overall.

**Management's role in assessing and managing climate and nature-related impacts, dependencies, risks, and opportunities.**

The CEO has the overall responsibility for the implementation of planetary boundaries approach. This involves overseeing the integration of climate and nature-related considerations into decision-making processes, setting clear objectives, allocating resources appropriately, and fostering a culture of transparency and accountability throughout the organization to effectively manage planetary boundary impacts and seize opportunities for sustainable growth. The CEO updates the Board on relevant developments and jointly reviews the firm's planetary boundaries approach with the Board at least once a year. The approach is developed in cooperation with the thematic partners, the management team, and the impact director, who support the CEO in ensuring that the firm's climate and nature related objectives are operationalized and achieved.

The impact director, part of the value creation team, leads sustainability efforts by supporting integration across the funds, and reporting on planetary boundary impacts, risks, and opportunities in line with TCFD recommendations. The impact director updates the partner group, including the firm's CEO, on a quarterly basis.

**A visual representation of the organizationa structure can be found below:**








**Human rights policies, engagement, and oversight in relation to nature, indigenous peoples, local communities and affected and other stakeholders.**

Summa is a signatory of the Principles for Responsible Investment ("UNPRI"). Among the principles is a commitment to integrate ESG into ownership policies and practices, as well as to seek appropriate ESG disclosures from the companies we invest in. We seek to adhere to the 10 principles of the UN Global Compact ("UNGC"). The four sustainability themes (Human Rights, Responsible Investment and Stewardship Policy 6 of 15 Labor Rights, Environment, and Anti-Corruption) are integrated into our Code of Conduct, and our due diligence process is founded in the OECD Due Diligence Guidance for Responsible Business Conduct to ensure fit for purpose ESG Due Diligence in each investment case. Summa is a Certified B Corp. B Corps are expected to meet the highest standards of verified social & environmental performance, transparency, and accountability.

Human Rights principles are contained in Summa's general Code of Conduct, and we also have a separate Human Rights policy describing our approach and commitment. Summa communicates publicly about our approach to human rights. Material issues are reported to relevant stakeholders.

Human rights due diligence, including rights of indigenous peoples and local communities, are embedded in documents that describe Summa's processes for assessing companies before we invest, and as part of regular assessments of the current portfolio. Human Rights are considered as one out of many topics that must be addressed by third-parties that carry out pre-investment due diligence on our behalf.

The Summa Board is ultimately responsible for ensuring that adequate principles are in place on nature-related advocacy and lobbying. No contributions will be made to any party on behalf of Summa with regard to this or any other topic.

However, the Summa leadership group, impact team and others participate in e.g. forums, industry events and conferences advocating for the importance of strong standards, in particular with regard to measuring and addressing impact.

The Summa senior management and board receive continuous information about Summa's work on impact and sustainability, including issues related to local communities and indigenous people, and considers this information in decision-making processes related to the firm's strategy, objectives, and planning.

Direct engagement activities are based on materiality. As a Private Equity investment manager, Summa has negligible direct impact on local communities, however we take an active role in ensuring investees (portfolio companies) have adequate measures in place for stakeholder engagement. We encourage the companies we invest in to solicit feedback and perspectives from all affected stakeholders, e.g. customers and, where material, local communities. Summa aims to invest in companies that do not do significant harm to the environment or communities, either directly or through the value chain, and is committed to measure both negative and positive impacts post-investment. Engagement efforts are determined on a case-by-case basis, by the the individual portfolio companies, and can be either ongoing or one-off depending on e.g. the characteristics, stakeholder group, use-case.

Summa does not engage in direct lobbying but contributes to several multinational NGOs and participates in networks that advocate for responsible investment and take into account nature related impacts and other sustainability factors in all aspects of business and investment, e.g. GIIN and UN PRI. Summa is not involved in any ongoing cases concerning nature related dependencies.

# Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning where such information is material

## Strategy

**Climate and nature-related impacts, dependencies, risks, and opportunities identified by Summa in the short, medium, and long term.**

**Climate**
We consider climate-related impacts across the following time horizons: Short-term: 1 year ; Medium-term: 10 years ; Long-term: 25 years

Due to the nature of our private equity business, short- and medium-term risks are material for our investment cycle. Nevertheless, we do take into account long-term risks as well. Please see further detail on our methodology in Chapter 5.2.

The results of our scenario analysis indicate that our risk exposure is relatively low. Most of our portfolio is concentrated in geographical zones with low climate risks, though companies outside these zones are exposed to a wider range of risks. Please see 3.2 for a detailed overview of the results.

We conduct scenario analysis for both physical and transitional climate risks. The outcomes of our analysis of physical and transitional risks are translated into risk scores. For example, in the case of market risks, the score based on the changes to a company's revenues and climate-sensitive costs in the below 2°C scenario vs. the Current Policies base case. In addition, we calculate and monitor the potential EBITDA-impact of market risks under different climate-scenarios. For physical hazards, the risk score is based on a function of hazard, exposure and vulnerability, with thresholds used to determine the relative risk levels. Please consult 5.2 for a more detailed description of the methodology underlying our climate risk assessment.

**Nature**
Based on Summa's assessments, most companies in the Summa portfolio have limited impact nature through their direct operations. Most negative impacts occur upstream in the value chain, where companies are dependent on e.g. production of agricultural products, other physical goods and/or processes utilizing high impact commodities like electronics, concrete and steel. Please refer to the section 3.2 Mitigating adverse impacts and 3.2 Creating risk resilience, as well as Chapter 4.2 for a description of the methodologies.

Summa's portfolio depends on natural resources across its value chains, with significant implications for its operations and strategy.

**Location and Scope of Dependency:** Dependencies primarily arise in the upstream value chain (e.g., agricultural inputs for portfolio companies like Oda) and direct operations (e.g., NG Group's waste logistics and processing), with minor downstream dependencies in logistics).

**Dependency Pathway:**

- **Environmental Assets and Ecosystem Services:** The portfolio relies on fertile soil, freshwater, and biodiversity for provisioning services (e.g., crops, raw materials), regulating services (e.g., pollination, water purification), and supporting services (e.g., nutrient cycling)
- **Impact Drivers and External Factors:** Land use, water drawdown, and resource consumption (e.g., plastics, aluminum) drive dependencies
- **Interconnections Between Dependencies and Impacts:** All nature related dependencies ultimately cause impacts on nature. Examples of interconnections include:
- Dependence on fuel for transportation and logistics drives impacts from e.g. air and soil pollution
- Reliance on land use drives land conversion, degrading ecosystems and potentially reducing the availability of provisioning services over time.





**Effects of climate and nature-related dependencies, impacts, risks and opportunities on organisation's business model, value chain, strategy and financial planning, as well as any transition plans or analysis in place.**

Please refer to Section 3.1 on Summa's investment strategy & process. Our planetary boundary approach is fully embedded in the investment process to ensure that investments align with the firm's objectives of achieving competitive returns and positive environmental outcomes.

**Climate**
Summa's thematic investment approach is targeting opportunities related to climate change. On a portfolio-level, we consider the risks and opportunities across a variety of dimensions. Decisions are informed by our physical and transitional risk assessments. The results indicate that although our risk exposure is relatively low, there is significant untapped potential in the markets where our companies operate.

We manage related risks and opportunities to help restore safe environmental limits and build a resilient portfolio. The consideration of impacts, risks and opportunities related to the planetary boundaries starts with the development of a Theory of Change for the relevant subtheme. During the due diligence phase, we conduct detailed analysis on the potential impact of the planetary boundaries onto costs and revenues, as well as the required capital expenditures to achieve a company's impact goals. We examine potential risks that may arise in the company's supply chain, including nature-risk related to regulations, adverse impacts, customer and stakeholder demands, and material and resource scarcity.

**Nature**
Nature related risks and opportunities are considered when developing and updating Summa's investment strategy across its themes and sub-themes. Summa believes that the long-term success of its investments depends on the ability of portfolio companies to reduce their environmental impact and adapt to a low-carbon, nature-positive economy. As an active owner, we support companies through this transition by:

- Mitigating climate and nature impacts through the implementation of science-based measures designed to prevent further environmental degradation.
- Identifying and managing risks related to climate change, biodiversity loss, and ecosystem degradation—both physical and transitional—while assessing their potential financial implications for the business.

Summa has set targets related to climate impacts and will develop non-climate nature related targets in the future. We will furthermore increase our alignment with the TNFD reporting recommendations.

While several companies have taken specific actions to reduce nature impact, that are related to their specific impacts, Summa expects that further action to be taken by many of our portfolio companies as we fill data gaps, gain better insights and further develop our approach.

Impacts related to breach of the planetary boundaries may lead to increased costs over time, while opportunities in sustainable markets provide opportunities for investments and business growth in the portfolio. Financial risks related environmental factors are integrated into Summa's annual cycle of overall portfolio risk assessment.

**Resilience of Summa's strategies for climate and nature-related risks and opportunities, taking into account different scenarios.**

Summa's strategy is built around investing in companies that can mitigate and help build societal resilience toward risks related to planetary boundaries and other risks factors. The strategy is designed to be resilient to environmental and social megatrends, focusing on industries that are needed across e.g. multiple climate change scenarios.

**Climate**
On a portfolio level, we consider the risks and opportunities across a variety of dimensions. Decisions are guided by our physical and transition risk assessments, which show that overall risk exposure is relatively low. Most of our portfolio is concentrated in geographical zones with low climate risks, although their supply chains have a global exposure and might be affected to a larger degree. Due to our focus on winning companies in transitioning industries, the portfolio's exposure to transition risk is limited, and we see significant opportunity in the respective transitions. In addition to our risk assessment in this report, please see our Theory of Change assessments for the sectors we target for further detail.

**Nature**
Summa's priorities include the upstream value chains of portfolio companies as well as locations within the sphere of our portfolio companies' operations. Currently, there are no identified facilities in high-biodiversity or water-stressed areas where company operations materially affect those areas. Locations upstream in portfolio company value chains are not systematically assessed by Summa, but value chains are scored based on the industry of the respective portfolio company and known activities in the respective value chain.

Transition risks from regulatory changes are assessed using NGFS scenarios. We aim to build on our current assessment frameworks over the coming years to help portfolio companies determine adaptations to safeguard business value and mitigate supply chain vulnerabilities.

Material dependencies on ecosystem services like water provision are assessed using TNFD tools, although current gaps in the data limit the granularity of the insights. Summa intends to increase the data quality year by year to enhance the depth and accuracy of our assessments.

# Describe the organisation's processes for identifying, assessing and prioritising climate- and nature-related dependencies, impacts, risks and opportunities in its direct operations, and in its upstream and downstream value chain.

## Risk management

**Climate**
Summa assesses the exposure to climate- and nature-related risks at least on an annual basis. In addition, we conduct an initial assessment during the screening and due diligence process, where we evaluate the physical and transitional risk exposure of a target.

Where possible, we express risk exposure in financial terms, such as climate-adjusted EBITDA. We view sustainability risks as business risks and give them equal weight in decision-making.

Please refer to Chapter 3.2 for a description of the underlying process, and Chapter 5.2 for the underlying definitions used.

**Nature**
Summa identifies dependencies, impacts, risks and opportunities through annual assessments aligned with TNFD. Risks are prioritized by financial impact, with NGFS scenarios evaluating ecological thresholds. Summa's geographic risk assessment looks at risks specific to the region where each facility is located.

Summa assesses upstream and downstream dependencies and impacts on biodiversity, focusing on high-impact commodities using TNFD guidance. This is based on datasets containing average industry materiality scores that cover value chains as a whole. Risks are prioritized based on materiality scores, and on a case-by-case basis we conduct in-depth impact accounting to quantify impacts on nature and secondary wellbeing impacts on peopl. Plans to improve data quality involve expanding the coverage of quantified company impact assessment to cover a larger share of the portfolio.

Please see Chapter 3.2 for the outcomes of Summa's risk assessment.

**Describe the organization's processes for managing climate-related risks and nature-related dependencies, impacts, risks and opportunities.**

**Climate**
The assessment of climate impacts and risks is a core part of Summa's investment process. We leverage the Theory of Change framework to identify the total opportunity attached to certain global challenges and sub-sectors. The outcomes inform our sourcing, screening, and investment process, where we aim to invest in companies that can deliver on the assessed opportunity.

We evaluate exposure to physical and transitional climate risks, as well as nature risks, on an ongoing basis. Throughout the ownership phase, we collaborate closely with portfolio companies to address and mitigate material risks, fostering resilience across our investments (see Chapter 3.2). As part of our scenario analysis, we model the expected impact of different transition scenarios on company's revenues, thereby identifying companies that can benefit from available transition scenario's.

**Nature**
Please refer to Chapter 3.2 and Chapter 5.2.

**Describe how processes for identifying, assessing, prioritising and monitoring nature-related risks are integrated into and inform the organisation's overall risk management processes.**

**Climate**
Summa integrates climate and nature-related risks into its overall risk management framework and Key Risk Indicators ("KRI") reporting process. Climate and nature-related risks are systematically identified, assessed, and managed across Summa's operations and investment portfolios, alongside traditional financial, operational, and compliance-related risks. By incorporating climate and nature considerations into its risk management framework, Summa strives to mitigate potential adverse impacts on financial performance, operations, and stakeholder trust.

Furthermore, the Risk Manager monitors and assesses KRI's related to market risk, credit and counterparty risk, liquidity risk, operational risk and sustainability risk, including climate and nature-related risks, on a quarterly basis and presents the assessment to the Board.

**Nature**
Summa integrates nature-related risk assessments into its enterprise risk management, using e.g. the WWF risk filter and metrics like GHG emissions and potential biodiversity loss (e.g. PDF.m2.year) to monitor impacts and risks. Annual reviews and NGFS scenario analyses inform prioritization, ensuring alignment with financial and operational strategies. This integration supports proactive responses to risks like extreme weather, water scarcity and regulatory changes.

# Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities and nature-related dependencies, impacts, risks and opportunities.

## Metrics and targets

**Disclose the metrics used by the organization to assess and manage climate- and nature-related risks and opportunities in line with its strategy and risk management process.**

**Climate**
Summa analyses the impact onto the planetary boundaries from its investments across various key metrics. We monitor GHG emissions from our portfolio and operations annually, reporting Scope 1, 2, and 3 emissions in line with the GHG Protocol. We prioritize high-quality data for accuracy and completeness and ensure full emissions coverage as all companies are expected to set SBTi targets. In addition, we monitor both nature impacts and nature risks and dependencies for all portfolio companies.

Impact KPI's are develop based on each company's unique contribution to the Theory of Change, and in many cases address planetary boundaries.
Please view the results in Chapter 3.2 for an extensive overview of the outcomes, as well as descriptions of the frameworks and methodologies used. More detailed figures per portfolio companies, as well as methodologies, can be found in the chapter 5.2.

**Nature**
Summa employs TNFD-aligned metrics like water usage, GHG emissions and biodiversity loss to manage risks, alongside opportunity metrics like potential revenue from solutions that can help solve nature related problems. To assess risks, we track e.g. short-term compliance costs as well as long-term ecosystem risks. We perform annual assessments to support trend analysis over time.

**Disclose the metrics used by the organisation to assess and manage dependencies and impacts on nature.**

**Climate**
Summa uses TNFD aligned metrics to assess dependencies and impacts, in supply chains and direct operations. Data gaps in upstream tracing are addressed with industry-based scoring, with plans for using e.g. spend-based input-output modelling to generate more accurate assessments over time. These metrics will be used to inform actions to determine mitigative actions to reduce environmental footprint in the future.

Please refer to the tables displayed in Chapter 3.2 regarding core metrics used for dependencies and impacts.

We evaluate exposure to physical and transitional climate risks, as well as nature risks, on an ongoing basis. Throughout the ownership phase, we collaborate closely with portfolio companies to address and mitigate material risks, fostering resilience across our investments (see Chapter 3.2). As part of our scenario analysis, we model the expected impact of different transition scenarios on company's revenues, thereby identifying companies that can benefit from available transition scenario's.

**Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.**

**Climate**
Please see Chapter 3.2 for an overview of the portfolio's GHG emissions and the underlying methodology.

For a detailed breakdown of carbon emissions per company, please refer to our latest Portfolio Report.

**Describe the targets and goals used by the organisation to manage climate- and nature-related dependencies, impacts, risks and opportunities and its performance against these.**

**Climate**
Summa Equity has committed to the Science-based targets initiative ("SBTi"), a leading framework in Greenhouse Gas Reduction target setting. Summa strives to have 78% of its portfolio by fair value set SBTi's by 2028, and 100% by 2030. Please see Chapter 3.2 for a detailed description of Summa's SBTi target and the portfolio's progress.

**Nature**
Summa has set targets related to climate impacts and will develop non-climate nature related targets in the future. We will furthermore increase our alignment with the TNFD reporting recommendations.



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## 5.2 Methodologies

### Climate risk assessment

**Scenarios**
Physical and transitional risk assessments are conducted at the asset level, evaluating hazard, exposure, and vulnerability across different climate risks under three of the IPCC scenarios:

- **SSP1-2.6**: Successful transition to a low-carbon economy with net-zero achieved around 2075
- **SSP2-4.5**: Business as usual and failure to achieve net zero by 2100
- **SSP5-8.5:** Heavy reliance on fossil fuels causing emissions to triple by 2075

Figure 20
**Time horizons**
We assess climate risks across three different time horizons:

| Risk | Short: now to next 12-months | Medium: 2035 | Long: 2050 |
|---|---|---|---|
| **Transition: Market** | | ● | |
| **Transition: All other** | ● | | |
| **Physical** | | ● | ● |

**Physical climate risk hazard categories**

**Acute**: Event-driven physical hazards, such as an increased frequency and intensity of extreme weather events, including cyclones, hurricanes, and floods.

**Chronic**: Long-term shifts in climate patterns, such as sustained temperature increases, sea-level rise, and prolonged heatwaves.

| Physical climate risk hazard category | Type | Description | Return period |
|---|---|---|---|
| **Drought** | Acute | Periods of abnormally dry weather, long enough to cause serious hydrological imbalance | 1:50 years |
| **Riverine flooding** | Acute | Overflowing of the normal confines of rivers and streams | 1:100 years |
| **Tropical cyclone** | Acute | Strong, cyclonic-scale disturbances (storms) that originate over tropical oceans | 1:100 years |
| **Cold waves** | Acute | Extended periods of days with temperatures below a certain percentile of the local temperature distribution | 1:50 years |
| **Pluvial flooding** | Acute | Water build-up and overflow due to intense rainfall | 1:50 years |
| **Storm surge** | Acute | Rise in total water levels, including tidal levels and surge levels, excluding the long-term rise in sea levels | 1:50 years |
| **Heat** | Chronic | Temperatures regularly exceeding values that can cause harm to people, infrastructure, business operations, or ecosystems | 1:50 years |
| **Coastal flooding** | Chronic | Submergence of coastal areas due to level rise, or the temporary inundation from tides or storm surges | 1:100 years |





**Return periods**

Climate risk models use probabilistic methods to estimate the likelihood of a specific event occurring. These models often reference **return periods** to describe how frequently a given risk level may be exceeded. For example, a return period of 1:50 means that there is a 2% chance that the event might happen in a given year.

Figure 21
Note that some risks are not available for all scenarios.

| Risk | SSP1-2.6 | SSP2-4.5 | SSP5-8.5 |
|---|---|---|---|
| **Drought** | ● | ● | ● |
| **River flooding** | | ● | ● |
| **Tropical cyclone** | | | ● |
| **Cold waves** | | ● | ● |
| **Rain flooding** | ● | ● | ● |
| **Storm surge** | | | ● |
| **Heat** | ● | ● | ● |
| **Coastal flooding** | | ● | ● |

| Risk hazard category | Description |
|---|---|
| **Market** | Changing consumer preferences, investor priorities, and supply-demand dynamics linked to climate change |
| **Policy** | Introduction of new climate-related policies, such as carbon taxes, emissions regulations, or mandatory climate disclosure laws |
| **Technology** | The development, adoption, or obsolescence of technologies during the transition to a low-carbon or nature-positive economy |
| **Litigation** | Legal action being taken against companies in relation to their impacts on climate or nature, or their failure to adequately respond to associated risks |
| **Reputation** | Changes in public perception, media scrutiny, and stakeholder activism that have financial consequences |

## Nature risks and TNFD Leap

**Summa Nature Impact Assessment**
The assessment was developed for Summa by The Footprint Firm and maps company value chain activities to items in two SBTN databases:

1. The SBTN UP database, which focuses on processes.
2. The High Impact Commodity List (HICL), which focuses on commodities. This tool includes 'conversion driving' commodities within the HICL. For each impact topic, these databases are used to provide a materiality score
3. The SBTN UP database provides a score, and materiality threshold for each activity. In this tool, the materiality is marked as zero if the score is below the threshold, 1 if it equals to the threshold, 2 if it exceeds the threshold.
4. The High Impact Commodity List, which provides a materiality of 0 or 1. For each activity, an impact topic is marked as 1 if it features in either the SBTN literature review, or the ENCORE materiality database.

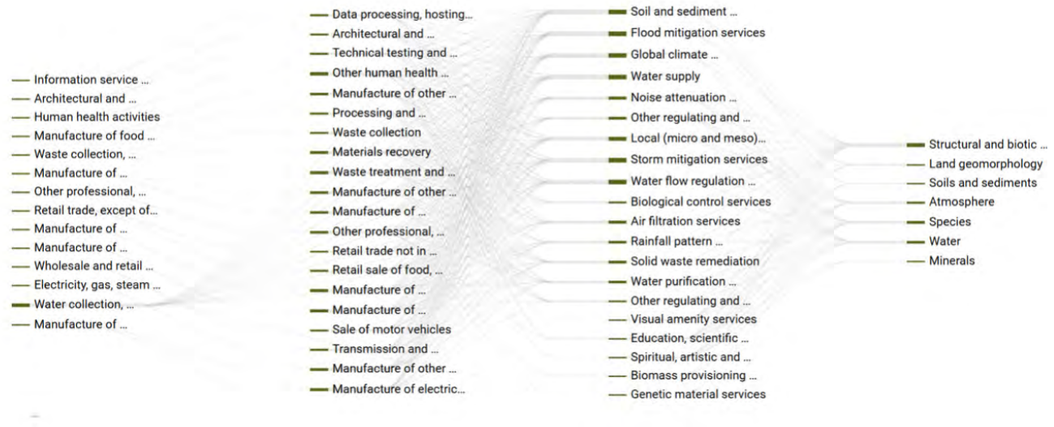
Each value chain activity is assigned a materiality scorebased on the highest rating derived from two assessment methods. For example, the activity 'cardboard' may be linked to the SBTN UP category 'Production of paper products' and the HICL commodity group 'Pulp, cellulosic, paper, paperboard, cardboard'. If, for instance, the SBTN UP score for 'Soil pollutants' is 7, exceeding the materiality threshold of 6, the activity is assigned a materiality score of 2.



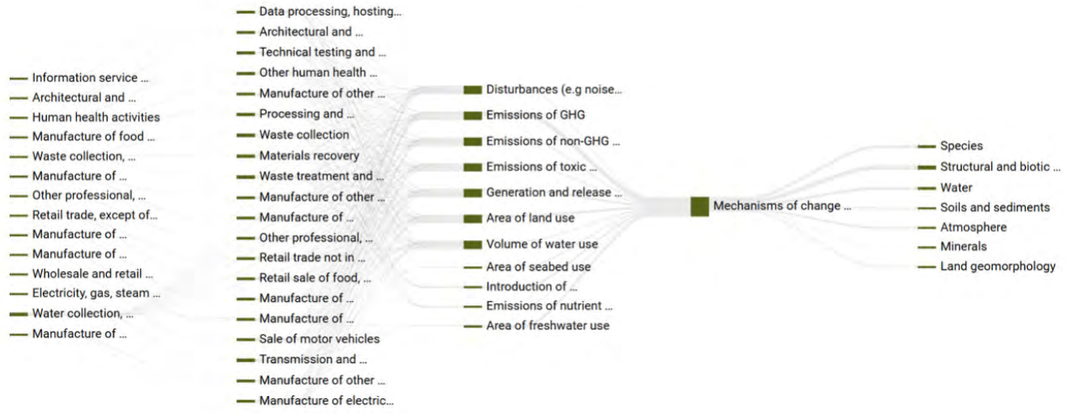


## Dependencies and Impacts from ENCORE database

**Dependencies**




**Impacts**




To visualize the impact and dependency flows based on the sectors we invest in, Summa has analysed its exposure to nature-related impacts and dependencies using the ENCORE tool in addition to the assessments described above. The resulting flow charts illustrate impacts and dependencies at the sub-sector level. However, they are not weighted according to Summa's actual portfolio exposure due to limitations within the tool.

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