Microsoft

# Task Force on Climate-related Financial Disclosures

## 2024 report

Reporting on our 2022 and 2023 fiscal years

**About this report**

This report presents information on Microsoft's process for assessing and managing environmental risk, including our use of scenario analysis. We aim to present as transparent and comprehensive a picture of our work in this area as possible, aligning with the recommendations of the Task Force for Climate-related Financial Disclosures (TCFD) where possible.

Please note that the inclusion of examples of risks and opportunities in this report does not characterize their probability, significance, or potential substantive impact. (See page 9 for more information on how we define "substantive.")

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Cover captured by: **Edmond Chan**,
Senior Sustainability Manager, United States

**To our stakeholders:**

In 2020, Microsoft established a bold set of goals: to be a carbon negative, water positive, zero waste company that protects ecosystems—all by 2030. Sustainability is at the center of many of our efforts, from how we design, build, and operate our facilities to how we work with suppliers across our supply chain.

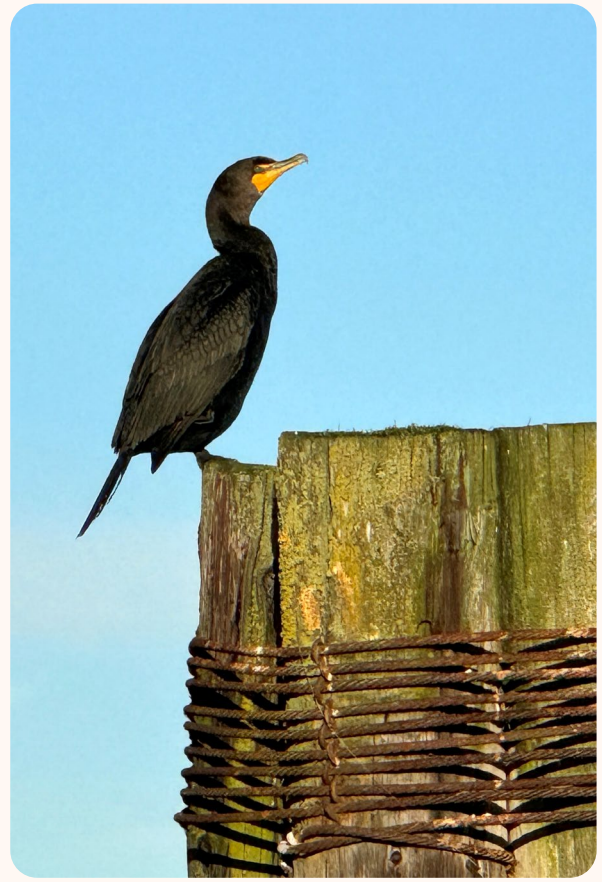
The shift from pledges to progress requires action, transparency, and accountability. Over the last few years, the world has seen rapid changes in our industry, including the arrival of new technologies such as generative AI. AI holds tremendous promise for the discovery and development of new solutions that can help us meet the pace and scale of sustainability solutions needed to address the climate crisis. At the same time, we are working to address the challenges that come with the resource intensities of this new technology.

We have made great strides in assessing, managing, and transparently reporting on environmental risks. We have evolved our board governance, expanded our climate-related scenario analyses, and implemented actions to reduce risks and expand on opportunities. We will continue to evolve our processes as new ways to measure and identify risk become available and as the technology landscape delivers new capabilities. We are optimistic about the role that technology can continue to play in accelerating climate progress, and we look forward to working with others on this critical journey for all of us. We all need to succeed together.

To learn more about our work and progress against our carbon, water, waste, and ecosystems goals, please see our 2024 Environmental Sustainability Report at aka.ms/SustainabilityReport2024.

Melanie Nakagawa

**Melanie Nakagawa**
Chief Sustainability Officer



Captured by: **Fernando Reyes-Gonzalez**, Director, Environmental Sustainability Monitoring and Disclosure, United States

# Governance

At Microsoft, we work to conduct our business in ways that are principled, transparent, and accountable, which generates long-term value. Microsoft has made sustainability part of its business, including embedding it deeply into our governance structure. We focus our efforts where we can have the most positive impact on our business and society, including issues related to environmental sustainability.

Microsoft's Board of Directors and executive leaders recognize the interconnections between corporate governance and effective business responses to pressing environmental and social challenges. In considering these challenges, we have proactively engaged with investors to learn from their perspectives and share Microsoft's approach, as well as considering best practices from our industry peers, partners, customers, and the broader business community. Microsoft's Board and management team understand that the work we do across a spectrum of environmental and social areas makes an important contribution to Microsoft's long-term opportunities. We are committed to building and executing on strategies to help foster a healthy planet and advance a more inclusive global economy that supports additional growth opportunities for everyone.

## Board oversight

The Environmental, Social, and Public Policy (ESPP) Committee of Microsoft's Board of Directors provides oversight and guidance on Microsoft's environmental sustainability strategy and efforts (see Figure 1).

The ESPP Committee is chartered with assisting the Board of Directors in overseeing Microsoft's "key non-financial regulatory risks that may have a material impact on the company and especially its ability to sustain trust with customers, employees, and the public." Specifically, the ESPP Committee charter identifies the following (among other topics) in its responsibilities: "review and provide guidance to the Board and management about key environmental and social matters such as climate change, and environmental sustainability."

The ESPP Committee meets at least three times a year. During at least one meeting each year and on an as-needed basis, our Vice Chair and President and our Chief Sustainability Officer present to this committee on our overall environmental sustainability agenda and goals. During the period of this report (fiscal years 2022 and 2023 [FY22–FY23]),[1] our Chief Sustainability Officer briefed the ESPP Committee on topics including Microsoft's environmental sustainability strategy and goals, global challenges that the world faces on the path to net-zero emissions, and the promise of new technologies, including generative AI, to help achieve climate goals.

## Management responsibilities

Our Vice Chair and President leads our Corporate, External, and Legal Affairs (CELA) group—the legal, public policy, and social responsibility arm of the company. This group is focused on building and maintaining trust with Microsoft's customers, investors, and stakeholders, including in areas of environmental sustainability. Our Vice Chair and President's responsibilities include establishing the breadth, scope, and timing of public-facing sustainability goals (which include to become a carbon negative, water positive, zero waste company that protects ecosystems—all by 2030).

[1] Microsoft's fiscal year runs from July 1 to June 30.

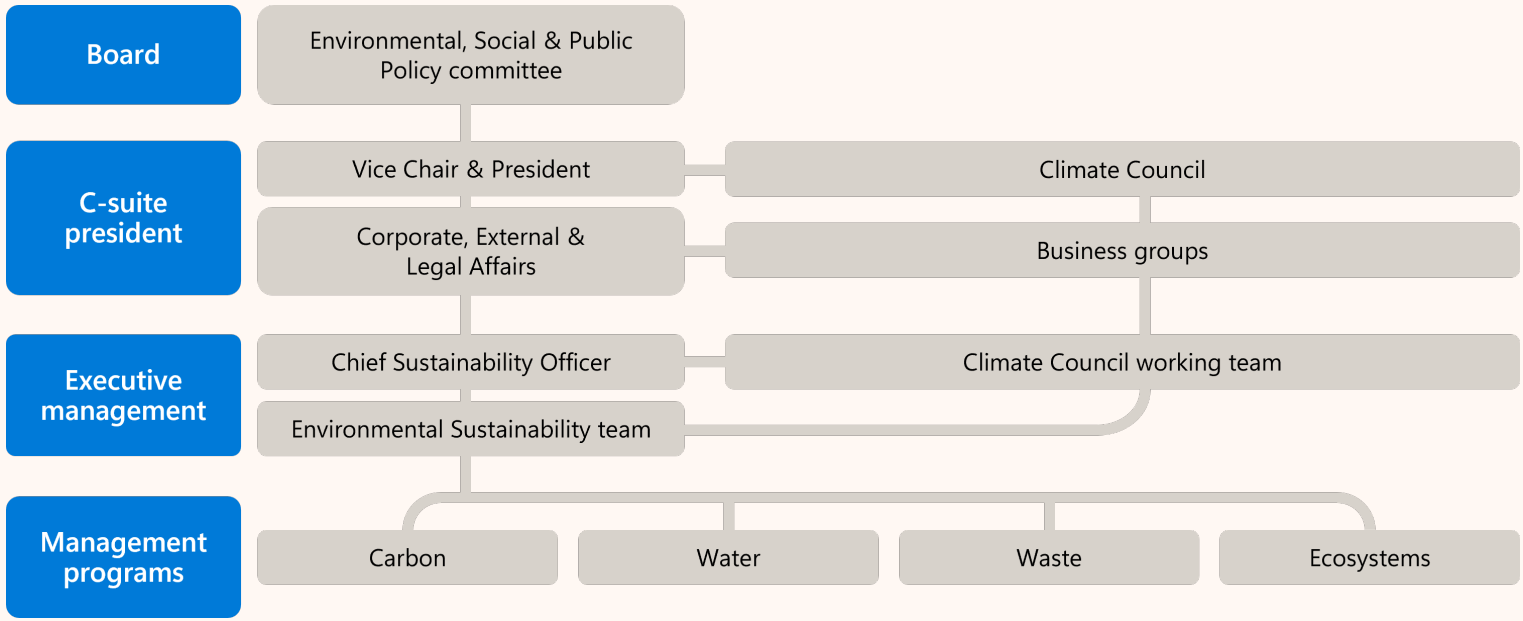



**Figure 1. Microsoft's sustainability governance structure.**

Together, our Vice Chair and President and our Chief Sustainability Officer hold senior executive accountability for environmental risk management aligned with business teams, who ultimately manage environmental risk mitigation across our business. The Vice Chair and President monitors environmental sustainability issues and the company's progress on related objectives through regular business reviews with our Chief Sustainability Officer, as well as in individual meetings as appropriate.

Our Chief Sustainability Officer is the head of our corporate Environmental Sustainability team, leading our overall environmental sustainability vision, regulatory strategy, and program execution. The Chief Sustainability Officer reports directly to our Vice Chair and President and provides regular updates on our environmental sustainability strategy and progress. Our Chief Sustainability Officer and energy procurement team also provide quarterly updates to our Chief Financial Officer on our progress with carbon abatement (such as through purchases of renewable energy and carbon removal offsets) and strategic investments.

Focusing on operations, products, partners, and policy, the Environmental Sustainability team strives to reduce our company's environmental footprint. This team plans, develops, and executes environmental sustainability initiatives, assesses progress on our environmental sustainability programs, and supports our overall commitment to, and achievement of, our environmental sustainability goals. The Environmental Sustainability team also brings leaders from across Microsoft together to discuss relevant topics, such as energy efficiency, renewable energy procurement, water stewardship, climate risk, and circular economy.

For guidance on globally changing dynamics, this team engages with experts around the world, including internal finance, regulatory/policy, technology, and environmental professionals. In addition, the team works with external resources to aid our understanding of the evolving sustainability landscape. Our approach includes partnerships with key academic institutions and nongovernmental organizations (NGOs) that are leading research in sustainability topics. This robust network of internal and external resources helps our Environmental Sustainability team and other management positions remain informed about sustainability-related issues.

The Environmental Sustainability team also participates in our Enterprise Risk Management (ERM) framework, which helps risk owners and subject matter experts (SMEs) identify, assess, and prioritize the company's most significant risks and, through regular reporting and discussion, support Microsoft's senior management and the Board with governance of risk. The Environmental Sustainability team completes ongoing climate-related scenario analyses to help identify Microsoft's climate-related risks and opportunities. The results of these analyses feed into our companywide ERM process. More information on these analyses can be found in the Strategy section of this report.

## Supporting roles

The Microsoft Climate Council brings together leaders representing each part of our company to help the company achieve our environmental sustainability goals. The Climate Council addresses Microsoft's four sustainability focus areas of carbon, water, waste, and ecosystems, helping the company to be a responsible environmental steward and a leading platform provider for technology solutions to environmental challenges.

In addition, our corporate Environmental Sustainability team includes multiple sub-teams and key positions that support our sustainability initiatives. These sub-teams lead cross-company work on:

- **Sustainability goals**—Leading efforts toward our operational sustainability goals covering our four focus areas: carbon, water, waste, and ecosystems.
- **Sustainability data and reporting**—Leading enterprise sustainability data measurement, governance, and reporting.
- **Sustainability product strategy**—Helping define and coordinate Microsoft cross-company sustainability product strategy.
- **Climate Innovation Fund**—Leading sustainable investments in climate innovation, new market development, and emerging climate technologies.
- **Sustainability science and innovation**—Helping ensure that the best available science and technology are used to advance action to tackle climate change, help protect ecosystems, and manage water resources. Defining and executing environmental risk and resilience models.
- **Sustainability policy**—Leading the development, alignment, and execution of public policy advocacy to advance Microsoft's carbon, energy, and sustainability goals.

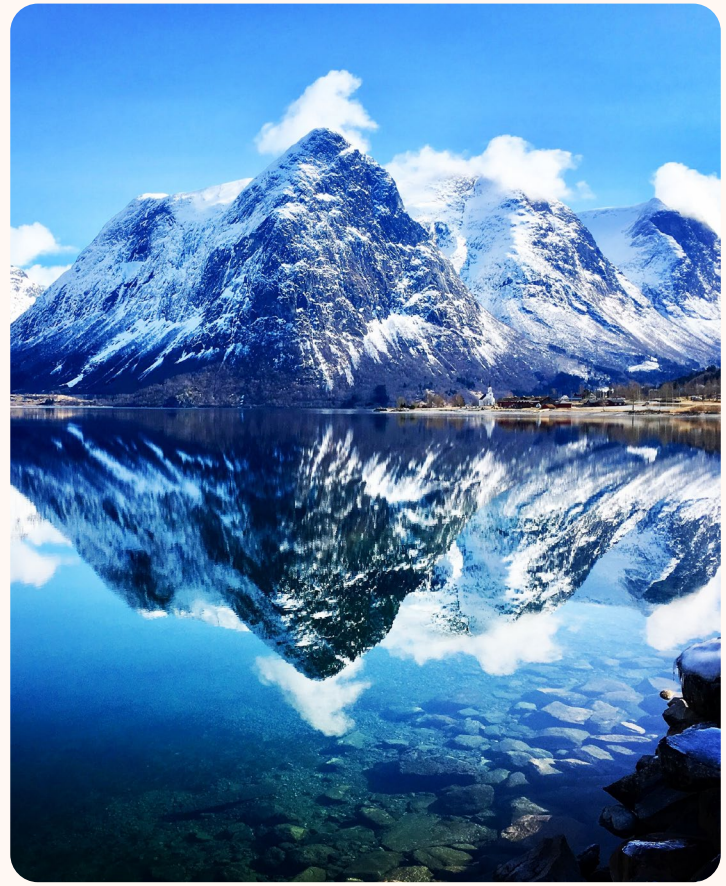
Additionally, multiple sustainability teams in business segments across the enterprise support our sustainability work.

## Compensation and incentives tied to sustainability

Several positions across the company have sustainability performance targets aligned with annual performance plans. With senior management's focus on achieving Microsoft's ambitious carbon, water, waste, and ecosystems goals, progress on sustainability is assessed as part of annual performance reviews for key leadership positions.

We also continue to look carefully at emerging investor expectations and best practices for addressing environmental, social, and governance (ESG) commitments in our executive compensation program. We have been early leaders in this practice, and we include an evaluation of execution on our sustainability goals as part of the operational assessment component of the annual cash incentive under our Executive Incentive Plan. We continue to seek feedback from investors and compensation experts as we thoughtfully consider future enhancements that connect executive compensation to Microsoft's strategic environmental and social efforts.

Within our corporate Environmental Sustainability team, our Chief Sustainability Officer role is dedicated to executing on our sustainability strategy. Business groups across our organization also have executive positions with direct incentives tied to sustainability performance. For example, the cloud supply chain team proactively engages with our cloud infrastructure supply chain throughout the complete life cycle. One objective of the cloud supply chain team is to reduce the environmental footprint of the electronic equipment (and its related packaging) used to support our cloud, which includes all scopes of greenhouse gas (GHG) emissions of our supply chain (Microsoft Scope 3 emissions). The team is also responsible for the creation of a framework for standardized sustainability metrics from the Microsoft supply chain with third-party validated data inputs and outputs. Annual compensation decisions relate to performance against key results for these objectives as part of the annual review process.



Captured by: **Therese Gule**, Industry Lead Transportation and Logistics, Norway

# Strategy

Microsoft's climate strategy is focused on understanding, mitigating, and managing the operational, legal, and reputational risks from climate change that affect our business and our ability to deliver services to our customers. Its importance is reflected in the companywide decision to make climate change one of our company's strategic priorities, with an aim by 2030 to be carbon negative and by 2050 to remove from the atmosphere an equivalent amount of all the carbon dioxide that our company has emitted either directly or by our electricity consumption since we were founded in 1975.

Water and water risk are likewise important topics for our company. Water is essential to life as well as a critical input to many businesses. As water risks intensify, we are taking a multifaceted approach to mitigate our operational risks as well as the external impacts of our water use in the communities in which we operate. In 2020, Microsoft announced that our company would be working to become water positive by 2030. For Microsoft, being water positive means that we will (1) reduce our water footprint across our direct operations, (2) replenish more water than we consume across our operations, (3) increase access to water and sanitation services, (4) scale water solutions through innovation and digitization, and (5) advocate for effective and innovative water policy. We believe that Microsoft has an important role to play in helping to address water stress[2] in the areas where we have operations by investing in projects that help improve and protect freshwater resources and affected ecosystems and support local communities.

We acknowledge that the future of ecosystems and the rich biodiversity that our planet supports are increasingly at risk from human impacts. Healthy, functioning ecosystems in turn support human populations and activities, including company operations. They are thus critical to mitigating the risks and adapting to the impacts from climate change. In our 2024 Environmental Sustainability Report, we reported that we have contracted for the legal, permanent protection of more than 15,000 acres of land (including through conservation easements and land trusts) and have exceeded our land protection target of 11,000 acres by more than 40%. We are now looking to continue that commitment and build on the good work to further protect nature.

Similarly, we recognize the urgent need to reduce waste and greenhouse gas (GHG) emissions associated with the life cycle of materials by prioritizing reduction and reuse as much as possible. As a company that manufactures devices, builds campuses and datacenters, and uses manufactured goods in our operations, we are pursuing initiatives to more responsibly design and source materials and are taking an increasingly circular approach to reach our goal of zero waste by 2030. This strategy, grounded in the prioritization of reduction and reuse, enables us to extend the life of the materials we use and reduce waste and GHG emissions as a result.

The Strategy and Risk and opportunity management sections of this report cover both climate and water. For more information on our sustainability work, including with ecosystems and waste and circularity, please see our 2024 Environmental Sustainability Report.

[2] According to the Pacific Institute, water stress refers to the ability, or lack thereof, to meet human and ecological demand for freshwater. Water stress is a more inclusive and broader concept than water scarcity; it accounts for both demand (like scarcity) and where supply is compromised from water quality impairment.

## Climate-related risks and opportunities

Microsoft primarily uses scenario analysis to identify and assess climate risks and opportunities to help determine if any could have a substantive impact on our organization. We define substantive as a financial or strategic impact that significantly affects our business strategy or our ability to deliver continuous customer services.

In our scenario analyses, we consider acute and chronic physical risks, such as those associated with temperature extremes, water stress, drought, wildfire, coastal and inland flooding, tropical cyclones, and damage from extreme weather events. We also consider a multitude of risks associated with a transition to a low-carbon economy (also known as transition risks), including current and emerging regulations and policy, market, new technology, and reputational risks. In addition to risks, we consider climate-related opportunities associated with resource efficiency (including energy, water, and materials), use of lower-emission sources of energy, and designing and developing new products and services that support the transition to a low-carbon economy. Specific areas of climate-related physical and transition risks and opportunities explored in our analyses are determined in part by the analyses' scope, boundaries, and focus.

We use the following forward-looking time horizons in our physical and transition risk and opportunity assessments and corresponding scenario analyses:

- Short term: 0–3 years
- Medium term: to 2030
- Long term: to 2050

## Background: historical assessment

In 2020, we conducted a screening scenario analysis. The analysis was a quantitative climate-related physical and transition risk and opportunity assessment of Microsoft's physical assets across the next several decades under two future representative concentration pathway (RCP) emission scenarios:[3]

1. **RCP8.5:** RCP8.5 represents a higher GHG emissions future, with increasing GHG emissions through 2100 and greater physical impacts from climate change. RCP8.5 is consistent with global warming of 4.3°C by 2100 (range 3.2–5.4°C).
2. **RCP4.5:** RCP4.5 represents a moderate emissions scenario with decreasing GHG emissions after mid-century and lesser physical impacts than RCP8.5. It is consistent with global warming of 2.4°C by 2100 (range 1.7–3.2°C).

We included approximately 400 Microsoft assets in the analysis—selected based on highest asset value and high-energy consumption. The assets included datacenters, retail stores, and offices.

The analysis evaluated climate-related risks and opportunities to help determine if any could have a substantive impact on Microsoft. The data used in this climate scenario analysis has global coverage and spans decadal time periods from present day to 2100.

In 2020, we followed this scenario analysis with a qualitative assessment of adaptive capacity at 20 of our most exposed facilities. This analysis helped us understand the initial level of adaptive capacity and climate resilience of our assets, as well as our employees and host

[3] RCP scenarios were developed for use in Intergovernmental Panel on Climate Change (IPCC) assessments. Van Vuuren, D.P., Edmonds, J., Kainuma, M., Riahi, K., Thomson, A., Hibbard, K., Hurtt, G.C., Kram, T., Krey, V., Lamarque, J.F. and Masui, T., 2011. The representative concentration pathways: an overview. *Climatic change, 109*(1), pp.5-31.

communities. We assessed several dimensions of resilience, including:

- The structural and operational integrity of our owned or operated facilities.
- The resilience of our employees, their health and safety, and their ability to work and get to work.
- The resilience and adaptive capacity of the surrounding communities that host our facilities.

The resilience of host communities is not directly in our control; however, an understanding of how communities are adapting to climate change is important to understanding our overall enterprise resilience. Any gaps in adaptation and resilience at our sites are opportunities for us to take steps to close those gaps, and any gaps in adaptation and resilience within the communities in which we operate are opportunities for us to partner with the community to protect operations, capital, and critical services and resources upon which we depend.

## Additional scenario analyses

We continue to improve and build on these assessments to increase our scope and refine our methodology and to assess bigger ranges of impact on more diverse parts of our business (see Figure 2). This has translated into a better understanding of these potential areas of risk and opportunity.

In 2022 and 2023, we conducted additional scenario analyses focused on our:

- **Operations**, including datacenters and other assets that support our cloud services (owned and leased).
- **Upstream value chain**, including key upstream suppliers who are critical to support our growing cloud services and the supporting datacenter infrastructure.
- **Downstream value chain**, including key downstream customer segments for our cloud services.

These scenarios aimed to explore:

- **Climate-related physical risks** in our own operations and in subsets of our upstream and downstream value chains. This work included evaluating climate-related hazards and how our assets and business activities may be sensitive to these hazards, considering at least one high-emissions scenario.
- **Climate-related transition risks and opportunities** in our upstream and downstream value chains, which may have implications for our direct business operations, considering at least one climate scenario in line with limiting global warming to 1.5°C with no or limited overshoot.

Across these scenario analyses, our focus is on the value chain associated with our cloud services.

### Climate-related physical risk assessments

For the physical climate-related risk analyses that we conducted in 2022 and 2023, we used the same two RCP emission scenarios (RCP8.5 and RCP4.5) that we used in the initial screening assessment to help frame and guide the analyses and assess potential future exposure to physical climate change risks.

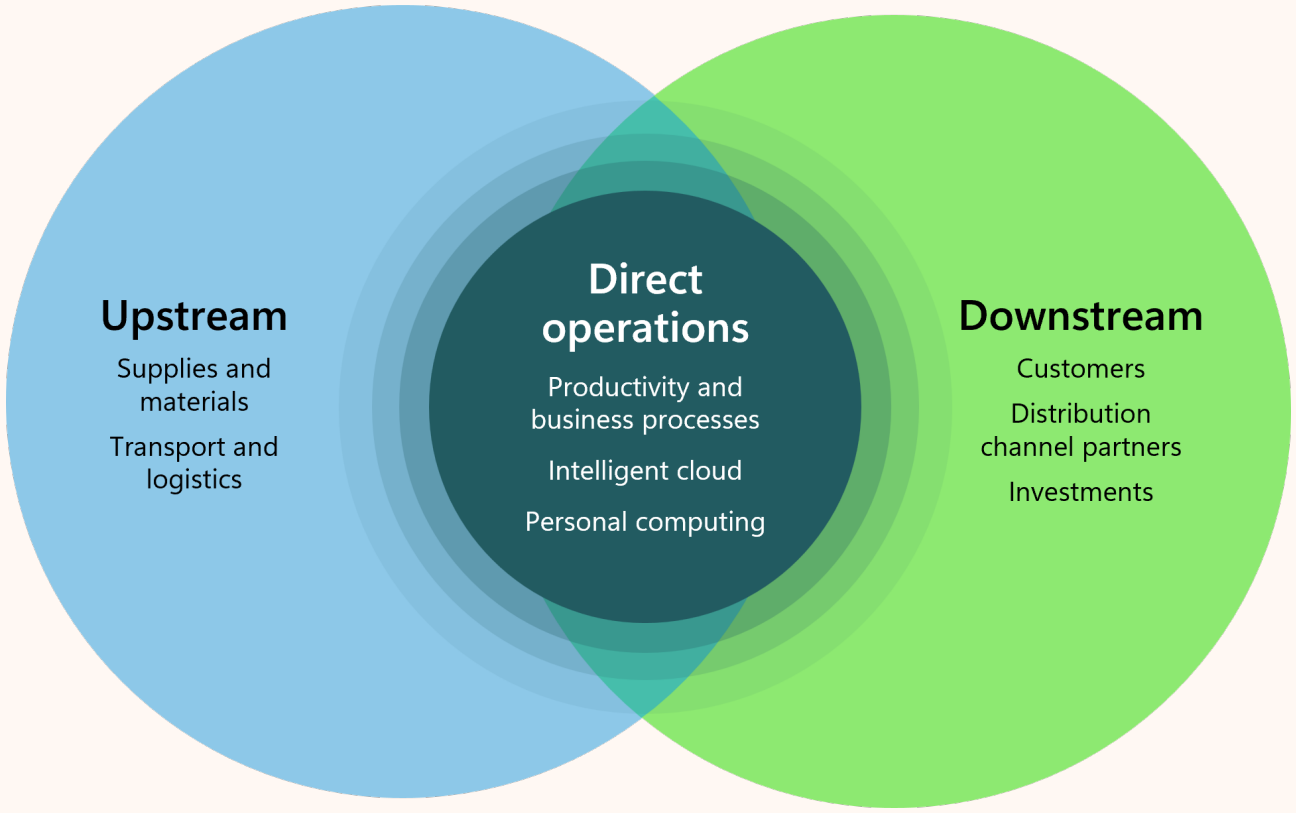



**Figure 2. Assessing climate-related risks and opportunities is a continually occurring process. Microsoft climate-related risk and opportunity assessments began with a focus on direct operations and have expanded to include upstream and downstream risks and opportunities.**

### 2022 upstream cloud services supply chain physical risk assessment

In 2022, our Microsoft cloud sourcing team launched a climate risk and resilience assessment with a select group of suppliers to evaluate climate-related physical and transition risks and opportunities. We assessed future physical climate change hazards and associated risks to our cloud sourcing supply chain to understand where and how physical climate change hazards may disrupt our direct suppliers' ability to deliver critical products and services to Microsoft.

The team identified critical cloud suppliers and conducted a quantitative physical risk assessment. The suppliers were grouped into general industry taxonomies for assessment purposes; these included semiconductor suppliers, networking hardware suppliers, and hard drive suppliers.

We evaluated both acute and chronic physical climate change hazards. We examined indicators for each hazard to evaluate the potential effect on the supplier, which could in turn disrupt the supply chain for Microsoft. For example, extreme temperature is an acute climate hazard, and the projected number of days above 95°F per year is an indicator that can be used as a proxy to evaluate the potential impact of extreme temperatures on a supplier's facilities and workforce.

Sites were evaluated for each climate indicator under the RCP4.5 and RCP8.5 scenarios across present day, 2030, and 2050 time horizons. The evaluation considered each site's potential exposure to the climate hazard, as well as its sensitivity to the climate hazard. The analysis focused on projected impact pathways on supplier employee productivity and supplier business interruption—both of which could potentially have a direct impact on the Microsoft supply chain. The model did not account for suppliers' ability to adapt to or plan for climate-related hazards.

Captured by: **Fernando Reyes-Gonzalez**, Director, Environmental Sustainability Monitoring and Disclosure, United States

Following the evaluation, we engaged the suppliers via a questionnaire to collect information about each facility's exposure and adaptive capacity. Suppliers self-reported limited, if any, historical exposure from climate hazards, and respondents indicated a varying range of adaptive capacity.

### 2023 Microsoft operational physical risk assessment

In 2023, we conducted a qualitative and quantitative analysis of physical climate-related risk exposure of approximately 1,400 assets around the world, including datacenters supporting our cloud services as well as our offices and warehouses. The exposure analysis also included network sites and fiberoptic locations in our downstream value chain. The analysis aimed to quantify projected climate change impacts on our datacenters, taking into account the unique and specific engineering specifications inherent in our datacenter designs. With the support of third-party providers, our assessment included exposure to both acute and chronic physical climate-related hazards.

For the RCP4.5 and RCP8.5 scenarios, we assessed return periods across each decade through 2050. The analysis employed climate projections from CORDEX (Coordinated Regional Downscaling Experiment) used to downscale global climate models. Additionally, given the locality-specific nature of flood risk, we used flood projections from other peer-reviewed, credible sources to validate and modify exposure analyses. We coordinated with datacenter engineers to validate the engineered impact in our datacenter infrastructure.

Of note, from the future climate projections, the analysis found that:

- Warmer and drier conditions are projected at many locations around the world.
- Precipitation projections for many locations were uncertain across models; this remains an area that may require additional analysis in the future.
- Fluvial and coastal flooding hazards may pose potential risk to a small number of locations around the world.

When assessing how our datacenter designs may perform in these future climates, we found that the design criteria of our facilities are expected to be sufficient to accommodate extreme heat and humidity conditions for the scenarios assessed.

## Climate-related transition risk and opportunity assessments

We conducted two transition risk and opportunity analyses of our cloud services in 2022 and 2023: one of our upstream value chain and one of our downstream value chain.

### 2022 upstream cloud services supply chain transition risk and opportunity assessment

In 2022, as part of our cloud services supply chain risk and resilience assessment, we performed a climate-related transition risk and opportunity analysis for a select group of critical suppliers to our cloud services. This analysis included an evaluation of future risks and opportunities stemming from our suppliers' transitions to a lower carbon economy. The suppliers represented a variety of manufacturing types—including semiconductor manufacturing, network manufacturing, and datacenter infrastructure manufacturing—that provide critical services to our cloud operations.

We used the following scenarios to help frame and guide the analysis:

- International Energy Agency (IEA) World Energy Outlook (WEO) 2021 Sustainable Development Scenario (SDS) (1.6ºC by 2100)
- IEA WEO 2021 Stated Policies (STEPS) (2.6ºC by 2100)

We developed the assessment methodology to reflect how specific risks and opportunities for our suppliers could manifest and affect our business—namely, through supply chain disruption or risk of service deterioration to Microsoft. Risks included, but were not limited to, legal and policy risks such as those from carbon pricing and other regulations, reputational risks from the use of high-carbon products, and market risks from difficulty sourcing raw materials.

### 2023 downstream cloud services customer transition risk and opportunity assessment

In 2023, we conducted a quantitative analysis of transition risks and opportunities associated with Microsoft cloud services customers and their roles within a low-carbon transition. We applied the analysis to select key Microsoft-defined customer industries. We aimed to explore transition market risks and how the various customer industries that use our cloud services may change over time under different low-carbon scenarios. We conducted the analysis at the industry level with a specific focus on sectors that may be affected by a transition to a low-carbon economy.

We used the following scenarios for this transition risk and opportunity analysis:

- Network for Greening the Financial System (NGFS) Phase III Net Zero 2050 (1.5°C climate warming/Paris aligned)
- NGFS Phase III Delayed Transition (1.6°C climate warming)

We used projections from integrated assessment models (IAMs) to estimate impacts and model uncertainty. We quantified impacts across the 2030 and 2050 time horizons for each scenario.

Our methodology focused on two different approaches to provide directional insights: one looks at sectors that may be affected by a transition to a low-carbon economy and the other focuses on sectors driven by economic change.

Data limitations and model sensitivity proved challenging during this work, but the scenario analysis provided directional insights to potential economic and market impacts. We found that IAMs can be useful, but they also have limitations that must be acknowledged. We recognize that this is an emerging area.

## Policies that support climate change mitigation and adaptation

As a global company with a robust governance structure in place, we use sustainability-related company policies and, more broadly, principles to:

- Formalize our position and establish guiding posts on relevant sustainability and other topics.
- Define an end-state goal or objective that we aim to achieve through policy alignment.
- Facilitate resource alignment in the execution of initiatives or actions in support of the policies.

As discussed fully in our Environmental Sustainability Report, Microsoft is working to become carbon negative by 2030 and by 2050 to remove from the atmosphere an equivalent amount of all the carbon dioxide that our company has emitted either directly or by our electricity consumption since we were founded in 1975. To achieve these ambitious goals, we focus on four areas:

1. Reducing direct emissions
2. Reducing value chain emissions
3. Replacing with carbon-free electricity
4. Removing the rest of our emissions

In addition, the following are examples of Microsoft policies and principles for our suppliers that support our sustainability goals, as well as good business practices.

- Microsoft Supplier Code of Conduct
- Microsoft Responsible Sourcing Requirements of Raw Materials Policy
- Microsoft Supplier Social and Environmental Accountability Manual

As we continue our journey to understand and assess our environmental, social, and governance (ESG) risks, including climate- and water-related risks, we may develop additional policies.

Captured by: **Ian O'Connor**, Senior Program Manager, Ireland

# Actions and resources that support climate-related policy and target implementation

The following table provides a summary of the actions and resources that we are dedicating to work toward our ambitious carbon negative goal, organized by our four focus areas.

**Table 1. Microsoft climate-related actions**

| Focus area | Actions |
|---|---|
| **Reducing direct emissions** | Microsoft has a significant physical presence globally, with owned and leased facilities (primarily for datacenters, offices, and research and development) covering 78 million square feet in FY23. The accompanying energy demands associated with operating these facilities, in particular for datacenters and development labs, are high. Any measures taken to improve the energy efficiency of our facilities will directly reduce our operating costs.<br><br>**Datacenters:** All datacenter lighting is high-efficiency LED with motion detection to reduce use of space light. Cooling systems are integrated with the servers, providing cooling only when the servers require it. We are investing to design more efficient datacenters, using technologies such as liquid immersion cooling. We design and build Microsoft datacenters as close to a power usage effectiveness (PUE) of 1.0 as possible (the closer the PUE is to "1", the more efficient the use of energy). In FY23, our datacenters delivered a design rating of 1.12 PUE and, with each new generation, we will strive to be even more efficient. All future new-build, owned datacenters will be LEED (Leadership in Energy and Environmental Design) Gold certified with an emphasis on water and energy conservation. An example of Microsoft's approach to reducing resource use includes two new Microsoft datacenters in Finland, which are designed to harness their heat waste and contribute it to the district heating system that provides warmth to Finland's second-largest city, Espoo, and neighboring Kauniainen.<br><br>**Campuses:** We have set out to certify our major offices to LEED Gold or Platinum. As part of the Puget Sound (Washington) campus modernization project, we are constructing 17 new buildings in varying timelines, replacing 14 of the original structures. These will be energy-smart buildings that will use Microsoft Azure for building system monitoring and optimization of energy usage. In addition, the buildings will be all-electric for all daily operations (excluding emergency power generation, which is diesel based). This includes cooking, where induction cooktops can reduce consumption by more than 500,000 kWh annually. We are pursuing Zero Carbon certification for our Silicon Valley (California) campus and Puget Sound campus modernization project with the International Living Futures Institute (ILFI). In 2012, we deployed an Energy Smart Buildings (ESB) solution. Since 2014, ESB has reduced year-over-year energy consumption and costs by 14% at our Puget Sound campus. ESB, in addition to energy optimization programs and modern workplace solutions, has enabled us to reduce our energy consumption at our Puget Sound campus by 96 million kWh since 2014, while growing our building portfolio. We are using Bonsai, a low-code AI platform that is part of the Autonomous Systems suite from Microsoft, |

| Focus area | Actions |
|---|---|
| | to improve the efficiency of our Puget Sound campus chiller plants; we have seen a 12% increase in median efficiency based on energy estimates and plan to implement Bonsai in the 12 remaining chiller plants. Additional energy conservation measures are estimated to have saved 750,000 kWh on campus.<br><br>**Vehicle fleet:** We will right size and electrify our global campus operations vehicle fleet, currently more than 1,800 vehicles, by 2030. This work encompasses vehicles that support our office locations around the world. Since announcing this target, we have spent the last year developing regionally specific implementation strategies, analyzing the vehicles, and determining the infrastructure needed to support operations. In FY24, we launched a series of pilots appropriate to each region to keep us on track to the goal. We also provide employee mobility solutions such as shuttles and buses where possible. |
| **Reducing value chain emissions** | Our cloud services team focuses on reducing cloud infrastructure emissions by collaborating with suppliers (for example, in eco-design); measuring, managing, and reducing upstream supply chain emissions; and optimizing transportation, packaging, and distribution footprints.<br><br>We are also working to reduce our carbon impact in constructing datacenters. One example of innovation in this area is a series of pilots completed in FY23 using a limestone alternative to traditional concrete. This yielded a concrete mix that met our performance requirements and achieved an estimated 65% embodied carbon reduction from conventional concrete of a similar strength.<br><br>We also drive progress through our partners, who now report embodied carbon impacts from datacenter construction and for their organizations through the Embodied Carbon in Construction Calculator (EC3) and CDP. We are working to improve the accuracy and completeness of the data that they provide and have established targets to reduce embodied carbon from their activities. Our partners continue to mature alongside us. Now, supported in part by Microsoft's engagement, several of our key critical infrastructure equipment suppliers have set carbon reduction targets for their business. The progress our suppliers make against these targets will reduce our Scope 3 emissions impact in future years.<br><br>Our device and gaming teams have roadmaps that cover the product life cycle: carbon-conscious design, reducing supply chain emissions, innovating energy-efficient hardware and software in use, and enabling product repairability, reusability, and recyclability. Initiatives include experimenting with and using lower-carbon material alternatives in products, introducing lower-carbon shipping options, and boosting the energy efficiency of our devices. As a result, for example, the new Xbox Shutdown (energy saving) mode offers up to 20 times reduction in power consumption compared with the higher power Sleep mode. Furthermore, we publish Eco-profiles, which provide information about the materials, energy efficiency, packaging, and environmental impact of our products to promote transparency and progress. Supply chain emissions reductions are achieved by increasing the amount of renewable energy used in our manufacturing supply chain. In FY23, 59 suppliers transitioned to using |

| Focus area | Actions |
|---|---|
| | renewable energy in manufacturing facilities for Microsoft, with six transitioning to 100%. These efforts contributed to 105,000 metric tons of carbon dioxide equivalent ($mtCO_2e$) in avoided emissions in FY23—roughly equivalent to the annual average energy usage of 21,000 homes.<br><br>Since 2020, our Supplier Code of Conduct has required that suppliers disclose GHG emissions and plans to reduce those emissions. To understand the full extent of our Scope 3 carbon footprint, our procurement team piloted the new ESG value chain solution in Microsoft Sustainability Manager in 2023. The team used the ESG value chain solution as its disclosure platform to successfully collect emissions from top in-scope suppliers, customizing the platform to collect more advanced, granular emissions data from suppliers.<br><br>We also identified a near-term need to support suppliers in decarbonizing their electricity consumption, especially our smaller- to medium-sized suppliers, and so partnered with climate solutions expert 3Degrees to launch Supplier REach, a renewable electricity portal. The portal assists with Microsoft supplier evaluation and procurement of high-quality carbon-free electricity options based on factors such as their geography and energy load.<br><br>And finally, through our Climate Innovation Fund (CIF), we have made investments in companies positioned to directly affect our Scope 3 emissions. For example, H2 Green Steel, a near-zero emissions steel producer in Sweden, aims to build the world's first large-scale green steel plant with a 95% reduction in carbon dioxide emissions compared with traditional steelmaking. |
| **Replacing with carbon-free electricity** | The ability of Microsoft and the technology sector to meet net-zero goals is dependent on our collective ability to procure carbon-free electricity and the decarbonization of our supply chains. Microsoft continues to build and scale carbon-free electricity through our procurement of renewable energy and investing to bring more carbon-free electricity onto the grids where we operate.<br><br>In 2023, we increased our contracted portfolio of renewable energy assets to over 19.8 gigawatts (GW) across 21 countries. We signed new power purchase agreements (PPAs) around the world, including with AES in Brazil, Constellation Energy in Virginia, Powerex in Washington, Contact Energy in New Zealand, and Lightsource bp in Poland. Microsoft is the first large commercial entity to use Powerex's wholesale 24×7 Clean Load Service for our new datacenter in Washington state. Under this agreement, Powerex will match Microsoft's hourly datacenter demand with direct deliveries of carbon-free hydro, solar, and wind power on a 24-hour, year-round basis.<br><br>Incorporating environmental justice principles into our carbon-free electricity procurement, we partnered with EKOenergy's Climate Fund to enable the installation of solar-powered refrigeration for a Kenyan fishing village; signed a 366-MW renewable energy deal in Ireland with European developer Statkraft, which includes a fund to |

| Focus area | Actions |
|---|---|
| | support local community needs; and partnered with Clearloop to expand equitable access to clean energy and help decarbonize the grid in the Mississippi Delta region, enabling a 6.6-MW project in Mississippi.<br><br>We have installed on-site renewables at select campuses as well. At our Silicon Valley campus, a solar panel system offset energy consumption by up to 8% in FY23. Our Beijing, Hyderabad, and Shanghai Zizhu campuses have offset energy consumption through similar efforts. In FY24, our hyper-efficient thermal energy center for our Puget Sound campus began operation. The facility uses geothermal wells and carbon-free electricity to heat and cool our buildings—resulting in a reduction in energy usage compared with the typical utility plant. At our LinkedIn campus in Omaha, Nebraska, we have been accessing direct renewable energy through our parking canopy solar installation since July 2022; in FY23, this solar installation project provided approximately 17% of the building's total electricity, including helping to power the all-electric kitchen. |
| **Removing the rest of our emissions** | Microsoft is planning for a portfolio of more than 5 million metric tons of carbon removal per year in 2030. We are committed to a portfolio that balances relatively proven low-durability, nature-based solutions with medium- and high-durability solutions, where low-durability options face perhaps the greatest qualitative challenges and the high-durability opportunities need the greatest scaling. In FY23, we contracted 5,015,019 metric tons of carbon removal to be retired over the next 15 years. Many of these projects entail multi-year commitments to carbon removal. Altogether we expect our contracts signed as of December 2023 to provide 875,000 metric tons of carbon removal toward our 2030 goal of greater than 5 million metric tons. For further details on our carbon removal approach and procurement, please refer to the "Advancing carbon dioxide removal (CDR)" section (p. 19) of our 2024 Environmental Sustainability Report and our 2023 white paper Microsoft Carbon Removal: Observations from Our Third Year. |

**Funding operational climate-related actions and resources**

The strategies that we are undertaking to help achieve our carbon negative goal require financial investment. Our internal carbon fee serves as the internal funding mechanism for the purchase of sustainability products including renewable energy, sustainable aviation fuel, and carbon removal. Microsoft's business groups invest additional resources to further these and other carbon reduction initiatives.

Our efforts in carbon reduction extend beyond our business operations to supporting our customers in reducing the emissions associated with their own operations. As a global technology provider, we support our customers by offering products and services that can, for example:

- **Help customers measure and manage sustainability data.** Microsoft Cloud for Sustainability helps customers to track and to manage sustainability data at scale. In 2023, we expanded Microsoft Sustainability Manager to include Scope 1, Scope 2, and all 15 categories of Scope 3 GHG emissions across organizations' operations and value chains. A new ESG value chain solution in Sustainability Manager enables customers to use surveys and customized workflows to collect from their value chain partners the detailed data about sustainability activities needed for reporting, science-based target setting, and reduction strategies.
- **Help customers analyze and report ESG performance.** In 2023, we introduced Project ESG Lake (Preview), enabling organizations to centralize and standardize data in a comprehensive ESG data estate. To help our customers track the required actions and document evidence for emerging ESG reporting and compliance initiatives, we rolled out the first of several planned new reporting templates in Microsoft Purview Compliance Manager. And for regulations coming from the European Union's Corporate Sustainability Reporting Directive (CSRD), we released the CSRD template (Preview).
- **Deliver emissions insights to customers.** Our Emissions Impact Dashboard is a tool to improve transparency into the GHG emissions generated by the use of Azure or Microsoft 365 cloud services. In addition, our Microsoft Surface Emissions Estimator enables commercial customers to gain insight into the carbon footprint of their entire Surface device fleets. We continue to work to embed Copilot in Windows 11 chat functionality into the Surface Emissions Estimator, aiming to demystify data interpretation for customers and eliminating the need for extensive knowledge in life cycle assessment or sustainability in order to understand an individual's emissions impact.
- **Deliver emissions insights to developers.** The Xbox Developer Sustainability Toolkit provides game studios with bespoke insights as to how their game code compares with genre averages for energy consumption, as well as precision insights into energy consumption, emissions consequences, and suggestions to improve game code to reduce energy costs and emissions created, for both the game studio in the development phase and their gamers when playing. In addition, we released a white paper, in partnership with UBS and WattTime through the Green Software Foundation, outlining our contributions to the open-source Carbon-Aware software development kit (SDK). The Carbon-Aware SDK tool lets developers use a web application programming interface (API) and command-line interface to assist in building carbon-aware software, enabling any organization to become carbon aware by modifying computation to take advantage of the lowest-carbon sources of energy possible.
- **Reduce daily energy consumption.** With the introduction of Energy Recommendations in Windows 11 in February 2023, we continued the work we started in 2022 to make Windows carbon aware, with a focus on empowering customers to reduce energy consumption and GHG emissions and improve battery life.
- **Optimize Azure workloads.** Microsoft developed new technical guidance and best practices to help customers and partners adopt and operate on Azure sustainably as part of the Cloud Adoption Framework.
- **Track the embodied carbon of raw building materials.** We partnered with other industry leaders to

support an open-source Azure-hosted tool called the Embodied Carbon in Construction Calculator (EC3).

- **Help customers gain sustainability skills while reducing travel-related emissions.** LinkedIn offers a learning platform with online courses and skills training available to all of its more than 1 billion members, enabling them to undertake online learning alternatives to in-person training. In addition, as of the conclusion of calendar year 2023, LinkedIn Learning offered 127 sustainability courses (43 of which are in English).

## Internal carbon pricing

In 2012, we established an internal carbon fee to fund our company's carbon neutral target. Through this fee, we charged Microsoft business groups across the company for emissions associated with their energy consumption (Scope 1 and Scope 2) and business air travel (Scope 3 Category 6). In 2019, we raised the fee to $15/mt$CO_2$e.[4] The $15/mt$CO_2$e costing was based on the cost of the carbon abatement initiatives we were undertaking.

In 2020, in support of our new goal to be carbon negative by 2030, we expanded the fee to cover each business group's full Scope 3 emissions. Besides funding Microsoft's procurement of renewable energy certificates, sustainable aviation fuel certificates, and carbon removal, the fee provides an incentive that helps promote energy efficiency and design changes that use low-carbon materials.

## Water-related risks and opportunities

Microsoft assesses water-related risks and opportunities across our business portfolio using both quantitative and qualitative scenario analyses and other risk assessment methods. The results from these analyses are assessed and validated through consultation with subject matter experts across the company and then used to inform Microsoft's formal enterprise risk assessment process facilitated by the Enterprise Risk Management (ERM) organization.

## Operational water-related risk assessments

The climate-related scenario analyses detailed earlier included specific water-related physical risks (such as water scarcity), climate-related water risks (such as sea level rise, flooding, and increasing severity of storms), and transition risks (such as reputational impacts, regulatory changes, and market changes) for our direct operations. For more information, refer to the Climate-related risks and opportunities section.

In addition, in 2020 our water management program began evaluating water risks to inform our water positive strategy, with support from the World Resources Institute (WRI). WRI's assessment considered level of water stress (using the WRI Aqueduct Water Risk Atlas version 3.0) and our operational water dependency for facilities across the globe. The assessment identified approximately 40 priority basins for our replenishment investments, as well as countries to focus on for improving access to water and sanitation services.

Water issues shift over time, as do Microsoft locations. We recognize that our approach needs to be fluid, factoring in

[4] All dollar values presented in this report are US dollars.

changing levels of water stress and operational demand. We use an ongoing water risk assessment process to validate that we have prioritized the right locations for our water replenishment strategy, and we make updates as needed. For example, we have updated our water risk assessment to reflect version 4.0 of the WRI Aqueduct Water Risk Atlas, which WRI released in August 2023.[5]

Furthermore, we have conducted detailed water risk assessments for each priority location to better understand the local context. These assessments consider the condition of the water sources that supply our assets, how water is discharged by local water utilities, and other shared water challenges related to quantity, quality, biodiversity, access to water and sanitation, water governance, and reputational risks. These assessments promote our goal of investing in locally relevant replenishment projects that offer appropriate social and environmental co-benefits.[6]

In addition, our datacenter site selection process pre-screens for a broad range of risks and includes preapproval for water supply and discharge. We meet with key local representatives to determine the likelihood of future potential issues and site viability and to support our goal that Microsoft operations are not detrimental to surrounding communities. Access to water is critical for the cooling of many of our current datacenters, but central to our cloud services design is geographic redundancy, which inherently reduces our vulnerability to water impacts (from excess water or drought). Our new datacenters are designed and optimized to support AI workloads and will consume zero water for cooling. For our offices and labs, each local operation is a relatively small contributor, and most functions are mobile.

To reduce our dependence on freshwater, particularly in high water stress regions, we use recycled or reclaimed water where available, unless potable water is required. As another example, our datacenter region in Arizona has adiabatic cooling, which uses zero water for more than half the year. Ongoing business continuity and resilience strategies, such as monitoring identified risks and implementing business continuity and resilience measures, help promote continued reliability. We vet capacity and quality with utilities and put service agreements in place prior to construction. Our effort to replenish water in high water stress regions is expected to contribute to increasing water availability in key basins.

## Supply chain water-related risk assessments

Water is an essential input to information and communications technology (ICT) manufacturing processes, particularly for the production of semiconductors, printed circuit boards (PCB), cables and connectors, and aluminum enclosures. At Microsoft, these materials are procured primarily to manufacture devices and cloud infrastructure.

We recognize that a large portion of Microsoft's water footprint lies in our supply chain, and we are working to improve our understanding of the scope and scale of water-related risks in our supply chain. One of the challenges we have faced in these initial analyses is securing local data at the basin level from indirect suppliers.

We annually request our top directly contracted hardware manufacturing suppliers to participate in the CDP Supply Chain water security program. In addition, for our directly contracted hardware manufacturing suppliers, we assess supplier performance in environmental, health and safety,

[5] Microsoft became one of the inaugural WRI Aqueduct Pro Sponsors, providing support for the most recent WRI Aqueduct tool, Aqueduct 4.0. This tool, which is free to the public and available online, helps companies, organizations, and investors across the globe understand risks, with new projections on water stress, demand, and supply.

[6] We share detailed information on our replenishment strategy and progress to date through our website and in our Water replenishment: Our learnings on the journey to water positive white paper.

and labor and ethics (EHS&LE) areas, including water management, through our supplier audit program (typically on an annual basis, though some supplier audits are biennial or triennial if their risks are low).

Over the course of the past few years, we have been engaging with some suppliers on water conservation and stewardship. For example, Microsoft provided financial support for a PCB supplier in China to achieve Alliance for Water Stewardship Standard Certification in 2023 after two years of intensive water risk identification and mitigation. As we continue to evaluate our exposure to water risks in the supply chain, we expect to be able to make better decisions that support our business operations and customers.

## Policies that support water and marine resources

Microsoft is working to become water positive by 2030. For Microsoft, being water positive means that we will:

- Reduce our water footprint across our direct operations.
- Replenish more water than we consume across our operations.
- Increase access to water and sanitation services.
- Scale water solutions through innovation and digitization.
- Advocate for effective and innovative water policy.

We recognize that reducing our water consumption alone is not sufficient to address the physical risk to watersheds in the areas in which we operate. In 2020, Microsoft co-founded the Water Resilience Coalition (WRC), an industry-driven, CEO-led coalition of the UN Global Compact's CEO Water Mandate to achieve Net Positive Water Impact (NPWI) in 150 water-stressed basins by 2050. The five pillars of our water positive goal leverage the concept of NPWI, a core ambition onto which companies must sign when joining the WRC. NPWI contributes to reducing basin-level water stress across three dimensions—availability (quantity), quality, and accessibility—where a company's contributions exceed its impacts within the same watershed. As a founding member of the WRC, Microsoft has pledged to maintain a continuous focus on measurable watershed outcomes through collaboration and collective action. Our water positive pillars provide a framework for strengthening how we manage water within Microsoft while working to improve the way the world evaluates and manages water today and for future generations.

We have committed to assessing water risk to our direct operations and supply chain annually.

## Actions and resources that support water-related policy and target implementation

The following table provides a summary of the actions and resources that we are dedicating to work toward our ambitious water positive goal, organized by our five supporting pillars.

Table 2. Microsoft water-related actions

| Focus area | Actions |
|---|---|
| **Reducing our water footprint across our direct operations** | We remain focused on reducing the water intensity of our operations by increasing efficiency, recycling, and reuse (such as procuring reclaimed water and capturing rainwater) and investing in innovation. As our datacenter business continues to grow, and we balance the need for power and water, Microsoft remains committed to reducing the intensity with which we withdraw resources, focusing on being as efficient as possible. We will continue to design and innovate to minimize water use and help break the relationship between AI growth and resource consumption.<br><br>In 2022, all owned datacenters that use water for cooling underwent an audit to assess whether operational values aligned with design expectations. Observed deviations were reviewed and corrected, which resulted in lower water use and improved water usage efficiency.<br><br>Datacenter water withdrawal and discharge are closely tracked and used to monitor our water consumption. Additionally, we are developing advanced prediction models that anticipate water consumption based on real-time weather data. Comparing anticipated and actual consumption values helps quickly identify operational inefficiencies and provides the ability for advanced troubleshooting.<br><br>Our new datacenters are designed and optimized to support AI workloads and will consume zero water for cooling. This initiative aims to further reduce our global reliance on freshwater resources as AI compute demands increase. |
| **Replenishing more water than we consume across our operations** | In 2023, Microsoft published a white paper to share our learnings as we developed our global corporate water replenishment program, including our use of the Volumetric Water Benefit Accounting (VWBA): A Method For Implementing and Valuing Water Stewardship Activities published by WRI. In FY23, we grew our water replenishment program significantly, adding rigor to our approach while nearly doubling the size of our portfolio. As of July 2023, we had invested more than $16 million in 49 replenishment projects around the world, for more than 61 million $m^3$ of potential volumetric water benefits (the equivalent volume of 24,000 Olympic size swimming pools) over the lifetime of the projects. |
| **Increasing access to water and sanitation services** | As of 2023, having invested more than $3 million to support communities in Brazil, India, Indonesia, Mexico, and Chile, we have reached our target to provide more than 1.5 million people with access to water or sanitation services. We are proud of the progress we have made, and we aim to continue our support for marginalized communities that have limited access to water and sanitation services. |

| Focus area | Actions |
|---|---|
| **Scaling water solutions through innovation and digitization** | Our Climate Innovation Fund has invested $45 million in scaling innovative water solutions, including a $25 million anchor investment in WaterEquity's Water & Climate Resilience Fund in FY23. This fund will focus exclusively on investing in municipal-level climate-resilient water and sanitation infrastructure. |
| **Advocating for effective and innovative water policy** | We recently signed on as a founding member of the WateReuse Association's Coalition for Water Recycling, a group of companies looking to support the adoption and expansion of water reuse across the United States, and we are members of Water Europe, a multistakeholder organization conducting research, analysis, and advocacy on water in the European Commission. |

Captured by: **Luis Renato de Souza**, Senior Cloud Solutions Architect, Brazil

## Internal water pricing

In FY20, Microsoft developed an internal water fee, which plays a critical role in enabling progress against our water positive goal. The fee is used to fund replenishment and access projects around the globe. It is charged to business groups based on annual water consumption projections at a rate that was determined with historical data and guidance from experts on the cost of replenishment and access projects. Our objective with the fee is to incentivize business groups across Microsoft to take steps to reduce water use and to raise internal awareness of our water positive goal. Our internal water fee continues to play a critical role in funding replenishment and access projects while providing an incentive to our business groups to reduce water use.

## Organizational resilience

As a company, we acknowledge that sustainability issues are critical issues—not just for our own operations, but also for our suppliers, our partners, our customers and, more broadly, the planet.

Climate change impacts are evident around the globe, affecting every aspect of people's lives, and will continue for decades to come. Ecosystems and communities are at risk because of changes in land use, habitat loss, invasive species, water basin degradation, and growing demand for clean, accessible water sources. At Microsoft, we strive to mitigate our impact on the environment and inspire others to as well, as evidenced by our ambitious sustainability goals.

Scenario analysis is one tool to explore the ways in which climate change may affect our business and help us understand our organizational resilience. As a global company with dynamic product and service offerings and countless stakeholders throughout our value chain, the process required to better understand our climate risks and opportunities is necessarily ever evolving and expanding. We continue to improve and build on each assessment to increase our scope and refine our methodology and to assess bigger ranges of impact on more diverse parts of our business. Exploring different facets of our organization through a climate risk lens allows for better understanding of potential areas of risk and opportunity.

We provide innovative technology solutions to our customers around the world and remain committed to advancing solutions that achieve sustainability-minded outcomes for ourselves as well as for our customers and society at large. Our ambitious sustainability goals require a full company approach. In our efforts to achieve these goals, we are ingraining sustainability not only into our business strategy, planning, and operations, but also, and more importantly, into our company culture. We believe that a carbon negative, water positive, zero waste company is a resilient company.

Captured by: **Srinivasan Venkatarajan**, Director – Global Partner Business (Data & AI), United States

# Risk and opportunity management

Risk and opportunity management is an important component to how we do business. Our companywide Enterprise Risk Management (ERM) organization facilitates the overall enterprise risk management process, in partnership with executive risk owners and with support from internal subject matter experts (SMEs). The ERM framework helps risk owners and SMEs identify, assess, and prioritize risks and, through regular reporting and discussion, support senior management and the Board with governance of risk. The Environmental Sustainability team solicits input from SMEs across the company to support this reporting.[7]

## Identifying and assessing climate- and water-related risks and opportunities

Our corporate Environmental Sustainability team, led by our Chief Sustainability Officer, identifies and assesses Microsoft's climate- and water-related physical and transition risks and opportunities across the business portfolio using quantitative and qualitative analyses. The results from these analyses can be found in the Strategy section of this report and are validated through consultation with SMEs across the company (including but not limited to datacenter, workplace, economist, and supplier teams).

The results of these risk and opportunity analyses inform a review process led by executive risk owners including our Chief Sustainability Officer, guided by the ERM framework, which identifies, assesses, and prioritizes the criticality of any potential risks to Microsoft core business functions and operations (climate- and water-related risks included). Through regular reporting and discussion (at least twice a year), the ERM organization partners with the executive risk owners to support senior management and the Board with governance of risk. The ERM risk assessment process involves categorizing risks according to their inherent impact in four categories: trust or reputational; operational scope; legal, compliance, or environmental; and enterprise value. Risks are then rated according to their inherent likelihood. These two ratings are used to produce an inherent risk score and then aggregated with a management action/control effectiveness rating for a residual risk calculation. This process determines whether any identified risks have the potential for financial, strategic, operational, or legal impact on the company. The ERM framework primarily focuses on risks looking out up to approximately three years (short term), though its analysis timeframes vary from risk to risk, scenario by scenario; with longer-range assessment data, such as is available in the sustainability risk category, the time horizon may be extended.

Business groups drive their operational risk identification and assessment processes to inform executive risk owners. For example, in our Intelligent Cloud segment, our datacenter infrastructure group has a defined process for identifying and assessing risk in the design and siting of new datacenters and during ongoing operations, including availability of water and energy. Our cloud hardware group

[7] The Strategy and Risk and opportunity management sections of this report cover both climate and water. For more information on our sustainability work, including with ecosystems and waste and circularity, please see our 2024 Environmental Sustainability Report.

identifies and manages risk related to the emissions impact of the design, sourcing, manufacturing, transportation, use, and end-of-life choices for cloud infrastructure materials and chemicals by monitoring supplier metrics against compliance standards and reduction targets through its supply chain team. In our More Personal Computing segment, we evaluate risks and opportunities as part of our process to pursue the ISO 14001 and ISO 50001 certification in the context of energy efficiency and other environmental requirements at the global, national, regional, and local level for existing and planned Microsoft-branded hardware and related devices and packaging. Microsoft subsidiaries manage their own processes based on regional and geographical factors (such as local regulations).

## Managing climate- and water-related risks

To make decisions on risk, we use our ERM risk prioritization criteria in the context of business continuity and service resilience, which include the scope of impact (for example, reputational, regulatory, and cost), potential return on investment, and time and resources required to implement changes. The Environmental Sustainability team brings leaders from across the company together to align on management decisions to mitigate, transfer, accept, or control identified risks. Microsoft also has a dedicated program to identify the baseline requirements for implementing business continuity, disaster recovery, and overall resilience at Microsoft to help strengthen our capability to prepare, recover, and perform in the event of a major or catastrophic business disruption that affects our ability to meet customer expectations.

Examples of areas of risk captured by our ERM framework include the following:[8]

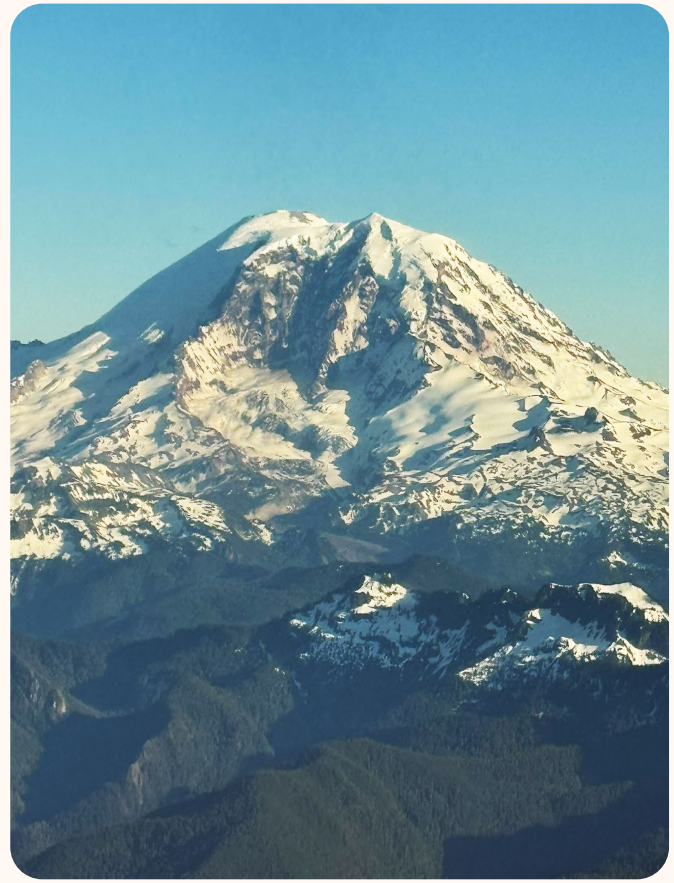
- **Policy and regulatory risks.** Our risk assessments consider the impact of current and emerging environmental policies and regulations. Emerging regulations are uncertain and vary across the geographies in which we operate and conduct business. We include them in our risk assessments because any regulation that increases business costs or imposes restrictions on how we design, operate, construct, or manufacture our datacenters, devices, or technology could affect our business. Our device and cloud teams track these developments closely. Our legal group also has global, federal, and regional policy experts that monitor upcoming regulations and engage directly with policymakers to understand the likelihood and impacts of new policies. In particular, we have an environmental sustainability policy team that monitors emerging policies and regulations and works with government affairs teams to develop geographically relevant strategies to engage with policymakers. Our product groups, marketing teams, legal teams, and corporate Environmental Sustainability team also work together to identify the appropriate green claim policies, review our methodologies and substantiation, and work to provide product information and communications that are accurate, transparent, and consistent with green claims legal guidance.
- **Technology risks.** As Microsoft is a technology company, we continually assess technology risks and opportunities. One example considered during our risk assessments is the environmental performance of Microsoft technologies and services, such as the energy efficiency of our devices and cloud infrastructure. Our aim is to develop best-in-class products and services that, generation over generation, have reduced environmental impact.

[8] The inclusion of these examples does not characterize the probability, significance, or potential substantive impact of these risks.

Another example of how we address technology risks is our commitment to invest in new technologies through our Climate Innovation Fund—thereby supporting the development of emerging sustainability-focused technologies that may offer scalability in the future. This program has allocated $761 million through 2023 to accelerate technologies that deliver carbon-free electricity, low-emissions building materials, sustainable fuels, carbon removal, and climate intelligence solutions.

- **Market risks.** Market demands are included in our risk assessments because businesses are increasingly looking to reduce their carbon footprint, including IT and operational emissions. In some cases, this demand is driven by our customers' own regulatory and compliance requirements. We need to ensure that our strategic direction can meet shifting customer preferences in the transition to a low-carbon future, including increasing demand for products with innovative sustainable features and a low-carbon footprint. For example, when considering the downstream impacts of our devices, we focus on designing for longevity and repairability to extend product lifespans, raising energy efficiency, and reducing their overall carbon footprint. We carefully evaluate the environmental performance of our products, striving to improve generation over generation.
- **Reputational risks.** Reputation amplifies enterprise risks. It is included in our risk assessments—including risks related to both our environmental impact and stewardship and the climate resilience of our services. A specific example of risk related to environmental impact and stewardship is the increasing weight given to a company's environmental performance by consumers, businesses, and institutional investors when making investment decisions. We are one of the largest technology companies in the world, and the perceived environmental impact of our products and services is heightened as a result. If our approach is not seen to be as strong or stronger than other companies, we could potentially lose business. To help foster effective transparency, we publish our annual Environmental Sustainability Report to publicly track our progress on our environmental goals. We use common global standards to report on environmental metrics, such as those from the Greenhouse Gas (GHG) Protocol and the Global Reporting Initiative (GRI) Standards. We also publish information on risks and opportunities related to environmental sustainability on a regular basis. Another example is the potential impact of our operations at the local level. For example, we support communities and help protect freshwater resources in high water stress locations where we operate datacenters by funding replenishment and water access and sanitation projects, including intentionally integrating environmental justice into our replenishment investments. We have also been incorporating environmental justice principles into our carbon-free electricity procurement. A specific example of risk related to climate resilience is the potential for damage to our reputation from any impact on the reliability of our cloud services. Microsoft has a reputation for reliable cloud services, increasingly powered by clean energy. A physical impact from climate change that compromised our reliability would be unacceptable to Microsoft and adversely affect our service reputation. Therefore, we prioritize ongoing global business continuity and resilience by monitoring and assessing risks and implementing measures to help with continued reliability.
- **Acute and chronic physical risks.** Physical risks are included in our risk assessments because, as the physical impacts of climate change become more extreme, facilities in affected areas have the potential to experience operational impacts. This could lead to increased costs (such as to repair or relocate the

facilities). To help promote the safety and reliability of our datacenters, Microsoft performs climate risk and vulnerability assessments as part of our ongoing datacenter risk process and implements risk mitigation measures. This begins with assessing all potential locations for current and future climate, environmental, and natural hazard risks prior to site selection. If risks are identified, we design and engineer our datacenters to be operated in a resilient way in the face of those risks. We also conduct an annual threat, vulnerability, and risk assessment on every operational datacenter to update the risk profile and understanding of mitigation effectiveness for each site. We prioritize ongoing global business continuity and resilience by monitoring and assessing risks, implementing business continuity measures, and using geographic redundancy to help provide continued reliability. In this way, we have adopted physical and non-physical adaptation solutions that we believe will substantially reduce the impact of climate-related hazards on our datacenters. Furthermore, acute physical risks will affect not only Microsoft but also our suppliers. A significant disruption to our supply chain could incur significant costs for our business. We assess property risks annually to value the global property insurance program. To assess our exposure to supply chain disruptions, this assessment includes supplier mapping; the risk models identify natural hazard risks for any locations of identified vendors that support Microsoft (to the extent possible given the fluid nature with which suppliers assign workloads to any of multiple available production locations) and then model their probabilities. Our procurement processes also consider supplier risks and take appropriate measures to mitigate issues related to the supply of key services and products. We prioritize a resilient and diverse supplier base by engaging with suppliers on various sustainability initiatives and defining supplier expectations in documents including, but not limited to, the Microsoft Supplier Code of Conduct, Responsible Sourcing of Raw Materials Policy, and Supplier Social and Environmental Accountability Manual.



Captured by: **Fernando Reyes-Gonzalez**, Director, Environmental Sustainability Monitoring and Disclosure, United States

## Managing climate- and water-related opportunities

Our Environmental Sustainability team brings leaders from across the company together to align on management decisions to realize opportunities.[9] Examples of areas of opportunity considered include:

- **Lower-emission sources of energy.** In the transition to a low-carbon economy, increasing our use of clean energy will help us both lower our net GHG emissions (and any associated carbon pricing costs) and meet our 100% renewable energy target. We can also help increase global renewable energy capacity and decrease market costs by supporting the creation of new energy technologies, helping bring the benefit of renewable energy to communities of all sizes.
- **Low-emission products and services.** As our customers seek to lower their own GHG emissions, we have an opportunity to support them by delivering low-emission cloud services and digital technology. For example:
  - With our cloud services, enterprises can reduce their own direct GHG emissions and take advantage of the higher efficiencies that large cloud service providers like Microsoft can achieve.
  - We're taking an increasingly circular approach to materials management, to reduce waste and GHG emissions associated with our products and services. With our devices, we've made significant investments in designing for a smaller manufacturing footprint by reducing waste, moving to more efficient manufacturing processes, and increasing the use of recycled and repurposed materials.
  - We continue to work to scale corporate clean energy purchases across our supply chain, including for our devices, and invest to help decarbonize hard-to-abate industries, including steel, concrete, and other building materials used in our datacenters. As a recent example, increased use of documented renewable energy in the supply chain resulted in a reduction of approximately 13 kg $CO_2$ equivalent in the carbon footprint of each Surface Laptop Studio 2 compared with the previous generation Surface Laptop Studio.[10]
- **More efficient buildings and car fleet.** Increasing energy and water use efficiency in our facilities will help us decrease our Scope 1 and Scope 2 emissions in support of our carbon negative goal while decreasing our water-related costs:
  - We are working to design and build Microsoft datacenters as close to a power usage effectiveness (PUE) of 1.0 as possible. In FY23, our datacenters delivered a design rating of 1.12 PUE and, with each new generation, we will strive to be even more efficient. We are also optimizing new datacenters to support AI workloads while consuming zero water for cooling. Furthermore, we are designing two new Microsoft datacenters in Finland to harness their heat waste and contribute to the district heating system that provides warmth to Finland's second-largest city, Espoo, and neighboring Kauniainen. Similarly, surplus datacenter heat from a Microsoft datacenter

[9] The inclusion of these examples does not characterize the probability, significance, or potential substantive impact of these opportunities.
[10] The overall manufacturing carbon footprint of a product is influenced by energy and other auxiliaries used in manufacturing processes, technology, and materials production. The manufacturing carbon footprint varies by product configuration (such as processor, storage, memory). This statement is solely referring to the reduction seen in global warming potential from energy use in manufacturing processes.

currently under construction in Denmark will be repurposed to heat homes

- For our campuses, we have expanded our Sustainability Standards for new construction to meet our climate goals. For example, new campus projects require the procurement of high-efficiency refrigeration systems and all-electric kitchens and mechanical systems. Project design teams must also develop a water reuse plan that outlines strategies to reduce, capture, and reuse water on the construction site. We are also investing in energy-smart buildings that will use Azure AI for building system control and optimization of energy usage at Microsoft campuses.
- We are focused on establishing the infrastructure needed to support our goal of operating a 100% electric fleet by 2030. For example, we are constructing an Electric Vehicle Fleet Facility that will house, charge, and maintain our electric commute fleet of the future at our Redmond (Washington) headquarters.

→ **Access to new and emerging markets.** As our customers increasingly need to record, report, and reduce their environmental footprints, we have an opportunity to develop new solutions that could quantifiably help them do this. We are focused on offering customers products and services that help them with their sustainability programs, including climate and water sustainability reporting and disclosure tools. For example, we are creating tools to better measure and manage environmental data through Microsoft Cloud for Sustainability. For more information on the sustainability products and services we are developing and delivering for customers, please see the Actions and resources that support climate-related policy and target implementation section. We're also focused on enabling organizations to develop AI computing resources that help people, organizations, and governments anticipate, predict, and manage climate change impacts. For example, the Planetary Computer enables people to use cloud and AI technology to access data, create high-resolution maps, and inform data-driven decision making.

→ **Climate resilience.** We have an opportunity to deliver technology and services that are resilient to the physical impacts of climate change and that are lower carbon than competitor options. To help provide continued reliability, we prioritize ongoing global business continuity by monitoring and assessing risks, implementing business continuity measures, and using geographic redundancy. We are also helping develop global climate resilience with AI. AI can be used to help better understand risks and inform the response to disasters when they strike, by improving early warnings, mapping population and risk, and helping guide disaster response. For example, Microsoft AI for Good Lab is researching the use of new AI models and methods in supporting first responders during the immediate aftermath of natural disasters.

# Metrics and targets

We measure a variety of sustainability-related metrics that inform our environmental sustainability and overall business strategies. We have set ambitious goals for our four core sustainability focus areas—carbon, water, waste, and ecosystems—to monitor efficiencies in our operations and value chain. See Table 3 for a summary of these goals and the supporting targets (note that this list extends beyond the climate and water focus of this report). A comprehensive account of our environmental metrics and progress on achieving these targets is disclosed annually in our Environmental Sustainability Report and in our CDP responses. Please refer to those resources for details.

**Table 3. Microsoft environmental sustainability goals and targets**

| Topic | Goal | Targets |
|---|---|---|
| **Carbon** | Carbon negative by 2030 | By 2025, reduce our Scope 1 and 2 emissions to near zero.<br>By 2030, reduce our Scope 3 emissions by more than half from a 2020 baseline.<br>By 2025, cover 100% of our electricity consumption with direct renewable energy.<br>By 2030, remove more carbon than our company emits.<br>By 2050, remove from the atmosphere an equivalent amount of all the carbon dioxide our company has emitted either directly or by our electricity consumption since we were founded in 1975. |
| **Water** | Water positive by 2030 | By 2030, replenish more water than we consume across our global operations, with a focus on water-stressed regions where we work.<br>By 2030, provide 1.5 million people with access to clean water and sanitation services. |

| Topic | Goal | Targets |
|---|---|---|
| **Waste** | Zero waste by 2030 | By 2030, achieve 90% diversion of operational waste at owned datacenters and campuses.<br>By 2030, achieve 75% diversion of waste for all construction and demolition projects.<br>By 2025, reuse and recycle 90% of servers and components for all cloud hardware with support from our Circular Centers.<br>By 2025, eliminate single-use plastics in all Microsoft primary product and cloud packaging.<br>By 2030, design Surface devices, Xbox products and accessories, and all Microsoft product packaging to be 100% recyclable in OECD countries. |
| **Ecosystems** | Protect more land than we use by 2025 | By 2025, take responsibility for the ecosystem impacts of our direct operations by protecting more land than we use. |

**Sustainability investments**

Through the Climate Innovation Fund, Microsoft is investing $1 billion to accelerate technology development and deployment of new climate innovations through equity and debt capital.

## Important notes about this report

This report includes estimates, projections, and other "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, section 27A of the Securities Act of 1933, and section 21E of the Securities Exchange Act of 1934. These forward-looking statements generally are identified by the words "believe," "project," "expect," "anticipate," "estimate," "intend," "strategy," "future," "opportunity," "plan," "may," "should," "will," "would," "will be," "will continue," "will likely result," "target," "efforts," "goal," "commitment," "committed to," and similar expressions. Forward-looking statements are based on current expectations and assumptions that are subject to risks and uncertainties that may cause actual results to differ materially. We describe risks and uncertainties that could cause actual results and events to differ materially in our reports filed with the Securities and Exchange Commission, though there may be other unknown or unexpected risks that may also impact these results. We undertake no obligation to update or revise publicly any forward-looking statements, whether because of new information, future events, or otherwise.

As discussed earlier in this report, our environmental, social, and governance (ESG) reporting describes the topics we consider to be the most important to stakeholders when evaluating ESG issues at Microsoft. Therefore, ESG materiality in our reporting does not directly correspond to the concept of materiality used in securities law. Given the long timelines and uncertainty involved with these issues, materiality can be inherently hard to predict in advance. Additionally, certain information in this report relies on assumptions and projections of various scenarios that may not be representative of actual current or future risks.

As information and expectations on ESG matters continue to develop, our methodologies (including for the collection and interpretation of ESG data) may change in ways that impact our ESG strategy and goals. For example, our ESG priorities and reporting may evolve as a result of changes to frameworks and standards, data availability and quality, governmental or business policies, or other matters, which may not necessarily be in our control. Moreover, while we reference certain third-party standards and frameworks, we cannot guarantee, and any language of "alignment" or similar should not be taken to mean, strict adherence to any particular interpretation thereof.

Captured by: **Peter Treanor**, Financial Operations Engagement Manager, Ireland



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