

Climate Risk Assessment FY23



Jacobs

Challenging today.
Reinventing tomorrow.



At Jacobs, we're **challenging today to reinvent tomorrow** by solving the world's most critical problems for thriving cities, resilient environments, mission-critical outcomes, operational advancement, scientific discovery and cutting-edge manufacturing, turning abstract ideas into realities that **transform the world for good**.

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1. Introduction

1.1 FY22-24 Boldly Moving Forward

As a purpose-led company, we know we have a pivotal role to play in addressing the climate emergency. While this may be viewed as good business, we consider it our duty to channel our technology-enabled expertise and capabilities toward benefiting people and the planet as we work to create a more connected, sustainable world.

With this sense of urgency top of mind, along with increased interest and concern from all our stakeholders – employees, Board members, clients, investors, partners and suppliers, and communities we impact – Jacobs has elevated Climate Response as one of three core accelerators within our fiscal year [2022 to 2024 Company Strategy](#) – aligning positive societal, economic and environmental impact with long-term business growth.

1.2 Climate Action Plan

Our [Climate Action Plan](#) lays out our current phase of climate mitigation and adaptation commitments, which build on the progress we have made since the release of our initial plan in 2020 on the 50th Anniversary of Earth Day. As of the end of FY22, we have reduced our total Scope 1, Scope 2 and Scope 3 market-based carbon emissions by 61% from our base year of FY19. We continue to procure 100% low-carbon electricity for our operations and maintain carbon neutrality status for our operations and business travel.

We are proud to be the first consultancy and one of the world's first companies with a corporate net-zero target approved by the Science Based Targets initiative.

1.3 FY21 & FY22 Update

Climate risk disclosures and the recommendations of the Taskforce on Climate-related Financial Disclosures (TCFD) are rapidly becoming part of business mainstream and are being incorporated into legislation and regulatory frameworks around the world. In the UK, for example, from April 2022 certain large businesses are required by law to publish a climate-related financial disclosure with similar legislation in force in New Zealand. The new climate-related disclosure rules proposed by the U.S. Securities & Exchange Commission (SEC) suggests the United States is likely to follow. The recommended disclosures put forward by the TCFD also provide a foundation for climate disclosures that are required by the European Union (EU) Taxonomy and Corporate Sustainability Reporting Directive (CSRD).

Jacobs has undertaken climate risk reporting since 2020. Our inaugural FY20 report was a qualitative assessment that allowed us to explore the process and align ourselves with the TCFD reporting framework.

Our [FY21 report](#) went a step further and assessed our main climate-related risks and opportunities across all sectors and lines of business. Within each sector, we estimated the broad financial value of material climate impacts we could experience by 2050 under two different climate scenarios.

To further manage climate risks, position Jacobs for current and future sector opportunities and strengthen the climate resilience of ours and our clients' businesses, our [FY22 Climate Risk Assessment](#) focused on planning to adapt to climate change within our Water sector. We considered physical and transitional risks and opportunities in the sector, which we identified as having the greatest net financial opportunity of all Jacobs' sectors in our FY21 Climate Risk Assessment.

Our approach to this FY23 climate risk assessment is consistent with the approach we took for the FY22 report: it is structured around the TCFD recommendations and applies Intergovernmental Panel on Climate Change (IPCC) and Network for Greening the Financial System (NGFS) scenarios as lenses through which we can better understand our main physical and transitional climate-related risks and opportunities.

1.4 Our FY23 Climate Risk Assessment

Our FY23 Climate Risk Assessment follows the recommended disclosure framework put forward by the TCFD, and is a further step in our work to implement key commitments in our Climate Action Plan, which are:

1. Integrate climate risk analysis into company strategy and planning
2. Deploy climate risk assessment technology on pursuits and projects where climate risk is considered material
3. Support our clients and major suppliers to undertake their own climate risk assessments, in line with TCFD recommendations
4. Integrate by 2025 climate risk and adaptation considerations into each of our market sector strategies

This year we have extended our FY22 approach for the Water sector to undertake sectoral climate risk analyses for our Aviation, Rail & Transit, Ports & Maritime and Health sectors.



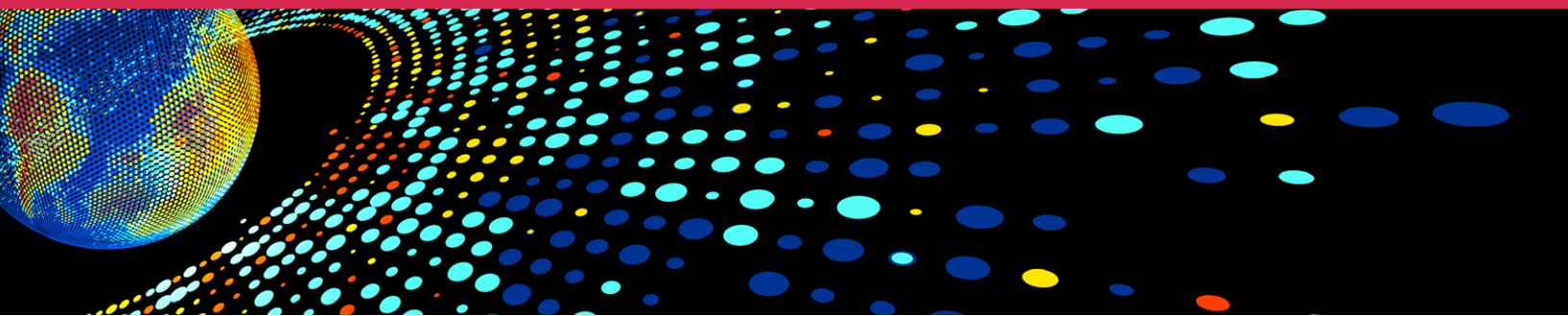
Our FY22-24 company strategy, the introduction of Climate Response as one of three key accelerators for growth, and our updated **Climate Action Plan** show how we are integrating climate risk into company strategy and planning.



Our **Climate Risk Manager** tool provides teams with a digital solution to understand the immediate and long-term impacts of physical climate change at asset and portfolio level, anywhere in the world. We have used this technology as outlined in our FY21 climate risk disclosure to map the physical risks from climate change to our global asset portfolio.



We are taking proactive steps to support clients around the world with undertaking their own climate risk disclosures; and building business resilience against the threat of climate change.



2. Global Context

2.1 Taskforce on Climate-related Financial Disclosures (TCFD)

The TCFD was formed in 2017 by the G20's Financial Stability Board (FSB) to improve and increase reporting of climate-related information and bring climate risk reporting into the business mainstream.

Since the release of their recommendations report in 2017, the TCFD has published an annual status report on the success, adoption and significance of the recommendations and reasons why it is increasingly important for businesses to understand, manage and disclose their climate-related risks and opportunities. The 2022 status report indicated that the percentage of companies reporting against TCFD recommendations continues to increase, as does the level of disclosure across all global regions. The report also noted that *"90% of investors and other users incorporate climate-related financial disclosures in financial decision-making, and 66% of these indicated such disclosures factor into the way they price financial assets"*¹.

2.2 Corporate ESG Disclosures

TCFD disclosures are fast becoming a foundational element of Environmental, Social and Governance (ESG) transparency. For example, the CDP climate disclosure – a globally-significant framework used by companies, investors and clients for the disclosure and benchmarking of environmental impacts – is now closely aligned to the recommendations of the TCFD, and the EU CSRD and the reporting standards required therein also draw and build on TCFD recommended disclosures. The new climate-related disclosure rules proposed by the SEC are likely to be in effect prior to 2024 and draw directly on the recommendations of the TCFD. Companies that have been implementing TCFD-aligned reporting are thus well-positioned for the global regulatory shift in corporate sustainability reporting that is already underway.

The TCFD recommended disclosures are as follows.

Governance	Strategy	Risk Management	Metrics and Targets
Disclose the organization's governance around climate-related risks and opportunities.	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.	Disclose how the organization identifies, assesses and manages climate-related risks.	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.
Recommended Disclosures			
A Describe the board's oversight of climate-related risks and opportunities.	A Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	A Describe the organization's processes for identifying and assessing climate-related risks.	A Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.
B Describe management's role in assessing and managing climate-related risks and opportunities.	B Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	B Describe the organization's processes for managing climate-related risks.	B Disclose Scope 1, Scope 2, and if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
	C Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2oC or lower scenario.	C Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.	C Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

Reproduced from Recommendations of the Task Force on Climate-related Financial Disclosures.

¹TCFD 2022 Status Report, Table ES1

2.3 Climate Risk, Adaptation and Resilience

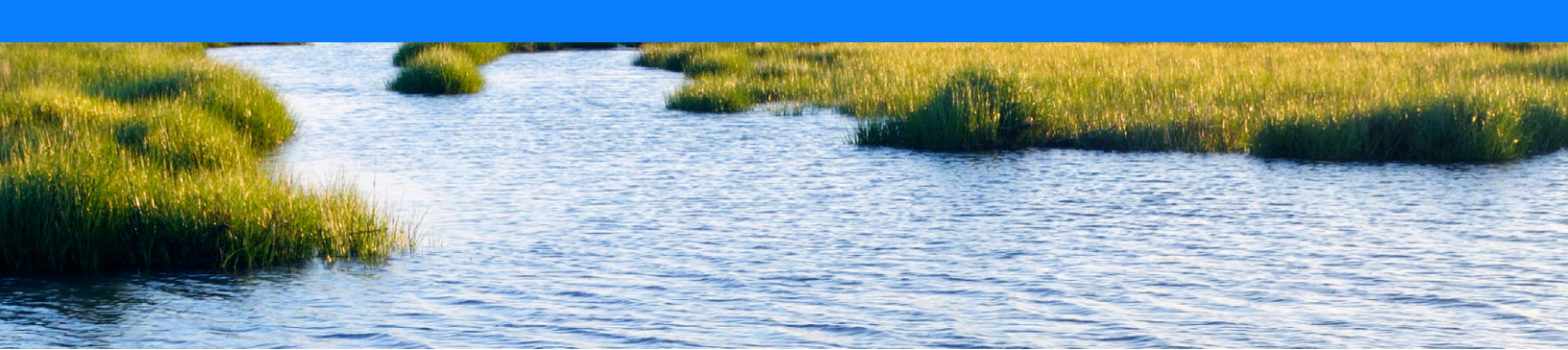
The importance of mitigating and adapting to the impacts of climate change is greater now than it has ever been. The IPCC published its Sixth Assessment Report (AR6) from 2021, with a series of reports covering the findings of its three Working Groups on (I) physical science, (II) adaptation, impacts and vulnerability, and (III) mitigation. The AR6 Synthesis Report was released in 2023. Among other things, the Synthesis Report emphasized that:

- Human influence on the climate system and human causation of climate change are “unequivocal”.
- Global surface temperatures will continue to increase under all emissions scenarios considered, and global warming of 2°C will be exceeded during the 21st century unless deep reductions in greenhouse gas emissions occur in the coming decades. The Paris Agreement target to limit global warming to 1.5°C will more likely than not be exceeded, even under the most ambitious of the emissions reduction scenarios considered.
- With further global warming, every region is projected to experience concurrent and multiple changes in climatic impact-drivers.
- The window of opportunity to secure a livable and sustainable future for all is closing rapidly and there is a need for urgent action on climate resilient development that incorporates change mitigation and adaptation.

These points underpin the need to understand climate-related risks and opportunities across the globe. The TCFD recommendations provide a clear framework for how businesses can frame, manage and integrate climate risks into their everyday operations and reporting. By applying a sector-level approach, we are taking steps to understand how climate change will impact our clients and hence our business across the many sectors and geographies in which we operate.



The importance of mitigating and adapting to the impacts of climate change is greater now than it has ever been.



3. Climate Change and Our Sectors

We recognize that our global sectors and clients face significant challenges as societies transition towards net-zero emissions and the physical implications of climate change are increasingly expressed. We are committed to helping our clients across the globe decarbonize their infrastructure and operations, and to integrate climate resilience across our value chain.

3.1 Water

Water is one natural resource we all share – it shapes our lives, our communities, and our natural environment. Managing this essential resource has never been more complicated than it is today. Water utilities and stewards are facing unprecedented challenges, including impacts from climate change, as they work to provide critical water services and protect their communities and the environment.

Jacobs is a [global leader](#) in the provision of solutions in the Water sector, with decades of experience and multi-domain expertise spanning water and wastewater treatment, resources management, conveyance, storage, digital water solutions, and at the intersection of Water and other sectors such as Energy and Environment. We understand that water challenges are complex and interconnected, and that traditional ways of managing the water cycle in silos cannot keep pace with challenges, including climate change, that all our communities face. Jacobs' approach to addressing water management challenges is through a OneWater lens – viewing all water as a resource and developing integrated, holistic solutions that provide comprehensive benefits. Through OneWater, we recognize water's role in the natural cycles of our planet; its connections to land, food, and energy; and perhaps most importantly, its influence on our cities, our societies, and our cultures. We use this perspective to help our clients implement integrated solutions to solve the most pressing water management challenges. Our Water sector solutions directly support various United Nations Sustainable Development Goals (U.N. SDGs), such as SDG 6 (Clean Water and Sanitation), 11 (Sustainable Cities and Communities), 12 (Responsible Consumption and Production) and 14 (Life Below Water).

The IPCC's AR6, The Physical Science Basis for Climate Change, highlighted the pressures on the global water cycle from growing population, unsustainable use, pollution and climate change. Water scarcity, food insecurities, and flooding are placing human settlements and millions of people around the world at risk. Reflecting the seriousness of the challenges the Water sector faces, the IPCC's report on Impacts, Adaptation and Vulnerability found that since 2014, 60% of documented climate adaptation responses responded to water-related hazards such as flooding, drought and rainfall variability. Jacobs' OneWater approach, supported by our industry-leading capabilities across the entire water cycle and project lifecycle – from planning and consulting to alternative delivery, and operations – is well positioned to continue to provide impactful solutions under different climate change scenarios. For more detail on Jacobs' activities in the Water sector, see our [FY22 Climate Risk Assessment](#) and Water Solutions [webpage](#).





3.2 Aviation

With over 40 years of experience providing airport planning, architecture, engineering, program and construction management, consulting, and specialty services, Jacobs has become one of the world's [leading providers](#) of comprehensive aviation services (illustrated in Figure 3-1). We strive to align our Aviation sector solutions with the U.N. SDGs, such as SDG 9 (Industry, Innovation and Infrastructure) and SDG 11 (Sustainable Cities and Communities). We have held contracts on more than 500 airport projects, and been responsible for the successful delivery of 20 major aviation programs, totaling almost \$40 billion USD in the past 20 years. Ground and aerial aviation operations are currently highly reliant on fossil fuels. The IPCC estimates that in 2019 aviation directly and indirectly accounted for about 1.8% of global emissions and about 12% of direct transport emissions. While aviation emissions grew by over 3% annually in the decade to 2019, the sector is increasingly focused on reducing emissions across Scopes 1, 2 and 3 across ground and aerial operations.

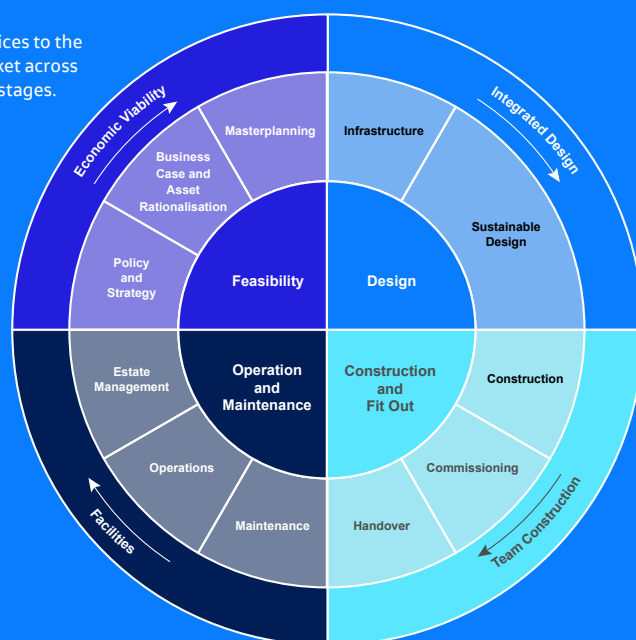
Aircraft emissions may also create contrails (human-made clouds) under some atmospheric conditions. These can trap heat radiating from the earth's surface contributing further to climate change.

The reductions in global greenhouse gas emissions required to achieve Paris Agreement climate change goals will necessitate significant changes in aviation. These may be in both the patterns of use of air transport, and the technologies and fuels used to power aviation. While decarbonization technologies for aviation are emerging, considerable research and development is still required before fossil fuels can be replaced and the contribution of contrails to climate change can be understood or measured.

Aviation operations and infrastructure may also be affected by physical impacts associated with climate change. At high temperatures, which will become more common with climate change, the lift available to aircraft is reduced and flight schedules and operations may be increasingly disrupted at some locations. Airport infrastructure and operations may be also disrupted due to the effects of atmospheric warming on storms and extreme rainfall events and associated wind damage and/or stormwater and riverine flooding. As sea levels rise, coastal airports may be increasingly subject to flooding during storm surge events or from elevated groundwater tables. As a leading Aviation solutions provider and in recognition of these challenges, we have significant potential to influence positively impactful solutions through the work we deliver for our clients.



Figure 3-1
Jacobs delivers services to the global Aviation market across all project life cycle stages.





3.3 Rail & Transit

Rail has long been the backbone of many societies, connecting people and places, moving goods, creating opportunities and catalyzing growth and development. As a globally recognized [leader](#) in the safe and efficient delivery of rail and transit solutions that cover the whole rail lifecycle, our rail and transit professionals provide holistic and integrated rail solutions that help clients plan, develop, finance, design, construct, operate and maintain transit infrastructure that connects people, communities and business. Our Rail & Transit market covers high-speed and conventional passenger rail, freight and logistics and mass/public transit.

Many of our Rail & Transit sector solutions are strongly aligned with the U.N. SDGs, such as SDG 11 (Sustainable Cities and Communities), SDG 9 (Industry, Innovation and Infrastructure) and SDG 13 (Climate Action). The rail and transit industry faces new challenges and opportunities to decarbonize and respond to the physical risks of climate change. Many rail routes and operations are not electrified and hence remain reliant on fossil fuels. The IPCC estimated that these operations account for 1% of direct transport emissions. Even where electrification has taken place and there are no direct emissions from fossil fuel use, rail and transit operations will remain a significant source of greenhouse gas emissions until grid electricity is renewably sourced.



Many of our Rail & Transit sector solutions are strongly aligned with the UN SDGs.

The reductions in global greenhouse gas emissions required to achieve the Paris Agreement will necessitate significant electrification and development of new technologies to support decarbonized fuel sources for rail and transit operations. There will be significant capital required to fund the necessary changes, and technology is still emerging.

Rail and transit operations and planning may also be affected by changing passenger/freight behaviors in response to physical climate risk. More extreme temperatures, flooding and sea level rise linked to climate change may also damage infrastructure and disrupt passenger and freight services. Rail and transit are also exposed to a variety of transitional risks, associated with changed access to capital, variable political responses to the low-carbon transition and potential changes in the locations and destinations of passengers and freight.

3.4 Ports & Maritime

Jacobs provides value-add consulting, planning, and engineering services to clients in the Ports & Maritime industry. With our ports legacy spanning back more than 150 years, Jacobs provides [specialist solutions](#) for clients across key Ports & Maritime market segments.



Jacobs has formed long-term, trusted relationships with Ports & Maritime clients around the world, including port authorities, government agencies, private developers, and cruise operators. Our more than 650 Ports & Maritime professionals are committed to using their knowledge and experience to provide clients with local solutions that help them achieve their missions and deliver results that meet or exceed the expectations of their stakeholders. We strive to deliver our Ports & Maritime sector solutions in alignment with the U.N. SDGs, such as SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action) and SDG 14 (Life Below Water). The International Maritime Organization (IMO), the EU, the U.K., and the U.S. are among the entities implementing policy and regulatory initiatives to reduce greenhouse gas emissions from shipping and maritime transport, which according to the IPCC, accounts for about 11% of direct emissions from transport globally. These initiatives include reducing carbon intensity of transport work, setting limits on greenhouse gas emission from shipping fuels, including international shipping and aviation in national carbon budgets, and investing in zero-emissions port equipment and technology.

The Ports & Maritime industry faces significant challenges related to climate change impacts, including coastal and inland flooding, sea-level rise, excessive heat, changing climate conditions at sea, and storm activity. These impacts can damage port assets and infrastructure and increase the frequency of and expenditure in repairs and maintenance. This may, in turn, affect workforce productivity, health, and safety and disrupt port and trade operations.

As the industry works to reduce its contribution to climate change and adapt to its impacts, transitional issues can include electrification of cargo handling port equipment, cranes, drayage and vehicles, provision and use of alternative fuels and associated infrastructure for shipping, skills and workforce changes, interoperability issues between ports and vessels, changing trade and cargo patterns, and adapting to impacts from a changing investment and insurance landscape.



Key sector segments for Jacobs' Ports & Maritime business

- Containers
- Energy
- Dry Bulk Break Bulk Ro/Ro and General Cargo
- Cruise & Ferry
- Shipyards
- Coastal Infrastructure
- Asset Management & Evaluation
- Military & Defense
- Urban Waterfront & Marinas
- Intermodal Rail



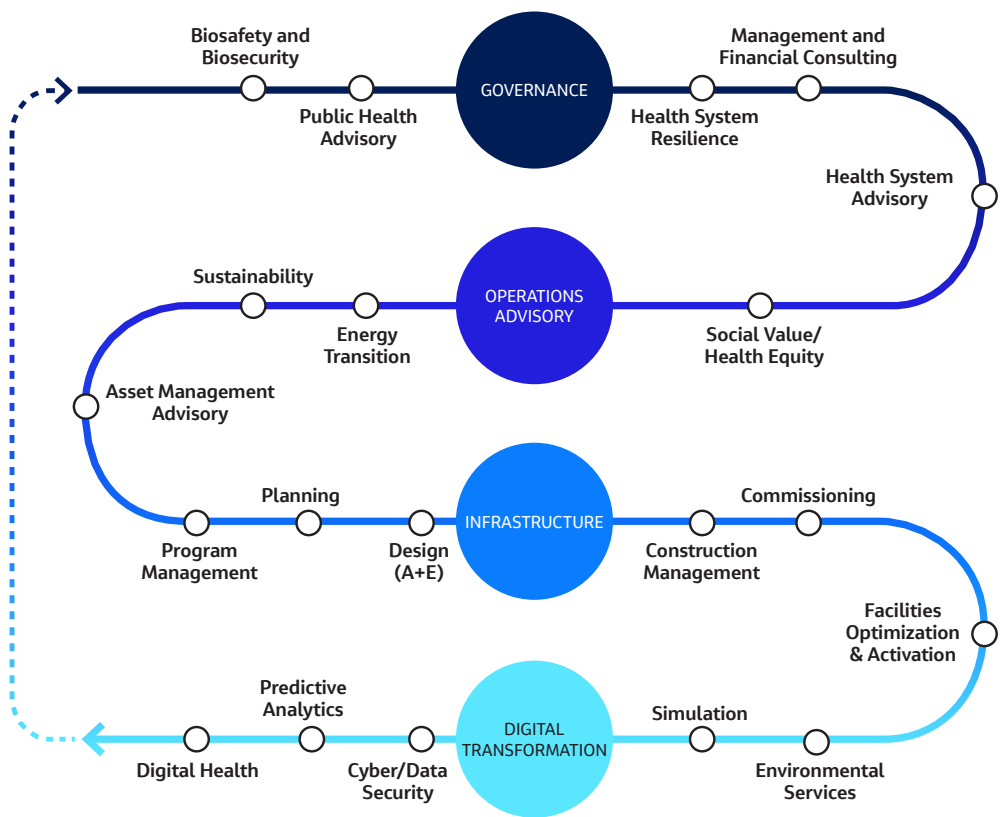
3.5 Health

Jacobs' [Health & Life Sciences](#) sector comprises a range of industries from healthcare equipment and supplies, patient care and services, research and education, national and local governments, biosafety and security, technologies, biotech, life science and pharmaceuticals. The emphasis of this report is on Health: infrastructure, systems governance, and operations. Our FY24 Climate Risk Assessment Report will expand the focus to include the Life Sciences aspects of this sector more fully.

Jacobs provides end-to-end Health sector solutions for complex challenges to create and enable well-functioning and thriving health systems, contributing to societal and economic wellbeing (illustrated by Figure 3). Our diverse, interdisciplinary team specializes in connecting people and systems to advance and amplify impact with a deep understanding of the complex nuances of the health market. Trusted by top-tier health clients around the world, we bring relevant, regional solutions that will help transform health systems to become more effective and resilient. Our Health sector solutions are strongly aligned with the U.N. SDGs, and in particular SDG 3 (Good Health and Well-being), SDG 9 (Industry, Innovation and Infrastructure), SDG 10 (Reduced Inequalities) and SDG 11 (Sustainable Cities & Communities).

Jacobs has deep subject matter expertise across diverse scientific, infrastructure, environmental and digital domains in biopharmaceutical research, health system governance, health infrastructure, and business advisory. We have delivered over 100 projects in the Health sector, representing >\$45 billion USD in construction costs. Our advisory work has achieved over \$1 billion USD in savings since 2005 due to clinical operational efficiencies, energy optimization, facility operating improvements, and construction costs reductions.

Figure 3-3
Providing end-to-end solutions throughout the entire health delivery system



- **Health system governance** – We advise governments, healthcare agencies and organizations on creating and implementing new pathways for effective decision-making, resource management and operational environments. We focus on system structure, policy frameworks, oversight mechanisms, financial models, healthcare coalitions and accountability.
- **Health operations business advisory** – We advise healthcare executives, service providers and corporate partners on pathways to remain people-centered, while making services accessible, affordable and integrated. We provide strategic operational and digital advisory implementation support to improve quality of care, optimize service delivery and enhance the safety of patients and healthcare workers.
- **Health infrastructure** – We serve health system operators and providers, academic medical centers and research institutions and the world's leading biopharmaceutical companies across the full asset lifecycle from funding, planning, design and procurement to construction, asset-management, commissioning and operations and maintenance. We deliver innovative facilities that operate sustainably and enhance economic, social and environmental outcomes.



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4. Our Approach for FY23

4.1 Overview



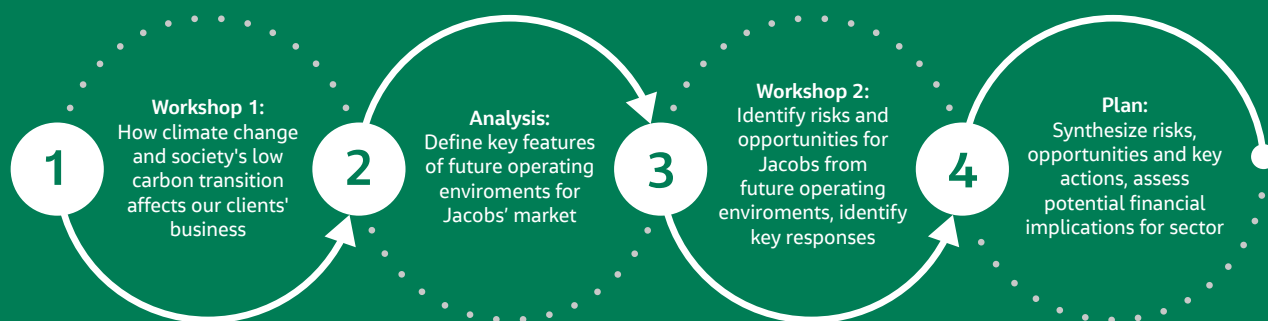
We are learning by actively framing and managing material climate risks and opportunities across each of our sectors.

Our TCFD-aligned approach to understanding climate-related business risks and opportunities continues to evolve. We are learning by actively framing and managing material climate risks and opportunities across each of our sectors. In our current, sector-led approach, we engaged global and regional sector leads in a series of structured workshop activities (illustrated by Figure 4-1) to explore:

- How climate change and society's low-carbon transition may affect their sector
- What material risks and opportunities this presents to our clients
- How climate change impacts on our clients may affect Jacobs' business
- How Jacobs should respond to mitigate key risks and take full advantage of the opportunities presented

We applied this approach to our Water sector in FY22 and to our Aviation, Rail & Transit, Ports and Maritime, and Health sectors in FY23.

Figure 4-1
Our climate change workshop approach is effective in facilitating "deep dives" into climate risks and opportunities for our sectors



4.2 Scenario Analysis

Since FY21, we have applied climate change scenario analyses to define features of the future operating environment for our sectors, assess the risks and opportunities this presents for Jacobs, and refine aspects of our sector strategies. Our scenario analyses have been informed by quantitative analysis in IPCC climate change projections and the qualitative NGFS scenario framework (illustrated by Figure 4-2).

The NGFS⁴ framework provides a set of harmonized transition pathways that define policy, regulation, and action around the decarbonization transition and resultant changes to global climate. It is applicable across all sectors. Through our actions, example and advocacy, Jacobs seeks to bring about the orderly transition scenario (as shown by Figure 4-2).

We have adapted NGFS narratives to consider climate-related risks and opportunities for each of our sectors described in this report. We have only included three of the NGFS scenarios in our assessment, as follows:

- **Orderly transition** – lower physical risks and moderated transition risks. This pathway assumes that global climate action begins quickly and escalates in a steady but consistent manner, with relatively little variation across Jacobs’ regions. The comprehensiveness and consistency of global climate action moderates transition risks. While there is a high chance that dangerous human interference in the climate system is avoided, growing climate change physical effects are experienced.
- **Disorderly transition** – lower physical risks but higher transition risks. This pathway amplifies transition risk because actions to reduce emissions are delayed, piecemeal, abrupt and/or geographically differentiated. This could result in large variations in sector drivers for climate action and legislative and policy frameworks across our global regions. Despite the disorderly transition, global emissions are reduced to net-zero by 2050 and the worst physical impacts of climate change are avoided. Nonetheless, physical impacts from climate change are greater than under a rapid, orderly transition.
- **Hot house world** – higher physical risks but lower transition risks. This pathway assumes some climate action occurs, but no more than anticipated by current policies and insufficient to achieve net zero by 2050. The slow place and limited

extent of the low-carbon transition moderate transitional risks. Dangerous climate change is not avoided; the world and Jacobs’ sectors and operations are beset by damaging climatic events and trends.

Each sector was assessed against two of the three scenarios (described for each sector in Sections 4.3.1 to 4.3.4), with scenario selection being informed by our interpretation of the key drivers of climate risk and opportunity in each sector.

For consistency in analysis, we may choose to continue our use of the NGFS scenarios for the remaining sector-based assessments; however, recognizing our iterative learning and experience-building through the creation of these annual reports, our intention is to align future scenario analyses with aspects of IPCC, NGFS and the [International Energy Agency’s](#) (IEA) scenarios to further enhance overall assessment robustness.

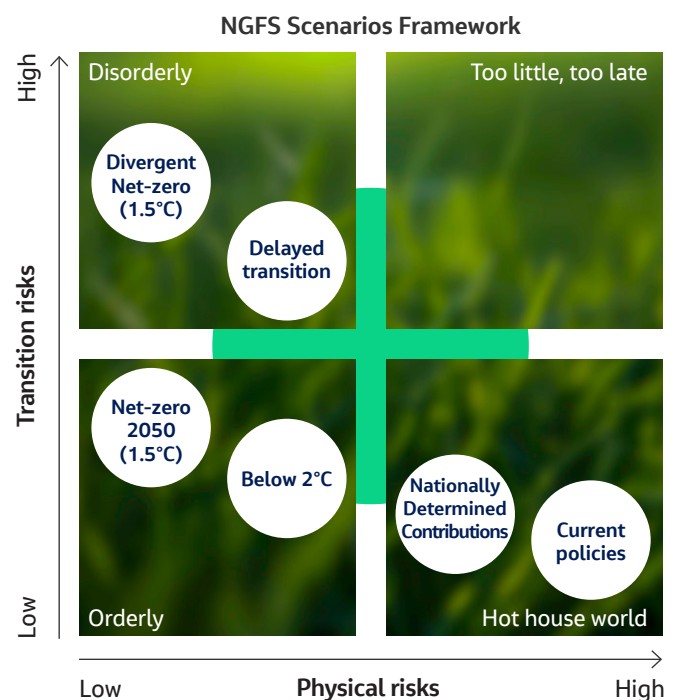


Figure 4-2
NGFS scenarios framework organized by extent of physical and transitional climate change risk.

⁴<https://www.ngfs.net/en>

4.3 Characterizing our Sectors

Our global sector teams identified Political, Economic, Social, Technological, Legal and Environmental (PESTLE) features of the future scenarios for their sector. Although our characterization of the scenarios is uncertain, the PESTLE analyses (summarized below) provided a rich foundation for exploring risks and opportunities for our business. As this analysis did not change or reassess the scenarios evaluated for our Water sector (as published in our FY22 Climate Risk Assessment Report). Water is intentionally excluded from the following subsections.



4.3.1 Aviation

Potential futures for our Aviation sector were explored under the NGFS orderly and disorderly scenarios (as detailed in Section 4.2). Both scenarios accentuate risks and opportunities associated with rapid decarbonization; either over the next decade (orderly scenario) or during the 2040s (disorderly scenario). While physical climate change risks are important to Aviation, the most immediate and pressing challenges, and perhaps some of the key opportunities for Jacobs to support our clients, are transition related. Hence, unlike the other sector analyses reported here, we did not consider the hot house world scenario.

Potential features of the operating environments for Aviation are summarized in Table 4.1. Key differences between the scenarios are:

- **Timing of the low-carbon transition:** net-zero emissions are achieved by 2050 under both scenarios, however the transition is delayed significantly in the disorderly scenario, with transition risks compounded by both the disorderly early progress and accelerated, somewhat chaotic transition during the 2040s.
- **Coordination and collaboration:** consumer- and government-led aviation behavior change and rapid, collaborative development of low-carbon technology anticipated in the orderly scenario mitigate some risks from low-carbon transition that could otherwise occur under the disorderly scenario.

●● The most immediate and pressing challenges for Aviation are transition-related.

Table 4-1

Overview of the future operating environment for Jacobs' Aviation sector under NGFS orderly and disorderly transition scenarios..

Aspect	Orderly transition	Disorderly transition
Political	Globally consistent decarbonization that is strongly coordinated by governments, and facilitated by regulation, investment and incentivization.	Inconsistent geographical climate response results in uncoordinated 'knee jerk' reactions which affects demand and route networks and increases sector uncertainty.
Economic	Flight costs increase as investment in resilience and decarbonization is required, with increases targeted towards wealthier customers and critical business travel.	Business-as-usual in the near term gives way to significant loss of revenue and collapse of some airlines post-2040, leading to economic stagnation in geographies with fewer services.
Social	Pressure from 'flight shaming' and voluntary move away from flying motivates unified decarbonization and industry transition to sustainable travel habits and growth.	Pressure from 'flight shaming' reduces customer demand on some routes, with fewer long-haul trips taken and other travel modes used in place of short haul flights.
Technological	Clean alternative fuel technologies established in the sector with coordinated availability between airlines and airports.	Limited investment in low-carbon flight technologies in the near-term gives way to scramble for alternative technologies post-2040. Less funding available at that time because of the required parallel investment in resilience to physical impacts.
Legal	Risk of legal action for greenwashing. Need for coordinated decarbonization results in regulation of low-carbon technologies, fuels, offsets, etc.	Legislation introduced after 2040 requires faster and more ambitious decarbonization, with an emphasis on capping flights and reduced growth to achieve emissions targets.
Environmental	Risk of flight disruptions from physical impacts and low customer confidence managed through innovative and holistic investments (such as nature-based solutions) that improve resilience of infrastructure at airports.	Increasing frequency and severity of physical impacts and resulting flight disruption and reduction in customer confidence. Increased investment in infrastructure resilience and/or relocation post-2040.



4.3.2 Rail & Transit

The future for Jacobs' Rail & Transit sector was explored using the NGFS disorderly transition and hot house (current policies) scenarios (as detailed in Section 4.2). These accentuate risks and opportunities associated with rapid but delayed decarbonization during the 2040s and insufficient climate action under the hot house scenario. With the long asset life associated with many rail infrastructure components, the physical impacts associated with the hot house scenario are highly applicable. The disorderly scenario is useful in exploring risks and opportunities with low-carbon transition, which are particularly important to Rail & Transit given its potential as a low-carbon form of transportation and mobility.

Potential features of the operating environments for our Rail & Transit sector are given in Table 4.2. The main differences between the scenarios are:

- **Technological changes:** new low-carbon rail technologies, for which we anticipate a rapid scramble in the 2040s under the disorderly scenario, do not get developed under the hot house scenario.
- **Travel behavior:** there are likely to be new routes and growing demand for passenger and freight services in the disorderly scenario, reflecting mode shift to rail and the potential for decarbonization compared with aviation and road transportation. However, under the hot house scenario, rail service use may decline, in part due to climate-related service and infrastructure disruptions.
- **Physical impacts:** physical risks from climate change are features of both scenarios, however these will be significantly amplified in a hot house world.



Rail & Transit is an important form of low-carbon transportation and mobility.

Table 4-2

Overview of the future operating environment for Jacobs' Rail & Transit sector under NGFS disorderly transition and hot house scenarios.

Aspect	Disorderly transition	Hot house
Political	Inconsistent geographical climate response and regional impacts results in regional governments responding with 'knee jerk' reactions and regulations that are not coordinated. This impacts political and government support for rail sector actions and coordination of sector responses to climate impacts.	Global political unrest as there is a variable approach to climate response and different regions experience the impacts of climate related natural hazards.
Economic	Business-as-usual in the near term gives way to constrained fuel/energy supply due to disorderly transition, resulting in shortages which impact rail services, and cost escalations which have economic impacts.	Significant economic losses due to network outages and disruption to freight. Increasing capital/operating costs for rail services.
Social	Changing travel behaviors and demand in both freight and passenger rail. The distances, location, frequency of network usage result in new routes being required and/or reduction in use of existing services.	Climate migration/depopulation and limitations on travel due to reliability of network and changes in passenger behavior.
Technological	Limited near-term investment in new technologies. When the transition begins in the 2040s, there is a rapid 'scramble' to develop alternative energy (fuel, battery storage) sources for rolling stock.	Society's expectation of an eventual low-carbon technological solution does not eventuate. Very limited support for investment in low-carbon rail technology research and development.
Legal	Legislation introduced after 2040 requires faster and more ambitious decarbonization. Legislative penalties for excessive carbon emissions and incentives to drive mode shifts from more carbon-intensive transportation modes.	Supply chain/accessibility issues for materials required for network development and maintenance due to geographical limitations on access to resources and introduction of regional legislation to protect resources.
Environmental	Delays and funding constraints mean that some vulnerable areas within rail networks are not protected against physical impacts of climate change, with resulting services disruptions during extreme weather events.	Rail networks experience irreparable impacts to infrastructure from physical climate-related hazards.



4.3.3 Ports & Maritime

The future for Jacobs' Ports & Maritime sector was also explored under the NGFS disorderly transition and hot house (current policies) scenarios (as detailed in Section 4.2). In common with Rail & Transit and Health, these scenarios accentuate risks and opportunities associated with rapid decarbonization during the 2040s and insufficient climate action under the hot house scenario. The industry faces both physical and transitional risks from climate change, but is likely to focus on one or the other, depending on the scenario.

Potential features of the operating environments for Ports & Maritime are given in Table 4-3. Differences between the scenarios include:

- Greater volatility in Ports & Maritime-related sectors and communities in a hot house world, disrupting the industry's supply chains, costs and operations. This contrasts with the disorderly scenario, where the industry ultimately works more cohesively with stakeholders on sector developments.
- Technology development follows two different pathways, focusing on adaptation under a hot house world or decarbonization under the disorderly transition. Where the industry focuses on decarbonization, it is expected that changing cargo and trade patterns and shipping technology will transform the sector. However, with an adaptation focus, transformation at this scale is not expected, with effort more directed towards mitigating the physical impacts of climate change.

● The scenarios accentuate risks and opportunities associated with rapid decarbonization during the 2040s.

Table 4-3

Overview of the future operating environment for Jacobs' Ports & Maritime sector under NGFS disorderly transition and hot house world scenarios.

Aspect	Disorderly transition	Hot house
Political	Disorderly transition initially disrupts trade patterns. Ultimately port operators work harmoniously across regions as global decarbonization policies align as the transition gathers momentum.	Physical impacts caused by climate change and misalignment in responses disrupt global supply chains. This causes instability and conflict as food and energy supplies become increasingly insecure.
Economic	Significant change in cargoes to service renewables industry and low-carbon commodities. Industry aligns on preferred shipping fuel. New ports emerge to support renewable cargoes market and existing ports undergo modifications to support preferred shipping fuel, decarbonization of ports through electrification of equipment, and net-zero initiatives.	Rising physical risks lead to increasing insurance, operating and maintenance costs. Increased frequency and/or severity of physical impacts disrupt port operations and trade, and operators' financial resilience.
Social	'Two-paced' industry emerges where wealthier regions transition smoothly, and other regions/communities unable to afford the transition lose maritime services. Port authorities work with communities to develop broader carbon offsetting initiatives.	Port-related communities are adversely affected by high physical risks of climate change. Physical environments and industry are compromised. Coastal cities are severely impacted and require physical adaptation and flood resilience measures.
Technological	More dynamic/adaptive technology adopted at ports in response to climate change (e.g., to allow operating infrastructure to be raised with sea level rise). Significant advances in electrification of ports, shore power solutions and non-fossil fuels. Onshoring manufacturing and food production changes shipping demand.	Technological development of adaptation solutions is reactive leading to higher development costs. Increasing physical risks and changing coastal environments lead to development of previously unavailable greenfield sites.
Legal	Emergence of clear legislation and guidance on accounting for maritime greenhouse gas emissions, energy and fuel sources, carbon capture, and emissions taxation and incentive for both ships and ports.	Policy and action are localized due to global misalignment on climate change response.
Environmental	Sea level rise, storms and other weather events more severely impact operations and infrastructure durability.	Increasing physical risks to environmental systems from climate hazards exacerbated by traditionally unsustainable, environmentally harmful infrastructure solutions.



4.3.4 Health

The future for Jacobs' Health sector was explored using the NGFS disorderly transition and hot house (current policies) scenarios (as detailed in Section 4.2). As discussed in Section 4.3.2 for the Rail & Transit sector, these two scenarios were selected as they accentuate risks and opportunities associated with rapid but delayed decarbonization during the 2040s and insufficient climate action under the hot house scenario. The Health sector faces both physical and transitional risks from climate change but is likely to focus on one or the other, depending on the scenario. The disorderly scenario for example focuses on aspects related to technological shift and the allocation of resources to prioritize emissions reductions, climate adaptation and patient care. The hothouse scenario on the other hand is useful to explore the more extreme physical impacts which could result in changes in demand for healthcare as well as impacts on buildings and infrastructure.

Potential features of the operating environments for our Health sector are given in Table 4-4 on the next page. The main differences between the scenarios are:

- The disorderly scenario sees a variable, disjointed response resulting in funding shortages, potentially incompatible technologies, and increased red tape as some organizations prioritize climate mitigation to a greater extent than others. Greenhouse gas emissions are factored into decisions between treatment options and those that can afford to select healthcare providers based on their sustainability performance, potentially increasing health inequalities.
- Under the hot house scenario, resources are channeled into emergency planning at the expense of climate mitigation and new advances in medical treatment and diagnostics. Demographic shift coupled with extreme events changes the demand for care and type of care required and healthcare facilities are repurposed to deal with the threat of new infectious disease, increases in chronic disease and mental health issues, as well as provide disaster relief.

● ● **The Health sector faces both physical and transition risks from climate change.**

4.3.4 Health

Table 4-4

Overview of the future operating environment for Jacobs' Health sector under NGFS disorderly transition and hot house world scenarios.

Aspect	Disorderly transition	Hot house
Political	Global political unrest as there is a variable approach to climate response and different regions experience the impacts of climate related natural hazards and impacts on infectious disease/chronic health conditions. This exacerbates the divide between public and private funded healthcare as revenue and reimbursement is linked to greenhouse gas reduction so those who can afford to decarbonize fare better.	Sub-national government responses become extremely varied, as climate is increasingly politicized. This results in excessive red tape and heightened inequality in health outcomes across regions and population groups. Climate related protests become increasingly disruptive. Long-term planning becomes increasingly difficult as there are calls to make the Health sector wholly public/private.
Economic	As extreme weather events and climatic disasters become more prevalent, funding is directed away from care towards resilience and mitigation investments. There are increased costs and supply chain uncertainty due to vulnerability from physical risk as well as climate-related 'red tape'. Failure to account for non-financial impacts of investments leads to decisions based on least cost and affects ability to attract and retain staff.	Some health facilities in locations most vulnerable to extreme weather become difficult/unaffordable to insure, resulting in closure/relocation. Scarce resources affect all aspects of health delivery, with crisis care being prioritized over elective and preventative care. The funding gap for health increases as chronic conditions exacerbated by climate put downward pressure on economic productivity.
Social	Disorderly transition increases health inequalities and mental health issues due to climate anxiety. Elderly population, population growth and climate refugees simultaneously impact on demand for care. Higher risk of social unrest as patients and staff who can afford to select care based on organizations' climate posture.	Sudden population shifts cause demand to quickly outstrip capacity. Demographic change as regions become uninhabitable/unsuitable for elderly and vulnerable populations. Risk of anarchy and civil unrest in response to various pressures compounds social problems and security.
Technological	Changes in technology are both driven by and exacerbate GHG emissions, e.g., shift towards automation/virtual delivery models to meet carbon targets versus new Artificial Intelligence and Internet-of-Things devices which have high energy demands. Risk of multiple and incompatible technologies due to lack of coordination across health systems. Increased capacity/new skills required for staff to deliver new low-carbon technologies and integrate them into operational planning.	Rather than advancing patient care or cutting GHG emissions with associated co-benefits for health, technological innovation is focused on recovery after catastrophic events and building infrastructure resilience to increasingly severe climate extremes.
Legal	Risk of sudden and severe legislative changes requiring asset management/retrofit of buildings, heating systems, vehicles, etc. Difficulties for health services to do effective long-term planning. Health organizations are subject to penalties for failure to meet climate targets.	Climate legislation is disjointed and ineffective, either full of loopholes or enacted without sufficient industry consultation to make it achievable. Extreme physical effects on health infrastructure and operations increase risk of emergency legislation to suddenly curtail emissions or deal with climate crises (akin to war-time or Covid-19 response).
Environmental	Increasing climate-nature intersection as development continues to encroach on natural habitats, introducing new zoonotic diseases. Ability to source natural resources required for treatment is affected, including implications from water scarcity and water quality, with disease spillover leading to increased demand for global health security and emergency management. Investment in climate resilience and mitigation has wider environmental impacts (both positive and negative).	Widespread damage and disruption to healthcare infrastructure from flooding, sea level rise, intense storms, and wildfires. Patient care is impacted by lack of scarce resources including water and medicinal products driving huge price increases. Facilities are unable to continue operation due to inability to meet minimum standards.



5. FY23 Climate Risks & Opportunities

Our approach to the FY23 climate risk assessment (Section 4) builds on the process applied in FY22 to our Water sector and extends it to our Aviation, Rail & Transit, Ports & Maritime, and Health sectors. This section provides an update on our understanding of climate risks and opportunities faced by our Water sector and follows with the main findings of our examination of the Aviation, Rail & Transit, Ports & Maritime, and Health sectors for FY23.

Physical damage and disruption resulting from climate change (e.g., storms, floods, sea level rise) presents both risks and opportunities for Jacobs. It potentially brings new opportunities in resilience planning and post-disaster recovery and redevelopment for all kinds of infrastructure and built environments. However, repeated climate disasters and/or chronic damage from sea level rise, for example, could lead to some infrastructure systems losing economic viability and ceasing to function.

Transitional risks to Jacobs arise from policy and legal changes, market shifts, and potential impacts to our people. Through thought leadership, the embedding of climate risk awareness across our operations and solutions, and decarbonization and resilience advocacy, we can help clients across our sectors to innovate and adopt new technologies and practices, and achieve ambitious emissions reduction and climate resilience goals. Conversely, complacency and failure to respond to the challenges that climate change presents may negatively impact our reputation, and we could lose market share and/or potentially face legal challenges.

A key opportunity with climate change is to invest in people and innovation so that we maintain leading expertise, insights and technology and can deploy them effectively to serve our clients in their transition towards net-zero emissions and climate resilience. Success in this can help our business to grow in revenue and market share; not doing so could see our business stagnate or decline.

This section includes discussions of potential financial implications arising from climate change risks and opportunities. This information is presented solely to highlight and demonstrate the potential size of future unmitigated climate-related risks, and the scale of realizable climate-related opportunities. This financial impact discussion and any estimations do not serve, and should not be used as, revenue forecasts.

5.1 Water

In FY22, our [Climate Risk Assessment](#) focused on Jacobs' Water sector and explored risks and opportunities under NGFS orderly and disorderly transition scenarios (as detailed in Section 4.2). Features of our FY22 report scenario analyses are detailed in Table 4-1, with key risks and opportunities from that report having been reframed in Table 5-1 to present them in alignment with the TCFD risk and opportunity categories used in this report for other focus sectors. This reframing also recognizes the iterative nature of our sequential risk assessment report development that occurs over time.

In our analysis of opportunities potentially created by the two low-carbon transition scenarios, we identified that the types of opportunities were similar, but that the timing of the opportunities was likely different. Our opportunities were therefore presented as a single combined scenario.

Unmitigated climate risks have significant potential to impact, both positively and negatively, projected revenue from Water sector clients over the coming decade. Mitigating these risks – for example, through integrated water management approaches – would not only position Jacobs for future opportunities, but also provide benefits to utilities, rate payers, communities, and the environment.

Jacobs' OneWater approach recognizes water's role in the natural cycles of our planet; its connections to land, food, and energy; and perhaps most important, its influence on our cities, our societies, and our cultures. We use this perspective to help our clients and communities implement integrated solutions to solve the most pressing water management challenges. OneWater approaches are essential to tackling water-related risks from climate change – and maintaining public trust in our roles as water and environmental stewards.

Our FY22 Climate Risk Assessment included key actions aligned to our OneWater approach and to our commitments to address climate change impacts. In FY23 and beyond, these actions include:

- Continue research on potential acquisitions and partnerships to expand our capability
- Consolidate the advisory offering in water to enable policy-level solutions
- Enhance Jacobs' relationships within climate advocacy and regulatory groups
- Further develop energy/emissions solutions targeted towards the Water sector
- Strengthen capacity to articulate net-zero, social and environmental benefits of the water solutions we deliver
- Co-invest in decarbonization technology for the Water sector
- Actively participate in sustainability-focused research efforts, networks, and working groups led by key stakeholders within the Water sector
- Advance our digital OneWater strategy to optimize the full project life cycle and to provide operational, financial, and environmental benefits to utilities
- Support local and national groups with incorporating social value and economic inclusion considerations in water programs and projects



Project Example

TCFD gap analysis for Melbourne Water operations

Melbourne Water provides drinking water and wastewater services to retail water businesses that service the 5 million people of the city of Melbourne in Australia.

Melbourne Water aspires to adopt best practice climate risk disclosure and wanted to understand where the organization might best invest resources to achieve that goal. In 2022, we worked with them to undertake a TCFD gap analysis. The approach included:

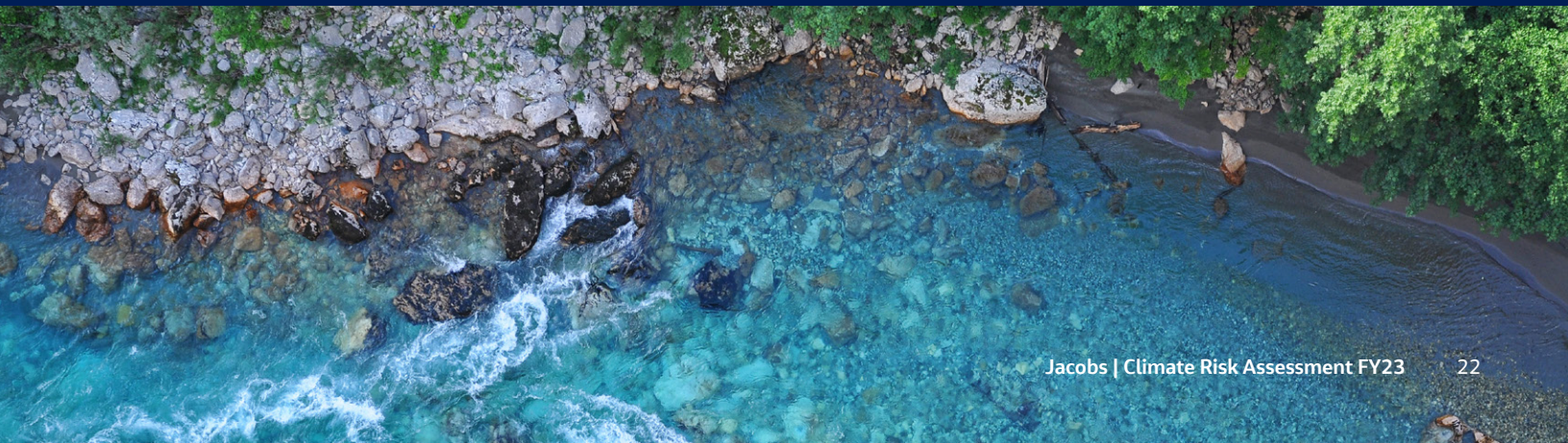
- Undertaking a review of water utility peers and organizations that are considered leading in TCFD reporting to identify lessons learned and contextualize the maturity of TCFD reporting.
- An assessment of publicly reported information (in Melbourne Water's 2020-1 annual report) pertaining to climate risk against the TCFD disclosure recommendations.
- Review of internal documentation and discussion with key internal stakeholders to identify what information could potentially be disclosed in future reporting cycles and develop recommendations on future actions to achieve leading disclosure maturity.

The project identified climate risk disclosure gaps that can be addressed by leveraging existing risk and reporting processes and enable Melbourne Water to improve climate risk disclosure.

Table 5-1

Key climate change risks and opportunities in Jacobs' Water sector (Source: Jacobs FY22 Climate Risk Assessment)

Category	Risk		Opportunity
	Disorderly transition	Disorderly transition	Orderly & disorderly transition
Physical	Clients sole focus is on decarbonization, leading to erosion of infrastructure resilience to physical climate change impacts.	Not explicitly referenced in FY22 TCFD report.	Not explicitly referenced in FY22 TCFD report.
Policy & Legal	Jacobs may face increased tax regime in some jurisdictions as governments seek increased capacity to accelerate the low-carbon transition and recover costs from climate-related hazards; this could have material impact to both private and public water utility and water infrastructure clients.	Delayed transition may lead to community disengagement and apathy regarding climate change. Water utilities may initially lack support from customers and governments/regulators to invest in decarbonization and resilience. Litigation against Jacobs for perceived failures in service/advice on low-carbon transition once it occurs.	Jacobs could capitalize on the mindset, funding and policy shift towards decarbonization and align its corporate development activities with this trend, particularly in the Water sector. Governments require support in establishing the legislation, frameworks and policies that support low-carbon transition. Jacobs leverages global in-house capabilities to support policy development, growing market share in strategic and policy advisory services.
Technology	Jacobs invests in, promotes or advises on transition technology solutions that prove to be ineffective or financially inefficient. Poorly-performing investments or those misaligned with client/sector needs may lead to reputational damage and/or unrecovered costs.	Jacobs invests in technology solutions that are ineffective or have unintended effects (as per orderly scenario). Risk is exacerbated by reduced (initial) market interest in low-carbon transition solutions and partnerships (e.g., nature-based solutions., Biomimicry 3.8).	Jacobs has the interest and financial backing from clients to develop new intellectual property to support decarbonization and climate resilience. Jacobs strengthens internal analytic capabilities to trace carbon through the supply chain, growing our digital solution capabilities in the Water sector.
Market	Competition for capital investment in decarbonization across multiple sectors may lead to some water clients being unable to secure finance for capital expenditures. This may lead to contraction in some of our sectors and reduced revenue. Cost of service pressures experienced by clients could transfer similar cost pressures to Jacobs and increased price competition in service provision.	Delayed transition may reduce green investment funding for projects that support decarbonization. This may reduce growth opportunities until the transition begins. Increased scrutiny of water clients' spend on consultants through a more economically volatile transition may affect our financial performance and reputation.	Clients require support in managing the social, political and governance shifts occurring during the transition, leading to potential growth in solution and service areas that intersect the Water sector. Clients require new ways to justify spending on climate resilience and decarbonization initiatives. Jacobs develops new economic and funding models for water clients to support decision making/investments and business cases. New metrics for capturing social and community value are included in Jacobs IP.
Reputation	Jacobs is out-competed in integrating climate resilience and decarbonization into our services and infrastructure solutions, diminishing the relative value we offer our clients.	During the delayed transition, clients focus on adaptation measures rather than decarbonization. Jacobs' reputation may be affected if we have not advocated for balanced adaptation and mitigation responses, leaving our clients poorly prepared when the transition eventually occurs.	Jacobs strengthens its reputation by formalizing an organizational structure dedicated to decarbonization and climate response.



5.2 Aviation

Our characterizations of the orderly and disorderly climate transition scenarios from an Aviation perspective (see Table 4-1) were used to identify risks and opportunities to Jacobs' business in this sector. Risks and opportunities were framed around the five categories recommended by the TCFD (illustrated in Table 5-2), noting that some risks span multiple categories.

The similarities in the scenarios (aside from timing and cohesiveness of the transition and degree of exposure to physical impacts) meant that the same kinds of risks and opportunities were thought to be applicable to both scenarios. We have therefore presented a more consolidated view of risks and opportunities for the Aviation sector in Table 5-2. At the heart of the opportunities (and risks) sits the need for congruence between Jacobs stated values with respect to climate response, our technological capacity and how we work with our Aviation clients to decarbonize and build resilience into their operations.

If not effectively mitigated, our key climate change risks have potential to reduce revenue from Aviation sector clients through reduced overall market size. This could cause revenue within our Aviation sector to decline over the next decade, in part because of climate change-influenced contraction in the global Aviation industry.

Conversely, climate change also presents significant opportunities for Jacobs to grow its Aviation sector solutions (illustrated in Table 5-2). Being a low-carbon transition leader and providing integrated decarbonization and climate resilience solutions for our clients could collectively contribute to our business growing significantly over the next decade, compared with business-as-usual.

Our Aviation sector business leaders identified a set of actions that will help manage risks and realize opportunities associated with climate change and the low-carbon transition to a low-carbon future. These include:

- Further engagement with Aviation clients, industry bodies and government to align our delivery with market requirements
- Mapping our current skills and capacities for climate-focused aviation delivery and plan for growth in key areas
- Continued effective coordination across global regions within Jacobs' Aviation business
- Focus our Aviation-focused climate risk and opportunity assessment offering, to support airport master planning, capital investment strategies and asset optimization
- Include Aviation within a wider transportation sector focus on decarbonization and embed multi-modal design
- Grow Jacobs offering in design and manufacturing of sustainable aviation fuel plants
- Develop an alternative aviation fuels proposition that will help airports understand the practical implications and potential actions on their journey towards net -zero.



Project Example

Climate resilience for Highland & Islands Airports Ltd

Highlands & Islands Airports Ltd (HIAL) is responsible for the management and operation of 11 regional Scottish airports, and is committed to supporting the essential socio-economic role of aviation in Scotland by maintaining and developing its airports and the connections they provide for some of the country's more remote communities. Without the ongoing operation of these remote airfields the socio-economic benefits and ability to access essential and lifeline services, particularly in an emergency, would be significantly impacted.

HIAL's vision is to become a net-zero regional airport group. Jacobs worked with HIAL to turn this objective into a practical plan of initiatives. The plan includes assessment of current energy use and the carbon footprint of HIAL's infrastructure, and importantly includes advice on carrying out a climate resilience and risk assessment. Many of HIAL's airports are located in coastal and estuary locations and climate change is likely to have a considerable impact on airport infrastructure as sea levels rise and storm and rainfall severity increases. Jacobs devised a plan for HIAL to assess the climate resilience of its infrastructure and carry out climate risk assessments at its airports. The results of this will lead to practical solutions that support HIAL's infrastructure and protect its long-term future and the continuation of lifeline services and essential air connectivity.

Table 5-2

Key climate change risks and opportunities in Jacobs' Aviation sector and their potential financial implications

Note: the potential financial implications of opportunities and risks overlap and interact. The impact of risks is assessed without mitigation and the benefit of opportunities is assessed assuming that full advantage is taken. The table may not be used in any way to assess or forecast the potential financial impact on Jacobs' revenue in the Aviation sector.

Category	Risk	Opportunity
Physical	Catastrophic physical damage to airports causes closure and impacts Jacobs' client base	Jacobs to produce and deliver integrated resilience plans, infrastructure, and operations and maintenance solutions for airports
Policy & Legal	Greater possibility of claims against Jacobs, where we are perceived to have provided inadequate climate resiliency services	Jacobs to advocate actively and visibly within government in developing policy and funding programs to decarbonize the aviation sector
Technology	Jacobs does not have sufficient or appropriate resources at the right time or in the right location to support our clients on decarbonization and resilience; innovative products and solutions don't evolve fast enough to sufficiently address client needs.	Support our airport clients from strategy through planning to implementation and monitoring to fully decarbonize landside and airside operations
Market	Jacobs is not agile enough to anticipate and respond to rapid sector changes, ultimately losing market share	Jacobs defines, assures and implements net zero road maps
Reputation	Jacobs perceived by industry to greenwash on behalf of clients that delay their low-carbon transition.	Jacobs seen as a transition leader, through coordination and sharing of innovation across industry

Potential impact to sector revenue: ■ <10% loss ■ 10-25% loss ■ >25% loss ■ <10% growth ■ 10-25% growth ■ >25% growth



5.3 Rail & Transit

There is currently and will likely remain significant ambition for decarbonization within Rail & Transit into the coming decades. If the sector decarbonizes ahead of other sectors, particularly the Highways and Aviation sectors, it will attract demand for freight and passenger services. Decarbonization and servicing this demand will require major infrastructure upgrades. These opportunities are accompanied by the risk that rail's low-carbon advantage is surrendered to other modes and that physical climate impacts disrupt and reduce the attractiveness of rail services.

Our characterizations of the disorderly transition and hot house world from a Rail & Transit perspective (see Table 4-2) were used to identify risks and opportunities for Jacobs' business. These were framed around the five categories recommended by the TCFD, as outlined in Table 5-3. Some risks and opportunities span multiple categories.

The opportunities and risks highlight the need for technological capacity and staff capability to support our clients in key areas. Mitigating risks and taking advantage of opportunities will require ways of working that effectively engage our global cohort of Rail & Transit practitioners and our clients to decarbonize and build resilience into rail and transit infrastructure and operations.

If not effectively mitigated, our key climate change risks (illustrated in Table 5-3) have significant potential to reduce revenue from Rail & Transit sector clients and cause the company to lose market share. Conversely, by mitigating these risks and taking advantage of the opportunities climate change also presents, Jacobs would be well-positioned for significant growth in our Rail & Transit business compared with business-as-usual over the next 10 years and beyond.



Project Example

Weather resilience and climate change adaptation management for Network Rail

The Transpennine Route Upgrade (TRU) is a multi-billion pound, transformative, long-term railway infrastructure program that will improve connectivity across the North of England. The core route of the project stretches from Manchester Victoria station in the west to York Station in the East and includes 76 miles of track (122 km), 8 tunnels, 15 viaducts, 25 stations and 270 bridges. Jacobs' role—providing engineering and technical support services to Network Rail—includes development and management of weather resilience and climate change adaptation across the program. This includes:

- Developing the TRU Weather Resilience and Climate Change Adaptation Plan (including specific weather and climate resilience requirements for delivery partners);
- Review and assurance of delivery partner weather and climate risk reviews for each project within the program
- Establishing and coordinating quarterly TRU Weather Resilience Forum (reporting to TRU Head of Engineering)
- Co-ordinating, tracking and reporting locations/assets vulnerable to adverse weather and climate, mitigations and opportunities for further resilience measures

As part of our weather resilience work, we actively supported an earthworks and drainage risk assessment along the TRU route that included inspection and evaluation of all high-risk embankment and cutting slopes. Risk of future ground movement from adverse/extreme weather events was evaluated, with important sites resulting from the assessment being included within Network Rail's Adverse/Extreme Weather Plans.

We also developed a research project in collaboration with the TRU Asset Management Team and the Network Rail Innovation Team. The project involves the installation of real-time monitoring to measure the pore water pressure and displacement within railway earthworks due to dynamic loading from passing trains, and to also record rainfall volume after storm events. This research project aims to provide further understanding of the behavior of railway embankment and cutting slopes under dynamic conditions and allow for improved design and maintenance solutions that maximize design life and railway safety.

Our Rail & Transit sector business leaders identified a set of actions that will help manage risks and realize opportunities associated with climate change and the low-carbon transition to a low-carbon future. These include:

- Enhancing the connectivity and interoperability of our global teams and subject matter experts to respond to rail clients' differing progress and investment needs across regions. This could be through a focus on increasing staff mobility across regions, implementing a global approach to staff resourcing, commercial model arrangements and identification of local versus global capability needs.
- Developing or sourcing staff with rail-sector specific capability and expertise within rail client organizations. Building climate expertise into this capability through internal upskilling and knowledge sharing.
- Developing integrated solutions offerings to rail clients to address complex transition challenges and opportunities (e.g., net-zero and digital services).
- Commit time and resources to promote decarbonization and resilience. This may include developing:
 - Practical route maps to help the sector transition towards net-zero and climate resilience
 - Checklists to measure progress
 - Services that support the design and implementation of low-carbon infrastructure and rail transit

Table 5-3

Key climate change risks and opportunities in Jacobs' Rail & Transit sector and their potential financial implications

Note: the potential financial implications of opportunities and risks overlap and interact. The impact of risks is assessed without mitigation and the benefit of opportunities is assessed assuming that full advantage is taken. The table may not be used in any way to assess or forecast the potential financial impact on Jacobs' revenue in the Rail & Transit sector.

Category	Risk		Opportunity	
	Disorderly transition	Hot house	Disorderly transition	Hot House
Physical	Reduction in client base/funding due to increased physical damage to rail networks.	Clients become more reactive to immediate physical issues (i.e., maintenance) and less on future opportunities to enhance and innovate, limiting our ability to provide strategic and integrated solutions.	Maintain bench strength of key skills to respond to base needs of clients to adapt to physical impacts of the transition.	Invest in solutions development to support clients operating under hot house environmental conditions (e.g., less resource intensive ways to build/maintain rail infrastructure that reduce workers' exposure to adverse weather).
Policy & Legal	Greater likelihood of claims against Jacobs, where we are perceived to have provided inadequate decarbonization advisory services.	Political chaos means a slow-down in spend even if funds are available - due to political "battles" slowing grant execution.	Use our global presence and expertise to rapidly adapt solutions developed in one region to other regions / for other clients.	Jacobs utilizes its Advisory expertise to actively and visibly influence policy and funding programs to support decarbonization and resilience in the sector.
Technology	Lack of strategic staff to advise clients on funding and technology pathways; pace of innovation needed to solve challenges not matched by Jacobs' investments.	Unable to procure resources needed to deliver projects, leading to significant increases in the costs of service delivery.	Support clients with development of energy/fuel alternatives through research & development partnerships and investment in technologies/methodologies.	Build /expand our modelling/digital capabilities in rail network optimization.
Market	Our business model is too slow in responding to client needs, leading to loss of market share. Jacobs unable to maintain our brand presence.	Political instability impacting our clients that are government entities. This affects their operations / budgets and work opportunities for Jacobs.	Jacobs becomes a leader in areas such as digital modelling to support the transition, and use of data to help passengers and operators optimize the network.	Market demand for global and agile engineering firms with deep domain expertise in rail in harsh climates.
Reputation	Misalignment or insufficiency of Jacobs resources with highly variable global response diminishes brand and market awareness.	Jacobs unable to maintain bench-strength of rail capability and maintain and build upon our domain expertise to remain competitive.	Move quickly to organize ourselves globally, understand market direction and facilities/technologies required to lead the response.	Jacobs' large geographic reach allows us to focus resources on areas of greater response and be agile across regions.

Potential impact to sector revenue: ■ <10% loss ■ 10-25% loss ■ >25% loss ■ <10% growth ■ 10-25% growth ■ >25% growth

5.4 Ports & Maritime

Ports and maritime facilities could play a large role in global decarbonization and energy transition. They form key global infrastructure, facilitating trade and commerce, providing connectivity between people and businesses, supplying nations with food, goods and energy resources, and generally underpinning our economies and livelihoods. Ports are now at a critical juncture, being poised to decarbonize and be a key enabler of society's energy transition.

Our characterizations of the disorderly transition and hot house scenarios from a Ports & Maritime perspective were used to identify risks and opportunities to Jacobs' business in the sector (illustrated in Table 5-4). Opportunities in the sector respond to both the physical impacts of changing climates, and ports' roles as enablers and participants in the energy transition. Taking up these opportunities will require a range of skills; from strategic through to planning and design services. Our ability to provide the required technological capacity in the required timeframes and how we respond to changes in market demand lie at the center of the opportunities and risks identified.

If not effectively mitigated, our key climate change risks (detailed in Table 5-4) have significant potential to reduce revenue from Ports & Maritime sector clients and cause the company to lose market share. Conversely, climate change also presents significant opportunities for Jacobs to grow its business in the Ports & Maritime sector. Managing our climate risks and being an energy transition and climate resilience leader could contribute to significant growth, well beyond business-as-usual, over the next decade.

Our Ports & Maritime sector business leaders identified a set of actions that will help manage risks and realize opportunities associated with climate change and the low-carbon transition to a low-carbon future. These are to:

- Adopt adaptive management approaches in ports design and climate risk mitigation
- Explore novel solutions to adapting to changing climate and coastal impacts (e.g., offshore structures, large scale coastal defense solutions), including nature-based and regenerative solutions
- Integrate Jacobs' energy transition capabilities (e.g., renewable power, electrification, power supply design services) into our Ports & Maritime service offering
- Develop specialist digital capabilities for Ports & Maritime such as those related to artificial intelligence, big data, digital twins and the like to assist decision-making, and provide options/scenarios analysis and evaluation
- Conduct due diligence on existing and prospective Ports & Maritime clients. Identify priority and high-risk clients (e.g., successful vs distressed clients in a climate changed future, port locations with high climate risk, client diversity to address global shocks and stressors)
- Explore emerging and future investment flows and opportunities in the Ports & Maritime sector (e.g., defense, space, marine-based industries)



Project Example

Climate risk analysis for PSA International port operations

PSA International (PSA) ports and cargo portfolio comprises over 60 deep sea, rail and inland terminals, across 160 locations in 42 countries, making it one of the world's leading container terminal operators and developers.

As an essential part of its sustainability journey, PSA is continuously improving the resilience of its terminals to climate change. Jacobs worked with PSA to develop standard methodologies and guidance for assessing climate resilience, risks, vulnerabilities, and adaptations for its global civil infrastructure. Our services included risk assessment workshops for four container terminals to:

- Develop immediate resilience improvements (easy, quick, cheap, reliable)
- Develop longer term adaptation strategies for future improvements to protect the terminal
- Identify features of future terminal facilities that will enable them to recover more efficiently from major storms caused by climate change effects.

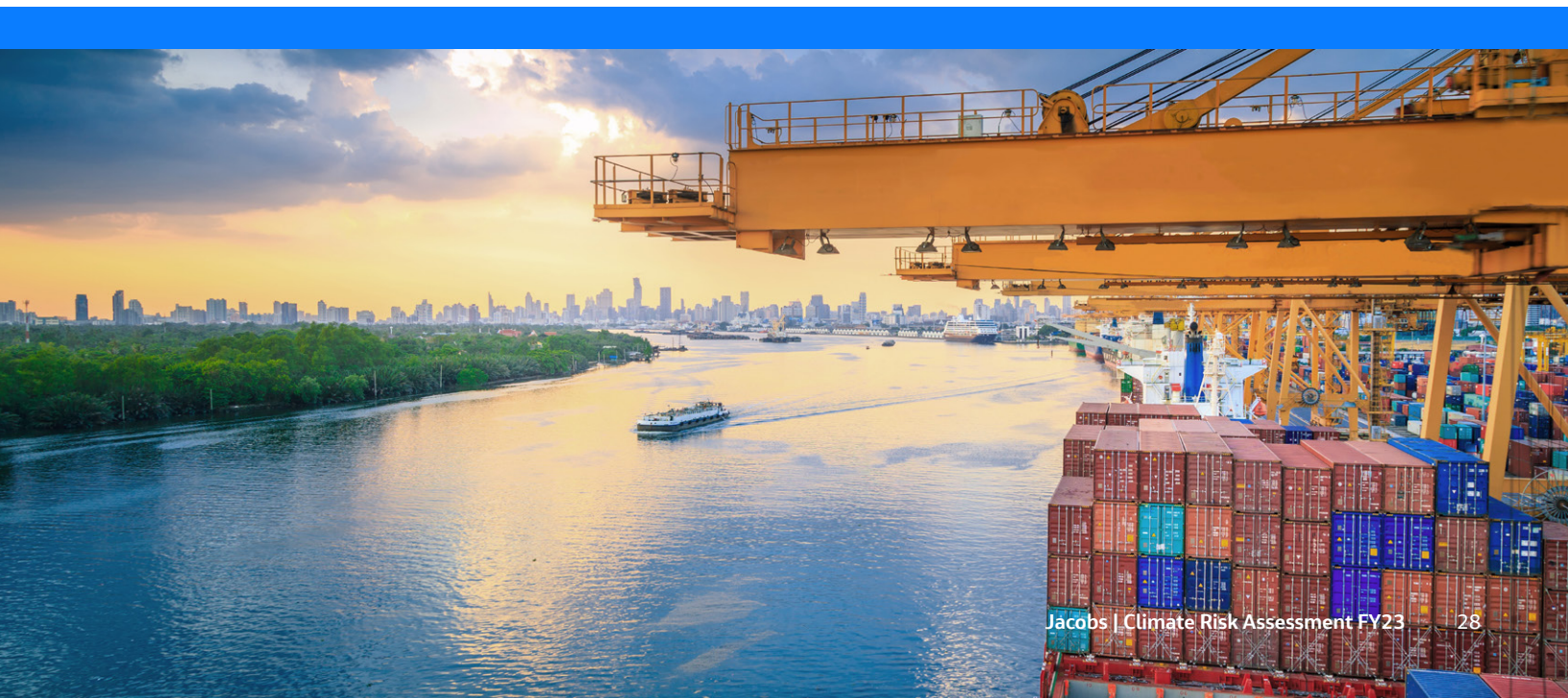
Table 5-4

Key climate change risks and opportunities in Jacobs' Ports & Maritime sector and their potential financial implications

Note: the potential financial implications of opportunities and risks overlap and interact. The impact of risks is assessed without mitigation and the benefit of opportunities is assessed assuming that full advantage is taken. The table may not be used in any way to assess or forecast the potential financial impact on Jacobs' revenues in the Ports & Maritime sector

Category	Risk		Opportunity	
	Disorderly transition	Hot house	Disorderly transition	Hot House
Physical	<div></div> Misalignment between client funding, service procurement and resilience implementation results in mistiming around impact mitigation, resulting in physical impacts to client assets and/or surrounding areas.	<div></div> Retreat and relocation of coastal communities reduces demand for planning and design services surrounding ports & maritime facilities.	<div></div> Assist our clients to develop adaptive pathways for their infrastructure to enable them to plan effectively for the future.	<div></div> Assist our clients to develop adaptive pathways for their infrastructure and surrounding environment to enable them to plan effectively for the future and protect critical assets.
Policy & Legal	<div></div> Changing political administration and policy redirects/reduces availability of funds to support adaptation.	<div></div> Limitations on energy supply limit's clients profit and reduction on procuring planning and design services externally.	<div></div> 'Urgent' and major event recovery and restoration effort resulting in increased/ fast-tracked funding for services.	<div></div> Growth with national government agencies and clients leading to more ports, more investment in border security.
Technology	<div></div> Investment cycle time is too short for the 'right' solutions to be developed, tested and refined.	<div></div> Adaptive solutions are too expensive or disruptive to current options for most clients to invest in.	<div></div> Opportunity to connect services for power demand and supply to support clients in managing their energy transition.	<div></div> Development of solutions and services for flood protection, power resiliency and redundancy.
Market	<div></div> Jacobs not prepared for rapid influx of transition projects and misses market share.	<div></div> Breakdown of global community and economy/reduced globalization.	<div></div> Jacobs supports access to new funding opportunities for decarbonization.	<div></div> Planning and design services for the development of new ports due to increasing climate vulnerabilities, costs and competing land uses for ports particularly exposed to a changing climate and the climate response.
Reputation	<div></div> Heightened public scrutiny of the costs and benefits arising from resilience investments, including through our services.	<div></div> Misalignment of design standards with significantly altered climate results in impacts to infrastructure beyond design scope, causing potential reputational impacts.	<div></div> Jacobs seen as a leader, moving quickly to organize globally, understand market direction and facilities/ technologies required to lead the climate response and energy transition.	<div></div> Jacobs seen as a leader in maritime climate resilience. Jacobs' ports and/or waterfront projects successfully incorporate resilience to seal level rise and other hazards/climate-related events.

Potential impact to sector revenue: ■ <10% loss ■ 10-25% loss ■ >25% loss ■ <10% growth ■ 10-25% growth ■ >25% growth



5.5 Health

Greenhouse gas emissions from the Health sector contribute significantly to climate change. The sector will also experience some of the most significant impacts from physical climate risks, as the intersection between health and the environment becomes increasingly pronounced. This will change the demand for healthcare and could exacerbate health inequalities.

Our characterizations of the delayed transition and hot house world scenarios from a health perspective (see Table 4) were used to identify risks and opportunities Jacobs' business. Risks and opportunities were framed around the five categories recommended by the TCFD.

At the heart of the opportunities (and risks) sits the need to reinvent healthcare with increased focus on care delivery, wellness, infrastructure and governance. This includes adaptive measures to protect physical assets from the worst effects of climate change as well as repurposing them to provide emergency response. There is an opportunity to lead the development of solutions that deliver better, more efficient integration of services and delivery agencies across the value chain, ultimately improving health outcomes.

If not effectively mitigated, our key climate change risks (illustrated in Table 5-5) have significant potential to reduce revenue from Health sector clients and cause the company to lose market share. Conversely, climate change also presents significant opportunities for Jacobs to grow its Health sector. Managing our climate risks, being a low-carbon transition leader and providing integrated decarbonization and climate resilience solutions for our Health sector clients could collectively contribute to significant growth, beyond business-as-usual in our Health business over the next decade.

Our Health sector business leaders identified a set of actions that will help manage risks and realize opportunities associated with climate change and the low-carbon transition to a low-carbon future. These are to:

- Focus on a more holistic response to the greater ecosystem of health that includes care delivery, pharmaceuticals, and wellness, infrastructure and governance, to support social and environmental determinants of health in a broader sense
- Increase our advocacy role including embedding health in all policies (HiAP) thinking across infrastructure, business, policy, planning and environmental teams
- Develop and apply metrics to capture the full suite of outcomes including societal costs and benefits to deliver best value solutions
- Continue to develop and expand advisory and alternative delivery/commercial models based on sharing best practice across our global sectors
- Leveraging our client relationships to build our capabilities in advisory services targeting emergency preparedness, healthcare decarbonization, health equity, and resilience
- Strengthen cross-sector collaboration around the climate-water-health nexus, setting the example for government and private organizations.



Project Example





















Climate-resilient planning and design for Kiribati hospital

Jacobs worked in collaboration with the New Zealand Government and Ministry of Health (Kiribati) to undertake a strategic masterplan for the hospital system of Tarawa Island, capital of Kiribati. Following the masterplan, Jacobs were engaged to design the redevelopment of Betio Hospital as a priority due to the growing population in the area. Adaptation to current and future climate change impacts was a key consideration for the project, and was addressed by raising the ground floor level to accommodate sea level rise and increasing tidal swells, incorporating natural ventilation and passive solar design to maintain thermal comfort in increasing temperatures while reducing carbon emissions by omitting HVAC systems, and rainwater harvesting and reuse to assist in prolonged periods of drought.

Table 5-5

Key climate change risks and opportunities in Jacobs' Health sector and their potential financial implications

Note: the potential financial implications of opportunities and risks overlap and interact. The impact of risks is assessed without mitigation and the benefit of opportunities is assessed assuming that full advantage is taken. The table may not be used in any way to assess or forecast the potential financial impact on Jacobs' revenue in the Health sector.

Category	Risk		Opportunity	
	Disorderly transition	Hot house	Disorderly transition	Hot House
Physical	 Working in silos resulting in inability to keep pace with emerging climate and nature crises.	 Current facilities are not able to operate continuously in disaster scenarios and/or provide refuge space as necessitated by severe climate impacts.	 Facilitate cross-sectoral partnerships for solutions that address mitigation, adaptation and wider environmental outcomes.	 Establish solutions for strategic resource sharing/ integration (similar to strategic resource options in Water sector).
Policy & Legal	 Changing policy and legal requirements impact our ability to grow if our solutions focus is limited; additional investment may be needed to move upstream in the value chain.	 Delays/disruption to project delivery due to government indecision.	 Strengthen capabilities around green finance, developing processes and tools to transform operations and align with ESG drivers.	 Develop centralized emergency response across sectors /government departments.
Technology	 Invest in skills, training and technology that turns out to be redundant/not capable of adapting to future changes.	 Roll-out of critical technology is hindered by severe supply chain disruption and/or lack of natural resources to manufacture.	 Develop new service lines targeting AI/IOT and global health security including cybersecurity solutions which may be required as more services move online in response to climate.	 Adopting technology in health system planning that is adaptable in multiple scenarios and/or optimizes existing footprint.
Market	 Adopting technology in health system planning that is adaptable in multiple scenarios and/or optimizes existing footprint.	 Market volatility results in supply chain disruption and sharp rise in price of primary goods. Ability to respond rapidly to health clients' needs is hindered by staff availability/ mobility.	 Lead the re-imagining of service delivery including integration of services and delivery bodies across the value chain, greater resource sharing and focus on specialisms.	 Invest in developing solutions for automation, remote care options.
Reputation	 Disagreement on solutions prioritization across stakeholder groups impacts Jacobs' ability to effectively lead and advise clients, resulting in shared penalties and/or reputational damage.	 Reputational risk from failing to address rising health inequalities.	 Stakeholder-centered solutions developed embracing science-based, multi-faceted approaches which all link back to individual wellbeing/ community benefits.	 Stakeholder-centered solutions developed embracing science-based, multi-faceted approaches which all link back to individual wellbeing/ community benefits.

Potential impact to sector revenue:  <10% loss  10-25% loss  >25% loss  <10% growth  10-25% growth  >25% growth



5.7 Physical Adaptation and Operational Resilience

Our [FY21 Climate Risk Assessment](#) provided an overview of direct physical climate impacts on Jacobs' projects and locations (see Section 2.3.4 [Project Analysis] and 2.3.5 [Office analysis] of that report). We do not believe that these have materially changed since that assessment.

We take steps to ensure we are mitigating and adapting to some of the physical impacts of climate change such as meteorological impacts or infrastructure failure like power outages, loss of communications and direct damage. Through a collaborative approach, led by our Global Security & Resilience team (GS&R), we have put in place a Resilience Manual and supporting Operational Resilience Plan to guide decision making on adaptive measures in response to these types of physical impacts. Together with our Climate Risk Manager tool that maps long-term projects physical impacts from climate change, the responsiveness of our business leads to mitigating and adaptive outcomes.

Our business resilience program enhances our ability to build our overall capability utilizing a standardized framework to prepare, respond and recover during any disruptive emergency incident or a crisis event that may affect our people, assets, environment or reputation. The business resilience program, developed by GS&R, encompasses Emergency Management, Crisis Management and Business Continuity and employs a risk-based, all-hazards approach.

Several consistent themes emerge from the sector-led analyses of Jacob's climate change risks and opportunities:

- People and their expertise are central to our business model, as well as to the climate-related challenges that we solve with our clients. Continuing to invest adequately in talent attraction, development and retention is an important risk mitigation measure and opportunities enabler for all sectors assessed so far, and likely across our entire portfolio. As a solutions provider and strategic advisor, we need to continue to develop deep domain expertise in each sector and couple that with specialist insights into decarbonization and climate resilience.
- The pace of innovation needed to solve climate change-related challenges in all sectors requires ongoing investment from Jacobs, primarily in technology. There are risks associated with investing in technologies that fall short of solving the challenges at hand, or that are rapidly outcompeted by emerging technologies and therefore face quick redundancy. Equally, there are opportunities associated with smart, relevant technology investments that can be scaled and implemented well.
- Linked to the preceding point are reputation impacts that may arise from stakeholder perceptions associated with technology selection, implementation and performance across all sectors. Such risks are likely heightened in geographies experiencing hyper-politicization or polarization of sustainability-related matters. Sustaining a focus on science-based and impact-driven outcomes will be critical to navigating the transition to a decarbonized economy. Jacobs' ability to draw upon multi-domain, science-based expertise and experience is a strength that may introduce opportunities for our company in this regard.
- The TCFD disclosure framework continues to facilitate a layered and insightful assessment of risks and opportunities for Jacobs under different future scenarios – the outcomes from which are being factored into operational and strategic decision-making. This is useful and important for Jacobs, with ongoing method refinements likely to be adopted into the future as further assessments and reports inform the process.

Operational Resilience Plan

Business Resilience Manual

BeyondZero



Jacobs is committed to working with our clients, communities and suppliers to rapidly transition society and the economy towards net-zero emissions globally.

While this presents many challenges to them and us, these are more palatable and less costly than delaying or not making that transition. Regardless of progress on emissions reductions, we are also committed to working with our clients – in Water, Aviation, Rail & Transit, Ports & Maritime, and Health, as well as other Jacobs' market sectors – to build climate resilience into their strategy, operations and infrastructure. We recognize that adaptations to climate change often have long lead times and that delayed action may escalate costs from climate risks, strand clients' assets and reduce their feasibility and effectiveness.

6. Our Disclosures

The sections below represent the recommended disclosure framework put forward by the TCFD and provide details of the disclosures we publish in each area.

6.1 Governance

Disclosure	Summary	Links
Describe the Board's oversight of climate-related risks and opportunities	Climate-related risks and opportunities and ESG considerations are integrated into our Enterprise Risk Management processes.	2022 Integrated Annual Report Climate Action Plan ESG Data Disclosures PlanBeyond 2.0 Code of Conduct
Describe management's role in assessing and managing climate-related risks and opportunities	<p>Our PlanBeyond Executive Steering Committee has management oversight responsibilities for our Climate Action Plan. Regular updates are reported to the Board of Directors.</p> <p>We established a dedicated ESG & Risk Board Committee in April 2021.</p> <p>We established a new Office of Global Climate Response & ESG in October 2021, to enable the business to deliver on our climate commitments, including overseeing our climate-related disclosures.</p>	

6.2 Strategy

Disclosure	Summary	Links
Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term	<p>The focus of this report has been to provide a deeper exploration of physical and transitional risks and opportunities in our global Aviation, Rail & Transit, Ports & Maritime, and Health sectors, including an update to our previous annual reports focus on our Water sector, under contrasting future scenarios to support the objectives of our FY22-24 company strategy, and ensure we are maximizing our company climate response opportunities. Generally, the opportunities are likely to be greater if the global economy transitions to net zero early and in an orderly manner.</p>	<p>Section 5 of this disclosure</p> FY21 Climate Risk Assessment FY22 Climate Risk Assessment PlanBeyond 2.0 Climate Action plan FY22-24 Company Strategy
Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning		
Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario		

6.3 Risk Management

Disclosure	Summary	Links
Describe the organization's processes for identifying and assessing climate-related risks	<p>Climate-related risks and opportunities are integrated into our Enterprise Risk Management processes, led by our Senior Vice President, for the Office of Global Climate Response & ESG and Enterprise Risk Management. We undertake sector-level analysis through structured consultation with our leaders, and project and office-level analysis using our Climate Risk Manager tool. Findings are included in our Climate Action Plan and ESG data disclosures. Risk management actions are communicated internally and reported to our ESG & Risk Board Committee, and are summarized in our Climate Action Plan.</p>	<p>Section 2 of this disclosure</p> ESG Data Disclosures PlanBeyond 2.0 Climate Action plan 2022 Integrated Annual Report
Describe the organization's processes for managing climate-related risks		
Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management		



Risks and opportunities were framed around the five categories recommended by the TCFD: physical, policy and legal, technology, market and reputation.

6.4 Metrics & Targets

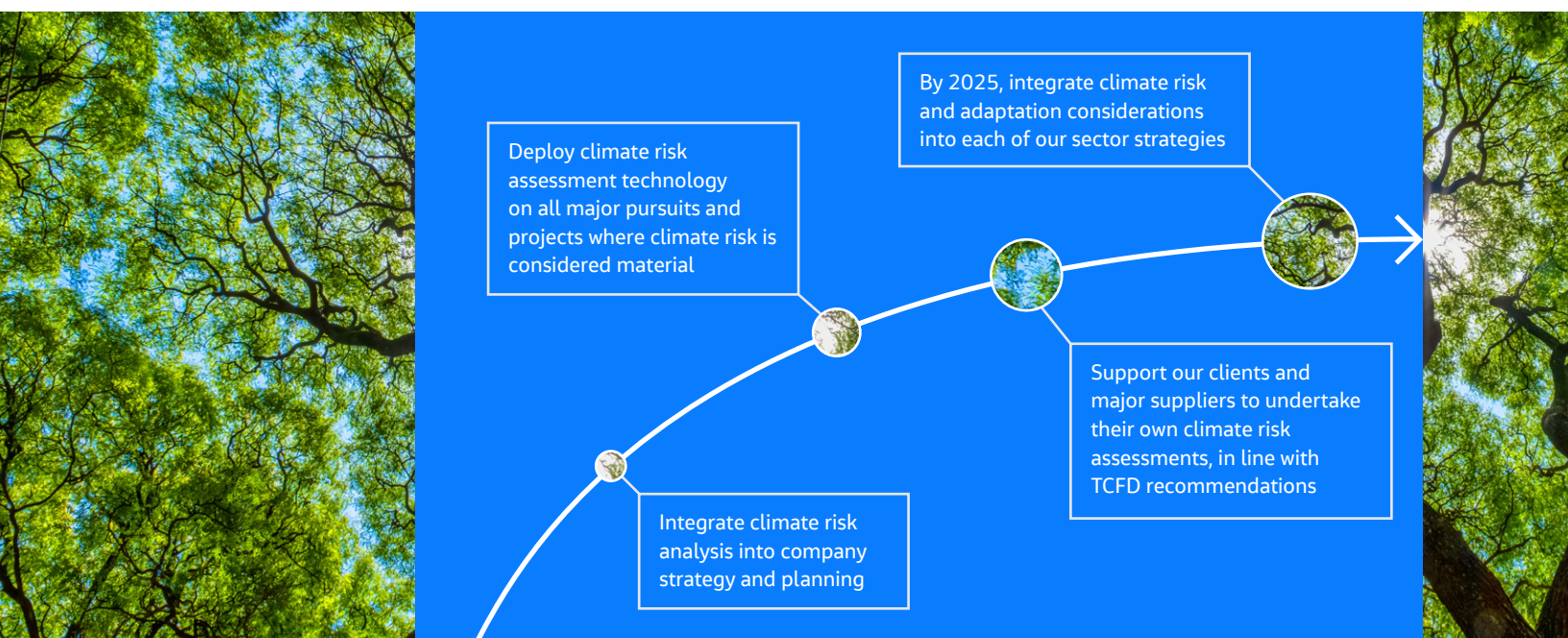
Disclosure	Summary	Links
Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management processes	<p>In FY21, we have assessed material risks and opportunities for our business annually up to 2050 in broad categories (in USD: \$10M–\$100M, \$100M–\$1B, >\$1B). If we follow a 4°C trajectory, Jacobs could see limited net opportunities in response to the increasing physical risks and the limited transition to a low-carbon economy. If we follow a 1.5°C trajectory, then the limited net opportunities from the same physical risks could be supplemented by significant sector opportunities connected with the rapid transition to a low-carbon economy.</p> <p>In FY22, we looked more deeply at Water sector transitional risks and opportunities and developed an impact heatmap to show positive or negative impact over different scenarios.</p> <p>For FY23, we have continued the sector-based analysis of our climate-related risks and opportunities to cover our Aviation, Ports & Maritime, Rail & Transit, and Health sectors.</p>	FY21 Climate Risk Assessment FY22 Climate Risk Assessment Section 5 of this disclosure
Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas emissions, and the related risks	All quantifiable emission sources are fully verified externally to a level of limited assurance each fiscal year and published in our annual ESG Disclosures document, together with supporting summary of the key risks and opportunities we face in meeting our near-term and long-term science-based targets.	ESG Data Disclosures
Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets	<p>Follow the TCFD framework for assessing climate risk and opportunities and disclose annually. Continually committed to enhancing the rigor, discipline and controls around our ESG data and reports.</p> <p>We have SBTi approved near- and long-term science-based emissions reduction targets. This means our emissions reduction targets are consistent with the aim of the Paris Agreement to limit average global warming to 1.5°C by the end of the century, compared to pre-industrial temperatures. They are also consistent with the Net-Zero Standard.</p> <p>Our near-term targets are approved by the SBTi as follows:</p> <ul style="list-style-type: none"> • We commit to reduce absolute Scope 1 and 2 greenhouse gas emissions 50% by 2030 from a 2019 base year and commit to reduce absolute Scope 3 greenhouse gas emissions from business travel and employee commuting by 50% over the same timeframe. • We commit that 65% of our suppliers by spend covering purchased goods and services will have science-based targets by 2025. <p>Our long-term targets are approved by the SBTi as follows:</p> <ul style="list-style-type: none"> • We commit to reduce absolute Scopes 1, 2 & 3 greenhouse gas emissions 90% by 2040 from a 2019 base year. <p>We have also established a Sustainability-Linked Bond Framework which the company utilized to guide its recently-issued Sustainability-Linked Bond. The framework is aligned with the five core components of the Sustainability-Linked Bond Principles June 2020 (SLBP 2020) as administered by the International Capital Markets Association. The SLBP 2020 outline best practices for financial instruments to incorporate forward-looking sustainability outcomes. The two key performance indicators included in the Sustainability-Linked Bond Framework are: (i) absolute greenhouse gas emissions and (ii) representation of people who identify as female in Vice President and above positions.</p>	FY21 Climate Risk Assessment FY22 Climate Risk Assessment This disclosure Climate Action Plan Sustainability-Linked Bond Framework

7. Conclusions & Next Steps

Our FY22 Climate Risk Assessment reiterated our focus on delivery of the commitments we established in FY21.

Our continued focus in FY23 and beyond is to deliver on these commitments. This year we have extended our sectors analysis from Water to our global Aviation, Rail & Transit, Ports & Maritime, and Health sectors. We continue to support clients around the world to undertake their own climate risk assessments in line with TCFD recommendations and implement climate mitigation and adaptation strategies.

Continuing throughout FY23, FY24 and FY25, we plan to expand our assessment of climate risks and opportunities to the remainder of our business, with an eye towards ongoing changes in the financial and non-financial disclosures and regulatory landscape. The integration of climate risk and opportunity considerations into our company strategy and planning is a priority for Jacobs, and is supported by our ESG & Risk Board Committee which was established in April 2021.



Into FY24 and beyond we will also focus on enhancing the way we assess, disclose and manage our climate-related risks and opportunities, through:

- Enhanced **governance** of climate-related risks by monitoring progress on mitigating or adaptive actions, and establishing clear key performance indicators for climate risk management in line with our overall approach to Enterprise Risk Management
- Consistent scenario analysis: climate **scenario analysis** is not an exact science and there are multiple methods and future scenarios to use to consider how our business may be impacted by climate change. Jacobs is transparent in the fact we are 'learning by doing', and optimizing our approach to these assessments each year
- Consistent and proportionate approach to **financial quantification** of key risks and opportunities that is both appropriate for and material to the nature of our business, and pragmatic for the benefit of external stakeholders.



Challenging today.
Reinventing tomorrow.

Cautionary Note Regarding Forward Looking Statements

Certain statements contained in this report constitute forward-looking statements as such term is defined in Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, and such statements are intended to be covered by the safe harbor provided by the same. Statements made in this report that are not based on historical fact are forward-looking statements. When used herein, words such as "expects," "anticipates," "believes," "seeks," "estimates," "plans," "intends," "future," "will," "would," "could," "can," "may," and similar words are intended to identify forward-looking statements. Examples of forward-looking statements include, but are not limited to, statements regarding estimates and expectations with respect to the future impact of climate change on our business, and the markets in which we operate, including risks and opportunities for our sectors we have assessed in this and previous reports. We base these forward-looking statements on management's current estimates and expectations as well as currently available competitive, financial and economic data. Forward-looking statements, however, are inherently uncertain. There are a variety of factors that could cause business results to differ materially from our forward-looking statements, including, but not limited to, the pace and severity of climate change and its impact on local, national and global

economies, whether the underlying assumptions used by the Company to estimate the impact of climate change on the Company and on the industries in which it operates prove to be incorrect, future changes in the Company's strategy or business model, economic events, and whether actions taken by governments and non-governmental actors in an effort to mitigate the effects of climate change are successful, among others. For a description of some additional factors that may occur that could cause actual results to differ from our forward-looking statements, see our most recently filed Annual Report on Form 10-K, and in particular the discussions contained under Item 1 – Business; Item 1A – Risk Factors; Item 3 – Legal Proceedings; and Item 7 – Management's Discussion and Analysis of Financial Condition and Results of Operations, and our most recently filed Quarterly Report on Form 10-Q, and in particular the discussions contained under Part I, Item 2 – Management's Discussion and Analysis of Financial Condition and Results of Operations; Part II, Item 1 – Legal Proceedings; and Part II, Item 1A – Risk Factors, as well as the company's other filings with the Securities and Exchange Commission. The company is not under any duty to update any of the forward-looking statements after the date of this report to conform to actual results, except as required by applicable law.

About Jacobs

At Jacobs, we're challenging today to reinvent tomorrow by solving the world's most critical problems for thriving cities, resilient environments, mission-critical outcomes, operational advancement, scientific discovery and cutting-edge manufacturing, turning abstract ideas into realities that transform the world for good. With approximately \$15 billion in annual revenue and a talent force of approximately 60,000, Jacobs provides a full spectrum of professional services including consulting, technical, scientific and project delivery for the government and private sector.

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Aligned with the United Nations Sustainable Development Goals (UN SDGs), PlanBeyond is our approach to sustainability — planning beyond today for a more sustainable future for everyone. We advance innovations that improve energy efficiency, resilience, conservation, reuse and reclamation of vital air, land and water resources.



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