Down to earth

Climate governance case studies in Asia Pacific

Special report

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Long-time collaborators, ACGA and CLSA jointly release *CG Watch* every two years

Contents

Foreword

The idea for this report came from ACGA Secretary General Jamie Allen: to take companies from the 12 markets we follow in *CG Watch* and examine the practical steps they are taking in their governance to respond to climate change. Using a Taskforce on Climate-Related Financial Disclosures (TCFD)-based framework, the plan was to identify tangible changes in governance structures, strategy and operations and map out the different approaches the issuers are taking in managing risk and setting targets. Underscoring this enterprise was a firm belief that if companies do not take action to realign their basic governance processes and mind set, they will flounder in the face of global warming.

The criteria for selection was partly based on size, diversity of industry and ownership structures, and a shown commitment to TCFD and Net Zero targets going beyond mere statements of intent. We chose companies with scale and complexity of products: from a metro operator in Hong Kong to a sprawling conglomerate operating in multiple jurisdictions. Some firms had family ownership, others have majority government control. A few companies had a long history in the region; others are relative newcomers.

We sought companies which appeared to be making strides in realigning themselves with climate goals, with a sound approach to ESG reporting and a track record in sustainability governance. Integral to this process was hearing from the companies themselves, through interviews with management and executives, to give a real sense of the time, effort and thought-processes behind these changes. While ACGA and CLSA worked together on the logistics and parameters of the report, the researchers proceeded independently in writing their respective chapters. We did not seek to marry our views, but rather to come at the process from a different perspective. There is inevitably a degree of overlap in the final content, it being difficult to consider strategy without looking at risk, for example. This may lead to a differing of opinions: each chapter should be read with this in mind.

We thank the companies for their participation and candour. The fact that we are writing about nine, rather than 12 companies, reflects the challenge we had in enlisting candidates in Indonesia and the Philippines. There we found a reticence to share perspectives, the typical mantra being that they were at too early a stage in the process to participate. In Malaysia, our chosen candidate was a high achiever on paper, yet declined to provide us with access to management and executives.

The goal of the report is not to score or rank the companies, but to study and make observations on approaches they are taking and the challenges they face in doing so. Each case study focuses on four areas: **governance**, **strategy**, **risk management**, and **metrics and targets**. It is hoped that this will provide investors with a better sense of the changes that are happening across Asia Pacific through real-life examples of how companies are thinking, organising and executing to meet the mighty challenge of climate change.

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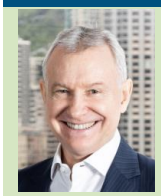

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Governance and strategy

When embarking upon a study of this nature, there is always the hope that themes will jump off the page. An obvious trend to be plucked out, a quick conclusion reached. This report is more of a slow burn, each chapter offering the reader an opportunity to peer into the work, organisation and thought processes going on behind the scenes at a selection of large companies in Asia Pacific which are adapting to climate change. Some are moving faster than others, but they are all moving.

A key challenge is a lack of climate expertise on boards

While the companies may take a slightly different tack in this process, there are common challenges. On the governance side, the biggest one is to be found at the apex of these corporations: the board. We scoured the bios of each chair, director and independent director and found scant climate expertise. There are a few engineers and urban planners, directors with comparative knowledge on climate change strategy, and many others with experience of sustainability reporting; but there are more accountants, finance veterans and academics than one would hope to see.

Extensive board training on climate is wanting and there is a supply issue in nominations

High-level and comprehensive training to fill a gap in climate-related skills was also not apparent on a large scale. Some companies are adjusting their nomination criteria and processes (although the average skills matrix tends to pay lip service to climate experience) but lament the lack of a sufficient pool of talent to choose from. For the firms with government, family and majority control, to move beyond traditional networks will take a bigger reset in how they typically fill their board seats, and there is not much evidence of this yet.

Climate tone is set at the top but there is a sense the drive is bottom-up

The upshot is a pervading sense that climate initiatives are very much bottom-up, driven by management and often with a sustainability officer as the nucleus. The command and tone from the top is that something must be done and a roadmap put in place, but the method and means of doing so usually rests somewhere in the middle of the organisation. In several companies, the sustainability officer has direct interaction with the board, but the impression is that climate strategy at a more granular level is fed up the chain, than vice-versa. It was a telling feature of this report that board members declined to engage directly with us to share their views, or elaborate on their work processes.

Several companies have sustainability committees, others opt for a risk focus

A number of the companies do have special sustainability committees at board level, or with a mix of directors and executive-level members, sometimes with a sustainability or management representative. Others centralise climate issues in risk management committees, or risk/audit, or a sustainability and risk combination. At all of the companies there has been some form of organisational reshuffle to allow greater focus on climate initiatives, often moving from a generic corporate responsibility agenda commonly found in the mid-2010s to a tighter narrative on ESG circa 2019 or 2020. None of our researchers believed this to be merely a cosmetic exercise as companies rejigged and renamed CSR committees and moved the deck chairs around.

The issuers are apt in disclosing sustainability information

Despite disparity on what regulators require of them, the companies by large proved to be prolific producers of sustainability information and reports, although more forthcoming on physical than transition risks. In many markets this is a reflection of a lack of clarity on the regulatory response in the pipeline, some governments themselves are unsure of how they will reach their Net Zero targets and what policy shifts to make. Companies operating in multiple jurisdictions have a tricky path

ahead in this respect. The role of governments in shaping the climate narrative also poses challenges: for MTR in Hong Kong it is drafting its Net Zero pathway despite the lack of a government one; Mengniu Dairy meanwhile has government goalposts firmly front and centre.

Extreme weather is already affecting many companies

The most common physical risk identified was extreme weather, from mega typhoons and rising sea levels in cities such as Hong Kong to droughts in China. Some companies have factored this into their financial planning, others have yet to do so. The issuers who are more advanced in their response to climate are the ones who have identified the most tangible opportunities, but across the board it is evident this process is at an early stage. Some companies are investing in new products to adapt with the times: technology will have a key role here, from biosensors on cows at Mengniu Dairy and QR codes stamped on tins of tuna by Thai Union, to the drones enlisted by Komatsu to scan remote forests.

Myriad hurdles, from policy constraints to changing habits

Some companies have it easier than others in responding to climate change, but all have an Achilles heel. MTR's emissions are simple in nature, but its experience in Hong Kong compared to Sweden shows how a more ambitious government policy can propel the use of renewables. Similarly, Dalmia Bharat is ahead of the pack with a commitment to becoming carbon negative, but government investment is required in the market for the industry to move faster on net zero and weather risks loom large. Jardine Matheson, with its conglomerate sprawl, faces the dual hurdles of a diverse product mix and multiple jurisdictions. And a significant challenge lies ahead for companies such as Thai Union and Shinhan Financial, with mostly Scope 3 emissions, who have a significant challenge in changing habits of its suppliers and customers.

Motivation to improve climate response comes from many angles

The pressure points for change are conspicuous and take myriad forms: all companies feel the heat from investors, NGOs and other stakeholders to respond to climate change. Shinhan Financial gives a special shout out to European institutional investors as potent agitators. For Thai Union, a shift to greater sustainability amid social pressure to improve welfare in the fishing industry was a huge catalyst. At Jardine Matheson, a younger generation of family members helped convince their elders it was time to act. Peer pressure also plays a part: Shinhan Financial prides itself on being the first among its competitors to take bold strides on climate. Cement-maker Dalmia Bharat enrolled in an investors' green portfolio more than a decade ago and now wants to be the best.

Stakeholder demands are not going away

It has been a long process for some; others are just beginning. A common demoninator among all the companies is the realisation that stakeholder demands are not going away, climate risk is only going to increase, and as the adage goes, the secret of getting ahead is getting started.

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Risk management, metrics and targets

While governance is about top-level alignment and accountability, its effective execution relies on sensible planning for the future. Risk management, metrics and targets provide a guide that helps keep a company on track towards a realistic and more sustainable path. In our collaboration with ACGA, we analysed nine regional companies on their risk management approaches, and identified current metrics and targets, their status and where to next. Our hope is that sharing the practical actions companies are taking will allow readers to come away with a more down-to-earth understanding of where Asia's corporates are in their journey to climate-proofing their business models.

Climate change, along with other related environmental issues, has become an area that boards are beginning to recognise that change is needed in corporate practices. From inaction to action, the current landscape sees Corporate Asia learning, aligning interests, dedicating resources and making progress. Companies across the region are starting to understand climate risks, revamp risk systems to fit-for-purpose, setting progressive targets that are tailored to business models and aligned with climate science to enable actions on the ground. We are encouraged to see that Asian companies are increasingly becoming active on climate governance and are developing ways of monitoring risk management, and committing to ambitious metrics and targets.

Our commentary shines a light on the status quo of Asian companies' practices in risk management, and their stated metrics and targets (as recommended by TCFD). Our findings highlight varying overall maturity levels of the cohort we selected for this report.

Asian companies are making reasonable progress to identifying climate-related risks

In general, Asian companies are making reasonable progress in meeting TCFD's guidance on best practices in risk identification and assessment. We see two methods being deployed. The top-down approach leverages existing enterprise risk management systems to add climate-related issues as an emerging category. Our commentary reveals that the world's largest electronics company, Taiwan's Hon Hai, China dairy producer Mengniu, Hong Kong's sole rail operator MTR, Singapore conglomerate Jardine Matheson and Indian cement manufacturer Dalmia Bharat have adopted this model, although maturity/execution levels vary. The others demonstrate internally-developed risk processes to look at climate change, which are then mapped out as different triggers back into conventional risk categories - a bottom-up approach. We identify Australian road operator Transurban, Japan construction-maker Komatsu and Korea financials firm Shinhan Financial as examples of this method, each exhibiting unique ways of linking back climate change into their overall risk management framework.

Room for improvement lies in risk integration

How companies integrate climate risk is where the fluctuation lies. We concede that as the level of disclosure is non-standardised, and as companies use different approaches to identify and assess risks (top-down versus bottom-up), it is hard to draw conclusions on the success of climate risk integration into overall existing risk management frameworks. However, our takeaways from the companies are that both are needed for more effective climate risk integration, and it's just a matter of time before risk systems implement both top-down and bottom-up processes to manage climate risks better. Currently, the decision to start from the top or bottom are not so much determined on suitability, but very much influenced by a company's scale, business model, existing regulated levels within the sector and overall policy development in their corresponding jurisdictions. Seafood manufacturer Thai Union

uses a combination of top-down and bottom-up approaches in its climate risk management system. This level of capability is impressive, given it only started integrating climate risks from 2021, albeit it is likely to have benefited from a more mature and experienced pool of climate experts (compared to if it was starting out 10 years ago). This is a good start, and it may suggest as ESG goes more mainstream in Asia Pacific, companies will receive better guidance due to a more developed ecosystem of regulators, consultants and climate initiatives. We still see room for improvement in increasing quantitative information and a more specific action plan to support responses to existing risks.

Metrics for financial impacts are challenging and subject to macro policy development

Of the companies we have studied, all follow the TCFD framework to set metrics and targets. This promotes a level of standardisation in the information provided from the companies we examined. However, when we look at materiality - how sustainability reporting determines how important a risk is - there is a lack of consensus and it is still highly dependent on the legacy reporting standards that companies currently follow. So how much TCFD metrics and targets can help is still uncertain for many investors. The definition for materiality has an impact for corporate decisions on whether to conduct more detailed estimates on quantitative financial impact through additional robust climate scenario analysis. This would involve significant planning and resource management.

Further development of ISSB and carbon trading schemes will help

Further development the International Sustainability Standards Board (ISSB) and the establishment of national carbon trading schemes in each jurisdiction will help bring reporting of quantitative metrics to the next level for Asian companies, as the former will hopefully provide a consensus view of what is material and the latter will at least establish an external price for carbon, thereby easing pressure on estimation uncertainty of future climate scenarios over more than a decade. To this end, we do see some promising signs in the companies' practices, such as in Transurban and Shinhan. Nonetheless, representatives for all of the markets selected for this research are working on at least having qualitative climate scenario analysis in place and quantitative ones in the pipeline to help navigate into more meaningful metrics building.

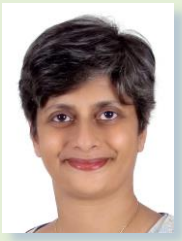
Scope 1 and 2 emissions are reported across the board while Scope 3 needs more capability building

The good news is that no one lags when it comes to reporting Scope 1 and 2 emissions, although we do see varying capabilities to break down the aggregated figures into business units, activities and geographical locations. Scope 3 emission reporting is a common challenge for everyone, although the exact pain points may differ, sector by sector. For example, Komatsu is more focused on technology advancement to enable further decarbonisation in its value chain, while Korean financial firm Shinhan's emphasis is on how financed emissions are calculated and Mengniu's biggest challenge is how to engage supplier participation to collect appropriate data.

Target setting practices are maturing, albeit at varying rates

Maturity level in target setting varies, however, all the representatives show strong commitments to aligning with the most up-to-date climate science. Essentially, Asian companies are actively upgrading from setting only nominal targets, ie, percentage reduction without transparent reduction pathways, to science-based ones.

Company case studies



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Dalmia Bharat: Cementing a green ambition

- ❑ First cement company in the world to commit to becoming carbon-negative; announced it has a strategic roadmap to achieve it by 2040.
- ❑ First cement company globally to commit to all three RE100, EP11 & EV100 initiatives.
- ❑ Committed to using 100% renewable energy by 2030.
- ❑ Committed to replacing fossil fuel by 2035 for generating heat by switching to 100% alternative (green) fuel.
- ❑ Committed to produce 100% blended cement by FY26, lowering clinker content and lowering carbon footprint.
- ❑ Significant transition to electric vehicles by 2030.

Summary

Cement is one of the largest industrial sources of pollution in the world, ranking either second or third, and is responsible for approximately 7% to 8% of global carbon dioxide emissions. India is the second-largest producer and the second-largest consumer of the product and has some of the most polluted cities in the world: Delhi and Kolkata are ranked first and second in 2022 in exposure to fine particulate matter, or $PM_{2.5}$ pollution[1]. Still, it trails world leader China, which produced 57.2% of the world's cement in 2020, by a wide margin; India accounted for 7%[2]. However, "Cement Industry in India 2021," a report from Research and Markets, noted that demand is only expected to grow exponentially as the urban population grows, and demand for housing, infrastructure and industrial and commercial construction rises from 294.40m tons in 2021 to 419.92m tons by 2027.

Early, voluntary actions led to lower carbon footprint for cement in India

Both analysts and investors, though, agree that India's cement industry is in a far better position than many of its global counterparts. This is largely due to the early, and in many cases voluntary, action taken by Indian cement makers. And Dalmia Cement, the fourth-largest cement manufacturer in India, is a national and global leader in the climate preparedness stakes: a carbon footprint that is 40% lower than the global average and a roadmap to being carbon-negative by 2040, a decade before its peers.

Hard-to-abate sector

Process-related emissions makes cement a hard-to-abate sector

Cement is a hard-to-abate sector, meaning that the path to net zero is a complicated one. According to Dr Arvind Bodhankar, Head - ESG and Chief Risk Officer, Dalmia Bharat, the process-related emissions are what makes cement manufacturing unique, differentiating it from other industries that mainly deal with emissions from fossil fuels.

Government investment needed to further net zero ambitions

"Cement is primarily calcium oxide (quicklime or burnt lime); when we convert calcium carbonate (limestone) to calcium oxide, there is a slow emission that happens, which is an inorganic emission, and that is what makes the cement industry a hard-to-abate sector," Dr Bodhankar explains. While fossil fuel can be replaced, there is no replacement to date for calcium carbonate, and unless there is some investment from the government, it will be very difficult for the cement industry to achieve net zero, he said.

[1] *Air Quality and Health in Cities*, released by Health Effects Institute's State of Global Air Initiative: www.healtheffects.org/announcements/comprehensive-new-report-details-two-major-air-pollutants-and-related-health-impacts
[2] CEMBUREAU 2021 Activity Report

Clean and Green is Profitable and Sustainable is Dalmia's business philosophy

Yet by 2018, Dalmia became one of the lowest carbon footprint cement companies globally, while remaining profitable. It embedded its business philosophy of "Clean and Green is Profitable and Sustainable" into the company's growth trajectory. CDP ranked it No. 1 in the global cement sector that same year on business readiness for a low-carbon economy transition.

Limestone decomposition responsible for more than 50% of CO_2 emissions

Clinker calcination

Carbon dioxide emissions from cement production can be divided into three categories: usage of electricity, burning of fossil fuels and the decomposition of limestone during clinker calcination. Clinker, described as the "backbone of cement production" by Cembureau, the European Cement Association, is the final product when limestone mixed with aluminiosilicate materials such as clay is heated in a cement kiln at very high temperatures, around 1,400°C. Limestone decomposition or calcination is responsible for approximately 56% (while the Global Cement and Concrete Association (GCCA) says it is closer to 60%) of carbon dioxide emissions during cement production, while electricity usage and burning fossil fuels for energy are responsible for 13% and 31%, respectively, in India[3]. Measures are being taken to minimise the emissions through energy-efficiency initiatives, but process-related emissions are not impacted because limestone cannot be substituted, as Dr Bodhankar explains.

Reducing clinker/cement ratio is one way to reduce process emissions

The way ahead

The tracking report by the International Energy Agency (IEA)[4] reported that "direct CO_2 intensity of cement production increased about 1.5% per year during 2015-2021" globally, while noting that 3% annual declines to 2030 were required to be able to get on track with the GCCA Net Zero Emissions by 2050 Scenario. Two key areas needed to be addressed to achieve this, the report explained: reducing clinker/cement ratio and deploying "innovative technologies," ranging from carbon capture and storage to clinkers made from alternative raw material and noted that governments could do more by stimulating "investment and innovation in these areas by funding R&D and demonstration, creating demand for near zero-emission cement and adopting mandatory CO_2 emission-reduction policies." (*See box on government investment on page 11).*

Dalmia committed to being a 100% blended cement company by 2026

Many cement manufacturers are lowering their clinker/cement ratio by manufacturing blended cements: cements where part of the clinker is replaced by other supplementary cementitious materials (SCMs) such as fly ash, granulated slag, volcanic ash and other industrial by-products that would contribute to a circular economy. Dalmia produces 80% blended cement, while its Eastern operations produce 100% blended cement. The company is committed to being a 100% blended cement company by 2025-26 on its journey to becoming carbon-negative by 2040.

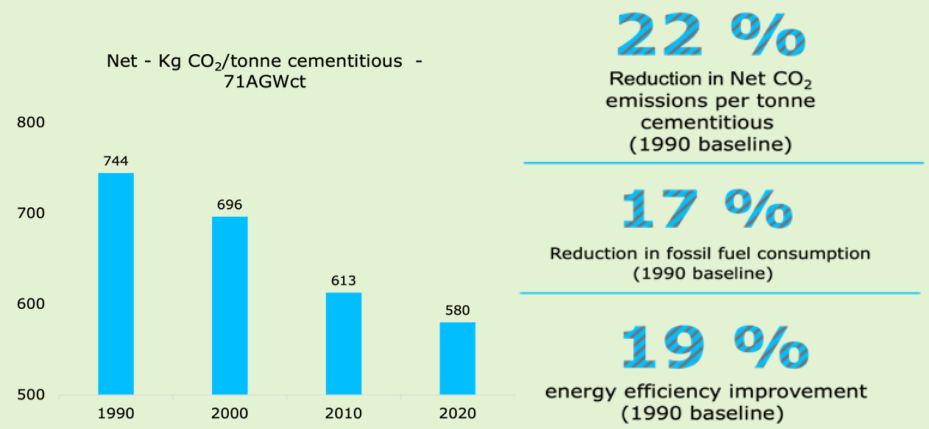
Green cement helped Dalmia significantly reduce CO_2 emissions

Blended cement saves natural resources as the materials are usually the waste products from thermal and steel plants. It also reduces energy consumption, conserves water and significantly reduces the GHG emissions during cement production as the SCMs are industrial by-products. Dalmia has significantly reduced its carbon footprint due in part to the production of green cement:

[3] Emission Reduction Approaches for the Cement Industry, Alliance for an Energy Efficient Economy, 4 February, 2021. https://aeee.in/emission-reduction-approaches-for-the-cement-industry/
[4] Tracking report – September 2022, International Energy Agency. https://www.iea.org/reports/cement

Figure 1

Reduction of carbon emissions through production of green cement



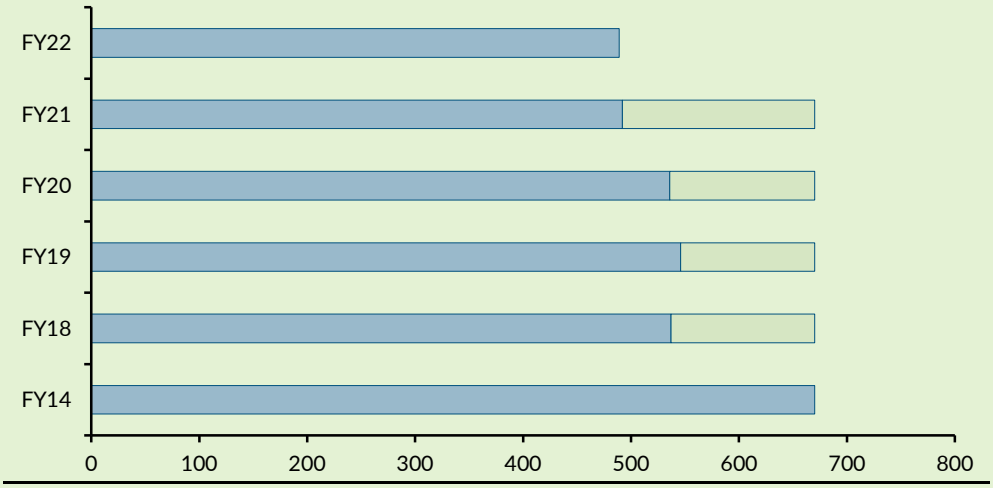
Source: GCCA 2020 Cement Industry GNR data

In contrast, Dalmia's group carbon footprint over the same period and going forward to FY22 is much lower.

Group carbon footprint of Dalmia lower than global footprint

Figure 2

Group carbon footprint Kg CO_2/Tonne of cementitious material



Source: Dalmia Bharat AR2022 and AR 2020

Dalmia Cement (Bharat) is undergoing major restructuring to divide into pure-play businesses

Background

Dalmia Bharat Group, founded by Shri Jaidayal Dalmia in 1939, is a conglomerate comprising cement, sugar and refractory businesses. Initially, the Group listed all the businesses under Dalmia Cement (Bharat) Ltd (DCBL), but underwent a major restructuring in 2010, stating that it wanted to create pure-play businesses. It demerged into two entities: the listed entity housing the sugar business and renaming itself Dalmia Bharat Sugar and Industries Ltd, while the cement, refractory and thermal power businesses moved into a new unit, Dalmia Bharat Enterprise Ltd (DBEL), listing on the Bombay Stock Exchange at the end of 2010 and the National Stock Exchange at the beginning of 2011. DBEL became Dalmia Bharat Ltd (DBL) in 2013 and is the holding company for Dalmia Cement (Bharat).

Private equity firm KKR invested in Dalmia Cement

Beyond the demerger in 2010, Dalmia inked an agreement with US private equity firm Kohlberg Kravis Roberts & Co (KKR), whereby it invested an initial Rs5bn (US$110.49m at the time) in an unlisted, wholly owned subsidiary of the cement business, with an option to invest a further Rs2.5bn. In 2016, KKR finally exited the cement business by selling its stake in Dalmia Cement Bharat to DBL and concurrently becoming the holding company's largest institutional shareholder with an 8.5% holding.

Cement company joined KKR's green portfolio program

At the time, Puneet Dalmia, managing director of DBL, said that the partnership had helped the company not only expand its business but also implement "environmentally sustainable production processes in a cost-effective manner." Dalmia Cement had been a part of KKR's Green Portfolio Program since FY2011, measuring and managing energy efficiency in its production facility in Ariyalur in South India, as well as in its captive power plant. The PE firm fully exited Dalmia 14 months later by selling all its shares in DBL on the open market and netting nearly 150% return in the process.

Divests itself of non-core businesses

In FY2019, the company restructured and amalgamated its multiple subsidiaries into DBL. In its 2022 annual report, it told its shareholders that it had kept its word and completed the divestment of its non-core businesses, refractory and Hippo stores as well as divesting a partial stake in IEX, an Indian electronic system based power trading exchange, and was on the road to being a pure-play cement company.

Ownership

Company is promoter-owned but professionally run

As of September 2022, promoters and promoter groups held 55.87% of the shares, while institutions, non-institutions and government bodies held 20.53%, 23.47% and 0.14%, respectively[5]. The company has a seven-member board of directors, two male executive directors from the Dalmia family, Gautam Dalmia and Puneet Dalmia, two non-executive directors, Yadu Hari Dalmia and Dr Niddodi Rajan, and two independent directors, Mrs Sudha Pillai and Mr Virendra Singh Jain. Under the board sits an 11-member management team, all of whom are non-family members from Dalmia Cement (Bharat) except for Puneet Dalmia, which handles the day-to-day operations of the company. Dr Bodhankar describes the listed entity, Dalmia Bharat, as the umbrella company, while one analyst said it was a holding company with a number of subsidiaries, which is common in the Indian corporate landscape, but as long as there are no cross-holdings, there is nothing to worry about.

Expand manufacturing capacity but continue to lower GHG emissions

The company had 32 subsidiaries, six associates and two joint ventures as of 31 March 2022, and reported revenue of Rs110.60bn from sale of products and services for FY22. Dalmia Cement represented 99.4% of the entity's turnover, while management consultancy services made up 0.20%.[6] Dalmia Cement operates 14 plants and during the year expanded its manufacturing capacity by 17% to 35.9 million tonnes per annum (mtpa). In the coming years, it has big plans for the future: increasing its capacity by 60% to 48.5mtpa by the end of fiscal 2024 with an investment of Rs90bn (US$1.2bn) and aiming for 130mtpa by FY30, all while continuing to lower its GHG emissions, increase its energy efficiency and further explore the use of biomass as fuel to fully replace fossil fuels.

[5] BSE website, shareholding pattern, September 2022
[6] Dalmia Bharat AR2022

Regulations

BRSR is India's homegrown sustainability report

Dalmia must publish a Business Responsibility and Sustainability Report (BRSR), India's version of a sustainability report, since it is one of the top 1,000 companies listed on both BSE and NSE by market cap. BRSR is voluntary for FY22 but mandatory from FY23 onwards. A replacement to the business responsibility report (BRR), the new version requires disclosures to be based on ESG parameters: risks and opportunities, financial implications of risk mitigation, sustainability-related goals and targets as well as performance against them, resource usage, discharge of emissions and transitioning to a circular economy, among other things. One of the issues that marred BRR disclosure by companies was incomplete, irrelevant disclosure to some of the questions, and providing qualitative rather than quantitative answers when required. These were lessons taken on board when creating the BRSR framework. But only time will tell whether companies are able to provide the kind of disclosure stakeholders, especially investors, are looking for.

Cement companies subject to various policies under MoEFCC

Besides sustainability reporting, cement companies are subject to a rash of acts and policies, running the gamut of hazardous waste, water pollution, air pollution and the environmental protection act under the Ministry of Environment, Forest & Climate Change (MoEFCC). However, the Central Pollution Control Board (CPCB) and the State Pollution Control Board (SPCB) administer and enforce the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. SPCB regularly inspects cement plants and limestone quarries to verify compliance with its emission norms. CPCB also inspects cement plants to ensure compliance to emission standards.

PAT improves energy efficiency in energy intensive industries

Another mandatory initiative for Dalmia is PAT (Performance, Achieve and Trade), a flagship programme of the Bureau of Energy Efficiency under the National Mission for Enhanced Energy Efficiency (NMEEE). NMEEE is one of eight missions under the National Action Plan on Climate Change 2008. PAT is a market-based compliance mechanism to improve energy efficiency in energy-intensive industries, like cement, which are deemed designated consumers (DCs). The energy savings achieved is converted to tradeable instruments called Energy Saving Certificates that can be traded at Power Exchanges.

UN commitments

At COP26 in November 2021, Prime Minister Narendra Modi made five climate action commitments, which are:

Prime Minister Modi committed India to being net zero by 2070

- ❑ To reach non-fossil energy capacity of 500GW by 2030
- ❑ Meet 50% of its energy requirements from renewable energy by 2030
- ❑ Reduce total projected carbon emissions by one billion tonnes from now onwards until 2030
- ❑ Reduce the carbon intensity of its economy to less than 45% of 2005 level by 2030
- ❑ To be net zero by 2070

The year's 'green' budget looks to promote climate action

To that end, India's 2022-23 budget has made a number of revisions this year: the centre's electric vehicle policy 'Scheme for Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicle in India' was provided Rs29.08bn and the Union Ministry of New and Renewable Energy is allocated Rs33bn for grid-based solar power and an additional Rs19.5bn for production-linked incentives for manufacturing of high-efficiency solar modules. Other announcements made

during the budget included: four pilot projects for coal gasification and conversion of coal into chemicals; sovereign green bonds to be issued in public sector projects that would reduce carbon intensity of the economy; and including energy storage in the harmonised list of infrastructure, thereby facilitating credit availability for digital infrastructure and clean energy storage.

Climate reporting initiatives

The company published its first standalone sustainability report in 2015

Dalmia published its first and only standalone sustainability report in 2015, covering two financial years, 2013-14 and 2014-15, using GRI G4 guidelines. In FY2015, it responded to CDP's Climate Change Programme. In 2017, it produced a prelude to integrated reporting as well as its first business responsibility report. In 2018, it announced its commitment to being carbon-negative by 2040, with interim targets of doubling its energy productivity and switching to 100% renewable energy by 2030. It was also the year the company committed to set a science-based target. In 2021 Dalmia began using the TCFD reporting framework and produced its first TCFD report in 2022.

1. Governance

Climate governance is being fashioned by corporates

Corporate governance norms, with committees and their terms of reference, are mandatory in India and top companies rarely fall foul of them. 'Climate governance,' though, is a fairly novel concept in the country and has been fashioned more through company leadership than mandatory regulations. This might, of course, change in the years to come for listed companies, but for now companies continue to fashion their own sustainability governance.

Dalmia's climate governance is slightly complex

In Dalmia's case, the climate governance structure seems complex and unduly opaque, even after speaking to the company, due to its many subsidiaries. That being said, the company had whittled down its board committees during FY2021-22 from seven to five statutory committees: audit, risk management, nomination and remuneration, stakeholders' relationship and corporate social responsibility.

Sustainability governance

Sustainability governance makes an appearance in the company's AR

In March 2021, it began incorporating the TCFD recommendations and guidelines into its reporting framework, and for the first time used the term "sustainability governance," explaining that it had "assembled a sustainability governance structure with cross-functional representation, with senior leadership oversight at the board level." But it remained unclear how climate governance was developed and implemented. The company did mention the formation of an internal sustainability team comprising people from operations and various management levels to "oversee environmental, health & safety."[7] The team would be "responsible for reviewing and approving targets, roadmaps and implementation procedures for sustainability vision."

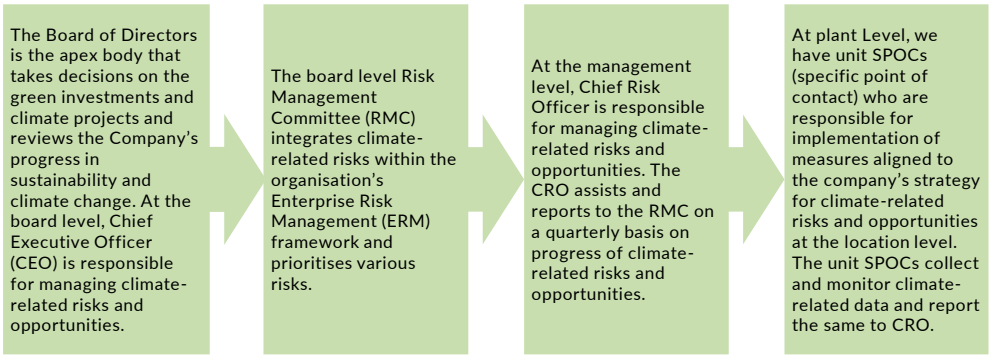
Dalmia appointed a Chief Risk Officer

In 2022, it produced its first TCFD report, offering more clarity on the structure, which had changed over the course of the year. The two noticeable additions are the Chief Risk Officer, appointed in January 2022, and the implementation of the Enterprise Risk Monitoring framework.

[7] Dalmia AR 2020-21

Figure 3

Climate Governance structure



Source: Dalmia AR 2021-22

Internal sustainability team is a mystery to the average shareholder

Missing from the template, though, was the internal sustainability team: who is on the team, who is it accountable to and how does the board exercise oversight over it? Dr Bodhankar clarified that the team, composed of various heads of departments, including CSR, sustainability, health and governance, answered to him. He explained that the four-tier governance structure has the board at the top where the CEO is responsible for managing climate-related risks and opportunities; the risk committee, which integrates these risks into the ERM framework and prioritises the risks; at the management level is the CRO; and at the locations are the SPOCs (single point of contact). The 31 SPOCs, responsible for implementing the measures at the locations, are tasked with collecting and monitoring climate-related data and reporting to the CRO monthly. He, in turn, collates the data and presents it to the risk committee on a quarterly basis and to the full board half-yearly.

KPIs, compensation and skills matrix

Difficult to find how senior management and board are incentivised

Yet accountability in two key areas has glaring omissions: 1) executive KPIs and incentives for senior management and directors and 2) climate and sustainability expertise on the board and in the nomination and remuneration committee's skills matrix. The annual report does not provide a detailed explanation on executive compensation, but the company's CDP submission does acknowledge that incentive compensation is tied to environmental KPIs for the board CEO, the company's chief sustainability officer, its chief risk officer and location-specific heads. A lone statement is provided in the BRSR: "Targets related to environmental KPI such as water reduction in operations, usage of alternative fuels and raw materials as well as mitigation and management of climate change impacts are part of the KRA of senior management. The board reviews the performance against these KRA on a quarterly basis."

Clarity is missing

But it is still confusing because Dalmia Bharat is the holding company and the CEO for the holding company and Dalmia Cement are different, so one wonders, from the non-specificity of the answers given, who is incentivised. Or are both CEOs, from the holding company as well as the cement manufacturer, incentivised?

Climate and sustainability expertise not explicitly stated in skills matrix

Meanwhile, a summary of board expertise showed that all five members of the board were proficient in ESG and sustainability, but climate and sustainability expertise is not a core skill that the sub-committee listed in the skills matrix. And while the company says in its CDP submission that the board's competence can be assessed by the fact that the organisation has "one of the lowest carbon footprints"

among global cement producers, what about the next crop of independent directors to come sit on the board? Will the nomination and remuneration committee explicitly state that it is looking for such expertise at that time or is the expertise of the executive directors enough? While not addressing these questions directly, Dr Bodhankar said the committee looks for whatever is necessary for the board, even though it is not clearly stated in the skills matrix.

2. Strategy

Green Portfolio Programme helps Dalmia manage its environmental impacts

Dalmia's business decisions have always been rooted in its philosophy of 'Clean and Green is Profitable and Sustainable'. In FY2011, Dalmia Cement enrolled in KKR's Green Portfolio Programme as a means of improving its environmental performance. The programme helped Dalmia manage its environmental impact by assessing and tracking improvements across several key environmental performance areas, such as greenhouse gas emissions and thermal and electrical efficiency before the private equity firm exited Dalmia Cement in 2016. It would be fair to say that Dalmia's high profile as an environmentally conscious corporate is due in no small part to its involvement in KKR's programme. That it was the first Indian cement company in the programme also helped bolster Dalmia's rising star as a "green" company and helped distinguish it from its larger peers. Puneet Dalmia is the one who engineered this shift. But until Dalmia Cement Bharat hired Singhi as MD and CEO in 2013, the company did not really have a face for its greening. Singhi's advocacy for green initiatives and Dalmia's forward thinking on sustainability and environmental issues for the cement industry cemented the company's place as a leading proponent of these issues, not only nationally but globally for Dalmia.

Weather risks loom large

Risks, identified

The company has only one standalone sustainability report that is available for download, which was prepared following the GRI G4 framework, and it showed the company's commitment to the sustainability journey. Since then its commitment to adopting international reporting frameworks showed its seriousness in achieving transparency and accuracy. In 2022, Dalmia has identified physical risks and transitional risks with a time horizon of short term (0-3 years), medium term (3-10 years) and long term (10-30 years and beyond). The physical risks identified were acute floods, storms, cyclones and extreme weather events over the short term and chronic variation in temperature, precipitation and water stress over a period of time over the long term.

Company identifies physical and transitional risks with a time horizon

Transitional risks included:

- Policy and regulation, which is long term:
  - The introduction of carbon tax or Emission Trading Scheme (ETS) in the future
- Technology, which is long term:
  - Early retirement of assets before their useful life due to low-carbon transition
- Market, long term:
  - Changing customer behaviour towards green products
  - Increased cost of raw materials
- Reputation, medium term:
  - Increased stakeholder concern or negative stakeholder feedback for not being able to achieve global targets.

Announced a carbon negative roadmap for 2040

In 2018, the company announced a carbon negative roadmap for 2040. Since then, the company has reduced its Scope 1 emissions and Scope 2 emissions by more than 9% and 30%, respectively, and achieved a carbon footprint of 489 Kg CO_2/t cementitious material against baseline of 546 Kg CO_2/t cementitious material. Being a signatory of the Science-Based Targets initiative (SBTi) since 2020, it undertook in FY2022 SBTi's approved targets of reducing its Scope 1 and Scope 2 emissions per tonne of cementitious material by 32% and 61.9%, respectively, by FY34, with FY19 as the baseline.

Achieved 80% blended cement during the year

In FY2022, Dalmia achieved 17% non-fossil power consumption out of its total power share; energy productivity increased to 2.23, a 43% improvement on the 2010 baseline; 13% thermal substitution rate was achieved by replacing fossil fuel with industrial wastes, municipal solid waste, renewable biomass and hazardous waste; and it achieved 80% blended cement during the year using 9m tonnes of alternative raw materials such as fly ash and slag. It also joined EV100 in 2021 and purchased 22 heavy-duty electric trucks for transportation of its raw materials.

Dalmia has also been using an internal carbon price of US$11 per metric ton of CO_2 since 2015 to raise supplemental funds for low-carbon projects.

Short-term action

Innovation and Green Energy Fund to invest in WHR, solar power

Dalmia has committed to interim targets on its carbon negative journey, the first being to produce only blended cement by 2025. In its 2021 annual report, Puneet and Gautam Dalmia stated that the company would be investing Rs10-12bn (US$121.2m) from its Innovation and Green Energy Fund "over the next two to three years in waste heat recovery, solar power generation systems and build capability to enhance usage of green fuel to substitute fossil fuels and clinker."

R&D core to the company as its three centres help it innovate

Research and development is core to the company and it continues to strengthen it; it has three R&D centres that are working on the quality of cement, keeping abreast of global industry trends, changing customer demands and environmental impacts. In FY22, it spent Rs40m on R&D.

Code of conduct for suppliers published

Noting that reaching its sustainability targets requires its suppliers to also be following ESG principles, it has published a code of conduct for suppliers, which encompasses ESG, including climate change. Dr Bodhankar said that the company had identified its top 20 suppliers and it had "a roadmap, a programme in place that within three years, these suppliers should meet our expectations."

Awareness key to having customers adopt blended cement

It is also raising awareness among its customers regarding green cement, with Dr Bodhankar stating that there are no other issues except the lack of awareness. "Customers do not have any concerns about the green cement, they are only interested in the commercial benefits. They are interested in blended cement, but they want to do the blending at their end, instead of buying it from us," he elaborated.

Communicate to clients that buying blended cement from them assures consistent quality

Dalmia is trying to communicate to them that buying it from the company is beneficial to them because of the consistency in quality as well as better logistics because they may not have access to the large supply chain that Dalmia has. Dalmia Cement is the largest producer of Portland Slag Cement (PSC) in India. According to the company, PSC has the "lowest carbon footprint and is the most environmentally friendly cement available commercially"[8] today.

[8] Dalmia Cement website on sustainability: www.dalmiacement.com/sustainability/

Impact of physical risks on operations insignificant, only 1% of Ebitda

With regard to physical risk, the company stated as of FY22 the impact of physical risks on its operations was less than 1% of Ebitda "and hence insignificant," but controls have been put in place. Each of its plants has an emergency response plan that is periodically reviewed. A standard operating procedure (SOP) for conducting climate risk assessment has been developed for its upcoming plants and based on the risk assessment an emergency response plan will be developed. As for transitional risk, Dalmia has both a near-term as well as a long-term roadmap, which have been approved by SBTi "with year-wise strategy and financial planning needed to reach the above targets" and includes "efforts for abatement of emissions considering our business expansion and growth."

First global cement company to commit to RE100, EP100 and EV100

Medium-term and long-term action:
To fulfil commitments to RE100, EP100 and EV100, the company plans to use 100% renewable energy, double its energy productivity by 2030, have 100% electric fleet by 2030,and achieve 100% thermal substitution rate, ie, use 100% green fuel for generating heat to replace fossil fuel by 2035.

Dalmia collaborates both locally and globally on net zero transition, being a member of a number of associations and institutions, including:

- A founding member of the First Movers Coalition (FMC) led by the US government and the World Economic Forum
- A founding member of LEADIT, a UN Leadership group for heavy-industry transition, chaired by India and Sweden
- A member of the Geneva-based Cement Sustainability Initiative (CSI), a cement sector project of the World Business Council for Sustainable Development (WBCSD)
- Sitting on the Confederation of Indian Industry Sustainability Council
- Signatories to EP (Energy Productivity) 100 and RE (renewable energy) 100 and EV (electric vehicles) 100.

Company does policy advocacy in various forums

It noted that it collaborates with government bodies and makes "periodic suggestions and recommendations to various central and state ministries and think tanks such as Niti Aayog." It also engages with the government on regulatory changes, business clearances and approvals, and ease of doing business, among other things.

CCU demonstration plant operational, key to its carbon negative roadmap

By far its most ambitious project is its carbon capture utilisation (CCU) facility. On 19 September 2019, Dalmia signed an MoU with Carbon Clean Solutions Limited (CCSL) U.K., a company that provides low-cost carbon dioxide (CO_2) separation technology, to build a plant at its Ariyular integrated plant in the southern state of Tamil Nadu. The CCU demonstration plant has a capacity of 500,000 tonnes per year. At the time, Mahendra Singhi, managing director and CEO of Dalmia Cement (Bharat) Ltd, said, "It is time to resolve the climate crisis. At Dalmia Cement, a progressive business enterprise that foresees the future today, we are committed to becoming a carbon negative cement group by 2040. Capturing process emissions from cement manufacturing will be critical towards reaching net zero by 2040 and therefore, our approach is to set up a large scalable demonstration project on carbon capture with multiple utilisation streams." The plant is ready, and a pre-feasibility study has been completed, and according to its annual report, it is now discussing "the design aspects with potential partners for CCU project activity."

Utilising carbon is still a work in progress, but Dalmia is optimistic

The issue, though, with CCUs is the utilisation of the carbon once it has been captured. While carbon capture technology has been around for decades, what to do with it is still problematic. Dalmia, however, is "optimistic." Dr Bodhankar said, "We may not have all the answers today. Once we have the economies of scale, prices do come down, and something or the other will come up. We still have another 18 years."

Dalmia sees itself leading the industry's shift from grey to green and transforming the hard-to-abate sector to a possible-to-abate one.

Government investment

Government investment is key to achieving net zero roadmap

The global cement industry has strongly emphasised over the years that governments must invest if the sector is to achieve its goal of net zero by 2050, a sentiment Dr Bodhankar echoed, explaining that he was referring mainly to policies. With India being the third-largest emitter of carbon dioxide in the world, policies and legislation for renewable energy and low-carbon technology are critical. These are areas that the Reserve Bank of India (RBI) highlighted in its December 2021 bulletin.

RBI says policy rethink necessary for high-emitting industries

In November 2021, the government announced its intention to be net zero by 2070 at the COP26, while meeting 50% of its energy requirements from renewable energy by 2030. But challenges lie ahead to achieving this vision, as the country grapples with rising urbanisation and rising per capita energy consumption, as well as its continued commitment to coal. In its bulletin, RBI said that for India to stay on track with its goals and reduce the economy's carbon intensity by 45%, there needs to be a "policy rethink across sectors" with high carbon emissions including the cement industry.

Emerging green tech solutions the way forward

The central bank suggested the way forward was to employ "emerging green tech solutions" such as reverse calcination for carbon capture and using alternatives such as biomass instead of fossil fuels for calcination. RBI acknowledged the progress made by the Indian cement industry to reduce CO_2 emission levels by "about 36 per cent from 1.12 t/t to 0.719 t/t of cement produced between 1996 and 2017", but noted that in order for it to reach its target of 0.35t CO_2/t of cement by 2050, the industry needs an investment of US$29bn to US$50bn.

RBI's policy recommendations included:

- Increasing the financing towards green sustainable solutions through subsidised interest loans;
- Proactively engaging with research institutes and countries working on cutting-edge green tech solutions for the cement industry; and
- Incentivising the industry to procure stubble from northern states as a biomass fuel for the process of reverse calcination.

Access to capital is essential for pursuing new technologies

Dr Bodhankar embraced the recommendation by RBI for financing, saying "We need funding for these technologies, access to capital is very important and the capital has to come at a cheaper rate. If we don't do this, they are going to blame us, but if we are doing this voluntarily, then there has to be some sort of encouragement; it can be in the form of low-cost loans, in the form of grants, it could be in the form of subsidies . . . any form of support."

Green Hydrogen policy announced; green hydrogen and ammonia the fuels of the future

Green Hydrogen

Another piece of welcome news was PM Modi's launch of the National Hydrogen Mission on 15 August 2021. The Mission's aim is to help the government achieve its climate targets and make the country a green hydrogen hub. The Ministry of Power, when announcing the Green Hydrogen Policy in February 2022, said green hydrogen and ammonia are the fuels of the future, and will replace fossil fuels. It further stated that these two alternative fuels were "one of the major requirements towards environmentally sustainable energy security of the nation." The Policy also promotes renewable energy generation as it is essential for manufacturing green hydrogen, a fossil-free fuel that can help hard-to-abate sectors decarbonise and meet their net zero targets.

Hydrogen necessary for CCU plant to be fully functional

Green hydrogen is a fuel Dr Bodhankar says is necessary for its carbon capture and utilisation plant to be fully functional. The plant currently "may not be economically viable because of the prices of green hydrogen" and it is likely that with the policy, green hydrogen could come down "to US$1 per tonne" making it more financially feasible for Dalmia to use.

Domestic carbon trading market could be a reality by 2023

Domestic carbon trading market

A final key piece of legislation, the Energy Conservation (Amendment) Bill 2022, was passed by the Lok Sabha (Lower House of Parliament) on 8 August 2022 and is now awaiting approval in the Rajya Sabha (Upper House of Parliament). One of the key provisions of the Bill, which many hard-to-abate sectors have been anticipating, is empowering the government to set up a carbon credit market.

According to Dr Bodhankar, when the company is making an effort to bring down its carbon footprint, it should be able to get the right price in the market. He stated that if Dalmia sells its tradeable carbon credit in the European market, it can make £80, so when the same credit is sold in India, the company should not get £10 or £12. "That is not fair," he said.

However, rules and guidelines for trading carbon credits have not yet been notified and will not be until the Bill passes the Rajya Sabha. Dr Bodhankar believes, though, that the market will be in place by next year.

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Risk management, metrics and targets: Key highlights

- **Context - cement in an ESG world:** Cement is the third-largest industrial energy consumer globally and it accounts for 7% of global CO_2 emissions. India accounts for 6% of global cement consumption and is one of the fastest growing markets globally. Hence, it plays a key role in global cement-related carbon emissions.
- **Sustainability - measurable targets:** Dalmia has taken carbon emission reduction targets approved by the Science-Based Targets initiative (SBTi) to reduce Scope 1 CO_2 emissions by 32% and Scope 2 CO_2 emissions by 61.9% by FY34, with FY19 as baseline year. For the long term, it has adopted a target to be carbon neutral by 2040.
- **Steps taken:** Clinkerisation is the most carbon-emitting step in the cement manufacturing process. To achieve its carbon neutral goal, Dalmia aims to increase clinker factor, raise alternate fuel/renewable energy usage and double energy productivity, among other steps.
- **Risks:** Dalmia has formalised an Enterprise-wide Risk Management (ERM) Programme and Framework to facilitate risk-informed decision-making, keeping its focus on the six capitals - Financial, Intellectual, Manufactured, Natural, Human and Social & Relationship Capital. Based on these, it has identified its risk appetite and tolerance limits to assess the impact of the risks in achieving its strategic objectives. For transitional risks, Dalmia has developed a near-term and a net-zero (long-term) roadmap (approved by Science-Based Target Initiative (SBTi)) with year-wise strategy and financial planning needed to reach the above targets. In terms of physical risks, as of FY 22, the impact of physical risks on Dalmia's operations is less than 1% of Ebitda.
- **What to watch for:** In terms of next monitorables for Dalmia's risk assessment, more details of granular near-term targets would be appreciated. On sustainability, we believe Dalmia is on the right track. It has also earmarked capex of Rs10-12bn towards sustainability initiatives. However, given cement manufacturing will remain a carbon-emitting process, breakthrough in new technologies and supportive legislation would be key to achieve its net zero goal.

3. Risk management

Dalmia has been building on its risk management over the years. In FY22, it instated a risk management policy and framework to better evaluate and mitigate business and ESG risks. In line with the Taskforce on Climate-related Financial Disclosure (TCFD), it has evaluated the climate change impact and is already adopting a strategy to address this threat.

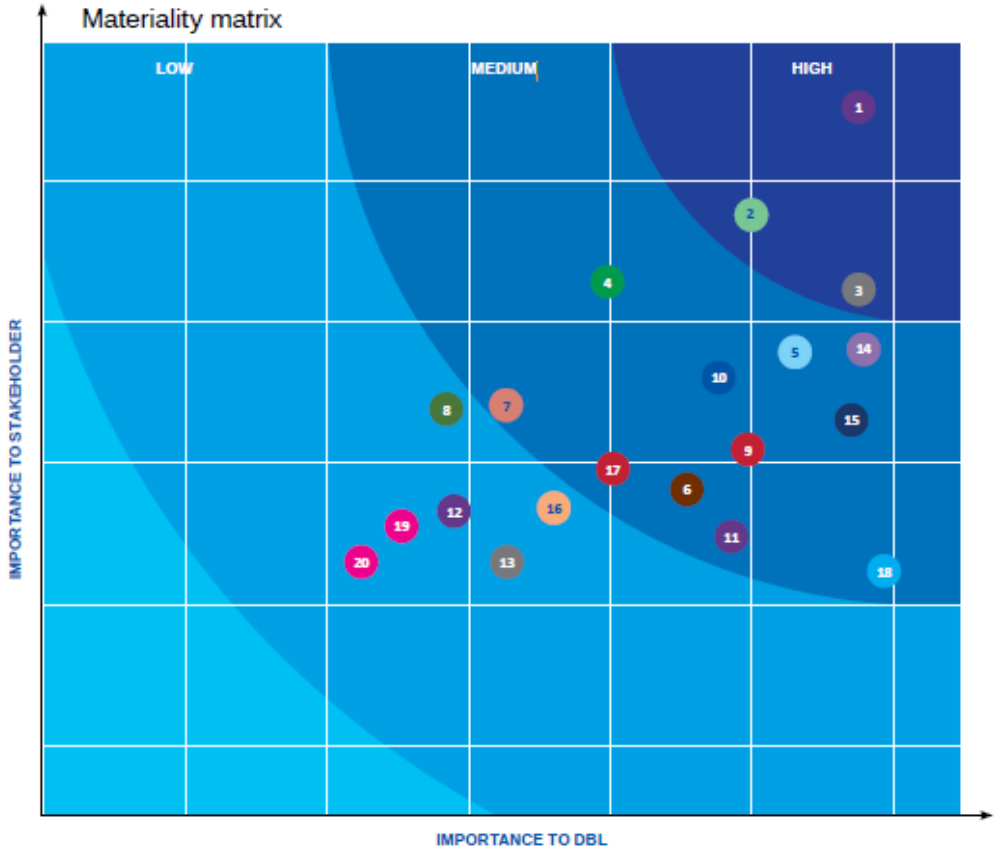
Dalmia has formalised an Enterprise-wide Risk Management (ERM) Programme and Framework to facilitate risk-informed decision-making, keeping its focus on the six capitals. The ERM process is aligned with international standards like COSO ERM 2017 and ISO 31000:2018. Its climate-related risk management process is integrated into a multi-disciplinary company-wide risk management process.

Materiality matrix defines core issues

The underlying foundation of Dalmia's risk management has been a robust materiality assessment on FY21 and evaluation of 20 topics that are material to the company and its stakeholders. This also helps Dalmia incorporate ESG priorities with business processes. Per the company, as of FY22, the impact of physical risks on Dalmia Bharat operations is less than 1% of Ebitda and hence insignificant.

Figure 4

Dalmia materiality matrix



Material issues

High risk ↑	Medium risk ↔	Low risk ↓
1. CIRCULAR ECONOMY	4. CUSTOMER AWARENESS ON GREEN CEMENT	8. SUSTAINABLE VALUE CHAIN
2. CLIMATE CHANGE	5. WATER CONSERVATION	12. DIVERSITY AND GENDER EQUALITY
3. ALTERNATIVE (GREEN) FUEL USAGE	6. BIODIVERSITY	13. EMPLOYMENT AND LABOUR PRACTICES
	7. EFFLUENT & WASTE MANAGEMENT	16. PRICING INTEGRITY
	9. COMMUNITY DEVELOPMENT	19. GRIEVANCE REDRESSAL
	10. TALENT MANAGEMENT	20. LAND ACQUISITION FOR MINES AND NEW PROJECTS
	11. OCCUPATIONAL HEALTH AND SAFETY	
	14. ECONOMIC PERFORMANCE	
	15. CORPORATE GOVERNANCE	
	17. PRODUCT INNOVATION	
	18. BRANDING AND REPUTATION	

Source: Dalmia

Approach: Dalmia has formalised an Enterprise-wide Risk Management (ERM) Programme and Framework for a comprehensive evaluation of its risk exposures. The process is aligned with leading international standards such as COSO ERM 2017 and ISO 31000:2018.

Figure 5

Dalmia risk management process

Risk management process under the ERM framework

Source: Dalmia

Dalmia has identified six key capitals to focus its business decisions: Financial, Intellectual, Manufactured, Natural, Human and Social & Relationship Capital. Based on these, it has identified its risk appetite and tolerance limits to assess the impact of the risks in achieving its strategic objectives. The Board has constituted the Risk Management Committee (RMC), a sub-committee of the board and has also appointed a Chief Risk Officer.

Figure 6

Dalmia: key risks to the business

Key risks to the business

RISKS	Commodity prices	Climate change	Competition	Talent Management
	Volatility in the commodity prices i.e., of fuel and raw materials.	Based on the TCFD[1] recommendations we have identified climate related risks and carried out scenario analysis.	Competition with pan-India peers and emergence of new entrants.	Ability to attract and retain talent for critical roles with key skillsets
	Capital impacted: Financial	**Capital impacted:** Natural, Social and Relationship	**Capital impacted:** Financial and Intellectual	**Capital impacted:** Human
OUR MITIGATION STRATEGIES	We are looking to move towards green power and alternative (green) fuels such as bio-mass, municipal and industrial wastes reducing use of fossil fuels. We are also making efforts to reduce clinker to cement ratio.	We ensure that the climate risks and associated mitigation/adaptive controls are embedded at the inception stage itself. The details of our mitigation measures can be read on page 58.	Focus on producing blended cement and low carbon cement varieties along with cost leadership, focus on quality & innovation and customer satisfaction.	We have a robust talent management framework is put in place. We have enhanced focus on training, capacity building and multiskilling. Succession planning is done for all critical roles.

We have identified Commodity Prices and Talent/People Management as the emerging risks for our company in next 3-5years.

[1] TCFD - Task Force on Climate related financial disclosures
The Climate change risks have been discussed in detail in the TCFD Section of this report (refer to page 63)

Source: Dalmia

It has consistently evaluated and improved upon its risk management framework. Some of the recent changes include:

- Anticipate and measure emerging risks and opportunities
- Embed risk-based decision-making and implement mechanisms to reward best practices
- Integrate the ERM framework with the Environment, Social and Governance (ESG) practices of the group
- Extend risk management practices beyond risk mitigation and build contingency and business continuity mechanisms

Incorporate sustainability into risk-management framework: For transitional risks, per Dalmia, the company has also introduced an internal carbon pricing mechanism to support further carbon reduction.

For physical risks, Dalmia has several engineering and administrative controls. For existing plants, it already has an emergency response plan that is regularly reviewed, while for upcoming plants it has a standard operating procedure (SOP) for conducting climate risk assessment. As of FY22, the impact of physical risks on Dalmia's operations is less than 1% of Ebitda.

Figure 7

Risk-management strategy

TCFD Category	Risk Description	Time Horizon
Physical Risks	❑ Acute floods, storms, cyclones and extreme weather events	Short term
	❑ Chronic variation in temperature, precipitation and water stress over a period of time	Long term
Transitional Risks	**Policy and regulation**	Long term
	❑ Introduction of carbon tax or Emission Trading Scheme (ETS) in future	
	Technology	Long term
	❑ Early retirement of assets before their useful life due to low-carbon transition	
	Market	Long term
	❑ Changing customer behaviour towards green products	
	❑ Increased cost of raw materials	
	Reputation	Medium term
	❑ Increased stakeholder concern or negative stakeholder feedback for not being able to achieve global targets	

Note: Short term (0-3 years); Medium term (3-10years); Long term (10-30 years & beyond). Source: Dalmia

We noticed Dalmia has also disclosed estimated financial impact of identified physical and transition risks as well as estimated cost of response to the risks.

Basis of estimate is discussed in Dalmia's 2021 CDP Climate Change Questionnaire. However, we noticed it is difficult even for companies already taking action to estimate the financial impact with more accuracy. The impact transmission paths to financial statement line items or management accounting items could be made clearer. Given the high level of estimation and uncertainty in these figures, it is good effort from Dalmia to try to disclose.

Figure 8

Climate-related risks identified and estimated financial impacts

Risk type	Risk description	Primary potential financial impact	Time horizon	Likelihood	Magnitude of impact	Estimated financial impact figure	Estimated cost of response to risk
Transition risk for direct operations - Current regulation	1) Investments are made to meet PAT targets 2) Benefits of energy saving certificates may not be realised from PAT Scheme due to low market price of the certificates	1) Increased capital expenditure due to PAT scheme investment 2) Increased financial liability due to potential loss in revenue	Short-term	Likely	Medium	1m INR potential liability	1m INR potential liability
Transition risk for direct operations - Emerging regulation	1) Upcoming policies to encourage higher level of alternative fuel use	1) Increased capital expenditure for investing in alternative fuel 2) Cost of managing alternative fuel facilities 3) Opportunity cost of coal required to substitute alternative fuel given policy uncertainty	Medium-term	Likely	Medium-high	6.5bn INR opportunity cost of coal	6.5bn INR opportunity cost of coal
Chronic physical risk for direct operations - Change in precipitation patterns and extreme variability in weather pattern	Deficient monsoons and depleting ground water table have the potential to impact production capability at some sites	Decreased revenues due to reduced production capacity	Long-term	Unlikely	Medium	-	-

Note: Short term (0-3 years); Medium term (3-10years); Long term (10-30 years & beyond). Source: CLSA analysis, Dalmia CDP Climate Change Questionnaire 2021

4. Metrics and targets

Dalmia Bharat has reported Scope 1, 2 and 3 emission data and has taken carbon emission reduction targets approved by the Science-Based Targets initiative (SBTi) to reduce Scope 1 CO_2 emissions by 32% and Scope 2 CO_2 emissions by 61.9% by FY34, with FY19 as baseline year. For the long term, Dalmia Bharat has taken a target to be carbon neutral by 2040.

Figure 9

Dalmia: sustainability vision

Source: Dalmia

Dalmia has highlighted aggressive targets around ESG, which not only encourages interest from ESG-focused investors but also augurs well for reduction in operating costs over the medium to long term

Our interactions with the company give us confidence that it is taking meaningful steps towards this goal. It has set steep targets to achieve these goals like increasing use of alternate fuels, renewable power, electric vehicles and raising energy productivity.

Figure 10

ESG targets highlighted by Dalmia

Carbon footprint	Commit to become carbon negative by 2040
EP100	Double energy productivity by 2030
RE100	Use 100% renewable fuel by 2035
EV100	Use increasingly higher proportion of electric vehicles by 2030
Scope 1 emission	Reduction by 32% in FY34 from baseline of FY19
Scope 2 emission	Reduction by 61.9% in FY34 from baseline of FY19
Alternative fuel usage	100% alternative fuel and sustainable biomass (% TSR) by 2035

Source: Dalmia Bharat

Dalmia Bharat uses internal carbon pricing (ICP) as an important enabler for decarbonisation. The shadow ICP of US$11/T of CO_2 is applied on a project-by-project basis on low-return projects with a long payback period.

Consistent evaluation of progress has been a key feature of Dalmia's ESG journey. While there has been periods when emissions have been volatile, Dalmia has been focused on taking corrective steps.

Figure 11

ESG - report card

Aspect	Target	Achievement - FY22
Climate change mitigation	1. Scope 1 GHG emissions: Reduction by 32% per tonne of cementitious material by FY34 from FY19 base validated by SBTi. 2. Scope 2 GHG emissions: Reduction by 61.9% per tonne of cementitious material by FY34 from FY19 base validated by SBTi. 3. Carbon negative by 2040.	1. Scope 1 emissions - 9% reduction against 2019 baseline. 2. Scope 2 - 30% reduction against 2019 baseline. 3. Achieved carbon footprint of 489KgCO_2/t cementitious material against 546KgCO_2/t cementitious material.
Renewable energy	Usage of 100% renewable power under fossil free electricity initiative by 2030 (RE 100).	17% is the share of non-fossil power consumption out of the total power share.
Energy productivity	To double the energy productivity by 2030 (EP 100), baseline 2010-11.	The energy productivity has increased to 2.23, which is 43% improvement compared to 2010 baselines and we are in-line with our target of doubling energy productivity.
Alternative (green) fuels	100% thermal substitution rate, ie, using 100% alternative (green) fuel for generating heat to replace fossil fuel by 2035.	15% thermal substitution rate achieved this year by replacing fossil fuels by industry wastes, municipal solid waste, renewable biomass (bamboo/plantation), hazardous waste.
Electric vehicles	Use of electric vehicles for significant EV transition by 2030 (EV100).	Joined EV100 in 2021 and in the first year of the target, we have purchased 22 heavy duty electric trucks for transportation of our raw materials.
Blended cements (low carbon cements)	Switch to 100% blended cement production by 2026.	80% blended cement share achieved this year using 9 million tonnes alternative raw materials like fly-ash, slag and others.

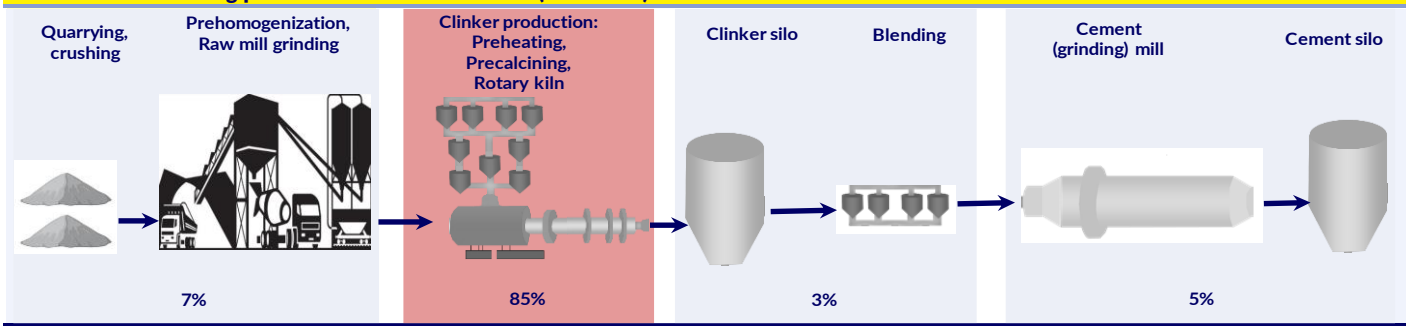
Source: CLSA, Dalmia Bharat

Emissions trend

As we dig deeper into the cement manufacturing process, we note that clinkerisation accounts for 85% of total carbon emissions of the cement manufacturing process. Hence a low clinker ratio is key for reducing direct Scope 1 CO_2 emission.

Figure 12

Cement manufacturing process and carbon emission (% of total)

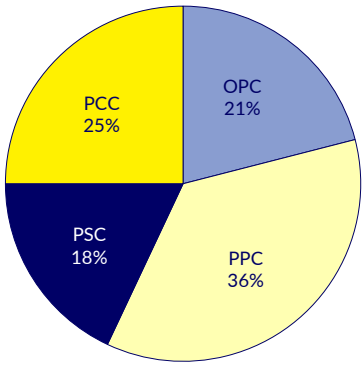


Source: CLSA, Industry

Dalmia's focus is on raising its cement-to-clinker ratio and creating more sustainable products, through a higher proportion of blended cement. Higher usage of alternate raw material in kilns instead of fossil fuels will also lead to lower Scope 1 emission. Dalmia has targeted full replacement by non-fossil fuels in kilns by 2035. Dalmia has set specific targets on both these fronts.

Figure 13

Cement mix - FY22



Source: CLSA, Dalmia Bharat

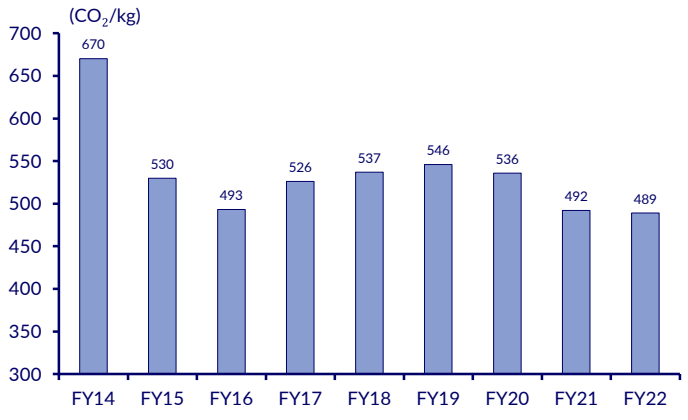
Figure 14

Clinker conversion ratio of cement companies

Source: CLSA, Dalmia Bharat

Figure 15

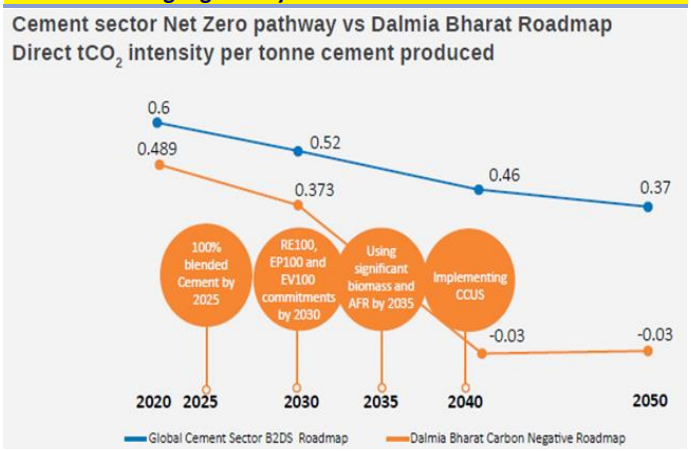
Carbon footprint



Source: CLSA, Dalmia Bharat

Figure 16

CO_2 emission highlighted by Dalmia

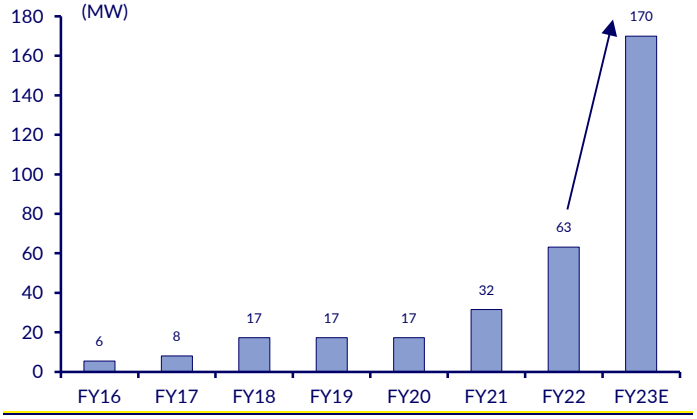


Source: Dalmia Bharat

Scope 2 emissions are indirect emission like in transportation or for power used for cement grinding units. Two key ways Dalmia is looking to reduce these emissions is by way of higher renewable power usage and transforming its fleet to electric vehicles.

Figure 17

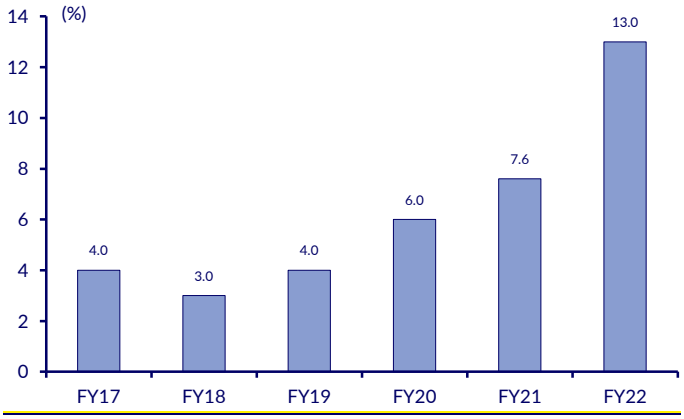
Proportion of green power (WHRS + renewables)



Source: Company data

Figure 18

Alternate fuel usage



Source: Company data

Comparative analysis

Dalmia has the highest proportion of sales in the east of India, which is typically a high slag cement market and has a higher cement/clinker ratio. Post its ongoing expansion, Dalmia's capacity will be more geared towards the east. Moreover, it is also evaluating new technologies and cement variants like composite cement, which will also enable it to reduce Scope 1 (direct) carbon emission.

Figure 19

ESG parameters - comparative analysis

as per latest annual report	Dalmia	Ultratech	Shree	ACC	Ambuja
Carbon emissions - Scope 1	489	582	529	488	529
Thermal substitution rate (%)	13	5	2	7	5
Alternative raw material (%)	39	19	27	31	32
Specific thermal energy consumption	727	835	853	863	867
Clinker factor (%)	61	72	63	58	63

Source: CLSA, Company data

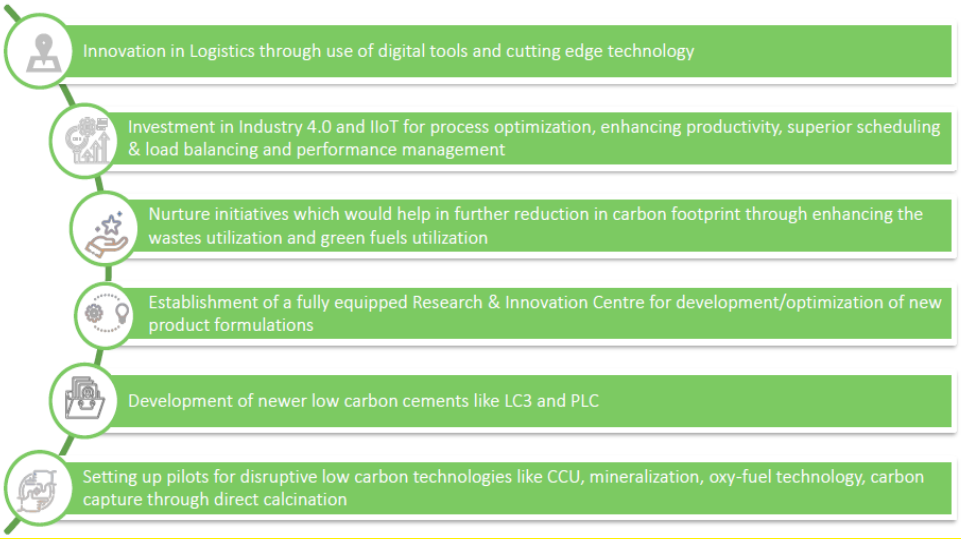
Breakthrough in new technologies key

Despite aggressive steps being taken, cement manufacturing will remain a carbon-emitting process. Breakthroughs in technologies like Carbon Capture and Utilisation (CCU), direct calcination, etc, is key for achieving the net zero goal. Moreover, unlike several other developed nations, India is yet to have robust waste collection and processing legislation. As such, we believe progress on some of these external milestones would be key for achieving its net zero goal.

Dalmia has earmarked a capex of Rs10-12bn towards sustainability initiatives

Figure 20

Innovation and Green Energy Fund



Source: Company data

Hon Hai: Have targets, will execute

- ❑ The company has set net-zero targets and interim goals to reduce emissions but details on how to meet these are still under discussion, with a full report expected in December 2022
- ❑ Investor engagement has played an important role in Hon Hai's net zero focus
- ❑ A Sustainability Committee, led by the Chairman/CEO drives climate initiatives
- ❑ Acute short-term physical risks pose core challenge with droughts and floods in China already prompting a rethink on manufacturing diversification.
- ❑ Massive logistical process in responding strategically, given 10,000 suppliers, 1m employees, and operations across multiple jurisdictions

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Introduction

The world's largest Apple iPhone maker freely admits to being at the early stages of integrating climate into its governance and strategy, but is confident that it can meet its sustainability ambitions by applying its existing execution capability. The company is clear on the 'what', and is very much in the process of figuring out the 'how.' It has hit the ground running in setting targets (it is beginning to apply the TCFD framework, has set a net-zero target and is joining SBTi), but recognises it will take a lot of work to achieve them. With the help of consultants, Hon Hai is in the process of building a coherent plan to communicate to stakeholders. As one might expect for such a high-profile company, expectations and pressure from consumers and investors is palpable. Meanwhile blunt encounters (notably floods and drought) have impacted production and brought home the reality of climate change.

Hon Hai has set a Net-Zero target and joined SBTi

Background

Hon Hai Precision Industry Co, also known internationally as Foxconn and trading as Hon Hai Technology Group, is a Taiwanese electronics manufacturer operating in 24 countries via its 137 campuses. Its manufacturing facilities are mainly in China, with additional operations in India, Japan, Malaysia, and South Korea in Asia; as well as the Czech Republic, Hungary, and Slovakia in Europe; and Brazil, Mexico and the US in North America. Its core business is comprised of four major product categories: smart consumer electronics, cloud and networking, computing, and components and others. Depending on the season, it has anywhere from 900,000 to 1.3 million employees, making it one of the world's largest employers. Customers include Amazon, Apple, Cisco, Dell and Google.

The electronics manufacturer is one of the largest employers in the world

Ownership and operations

Hon Hai was founded in 1974 by Terry Gou and went public in 1991. Gou remains the largest shareholder, with around 12.6% of shares. He currently serves as a director, having relinquished the chairmanship in 2019 to embark on a bid for the presidency of Taiwan, losing in the primaries. The next largest shareholder is the government of Singapore with 2.4%, and other institutional investors round out the top 10. [9]

Founder and director Terry Gou is the largest shareholder with 12.6%

The company is now led by chair and CEO Young-way (Young) Liu with a board of nine members, two of whom are women, with the goal of having 30% women directors, although a timeline for doing so is not evident. Around 60% of the company's NT$5.99 trillion (US$194 billion) revenue in 2021 came from its smart

Chairman Young-way Liu now leads the company

[9] Annual report 2021

consumer electronics business, featuring products such as smartphones, TVs and game consoles, while cloud and networking products such as servers and communication networks brought in 23%. Another 21% came from computers and tablets and the remainder from components and other products.

Main source of emissions

The main source of emissions is purchased electricity

The company's main source of emissions is purchased electricity: Scope 2 emissions were 5,982,836 tCO_2e in 2021, while Scope 1 emissions were 237,946 tCO_2e. The company is working on compiling Scope 3 figures. Operations in Asia accounted for 98.7% of emissions. The company discloses global energy consumption data for power consumption, natural gas, gasoline, diesel, and liquefied petroleum gas. Power consumption in 2021 in Asia alone was 9,191 Million kWh (which equals 9,191 Gwh) or 33,088,438 GJ. This accounted for about 86.8% of the company's 38,108,897 GJ global energy consumption from all the sources listed above.

A summary of Hon Hai's climate initiatives and commitments

Figure 21

Hon Hai's climate reporting, commitments and goals

Initiative	Status
Follows the TCFD disclosure framework	In process, committed since 2020
Annual sustainability report	✓ Since 2009
Net zero goal	✓ Set in 2021; strategy, timeline in process
Commits to the Science Based Targets Initiative (SBTi)	✓ Committed; verification expected in 2023
Aligns reporting with Global Reporting Initiative (GRI)	✓ Since 2014, required in Taiwan
Climate change policy	In process
Assurance of sustainability information	✓ Moderate assurance; AA1000AS v3 assurance standards and Type I moderate level AccountAbility Principles; compliance with the GRI Standards Core option and SASB

Source: ACGA

Reporting and initiatives

The company has produced ESG disclosures since 2009

Hon Hai produced its first corporate environmental and social responsibility report in 2009, with reports since 2010 available on its website. It began CDP climate disclosure in 2015, earning a D at the time, improving to a B- for 2021. It discloses under the GRI framework as required in Taiwan for firms of its size and also aligns disclosure to SASB.

The company plans to reduce GHG emissions by 21% before 2025, by 42% before 2030, and 63% before 2035

It pledged in November 2020 to reach net zero GHG emissions by 2050 and to provide disclosure in accordance with TCFD. It kicked off its TCFD process in 2021 and has been preparing for this disclosure through 2022. The company announced its interim targets on Earth Day 2022. Using 2020 as the base year, it plans to reduce emissions by 21% before 2025, by 42% before 2030, and 63% before 2035. It also aims to raise the proportion of green energy usage to more than 50% by 2030.

Hon Hai expects SBTi approval in 2023

The company has made its commitment to the SBTi Business Ambition for 1.5°C initiative, and submitted its disclosures to CDP and SBTi. It expects to obtain verification and approval in 2023.

Its disclosures follow GRI as required by the Taiwan Stock Exchange

Since 2014, Hon Hai has been required under Taiwan Stock Exchange listing rules to submit a sustainability report prepared in accordance with GRI standards, as well as information on ESG metrics and targets. From 2021, Taiwan also began to require TCFD-style governance disclosure on climate-related risks and opportunities, actual and potential climate-related impacts, as well as information on how it identifies, assesses and manages climate-related risks, and its associated metrics

and targets. Under amendments made in September 2022, it will be required to disclose Scope 1 and Scope 2 emissions for the parent company from 2023 and on a consolidated basis including subsidiaries from 2025. While assurance is currently encouraged under the market's Sustainability Code, it will be required for GHG disclosures from 2024 for the parent-only figures and 2027 on a consolidated basis.

1. Governance

A repurposing of committee to meet climate, ESG challenges

A Sustainability Committee drives Hon Hai's governance and strategy on climate change, with overall oversight of these issues residing with the board. The committee took on this name in 2022, previously being known as the Corporate Social Responsibility Committee since 2017. The committee began as the Social and Environment Committee in 2007, overseeing the company's first corporate environmental and social responsibility report in 2009. The company views the name change as more than simple cosmetics, claiming a shift in tone at the top to focus on greater integration of ESG issues into Hon Hai's daily operations.

Sustainability Committee plays central role

A dedicated committee is the key motor for sustainability issues

Although the board of Hon Hai Group provides guidance and oversight on sustainability issues, the heart of Hon Hai's sustainability governance lies with its Sustainability Committee. This senior management-level committee under the chairman's office serves as the nexus of decision-making and communication on all ESG and sustainablity-related issues and initiatives including strategies, policies, and implementation. Chairman and CEO Liu chairs the committee. The vice chair is James Wu, Hon Hai spokesman, head of the chairman's office and head of Corporate Communications.

The Sustainability Committee includes ESG executives and a supporting office

The remaining members are senior managers and each take ownership of E, S and G respectively: environmental issues are handled by Ron Horng, head of the Environmental Protection Department, which also produces a draft climate strategy and handles the roll out of ESG initiatives throughout the supply chain. Emily Hsia, head of Human Resources covers social issues. Governance is the responsibility of Galatea Chao, head of Audit. The committee is supported by the Sustainability Promotion Office, which is a dedicated coordination and implementation unit with seven full-time staff members headed by Martin Hsing, Assistant Vice President.

Chairman and CEO Liu chairs the high-level committee

At the head of the Sustainability Committee is Chair and CEO Liu. Chairman/CEO duality is extremely common in Taiwan, where it is perceived as offering the advantage of speed and agility in decision-making and execution, as well as facilitating communication between management and the board. To offset the possible concentration of control of the company, Hon Hai has a majority independent board (five of nine members). The board has also added ESG KPIs to its remuneration policy for the board and chair.

Hon Hai's chair was a successful entrepreneur before joining in 2007

Liu joined Hon Hai in 2007 as Special Assistant to founder Terry Gou. Prior to this, Liu was a successful entrepreneur in his own right. He founded motherboard company Young Micro Systems, IC design company ITE Tech, and ADSL IC design company ITeX. Young Micro merged with Hon Hai in 1994, while ITeX listed on NASDAQ in 2001.

Liu served as the general manager of business groups before becoming CEO

Before becoming CEO and Chair in 2019, Liu served as General Manager of Hon Hai's Innovation Digital System and Semiconductor business groups, as well as a board member of Sharp Corp. Liu holds a master's degree in electrical engineering from the University of Southern California, as well as a bachelor's in electrophysics from Taiwan's National Chiao Tung University.

Independent Director Wang Guo-cheng serves as an ESG communication channel for shareholders

Multiple channels of communication

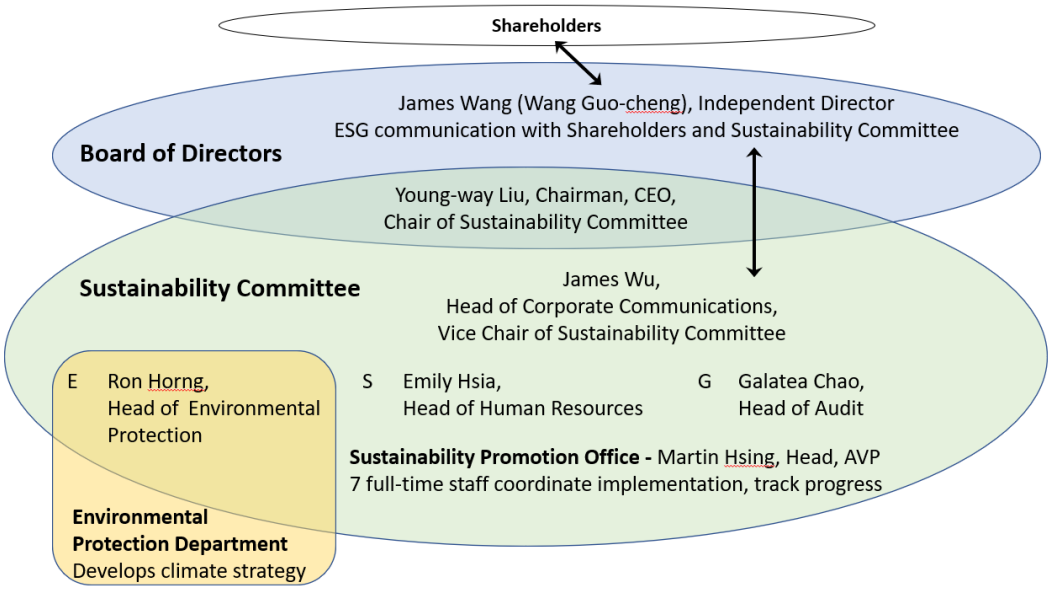
Although not a member of the Sustainability Committee, another person with an important role to play is independent director James (Guo-cheng) Wang. Wang is responsible for communicating directly with shareholders on ESG issues and bringing their insights back to the board as well as to the Head of Corporate Communications James Wu, with whom he has direct and constant communication.

Head of Corporate Communications James Wu serves as a lynchpin for sustainability work and communication

Wu serves as an important lynchpin to all of the efforts of the Sustainability Committee. In addition to hearing from Independent Director Wang about shareholder ESG concerns, Wu also hears from them directly as the company spokesman and head of communications. However, beyond this, he is also the vice chair of the Sustainability Committee, as well as the Head of the Chairman's Office. In addition to being directly involved with decision-making on sustainability issues at the management level in the committee, he is also able to oversee and coordinate internal communication across the organisation. He also reports directly to the board a few times a year on the committee's work.

Figure 22

Relationship between Board, Sustainability Committee, Sustainability Promotion Office and Environmental Protection



Source: ACGA

Wu has held multiple executive roles in the IT sector

Wu holds an MBA from Michigan State University and has more than 25 years of experience in accounting, finance, IR and investment. His previous roles include chief investment officer and spokesperson of Catcher Technology, a casing manufacturer, and chief financial officer of Chunghwa Picture Tubes, a TFT-LCD maker.

Head of the Environmental Protection Department has education in environmental engineering and health

Background of ESG executives

Horng began his career in the high-tech industry after earning master's degrees in environmental health sciences from Harvard University and civil and environmental engineering from MIT. Since then, he has worked in a broad array of roles: as a technical manager in the semiconductor equipment industry, developing the TFT-LCD industry in Shanghai, supply chain management, developing green manufacturing sites, technical coordination with stakeholders to achieve compliance, and establishing new sites and operations across Asia.

The heads of human resources and audit have decades of experience in their fields

Emily Hsia has 25 years of experience in a variety of industries including financial, consulting as well as high-tech. Her bachelor's and master's education is in Chinese intellectual history. Galatea Chao has 20 years of experience in accounting and internal audit, and holds a variety of certifications including in fraud examination, cybersecurity, and internal audit and controls.

The experience of the Sustainability Committee in full

Figure 23

Sustainability Committee	
Members	**Position and Background**
Young-way Liu, Chair	Hon Hai Chairman and CEO; general manager semiconductor and innovation; board director Sharp; entrepreneur; founder of NASDAQ-listed ITeX; master's degree in electrical engineering, University of Southern California
James Wu, Vice Chair	Spokesman, head of the chairman's office, head of corporate communications; 25 years in accounting, finance, IR and investment. CIO and spokesperson Catcher Technology, CFO Chunghwa Picture Tubes, MBA Michigan State University
Ron Horng, Environment Lead	Head of Environmental Protection; 20+ years in high-tech industry, implementation of green projects, master's degrees in environmental health sciences, Harvard University, and civil and environmental engineering, MIT
Emily Hsia, Social Lead	Head of Human Resources, 25 years in financial, consulting and high-tech; master's in Chinese intellectual history
Galatea Chao, Governance Lead	Head of Audit, 20 years of experience in accounting and internal audit, and holds a variety of certifications including in fraud examination, cybersecurity, and internal audit and controls
Sustainability Promotion Office	
Dr. Martin Hsing, Head	Assistant Vice President; PhD in Environmental Engineering from National Taiwan University

Source: Hon Hai

Sustainability Promotion Office supports implementation

Hon Hai veteran AVP Martin Hsing oversees the Sustainability Promotion Office

Supporting the Sustainability Committee is the Sustainability Promotion Office, which was set up in the first quarter of 2022. This unit is dedicated to implementation, as well as tracking progress and assessment. It is headed by Assistant Vice President Martin Hsing, a 15-year veteran of Hon Hai and holder of a PhD in environmental engineering from National Taiwan University. He oversees the office, its three units and seven full-time staff. The three units focus on policy and planning, operations and audit. The office also oversees the US$65m ESG fund, which can be used by internal divisions to hire outside service providers to help them achieve ESG targets.

The Sustainability Committee meets twice a month - once with the CEO and once without

The Sustainability Committee meets twice a month, once with Chairman and CEO Liu and once without him. When Liu is not present, James Wu serves as chair. In these meetings, the group shares information and progress updates, identifies new issues or projects, and brainstorms options. The group identifies the most promising options and then brings them to the meeting with CEO Liu. In those meetings, Liu offers his feedback, suggestions and approval. When necessary, decisions are escalated to the full board, which also receives reports from the committee twice a year. Issues escalated include ESG planning and ESG standards for the group. Other issues, such as ESG auditing schemes and setting up ESG control centres, do not require consideration by the board. When escalation is not necessary, the committee is able to begin implementation immediately.

Implementation begins with internal communication

Implementation can take a number of forms - directives from CEO Liu, internal communication handled by James Wu, horizontal communication with the group Operations Committee, department level implementation handled by the respective CXO's for environment, social or governance, or further implementation processes handled by the Sustainability Promotion Office.

The Sustainability Promotion Office has policy, operation and audit departments

To handle its implementation work, the Sustainability Promotion Office has three departments: policy planning, operation promotion, and audit management. The policy planning department handles such things as ensuring that the group's ESG policies, guidelines and codes of conduct are current; keeps up to date on recent external policies, best practice and regulatory changes; liases with external organisations; and handles internal communication and external assessments.

The operation promotion department plans the structure of projects

The operation promotion department carries out cross-unit ESG project planning, implementation, progress control, and tracking. It is also responsible for planning the structure of projects, submitting proposals, risk control and preparing briefings. It compiles sustainability disclosures and is responsible for international sustainability indicators and ratings, such as MSCI, Sustainalytics and so on. It is also responsible for planning and executing ESG training, as well as ESG staffing and management.

The audit department builds data collection systems and tracks down missing information

The audit management department covers the drafting, revision and interpretation of the group audit system. It also handles building the ESG data collection system for the assessment of ESG risks. It recruits and trains audit-related staff; conducts on-site audits and inspections to ensure ESG compliance; and conducts investigations as needed. It tracks down missing information and reviews ESG audits for inaccuracies.

Promotion is then replicated worldwide

This activity of the Sustainability Promotion Office is replicated throughout the organisation. Each business group has its own promotion group and dedicated ESG team. More than a thousand people worldwide are tasked with implementing the company's sustainability policies and are monitored by the Sustainability Committee.

History and Cultural Transformation

The Sustainability Committee started life as the Social and Environment Committee

The Sustainability Committee is the latest incarnation of what began life in 2007 as the Social and Environment Committee that oversaw the publication of Hon Hai's first corporate environmental and social responsibility report in 2009. The committee primarily focused on social issues and employee welfare following a spate of employee suicides in 2010 that attracted global attention. The committee morphed into the Corporate Social Responsibility Committee in 2017 before finally becoming the Sustainability Committee in 2022 and its CSR report renamed to sustainability report from 2020.

The transfer of the chairmanship to Young Liu was a turning point

While this change in name may seem cosmetic, Martin Hsing says it is the culmination of a fundamental change in the tone at the top which guides the culture of the company and its views on transparency and ESG issues, a shift that began with the transfer of the chairmanship from Terry Gou to Young Liu: "When Terry Gou was the CEO, he focused more on reducing costs and achieving a higher profit. He had a very strong urge to control, kind of like [German statesman Otto von] Bismarck, while treating his employees very well. However, CEO Liu has a different view. He always mentions that we are part of a global village, and he would like to be more open to everyone. He thinks we need to expand CSR to a broader area, we have to take ESG into our daily operations. So after some time we changed the name to the Sustainability Committee to catch up with the global trend."

Perceptions have shifted from CSR as a "nice-to-have" to long-term sustainability

James Wu agrees with the importance of re-naming the committee. "Before CSR was a nice-to-have and considered a kind of cost, but when you rename it, it's not just for social purposes anymore, it's for the company's long term sustainability. Also, from the financial point of view, TCFD will be related to the numbers. So now we need to figure out what are the real factors and impact on the numbers."

Committee structure helps the team move with agility, according to execs

Hsing and Wu also say that Liu taking leadership of the committee has made it more effective and efficient. As Hsing says, "Chairman Liu offers tremendous support. First we are led by James Wu to discuss and reach a conclusion on what to do. Then once Chairman Liu endorses it, we can go do it without any obstacles."

Engagement with investors

Spokesman admits company is behind on ESG, but it is ready to listen and learn

Wu says that part of what has driven the company's embrace of sustainability was Liu's experience as an entrepreneur in the US, which put him more in touch with global ESG trends, as well as pressure from customers to improve ESG practices. However, the factor that has had the most impact has been long-term engagement with shareholders: "Our chairman says we need to listen to stakeholders, because then you have the chance to learn where you are not good enough, and then you can make progress. The biggest improvement in the last two years [since Liu assumed the chairmanship] is that Hon Hai right now is much more open and transparent. We believe we are still far behind those leading companies in ESG, but we try to improve and listen to feedback. Cathay [Financial Holding] is one example. Another example is [Federated] Hermes, they are leading the way in helping us, for example regarding CA100+. We have very frequent conversations. We listen to them and tell them our progress. They also share their views or best practices with us and give us a feeling of how to improve."

Engagement with a domestic, listed investor has been the most fruitful

Wu points out that there are advantages to engaging with different kinds of companies, for example foreign and domestic, and listed and unlisted: "I would say [these engagements are] more like a partnership, especially with Cathay because it is also a listed company so on the one hand they are also monitored by their stakeholders so they also need to make progress. On the other hand, they invest in so many companies that they become like a mentor. They have experience from both sides. Sometimes this makes the conversation much more meaningful. Sometimes if you are not doing the ESG yourself, you have lots of expectations and that expectation is just too far away from the current situation. But because Cathay is already in that kind of situation themselves so they can share with you how to progress. I would say it's much more like partnership. It's not just someone sitting there monitoring you."

The hands-on chair

First-hand feedback from investors aids internal understanding

The company's chair joins and usually hosts every earnings call. He personally does most of the presentations and answers most questions. The company has further invited investors to meet with the independent directors, particularly James (Guo-cheng) Wang, a far cry from the closed company culture of the past. Wu explains the rationale: "The goal is we want our top management and board members to have first-hand feedback so they can feel the global trend regarding ESG and what the shareholders' expectations are of Foxconn."

The company admits it has a lot to learn and has sought consultant support

In terms of expertise, Wu is quick to admit the company's deficit in this area. "We are far from best, but I think the most important value you can take from Hon Hai is we are really serious. The chair has a monthly meeting to review our progress on ESG and from this year, now it's weekly, every Wednesday morning." Furthermore, the company has enlisted consultants and experts, and has sought assistance from

all the Big Four accounting firms as well as verification firms such as bsi and Bureau Veritas. Carbon Trust is also assisting the group as it generates its climate strategy draft and stepwise programmes, as well as documentation for SBTi.

2. Strategy

Details on how Hon Hai will reach its targets are still under development

While elements of Hon Hai's climate change strategy are beginning to take shape, details are in development and the company freely admits this is still very much a work-in-progress. It is not ready to say much about it yet. As Wu says, "This year we released our net zero target. Then the next question will be how we will achieve it. You know, 'How ya' gonna do it?' We have to be honest. We haven't disclosed those kinds of approaches because that's something we are working on. We will have a clearer path and then we will disclose." Hon Hai has since 2021 enlisted the help of consultants at PwC to help with its TCFD execution strategy.

The company is in the middle of a three-phase project to develop a plan

The company is currently in the midst of a three-phase project to develop its net-zero plan and TCFD process. The first phase involves internal training, setting the governance structures and getting the proper people in the proper places. It will culminate in the release of the company's net-zero vision report, currently slated for December 2022. The second phase will focus on the company's climate change risks and opportunities, assessing how climate change will impact operations and tallying the real and potential financial impacts. The third phase will then involve preparing the full strategy to control impact, mitigate risks and maximize opportunities, as well as produce details on how SBTi targets will be met. As mentioned previously, it has brought in consultants and experts from the Big Four, verification firms and Carbon Trust is assisting the company in generating a climate strategy.

Clues to the company's risks can be found in CDP disclosures

One of the challenges for the organisation is its sheer scale and complexity: It has more than 10,000 suppliers, a million employees and operations scattered all over the world, Because of this, the risks are dispersed too, making consolidation and prioritisation a challenge. In its CDP disclosure, Hon Hai highlights regulatory risk and increased costs as virtually certain in the medium term (5-10 years) and of medium impact. Acute physical risk from extreme weather is considered very likely in the short term (1-5 years) and of medium impact as are risks for their direct operations and their upstream supply chain. Figures are not yet available in the CDP disclosures and are being produced as part of phase two of the company's current plan.

Risks begin to emerge

Physical risks of climate change have begun to have some limited impact

Planning is still underway, but the physical risks have already begun to bite the company. For example, drought in Sichuan reduced the availability of hydropower in August 2022, impacting Hon Hai's operations, while flood waters breached a Hon Hai facility in Zhengzhou in July 2021, with some limited impact on production.

The company is already seeking to disperse production to spread risk

While not yet part of a fully-fledged climate strategy yet, Hon Hai is already responding to these challenges, with Chairman Liu saying at the 2021 annual shareholders meeting that Hon Hai would continue building complete vertically integrated regional supply chains to shift away from concentrating manufacturing in one place, such as China, as it has in the past. In doing so, the company hopes to spread its risk.

Energy-saving projects are already underway

The company has also been active in reducing its carbon emissions at the campus level and has sought to increase the use of renewable energy. The group's CDP disclosure showed that it used incentive measures, energy-saving audits and energy-saving technological transformations to reduce energy use, investing NT$1.36 billion in 2020 and launching 1,751 energy-saving renovation projects, saving 506 million kWh and nearly NT$1.34 billion.

The company has also invested in clean energy installations

The same year the group also increased its "clean energy" installations to reach 257MW, with an annual power generation capacity of 284.97 million kWh. While the term "clean energy" is not strictly defined in the disclosure, reference is made to rooftop and ground-mounted solar power stations and direct purchases of hydropower and wind power. In aggregate, global clean energy consumption reached 1048.56 million kWh in 2020, accounting for 12.45% of the total energy use.

Hon Hai has begun to focus on electric vehicles

In terms of climate change opportunities, Hon Hai is entering the electric vehicle (EV) market. The company built an open EV platform called MIH which is available to all partners and third-party developers, providing hardware and software components to support building a complete EV industry ecosystem. The intention is to facilitate collaboration to reduce development costs and increase speed.

Suppliers' response to climate will be a big issue to manage

The issue of suppliers is a significant one but at this stage Hon Hai declined to provide further detail pending its implementation roadmap. At this juncture they did explain that they use strict criteria on who can be a supplier and they offer training and guidance.

Business continuity echoes scenario analysis

Prototyping has been a useful way to practice and refine plans and processes

The company is also working with consultants on its three-phase plan to begin formal climate change scenario analysis. Details are not yet ready for disclosure, but how the company manages its responses to climate change scenarios may echo how it has already used prototyping to manage a variety of scenarios as part of its business continuity management (BCM) program. Under this program, business units identify a number of scenarios that could hamper operations, for example extreme weather, typhoons or earthquakes, and then plan how to ensure business continuity under these conditions.

The prototype unit shares its learnings with all units worldwide

To do this, the company chooses one business unit to serve as the prototype so that as it undergoes the new process, any problems or challenges can be ironed out. Every detail and difficulty it encounters is scoured for learning opportunities. The prototype unit then shares its experience on a global call with all the units worldwide so that others can learn from their mistakes and then the system can be rolled out. The company uses a similar process for its ESG efforts and the supply chain.

Rolling out to all units all at once could prove chaotic

Hsing explains that this is to ensure operations won't be disrupted during roll out: "Think about it. We have roughly 10,000 suppliers, so we can't just roll out all at once. So we select 10 sample suppliers or units, cooperate with them to see how we can help them doing ESG. For the first year we do this kind of prototype then we fine-tune the practice and roll out to other suppliers."

Being a guinea pig can be arduous

The process can be very arduous, taking months of preparation and finding a business unit willing to be the guinea pig takes some convincing because it requires the prototype unit to be vulnerable, fully share its mistakes and receive feedback and then share all of that with literally the whole world via a ten-minute talk during the company's global meetings.

That vulnerability saves costs for other units

As Hsing puts it, "It's like they need to 'take all their clothes off' to show what happened." This willingness to share is seen as valuable because it helps subsequent business units understand the costs of taking on these processes and what kind of commitment will be required to make them work.

Sharing can be quick, but high impact

The sharing on the global call might be only 10 minutes long, but it is enough to give everybody a big picture idea of what is involved and to know where to find resources. As Hsing says, this process shows "You can have this kind of benefit, by implementing this process, but you'll also have this kind of pain. But we are here to help so every problem can be covered."

Existing structures and practices can be leveraged to respond to climate change

Hsing says he expects a similar process will be used as the company responds to climate change. Once business units become aware of the options available, they can contact the Sustainability Committee and Sustainability Promotion Office to arrange information sharing, get help on implementation and hire outside service providers.

Targets are what drive Hon Hai's execution strategy

While details on how Hon Hai will meet its net-zero targets are not yet available, Hsing and Wu are confident of meeting them. Wu says that practices such as these are part of how Hon Hai has earned its reputation for exeuction and how it already achieves its existing targets. He says: "In Foxconn, as long as you have a target, everybody will follow. We are famous for our execution capability. This target, it's not just for one campus or one unit. It's for the whole group. So this is for everyone: you have a group target to follow!"

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Risk management, metrics and targets: Key highlights

- In 2021, Hon Hai officially became a supporter of Task Force on Climate-Related Financial Disclosures (TCFD) and pledged to implement TCFD guidelines. The company assessed links between climate change and business activities using the TCFD framework, and has conducted scenario analyses incorporating risk management and climate impact to further evaluate the resilience of its response to climate change.
- The company is following the TCFD framework to manage and control risks within the TCFD structure. However, the company has not yet identified in its public disclosures, further specific risks emanating from climate change including related management processes and potential financial impact.
- The company has made good progress in energy savings, lowering electricity density and quantifying energy consumption in different forms across different regions and initiating emission reduction target with commitment to specific targets. Nevertheless, it would be more helpful if the company laid down more concrete near term milestones by categories and action plans to get a better perspective on how feasible these targets are.

Energy saving measures are encouraging

- The company's energy saving measures and the resulting initial economic/environmental impact is encouraging. However, we are yet to observe a more structural framework that establishes the linkage between the efforts the company is putting in and the identified items associated with climate change impact, as well as the long term continuity of how it is tackling specific issues like global warming, extreme weather, insufficient energy supply etc.
- Since the company has only started to implement TCFD framework in 2021, we believe it will be a constantly evolving process for the company to identify risks and challenges associated with climate change and the implications on its operations/financials, before the company can align risk management activities and set metrics/targets accordingly to mitigate impact from climate change.

3. Risk management

Altering existing practices to address challenges from climate change

In this section, we examine Hon Hai's risk management framework, and see if the company is aligning its risk management activities with challenges/disruptions from the changing climate conditions. Our finding is that Hon Hai has existing risk management mechanisms in place, and it is altering existing practices to address challenges from climate change, while bringing in external resources to hedge against climate change risks.

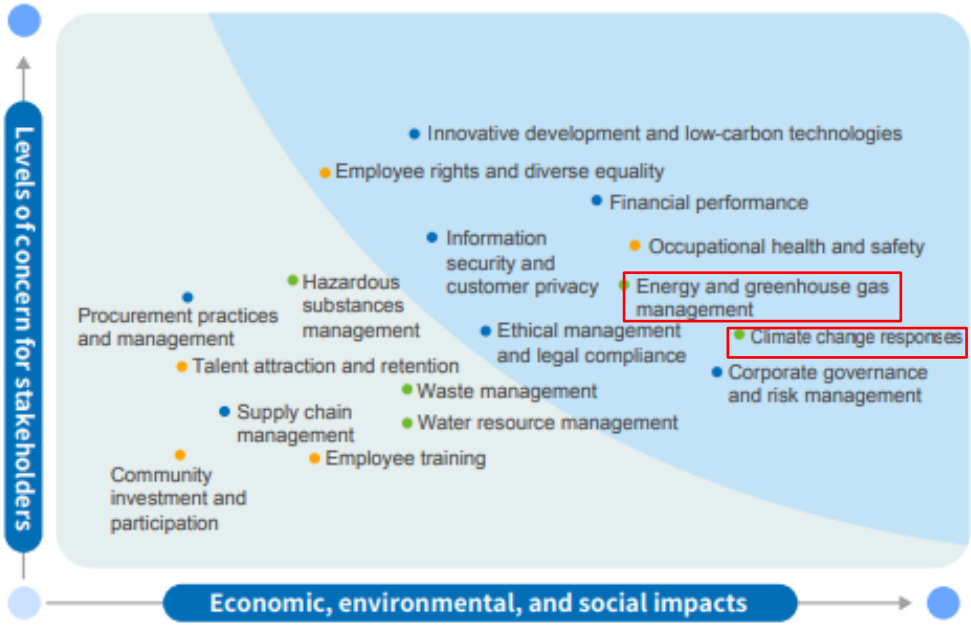
Risk management informed by materiality assessment

Hon Hai bases its sustainabilility risk assessment in analysis of materiality – level of economic, environmental and social impact and level of concerns for stakeholders are two criteria for identifying sustainability-related risks. Climate change response and Energy & greenhouse gas management are identified as two of the thirteen major material topics in 2021.

Climate change response, energy and greenhouse gas management are two of the thirteen major material topics

Figure 24

Hon Hai's material sustainability topics



Source: Hon Hai

This is a good starting point, yet going forward we'd like to see the company more accurately identify potential events/circumstances that could derail the company from its normal operation, or cause financial losses from a changing climate's perspective, and set up its risk management framework with specifc itemized control factor, in a way to help stakeholders better understand the financial implications from climate change, and how the company's risk management initiaitves are tackling these challenges.

Risk management mechanism in place since 2007

Hon Hai has an Enterprise Risk Management (ERM) system in place since 2007 to guide the identification, review, monitoring and strategic management of business risks. Clear reporting line and definitions of roles and responsibilities at different grades are in place to ensure effective communication of risks.

Climate risk management is integrated into multi-disciplinary company-wide risk management process according to Hon Hai's CDP response in 2021. At the direct operation level, Hon Hai has identified potential risk triggers related to climate, such as current regulations, emerging regulations, reputational/brands and extreme weather. Risk assessment has been conducted and reported to top executives once a year. At the value chain level, Hon Hai identifies, audits, and improves assistance for potential climate-related risks such as reduction or interruption of the supply of energy, raw materials or components, and set supplier level targets.

Mitigation actions are at an early stage

Hon Hai implements emergency responses to physical climate risks in accordance with its internal regulations. In response to urgent climate risks and weather warnings, Hon Hai conducts on-site prevention and management actions in accordance with its internal regulations. For long-term climate risks, the company uses its internal analysis results to compile major climate risks and opportunities for the company, take stock of information and management strategies related to climate risks and opportunities, implement related measures, and transfer risks through commercial insurance policies.

Responses to transition risks are varied. Hon Hai focuses on monitoring and researching on regulations related to GHG emissions and has determined so far that the financial implications are not significant. Most of its energy consumption is in Mainland China, therefore, the company is also paying more attention to energy-saving policies and targets in Mainland China.

Cost of response to certain physical climate risks are mentioned but not disclosed in Hon Hai CDP survey response 2021 due to confidentiality concerns.

Attempts on climate scenario analysis

Currently, Hon Hai has conducted qualitative climate sceanrio analysis based on 2 Degree Scenario (2DS) by International Energy Agency (IEA) and has stated in its CDP repsonse 2021 that it plans to conduct quantitative climate sceanrio analysis in the next two years.

Climate risk integration and financial implications are areas of improvement

We see room for improvement in: 1) More accurate identification of climate related business risks and associated financial impact, 2) Tighter linkage between business development strategy and the causality between direction that the business is steering towards and active prevention of associated climate risks.

4. Metrics and targets

Commitment to a more meaningful target setting

Two main categories of metrics are disclosed by Hon Hai with reference to TCFD recommendations, energy-related and emissions-related, followed by targets. Hon Hai has set up short, mid, and long term targets eventually leading to net zero emission across the company's value chain by 2050. The company is also committed to science-based emission reduction target in line with business ambition for 1.5 degree Celsius in 2021.

Near-term actions show a systematic approach . . .

In terms of execution and goal setting leading towards its long term target, the company does adopt a systematic approach in setting energy saving targets. It also establishes auditing procedures to track the results and performance of different energy saving projects, while offering incentives to employees to engage active participation of energy saving projects.

. . . but it is too early to comment on effectiveness

Based on the company's disclosure, while the results on energy saving and initial economic/environmental results are tracking positively, we have yet to observe a more structural framework that establishes the linkage between the efforts the company is putting in and the identified items associated with climate change impact, as well as the long term continuity of how it is tackling specific issues like global warming, extreme weather, insufficient energy supply etc.

Energy management and audit procedures in place

Managing energy use with energy saving targets

Hon Hai systematically manages its energy use through implementation of the ISO 50001 Energy Management System and third-party verifications to identify risks and opportunities for reducing energy use and enhancing energy efficiencies. Additionally, the company has formulated the "Audit Procedures for Energy-Saving Projects" and "Audit Procedures for Energy-Saving Management" for continued implementation and transformation of energy-saving technologies, and is also actively developing new energy and carbon reduction technologies, products, and business models, exploring further energy-saving potential, and promoting transformation and upgrades to increase benefits.

Progress in clean energy adoption in operation

Furthermore, in line with goals related to global energy transformation and low-carbon economic development, the company also continues to increase installation capacity by installing and purchasing rooftop and ground-mounted solar stations. Hon Hai directly purchases other clean energies to raise its usage volumes and ratios of clean energy while reducing GHG emissions.

Energy-related goal setting process

At the beginning of each year, the company formulates energy-saving goals and communicates these to its business subgroups. Incentive measures are also implemented to enhance the development of energy-saving technologies in each subgroup. The company has consistently achieved its annual energy-saving goal; for instance, its energy-saving target for 2021 was 5%, while the actual energy-saving rate was 5.56% (see below)

Track record of meeting nominal energy saving targets

Figure 25

Hon Hai annual energy saving target achievement rate

Achievement of energy-saving targets for 2017-2021					
	2017	2018	2019	2020	2021
Target value	5%	5%	5%	4.50%	5%
Achieved value	7.23%	5.77%	5.33%	5.18%	5.56%

Source: Hon Hai

Figure 26

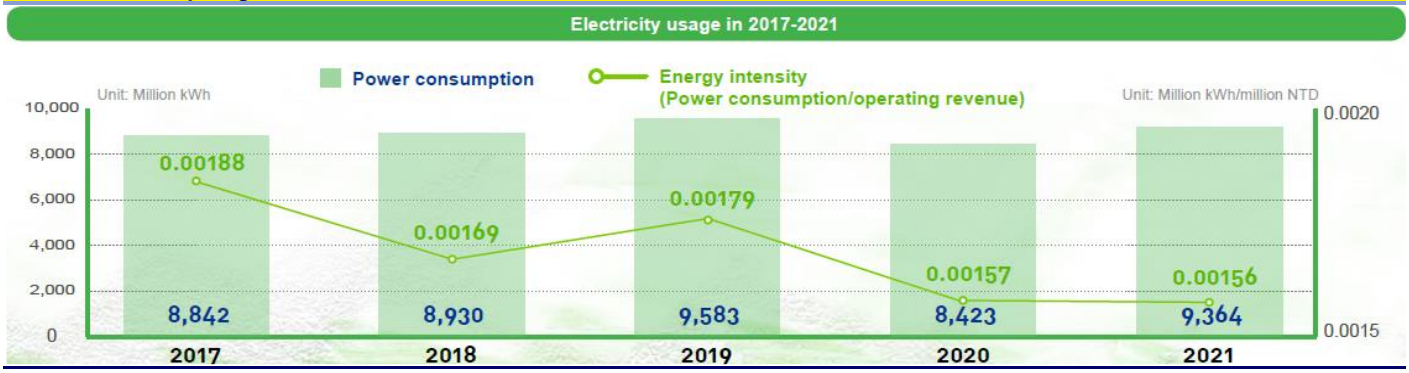
Hon Hai global energy consumption in 2021 by regions and energy types

Global energy consumption in 2021											
	Purchased power		Fuel								Energy consumption
	Power consumption		Natural gas		Gasoline		Diesel		Liquefied petroleum gas		
	Million kWh	GJ	m³	GJ	m³	GJ	m³	GJ	Tons	GJ	GJ
Asia	9,191	33,088,438	90,858,115	3,540,892	4,042	126,349	2,627	95,351	9,931	498,854	37,349,884
South America	8	28,921	0	0	0	0	478	17,348	3	151	46,420
North America	153	552,141	1,874,489	73,052	0	0	897	32,568	0	0	657,761
Europe	11	41,256	347,310	13,535	0	0	1	42	0	0	54,833
Total	9,364	33,710,756	93,079,914	3,627,479	4,042	126,349	4,004	145,308	9,934	499,005	38,108,897

Source: Hon Hai

Figure 27

Hon Hai Electricity usage from 2017 to 2021



Source: Hon Hai

Financial and environmental results from energy saving initiatives

Energy saving initiatives, audits, and incentives

In 2021, Hon Hai invested NT$1.75bn in 1,587 energy-saving projects encompassing transformation of energy-saving production processes, improvement of air-conditioning systems/air compressors/lighting equipment, and other improvements. Total energy savings were 520,982 MWh, equal to total carbon reductions of 320,925 tCO_2e, and energy-saving, with savings benefits equivalent to NT$1.3bn.

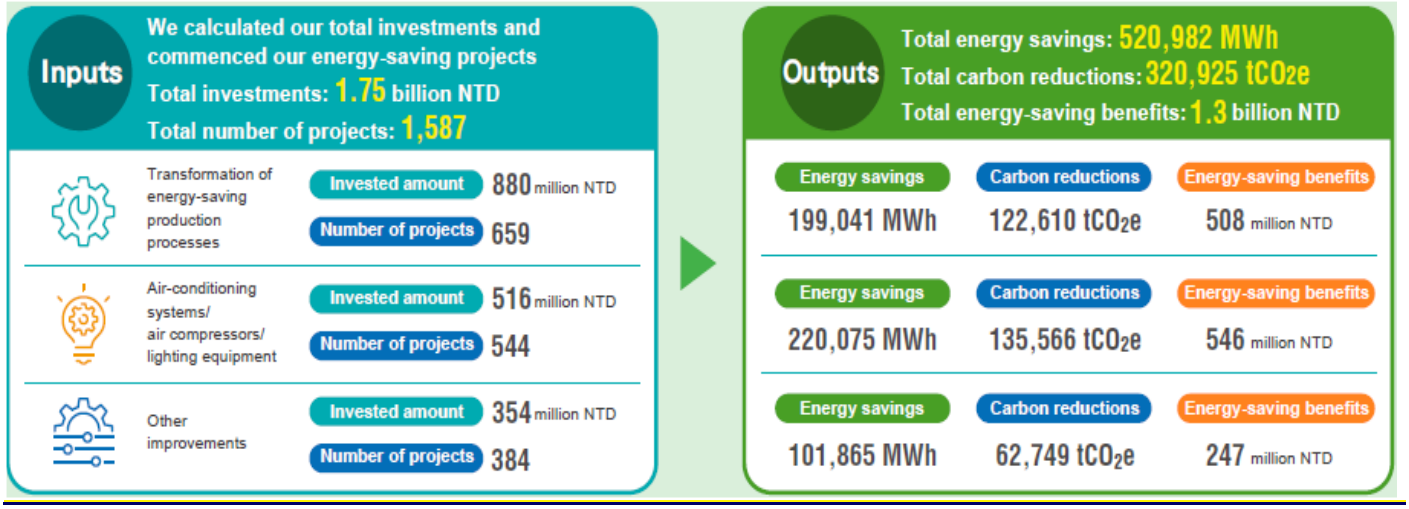
For effective implementation of energy and carbon reduction projects, the company reviews actual performance and benefits, and its Energy Resource Management Committees conducts annual audits and reviews all projects associated with achievement of energy and carbon reduction goals. In 2021, the company discovered 21,500 violations in its Chinese campuses, reduced power wastage by 7,800 MWh, and decreased expenditures by NT$21m.

In addition to employee incentives, it has formulated appraisal items and score cards to encourage energy savings

To enhance employee awareness on climate change and internalise relevant concepts into the core cultures of each department, Hon Hai has formulated annual "Appraisal Items and Scoring Guidelines for Energy Management" for use in its Chinese campuses. Appraisal items include energy management, energy reduction systems, implementation of energy-saving measures, supervision of energy reduction measures, and energy-saving KPIs.

Figure 28

Hon Hai measurement of energy saving spending versus energy saved alongside economic benefits



Source: Hon Hai

Positive results from early energy saving initiatives

Detailed quantitative scores are presented for each item, and those ranking within the top three for the quarter/year or remaining units that obtained high scores are awarded bonuses and incentives. The company provides team and individual cash rewards for outstanding energy-saving technological transformation projects that enhance energy efficiency. In 2021, Hon Hai awarded NT$1.57m to five teams and five individuals with outstanding energy-saving contributions.

Early implementation of clean energy usage

Figure 29

Hon Hai clean energy usage from 2019-2021

Clean energy usage for 2019-2021				
	Unit	2019	2020	2021
Total installed capacity of clean energies	MW	224	257	260
Generated power	10,000 kWh	25,202	28,497	29,661
Direct purchases of clean energies at Chinese Campuses	10,000 kWh	-	553	3,627
Direct purchases of clean energies at overseas Campuses	10,000 kWh	-	507	15,100
Purchased clean energy environmental attributes	10,000 kWh	70,000	75,300	-
Total clean energy usage	10,000 kWh	95,202	104,856	48,388
Proportion of clean energy usage	%	9.93%	12.45%	5.17%

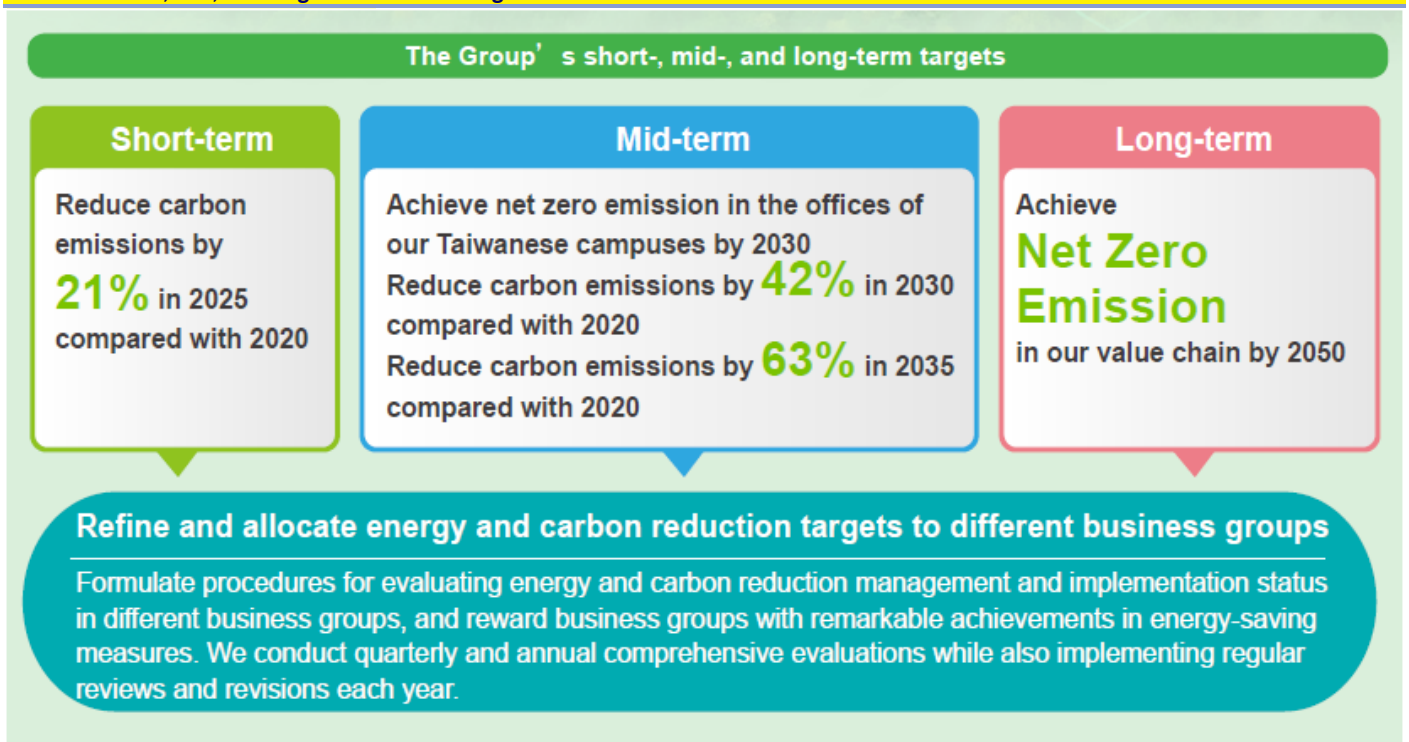
Source: Hon Hai

GHG emission reduction plan and performance so far

In response to global climate change impact, Hon Hai has proposed net zero emissions targets using 2020 as its base year, set scheduled milestones for 2025 and beyond, and simultaneously released related information on its corporate website.

Figure 30

Hon Hai's short, mid, and long term emission targets



Source: CLSA, Hon Hai

Net zero GHG emission targeted by 2050 despite spike in 2021 results

Hon Hai's verified Scope 1 and 2 greenhouse gas emissions in 2021 were 6,220,782 tCO_2e, an increase of 14.8% compared with 2020 (5,417,602 tCO_2e), mainly due to revenue growth and economic expansion, which raised electricity usage and carbon emissions. However, the company continued to be active in implementing carbon reductions and utilising renewable energies. It continues to work towards its goal of net zero GHG emissions in its value chain by 2050.

GHG emission heavily concentrated in Asia

Figure 31

Geographical breakdown of GHG emissions in 2021

Scope 1 and Scope 2 GHG emissions in 2021						
	Unit	Asia	South America	North America	Europe	Total
Scope 1 GHG emission	tCO_2e	229,943	1,222	6,076	705	237,946
Scope 2 GHG emission	tCO_2e	5,907,005	801	72,508	2,521	5,982,836
Total	tCO_2e	6,136,948	2,023	78,584	3,226	6,220,782

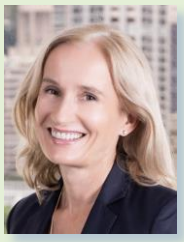
Source: Hon Hai

Scope 3 emissions results for 2021 not available yet due to operation scale

Due to the widespread operations of the group, the company is still compiling data on Scope 3 GHG emissions for 2021, and aims to disclose this information at the end of 2022. The company has completed inventory of Scope 3 GHG emissions for 2020, which amounted to 24,025,738 tCO_2e.

Jardine Matheson: An unwieldy truth

- ❑ Conglomerate is embedding climate strategy at group level in phases, initial focus is on shaping the collective narrative and metrics
- ❑ Sheer scale, diversity and geographical spread of group operations poses logistical challenge in consolidating data and formulating group-wide decarbonisation plan
- ❑ Pathway and timeline for net zero in the pipeline, business units to follow TCFD or science-based targets depending on net-zero experience, maturity
- ❑ Special board-level climate committee established to steer climate efforts across all group companies, working groups set up to pool resources, best practices
- ❑ Preliminary analysis of 800 major assets in 22 jurisdictions identifies those in Hong Kong, mainland China, Vietnam, Philippines as posing highest physical climate risk



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Summary

Jardines is laying the groundwork at a steady ppace

With more than 400,000 employees and myriad businesses (from property development and luxurious hotels to air cargo and automobiles) across 32 countries or jurisdictions, managing climate risk on a collective basis at Jardines has not been an easy task. Over the past three years, the group has made a solid start, gathering information and garnering consensus across the varying business lines to map out a way forward for the group as a whole. Jardines published its first group Sustainability Report in 2021 and now offers a baseline yardstick for years to come. Its board-level Sustainability Leadership Committee coordinates efforts and steers overall strategy, and includes chief executives from all group companies. Jardines has completed a preliminary physical risk analysis and is scoping group companies for opportunities. A specific timeline and targets for group decarbonisation is forthcoming. Moving forward, group companies with stronger net zero credentials will move at a faster pace to set science-based targets, with less experienced business units to move more gradually on a TCFD path.

Background

A 190-year history which takes in multiple stock exchanges

Jardine Matheson (Jardines) is a multinational conglomerate with a long and colourful history in the region. It is was one of the original trading "Hongs" (British-owned trading house), set up in 1832 by William Jardine and James Matheson in Hong Kong as Jardine, Matheson & Co. Today, the Keswick family, descendants of William Jardine's elder sister, maintain control and a significant board presence in the group companies. Ben Keswick is Jardines' current Executive Chairman, a position he has held since June 2020. Jardines has a standard listing on the Main Market of the London Stock Exchange (listing in May 1990), and secondary listings in Singapore (SGX) and Bermuda. Jardines' board of directors currently has 12 members, none of which are women. Across its group companies, Jardines employs in excess of 400,000 people.

Ownership and operations

The Keswick family maintains control

Historically the Keswick family has controlled Jardines through a complicated cross-shareholding structure, long opposed by minority shareholders. A US$5.5 billion restructuring took place in the Spring of 2021 which saw Jardines become the holding company for the entire group: as of March 2021, Jardines had held nearly 85% in wholly-owned subsidiary Jardine Strategic, which in turn held nearly 60% in Jardines. A month later, in April 2021, Jardines announced it would "simplify the

parent company structure of the Group" by acquiring shares in Jardine Strategic. This would result in a "single holding company with a conventional ownership structure." The Keswick family reportedly kept 43% of Jardines in the restructuring [10]. Jardines' portfolio of seven group companies spans diverse interests[11]:

Seven group companies with diverse operations

Astra operates a diverse range of business operations in Indonesia (from automative, financial services and heavy equipment to mining, property and IT and is listed on the Indonesia Stock Exchange. Jardine Cycle & Carriage holds 50.1% in Astra.

DFI Retail Group operates well-known grocery brands such as Wellcome in Hong Kong and Cold Storage in Singapore and Malaysia, 7-11 convenience stores in Hong Kong, Macau, Singapore and Southern China, the Guardian and Mannings health and beauty brands, as well as restaurants and home furnishing brand Ikea (Hong Kong, Macau, Indonesia and Taiwan). DFI Retail has a primary listing on the London Stock Exchange and secondary listings in Bermuda and Singapore. Jardine Matheson has a 78% shareholding in the group.

Hongkong Land owns and manages more than 850,000 square metres of prime office and retail space in Asia, notably Hong Kong, Singapore, Beijing and Jakarta. It is primary listed on the London Stock Exchange and has secondary listings in Bermuda and Singapore. The Jardine Matheson Group owns 53% of Hongkong Land.

Jardine Cycle & Carriage is the investment holding company of the Jardine Matheson Group in Southeast Asia. It is listed on the Singapore Stock Exchange and 76%-owned by the Jardine Matheson Group. In addition to its interest in Astra, and non-Astra automative businesses in the region, it has other strategic interests in Vietnam and Thailand.

Jardine Motors Group comprises automative businesses across the region, including Zung Fu Motors Group in Hong Kong and Macau, Cycle & Carriage in Singapore, Malaysia and Myanmar and Tunas Ridean in Indonesia. It also includes Jardine Motors Group UK.

Jardine Pacific comprises non-listed Asian interests in engineering and construction, aviation, transport services and restaurants. In Hong Kong these include Gammon Construction, air cargo terminal operator Hong Kong Air Cargo Terminals Limited ('Hactl') and airport ground handler Jardine Aviation Services Group. Jardine Matheson holds 100% of the Jardine Pacific.

Mandarin Oriental operates 36 hotels and 7 residences in 24 countries and territories. Its parent, Mandarin Oriental International Limited, is primary listed on the London Stock Exchange, with secondary listings in Bermuda and Singapore. Jardine Matheson holds 79% in Mandarin Oriental.

The group has market cap of US$14.66 billion

Jardines has a market capitalisation of US$14.66 billion[12]. In 2021, Jardines made an underlying profit of US$1.15 billion based on revenue of US$35.9 billion, up by 39% on the previous year. The geographical split of its profits are 55% from China, 42% from Southeast Asia and 3% from the rest of the world.

[10] https://www.reuters.com/article/us-jardine-strategic-jardine-matheson-br-idUSKBN2B809G
[11] Jardine Matheson % holdings in these companies are given as of August 2022
[12] https://www.jardines.com/en/share-prices

Scope 1 emissions account for three-quarters of Jardines' total

Main source of emissions

Collating GHG emissions across the group has been a formidable process, in 2021 culminating in the first set of aggregated data:

Total GHG emissions (tCO_2e)[13]:

- Scope 1: 4.1m (76%)
- Scope 2: 1.3m (24%)
- Total: 5.4m

Astra accounts for the vast majority (4m) of these Scope 1+2 emissions, followed by 'others' at 869,800 (DFI, Jardine Motors UK and the Jardines Head Office), Jardine Pacific (205,439) and Mandarin Oriental (189,422). Astra consumes the most energy in the group, at 70.23m gigajoules GJ in 2021, but nearly half of this (33.8m) was from renewable sources. Indeed, Astra accounted for nearly all of the group's renewable-sourced energy in 2021, with Jardine Pacific the only other group company utilising alternatives (40,945 GJ of renewable energy consumed).

Regulatory requirements

The company has a standard listing in London)

As a standard listing in London (in 2014 the company downgraded from a premium listing), Jardines is not required to comply with the UK Corporate Governance Code, but adopted "Governance Principles" based on the then-applicable requirements for a premium listing.

UK rules on climate require TCFD disclosure

The Financial Conduct Authority (FCA) in the United Kingdom introduced a mandatory climate-related disclosure rule in December 2020 for premium listed companies, requiring a statement in their Annual Financial Report (AFR) on whether they have made disclosures consistent with the TCFD recommendations, or to explain why not. The rule applied for accounting periods beginning on or after 1 January 2021, so the first annual reports subject to the rule were published in early 2022. The application of TCFD disclosure requirements was extended to standard listed shares in December 2021: this took effect from 1 January 2022[14] so will apply to annual reports published in early 2023.

Standard issuers in London must follow TCFD this year

Under the listing rules, standard issuers are expected to consider whether their TCFD disclosure provides sufficient detail to enable users to assess the listed company's exposure to, and approach to, addressing climate-related issues. Factors to consider are the level of its exposure to climate-related risks and opportunities; and the Scope and objectives of its climate-related strategy, noting that these factors may relate to the nature, size and complexity of the issuers' business.

Singapore requires TCFD reporting for primary issuers

As a secondary issuer in Singapore Jardines is only subject to the applicable listing rules of its home exchange[15]. While Singapore has required sustainability reporting on a comply or explain basis from 2016, Jardines published its first report in 2021. The regulatory arm of SGX, Singapore Exchange Regulation, has required all issuers from 1 January 2022 to make climate-related disclosure based on the TCFD recommendations on a comply or explain basis[16]. In addition to climate-related disclosures consistent with TCFD, issuers are expected to describe sustainability

[13] Aligned with the GHG Protocol Corporate Accounting and Reporting Standard
[14] https://www.handbook.fca.org.uk/handbook/LR/14.pdf
[15] http://rulebook.sgx.com/rulebook/751-0
[16] http://rulebook.sgx.com/rulebook/711b

practices with reference to their material ESG factors; policies, practices and performance; targets, sustainability reporting framework and a board statement and associated governance structure for sustainability practices.

From 1 January 2023, TCFD climate reporting will be mandatory for issuers in the financial, agriculture, food and forest products, and energy industries. Issuers in the material and buildings, and transportation industries, must follow suit in 2024[17]. Singapore has primary legislation dealing with environmental pollution control (air, water and noise), the Environmental Protection and Management Act.

Financial reporting standards

The UK plans to follow ISSB standards

The UK announced in October 2021 that it plans to adopt and endorse IFRS Sustainability Disclosure Standards issued by the International Sustainability Standards Board (ISSB)[18]. The UK government put in a response to the ISSB exposure drafts consultation in August 2022[19] and has published a roadmap[20] to sustainable investing. A consultation is expected on the next steps once the ISSB consultation conclusions are public.

SGX looks set to phase in ISSB standards

SGX has indicated that it plans to align its reporting standards with ISSB once they are finalised. The Monetary Authority of Singapore (MAS) also submitted a response to the ISSB consultation[21] where it suggested a phased approach in implementing the industry-specific requirements, in particular prioritising high climate-risk industries (similar to SGX's approach with the TCFD reporting requirements).

Voluntary climate reporting initiatives

Jardines publishes first sustainability report in 2021

Jardines published its first sustainability report in 2021. It referenced the World Economic Forum Stakeholder Capitalism Metrics, Global Reporting Initiative (GRI) Universal Standards, and recommendations from the Taskforce for Climate-related Financial Disclosures (TCFD). One of its group companies, Hongkong Land, has committed to the Science Based Targets initiative (SBTi), which aims to limit global warming to 1.5%. A number of other business units also publish sustainability reports: Astra, DFI Retail Group, Gammon Construction, Hong Kong Air Cargo Terminals Limited, Hongkong Land, Jardine Cycle & Carriage, Jardine Engineering Corporation and Mandarin Oriental Hotel Group. Gammon, Hongkong Land and Jardine Cycle & Carriage also do individual TCFD reporting.

The company supports a Just Transition

Jardines also supports a Just Transition[22] and its subsidiaries, Jardine Cycle & Carriage and Astra, have committed to growing non-coal revenue to 90% and 88% respectively by 2030.

[17] https://www.sgxgroup.com/media-centre/20211215-sgx-mandates-climate-and-board-diversity-disclosures
[18] https://www.gov.uk/government/publications/international-sustainability-standards-board-issb-exposure-draft-consultations-uk-government-response
[19] https://www.gov.uk/government/publications/international-sustainability-standards-board-issb-exposure-draft-consultations-uk-government-response/letter-from-lord-callanan-to-the-international-sustainability-standards-board-regarding-their-exposure-drafts-ifrs-s1-and-ifrs-s2
[20] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1031805/CCS0821102722-006_Green_Finance_Paper_2021_v6_Web_Accessible.pdf
[21] https://www.ifrs.org/content/dam/ifrs/project/general-sustainability-related-disclosures/exposure-draft-comment-letters/m/monetary-authority-of-singapore-920c6014-06c3-40e9-a91a-e4d11a5cfcb4/mas-response-to-issb-consultation.pdf
[22] https://www.jardines.com/en/sustainability/our-commitment/supporting-a-just-energy-transition

A summary of Jardines' climate initiatives and commitments

Figure 32

Jardines climate reporting, commitments and goals

Initiative	Status
Follows the TCFD disclosure framework	✓ Since 2021
Annual sustainability report	✓ Since 2021
Net zero goal	✓ Roadmap, timeline in progress
Supports a Just Transition	✓
Commits to the Science Based Targets Initiative (SBTi)	✓ Hongkong Land, group company, does
Aligns reporting with Global Reporting Initiative (GRI)	✓ Universal Standards
Climate change policy	✓ Since 2021
Assurance of sustainability information	✓ Limited assurance

Source: Jardine Matheson Sustainability Report 2021

1. Governance

How to align the group without stifling the individual?

The challenge for Jardines has been to organise its climate efforts as a group while still respecting the operating autonomy of individual business units. At board level, a Sustainability Leadership Council (SLC) was created, chaired by Ben Keswick, to corral the business units to map out a unified response. Each group company has its own budget, and responsibility for sustainability metrics and targets. These are fed up to the SLC twice a year. There was some hesitancy to start, given this autonomous culture at Jardines, but this was eventually mitigated via peer pressure and competitive quirks at the group.

Consolidating the sprawl

2019 is a turning point for the group

The year 2019 was a turning point for Jardines. Until then, its track record on managing and communicating its sustainability efforts was a patchwork. Within the group, there were of early starters (Astra, for example had been focussed on corporate social responsibility for three decades), reporting stalwarts such as Hongkong Land, and relative novices within the group. As some individual business units had made strides, others had barely scratched the surface. A decision was taken that it was time for a collective voice. "Everyone was coming from different bases, at different levels of maturity, and different degrees of focus," explains Jardines' Company Secretary Jonathan Lloyd. "They all had various elements of ESG but we didn't want them to be operating in siloes with very little collaboration. We wanted it to be joined up, thinking like a group."

Pressure from NGOs, family helps to drive efforts

That year, the group underwent a "fundamental change in how we thought about sustainability." Given Jardines' ownership structure and governance, it is not surprising that chairman Ben Keswick was a key driver of this process. It came against a backdrop of increasing pressure points: NGOs, investors, and even family members (some credit is given to Keswick's children). High-level conversations thus took place in the group, with Keswick articulating a set of strategic priorities. The group wanted a structured approach, tailored to its needs and corporate backdrop. Getting to a baseline would take three years, culminating in the group's first sustainability report, published in 2022.

Where to start?

Jardines brought expertise in-house after using consultants

A significant hurdle for Jardines was a lack of in-house expertise. Initially, it relied on consultants until Nadira Lamrad came on board as head of sustainability. There was also the question of what direction stakeholders thought Jardines should be taking. It drew upon its own employees: a detailed questionnaire went out in January 2020 seeking feedback on what it thought was important, sustainability-

wise, within the group. The strategy then took shape based on the input from 5,000 colleagues, with 1,000 showing an interest in being more involved in shaping the sustainability agenda. Jardines used this input to identify and prioritise material issues.

Each unit is engaged and sent off to battle

"We didn't want to be all things to all men," says Lloyd. "We knew if we wanted an aligned point of process, we needed something that found opportunities for synergies.'' In 2020 the board signed off on Jardines' social development goals which would provide a solid framework. "Each business was very much engaged,'' says Lloyd. "What we wanted to do from the start is empower our businesses, and give them as much autonomy as we could to get on with these things."

Jardines prioritises climate, responsible consumption and social inclusion

The "Building Towards 2030" strategic framework Jardines created adopts a rule of three: leading climate action, driving responsible consumption and shaping social inclusion. (See section on Strategy) Jardines opted to align its strategy with the United Nations' 2030 Agenda for Sustainable Development, identifying nine focus areas organised under three pillars: leading climate action, driving responsible consumption and shaping social inclusion. Within climate action, its focus is on risk, carbon and resilience.

Sustainability leadership

A leadership council is set up

To embed that strategy, a new governance framework was established to ensure oversight: in July 2019, the Sustainability Leadership Council (SLC) was established. Chaired by Ben Keswick, it comprises fellow Jardines directors and the chief executives of its business units (BUs).[23] While the board has overall responsibility for Jardines' sustainability reporting and strategy (and gets regular updates from the group Sustainability team), the SLC meets twice a year to brainstorm, share knowledge and experience, agree on the direction of the group's sustainability agenda, and provide oversight of the sustainability activities of each business unit.

The focus is to achieve a workable strategy

Lloyd describes it as "essentially a sustainability committee covering all our group businesses.'' Over the past three years the focus has been to get all the key decision-makers at the business units involved. For the first year or two, the initial agenda was to devise a strategy, with each of the units involved in (and signing off on) a framework which was workable at individual level which also aligned with the group. "It was a bit of a departure from previous governance bodies because we didn't have anything that sat across the group companies,'' Lloyd explains.

The course to true unity does not always run smoothly

There was a degree of trial and error in the process, Lloyd explains. Not so much in terms of agreeing the strategy, but rather making things work at a practical level. A core element of the groups' corporate culture has always been to respect the independence of its business units: indeed, as Jardines states in its annual report, "operational accountability resides within their respective executive management teams.'' A big challenge, with so many stakeholders, both within Jardines and the group, was "trying to conduct the orchestra so everyone is playing off the same sheet", Lloyd explains. The group businesses did see the value of collaboration, which helped Jardines overcome that obstacle. "We were pushing on an open door with most of the businesses anyway because there was strong enthusiasm for doing more on ESG. Ben (Keswick) as chair made it clear this was going to be an important part of governance framework.'' The balancing act was to continue to give these units autonomy: the board was reluctant to be "too directional and telling

[23] Entities where Jardines has overall control and/or influence on its business operations are referred to as business units (BUs), businesses or operating companies. Jardines uses these terms interchangeably.

businesses how to run things.'' Lloyd notes however: "Ben has his silver bullet when you need to do things.'' Initially, he recalls, some business units did not send along the most senior people to join the SLC meetings. "In the first couple of meetings we could see people still perhaps struggling to come to grips with whether businesses would see the benefits of doing this at group level.'' This changed. "Generally there is a little bit of competitiveness among our group CEOs and if they see their peers getting on, they tend to be more focussed.''

Board-level council on climate is pragmatic in its composition

The current SLC composition is described as "a bit of a cast of thousands,'' with the average meeting including 30 people around a virtual table. "We debate about the optimal size,'' says Lloyd. At the last meeting, a new approach was piloted which included breakout sessions: something they plan to continue with. Ms Lamrad explains that the group grows in size depending on the topic of the day. If the discussion is around finance, more finance-related participants join. The core group ideally involves the CEOs but they draw in more representatives from the companies as needs require. Meetings usually last two and a half hours on average and the agenda varies: while there is much focus on climate, the SLC does cover all of their three-pillared strategy, with a strong focus on the social side.

While the SLC takes stock at group level, its focus is also on enterprise risk management, capital allocation, sustainability funding and how the group as a whole reports on sustainability. While each business unit collaborates with the group on the overall strategy, the individual companies have it responsibility for their own sustainability metrics and targets. Each business unit is allotted a budget to fund its sustainability initiatives (including climate) and reports to its respective board two times a year, including how they have incorporated sustainability into their wider strategy and any opportunities they have identified as a result. The group Sustainability team works with their peers in the business units, in a support/advisory role, and holds meetings twice a week with the Jardines chair, providing support to both the SLC and the working groups. Nadira describes it as "integrating sustainability into how we operate businesses on a day-to-day basis, a key part of this being the planning and budgeting of sustainability criteria. We are about to go into the budget process and have templated what each business is expected to submit.''

Working groups

A climate working group meets three times a year

As part of Jardines' three-pronged sustainability strategy, a decision was taken to set up three working groups. The Climate Action working group (the other two are in respect of responsible consumption and social inclusion) meets three to four times a year and draws "enthusiastic and committed" representatives from all the business units, with support from the group sustainability team. It develops a group-level climate action strategy in terms of best practices, pooling of resources and the most effective way to do climate reporting across all the business units. The working group reports up to the SLC, which considers its initiatives and reviews its performance. Lamrad describes the interplay as "a lot of cross-business conversations going on.''

Expertise

There are gaps in board climate expertise

As with many of the companies in this report, climate expertise is not in the traditional roundhouse of Jardines' board members. Indeed the SLC has been on a steep learning curve, as its group executives up-scaling on climate issues at board level. Jardines' says it is mapping out what education and training is necessary as part of future planning. "We will make sure we bring our directors of the boards up

to speed in the right way,'' says Lamrad. In terms of board recruitment, "given we are trying to intertwine our strategy requiring people to shape and drive sustainability, it (climate experience) will be a key part of the criteria we think about when we bring people on board,'' says Lloyd. "I wouldn't want to suggest something formal is in place in how we do that at the moment, but we will have something in the future.''

Sustainability risks move up the chain to audit committee

Overall, the process involved a strong pooling of resources around the group and in particular the finance function was heavily involved. Through the group collaboration they were able to leverage their colleagues and Lloyd describes the SLC as "continuing to shimmy them along.'' In terms of assessing climate risk, all sustainability-related risks move up the chain from the group Sustainability team and individual business units to group level, where those considered as material to the group business are reported to the Audit Committee.

2. Strategy

Decarbonisation

A step-by-step approach is adopted for net zero

Jardines' annual report depicts its sustainability management as one of building blocks: review the material issues, align sustainability with overall strategy, develop what is needed in terms of systems and processes, and once established, monitor and report back on performance. Phase one of this process has been to put a strategy in place, Lloyd explains. The next step is to take less of a short-term focus and set priorities for the medium to longer term. Setting targets has been further down on the initial list, and is something Jardines will be doing moving toward. "It is one of the challenges we have as such a diverse business,'' Lloyd notes. "We really want to push them (business units) forward on a parallel basis rather than having initiatives moving forward at a different rate.''

Some business units will move on a faster trajectory

The group is formulating a long-term decarbonisation strategy which will have a pathway and timeline to net zero. In 2021 the Climate Action Working group came up with a broad strategy, which was complicated by the fact that business units are at different stages of addressing climate change, and they have to work across a number of regulatory and policy environments. The group plans to resolve these in 2022 and communicate its group decarbonisation pathway and timeline in due course. As a broad pathway, Jardines envisages a segmented approach which takes these differences into account. Those who are ready and able, will move ahead on a science-based targets path, followed by those requiring more time to develop a net-zero strategy. Some business units will align with partner strategies while others (those with a low emission footprint) will take a more streamlined approach. Wave one of the process will involve early movers with a strong net zero business case moving ahead while wave two will involve business units requiring more time to develop a net zero strategy.

Business units whose continuity is more vulnerable to climate risk will initially take the TCFD path, rather than a science-based targets one.

It's the data

Gathering data is no easy task

"We know that we cannot manage what we do not measure,'' Jardines notes in its 2021 Sustainability Report. In 2019, the scale and diversity of Jardines' operations posed a significant challenge: how to collate data from all its business units to form common set of sustainability performance metrics. The financial year 2021 was the first where Jardines presented data on the social and environmental impact of the whole group: the Sustainability Report will serve as a baseline for the years to come.

"It has been quite a challenge," Lloyd explains. "We have had to strongly leverage our resources around the group, and particularly our finance function has been involved in this." While some business units had been collecting key metrics over the course of many years, others had not. "We had to make sure there were processes in place." While getting the data on track was a strategic priority, Jardines also developed a group climate change policy, which underscores its approach: identify and manage climate-related risks and opportunities (and integrate these into their risk management and investment processes); undertake decarbonisation; monitor and report performance; and engage with stakeholders.

Templates, standards and protocols are set in place

To get to work on the first phase of Jardines' strategy, the group needed data in place. As Lamrad explains, this involved guidance at group level and in terms of how they gather the information, "we are quite manual, we use Excel spreadsheets." They are scoping for the best tools in the market for a group of Jardines' scale and variety, but for now they have developed templates, standardised definitions, terminology and different data points. For the GHG calculations, they preferred to follow best practice and looked at the GHG protocol. Lloyd refers to the data set as an ongoing process, noting "stakeholders are keen to see mid-year data." For now, it will focus on year-on-year comparisons. "We are making sure all the business units are on the same journey," explains Lloyd. "We want to make this not just a learning experience, but a way of making sure when you receive this information at group level, it is comparing apples and apples. We are making sure we are doing that in a consistent way in terms of how we look at issues across the portfolio."

The risk factor

Climate risks are seen as emerging and longer-term

Jardines views climate-related risks as emerging ones with an increasing long-term impact on the groups' operations. It is in the process of refining its physical risk analysis and is "trying to add layers to traditional thinking. It is all on the heat map and something we are increasingly focussing on," says Lloyd. It has conducted climate risk assessments on its assets (and plans of action in adapting to these risks) based on TCFD. The analysis looked at more than 800 significant assets in 22 countries and regions. According to Lamrad this involves scenario planning and includes the effect of rising sea levels: after completing its preliminary physical risk analysis, they are still in the process of confirming that information again. "The data is a bit less granular than we would like it to be," she explains. "It is one of the challenges we have here." Jardines is also working on transitional scenario analysis to understand location and industry-specific risks.

Hong Kong is a flashpoint for climate risk

This preliminary risk analysis identified Hong Kong, mainland China, Vietnam and Indonesia to be the geographic locations with the highest physical climate risk exposure for the group. Typhoons, rainfall flooding and extreme heat topped the list of acute and chronic hazards facing the group. For example, a prime asset is the Landmark shopping mall and office space in central Hong Kong: Jardines is considering the prospect of flooding (see also our chapter on Hong Kong) as the city experiences more mega typhoons and severe flooding.

The group faces multiple net zero commitments across jurisdictions

Transition risks are prominent: the group points to net zero commitments in regional economies it operates in, from 2050 in Hong Kong and Vietnam, 2060 in China and Indonesia. There is also the phasing-down of coal in China (peak consumption is expected by 2025) and Vietnam, which has committed to phasing it out by 2040. Indonesia is also looking at 2040 for phasing out coal.

The regulation landscape is also shifting rapidly

Regulation on climate reporting is also shifting. Although it is primarily-listed in London, other group companies are expected to follow rules in those respective markets. "We have range of different places we are where we are looking forward to see what's coming down the line and what's applicable to us," says Lloyd. The group is very focussed on TCFD and attempts to keep its disclosure aligned with it as much as possible. In Singapore, Jardine Carriage and Cycle had to comply with TCFD sooner, given recent changes to SGX rules. "In terms of future regulation we are focussed on what is coming down the line and what that might mean for us," Lloyd adds.

Opportunity knocks

Looking for plays on climate risk is in early stages

Jardines is at an exploratory stage in determining climate-related opportunities, although some of its business units have made some inways. Moving forward as a group involves a process of disseminating information across the organisation, Lloyd explains, working out where the areas where there are barriers or blockages. For example, this involves identifying where markets are not ready, where the supply of materials falls short (low-carbon steel and cement is cited as an example). Lloyd says the idea is to identify areas where there will be increased demand and understanding in these types of low carbon models and services. "We are well-poised to start to explore these opportunities and make some plays," he says.

Using the force to conserve energy

Its engineering business unit, Jardine Engineering Corporation, developed an analytics platform, Jardine Engineering Digital Insights (JEDI) to assist customers' conservation efforts in commercial buildings with the help of some AI and energy optimization: in 2021, it helped shed 4m kWh of energy from JEC's client portfolio.

Vietnamese associate is a major renewables investor

In Vietnam, Jardine Cycle and Carriage has been investing in renewables (it committed to no new investments in new thermal or metallurgical coal mines, as well as new thermal coal-fired power plants, and to divest out of non-coal mineral mining). One of its associates there, Refrigeration Electrical Engineering, is the largest investor in roof-top solar power generation in Vietnam and has been acquiring wind plants. In Indonesia, Astra has committed to no longer acquire new coal mining assets or invest in new coal-fired power plants, and is also expanding its use of renewable, including hydro, wind and solar. It is also exploring technology in biomass waste-to-energy and increased use of biofuels. Its palm oil subsidiary already uses biomass waste (palm fibres and kernel shells) to generate power for its palm oil mill and offices. In Thailand, Jardine Cycle and Carriage holds a strategic interest in a firm which set up a green business (Ecocycle) which converts waste into raw materials and fuel for cement production.

Financial statements

Reflecting climate in financial statements: "extremely challenging"

Reflecting the effect of climate on its financial statements is something the group sees as being much further down the line. "I think there is a rush in the market to request this information from companies," says Lamrad, cognisant that they themselves are undergoing a climate risk analysis and want to understand where these risks live, and the potential implications. However, she notes it would be "extremely challenging" to start putting such financial information out there, and "I don't think the market is ready to see it." Given the lack of consensus on what is best practice, what calculations should be used, she views it as not being clear from a business perspective. "We use operational control we don't use equity share, and it's (they use) Scope 1 and Scope 2, not Scope 3. We are still working out how to do this properly." The priority is to have consistency across the different lines of business so it is credible information for shareholders.

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Risk management, metrics and targets: Key highlights

- Jardine Matheson has created an organised structure to roll out its sustainability initiatives, with Sustainability Leadership Council established in 2019 (which includes the group's board of directors). Specifically, the group has a Climate Change Policy as a group-wide guideline in addressing climate-related issues.
- Jardine Matheson's sustainability strategy ("Building Towards 2030") aligns with the United Nations' "2030 Agenda for Sustainable Development".
- The group adopted a "stakeholder-driven" approach in assessing risk materiality related to sustainability, through employee pulse check survey.
- Although Jardines remains at an early stage and does not have an exact and quantifiable group wide target in terms of emission reduction, we note its commitment aligns with regional economies' "net-zero" goal (Hong Kong, Vietnam, China and Indonesia).
- Nevertheless, some group entities such as Hongkong Land and Gammon have achieved reduction of emission/waste by far.
- Going forward, Jardines will likely adopt a scale-based approach in identifying where opportunities of emission-reduction will come from.

The SLC (including key management) was established in 2019, with three core pillars

A clear structure to move towards the sustainability agenda

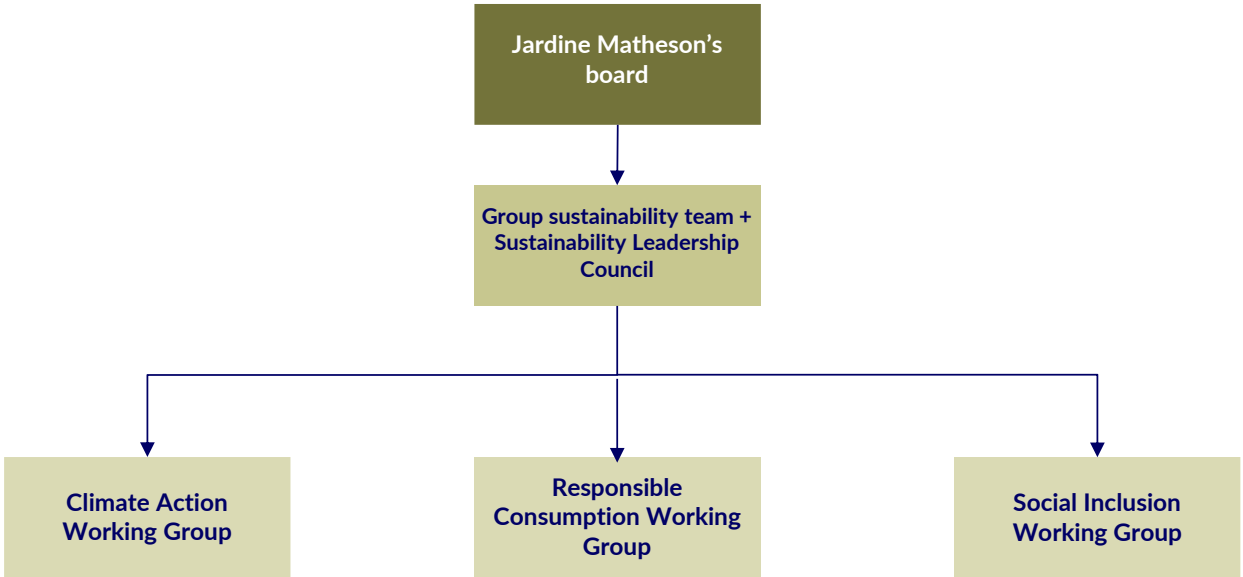
Following the establishment of Sustainability Leader Council (SLC) in 2019, which comprises the group's executive chairman, managing director, chief executives of principal businesses, directors and head of relevant group functions, Jardine Matheson has shaken up its structure for its goal of "Building Towards 2030". The goal involves three pillars "leading climate action", "driving responsible consumption" and "social inclusion". The SLC meets twice a year.

Roles of BU and the head office

Under Jardine Matheson's conglomerate structure, each business unit (BU) is responsible for setting sustainability metrics and targets which shall align with the group's overall strategy; whereas the group will allocate capital, facilitate funding for sustainability, and offer support to each BU whenever needed.

Figure 33

Sustainability governance structure (Sustainability Leadership Council)



Source: Jardine Matheson

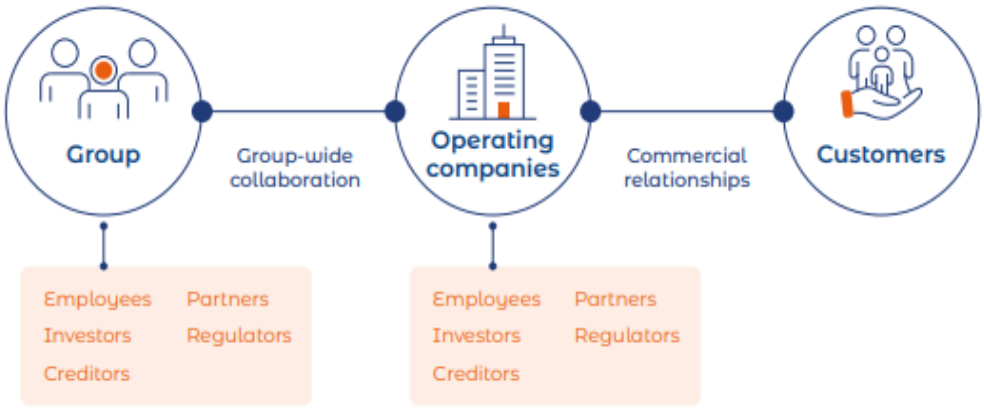
"Stakeholder engagement"

In Jardines' sustainability journey, its focus is "stakeholder engagement" (see below). Apart from customers, stakeholders also include employees, partners, investors, regulators and creditors of both Jardine Matheson and operating companies under the group.

Summary of JM's two-layer stakeholder engagement approach

Figure 34

Two-layer stakeholder engagement approach: Group level and BU level



Source: CLSA, Jardine Matheson

Employee-driven materiality assessment and sustainability strategy

Materiality assessment - Through employee pulse check survey

Jardines assesses the materiality of sustainable issues through its internal pulse check survey with employees, which the group believes is in line with its "stakeholder-driven" approach. The results of the survey played an important role in the group's sustainability strategy adopted in 2020.

We identify five areas of focus from the group's Climate Change Policy

Group Climate Change Policy lays out the foundation and direction

Underpinning the group's journey to being more sustainable is its Climate Change Policy (*link*), the one-page document lays out its main areas of focus: 1) maintain a robust risk management process for climate-related risks, 2) identify climate risks and opportunities into investment process and business continuity, 3) reduce and minimise greenhouse gas emissions, 4) pursue GHG emission targets aligning with climate science and 5) allocate adequate budget and resources to meet climate-related commitments and targets.

3. Risk management

The role of the group's risk management

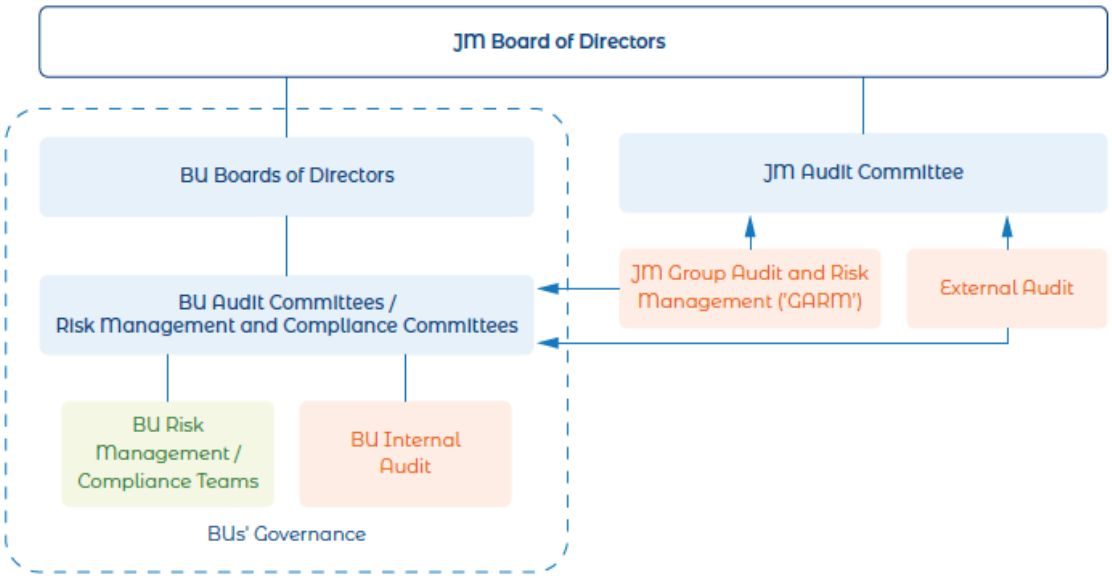
Jardines' risk management governance structure is similar to SLC's structure in terms of the roles and responsibility between the group and individual BUs. With the group's board of directors being responsible for the risk assessment and management, the group's "Group Audit and Risk Management" team offers guidance on risk management to the BU, while the team also regularly reports to the group's Audit Committee on the results of risk assessments and any serious concern on a group-wide basis.

Role of BUs in the risk management process

At the BU level, each unit performs ongoing risk assessment and maintains a risk register so that it can identify-sustainability related risks. For instance, climate risks are reported by relevant BUs.

Figure 35

Jardine Matheson's risk management governance structure



Note: BU = business units. Source: Jardine Matheson

Jardines' audit committee, according to 2021's annual report, comprises Stuart Gulliver (the chairman of committee), Adam Keswick and Anthony Nightingale.

Climate risk has been identified as one of the emerging risks for the Group

Climate risk has been identified as one of the emerging risks for the group. Based on its 2021 Sustainability Report, so far the climate-related risks cascade into 1) physical risks to assets and supply chain, 2) regulatory risks associated with new legislation and policies to restrict emissions, such as carbon pricing and taxes, 3) market risks in some sectors due to shift in consumer preferences, 4) financing risks from investors' and regulators' rising demand in sustainability reporting and finance.

Jardines has just started to work out its mitigation plan to address the climate risks it has identified and is moving towards the governance alignment, policy setting and risk assessment stages. Jardines is also aware of transition risk from adoption of Evs and renewable energy, however, mitigation efforts are at early stage.

Mitigation measures for climate risks have been identified

Figure 36

Mitigation measures to address climate risks identified

- **SLC** has been established to mobilise and coordinate sustainability efforts across the Group and a sustainability strategy, including the pillar on Leading Climate Action.
- **The Climate Action Working Group**, with representation from all BUs, coordinates Group-wide initiatives to strengthen collaboration and share knowledge.
- Our Group Climate Change Policy has been developed.
- **Net-zero commitments** are under development.
- We are in the process of assessing emerging **Environmental, Social and Governance ('ESG')** reporting standards to align with best market practices.
- **Our Climate risk assessments and adaptation action plans** will be based on recommendations of the **TCFD**, including measures to address physical risks and capitalise on opportunities for global transition to a low carbon economy.

Source: Jardine Matheson

4. Metrics and targets

Still at an early stage

Although it remains at an early stage and does not have an exact and quantifiable target on sustainability-related metrics, we note its focus on decarbonisation is well aligned with the goal of regional economies where the group operates in (Hong Kong, Vietnam, China and Indonesia). Meanwhile these targets will be decided by BUs (under the group's guidance and policies). Nonetheless, we think Jardines is taking a scale-based approach in achieving its sustainability ambition; in which it focuses on exploring opportunities for emission reduction in businesses with larger scale. In 2021, Jardine C&C and Astra, together represented 74% of the group's Scope 1 and Scope 2 emissions.

Hongkong Land and Gammon made progress in emission reduction

It is worth highlighting that Hongkong Land is on track to its entity-level emission reduction goal; it has already lowered its carbon emission by 40% in 2021 (using 2008 as the baseline). Meanwhile, Gammon also has had some achievement in reducing waste disposal where it is on track to reduce its landfill capacity by 25% by 2025 (using 2016 as the baseline). Gammon has achieved its target of allocating one-fourth of its procurement budget on purchasing more sustainable materials.

Science-Based targets for Gammon, Hongkong Land and Jardine C&C

How metrics are reported and set

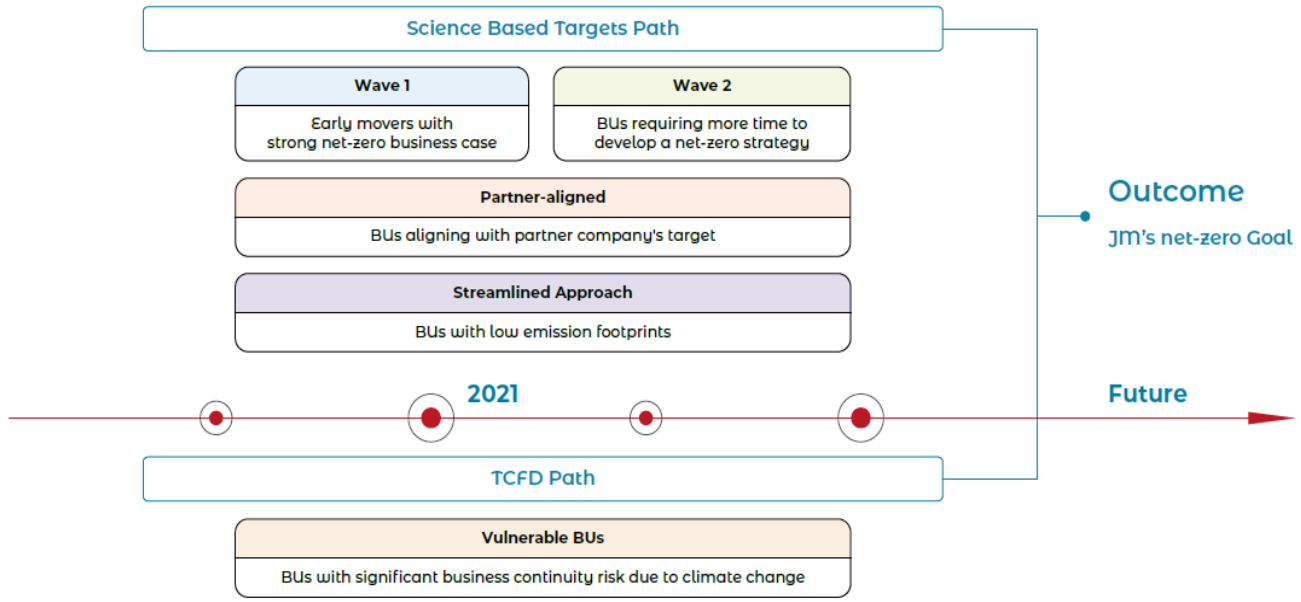
With regional economies' commitment on "net-zero" (Hong Kong and Vietnam by 2050, China and Indonesia by 2060), Jardine Matheson's key focus on sustainability is decarbonisation by segments, through the adoption of more efficient materials/renewable energy; while specific Science-Based targets are separately set at Gammon, Hongkong Land and Jardine C&C (based on our identification).

But decarbonisation at the group level remains at an early stage

In addressing what the group wants to achieve in its decarbonisation journey, we think it is taking a pragmatic, scale-based approach in focusing on where the opportunity of carbon net-reduction will come from. As of now, there is lack of granularity in group's decarbonisation plan. However, the group has acknowledged the complexity in assessing the impact from decarbonisation on its various businesses and plans to resolve the complexities in 2022, followed by the formulation of the decarbonisation pathway and timeline.

Figure 37

Jardine Matheson's segmented approach to decarbonisation



Source: Jardine Matheson

Jardine Matheson reports emission data based on actual emissions

Operations-based reporting emission data

In addition, Jardine Matheson reports its emission data based on actual operations, rather than taking the attributable share of such emission based on effective equity stake in businesses. The group stated in its 2021 sustainability report that its internal guidance on calculating the GHG emission data aligns with the GHG Protocol Corporate Accounting and Reporting Standards.

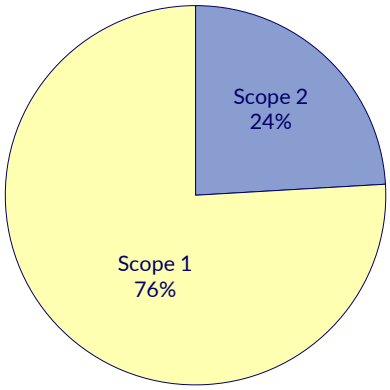
Established track record of reporting GHG emissions

2021 was the first year when the group-wide emission data were aggregated. In the year, 76% of the group's GHG emission (4.1m tonnes) was attributable to Scope 1 activities, while the remaining 24% was Scope 2. There is no Scope 3 emission disclosed so far.

Figure 38

Majority of GHG emissions in 2021 was attributable to scope 1

Jardine Matheson's group-wide GHG emission split by Scope of activities (2021)



Source: CLSA, Jardine Matheson

How have Jardine Matheson's group targets tracked so far - by businesses?

We only note high-level and qualitative targets thus far

A high-level, and qualitative goal of the group is to promote a just-transition towards a "net-zero" emission which is in line with climate science. As the group is resolving complexities regarding decarbonisation, we have not noted any quantitative targets yet at Jardines' group level. Nonetheless, there was some notable progress by Hongkong Land and Gammon with respect to climate-related goals set by each entity.

On track for its ongoing target; its Science-Based targets were also validated in July 2022

Hongkong Land: With respect to Hongkong Land's target to reduce carbon emission by 55% by 2030 (relative to 2008's level), it has achieved a 40% reduction in 2021. Therefore, we think it is on track compared to its goal. In July 2022, Hongkong Land's Science-Based targets was approved by Science Based Targets initiatives; where Jardines' property arm aims to reduce Scope 1 and 2 GHG emissions by 46% by 2030 (compared with 2019's level), and carbon intentiy of Scope 3 emssions by 22% (compared with 2019's level).

A mixed performance, but on track for meeting reduction of landfill waste and increasing renewable energy generation

Gammon: Gammon has had a mixed performance thus far. While it is on track to meet its target in reducing landfill waste intensity and increase its renewable energy generation, it has achieved the target of having 25% of its procurement spending on more sustainable materials. In contrast, further improvement is still needed on its reduction in carbon intensity and energy intensity.

Figure 39

Summary of climate and emission-related targets

Company	Targets	Achievement so far
Hongkong Land	To reduce carbon emission by 55% in 2030 (using 2008 as a baseline)	On track, achieved 40% reduction (vs 2008's level) in 2021.
Hongkong Land	Further committed to a 46% reduction in Scope 1 and 2 emissions; and a 22% reduction in carbon intensity for Scope 3 emissions by 2030 (using 2019 as baseline). Approvals from Science Based Targets initiatives were received in July 2022.	Na.
Gammon	Reduce carbon intensity by 25% by 2025 (using 2016 as the baseline year).	Further improvement needed.
Gammon	Reduce landfill waste intensity by 25% by 2025 (using 2016 as the baseline year).	On track to meet target.
Gammon	Reduce energy intensity by 25% by 2025 (using 2016 as the baseline year).	Further improvement needed.
Gammon	Reduce water intensity by 25% by 2025 (using 2016 as the baseline year).	Further improvement needed.
Gammon	Increase renewable energy generation by 50% by 2025 (using 2018 as the baseline year).	On track to meet target.
Gammon	Reduce 25% on-site hours (to increase efficiency in resources used) worked by 2025.	Further improvement needed.
Gammon	Have 25% of procurement spent on more sustainable materials.	Achieved.
Gammon	Have 25% of concrete quantity produced being certified or equivalent to "platinum" level under the CIC Green Product Certification scheme.	Ahead of target.
Jardine C&C	Na. Still in the process of formulating medium-term targets; but 2021 will be the baseline year. Disclosure of such targets shall occur before the end of 2022.	Na.

Source: CLSA, Gammon, Hongkong Land, Jardine C&C

2021: 76% of GHG emission in scope 1 activities; and 74% of GHG from Jardine C&C + Astra

Scope 3: not yet ready, important to watch

Emissions data - 2021 was the first year when data were aggregated

2021 was the first year when the emission data were aggregated and reported by Jardines. 76% of the group's total GHG emissions in 2021 (5.4m tCO_2e) came from Scope 1 activities as mentioned above. In terms of entities, 74% of the total GHG emissions came from Jardine C&C and Astra, which in the aggregate represented 4.02m tCO_2e in 2021.

There is no disclosure of Scope 3 emissions so far. Given that the conglomerate is still at an early stage of rolling the sustainability strategy further out and considering the complexity of its businesses, we think it needs more time to disclose Scope 3 emissions. Progress on establishing a baseline for Scope 3 inventory will be a key factor to watch going forward.

Figure 40

Jardine Matheson's emission data in 2021 (Scope 1 and Scope 2 GHG emission)

Metrics[1]		Jardine Pacific[2]	Hongkong Land[3]	MOHG[4]	JC&C[5]	Astra[6]	Others[7]	Group Total	Additional Disclosure[1]
Environmental									
GHG emissions (tCO_2e)[8]	Scope 1[9]	100,817	1,419	26,357	1,696	3,598,219	384,063	4,112,571	48,902
	Scope 2 (location-based)[10]	104,622	130,911	163,065	7,381	414,088	485,737	1,305,804	156,416
	Scope 2 (market-based)[10]	104,622	130,911	159,685	7,381	414,088	482,975	1,299,662	156,416
	Total GHG emissions (Scope 1 and location-based Scope 2)	**205,439**	**132,330**	**189,422[11]**	**9,077**	**4,012,307[12]**	**869,800**	**5,418,375**	**205,318**
Total biogenic emissions (tCO_2e)		3,537	-	-	-	859,190	-	862,727	-

Source: Jardine Matheson

Komatsu: Digging for opportunities

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- ❑ Komatsu has been publishing a detailed sustainability report since 2014 and committed to TCFD in 2019.
- ❑ It is well on the way to achieving its 2030 targets, which were certified by SBTi as early as 2017. In 2021 Komatsu announced a "virtually zero" goal by 2050.
- ❑ Sees carbon neutrality as a major business opportunity in two main areas: production and product improvements; and process improvements at the customer level. As a global company, Komatsu is undertaking these initiatives in different countries.
- ❑ It has no sustainability committee at the board level but a new sustainability promotion division and committee within management.
- ❑ TCFD reporting has allowed for more focused, robust and deeper internal discussions on sustainability and climate issues

Summary

Komatsu builds heavy-duty machines to dig up the earth, bulldoze and dump its contents across construction sites, mines and forests globally: the majority of its emissions are derived from use of these products, and this is not something it can easily control. Making an early start has helped. The company first developed a climate strategy and decarbonisation goals in 2014 (the same year, it released its first "integrated report.") It has an interim target for carbon reduction of 50% by 2030 (of 2010 levels) and increasing the use of renewable energy to 50% by 2030. In September 2021 it announced a "virtually zero" goal by 2050. Its governance structure to meet these challenges relies on key entities within management, who report to the board, rather than a board committee focused on sustainability. In this process it has mapped out equal risks and opportunities, with a major near-term goal of building equipment that is able to use less fuel, run more efficiently and that leverages new technology. It is also working with customers to make their processes more efficient and less polluting. The company is on a determined climate path: the Japanese term it uses to encapsulate its business strategy is "Dantotsu," which means "best of the best."

Most of Komatsu's emissions are scope 3, which poses a major challenge

Energy efficiency is having an effect on emissions

In absolute terms, its emissions did rise in FY21 due to bigger output of construction and mining equipment. However, in terms of emissions per unit of production value, they decreased as the following table shows. This was primarily due to improvements in energy efficiency and the use of renewable energy, both self-generated and purchased.

Decarbonisation targets and performance in full

Figure 41

Komatsu 2030 decarbonisation targets and performance

Scope	Reduction Target (%)	Type	Unit	SBTi approved	% achieved by 2022
Scope 1 + 2	-50%	Intensity	Per unit production	2017	-37% (74% of target)
Scope 3	-50%	Absolute		2017	-19% (38% of target)

Note: Base year: 2010. Source: Komatsu Annual Securities Report (June 2022); SBTi Progress Report 2021; ACGA calculations

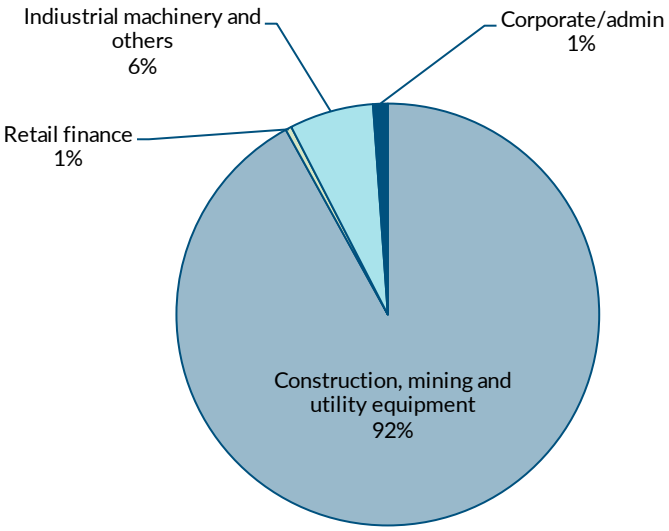
101-year-old company makes excavators, dump trucks, bulldozers and tunnelling machines

Background

Komatsu was established in May 1921 when Komatsu Iron Works was spun off from Takeuchi Mining Co (which began its life in January 1917) and incorporated as Komatsu Ltd. It took its name from Komatsu Town, now call Komatsu City, in Ishikawa Prefecture, Japan. Today the company is a leading global manufacturer of excavating equipment, dump trucks, bulldozers, tunnelling machines and numerous other heavy vehicles for the construction, mining and forestry industries. It also has a leasing business and makes industrial machinery, although its "construction, mining and utility equipment" segment accounts for the vast majority of its revenue and employees (see Figure 2 below).

Figure 42

Komatsu worldwide revenue and employee breakdowns (as of 31 March 2022)



Source: Komatsu

It has been listed since 1949 and is now on TSE Prime

Ownership and operations

Komatsu went public on the Tokyo Stock Exchange and Osaka Securities Exchange in May 1949. It was previously a member of the TSE First Section, and is now part of the new TSE Prime market for large companies with high liquidity as well as higher standards of board governance, disclosure, capital management, and sound business performance. As Figure 3 on the following page shows, the company's largest shareholder group is foreign investors (almost 42%), followed by (domestic) financial institutions (34%), and then individual shareholders (close to 18%).

Top 10 shareholders are listed as trust and custodian banks

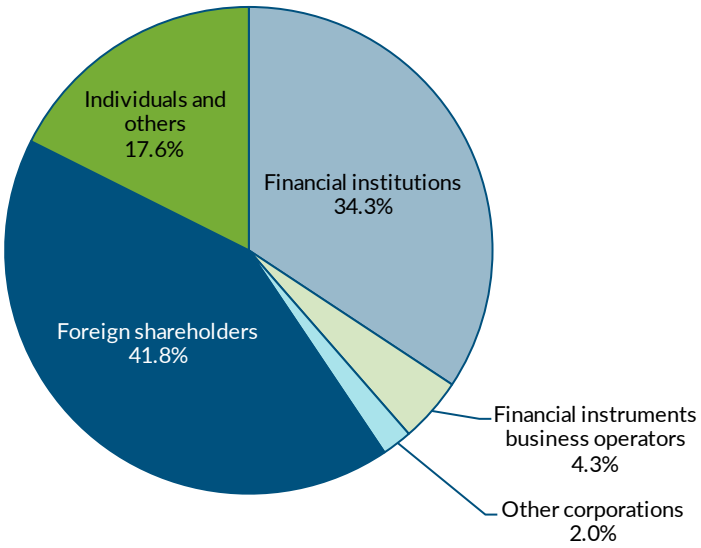
Information on the top 10 shareholders by name, as of March 2022, shows the usual list of large trust and custodian banks (holding shares on behalf of others), two insurance companies (Taiyo Life and Nippon Life), and most interestingly, the Komatsu Employees Shareholding Association, which owned a stake of 1.26%. The company also provides data on large shareholders (ie, holding more than 5%), including Nomura Asset Management, Nikko Asset Management and BlackRock, but it is somewhat out of date.

The group operates and sells in myriad jurisdictions

Komatsu has operations and customers in North, South and Latin America, Europe and CIS, the Middle East and Africa, and Asia-Pacific as well as Japan. In total it has 213 consolidated subsidiaries and 42 affiliated companies (accounted for by the equity method).

Figure 43

Komatsu shareholder groups (as of 31 March 2022)



Source: Komatsu

Most of Komatsu's emissions are scope 3

Main sources of emissions

Scope 3 emissions account for almost all Komatsu's GHG emissions. The biggest scope 3 component, making up 88% of the total, is the use of its products by customers. The second is the manufacturing of purchased goods and services (just over 10%). The remaining scope 3 emissions and scopes 1 and 2 are negligible, accounting for less than 2%. In FY21, the sum of all these emissions came to a little less than 31kt of CO2-equivalent.

A breakdown of the total emissions in 2021 is here

Figure 44

Komatsu scope 3 GHG inventory (kt-CO2/year), FY21

	%	kt-CO2/year
Scope 3 categories		
Customer use	88.4	27,310
Manufacturing of purchased goods	10.1	3,105
Capital goods construction and others	0.4	121
Fuel procurement	0.4	116
Upstream transportation disposal	0.3	108
Waste transportation	0.0	13
Business trips	0.2	50
Commuting	0.2	52
Upstream leased assets operation	-	-
Downstream transportation	-	-
Processing sold products	-	-
Product disposal	0.1	18
Downstream leased assets operation	-	-
Franchise member companies	-	-
Investment Management	-	-
Total emissions	**100**	**30,893**

Source: Komatsu website (sourced 28 October 2022)

Climate reporting in Japan is gradually becoming mandatory

Japanese sustainability reporting requirements

Although sustainability reporting has been extensive in Japan for the past decade and more, it is only in recent years that the government has started publishing ESG-style reporting guidelines. Initially voluntary, some reporting requirements are gradually becoming mandatory. Another feature of the Japanese reporting landscape is that different government ministries and financial regulators have had a hand in writing these guidelines and rules. In chronological order they include:

- In 2017, the Ministry of Economy, Trade and Industry (METI) published the second edition of its landmark Ito Review (2014) on enhancing long-term corporate value and competitiveness through improved governance, sustainability and enhanced dialogue between companies and investors. The second Ito Review contained a stronger focus on ESG and was accompanied by the "Guidance for Collaborative Value Creation," which was intended to promote a common language between companies and investors.
- In March 2020, the Japan Exchange (JPX) published a "Practical Handbook for ESG Disclosure." The handbook covered key subjects such as the need for board oversight of the disclosure process, linking ESG to strategy, identifying material risks and opportunities, engaging with stakeholders, and setting metrics and targets. It also encourages issuers to utilise international standards of sustainability reporting, including the Global Reporting Initiative (GRI), Integrated Reporting, the Sustainability Accounting Standards Board (SASB) and TCFD, if they wish. The handbook remains voluntary.
- In June 2021, the Financial Services Agency (FSA) released the third edition of the Japan Corporate Governance Code. It included a new reference to the use of TCFD in sustainability reporting and more explicit mention of boards taking account of climate change, human rights and fair treatment of workforces in managing sustainability risks and opportunities. Companies on the Prime market in particular should assess the impact of climate risk on their business and report in line with TCFD.
- In June 2022, the FSA published the latest report from its Working Group on Corporate Disclosure, including a recommendation for a new section on sustainability in the annual securities report (Yuho). This would require all issuers to follow the TCFD framework in two steps: the first being mandatory disclosure on Governance and Risk Management and the second allowing them to disclose information on Strategy and Metrics and Targets according to their materiality judgments.
- In late August 2022, METI published the third edition of the Ito Review, which broadened the ESG focus further to "synchronising social sustainability with corporate sustainability." A second edition of the Guidance for Collaborative Value Creation was also published and, among other things, called for sustainability disclosure to be aligned with the TCFD framework.

The company has reported on its climate efforts for decades

Komatsu climate reporting and commitments

Komatsu began reporting to the Carbon Disclosure Project (CDP) in 2010 and in recent years has been rated an "A" for both climate change and water security. Two subsidiaries, Komatsu Matere and Komatsu Wall Industry, also began reporting to CDP in 2022. It published its first Integrated Report in 2014 based on the framework designed by the International Integrated Reporting Council in the UK. This report brought together key elements of the company's financial, CSR and environmental disclosure in one document and was published alongside its standard annual securities report (Yuho), CSR Report and Environmental Report. In the same

year, Komatsu set its carbon-reduction targets and roadmap to 2030 for the first time. In April 2017, the company's carbon-reduction targets were certified by SBTi. In April 2019, Komatsu committed to the TCFD and in 2020 it produced its first TCFD-style report within its Integrated Report.

Climate commitments and goals in full

Figure 45

Komatsu climate reporting, commitments and goals

Initiative	Status
Follows the TCFD disclosure framework	✓ since 2019
Annual sustainability report	✓ Inaugural "integrated report" in 2014. Previously published CSR and environmental reports.
Reports under the Carbon Disclosure Project (CDP)	✓ since 2010
Plan to achieve net zero by 2050	✓ "virtually zero" (since 2021)
Interim GHG reduction targets by 2030	✓ initially set in 2014
Aligns reporting with Global Reporting Initiative (GRI)	✓
Climate change strategy	✓ since 2014

Source: Komatsu

A roadmap to find Komatsu's climate disclosure

Where to find Komatsu's climate disclosure

Like many Japanese companies, Komatsu distributes its sustainability information across several documents and its website. The place to start is the "Komatsu Report 2022," which covers the "FY21" fiscal year from 1 April 2021 to 31 March 2022. This summarises the company's business operations and performance, its latest Mid-Term Management Plan for 2022-2024 includes a concise TCFD report and touches upon corporate governance matters. The company calls this report its "integrated report" (ie, integrating ESG, business operations and performance).

The second major publication to review is the Annual Securities Report (Yuho) for the same FY21 fiscal year. This was published in June 2022 and contains similar business and sustainability information as the Komatsu Report, but a lot more on financials, the role of the Kansayaku Board, internal audit, executive compensation and cross-shareholdings. In some ways the Yuho is easier to read because the information is not surrounded by pictures and graphics. It is pure text, with a few basic tables and diagrams.

Komatsu also produces a detailed "ESG Databook," which at its name suggests provides metrics across a range of environmental, social and governance criteria. At more than 200 pages, the Databook also maps the firm's performance against both the GRI and SASB indices.

Meanwhile, the company's website has a "Sustainability" section, under "About us," that has links to its sustainability policy, management of sustainability (including materiality analysis) and all key ESG reports.

1. Governance

The company follows the Kansayaku board system

Komatsu follows the traditional Japanese form of corporate governance, with a board of directors audited by a second entity called a Kansayaku board (previously translated as the "statutory auditor board," but today more commonly referred to as the "audit and supervisory board"). Over time this system has become partially independent of management, with outside directors brought into the board of directors and outside auditors added to the Kansayaku board. The latter body essentially audits the legality of director decisions and behaviour, ensures it follows its reporting obligations and oversees the external accounting auditor.

The company also has nomination and compensation advisors

The firm's governance structure also comprises two newer entities not required by company law: a Nomination Advisory Committee and a Compensation Advisory Committee. The former advises the board of directors on the appointment of directors and auditors and discusses the appointment and "discharge" of executive officers, including the president (CEO). The latter deliberates on the remuneration of directors and auditors and advises the board of directors accordingly. In both areas, the board of directors is the final decision maker. It is important to note that the board chairman, Tetsuji Ohashi, who was formerly president and CEO, and its current president, Hiroyuki Ogawa, both sit on the Nomination Advisory Committee, though neither chair it. While the compensation committee comprises outside directors, outside auditors, one outside expert and one internal member from management.

There is no board committee focused on climate

Komatsu does not have a board committee focused on sustainability. Instead, it places responsibility for climate and sustainability strategy in a few key entities within the management structure of the company. These report to the board of directors and some are relatively new. They are:

The **Sustainability Promotion Division,** formed in April 2021. This division "enhances the commitment of the entire Komatsu Group to ESG-oriented management with the goal of building an environment for formulating policies and plans regarding two major areas of ESG management, the environment and society, to ensure the divisions and companies of the Group are able to maintain their commitment to sustainability."

The **Sustainability Promotion Committee**, chaired by President Ogawa. Meetings are held twice a year to decide on sustainability measures for the Komatsu Group, as well as environmental and CSR policies.

The **Risk Management Committee**, chaired by an executive officer, discusses climate change among other key risk matters.

The **Strategy Review Committee,** also chaired by President Ogawa, receives input from the above two committees and discusses a range of issues including low-carbon product development and growth strategies for key business segments such as mining and forestry.

Sustainability promotion division helps to coordinate efforts

While the Sustainability Promotion Division may be new in form, it is best seen as a continuation of work already being done in the company across different functional departments. As Mitsuko Yokomoto, president of the division and one of the company's senior executive officers, explains: "It was not that we decided to do something new. We were always engaged in sustainability, but the functions were spread over different organisational areas. We wanted to coordinate this work better." Creating the division, moreover, has not required recruitment of new staff. It has been more a case of reorganising existing resources.

Adoption of TCFD sharpened focus for the Risk Management Committee

It is a similar story for the Risk Management Committee. The adoption of TCFD in 2019, for example, gave the committee a new and enhanced framework in which it "can have different discussions," says Masatoshi Morishita, general manager of the Business Coordination Department and another senior executive officer of the company. "Of course, it is not that we started everything from then (2019). Before that we had an environmentally friendly mindset. But with TCFD we are able to engage in more concrete action, such as scenario analysis. Our approach is no different, but it is more enhanced, more robust."

TCFD structure has also boosted dialogue with investors

One of the other benefits of TCFD, says Ms Yokomoto, is that it has allowed the company to share a wider range of thoughts with investors. While undertaking scenario analysis has brought other advantages: "Generally we all knew about the impact of climate change, but with this framework we could create our business strategy on more specific terms (that is, the 4°C, 2°C, and 1.5°C scenarios). Within our organisation, discussion is now on more concrete terms. It has given us a tool that has facilitated internal discussions."

Where the board adds value

The board discusses report on sustainability twice a year

The primary way in which the Komatsu board adds value is to discuss the twice-yearly report from the Sustainability Promotion Committee. Directors, including outside directors, contribute to discussions of the company's sustainability policy and strategy, including the upgrade of the Mid-Term Management Plan in 2019, which positioned this policy more strongly (see Strategy section below). As Ms Yokomoto says, "by having outside directors join the discussions, the board has provided valuable inputs not only as Komatsu internal directors but also from the perspective as outsiders. For example, the board has strongly suggested to make our sustainability message to the public better align with other corporate key messages that we issue to our stakeholders, so that the key tones and overall presentation of Komatsu will appear more integrated.

Layout of the climate issues the board discusses

More specifically, and as reported in the Komatsu Report 2022, the board discussed a range of issues relating to climate change during the fiscal year from April 2021 to March 2022:

- ❑ Achieving carbon neutrality by 2050.
- ❑ Establishing a Sustainability Policy (see Strategy section below).
- ❑ Formulating a new Mid-Term Management Plan FY2022-2024 (see below) and reviewing progress in the current plan.
- ❑ Discussing reports from the Sustainability Promotion Committee and other parts of management.

Importantly, the board also decided to expand the company's scenario analysis work from focusing on just 4°C and 2°C to a 1.5°C projection as well. This was inspired by the conclusions of the 26th United Nations Climate Change Conference (COP26) held in Glasgow in November 2021.

Kansayaku members monitor board discussions on climate

Interestingly, the Kansayaku board also contributes to the development of sustainability policy. "The Kansayaku members monitor the board of director's discussions and voice their views. This is also true of our basic sustainability policy, where they are actively involved," says Mr Morishita.

2. Strategy

Carbon emissions were on the company's radar in 2008

Komatsu was thinking about carbon emissions as early as 2008, when it produced a hybrid hydraulic excavator that reduced emissions by combining a diesel internal combustion engine with a generator and electric motor. The company started developing a climate strategy and decarbonisation goals in 2014 and announced them as Management targets in 2019, the same year as it published its first "integrated report." It set FY2030 targets of reducing emissions from the operation of its products by 50% compared to a base year of FY2010 and increasing the use of renewable energy to 50%, both compared to a base year of FY2010. As Mr Morishita notes, these targets came with a roadmap that the company has been

implementing and monitoring ever since. In contrast, the newer 2050 net zero target is a more "challenging target", he says. Achieving neutrality will "require technological breakthroughs" and face "many uncertainties." The next key turning point came in late April 2019, when it incorporated ESG and sustainability more explicitly in its Mid-Term Management Plan (MTMP) for FY2019-FY2021. This continued with its current MTMP for FY2022-2024. Both plans reflect Komatsu's overarching business philosophy of "Dantotsu," which means "best of the best".

Mid-term management plan incorporated climate strategy

The MTMP for 2019-2021 outlined a strategy that closely linked business innovation, growth and profitability with solving ESG problems and meeting the expectations of society and stakeholders. It recognised that corporate value includes a strong intangible element and defined it as "the total sum of trust." More specifically, it described how it would achieve these goals through innovations such as "smart construction" and "smart forestry" (see below), more intelligent use of automation and IT, and global human resource development. The plan was published around the same time as Komatsu committed to TCFD and was followed a few months later by its new integrated report, the Komatsu Report, in September 2019. It also contained a series of explicit numerical targets covering financial performance, ESG objectives (reducing carbon emissions by 2030, enhancing use of renewable energy, and achieving positive evaluations by external organisations such as DJSI and CDP) and balancing the need to retain capital for investment with shareholder returns through dividends and buybacks.

Most recent mid-term plan outlines the carbon neutrality roadmap

The MTMP for 2022-2024 developed the sustainability and business innovation theme. It included discussion of a revised materiality matrix, a review of its business portfolio and the need for management to respond to a more-volatile demand environment. Accordingly, the three key pillars of this plan are continued investment in growth areas, a clear focus on improved profitability and strengthening the company's ability to deal with changes in the external environment. The plan talked more about Komatsu's roadmap for carbon neutrality, including a focus on both product and process improvements. It reaffirmed the financial, ESG and shareholder-return numerical targets set in the previous plan and added the new 2050 neutrality goal.

Sustainability policy

A sustainability policy came into play in 2021

Towards the end of its centenary year of 2021 the company developed a sustainability policy to clarify its goal of "addressing climate change and social demands and further promoting sustainability management." The policy has three parts, "With people," "With business" and "With the planet," each of which is linked to a number of materiality criteria and key activity themes for implementing the policy. This part of the policy is quite broad and generic. The more interesting component is how this links to a detailed set of KPIs and FY2024 targets from the latest Mid-Term Management Plan. Notable objectives include, among many other things: setting a ratio of full-time female employees of 17% or more and female managers of 13% or more; cultivating 1,000 smart construction consultants, and undertaking human rights due diligence work. In the area of climate change, it also wants to achieve a 45% reduction in CO2 emissions from production and boost renewable energy usage to 20% by the end of the current plan.

Risk and opportunity are in equal abundance

Risks and opportunities

Komatsu sees almost as many risks ahead as opportunities. Its TCFD report identifies 16 major items that could have an impact on its global construction, mining and forestry business segments, ranging from fluctuating coal demand to new environmental regulations, and the introduction of carbon prices and rising prices for energy and materials to more frequent natural disasters. These are grouped into four themes:

1. Changes in resource demand
2. Transition to low-carbon products
3. Manufacturing costs
4. Natural disasters

The company has undertaken scenario analyses of these themes against the standard three pathways of 1.5°C, 2°C and 4°C. *(For more analysis of Komatsu's approach to risk management, see the next section.)*

New technology is eyed to improve energy efficiency

Product improvements

Given that Komatsu's "products in use" account for almost 90% of its scope 3 emissions, a major near-term objective of the company is to redesign its equipment to lower fuel consumption, improve efficiency and "further enhance its existing hybrid, diesel electric and other technologies," as noted in its annual securities report for 2022. It is also looking into new technologies such as fuel cells and hydrogen engines.

There are, however, limits to what tech can do to help

All of this is easier said than done, however. It is not possible, for example, to simply stick a battery into a heavy excavator or truck. According to Mr Morishita, "We need innovations and breakthroughs" to address the limitations on the size of equipment that can use batteries today. Small excavators weighing up to 20 tonnes may be able to use batteries, while mini ones of around 3 tonnes already have them and are about to be launched into the market. But this leaves medium (up to 35 tonnes) and large excavators (up to 90 tonnes) relying on diesel engines. There also need to be breakthroughs on the cost front. A 3-tonne battery powered excavator costs about twice the price of a conventional model. "As we scale up the volume, the costs will come down. But we are envious of car producers. They can improve performance (more easily). Construction machinery is used in various applications under severe conditions and has various classes of weight, so the power source of the battery alone cannot cover all classes. Therefore, it is necessary to develop various kinds of power sources," says Mr Morishita.

Komatsu has been improving its track record on low-carbon products

Despite these challenges, Komatsu has been making progress. As of April 2022, a total of 16 of its hybrid models have received certification from the Japanese government as being low-carbon products. And another 23 models, including bulldozers, hydraulic excavators and wheel loaders, have met the Ministry of Land, Infrastructure, Transport and Tourism's fuel-economy standards.

Upgrades to products are underway to help reduce emissions

Production improvements

The priority for Komatsu here is to reduce CO2 emissions in the production process by cutting energy consumption overall, improving the efficiency of production technology, producing renewable energy in-house and also purchasing it. One such example can be seen at the company's wholly-owned subsidiary Komatsu Forest AB based in Umeå, Sweden, which manufactures and sells forestry equipment. In August 2021 it announced the completion of a new plant and that it had embarked

on production, consolidating old plants located separately mainly in Umeå, optimising the production process and layout. It has also adopted new manufacturing engineering benefits, including an automatic assembly line with an automated guided vehicle (AGV) for the first time. Additionally, it has adopted renewable energy facilities, such as solar panels which cover about 19,000 m2 of the roof and heating equipment which uses geothermal energy.

Renewables

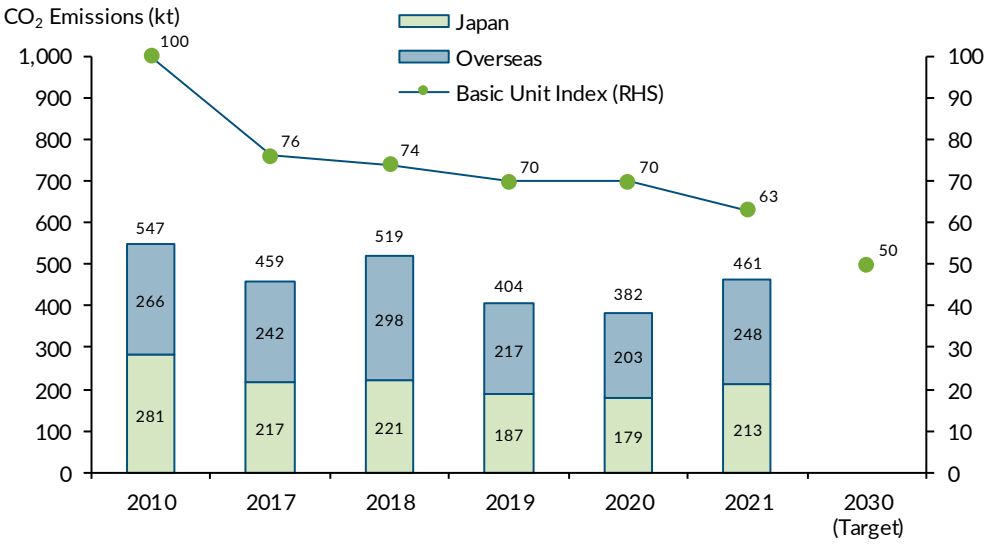
Emissions are increasing but intensity is dropping

Komatsu's use of renewable energy is increasing (standing at 13% in FY20 and 14% in FY2021). At the same time, emissions are increasing overall as production of construction and mine machinery expands. Still, Komatsu reduced its emissions per unit based on internal manufacturing value by 7% in FY 2021, the largest reduction in years and a 37% drop compared with FY2010.

Figure 46

Komatsu's absolute emissions over the years

Komatsu: absolute CO2 emissions vary, intensity falling

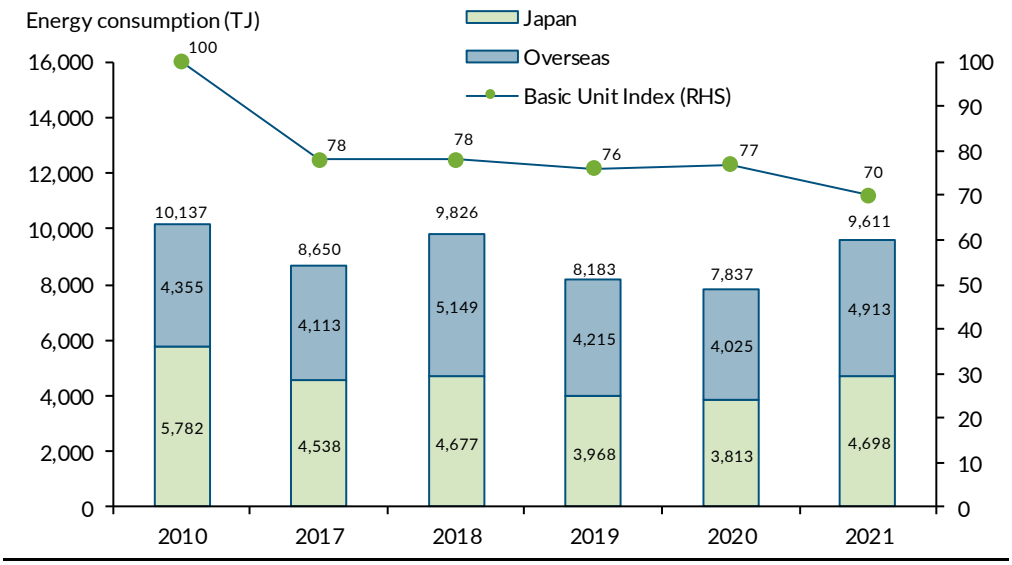


Source: Komatsu

Figure 47

Energy consumption is following a varied trajectory

Komatsu: absolute energy consumption varies, intensity falling

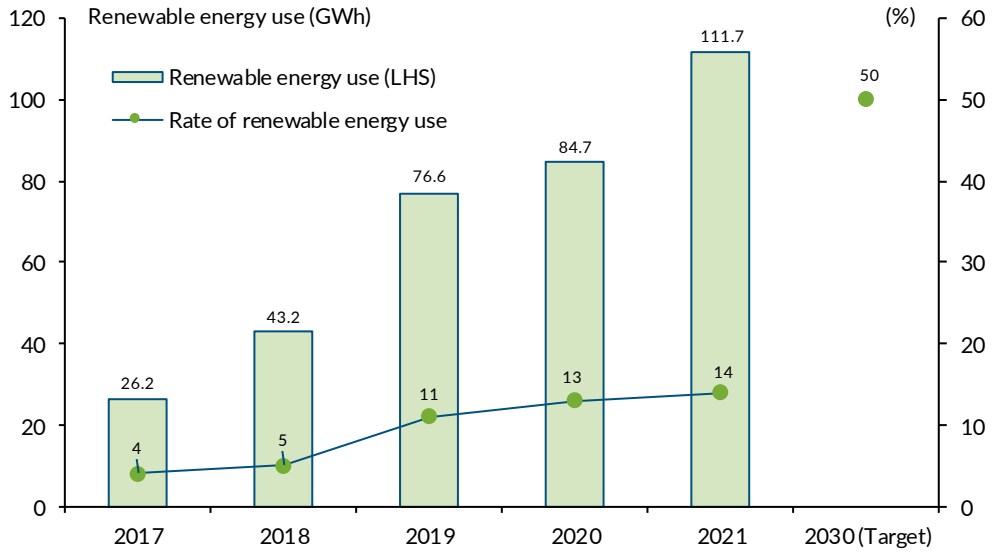


Source: Komatsu

There is a steady increase in the company's use of renewables

Figure 48

Komatsu: renewable energy use rising in volume and proportion



Source: Komatsu

Drones, 3D scanners and remote analysis of forests are employed

Process improvements

Changing customers' emissions is a challenge: Komatsu has taken a few steps in this area. Its Smart Construction initiative (with a lofty goal of building construction jobsites of the future) uses machine control equipment alongside drones and 3D scanners to reduce emissions in the lifecycle of construction equipment. The goal is to support more sustainable forest management in planting, cultivation and harvesting. The Komatsu tracking system "Komtrax" meanwhile gathers data on construction vehicles, enabling remote analysis of fuel consumption and operation times. Similarly, Komatsu uses drones to gather data on forests for sustainable management. Komatsu in 2021 announced that it had set up the Komatsu GHG Alliance, together with other major mining companies who are customers, Rio Tinto plc, BHP Group Limited & Plc, National Copper Corporation of Chile (Codelco), and Boliden AB. The alliance aims to develop a power-agnostic concept truck that can run on a variety of power sources.

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Risk management, metrics and targets: Key highlights

- Komatsu successfully follows the broad TCFD framework and recommendations for risk management and metrics and targets.
- It has a sound risk management system in place and demonstrates the ability to identify and monitor emerging risks.
- It meaningfully explores the risks and opportunities on climate change scenarios covering potential transitional and physical risks.
- Metric and targets are based on solid governance and third-party standards with granular split on what it intends to cut.
- Its risk management and metrics and targets standards outperform the majority of its domestic and global peers, but as ever there remains room for improvement.
- In particular, from an analyst's perspective, we would appreciate a clearer analysis of its identified risks to mid- and long-term financial consequences and distinguish the breakdown of its various targets across regions (and products).

3. Risk management

Komatsu has a robust history for establishing frameworks for risk management. In 1992, it established the Komatsu Earth Environment Charter, which launched activities for climate change and other environmental issues. This in itself was way ahead of where peers stood on addressing climate issues at the time. In 1998, it formulated the Komatsu's Code of Worldwide Business Conduct as a compilation of best business practices to be observed by officers and employees of Komatsu Group companies both inside and outside Japan. The code addresses fair business practices, non-discriminatory personnel systems, endeavours for the global environment, appropriate information management, internal control structure and other topics.

Long history of establishing risk frameworks

Komatsu has been conducting compliance and risk audits (CR audits) since FY2008. These covered areas are not included in J-SOX audits, which are conducted in accordance with the Financial Instruments and Exchange Act of Japan to evaluate the internal controls related to financial reporting and identify potential compliance risks within the company. Audited items include: 1) Safety, 2) Environment, 3) Labour, 4) Finance and Treasury, 5) Quality Assurance and Recall, 6) Vehicle Inspections and Specific Voluntary Inspections (inspections required by law), 7) Export Control, 8) Information Security, 9) the Anti-monopoly Act, 10) the Subcontract Act. It also implements field instructor audits (Safety, Environment) and audits of sales offices bases (Finance and Treasury, Labour, Information Security), which are implemented at each distributor base, as well as audits of overseas representative offices (Finance and Treasury, Labour, Information Security), which are implemented for overseas offices.

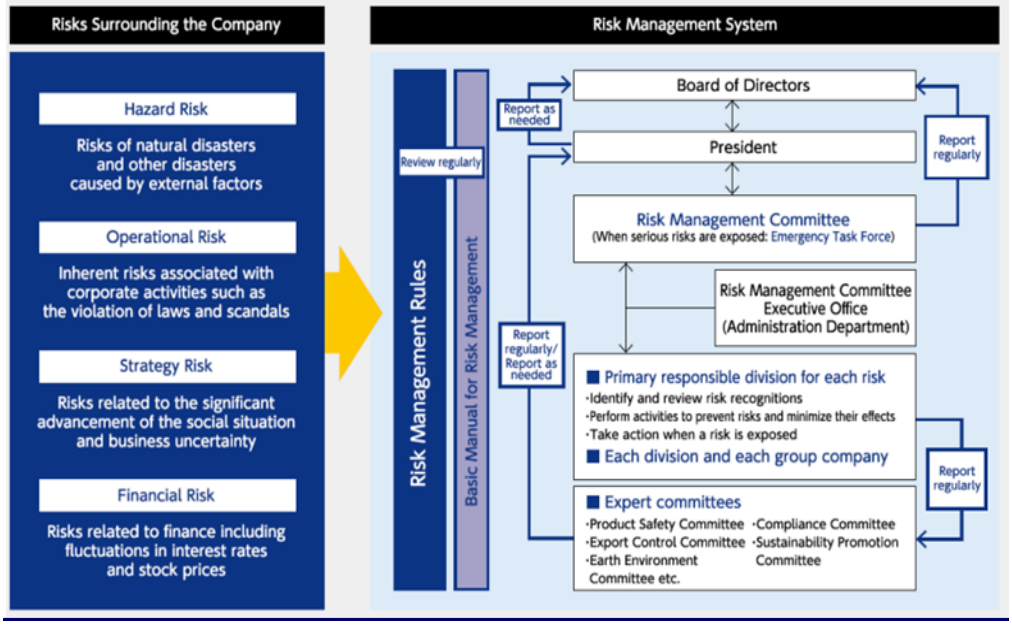
Risk management committee

Komatsu has developed both a policy and rulebook for its risk management. The Risk Management Committee comes up with relevant policies for the entire group, reviews existing risk management systems and evaluates and improves upon response measures in place for each risk. This committee takes charge and control when these risks arise. Komatsu's overall risk management system and reporting lines are illustrated in the chart below.

Reporting lines

Figure 49

Komatsu's risk management structure



Source: Komatsu

Dedicated process for climate-related risks

According to Komatsu's response in CDP Climate Change survey in 2021, climate-related risks and opportunities are identified and assessed in a dedicated process as they often differ in nature from other risks, and they are analysed based on four main themes: low-carbon products, impact on operations (including costs), resource supply and demand, and physical impacts such as natural disasters. Representatives from production, R&D, procurement, sales and investor relations participate in the process as mentioned above. The output of this process are climate-related risks and opportunities that could have substantial impact on Komatsu's direct operation and value chain and such discussion cross functions take place several times per year.

Integration of climate-related risks and opportunities into the overall risk management system

Subsequently, the identified climate-related risks and opportunities are deliberated, from both short-term and long-term perspectives, at the Strategy Review Committee, which also proposes countermeasures as needed. Then these climate-related risks and opportunities are integrated into the company-wide risk management process through reporting to the Risk Management Committee (RMC). The RMC will then determine the impacts of climate-related risks and opportunities among other risks and report to board of directors for approval before externally reporting to stakeholders in the integrated report.

Climate-related committees

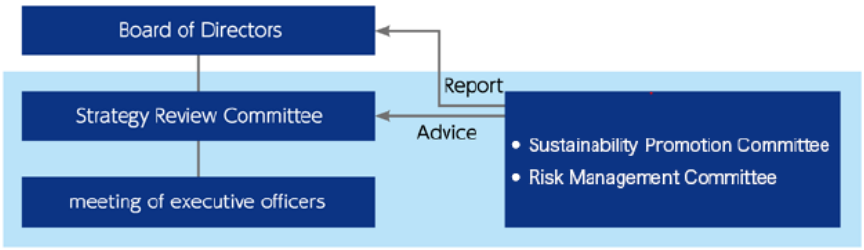
Two main committees for the environment

There are two main committees associated with the environment; the Sustainability Promotion Committee and the Risk Management Committee. Both advise the Strategy Review Committee, which reports to the board of directors, which has the final say on any system or approach the company takes.

Reporting system for anything environment-related

Figure 50

Systems for reporting and reviewing environmental-related issues



Source: Komatsu

Komatsu's materiality assessment

Assessment of material environmental risks provides foundation for TCFD disclosures

Komatsu's materiality assessment framework was developed in 2011 (before the founding of TCFD in 2015). The most recent review of materiality took place from November 2020 to February 2021, prior to its new mid-term plan, in order to "enhance our foundation for sustainable growth taking trends like digital transformation, carbon neutrality as well as diversity and inclusion as business opportunities."

Steps taken to identify material issues are taken with the support of a third-party organisation called Business for Social Responsibility (BSR), a US non-profit organisation. Together, they proceed through four steps.

Identification of sustainability issue

1) Identification of sustainability issues: it identifies 46 sustainability issues that have an impact on corporate value creation and business performance based on its materiality analysis, international targets and standards, reporting framework, management philosophy and strategy, key stakeholder issues, among others.

Evaluation

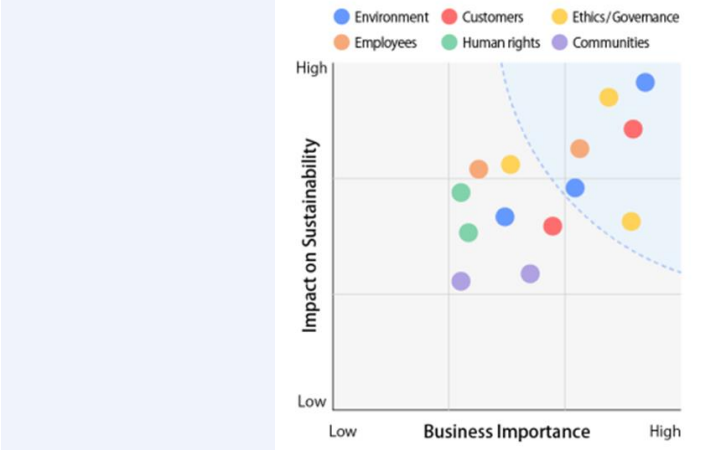
2) Evaluation of issues: it interviewed 26 internal (executives across the world) and external (institutional investors, WBCSD, environmental organisation (WWF), human rights NPO (BHRRC), customers and suppliers) stakeholders on its identified sustainability issues from two perspective including business importance and impact on sustainability (importance to stakeholders and environmental, social and economic impact).

Identification of materiality

3) Identification of materiality: six areas have been identified: Employees, Human Rights, Customers, Ethics/Governance, Communities and Environment. Additionally, it has identified Environment, Customers, Employees and Ethics/Governance as priority issues that have been emphasised in its FY2022-2024 mid-term plan.

Figure 51

Materiality analysis



Source: Komatsu

Relationship between materiality, sustainability and SDGs

4) Relationship between materiality, sustainability policy and SDGs: passed by board resolution, the current mid-term plan selects 10 new goals from the 17 sustainable development goals (SDGs) deemed most relevant to Komatsu's materiality. KPIs are set to monitor progress with the results disclosed in the Komatsu Report (Integrated Report).

Easier to view diagram

Figure 52

Relationship between materiality, sustainability policy and SDGs

Sustainability policy	Relationship with SDGs	Materiality
With people	Gender equality; Decent work and economic growth; Reduced inequalities; Partnerships for the goals	[Employees] [Human rights] ▪ Diversity and Inclusion ▪ Skills development and workplace retention ▪ Employee engagement and job satisfaction ▪ Occupational safety and health and wellbeing ▪ Respect for human rights
With business	Industry, innovation and infrastructure; Sustainable cities and communities; Responsible consumption and production; Partnerships for the goals	[Customers][Ethics / Governance] [Communities] ▪ Provision of solutions ▪ Product safety and quality ▪ Governance ▪ Compliance ▪ Contributions to local communities
With the Planet	Affordable and clean energy; Industry, innovation and infrastructure; Responsible consumption and production; Climate action; Life on land; Partnerships for the goals	[Environment] ▪ Development of low-carbon/low-emissions products, solutions and business models ▪ Resource recycling and remanufacturing ▪ Forest conservation through business activities ▪ Reduction of energy usage and GHG emissions

Source: Komatsu

Able to identify emerging risks

Our view is that Komatsu has developed a strong framework and commitment to identifying material sustainability risks, which allows it to effectively integrate both current and emerging climate and environmental-related risks into its overall risk management. Indeed, in the risks section of its 2022 sustainability report, it emphasises in great detail two emerging risks in the form of risks related to the development of low-carbon/low-emission products and risks related to providing solutions to customers.

Prevention of environment risks

Risk audits

Komatsu has been conducting compliance and risk audits for overseas group companies with the support of environmental managers at mother plants in Japan since FY2007.

Not letting Covid stand in the way

Komatsu has overcome obstacles posed by the pandemic to achieve recent audits. Despite not being able to visit sites, it managed to conduct audits through FY2021 in Europe and China through the use of remote audits and used of outsourced audits to external organisations. The result showed that none of the companies had any major problems that could lead to environmental risks and they were all actively engaged in activities to reduce their environmental footprint.

Audits when and where?

Figure 53

Past environment audits

2007	China	2015	Thailand
2008		2016	India and Indonesia
2009	Thailand and Indonesia	2017	Russia and China
2010	India	2018	Indonesia and Brazil
2011	Brazil	2019	China and United States
2012	Russia and Czech Republic	2020	Europe
2013	United States	2021	China and Europe
2014	United States and Brazil		

Source: Komatsu

Regional meetings

Those responsible for environment and safety at overseas business units have met at regional meetings since FY2019. Discussion and the exchange of information is aimed at improving compliance and better addressing environmental issues. In FY2021, meetings were held in Latin America, Europe, Southeast Asia, Oceania and China. The North American meeting was cancelled due to the outbreak of coronavirus.

Taking part in and complying with three major global organizations

Endorsement of climate initiatives and the TCFD

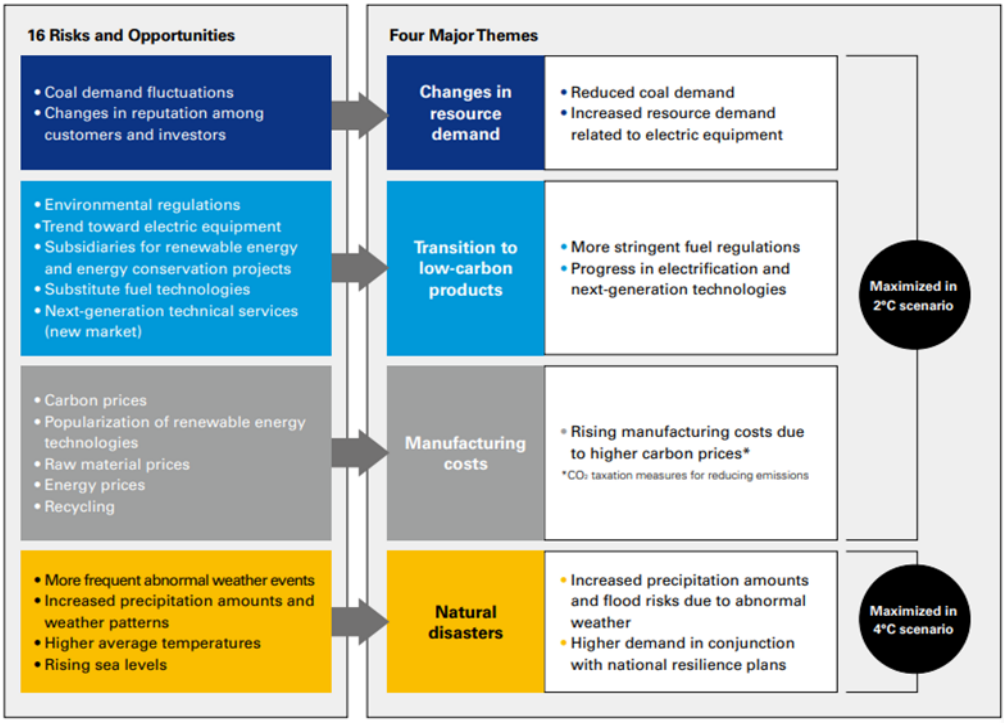
We note that Komatsu has chosen to actively take part in and comply with three main global organisations; the UN Global Compact, the World Business Council for Sustainable Development (WBCSD) and The Task Force on Climate-Related Financial Disclosures (TCFD). In regards to the TCFD, Komatsu first expressed its support in April 2019 and has been preparing information disclosures in compliance with the standards required.

Based on the recommendation of the TCFD, Komatsu identified 16 climate change-related risks and opportunities. Having assessed internal factors (its own sales and profits) and external factors, the 16 risks and opportunities were grouped into four major themes.

Risks and opportunities

Figure 54

Grouping of risks and opportunities



Source: Komatsu

Scenario analysis

To assess the potential risks and opportunities from climate change, Komatsu has performed a scenario analysis on the four major risk and opportunity themes noted above. Scenarios were based on 1.5°C, 2°C and 4°C, based on the Fifth Assessment Report (Representative Concentration Pathways 2.6 and 8.5) and the Sixth Assessment Report (Shared Socioeconomic Pathways 5-8.5) of the Intergovernmental Panel on Climate Change, and the Sustainable Development Scenario, the Stated Policies Scenario and the Net Zero by 2050 scenario of the International Energy Agency (IEA).

1.5°C and 2°C greatest impact on resource demand

Risks and opportunities for resource demand, the transition to low-carbon products and manufacturing costs were greatest in the 1.5°C and 2°C scenario. Risks and opportunities associated with natural disasters were greatest in the 4°C scenario.

4°C associated with natural disaster risk

Figure 55

Climate scenarios

Changes in Resource Demand

	Risks	Opportunities
2°C scenario	• Regulation of power generation using fossil fuels • Massive reductions in coal production volumes under IEA scenarios • Reduced sales to coal-related customers by Komatsu	• Rapid transition from fossil fuel-powered equipment to electric equipment • Higher demand for copper and other resources necessary for electric equipment (motors, batteries, fuel cells, etc.) • Increased sales to copper and other relevant mining-related customers by Komatsu in conjunction with trend toward electric equipment
4°C scenario	• Limited regulation of coal in developing nations • Coal production volumes in 2030 in line with current levels under IEA scenarios • Reduced appetite for investment in coal mines	• Trend toward electric equipment less pronounced than in 2°C scenario • Higher demand for copper and other resources necessary for electric equipment • Rise in investment for streamlining mine operations

Strategies

Exploration of business opportunities arising from climate change through value creation by means of innovation and growth strategies based on innovation

- Increased metal resource demand in conjunction with transition to electric equipment—Expansion of underground mining equipment operations
- Contribution to sustainable forestry—Provision of equipment and systems for streamlining processes spanning from afforestation to logging
- Contribution to rehabilitation of closed mine sites and greenification of deserts—Forest restoration projects at closed mine sites and forest machine operations
- Transition to circular economies—Expansion of equipment restoration ("Reman") business

Transition to Low-Carbon Products

	Risks	Opportunities
2°C scenario	• Regulations promoting transition to fuel-efficient equipment, electric equipment, and other low-carbon products • Rapid changes in research and development trends and competitive climate and market entry by new competitors	• Higher demand for electric, fuel-efficient, and bio-fuel equipment • Expansion of equipment restoration ("Reman") business in conjunction with transition to circular economies • Increased demand for SMARTCONSTRUCTION and other solutions contributing to decarbonization
Strategies	• Respond to transition risks by shifting toward low-carbon products through realization of the safe, highly productive, smart, and clean workplaces of the future described in the mid-term management plan	

Manufacturing Costs

	Risks	Opportunities
2°C scenario	• Taxation of fossil fuels and CO_2 emissions • Transfer of higher product purchase prices to Komatsu • Rising power fees and energy costs following investment in power generation facilities with low CO_2 emissions	• Increased competitiveness through production technologies that reduce CO_2 emissions
Strategies	• Mitigation of cost increases by achieving CO_2 reduction and renewable energy targets defined in the mid-term management plan	

Natural Disasters

	Risks	Opportunities
4°C scenario	• Increased frequency of heavy rain and floods due to abnormal weather • Risks of disaster damages to Komatsu plants at high risk of flooding • Component supply delays following damages to suppliers from disasters	• Increased demand for flood-control works
Strategies	• Institute heavy rain and flood countermeasures across the value chain	

Source: Komatsu

4. Metrics and targets

Strong metrics and targets based on solid governance

Our overall view is that Komatsu has set a strong set of quantitative targets based on solid governance. It is ahead on this front, relative to both its domestic machinery and global peers.

Who sets the metrics?

Two main committees provide advice to the Strategy Review Committee

The Sustainability Promotion Committee and the Risk Management Committee - both mentioned in the above discussion on risk management - discuss and provide advice on climate change to the Strategy Review Committee. This Strategy Review Committee is chaired by the president and reports to the board of directors. Meanwhile the meeting of executive officers is charged with managing progress in achieving its objectives. The below table illustrates respective roles:

Figure 56

Who does what?

Strategy Review Committee reports to the board

Meeting title	Chairperson	Main themes regarding climate change
Board of Directors	Chairman of the Board and Representative Director	▪ Report from the Sustainability Promotion Committee ▪ Report on research, development, product planning, and CTO ▪ Production and procurement report ▪ Mid-Term Management Plan progress report
Strategy Review Committee	President	▪ Growth strategies at main production plants (including climate change related strategies) ▪ Report from the Sustainability Promotion Committee
Meeting of executive officers	President	▪ Progress in product development and (including climate change related KPI)

Source: Komatsu

Mid- and long-term targets

50% reduction

Komatsu aims to reduce CO_2 emissions from products and production by 50% by 2030 versus FY2019. Further, it also aims for a 50% contribution from renewable energy by 2030. These targets are split into three categories: emissions from products, production and logistics, with the additional targets of remaining on the CDP A list. Komatsu aims to become carbon neutral by 2050, in line with Japan's national goals.

Figure 57

Illustration of Komatsu's Scope 1-3 emissions sources

Targets broken down

Area	Application	Object	Index	Base Year	2030 Targets	FY2021 Achievements and Progress
Products	Construction Equipment Mining Equipment Forest machines etc.	CO_2	Fuel Consumption Reduction	2010	50% reduction	19% reduction
Production	Domestic and overseas production bases	CO_2	Improvement rate of basic unit	2010	50% reduction	37% reduction
		Electricity	Ratio of renewable energy in total electricity usage	-	50%	14%
		Water	Improvement rate of basic unit	2010	60% reduction	64% reduction
		Waste	Improvement rate of basic unit	2010	40% reduction	39% reduction
Logistics	Japan	CO_2	Improvement rate of basic unit	2006	39% reduction	36% reduction
	Overseas	CO_2	Improvement rate of basic unit	2011	22% reduction	12% reduction
External evaluation	-	-	External evaluation	-	CDP A List (Climate, Water) DJSI World	CDP Climate : A Water : A DJSI World: Selected

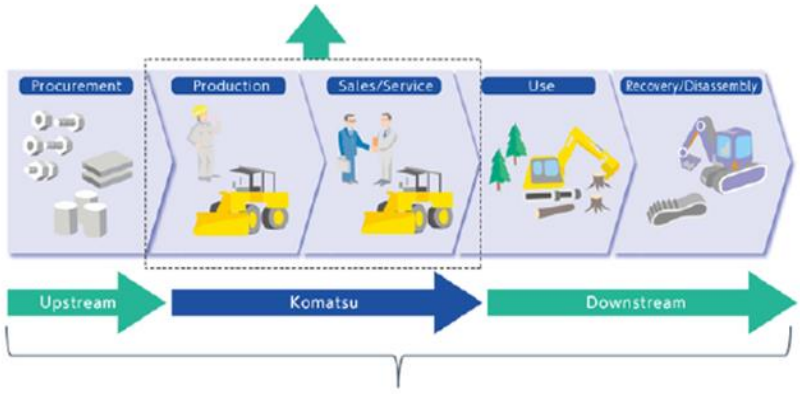
Source: Komatsu

Komatsu's scope 1-3 emissions

Figure 58

Illustration of Komatsu's Scope 1-3 emissions source

Scope1:CO_2 directly discharged from Komatsu (e.g. CO_2 emissions during fuel combustion)
Scope2:Indirect emissions of CO_2 due to energy use in Komatsu (e.g. CO_2 emissions produced at power generation due to use of purchased electricity)



Scope3:Other indirect CO_2 emissions
(Example) Upstream: CO_2 etc. generated during manufacturing of purchased items
Komatsu: Transportation ・CO_2 emissions occurring during commuting, business trips etc.
Downstream: CO_2 emissions produced when using products, such as construction machinery

Source: Komatsu

Acquiring ISO 14004

Worth noting . . .

This certification is an international standard for environmental management systems, which Komatsu aims to aquire to help enhance its environmental management quality.

Progress so far

Figure 59

ISO certification status

From 1997	Production sites in Japan and other countries began to acquire certifications individually.
2008	The Komatsu Group in Japan acquires integrated certification.
2015	Main production sites in overseas countries achieve 100% certification.
From 2018	Sales and service division are added to integrated certification in Japan.
	2018: Komatsu Customer Support Japan Ltd.
	2019: Four bases (Nagoya, Osaka, Hiroshima, Fukuoka) of Komatsu industries Corp.

Source: Komatsu

How much emission from where?

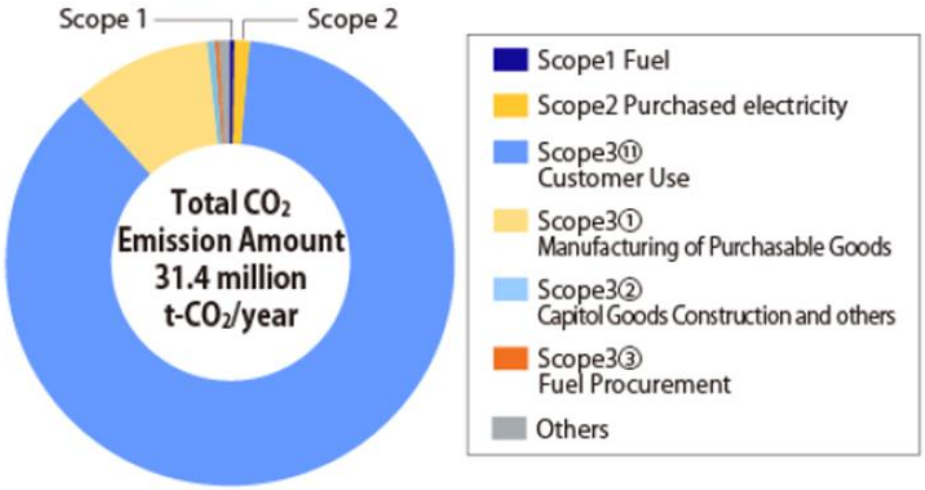
Its potential emissions saving are from scope 3

By far the greatest amount of emissions for Komatsu come from its product use - Scope 3 - making up appoximately 80-90% of total emissions. Therefore, by far the most impactful development in Komatsu emission-reduction contribution will over the long term come from technological emission reduction developments of its machines. To this end, our view that Komatsu leads the construciton machinery world technologically is encouraging.

Scope 1-3 breakdown

Figure 60

Komatsu's Scope 1-3 emission breakdown



Source: Komatsu

Products and services

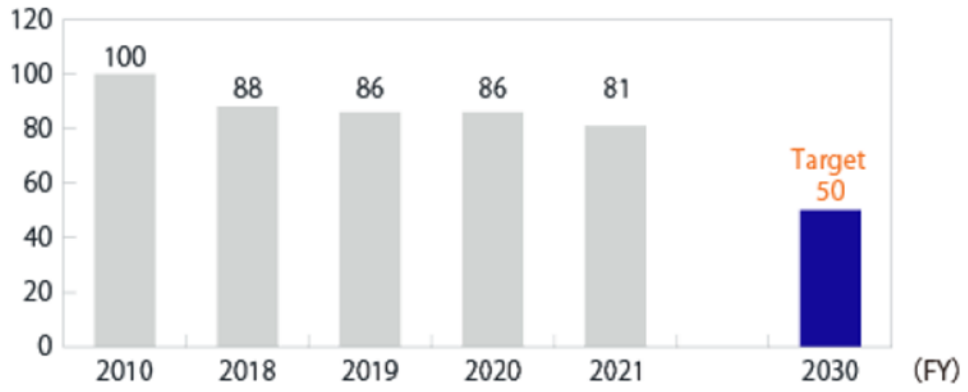
Emission reduction by category: products and services

Komatsu targets a 50% reduction in CO_2 emissions from operations of its products by FY2030 (versus FY2010). It estimates that by FY2021 (the year just past), it had achieved a CO_2 reduction of 19% compared to the FY2010 reference year.

19% saving so far vs its 50% target

Figure 61

CO2 emission index for product operations



Source: Komatsu

Technology leader

We note that over the past two decades, it has consistently been the first to announce new technologies, as was the case with hybrid construction equipment, which improves fuel efficiency by around 25%. As of April 2022, Komatsu offered a total of 16 hybrid models with Ministry of Land, Infrastructure, Transport and Tourism (MLIT) of Japan "low carbon type construction equipment" certification. Further, another 23 of its products have been certified to meet the MLIT "construction machines fulfilling fuel economy standards."

First to announce next-generation machines

Figure 62

Komatsu hybrid excavator

Source: Komatsu

Komtrax is a key technology for Komatsu

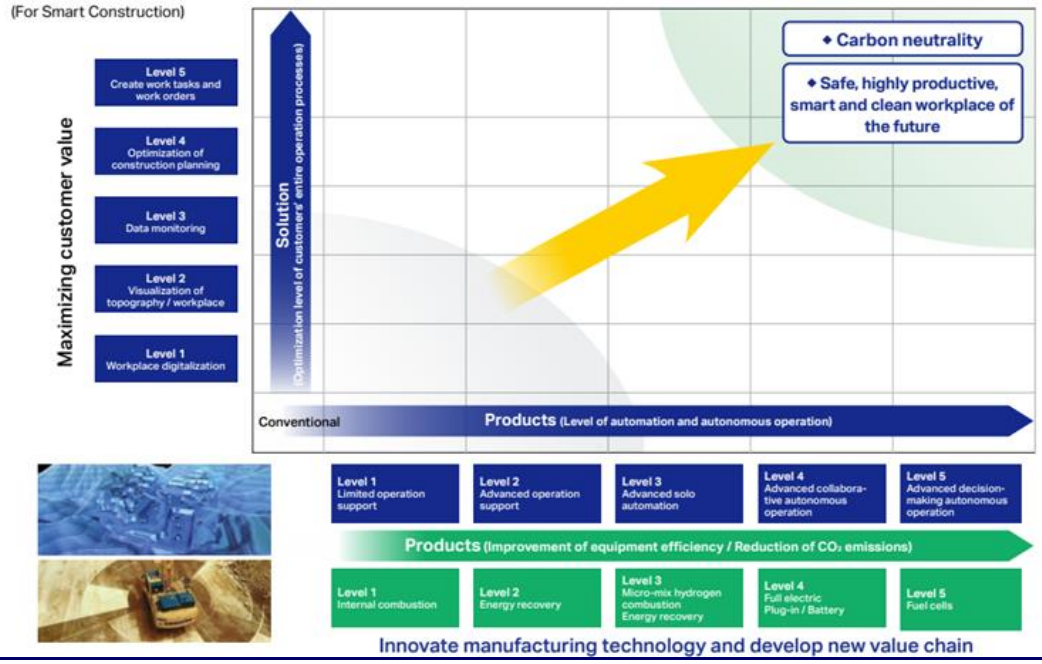
A key technology to help it achieve its goals in this category is its tracking system named "Komtrax," which gathers operational information from all its machines allowing it to monitor, manage and analyse its global installed base. This allows Komatsu to communicate with its customers about machine use optimisation.

Way ahead with automated smart construction

In 2013, Komatsu introduced the world's first automated (automatic blade control) ICT bulldozer, which was followed in 2014 by the world's first semi-automated excavator. In-house testing suggests the use of its automated excavators and bulldozers result in a 30% and 25% respective reduction in fuel consumption. What puts Komatsu most notably ahead of its peers technologically is the consolidation of these ICT machines into a "Smart Construction" package, utilising these machines together with drones and 3D scanners to take real-time topography. From start to finish, an army of automated construction equipment can lay the foundation for a building.

Figure 63

Komatsu's roadmap to the workplace of the future



Source: Komatsu

Working with Honda on electrification

On electrification of construction equipment, Komatsu works closely with Honda. In March 2022, Komatsu launched the first electric micro-excavators powered by portable and swappable mobile batteries. This size model is typically utilised in close proximity to people, trees and flowers, pipe laying work, gardening, agriculture and livestock. Electrification not only reduces emissions, but also noise, making it far more comfortable to work indoors and outdoors with the swappable batteries reducing downtime usually needed for charging.

Working closely with its mining customers

Under the TCFD-inspired risk and opportunities scenarios discussed above, Komatsu's resources (mining machinery) business is likely to be particularly impacted under the 1.5°C scenarios. For this business, Komatsu has established the Komatsu GHG alliance with its major mining customers to co-develop power-agnostic trucks that can run on a variety of sources, from electric trolley systems to next-generation engines, batteries and fuel cell power. It has also signed a memorandum of understanding to collaborate on the development of zero-emission power sources for haulage equipment. For underground mining, it is developing electrified equipment in collaboration with Proterra Inc.

Figure 64

New types of power generation for dump trucks

The Komatsu Greenhouse Gas (GHG) Alliance

Source: Komatsu

Emission reduction by category: manufacturing

Manufacturing

The machinery cycle impacting capacity utilisation will inevitably drive ups and downs on a year-on-year basis for factory use emissions. It should come as little surprise threfore that in FY2021, CO_2 from production activities increased YoY. That said, use of new photovoltaic facilities, green electricity purchases and energy-saving acitivties, particularly at plants with high loads such as those for casting, forging and machine processes, meant that CO_2 emissions per unit of internal manufacturing value delcined 7% YoY. So its on this measure, it has reduced CO_2 emissions based on units by 37% versus FY2010. Further, it has also increased the use of renewables by 14% in the same timeframe.

Cyclical vs secular for factory emissions

Figure 65

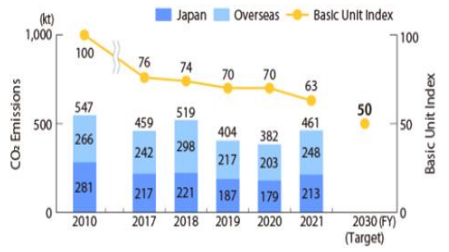
CO_2 emission basic unit and renewables targets

Item	FY2020	FY2021	Target of FY2030
CO_2 emission basic unit (compared FY2010)	70	63	50
The rate of renewable energy use (%)	13	14	50

Source: Komatsu

Figure 66

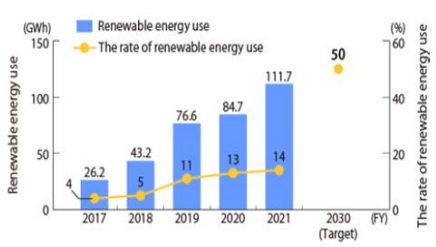
CO2 emissions



Source: Komatsu

Figure 67

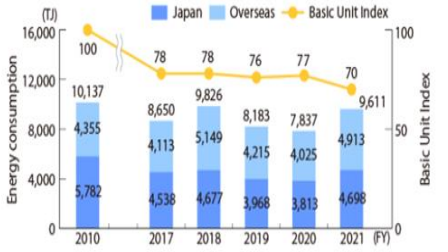
The amount of renewable energy



Source: Komatsu

Figure 68

Energy consumption



Source: Komatsu

Logistics

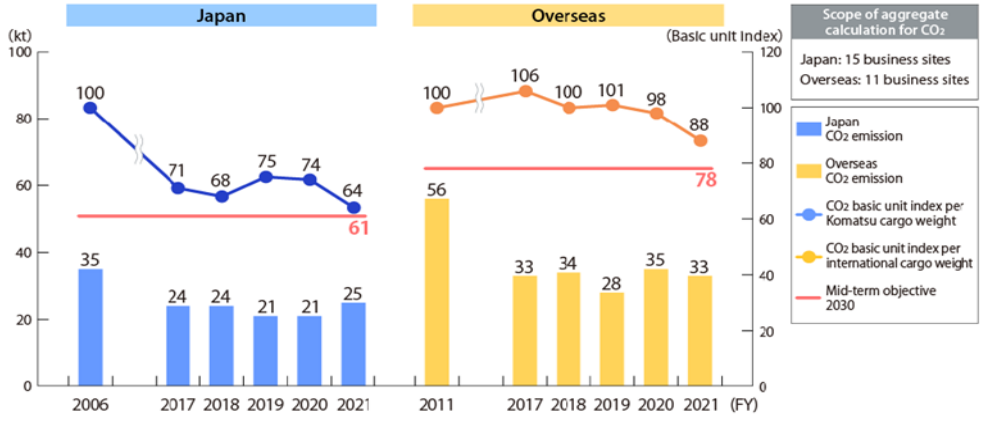
Emission reduction by category: logistics

Efforts haved focused on reducing transportatin distances by higher utilisatin of plants located nearer to ports (Kanazawa and Hitachi Naka plants), improving long-distance transportation through higher use of ships and rail and improvement of load ratios. Higher production through FY2021 led to higher transportation volume YoY, but the CO_2 emissions basic unit (per cargo weight) improved 10 points both in Japan and overseas.

Better load factors, among other ways of saving on transport

Figure 69

CO_2 emission from logistics



Source: Komatsu, Note: A basic unit index is an index relative to the CO_2 emissions per cargo weight in a reference year (2006 for Japan, 2011 for overseas) as 100

Remanufacturing also to help

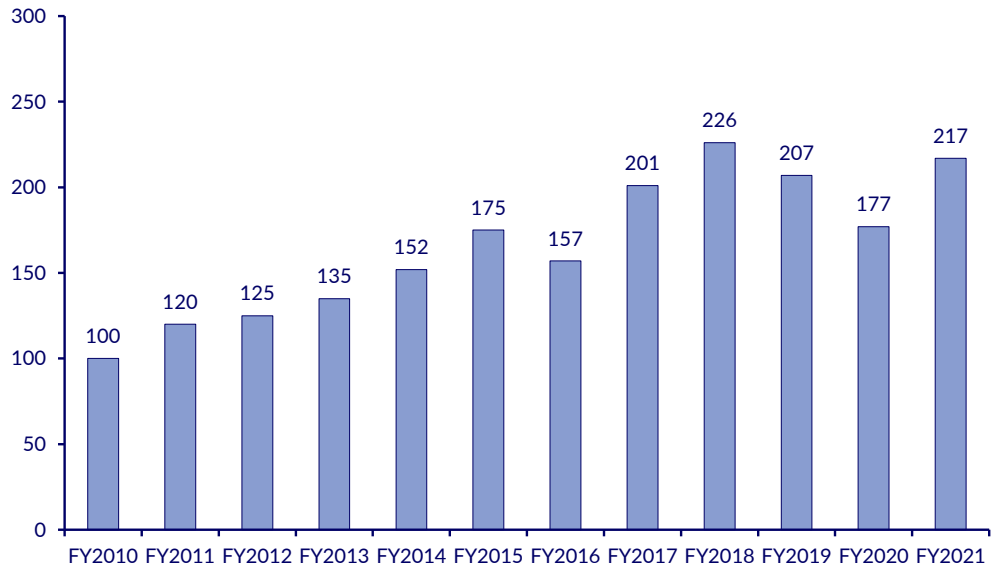
Other forms of emission reduction

Komatsu is encouraging the remanufacturing - "Reman" - of its products through its Reman plants and centers in 11 countries. The Reman business remanufactures engines, transmissions and other components from used construction machinery. This business acheived around 43,600 tons of CO2 reduction in FY2021 versus emissions that would have been emitted when making the equavalent in new products.

Remanufacturing plants in 11 countries

Figure 70

Changes in Reman sales since 2010 (units)



Source: Komatsu

Recycling

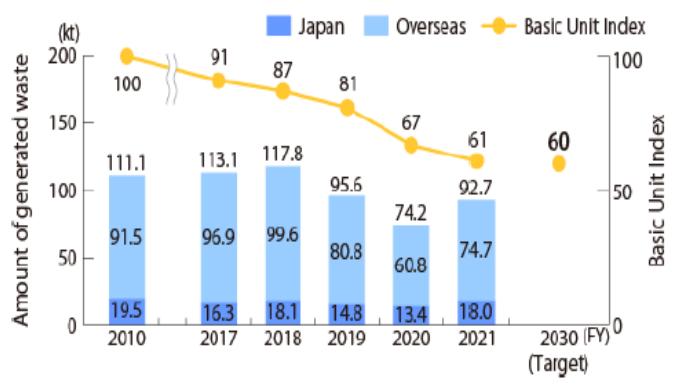
Another area is the effective use of limited resources through critical mineral reuse and waste recycling. In FY2021, its foundries, which account for about 70% of total waste emissions, meaningfully reduced waste emissions through the effective use of sand. Elsewhere, it managed to reuse waste plastics and reduce wood waste by more-effective packaging techniques. Overall, it managed to reduce waste emissions basic unit by 39% in FY2021 versus FY2010, already nearing FY2030 targets.

Optimising water use

For water, which is used heavily for its plants in the Hokuriku area, it has worked to optimize water use for snow melting purposes and reduce the amount used in general manufacturing through recycling cooling water. In FY2021, it managed to reduce the basic units of water input by 64% versus FY2010, far exceeding its FY2030 target.

Figure 71

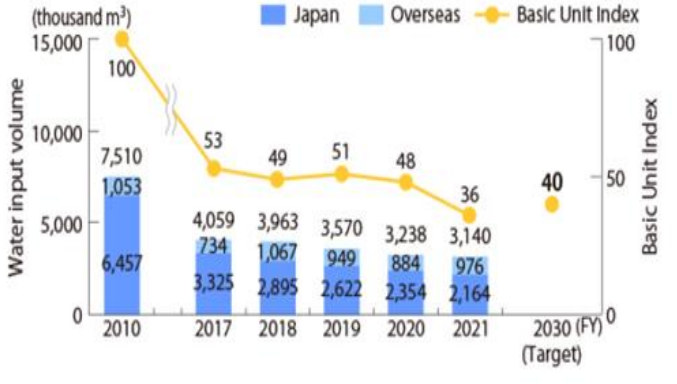
Waste emission reduction targets



Source: Komatsu

Figure 72

Water input volume



Source: Komatsu

Working with all its sales and services companies

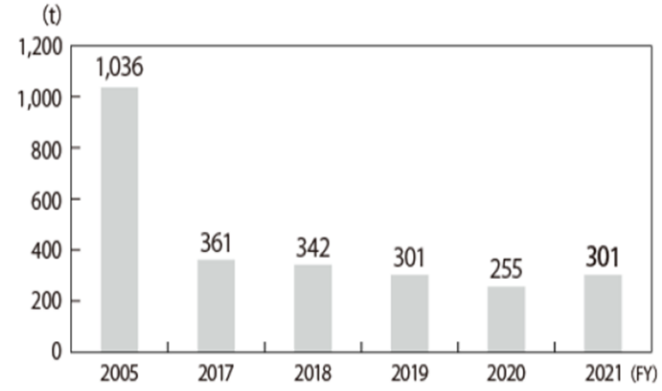
Also worth noting is its ongoing efforts to promote environemental management systems at its sales and serives companies. In FY2021, it sucessfully renewed the ISO 14001 certification for all its sales and services companies including head offices. Further, the waste discharge compaliance management system has been introduced at all Komatsu customer support companies and a large number of Komatsu group sales companies.

Elsewhere . . .

Other areas and factors Komatsu measures and monitors include: polychlorinated biphenyl (PCB) waste, pollutant release and transfer registers (PRTRs) related substances, volatile organic compounds (VOCs), nitrogen oxides (NOx) and particulate matter (PM).

Figure 73

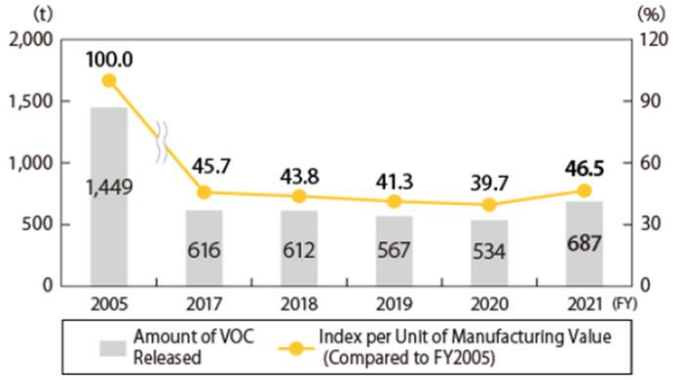
PRTR-related substances released into the atmosphere at Komatsu's manufacturing facilities in Japan



Source: Komatsu

Figure 74

Amount of VOC released



Source: Komatsu

PCB, PRTRs, NOx, VOCs

Figure 75

Average emission value of Nox and PM

	FY2019	FY2020	FY2021
NOx (g/kWh)	3.1	3.1	3.5
PM (g/kWh)	0.16	0.16	0.18

Source: Komatsu

Science-based targets

SBT approved and independent practitioner's assurance

Komatsu's CO_2 reduction targets were certified as science-based targets (SBT) in April 2017. It received renewed certification by SBT in March 2022.

Figure 76

Komatsu's science-based targets

Scope	Target	Target Year	Base Year
Scope 1+2	Total -30%	2030	2019
Scope 3	Total -15%	2030	2019

Source: Komatsu

Independent practitioner assurance

For all measurements, Komatsu receives an independent practitioner's assurance from Deloitte Tohmatsu Sustainability Co.,Ltd., an affiliate of the Deloitte Touche Tohmatsu LLC.

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MTR Corporation: Keep calm and carry on

- ❑ Early mover in terms of GHG emission disclosure, first sustainability report published in 2002
- ❑ TCFD disclosure since 2020, Scopes 1, 2 & 3, science-based targets submitted and pending approval
- ❑ Board and managerial commitment to meet Hong Kong's 2050 goals, but overarching government policy lacks ambition
- ❑ Bottom-up approach in managing and driving climate initiatives
- ❑ Company faces challenges in appointing board members with ESG expertise and experience
- ❑ Extreme weather events a key risk factor

Summary

MTR is moving steadily ahead

MTR's response to climate risk in many ways is like one of its trains: on time, efficient and dependable. It moved early to provide details of its sustainability efforts, is on track with TCFD reporting and, likely by the end of 2022, science-based targets. The company is upfront and detailed about the climate risks it faces, and the financial and logistical challenges of dealing with these. At the end of the day however, MTR is controlled by the Hong Kong government, which chugs at a slow pace when it comes to climate policy. Net zero targets for Hong Kong are in place, but decarbonisation lacks a road map with timelines and milestones. Indeed, one of the reasons why MTR was chosen as a case study was to give a narrative of a climate risk response from the perspective a government-owned asset (in this case the Hong Kong government owns nearly 75% of MTR). Its trains run on electricity, which in Hong Kong is supplied by two companies subject to a government scheme of control. Opportunities to pivot to renewables are negligible. Against this backdrop, MTR keeps moving along the tracks. Quite how it will get to its final destination remains unclear.

Background

Rail operator and property developer runs Hong Kong's metro

The MTR Corporation builds and operates urban metro systems in Hong Kong, China, Australia and Europe. It began its life as the Mass Transit Railway Corporation in 1975 with the Hong Kong government as its sole shareholder and opened the first metro line in the city on 1 October 1979. The inaugural 8km stretch from south Kowloon's Kwun Tong to Shek Kip Mei in the northeast quickly expanded: today the current rail network in Hong Kong comprises nine lines, 98 stations and a route length of 266.3km. The MTR also runs a light rail network, the city's high-speed Airport Express and a network of feeder buses. It is a property developer, with a residential and commercial portfolio, which includes the iconic One and Two International Financial Centre (IFC) on the central harbourfront.

Ownership and operations

Government has a 74.8% stake and three board seats

The company went public in October 2000, as MTR Corporation Limited, after the government sold 23% of its issued share capital in an initial offering, which raised HK$9.38bn. Today, the government retains a 74.8% stake in MTR [24] while legislation[25] governing the railway franchise gives it the right to appoint up to three additional non-executive directors. Presently, there are three such directors: Lam Sai-hung, Secretary for Transport and Logistics; Ricky Lau Chun-kit, Permanent Secretary for Development (Works); and Rosanna Law Shuk-pui, Commissioner for Transport[26]. These directors can only be removed from office by Hong Kong's Chief

[24] MTR Annual Report 2021
[25] The Mass Transit Railway Ordinance, Cap 556 (Section 8: Chief Executive may appoint additional directors)
[26] MTR website

Executive. In addition, the Secretary for Financial Services and the Treasury, Christopher Hui Ching-yu, is a non-executive director of the company. There are an additional 15 members on the MTR board, including non-executive chairman Dr Rex Auyeung Pak-kuen, Chief Executive Officer Dr Jacob Kam Chak-pui, and 13 Independent Non-executive Directors. Of all 19 board members, four are female. MTR has set a target for 25% of its board members to be women by 2025. MTR has no fare autonomy and, by agreement with the government, functions under an adjustment mechanism, where fares are set under a fixed formula based on movements in the consumer price index. This can be to the consternation of consumers who can be subject to fare rises even as MTR enjoys stellar profits.

Most profits come from China and international operations

It is the MTR's mainland China and international business that currently account for more than half of its revenue: in 2021, just 27.9% of its revenue came from Hong Kong transport services, with a further 6.8% from Hong Kong station commercial businesses. Its mainland China and international railway, property rental and management subsidiaries accounted for 53.1% of revenue. Total revenue for the company in 2021 was HK$47.2bn, up from HK$42.54bn in 2020. Its profit in 2021 was HK$9.5bn compared to a loss of HK$4.8bn in 2020.[27]

MTR operates and manages London's "Lizzie" line

MTR operates five metro lines in Beijing, two in Shenzhen and five in Hangzhou, and operates Macau's Light Rapid Transit Taipa line. Under a "rail plus property" development model, it also has a property business in Beijing, Shenzhen, Tianjin and Hangzhou. In the UK, the MTR operates and manages London's recently-expanded Elizabeth underground line ("the Lizzie") and jointly operates and manages the South Western rail franchise. In Australia, MTR operates and manages Melbourne's Metropolitan Rail Service and Sydney's Metro North West Line. Details of its Nordic operations can be found in the box below.

Hong Kong operations account for two-thirds of global energy consumption

Main source of emissions

Purchased energy accounts for most of MTR's emissions, its largest non-staff operating cost. In 2021, it consumed 3,161GWh of electricity worldwide, of which about two-thirds were consumed by its Hong Kong operations. Total emissions of Scope 1 emissions in 2021 (in tonnes of CO_2) accounted for 40,611 as compared to 40,949 in 2020. Scope 2 emissions were 1.03m tonnes ($C0_2$) in 2021, up marginally from 2020 when they were 976,574. Scope 3 emissions amounted to 3,137 in 2021 as compared to 7,290 the previous year.

Sweden is light years ahead on use of renewables

A tale of two targets

In Sweden, MTR Nordic operates and manages Stockholm Metro (Stockholms tunnelbana), the Stockholm commuter rail service (Stockholms pendeltag Malargag) and MTRX, an intercity railway between Stockholm and Gothenburg. MTR Nordic has adopted 100% renewable energy in its operations since 2019: Sweden gets most of its electricity supply from hydro and nuclear, with a growing contribution from wind. Sweden is a global leader in decarbonisation and has targets to cut GHG emission by 59% by 2030 and to have a net zero carbon economy by 2045[28]. Hong Kong's 2030 target is an absolute reduction of 26% to 36% and net zero by 2050. At present, the share of energy from renewable sources for electricity production in Hong Kong is less than 1%. It aspires to increase this figure to 3-4% of via wind, solar and waste-to-energy that can be exploited between now and 2030.

[27] Source: MTR Annual Report, 2021
[28] https://www.iea.org/countries/sweden

Regulatory requirements

Stock exchange rules require an ESG report, gives guidance on materiality

As a company listed on the Stock Exchange of Hong Kong, MTR is required to publish an ESG report each year. Recent changes introduced in January 2022 require the company to publish the report at the same time as its annual report. Appendix 27 to the Listing Rules, the Environmental, Social and Governance Reporting Guide[29], also sets out mandatory and comply or explain provisions for issuers, and has reporting principles companies are expected to follow in preparing the ESG report: the Appendix for example defines "materiality" as issues sufficiently important to investors and other stakeholders that they should be reported and encourages companies to set targets (actual numerical figures or directional, forward-looking statements) to reduce a particular impact. Among the mandatory disclosure requirements, the board must make a statement disclosing its oversight of ESG issues, its ESG management approach and strategy and how the board reviews progress made against ESG-related goals and targets. The company should also give a description of the reporting principles of materiality, quantitative information (standards, methodologies, tools used) and ensure consistency, disclosing any changes to methods or key performance indicators used in the ESG report.

Environment laws are scattered in Hong Kong

There is no single environmental law in Hong Kong that MTR must also follow. Relevant legislation is scattered in various statutes on air pollution, waste disposal, water pollution, noise control, hazardous chemicals, among others. In October 2021, the government announced a Climate Action Plan 2050, which seeks to end the use of coal for daily electricity generation by 2050 and increase the use of renewable energy to 10% by 2035. It also aims to have zero vehicle emissions (and zero carbon emissions) in the transport sector before 2050. New registration of fuel-propelled and hybrid cards are to be barred in 2035 or earlier. In the 2022-23 budget, the government said it would implement strategies and measures to reduce carbon emissions and bring Hong Kong towards the 2050 goal. In that particular budget, this included a HK$200m Green Tech Fund, and more charging facilities for electric vehicles. And HK$8.4bn for drainage improvement works. In the same budget, HK$100bn was earmarked for a dedicated fund to expedite infrastructure work on the Northern Metropolis.

Financial reporting standards

Reporting standards will likely follow the ISSB framework

Hong Kong is expected to sign up to the finalised International Sustainability Standards Board (ISSB) guidelines, albeit in a staggered process and to a selective degree. The Financial Reporting Council (FRC) set up a Sustainability and Climate Action Task Force (SCATF) in February 2022 to make recommendations on a suitable course of action for Hong Kong, including a Climate Change Action Roadmap which aligns with Hong Kong's Climate Action Plan 2050.

Voluntary climate reporting initiatives

Two decades of sustainability disclosure puts MTR ahead of the curve

MTR published its first sustainability report in 2002 (the same year it started disclosing its greenhouse gas emissions) and has been making reports under the Climate Disclosure Project (CDP) since 2009. It made its first climate-related financial disclosure with reference to the Task Force on Climate-related financial disclosures (TCFD) in 2020. In March 2022, the MTR board endorsed setting science-based targets for net zero by 2050 and an interim reduction in GHG emissions by 2030. Its schedule for doing so is in progress. It submitted a commitment letter to the Science Based Targets Initiative (SBTi) in July 2022 for its near-term targets and expects validation by the end of 2022. Ahead of this, MTR completed a carbon reduction study mapping the risks and opportunities for the business, and views from its

[29] https://en-rules.hkex.com.hk/rulebook/environmental-social-and-governance-reporting-guide-0

internal and external stakeholders. It will encompass two phases: the first one is concerned with rail operations and development in Hong Kong, with the second focussed on investment properties and property development in Hong Kong. Railway operations account for 86-87% of MTR's emissions (transport operation, network expansion, corporate functions and main office building), while properties account for 13% to 14%. The aim is to develop a carbon reduction roadmap with clear timelines, proposed action plans and a cost estimation.

Targets, goals and timelines to date

Figure 77

MTR climate reporting, commitments and goals

Initiative	Status
Follows the TCFD disclosure framework	✓ since 2020
Annual sustainability report	✓ since 2002
Reports under the Carbon Disclosure Project (CDP)	✓ since 2009
Plan to achieve net zero by 2050	In progress
Interim GHG reduction targets by 2030	In progress
Aligns reporting with Global Reporting Initiative (GRI)	✓ Core option
Climate change strategy	✓ Last revised in 2019

Source: MTR

1. Governance

The MTR chair leads its climate and social committee

MTR's climate initiatives are overseen by a specific committee, led by the board chair, which incorporates members of the executive team and focusses on climate and social issues in equal degree. Climate-related initiatives and issues feed up to this committee, with much of the nuts and bolts responsibility sitting with the executive and sustainability team. Against the backdrop of majority government ownership, the demographic of board members does not currently reflect a high degree of climate expertise or experience.

Recalibrating and moving with the times

Shifting from corporate responsibility to E and S

Oversight of climate issues is performed by the Environmental & Social Responsibility Committee (E&SRC), led by MTR chairman Rex Auyeung Pak-kuen. In essence, it is a reconfiguration of the Corporate Responsibility Committee, which was set up in 2012[30]. It changed its name to become the E&SRC in March 2022 and meets twice a year with a mandate to provide strategic guidance, review MTR's sustainability practices and performance (including climate change matters) and report on these to the board. It also tracks MTR's performance against its environmental and social key performance indicators (KPIs), (and reports to the board on these issues.) The committee has new terms of reference under the renaming process: although by large these are similar to those of its predecessor, as is the composition. The only notable deletion is the requirement that the Corporate Affairs and Branding Officer be present at meetings: for the E&SRC, now the General Manager - Sustainability must attend.

Rolling with the punches

Social issues loom large on the board agenda

MTR integrates climate issues with social ones: it found it very difficult to look at the two issues separately, according to Meller. She describes the 2022 name change for the committee as a reflection of the "reset" which took place in MTR's corporate strategy, approved in 2020. Under this plan, "Transforming the Future," MTR outlined core pillars which are very much growth-focussed (continue to grow in Hong Kong, mainland China and internationally, and leverage new technology and mobility services) and bear much resemblance to its previous strategy (strengthen and grow the Hong Kong market, expand in the mainland and internationally, and

[30] https://www.mtr.com.hk/archive/corporate/en/investor/sehk/e_TOR_CorpResponsibility_18.12.2012.pdf

enhance its corporate reputation[31].) In the 2020 strategy, MTR did however refine its social objectives: fostering social inclusion, reducing greenhouse gas emissions, and finding opportunities to empower people and communities. The purported goal was to embed social and environmental and social principles within the corporation. It should be mentioned that MTR's reputation did suffer quite considerably in the two years leading up to this 2020 redraft. In May 2018, a whistle-blower (a former contractor) alleged the cover-up of sub-standard steel bars being installed on the behemoth HK$90bn Shatin to Central link development, which led to a commission of inquiry in 2020. Then MTR chairman Fred Ma Si-hang offered a mea culpa in the company's 2018 annual report: "I would be less than honest if I said that we have done a good job in this matter.'' In 2019, MTR suffered from closures during the pro-democracy protests, and was the venue for a violent attack by a gang of men who clubbed protesters and commuters with sticks. Then Covid-19 arrive in Hong Kong in 2020. A shift toward social issues is hardly surprising: by 2019 MTR's annual report was talking of ESG as an important element of its strategy.

Beyond financial targets

An elevation of climate and social issues is apparent in latest strategy review

MTR revises its corporate strategy every five to seven years (on average it happens every five) and this was the first time, according to Meller, that there was a strategic review where the board identified environmental and social issues as being as important as financial targets. It was very much driven by the executive team and "very much accepted by the board.'' The environment was a no-brainer, she says, and the challenge was to turn it into a real strategy and something they could roll out. Beneath the three core social objectives are 10 focus areas and 35 KPIs. On the environmental side, the focal points are carbon emissions (including setting 2030 science-based targets in the short to medium term and striving for carbon neutrality longer-term), clean energy and energy efficiency (for example, greater use of renewable energy, engaging tenants in energy saving initiatives), waste management, and green and low-carbon designs. Against the backdrop of science-based targets for 2030 and 2050, MTR ran a board evaluation process: was the existing corporate responsibility committee fit for purpose? They wanted something with "more teeth,'' says Meller, which would oversee their sustainability efforts and large items of spend on the environmental and social budget.

Climate and social responsibility committee in full

Figure 78

Environmental & Social Responsibility Committee (E&SRC)[32]

Members	Age	Background/ESG experience
Non-executive directors		
Dr Rex Auyeung Pak-kuen	70	Insurance executive in Hong Kong and Canada (40 years); Bachelor of Environmental Studies (Urban and Regional Planning), University of Waterloo, Canada
INEDs		
Dr Bunny Chan Chung-bun	64	Garment industry (30 years)
Dr Pamela Chan Wong-shui	76	Former chief executive of the Consumer Council
Jimmy Ng Wing-ka	53	Solicitor, Legislative Councillor
Members of the Executive Directorate		
Dr Jacob Kam Chak-pui (CEO)	60	Chartered engineer; BSc in Civil Engineering University of Southampton, Doctorate in Mechanical Engineering, University of London
Margaret Cheng Wai-ching (Human Resources Director)	57	Human resources professional in financial services
Gill Meller (Legal and Governance Director)	49	Solicitor, Legal and Governance director since February 2021, former president of Hong Kong Chartered Governance Institute

Source: MTR

[31] https://www.mtr.com.hk/archive/corporate/en/investor/annual2017/EMTRAR2017F.pdf
[32] Effective August 2022 https://www.mtr.com.hk/archive/corporate/en/investor/sehk/e_Board_Committees.pdf

Mind the gap

The key board member responsible for climate risk is 70-year-old insurance veteran

The board demographic of MTR is one you would expect of a public transport company whose majority shareholder is the Hong Kong government. In its CDP filing, the company refers to 70-year-old insurance industry veteran Dr Auyeung as its key board member with responsibility for climate-related issues. Practically speaking, the background of its E&SRC leans more heavily toward the S and the G. Dr Pamela Chan, for example, is a social worker by trade who headed up the consumer council for more than 20 years. Dr Bunny Chan Chung-bun is a former district councillor. Gill Meller is a lawyer and established governance professional. Meller admits the board lacks a climate expert. "It is something we are looking at as we go through succession planning. At board level in Hong Kong there is a shortage. While there is a large amount of movement in ESG professionals in Hong Kong there is an overall shortage at board level, a lack of people with really detailed understanding of what all this means.''

The company is on the lookout for board appointees with climate experience

Meller says the nomination committee views climate-related experience as a preferred skill set and MTR is open to looking outside of Asia for candidates. MTR has committed to having a board where at least 25% are women by 2025 (currently three out of 19 board members are female, just over 15%), which overall, according to Meller, "has been making the nomination committee think differently.'' The nomination committee does not use an external search firm in this process. "We go through contacts and connections.'' It meets twice a year.

Executives are members of the committee, not just attendees

While the E&SRC is board-level, it also pulls in the CEO, the Human Resources Director and Meller as members, not just required attendees. This set-up, Meller admits, is unusual for a board, but they felt it was necessary for communication and coordination. "The pros of us (executive members) being there is that we have that closer relationship," she explains, citing opportunities for greater openness and collaboration.

The role of management: pervasive, but labyrinth

Management interplays with the board in myriad ways

There is no doubt that climate issues feed into MTR's management and risk frameworks at myriad levels. The layers and interplay at times can be confusing to follow. It is apparent that the CEO, and Meller in particular, are the key linkages throughout this process. As well as being members of the E&SRC, Meller and CEO Dr Jacob Kam Chak-pui are members of (and Meller chairs) the Environmental & Social Responsibility Steering Committee (E&SRSC). It too is a reincarnation, until March 2022 being known as the Corporate Responsibility Steering Committee. It meets three times a year with a mandate to drive and review the implementation of sustainability initiatives across all MTR business units and corporate functions. It is the guiding force at operational level and monitors progress of the company's environmental and social objectives and programmes (including GHG targets). On this committee (as well as the CEO and Meller) are other members of the Executive Directorate, as well as colleagues from MTR's major business units and corporate functions. Part of its remit is also to validate the findings of MTR's annual materiality assessment (see section on Strategy) which is then passed to the E&SRC for review as part of the sustainable reporting process. Typical issues on its agenda include managing the environmental and social budget and the ESG investor framework (the scorecard against which the environmental and social investments are measured), taking stock of progress on KPIs, and reviewing them: do they need more KPIs, should they set higher targets and the like. The chair of the steering E&SRSC reports on the corporate-wide ESG issues to the E&SRC.

An Executive Committee oversees climate strategy

Not to forget the Executive Committee (led by the CEO, comprising members of the Executive Directorate such as the capital works director, human resources director, corporate affairs director and Legal and Governance Director Gill Meller), which has overall responsibility for the day to day management of MTR. It is overall accountable for the climate change strategy, and assessing and monitoring climate risks (by virtue of the fact that the EC has responsibility for the Enterprise Risk Mechanism policy. It reviews and endorses the top risks, control measures, as well as climate risks, annually. As would be expected, the CEO assumes overall responsibility for ESG and climate-related risks.

The risk factor

Climate risks are the ultimate responsibility of the Audit & Risk Committee

And then there is the risk side of climate affairs: the Audit & Risk Committee at board level has primary oversight of climate change risks at the company. It reports directly to the board, as with the E&SRC, and Meller is a required attendee as Legal and Governance director. She chairs the Enterprise Risk Committee, which is responsible for reviewing the MTR's top risks and key emerging risks. She reports the top risks to the EC and the Audit & Risk Committee quarterly. Meller, for example, led the ERC to review mitigation measures on climate risks across different divisions. She also has responsibility for overseeing the overall progress of GHG reduction and that MTR meets the science-based targets, once set.

The Head of Sustainability develops MTR's climate change strategy

The Enterprise Risk Management (ERM) framework operates in a pyramid structure with the board-level risk committee at the top, the Executive Committee assisted by the Enterprise Risk Committee (ERC) in the middle, and the business units at the bottom. Sustainability risks go up the chain to the top: divisions report climate risks to the ERC, the chair of the ERC reports to the Executive Committee and the Audit & Risk Committee every quarter and to the board every six months. Climate change risks are reported to the ERC and EC each year by the Head of Sustainability and the chair of the ERC. The Head of Sustainability updates and reports climate change risks map at corporate level to the ERC each year (and comes up with responses) and develops the climate change strategy, along with a decarbonisation roadmap.

In its 22nd year of sustainability reporting

MTR is ahead of the curve in disclosing and providing a narrative to its sustainability data, initiatives and challenges: it was the first listed company in Hong Kong and China to publish a sustainability report, in 2001. That same year it appointed its first Sustainability Development Manager. The company has a standalone website [33] "Sustainability at MTR" where it publishes its annual sustainability report, details of its reporting framework, performance metrics, and how management approaches a range of ESG issues (from the customer experience and human capital to environmental protection.) There is also a content index tab which maps out where relevant data can be located within its website and sustainability report for the purpose of the Hong Kong Exchanges and Clearing (HKEx) Environmental, Social and Governance Reporting Guide, and for GRI Standards, along with a description of the disclosure level (full, partial or none) and whether there has been external assurance.

MTR puts out a lot of data on climate risk and responses

At times it can be challenging to navigate between the content index (a PDF) and the website or sustainability report, but it is comprehensive. Stakeholders seeking a more granular narrative on its response to climate risk may find MTR's annual Carbon Disclosure Project (CDP) filings[34] of greater value. While it is evident much work has gone into the sustainability website, and it ticks boxes for the requisite content, a

[33] https://www.mtr.com.hk/sustainability/en/home.html

[34] https://www.cdp.net/en/responses/12552?back_to=https%3A%2F%2Fwww.cdp.net%2Fen%2Fresponses%3Fpage%3D827%26per_page%3D20%26queries%255Bname%255D%3Dor%26sort_by%3Dproject_year%26sort_dir%3Dasc&queries%5Bname%5D=or

more discerning investor might prefer to see more meat on the bones. It is a challenge to present the information clearly and concisely, while also meeting HKEx, GRI and TCFD disclosure standards. According to Ms Meller, she used to produce a "50-100 page shiny sustainable report," but found it unsustainable to keep doing so (indeed, MTR's 2016 sustainability report runs to 234 pages). A decision was taken to keep a repository of core information which does not change much year to year, and to produce a more slimmed-down annual report setting out key challenges and changes. Collating the information each year is still a challenging task.

2. Strategy

Existentially speaking

The company wants to reduce energy and make its trains more efficient

As mentioned in the introduction, the MTR board in March 2022 endorsed setting science-based targets for net zero by 2050 and an interim reduction in GHG emissions by 2030. It is awaiting verification from SBTi and for this process completed a carbon reduction study mapping risks and opportunities for business, views of internal and external stakeholders. It will encompass two phases: phase one is concerned with rail operations and development in Hong Kong, with the second phase focussed on investment properties and property development in Hong Kong. The idea is to develop a carbon reduction roadmap with clear timelines, proposed action plans and a cost estimation. MTR's climate change strategy, reviewed annually, sits within fairly narrow parameters: keep building low-carbon railways, reduce energy consumption and improve the resilience of its infrastructure. MTR at government policy level is regarded as the "backbone" of Hong Kong's carbon future for public transport, promoting mass transit as a green alternative to fossil fuel-propelled private vehicles. Its plan here is simple: continue to expand its rail network, and build properties under a Rail plus Property (R+P) framework, where the government grants it land development rights alongside railway alignments. Income from these developments and investment properties are used to support railway operations. Under the government's current Railway Development Strategy 2014, its network will continue to expand up to 2031. Beyond this, MTR will continue to play its part in transport (and property) development: its 2018 annual report mentions a "Strategic Study on Railways beyond 2030 - Feasibility Study," which was planned for 2019, although to date no further details appear to have emerged[35].

It will also keep building railways and big property developments

This framework benefits from urban development policy which for the foreseeable future is very focussed on mega projects: this year, then Chief Executive Carrie Lam set out an ambitious plan to develop a Northern Metropolis. It is already planning a controversial "Lantau Tomorrow" project. Such carbon-intensive projects, and MTR's likely role in it, is not without its critics. Founder and Executive director of environmental group The Green Earth Edwin Lau poses a reality check to MTR's green credentials: "MTR is a big property developer, it gets revenue from property development and it has the rights or privilege of using land space for its buildings, both high rise residential and commercial projects. Look at the Tseung Kwan O residential development, and consider the emissions from these sites."

[35] https://www.mtr.com.hk/archive/corporate/en/investor/annual2018/E109.pdf

More people are buying cars in Hong Kong but there is no electronic road pricing

Where is my driver?
Hong Kong has an extensive, efficient and well-priced public transport network. But it still loves its cars. In July 2022, there were 571,257 private cars licensed to drive on Hong Kong's roads, up 40% in the past two decades, accounting for the majority of the city's 809,237 licensed vehicles. Electronic road pricing and low emission zones have never advanced up the policy agenda, unlike other major cities seeking to change commuter behaviour. The government has a long road ahead as it seeks to ban the registration of fuel-propelled and hybrid private cars in 2035 or earlier.

MTR trains rely on electricity from two power suppliers

The second part of MTR's climate strategy is to reduce its use of carbon. MTR runs on electricity and there are just two power suppliers (CLP Power Hong Kong and The Hong Kong Electric Company) in the market. These firms operate under a scheme of control agreement with the government which dictates the obligations of the companies, returns for shareholders, and monitors their electricity-related financial affairs. The transport sector accounts for 19.7% of Hong Kong's emissions, the lion's share of emissions (60.4%) being attributed to generating electricity for buildings (90% of total electricity consumption), and waste management 8.7%.[36]

As suppliers move toward gas, MTR emissions drop

The current fuel mix in Hong Kong for electric power is fossil fuels (25%) and natural gas (about 50%).[37] The year 2020 saw a major pivot toward natural gas: Hong Kong's emissions dropped by 16% compared to 2019 as the fuel mix shifted, with a 60% increase in gas use. The use of coal dropped from 44% to around 24%, with an uptake in gas from 29% in 2019 to 48% in 2020. Under the Climate Action Plan 2050 the goal is to increase the share of zero carbon energy in the fuel mix to about 60% to 70% before 2035. MTR's emissions figures reflect this: there was a large drop in its total emissions in Hong Kong, from 1.33m tonnes CO_2e in 2019 to 976,574 in 2020. The figure nudged back up to 1.03m in 2021.

Less than 1% of power in the city comes from renewables

Yet as mentioned earlier, renewable sources for electricity production in Hong Kong currently run at less than 1%. The government aspires to increase this figure to 3-4% from wind, solar and waste-to-energy between now and 2030, and to 7.5% to 10% by 2035. MTR's strategy on renewables is to adopt more use of it "where feasible."

Green groups seek a tangible decarbonisation plan from policymakers

When asked if MTR is in effect a hostage to the decarbonisation policy of its majority shareholder, Mellor replies that beholden is not a word she would use. MTR is tracking the city's progress to 2030 and is looking beyond, to the potential of new tech such as hydrogen-powered trains, or embodied carbon in new railways and property projects, low-carbon concrete and steel. In the meantime, she welcomes greater discussion in the business community - and a greater policy push, pulling in large companies who can play a role - as to how Hong Kong is to meet its decarbonisation goals. The Green Earth's Edwin Lau is more blunt, and in particular seeks a more ambitious plan on renewables from policymakers: "The government is not really giving any solid help to the private sector in terms of facilitating them to drive the zero carbon goal. We only have two power companies. Before you get to 2050 you need to say what is going to happen by 2030, 2035, 2040. It is a step by step reduction of carbon emissions: break down the timeline into pieces rather than just giving one single timeline of 2050. Every year you need an interim target to drive our journey step by step."

[36] https://www.info.gov.hk/gia/general/202206/27/P2022062700235.htm
[37] https://www.gov.hk/en/residents/environment/global/climate.htm

MTR uses some solar panels in stations

MTR's stated long-term GHG reduction objectives are to "strive to achieve carbon neutrality by 2050," and ensure 100% of its new stations and buildings attain the best practices of BEAM Plus Gold[38] certification. The bulk of measures to reduce its carbon footprint, improve efficiency and waste management are short- and medium-term: from additional EV charging stations and additional bike parking spaces at stations, to energy-saving initiatives in its shopping malls and building management. It continues to explore the possibility of using more renewable energy. In 2019, it installed solar panels at its MTR Hung Hom Building, and further panels at its headquarters in 2020. In 2021 it continued its solar project at the Hin Keng Station, and it continues to identify suitable locations (a large number of MTR stations are below large high-rise buildings). MTR targets increasing its generating capacity of renewable energy to 1m kWh by 2023. MTR is also exploring the Feed-in-Tariff (FiT) and Renewable Energy Certificates (RECs) under the Scheme of Control Agreement.

Moving along

The company does not feel held back by government policy

Does the MTR sustainability team feel held back by government policy? "We don't feel held back," says Meller. "I think there are discussions we need to have around renewables, carbon trading and offsets that will help us move forward. Hong Kong-wide conversations. But we are carrying on and doing our thing." How does MTR in turn influence its energy providers and supply chain to address climate risk? Meller points to conversations going on among themselves and other corporates, the government and members of the board. Having government appointees helps them understand what the policymakers view is.

The company anticipates higher electricity tariffs in the medium term

MTR identifies "regulatory pressure" as one of its climate risks under its Enterprise Risk Management framework from the perspective of compliance with sustainability disclosure under the listing rules, and the likelihood that the Stock Exchange will align its reporting framework with TCFD recommendations. It also classifies emerging regulation and carbon pricing mechanisms as a medium-term risk having a substantive financial or strategic impact on its business, notably to its direct operations. To meet Hong Kong's 2050 goals, MTR anticipates it may face higher electricity tariffs due to a carbon levy or other related charge for more low-carbon fuel, and the imposition of energy efficiency programmes for railway operations, including its buses, company fleet, new rolling stock and LED lighting under the Building Energy Code. Based on utility charges of HK$1.8bn in 2021, a 1% increase in these charges would equate to a potential financial impact of HK$18.1m. The financial cost of responding to this risk - by adopting more stringent energy-saving initiatives beyond compliance (from lighting in stations, trains and advertising panels to a HK$19m energy storage system for regenerative braking and a HK$1.1bn replacement of chillers) meanwhile totals HK$1.12bn.

Batten down the hatches

Adverse weather is forcing a rethink on resilience

The third prong of MTR's climate strategy is to adapt and build resilience: installing protective measures, enhancing precautions and formulating emergency preparedness and responses to minimise the impact of extreme weather events. In 2020 MTR used a consultant to conduct an Extreme Weather and Climate Change Impact Study to review how weather and climate change related events could impact its assets. It simulated various scenarios to identify potential high-risk areas and devise preventative measures. "Hong Kong is geographically very hilly and if you get coordinates wrong, you can have radically different results," notes Meller. "This poses huge practical challenges." Such stress-testing of assets reflects concerns in the market on scenario analysis, she notes, in particular whether Hong

[38] https://www.beamsociety.org.hk/en_about_us_0.php

Kong would be ready for double materiality under future sustainability reporting standards from ISSB ("my personal view is doubtless you have to look at both," she says) and concerns about readiness of the market, particularly in Scope 3 reporting. She hopes for a staggered approach.

External pressure to address climate risk comes from all corners

In terms of external pressures driving strategy, it derives from a mix of investors, NGOs and regulators, according to Meller: "Heads and hearts." Investors in particular she views as an area where it would be interesting see more pressure.

Climate risk in the grand scheme of things

An external review panel ranks health and safety first, climate is further down

The company conducts an annual materiality assessment where it takes each material issue based on its Enterprise Risk Management system, and groups them under six headings (governance, customers, employees, environment, supply chain and community). Each is plotted on a graph, the *x* axis grading the issue based on importance to business, and the *y* axis concerned with external interests. In this process MTR has since 2014 utilised an External Review Panel for an assessment, and the matrix is ultimately endorsed by the Environmental & Social Responsibility Steering Committee (E&SRSC). The External Review Panel (which also reviews and gives feedback on the MTR's website and sustainability report), consists of sustainability professionals and an academic, the lineup in 2021 including Mike Kilburn, former head of sustainability at the Airport Authority and the Head of Sustainability & Risk Governance at the Link Reit, Calvin Lee Kwan. MTR positions the highly material issues in the top-right quadrant. For 2021, the top-ranking issue was customers' health and safety (widely credited to Covid-19), followed by access to essential services (and avoidance of service disruption), community involvement and development. No environmental issues appear in the most material quadrant, with climate change on the immediate periphery, along with employee and contractor health and safety, customer education, anti-corruption and responsible political involvement.

Climate risk in detail

The company does describe physical and transition risks

MTR categorises its risks as short term (1-5 years), medium term (6-10 years) and long term (11-50 years). It describes both physical risks and transition risks. In terms of opportunities, MTR points to green finance and the ability to expand its operations as a low-carbon mode of transport.

Extreme weather is MTR's most pressing climate risk

Rising temperatures are a medium term risk while extreme weather is viewed as a short-term one. Indeed, non-profit China Water Risk describes rising sea levels an "existential threat" to Hong Kong, which despite its hilly terrain, relies on low-lying access points for its transport and commercial backbone. The city clusters 70% of its commercial buildings in just 6% of land, which is largely reclaimed, and along its shorelines.[39] Since the mid-1950s, the sea level of Victoria Harbour has risen at an average rate of 31mm per decade,[40] increasing the threat of storm surge by tropical cyclones and more frequent extreme sea level events[41]. Indeed, a stress test of physical risks among Hong Kong's banks suggests that HK$1tn of mortgages and property loans are vulnerable to climate risks, predominantly from flooding and typhoons under a 2050 sea level rise scenario. The high surge, coastal damage and general destruction caused by super typhoon Mangkhut broke records in September 2018: water levels rose by more than two metres generally, and that was with favourable tide conditions.

[39] https://www.chinawaterrisk.org/opinions/hk-stranded-asias-world-low-lying-city/
[40] Hong Kong Observatory https://www.hko.gov.hk/en/climate_change/obs_hk_sea_level.htm
[41] Hong Kong Observatory https://www.hko.gov.hk/en/climate_change/proj_hk_msl.htm

Responding to flooding is becoming expensive

MTR describes the likely impact as medium in magnitude, with a potential financial impact of HK$131.77m (based on suspending railway operations, reduced fares, construction delays and more maintenance). It assumed there would be a 1% decrease in revenue from Hong Kong transport operations, which in 2021 amounted to HK$13.1bn. Responding to this risk comes at a cost of HK$10.8bn, involving regular maintenance and review of flooding protection measures, improvement works. Most MTR exits/entrances are by design at least 450mm above street level and equipped with 1.2m high flood boards. In 2021, MTR invested HK$10.8bn to maintain, upgrade or replace the Hong Kong railway assets.

Great expectations

The future is green (finance), for MTR

MTR views its green finance framework as one of the most substantive areas where it has integrated climate-related issues into its business strategy and will continue to seek opportunity: this covers green bonds, loans and other credit facilities. At the end of 2021, the aggregate figure for its sustainable finance was HK$26.1bn, equivalent to half the outstanding debt of the corporation.

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Risk management, metrics and targets: Key highlights

- MTR has an established materiality assessment process, which lays out the foundation for appropriate risk management and strategy alignment (aimed at balancing against stakeholders' interests). This has helped the company to integrate climate-related risks into its overall risk management since 2001.
- MTR's disclosures related to climate change is in accordance with the United Nations Sustainable Development Goals, World Economic Forum's Stakeholder Capitalism Metrics, and the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD).
- Physical (acute and chronic) and transition risks are identified with high-level estimates of potential time spans and descriptions of the impact of utilising its Enterprise Risk Assessment process. These risks have implications on business continuity and the operational agility.
- Metrics showing quantification of financial implications are disclosed in detail. We see positive actions on increasing transparency of greenhouse gas (GHG) metrics and carbon reduction targets as the company has committed to 2030 science-based targets for its railway network and property portfolio in Hong Kong, and also aims to achieve carbon neutrality by 2050. MTR Nordic has already set a target to reduce absolute Scope 1, 2 and 3 purchased goods and services, fuel- and energy-related activities, and upstream transportation and distribution GHG emissions 25.2% by 2025 (2019 is the base year). This target has been validated by the SBTi. The target boundary includes biogenic emissions and removal from bioenergy feedstock.
- There are several risk assessment, metrics and targets, and associated disclosure areas that MTR could improve, including 1) more detail on the link between risks and actual financial impacts (with relevant assumptions), and 2) more granular details on emission metrics and targets related to its own environmental targets.
- MTR is a key part of the HK government's carbon neutral ambitions by 2050, and its path to net-zero is predicated on the work done by the city's two power companies, CLP and HK Electric, the biggest GHG emitters in MTR's system (including power grids).

3. Risk management

Proprietary risk management process at its core

Solid risk management in place

In 2006, MTR adopted a Corporate Climate Change Policy, marking a milestone in the group's path to tackle climate change issues. In the same year, MTR also established an Enterprise Risk Management (ERM) framework. Overall, we think the framework is robust, involving the participation of all department heads, Executive Committee and the board of directors, with an internal audit department conducting a periodical review of the risk management process. The framework is also underpinned by a materiality assessment process, which aims to take all stakeholder interests into account.

ERM framework-driven management process

In our understanding, the ERM framework facilitates the communication of identified business risks among different levels within MTR. Within the framework, there is also a standard rating system for prioritising the monitoring and mitigation process, which is reported to the group's Executive Committee and the board of directors. The Executive Committee reviews significant risk semi-annually; and the board reviews annually to ensure such risks are under satisfactory control.

Where we see scope for improvement

MTR has also disclosed its assessment on the financial impact on climate-related issues, but these are only found in the filings on the CDP platform, which houses its disclosures for environment-related issues. In our view, while investors' interests will primarily focus on the financials, we see scope for improvement in the disclosures in MTR's sustainability reports, which have been published annually since 2002.

Balancing risk and stakeholder interests

Materiality matrix provides the foundation for risk identification

Being the foundation of risk management, MTR developed a materiality assessment procedure in 2010 (before TCFD was founded in 2015). In our view, MTR has addressed its aim to balance all stakeholder interests in the process of managing risks, through assessments of materiality.

Four-step procedure

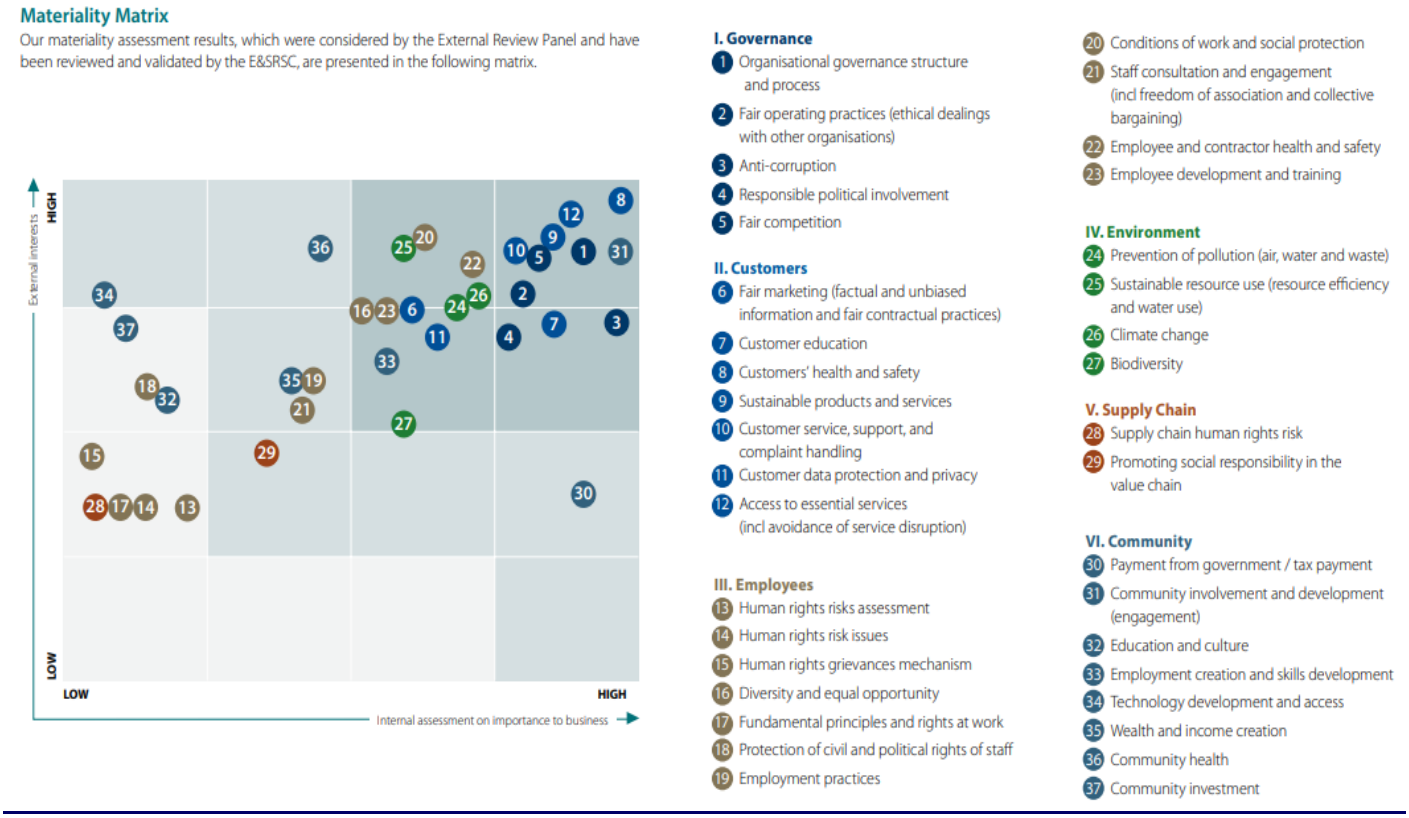
The group follows a four-step process for assessing materiality, including 1) identifying sustainability-related issues, 2) evaluating the significance to MTR based on the ERM system, 3) evaluating the significance to stakeholders and 4) validation by the Environment & Social Responsibility Steering Committee. We understand that such a process aligns with United Nation's Sustainable Development Goals.

What does the MTR materiality say about climate change?

Based on MTR's assessment matrix, we note that the prevention of pollution (No.24) and climate change (No.26) fall into the quadrant with the highest external interests, and moderately-high importance to its businesses.

Figure 79

MTR's materiality matrix (capture from sustainability report 2021)



Source: MTR

ERM framework adopts a bottom-up approach to assess, monitor and review risks

Integration of climate-related risks into overall risk management

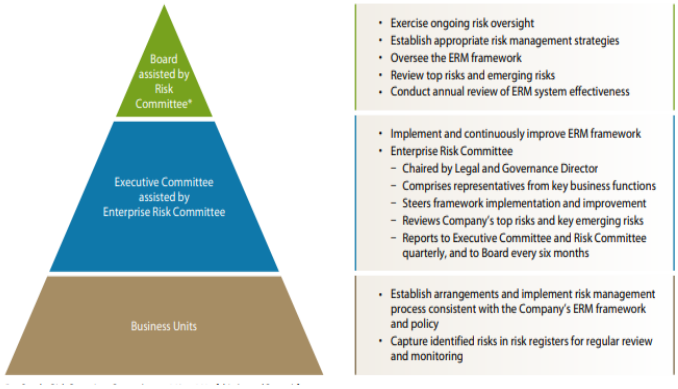
MTR's integration approach is mainly hinged on the Enterprise Risk Management (ERM) framework to identify, assess, monitor and review climate-related risks. Under the bottom-up framework, department heads of business units identify risks; and report annually to the Enterprise Risk Committee (ERC). After ERC's review, the committee reports to 1) the Executive Committee (EC) and Audit & Risk Committee on a quarterly basis, and 2) to MTR's board of directors semi-annually.

MTR identifies climate-related risks as key emerging risks

The risk assessment result is presented in risk ratings E1-E4, with E1 representing the highest level of risk. According to MTR's filings on CDP (a disclosure system related to environment issues), climate-related risks are identified as key emerging risks within the group (although the exact risk rating is unclear to us).

Figure 80

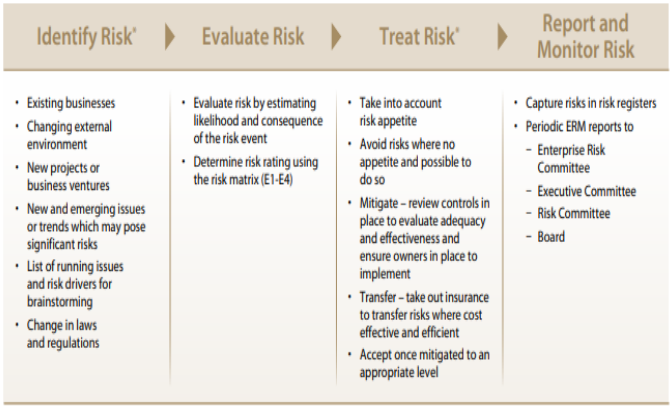
MTR's ERM framework



Source: MTR

Figure 81

MTR's management process for significant risk



Source: MTR

Convergence of climate-related risks and other business risks are not clearly illustrated yet

This is a process-wide incorporation, despite not yet fully integrated when compared with guidelines listed in the TCFD Status Report 2021 (*link*). A key difference is the ability to identify and converge climate-related risks to business risks, such as operational, financial, regulatory, strategic risks so that business objectives can be fully aligned with a climate aware approach.

MTR's assessment of potential financial impact from climate risks

Risk management's interdependence with financial implications and scenario analysis

While risk management process offers a preliminary picture of how a company addresses climate-related risks based on its assessments, investors are often interested on the impact on operations, under various climate conditions.

MTR's estimated recurring revenue impact from climate change implies four days of disruption per year

According to MTR'S response to CDP (such financial impacts however are not separately disclosed in its sustainability reports), MTR expects climate issues (such as heat waves, floods and change in weather patterns) could potentially lower its recurring revenue by 1% (or HK$119m), which means on average four calendar days each year. Meanwhile, carbon pricing could raise its energy and utilities expense by 1% (or HK$16.7m).

Figure 82

MTR - Estimated financial implications of climate-related risks

Risk type	Chronic physical - Higher ambient temperature, more hot days/heat waves	Acute physical - Increase severity and frequency of extreme weather events such as cyclones and floods	Emerging regulation - carbon pricing mechanism	Chronic physical - Changes in precipitation patterns and extreme variability in weather patterns
Primary potential financial impacts	Increased direct costs	Increased indirect operating costs	Increased direct costs	Increased indirect operating costs
Impact	1) increase demand on air-conditioning in railway system to more loading on ventilation and cooling assets and in turn to higher electricity consumption 2) induce track deformation or defects leading to service suspension 3) impact on staff well-being	1) flooding in stations and other underground assets 2) reduce visibility and increase risk of collision of fleets 3) limit construction activities on site 4) accidents caused by falling objects 5) damage on overhead lines or other equipment, destruction of power cable leading to service disruption, increased deterioration of infrastructure or accelerated asset depreciation	1) higher electricity tariff from the power companies 2) possible mandatory energy efficiency programmes	1) Regional extreme weather events may affect shipment of critical items, such as new trains from suppliers
Time horizon	Medium-term	Short-term	Medium-term	Long-term
Likelihood	Likely	More likely than not	About as likely as not	Unlikely
Magnitude of impact	Low	Medium	Medium	Low
Financial implication	HK$135.67m, assuming 1% increase in expense and 1% decrease in revenue	HK$118.96m, assuming 1% decrease in revenue	HK$16.7m, assuming 1% increase in energy and utilities expense	HK$118.96m, assuming 1% decrease in revenue
Cost of response to risk	HK$1.1bn	HK$10.9bn	HK$1.127bn	HK$0.5m

Source: MTR CDP Response 2022

The next step in risk assessment

As International Sustainability Standards Board (ISSB) has launched the integrated reporting initiative using TCFD framework, it is possible financial regulators will require companies to start reporting based on ISSB's sustainability-related financial information. Thus, the companies will likely be required to report the actual financial impact from climate change with information such as:

1. To what extent does the climate-related risks heightened in its business unit and geographies under operation;
2. Which operating assets are most exposed to climate-related physical risks and potentially any assets are facing impairment write off;
3. Value of asset at risks, loss avoided due to proactive measures, increasing in

However, we believe quantifying this information is difficult.

Different reporting standards can cause confusion

Furthermore, the existence of multiple reporting standards such as TCFD and the Global Reporting Initiative (GRI) approach could make things confusing and/or too broad, without clear articulation of how risks are aligned with metrics and targets.

Disclosures could be better

As we are at the early stages of aligning reporting standards for sustainability-related issues, we see scope for improvement in the disclosure of MTR's assessment of financial hits related to climate-related issues, which are currently only disclosed in its filings on the CDP platform. With a growing focus on sustainability in the investment community, we believe there is room to improve.

Best practices for disclosures
Our ESG research team believes the best practice for disclosure lies on the pillars of *'conciseness'* and *'usefulness'*. A granular climate-related risk assessment, which signposts financial impacts, shall address the conciseness as this shall help investors gauge the implications on valuations. In addition, a summary of how different climate targets can contribute to the overall net-zero commitment, the timeframe, scope and scenarios applicable to each target will address the usefulness pillar.

4. Metrics and targets

Lining up with government's ambition

MTR aims to become carbon neutral by 2050, while roughly 95% of its greenhouse gas (GHG) emissions in 2021 (1.04 tonnes of CO_2) was attributable to Scope 2, ie, from off-site generation of electricity purchased by the company. Its ambition lines up with HK government's pledge in the Hong Kong Climate Action Plan 2050 (issued in October 2021) to spend over US$31bn in the next 15 to 20 years to achieve its aim of carbon neutrality.

Engaging with SBTi to set reduction targets

According to MTR's sustainability report in 2021, the group conducted a study in 2020/21 to determine its long-term reduction targets for railway and property businesses in Hong Kong by 2030, with a "practical roadmap" that includes but is not limited to adding electrical vehicle charging stations in its properties. Nonetheless, while we are aware that such a target comes from the Science-Based Targets initiative (SBTi), we have not identified any stated quantifiable reduction target. Our understanding is that MTR proactively engages with SBTi in its target-setting process.

Corporate responsibility committee also has a say in the emission target

How metrics are set
While the emission target is verified by SBTi, the group's board-level Corporate Responsibility (CoR) Committee is responsible for deciding the carbon reduction targets. In the group's CDP response, MTR stated that CoR is well aware the expiration of current targets and the need to set up new carbon reduction targets for 2030 and beyond.

Four major KPIs
MTR has four major KPI categories on its website to measure GHG reductions, includng: 1) electricity consumption for its heavy rail and light rail in absolute and intensity terms, 2) electricity purchased for managed and investment properties in absolute and intensity terms, 3) Scope 1, 2 and 3 GHG emissions, and 4) emission reduction targets.

Established track record of reporting GHG emissions

MTR has reported Scope 1 and 2 emissions since 2005, and Scope 3 since 2007 - which our ESG research team believes is a long track record compared to the majority of listed companies in Hong Kong, and in Asia.

Achieved one target and retired another

How have MTR's targets tracked so far?
MTR had two identifiable emission targets in the past. It achieved one and had to retire another. MTR had targeted to reduce its energy usage (versus 2013's level) in its investment properties by 12% by 2023 and it achieved this in 2020. It was unable to meet a 21% reduction of electricity consumed per passenger-km in its heavy rail network (versus 2008's level) by 2020. Reasons for noting meeting this goal from the company include: 1) the public order event in Hong Kong in 2H19, and 2) Covid (which resulted in a drastic decline in patroange).

Figure 83

MTR's emissions targets and achievement

Target	Year of target set	Base year	Target year	Target status in 2021
To reduce energy use of investment properties portfolio by 12%	2013	2013	2023	Achieved
To reduce 21% the amount of electricity consumed per passenger-kilometre in our heavy rail network	2013	2008	2020	Retired
Renewable energy - 1 million kwh generation	-	-	2023	Active
Science-based target (near-term emission target)	Unknown	-	2030	Committed
Science-based target (net zero)	Unknown	-	2050	Committed

Source: CLSA, MTR CDP Response 2021

Growing emissions from 2017 to 2019, and from 2020 to 2021 (due to gradual recovery from Covid)

Emissions

Transport operation records the largest portion of total GHG emissions, 76% and 80% of the company's Scope 1 and Scope 2 GHG emissions in 2021, followed by corporate support functions and main office buildings and properties and other businesses. While the GHG emission from transport operations grew 7% from 2017 to 2019, it dropped 27% YoY in 2020 followed by a 5% growth in 2021 (in line with our observation of MTR's number/volume of passengers).

Definitions of Scope 1, 2 and 3

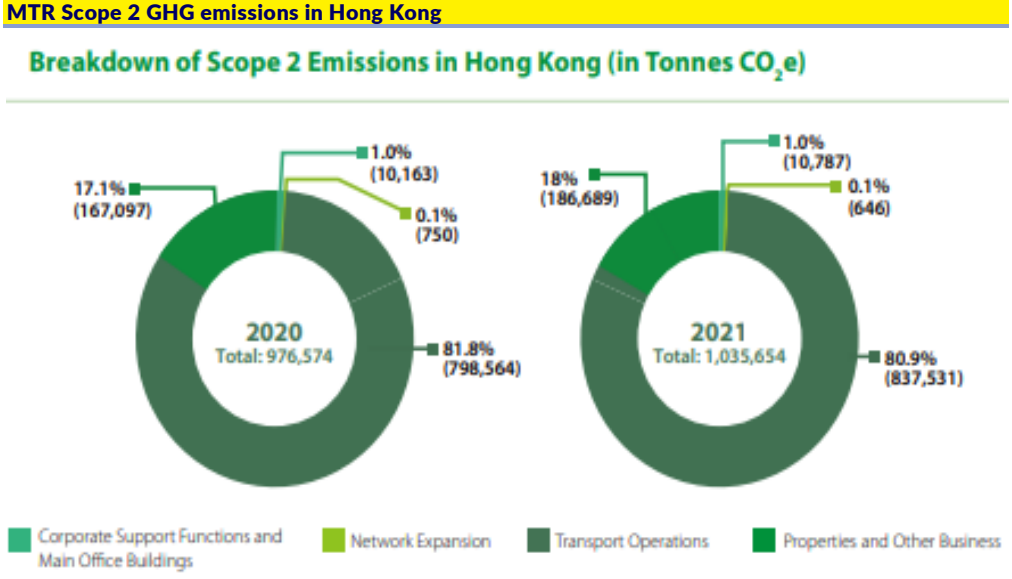
As a reminder, Scope 1 emissions reported include direct emissions from sources that are owned or controlled by the company, such as emissions from fossil fuels burned on site. Scope 2 emissions include indirect GHG emissions from the generation of electricity, heating and cooling, or steam generated off site but purchased by the company. Scope 3 emissions include indirect GHG emissions from sources not owned or directly controlled by the company but related to the company's activities.

Scope 2-heavy

Scope 2 emissions represented 82% and 81% of MTR's overall carbon dioxide emission in Hong Kong in 2020 and 2021, respectively, largely made up of the electricity it purchased from the two power companies for railway operations. In absolute terms, Scope 2 emissions was 789,564 tonnes in 2020, and 837,531 tonnes in 2021.

Figure 84

MTR Scope 2 GHG emissions in Hong Kong

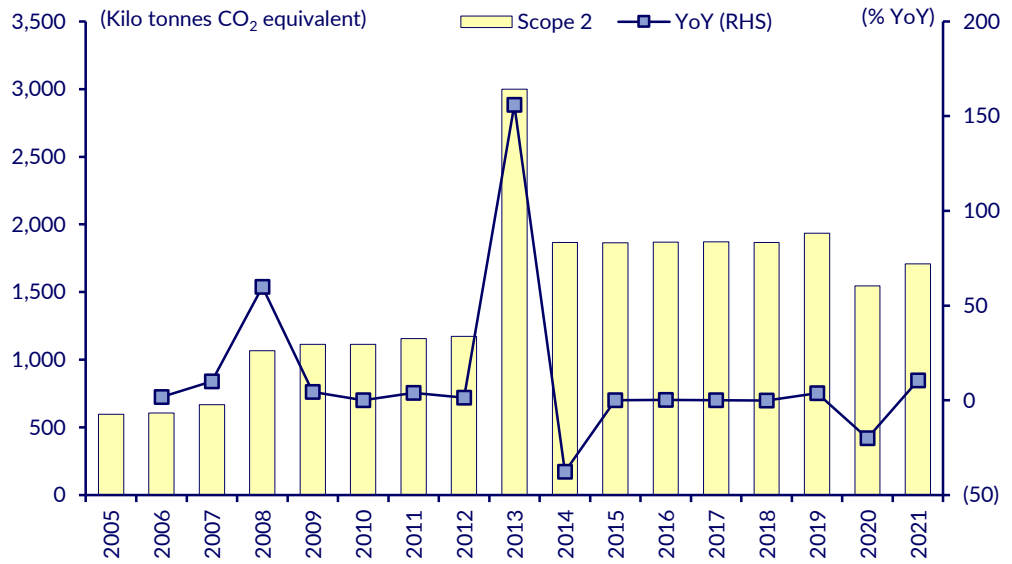


Source: MTR

Over the long term, MTR's emissions increased in line with its business expansion plan - railway merger in 2007 and investments in new lines. The sharp increment in absolute Scope 2 emissions in 2013 was due to four railway lines reaching peak activity and five new lines starting construction.

Figure 85

MTR 15-year Scope 2 GHG emissions



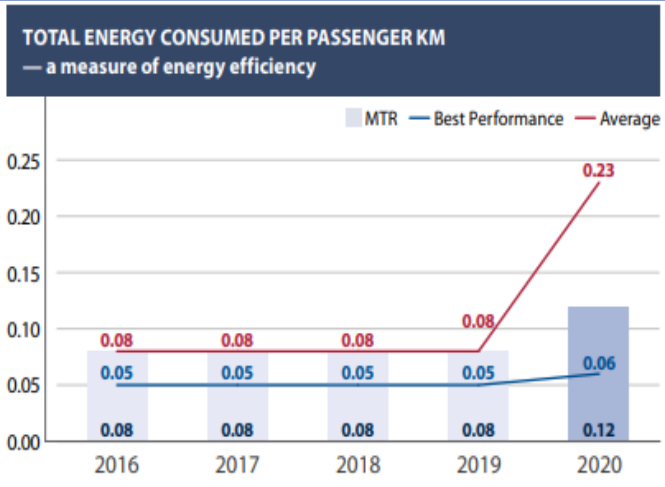
Source: CLSA, Thomson Reuters, MTR

Peer comparison

Compared with peers defined in the Community of Metros (COMET), an international programme that collects data from metro system operators around the world, MTR's GHG emissions performance is worse than peer averages pre-Covid (a proxy for noramlised years) while its energy efficiency is in line with peers' average. However, the per passenger-km carbon dioxide emission gap between MTR and peers' average had narrowed from 21.6 (units) in 2016 to 12.0 (units) in 2019.

Figure 86

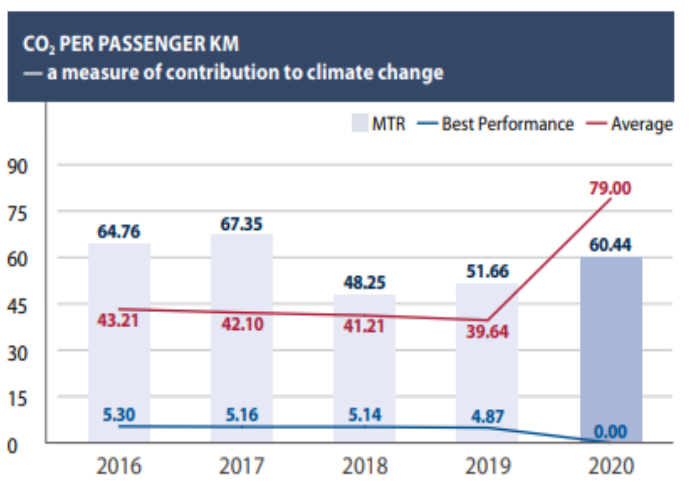
MTR - Energy efficiency performance peer benchmark



Source: MTR

Figure 87

MTR - GHG emission intensity performance peer benchmark



Source: MTR

Figure 88

MTR's 5-year GHG emissions (Hong Kong)

KPI	Unit	2017	2018	2019	2020	2021
GHG Emission Inventory						
Total GHG emissions	tonnes CO_2e	1,334,394	1,322,169	1,388,810	1,024,813	**1,079,402**
Scope 1	tonnes CO_2e	48,924	44,102	46,134	40,949	**40,611**
Scope 2	tonnes CO_2e	1,257,664	1,262,450	1,332,512	976,574	**1,035,654**
Scope 3	tonnes CO_2e	27,806	15,617	10,165	7,290	**3,137**
Corporate Functions and Main Office Buildings						
Total	tonnes CO_2e	20,212	19,351	19,400	13,934	**14,579**
Scope 1	tonnes CO_2e	3,799	3,122	3,844	3,374	**3,474**
Scope 2	tonnes CO_2e	13,679	13,609	13,328	10,163	**10,787**
Scope 3	tonnes CO_2e	2,734	2,620	2,228	397	**318**
Transport Operations						
Total	tonnes CO_2e	1,055,126	1,059,503	1,129,223	828,954	**868,815**
Scope 1	tonnes CO_2e	38,495	33,775	36,876	29,878	**30,775**
Scope 2	tonnes CO_2e	1,016,074	1,025,186	1,091,724	798,564	**837,531**
Scope 3	tonnes CO_2e	556	542	623	512	**509**
Network Expansion						
Total	tonnes CO_2e	25,871	13,833	7,637	6,608	**2,377**
Scope 1	tonnes CO_2e	206	153	123	126	**161**
Scope 2	tonnes CO_2e	1,842	2,033	1,070	750	**646**
Scope 3	tonnes CO_2e	23,823	11,647	6,444	5,732	**1,570**
Properties and Other Businesses						
Total	tonnes CO_2e	233,185	229,482	232,549	175,317	**193,630**
Scope 1	tonnes CO_2e	6,424	7,052	5,290	7,571	**6,201**
Scope 2	tonnes CO_2e	226,068	221,622	226,390	167,097	**186,689**
Scope 3	tonnes CO_2e	693	808	869	649	**740**

Source: MTR

Better monitoring and integration

Majority of reductions to be from the two power companies in Hong Kong

The path ahead: More integrated and monitored

It appears that its metrics and targets are becoming more tightly integrated and monitored, especially after Hong Kong's release of Climate Action Plan 2050 in 2021 and the HK government's announcement of new railway developments. However, at some point, we expect the company to report emissions from other locations in more details - for example breakdown of emissions by activities in mainland China, Australia and the UK.

It can't be achieved alone - CLP and HK Electric

The HK government's carbon neutrality initiative relies on MTR as it is the backbone of the city's public transport system; and given MTR's business nature, the group's road to carbon neutrality is highly dependent on the two power companies in Hong Kong - CLP and HK Electric. Thus, we expect some level of government intervention in this matter in order to push forward the climate change agenda. According to the HK government, the two power companies have committed to invest US$5bn in aggregate to tackle carbon reductions (including to drive the shift in usage of coal to natural gas). Additionally, the two power companies are studying proposals to construct offshore wind farms, which could meet 3.5-4% of Hong Kong's electricity consumption (if executed).

Figure 89

MTR's five-year environmental performance (Hong Kong)

KPI	Unit	2017	2018	2019	2020	2021
Energy Use						
# Total electricity purchased for railway operations	MWh	1,628,344	1,635,542	1,613,075	1,534,491	**1,555,211**
# Heavy rail	MWh	1,573,174	1,580,443	1,559,734	1,484,030	**1,503,677**
# Light rail and bus	MWh	55,170	55,099	53,341	50,461	**51,534**
# Electricity consumption per revenue car-km[1]	kWh per revenue car-km	4.85	4.77	4.81	5.26	**5.39**
# Heavy rail	kWh per revenue car-km	4.84	4.76	4.81	5.28	**5.41**
# Light rail and bus	kWh per revenue car-km	4.95	4.95	5.04	4.86	**5.03**
# Total electricity purchased for managed and investment properties	MWh	395,323	386,703	400,824	376,220	**411,914**
Water Consumption						
# Water consumption from railway operations	m^3	768,302	702,190	818,331	599,824	**567,147**
# Total water consumption from station cooling towers	m^3	223,237	218,729	278,767	254,934	**267,763**
# Water consumption from managed and investment properties	m^3	1,147,940	1,367,332	1,438,363	1,039,291	**1,180,694**
Waste Management						
# Metals recycled from railway operations	tonnes	3,598	3,569	3,955	4,288	**4,585**
# Total hazardous wastes	tonnes	238	189	272	361	**187**
# Total hazardous wastes in liquid	litres	75,609	102,201	94,822	99,653	**97,960**
# General wastes from railway extension projects	tonnes	53,608	26,203	14,504	18,428	**5,044**
# Total construction wastes recycled	tonnes	1,040,668	585,350	179,566	88,495	**29,085**
Climate Change Management						
Annual review of climate change - risks assessment and continuous risk management action	Text	Completed	Completed	Completed	Completed	**Completed**

Source: MTR

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China Mengniu Dairy: Greener pastures

- ❑ The company adopted a climate change strategy in 2021, aims for carbon peak by 2030, commits to be neutral by 2050, but no detailed timeline or milestones to date
- ❑ Three-tier governance structure to deal with sustainability issues, led by a board-level committee that meets twice a year
- ❑ ESG targets incorporated into annual management performance review
- ❑ Released historic Scope 1 and 2 data in 2021 and estimated Scope 3 for 2020
- ❑ New "GREEN" strategy released in 2021 covers 178 sustainability indicators in wide range of issues, from climate risk to common prosperity
- ❑ Extreme weather events are a key climate risk
- ❑ Digitalisation as a strategy to mitigate climate challenges is at an early stage

Summary

Mengniu has set climate goals and weather risk is palpable

From farm to fridge, a typical litre of milk involves myriad players: from working the land to manufacturing, distribution and retailing. Different stakeholders have varying interests and are not necessarily all at the same stage in thinking about climate change. Therein lies the challenge for Mengniu as the dairy farm market leader begins to chart a path toward carbon neutrality, in line with China's national goals and policy. The company in 2021 published historical emissions data (although only going back to 2018) and emerged with a new "GREEN" strategy, which on the climate front targets emissions reduction, leaner operations and recycling. In our interviews with executives, it is clear that Mengniu pins many of its hopes on a digital transformation of farming, from biosensors on cows to blockchain technology for suppliers, to help it collate carbon data, use fewer resources and boost efficiency in its own processes. To date, only eight of its 68 factories can track data from raw milk to the end product and upgrading the rest would take financing of up to US$600m. While it has set goals, its ability to get there is less clear, with more granular detail needed about timelines, milestones and the financial impact of climate on the company.

Background

The company began its life as an ice cream maker in Inner Mongolia

China Mengniu Dairy ("Mengniu") is a dominant manufacturer and distributor of dairy products in China. Established in 1999 by Niu Gensheng, a former employee of Yili Group, Mengniu's major domestic dairy competitor at present. Mengniu began its life in a small rented corner of Hohhot in the Inner Mongolia Autonomous Region. It did not take long for Mengniu's business to take off and develop into a dairy conglomerate. Today the company has more than 41 production bases in over 20 provinces in China, a further three in Australia, New Zealand and Indonesia, with annual production capacity amounting to over 10m tonnes a year. In recent years, Mengniu also has been expanding its sales beyond the domestic market to Australia, New Zealand, Singapore, Mongolia, Myanmar, Cambodia, Indonesia and Malaysia.

Ownership and operations

It was the first Chinese dairy firm to list in Hong Kong, raising HK$1.37bn in 2004

Mengniu went public in June 2004 on the Stock Exchange of Hong Kong, the first mainland dairy firm to list in the city, in an IPO worth HK$1.37bn. Prior to the listing, it had received backing in 2002 from Morgan Stanley, CHD Investments and China Capital Partners. The company entered a joint venture with Denmark-based Arla Foods in 2006, Mengniu Arla, to produce and distribute milk products in greater China. In 2009, a joint financial venture between China's largest state-

owned food processing enterprise, China National Cereals, Oils & Foodstuffs Corporation (COFCO) (70%) and Hopu Investment Management Co (30%) purchased a 20% stake in Mengniu. Since then, COFCO Corporation has remained the biggest shareholder of Mengniu, currently holding 23.14%.

Tainted milk scandal led to involvement of global strategic shareholder

In the wake of a food safety scandal in 2008, in which milk products, and in particular infant formulas in China, were found to be contaminated with melamine, Mengniu brought in two major global strategic shareholders, Arla Foods and Danone, as part of efforts to improve its public image and rebuild consumers' confidence in domestic dairy products. In 2012, Arla Foods bought a 6% stake in Mengniu, becoming its second largest shareholder at the time. As a strategic investor, Arla Foods would be involved in Mengniu's daily operations and introduce pasture management systems from Denmark and help Mengniu improve production and quality. In 2014, the world's biggest French yogurt maker, Danone, also doubled its stake in Mengniu from the original 4% (in 2013) in response to increasing demand for dairy products in China. Following the deal, Danone became the second-largest shareholder of Mengniu, holding 9.9% of the shares (at the time). In 2021, Danone exited its joint venture with Mengniu, selling its entire stake in the company.

Acquisitions help expand market dominance and geographical reach

Over the years, Mengniu has consolidated its market dominance through acquisitions. Domestically, Mengniu bought the local infant formula maker Yashili in 2013. In 2017, Mengniu became the controlling shareholder of China Modern Dairy Co Ltd, which controls China's largest cattle herd, securing the company's raw milk supply. Internationally, Mengniu has expanded its geographical reach through its acquisition of several companies in Australia, including Burra Foods, a raw milk processor in 2016 and Bellamy's Organi, an infant milk powder and complimentary food manufacturer in 2019. Mengniu's main product lines include liquid milk, ice cream, milk powder, cheese, selling through brands such as Milk Deluxe, Just Yoghurt, Champion, Yoyi C, Shiny Meadow, Deluxe, Reeborne, Bellamy's and Arla ASCX. Mengniu's profit in 2021 was Rmb5bn, up from Rmb3.5bn in 2020. Its revenue meanwhile increased from Rmb76bn in 2020 to Rmb88.1bn in 2021[42].

Main source of emissions

Emissions spiked by nearly 10% between 2020 and 2021

Mengniu's revised historical data on emissions were published in 2021, and date back to 2018. It shows total carbon emissions from its 63 factories in the group increasing annually, from 1,100,000 tonnes in 2018 to 1,360,000 tonnes for Scope 1 and 2 emissions in 2021. The intensity of Scope 1 and 2 carbon dioxide emissions was 0.171kg CO_2e/kg product in 2021, compared to 0.174 in 2018. In its sustainability report, the company notes that in 2021 production of the group saw an increase of nearly 10% from the previous year, a significant hike compared to the period between 2018 and 2019. The company also reported an estimated Scope 3 emission measurement of 10-14m tons for 2021, which covers major emission sources from raw milk sourcing, packaging materials, auxiliary materials and upstream and downstream transportation.

Figure 90

Mengniu GHG inventory, FY2018 to FY2021

	FY18	FY19	FY20	FY21
Total Scope 1&2 (10,000tCO_2-e)	110	116	127	136
Carbon emission intensity (kgCO_2-e/kg product)	0.174	0.168	0.169	0.171

Source: Mengniu 2021 Sustainability Report.

[42] China Mengniu Dairy annual report 2021

Hong Kong rules require an ESG report from the company each year

Sustainability reporting requirements

As a Chinese domestic company listed on the Stock Exchange of Hong Kong (HKEX), Mengniu has to follow the reporting standards set out by the market operator. Since 2016, HKEX has required issuers to publish an ESG report each year at the same time as its annual report.

Laws and rules in China require Mengniu to make environmental disclosures

While Mengniu is not subject to listing rules in mainland China, there are fragmented laws and regulations from various regulatory bodies focusing on the disclosure of environmental protection and social responsibility for both listed and non-listed companies. In December 2021, the Ministry of Ecology and Environment (MEE) released the Measures for the Administration of Legal Disclosure of Enterprise Environmental Information, mandating major polluters and companies that finance them to submit annual reports disclosing environmental information. According to the Measures, companies that are required to make disclosure include:

- ❑ Major dischargers of pollutants
- ❑ Companies that are required to undergo mandatory clean production audits under the Clean Production Audit Measures
- ❑ Publicly-listed companies (and their subsidiaries) and companies that issue bonds if they have been penalised for ecological or environmental violations in any of certain ways in the previous year.

Companies will have to disclose against the Format Guidelines for Legal Disclosures of Enterprise Environmental Information, which was released by the MEE in January 2022, and submit their reports by March 15. Research so far has not found any obvious indications that Mengniu is subject to this disclosure rule.

The company shifted from CSR to sustainability reports in 2014

Voluntary climate reporting initiatives

Mengniu published its first CSR report in 1999 (one consolidated report for the years 1999 to 2007) and a second CSR report (again consolidated) covered the years 2008 to 2013. Mengniu first published a sustainability report in 2014 (which also covered 2015). Starting from 2016, Mengniu started to release one sustainability report per year. The company says in its 2021 sustainability report that it enlisted the services of Boston Consulting Group (BCG) in 2021 to help develop its carbon neutral strategy in a "scientific and rigorous manner" with a target of carbon peaking in 2030 and carbon neutrality by 2050. It also says it "highly recognised" the Science-Based Targets Initiative (SBTi) and took part in the initiative as a "phased task," stating that it will make a schedule and scheme to participate in SBTi after new guidelines are released. As of the date of this report, ESG Manager Lin Di confirmed that the company is exploring the requirements to join.

Mengniu's climate reporting initiatives and goals in full

Figure 91

Mengniu climate reporting, commitments and goals

Initiative	Status
Follows the TCFD disclosure framework	In progress
Annual sustainability report	✓ since 2014
Reports under the Carbon Disclosure Project (CDP)	✓ since 2022
Plan to achieve net zero by 2050	In progress
Interim GHG reduction targets by 2030	In progress
Aligns reporting with Global Reporting Initiative (GRI)	✓
Climate change strategy	✓ since 2021

Source: Mengniu

1. Governance

A hierarchy exists to manage sustainability issues

Although it was in 2021 that Mengniu announced its official sustainability strategy, the Green Sustainable Development Strategy (also known as the "GREEN Strategy"), the company had been building a sustainability governance system behind the scenes for a number of years, culminating in a three-tier structure that the company admits is still a work in progress. Mengniu breaks the structure down into three processes: decision-making, management and execution.

A top-down approach

A board-level sustainability committee was set up in 2019

For decision-making on sustainability issues, Mengniu created a specific committee at the board level. With increased demands from institutional investors and enhanced ESG-related requirements from the Stock Exchange of Hong Kong, Mengniu set up the Sustainable Development Committee (SDC) in August 2019 as the apex of its decision-making on sustainability. It formulates and assesses Mengniu's sustainability-related strategies, goals and risks, as well as provides guidance and gives final approval on Mengniu's annual sustainability report. The SDC comprises three executive directors, a non-executive director and an independent non-executive director. It is chaired by Simon Stevens, a non-executive director. Willow Wu, the head of investor relations, said that Stevens was appointed as the chair of SDC due to his extensive experience in sustainable development, and since then he has been providing the board with advice on management around sustainability issues in the upstream sector.

An executive committee is the core management body on sustainability issues

For management, beneath the SDC sits the Sustainable Development Executive Committee, the core body responsible for leading five working groups that carry out the implementation and execution of its sustainability initiatives. The committee is made up of key executives in the company and oversees strategy implementation and advancement.

Five working groups execute objectives and plans

Execution is then tasked to five working groups responsible for setting work objectives and plans, implementing Mengniu's strategies and staying in touch with the company's internal and external stakeholders. The five working groups are: Governance - Sustainability; Responsibility - Common Prosperity; Environment - Carbon Net Zero; Ecosystem - Collaborative & Accountable; and Nutrition - Supreme & Inclusive. These working groups meet on a quarterly basis (or irregularly as needed for working progress reports) and on climate, consider ESG-related topics and training, work plan discussions and preparation of the ESG report. The working groups report to senior management teams or the sustainability committee at the board level twice a year and brief on strategy progress, discuss risks and seek ESG report approval. According to Ms Wu, the working groups have a "good mix of sustainability knowhow.''

A secretariat coordinates all ESG projects

A specific secretariat sits across this three-level governance system (the Secretariat of the Sustainable Development Executive Committee), consisting of members of Corporate Affairs, Investor Relations and the Finance Department, and it drives the overall cross-departmental coordination of ESG projects at Mengniu.

This structure may be fine-tuned to adapt to the company's needs

According to Lin Di, ESG Manager at Mengniu, the sustainability governance system is a work in progress that can be upgraded and optimised to fit the needs of the company. For example, the Secretariat of the Sustainable Development Executive Committee originally only included Investor Relations and the ESG team when it was first created but has further incorporated additional core departments as the company's ESG work further progressed. Ms Wu also added that in 2020, Mengniu

also appointed 46 sustainability officers in various departments and divisions across the group to promote the implementation of suitability programs and ESG information collection for ESG information disclosure.

How does the SDC work in practice?

The SDC sets the stage for wider board discussions

CEO Jeffrey Minfang Lu explained that discussion and alignment within the SDC sets the stage for the wider board discussions on budget, objectives and cash flow, and ultimately these will be reflected in the company's overall business strategy. The wider board has two meetings a year and each committee would have another separate meeting each time before the whole board convenes. The five working groups, on the other hand, as discussed above, meet among themselves on a quarterly or ad hoc basis to discuss work progress and ESG report preparation work as well as have ESG-related topic training and sharing sessions. The working groups then report to Sustainable Development Executive Committee or SDC twice a year to provide updates on sustainability development results and progress as well as to discuss major strategic issues and direction for ESG-related matters for the next year. Ms Wu elaborated that some of the typical issues that SDC discusses include carbon management strategy under climate change, responsible supply chain initiatives, ESG requirements and demands from various stakeholders, such as regulatory bodies and global institutional investors.

Board expertise

A big board reshuffle came in late 2021, but no inclusion of climate expertise

In December 2021, Mengniu's board underwent a reshuffle, replacing seven of the original 10 directors with six new members. Ms Wu, said the replenishment was to ensure the independence of outside directors and also to bring in new members to complement the board's skill sets and expertise. The current board consists of nine members with an equal number of executive directors, non-executive directors and independent directors. The executive directors are CEO Jeffrey Minfang Lu, the company's CFO, and another female director Wang Yan, who has a human resources background. The three non-executive directors are from Mengniu's two major shareholders, state-owned entity COFCO Corporation and strategic shareholder Arla Foods. The experience of non-executive directors Chen Lang and Wang Xi (both representatives of COFCO) appears very finance and investment-bank focused while the chair of the Sustainability Committee, Simon Stevens, is a dairy industry veteran. The three independent directors' expertise appears to be in corporate governance, law and finance and auditing. While the board does have a strong industry background and diverse skill sets, only one independent director, Ge Jun, has corporate governance experience at an academic level. No director has direct climate or sustainability experience. Wu noted that directors are given training once a year by external consultants on ESG-related topics, as well as new ESG disclosure and reporting requirements.

The SDC relies on risk and sustainability reporting expertise

Joining Simon Stevens on the Sustainability Development Committee is Li Michael Hankin whose experience is in auditing and finance, CEO Jeffrey Minfang Lu, Ms Wang Yan (human resources background) and CFO Zhang Ping. Wu explained that Li Michael Hankin will be helping the company identify major climate-related financial risks and oversee the management of Mengniu's subsidiaries while Ge Jun has been advising the company on its sustainability strategy and reporting.

Figure 92

Mengniu Board of Director

Name	Committee	Background/Experience
Mr Simon Dominic Stevens (NED)	Sustainability (Chair); Strategy & Development; Nomination	Arla Foods since 2002, roles across various functions: sales, marketing, commercial operation, international business and supply chain management
Mr Jeffrey Minfang Lu (CEO & ED)	Sustainability; Strategy & Development	EO of Yashili; Vice President (Greater China) of Danone Early Life Nutrition Greater China; worked at Danone Group and Dumex Baby Food Co. Ltd. for over 10 years
Ms Wang Yan (ED)	Sustainability	Talent management and human resources; was deputy director of the human resources department at COFCO Corporation
Mr Zhang Ping (CFO & ED)	Sustainability	31 years of experience in FMCG, specializing in management of operation, finance and audit and risk control; worked in Swire Beverages and was CEO of Coca-Cola Bottlers Manufacturing Holdings Limited
Mr Li Michael Hankin (INED)	Sustainability; Audit (Chair); Nomination; Remuneration	More than 30 years of experience in financial and accounting, fundraising, merger and acquisitions, restructuring and international business development; currently also INED at COFCO subsidiary, COFCO Womai Investment Ltd.
Mr Chen Lang (Chairman & NED)	Nomination; Strategy & Development	Executive vice president at COFCO; chairman of COFCO Womai Investment Ltd; most experience in China Resources, was CEO of China Resources Vanguard Co., Ltd and CEO of China Resources Gas Group Limited
Mr Wang Xi (NED)	Strategy & Development	Most experience in investment banking and finance; currently leading the Direct Investment Division of the Strategy Department of COFCO Corporation and is director of COFCO Womai Investment Ltd.
Mr Yih Dieter (INED)	Audit; Nomination; Remuneration	Practicing lawyer in Hong Kong; partner of the Hong Kong law firm, Kwok Yih & Chan, focusing on corporate finance, capital markets, securities and regulatory compliance
Mr Ge Jun (INED)	Audit; Nomination; Remuneration (Chair); Strategy & Development	Currently associate dean of the Shanghai Institute of Advanced Finance at Shanghai Jiaotong University and executive director of the National Innovation and Development Strategy Research Association; academic expertise: corporate governance, corporate stakeholder relations, evaluation of innovation mechanism, responsible business and sustainable development.

Source: Mengniu

Management is expected to meet ESG targets as part of its appraisal process

Incentivising management

In its 2021 sustainability report, Mengniu described setting specific ESG appraisal targets for management and has included them in its annual performance review to motivate achievement of the company's sustainable development goals. As further specified by Mr Lin, all core members of management, specifically those holding a position equivalent to or above the vice president level, are responsible for 5% of the company's ESG key performance indicators, though the metrics may vary depending on the departments. Mr Lin stated that the year 2021 is the first time Mengniu has incorporated ESG targets into management's performance evaluation. In the future, the company may consider including carbon emission-specific targets and increasing the percentage of ESG KPI or linking ESG targets with year-end bonuses and equity for management.

Mengniu's CEO believes the governance structure will help the company's brand

CEO Lu takes pride in the sustainability governance system that Mengniu has built. "[By] having the committee, the working group and KPI in place this will [not only] increase significantly the awareness across the entire organisation but also get people [to] understand this is not just a social responsibility, it will have a business impact, it will have a financial impact, it will have an impact on the equity of the brand and equity of the company," Lu said.

2. Strategy

A new sustainability strategy began in 2021

Mengniu came out with a new sustainability strategy in 2021. Dubbed the GREEN Strategy, it benchmarks against the United Nations Sustainable Development Goals and revolves around five pillars (also known as the five working groups, described in the Governance section above), namely "Governance - Sustainability," "Responsibility - Common Prosperity," "Environment - Carbon Net-Zero," "Ecosystem-Collaborative & Accountable" and "Nutrition - Supreme & Inclusive." These "strategic pillars" are then subdivided into 15 topics and 28 specific actions, totalling 178 sustainability indicators in total. Mengniu's previous strategy between 2019 and 2021, "Promise of a Healthier World," was focused on a more generic desire to produce more nutritious products, "build a better life" and a more sustainable planet. Within the GREEN strategy, climate is dealt with specifically under three headings: dual-carbon action, green operation and recycle. The first refers to Mengniu's carbon reduction plans, and the collation of the Scope 1 and 2 emissions data, with a promise to next improve emission management of suppliers and calculate the carbon footprint of the value chain. Mengniu also aims to reduce energy consumption (graphic examples include optimising faeces management). On the operations side, its 2021 sustainability report details environmental management initiatives and under recycle, much emphasis is put on green packaging.

At the same time, Mengniu set its carbon neutrality goals

Concurrently, the company also announced its goals for achieving carbon peak by 2030 and carbon neutrality by 2050. These strategic goals were set through the company's cooperation with the global strategy and management consulting firm Boston Consulting Group in 2021. Ms Wu cited several key factors that pushed Mengniu to reassess its sustainability plans and one of them was China's announcement of its dual-carbon policy. In 2020, China pledged to peak its carbon emissions before 2030 and achieve carbon neutrality before 2060. Mengniu's net zero targets very much align with the national ones. On top of its alignment on the carbon neutrality timeline, Mengniu also included initiatives such as common prosperity and rural revitalisation, which also sit on top of China's national agenda, into its ESG commitment. Besides national policy, Wu said HKEX was also starting to enhance its requirements for more ESG disclosure and board structure and foreign institutional investors were also demanding more ESG commitment. Internally, Mengniu also saw the value of integrating sustainability into its long-term development: not only can Mengniu build its competitive edge in the market by having more carbon-neutral and organic products, but it can also lower the cost of fundraising through green financing.

The risk factor

Obvious climate-related risks loom large but no financial impact estimate yet

Mengniu has identified an initial series of physical and transition risks related to climate change: at the physical end, typhoons, extreme rain, heat and cold, and floods loom large as acute risks. Warming and rising sea levels also pose a chronic risk. Mengniu recognised the potential impact each risk could cause on its milk source supply, operations and factories in its 2021 sustainability report and provided a brief and general countermeasure statement for each risk. In terms of transition risks, they are divided into three categories: policies and regulations, technical fields, and market supply and demand. Mengniu has assessed these risks in different regions in China (Northeast, North, East, Central, Southwest, and South) based on "low risk," "general risk," "higher risk" and "material risk" benchmarks but has not put the potential impact for each risk into a timeframe (either long or short term). So far, none of the risks have been identified as material, either.

Risk map is only for internal management purposes

Mr Lin explained that at the current stage, Mengniu has only preliminarily mapped out some of the climate change-related risks for internal risk management and investment purposes, and the company is still at the initial stage of quantifying risks and measuring their potential financial impacts. Lin added that the company has recognized the requirement to quantify the financial impacts of climate-related risks in the TCFD framework, which HKEX has made mandatory for all issuers to adopt by 2025, and Mengniu is still in the process of exploration.

Extreme weather forces a rethink of transportation options

CEO Lu described some of the countermeasures Mengniu is taking to navigate the potential logistic challenges in the case of extreme weather, such as the severe flood that occurred in Henan Province in 2021, which resulted in the evacuation of almost a million people and hundreds of deaths. The intensity of the floods was believed to have been amplified by extreme weather caused by climate change. "We are moving away from a pure truck transportation and logistics support towards a more diversified, but also much more stable [transportation method]," Lu said. "China has a very specific situation in that milk is mostly produced in the northern area and consumed mainly in the coastal area…in terms of trains and boats, transportation, over the last five years, [have] increased at least 20% of our total logistic support. And that actually significantly improves our capability of supplying but also reduces consumption by basically truck transportation."

A recent heatwave is a good example of the impact of climate change on Mengniu

Coincidentally, during the writing of this report, another extreme weather event took place in China. Many regions from southwest to east of the country along the Yangtze River were hit by the most severe heatwave in six decades that stretched for as long as 70 days from June to August. The heat wave resulted in severe power outages in factories, shopping malls and public transport. The extreme heat also disrupted crop growth and threatened livestock. When asked about the impact of the heatwave on Mengniu, Lu stated that the impact on the dairy industry specifically is not as significant as demand remains strong. However, Lu added, "Having said that, I think for the entire FMCG industry, the impact is quite obvious."

Carbon neutral progress

A three-phased approach is being taken to achieve carbon neutrality

In 2021, Mengniu completed its calculation of Scope 1 and 2 GHG emissions from the years from 2018 to 2021 and estimated its Scope 3 emissions, which cover major sources from raw milk sourcing, packaging materials, auxiliary materials and upstream and downstream transportation.

In its 2021 Sustainability Report, Mengniu outlined its three-phased goals for 2025, 2030 and 2050:

1. Phase I: to control the carbon emission intensity per tonne of dairy product within 165kgCO_2e/t in 2025;
2. Phase II: to achieve the peaking of absolute value of Scope 1 and 2 carbon emissions, and control the carbon emission intensity per tonne of dairy product within 160kgCO_2e/t in 2030;
3. Phase III: to achieve the carbon neutrality of Scope 1, 2, and 3 in 2050.

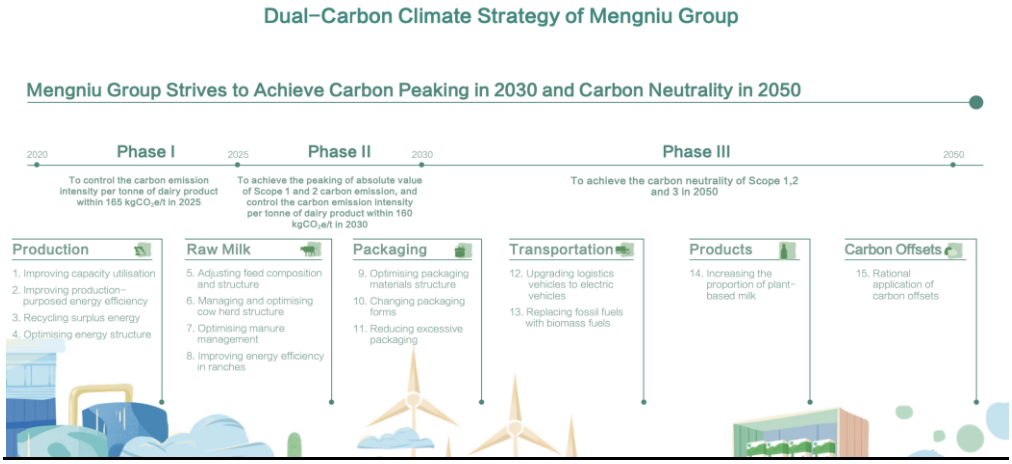
The company also sketched out broad pathways for each part of the process, including production, raw milk, packaging, transportation and products. It also included carbon offsets as one of the possible routes to achieve its carbon neutrality target. The pathways are described broadly: for example, under the heading of production, Mengniu sees a key route as improving capacity utilisation, recycling

surplus energy and optimizing energy structure. Under raw milk, a pathway is to adjust feed composition and structure, and manage cow herd structure. What is lacking is a more granular description of the way in which Mengniu plans to meet its goals, with timelines and an estimate of the financial impact.

Projects are underway for scope 3 management

Figure 93

Mengniu Group's dual-carbon strategy



Source: Mengniu Sustainability Report 2021

Mr Lin said that Mengniu has kicked off a series of projects for Scope 3 management. For example, Mengniu's Milk Source Management Business Unit has also drawn a strategic plan for the entire raw milk operation to achieve its carbon neutrality targets in 2050 and set targets to reduce carbon emission intensity levels. The plan includes four pathways: 1) adjusting feed composition and structure; 2) managing and optimising cow herd structure; 3) optimising manure management; and 4) improving energy efficiency in ranches. Secondly, two of Mengniu's invested raw milk suppliers, China Modern Dairy Holding Ltd (Modern Dairy) and China Shengmu Organic Milk Ltd (Shengmu Organic), which together contribute 40% of Mengniu's carbon emissions from raw milk, have completed their carbon calculations and formulated carbon-neutral strategic plans. China Shengmu specifically has also obtained SBTi certification. Lin also mentioned that Mengniu has started building a carbon net-zero animal husbandry pilot project in Shengmu Organic and Modern Dairy and, if successful, it will become a benchmark ranch for the company.

Data is being obtained from key suppliers on emissions

When it comes to the management of raw materials, Lin said that its procurement management unit has started collecting carbon emission data from its major suppliers. Very recently in August 2022, Mengniu also hosted a strategic supplier meeting to talk about carbon emission management with its main suppliers. CEO Lu said that Mengniu is at the stage where the company can clearly set feasible and reasonable objectives with adequate measures to implement in the next five years. With the data and analysis work conducted on Scope 1, 2 and 3, Mengniu hopes to see where the challenges and opportunities are for the company's carbon-neutral and commercial goals.

Taking farming models into the digital age comes with a high price tag

The big challenge

From farm to fridge, a typical litre of milk involves various players in the process, from farming to manufacturing, distribution and retailing. Different stakeholders have various interests and are not necessarily all at the same stage in thinking about climate change. How can Mengniu play the role of a leader to encourage and empower different players in the entire ecosystem and help them realise the value of sustainability?

CEO Lu confessed the biggest challenge in achieving carbon-neutrality lies in the farming part of the process and Mengniu is actively thinking about the composition and formulation of the feeds and its farming model. "The question is not about whether we can do it in one farm or not, it is about such a large scale we are talking about, you know 8m tonnes of raw milk each year, and it is growing," Lu said. "Our question is what can we do on the farming side, and [we] spent a lot of time to really go into all the details, for example, what kind of feeds we are using? What kind of technology? What's the farming model? And what is exactly the emission of each cow per litre of milk?" While Lu is confident that Mengniu has the necessary measures in place for manufacturing, investment in upgrading these plants is also an issue. Currently, Mengniu has 68 factories worldwide, but only eight of them have been upgraded to fully digital ones where they have the capability to track all the data from raw milk to the end products. According to Lu, the benefits of digital factories are perceptible: reduced water and energy consumption, improved efficiency and less transportation. Moreover, these digital factories have already started using solar energy and electric cars and trucks to reduce carbon emissions. However, upgrading the rest of the sixty factories, Lu estimated, would require approximately US$600m of investment.

Mengniu has identified four climate-related opportunities

The farm of opportunities

In Mengniu's FY2021 Sustainability Report, the company has identified four opportunities:

1. Resource efficiency: green operations can directly save costs for the operation of the organisation in the medium and long term;
2. Energy sources: increase the use of clean energy to reduce the production cost;
3. Adaptability: diversify products and marketing campaigns and strengthen the resilience of dairy enterprises;
4. Products and services: promote the development of green product business and innovate new low-carbon products.

Each opportunity is evaluated as "mildly favourable benefit," "general benefit," "large benefit" or "major benefit."

Details on climate opportunities are lacking but hopes are high

While Mengniu's 2021 Sustainability Report has not yet gone into much detail as to what these opportunities exactly entail, CEO Lu certainly appears very optimistic about the potential possibilities and positive impact sustainability development could bring to the business. Instead of taking the demands for sustainability as a mere cost-adding item on the company's balance sheet, Lu believes that many ESG initiatives align with Mengniu's business incentives.

Tapping consumer demand for sustainable products and rethinking transport options

For example, on the consumer side, Lu said there is an increase in demand from consumers for environmentally-friendly products, and investing in developing green products will help Mengniu build an advantage over its competitors and grab market share. While studies have shown that a majority of consumers indicate a willingness to pay more for sustainable products, Lu confessed that there still may be a disconnect between survey and practice, pointing out how much of a price premium

and perception of what is considered green products also play a role in consumer behaviours. “Interestingly, [consumers in China] link ESG more with health, and healthy lifestyle and healthy nutrition product rather than just green or carbon neutral.” Combatting climate change has also become an impetus for Mengniu to relook at its production processes and supply chain to improve efficiency. For example, Lu said Mengniu produces almost 10m tons of products each year and these products are typically transported around five to six times on average from the factory to the end consumers. Thus, the reduction of even one transportation round would make a huge difference to the company’s overall transportation cost as well as carbon emissions.

The digital transformation

Digitalisation is a key prong of Mengniu’s strategy

Big data, digitalisation and technology are usually not the first things that would come to one’s mind when talking about the traditional dairy and farming industry. But for Mengniu, digitalisation lies at the core of its corporate strategy. For many years, Mengniu has been digitalising the management of its farming, manufacturing and supply chain operations. For example in 2020, the company along with the cloud computing subsidiary of Alibaba, Aliyun, developed the Digital Milk Sources and Smart Ranches management platform to increase information sharing and connect the management of breeding, health, milk production, feeding, quality, veterinary and drugs, and dairy enterprise. Mengniu’s digital factories have also integrated manufacturing execution systems with enterprise management and laboratory information management systems to enable lean production, process automation and management transparency. CEO Lu believes that many of the inefficiency issues in the supply chain and farming processes can be solved with accurate data and digitalisation and the elimination of inefficiencies will then lead to the reduction of carbon emissions as a result.

From biosensors to blockchain, the future relies on tech

Lu said that last year Mengniu set up a company to provide biosensors to collect data on the cows’ well-being and nutritional balance. The biosensors can provide information such as the amount of milk each cow is producing and how much feed and water it is consuming every day. With this data, farmers then can accurately ration the quantity of feed and water without making extra waste and in return, receive better quality milk. “They provide a very good sensor where they can measure exactly what's the health status of the cow…those sensors collect these data and through analysis is provided to the farmers to help them see what are the areas for improvement. So, basically, the farmers get less weeds, less water use more health status of the cow and better production of milk,” Lu said. Lu said such biosensor technology has already been implemented in several farms and the results so far have been positive. Lu also said Mengniu is also exploring the possibility of incorporating blockchain technology into its business to help farmers solve cash flow problems. In China, farmers can only secure a loan using capital investment, which is the equipment and machines that they own, since farmers do not own the land. With the incorporation of blockchain, Lu said, each cow can become an individual P&L owner, which then could be used as collateral to secure loans from banks.

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Risk management, metrics and targets: Key highlights

- Mengniu has shown strong determination to excel in ESG-related issues, and we noticed that the company has been taking great efforts in embedding ESG topics into its daily operations. Regarding risk management, Mengniu has already established a thorough risk management framework in a bottom-up approach to identify, monitor and control the risks, and has already identified key risks and opportunities related to climate change.
- We note that Mengniu has taken initial steps towards a standardised disclosure for climate-change related issues, which would facilitate investors' process to capture a detailed picture about the company's progress and efforts taken. In 2021, Mengniu has also released its carbon neutrality strategies, which we see as an active response to China's goals of 2030 carbon emission peak and 2060 carbon neutrality.

3. Risk management

Follows the Committee of Sponsoring Organisations of the Tredway Commission's (COSO) risk management system

Mengniu has established a framework following the Committee of Sponsoring Organisations of the Tredway Commission's (COSO) risk management system to identify, review, monitor and report its business risk. Mengniu's Risk Management Committee is the highest deliberative body and decision-making body for the group's risk management. The Chief Executive Officer (CEO) of the group serves as the chairman of the committee, and the vice president (VP) of the group, who is responsible for risk management, serves as executive deputy chairman.

The risk management department, designated by the Committee, is responsible for management and control of important risks, as well as operational efficiency of the risk management system. It identifies and evaluates business risks over each business and functional unit on an annual basis, from the perspectives of strategies, market, finance, operations, law and compliance, quality and food safety, and sustainable development. It also reports to the Audit Committee under the board every year on a regular basis regarding the key issues over risk control and management.

Heads of each department are the person-in-charge for the department's risk management, while the risk department committee focuses on the control over the significant risks at the group level.

Uses a bottom-up approach to identify business risks

Three lines of defence

As mentioned in Mengniu's 2021 Sustainability Report, in 2021 Mengniu adopted a three lines of risk defence under the leadership of the board to identify and monitor business risks in a bottom-up approach:

- Each business division works as the "first-line defence" in identifying and responding to risks within its business scope. As mentioned in Mengniu's 2021 annual report, heads of each department are the person-in-charge for the department's risk management.
- Risk Management Committee, Risk Management Department and functional departments serve as the planners and supervisors of overall group risk management, and identify and control the top 20 risks for the company.
- International Audit Department and the Disciplined Inspection Department serve as the appraisers of risk management effectiveness

Three lines of defence

Figure 94

Mengniu's three lines of defence in its risk management organisation structure

Source: Mengniu

Identifying key persons in charge in each business department

We believe that this framework allows Mengniu to incorporate risk management into its business operations by identifying key risks from the ground level in a comprehensive manner, at the same time to control and monitor overall risk level from a group level. Besides, by clarifying the responsible divisions and identifying key persons in charge in each business department, Mengniu manages to improve efficiency in internal communication and overall risk control.

Integrate climate-related risks into overall risk management

As mentioned above, Mengniu established a comprehensive risk management structure and framework. Business divisions are the front lines of risk identification, the risk management committee and departments monitor and control the group risk under the leadership of the board.

Tone from the top on climate risk management

Mengniu's senior management introduced its Sustainability Committee, led by the group CEO, which oversees all ESG-related opportunities, risks, strategies and targets. Several working groups are set under the Sustainability Committee, which are responsible to report on working progress. The committee meets twice a year before the Bboard meeting, and the working groups under the Sustainability Committee report to the committee every six months on average.

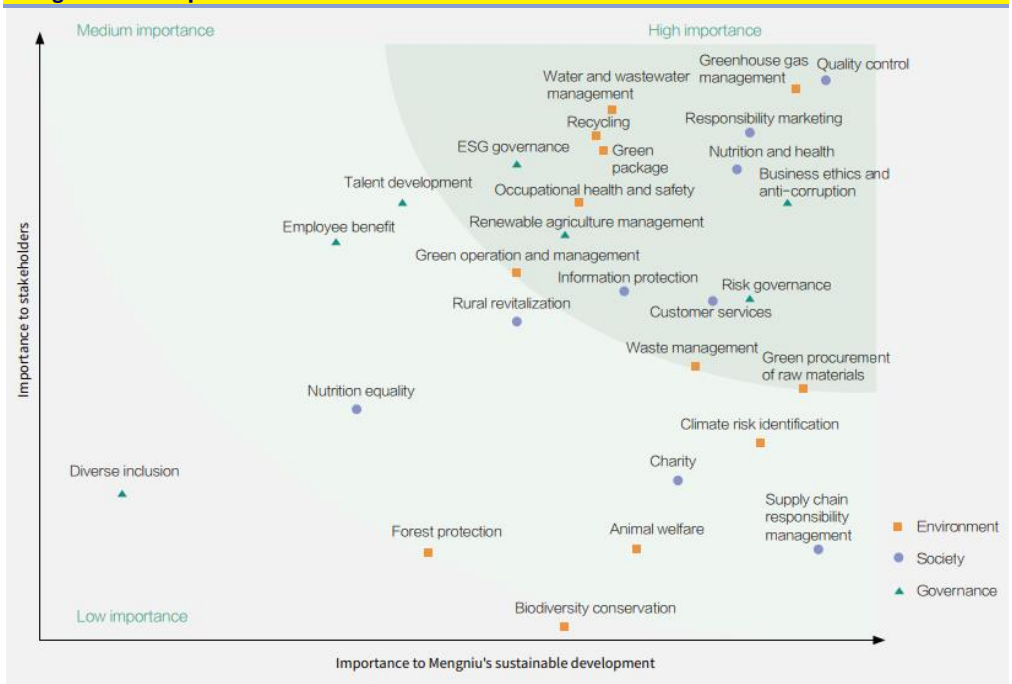
Climate risk identification has been regarded as highly important to Mengniu's sustainable development

Climate risk identification has been regarded as relatively low importance to stakeholders but high importance to Mengniu's sustainable development as shown in Mengniu's ESG Importance Matrix. As demonstrated in the 2021 Sustainability Report, Mengniu has identified key physical and transition risks arising from climate change, as well as corresponding solutions to mitigate the impact. It also identified key opportunities related to climate change in resource efficiency, energy sources, adaptability, products and services.

Risks and opportunities identified from materiality assessment

Figure 95

Mengniu's ESG importance matrix in 2021



Source: CLSA, Mengniu

Figure 96

Mengniu's climate risk identification - physical climate risks

Risk	Case	Description	Mitigation measure
Acute risks	Typhoon	Damage power & water supply facilities for production, resulting in operational suspension of some production lines and other businesses; increase construction cost of factories and ranches; cause interruption of supply chain of milk source, and production involving supply interruption, compensation and legal liability.	Formulated typhoon emergency rescue plan; heightened flood defences
	Extreme precipitation & flood	Increase flooding risks of ranches & factories in low-lying areas; cause physical impact on animals in the supply chain of milk source; affect milk production and quality; seriously damage the gas supply facilities of the enterprise	Formulated emergency rescue plans for flooding and lightning; established interconnection with the urban management information platform
	Extreme heat	Increase heat stress of animals in milk supply, lead to limited milk production, and affecting milk production and quality; increase difficulty of product preservation; increase likelihood of food contamination and foodborne illness; increase operating costs of ventilation, cooling and air conditioning; increase risks of site operators and workers to work outdoors	Formulated an emergency rescue plan for heat stroke; ensured sufficient water supply to dairies and high-quality feed; established more cowsheds and shading structures
	Extreme cold	Increase energy consumption of constant temperature environment in the factory operation; increase milk source supply for animals; increase costs related to loss and maintenance of gas supply pipeline facilities; increase risks of site operators and workers to work outdoors.	Implemented safety risk prevention and control measures for protection and supply
Chronic risks	Rising sea level	Increase the risks of write- offs and early retirement of existing assets in coastal areas with high risks; lead to the migration of some residents, investments and business activities to inland areas which would affect existing markets	Took into account the impact of rising sea level on new projects; continuously monitored the trends of rising sea levels
	Warming	Increase the risks of food safety hazards as the contamination in raw dairy during the dry period in tropical regions is higher; increase the risks of heat waves, droughts and fires	Formed comprehensive coldchain transportation; increased frequency of maintenance & inspection of transportation facilities

Source: Mengniu, CLSA

Figure 97

Mengniu's climate risk identification - transition risk of climate change

Risk	Case	Description	Mitigation measure
Risk in policies and regulations	Energy structure and energy use	National energy structure will shift to non-fossil fuel energy in the long term and the energy use will transfer to low-emissions energy; risks related to changes in policies and financial impact depending on the nature and time of changes in policies.	Adapt energy efficiency solutions, encourage more water efficiency measures and promote more sustainable usage of land and pasture.
	Carbon pricing	Charge to carbon emitters, transfer damage from emissions, namely external costs to the environment and the society, to emitters and prompt the emitters to change their business activities, thus decreasing the emission.	Transform energy usage to low emission sources while promoting the integrated energy solution simultaneously.
	Disclosure of environmental information	As the climate change reinforcing and the contemporary implementation of carbon trading, carbon tax and environmental tax, supervision organisations have higher requirements of the accuracy of environmental data reported by enterprises.	Make quality public disclose of historical data such as energy consumption and carbon emission with on an annual basis according to the rules and guidance of the regulatory authorities.
Risks in technical field	Requirements of energy technology	The government generally encourages the technology improvement and innovation on low-carbon and high efficiency economic systems, which can materially affect the organisation.	Actively use new technology; reduce carbon footprints and increase green labels of products.
Risks in market supply and demand	Changes in customer's preference	Based on government's advocacy, carbon neutral commitment, energy project and other issues, the awareness of residents, industrial customers and investors on the energy demand side has been raised, and prefer the use of clean energy. In terms of consumption/purchase, consideration related to green and environmental protection was increased.	Adapt the diversified product strategy, provide more products with "natural," "organic" and "local production" labels, and initiatively provide environmentally-friendly products that can be understood by customers.

Source: Mengniu, CLSA

Figure 98

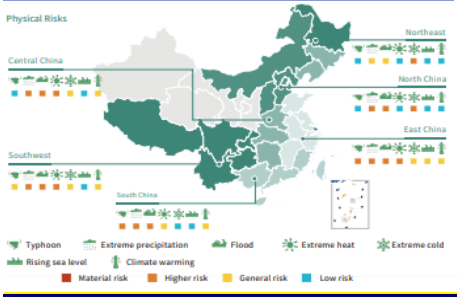
Mengniu defined opportunities related to climate

Case	Description
Resource efficiency	The energy conservation and pollution reduction, research and development of green materials, water resource management and waste management can directly save costs in the medium and long term, and curb greenhouse gases emissions and waste emissions worldwide to a certain extent.
Energy sources	Countries need to transit to low-emission and renewable resources from their main resources. Increase the use of clean energy in the dairy industry, including the research and usage of solar energy and biomass energy, to reduce the production cost rapidly in the future.
Adaptability	For the dairy industry, the considerations of future development include corresponding risk management in tackling climate change, searching for green alternatives for technology, improving production efficiency, designing new production processes, and researching new products, which can diversify the products and marketing campaigns, as well as strengthening the resilience.
Products and services	We will vigorously promote the development of green product business and continuously innovate and develop new low-carbon products, which can improve the competitive position. At the same time, it can also be efficiently adaptive to the changes in consumers' preferences. We can also develop potential carbon reduction partners while decreasing our own carbon emissions in the industrial chain to raise the industry barrier.

Source: Mengniu, CLSA

Figure 99

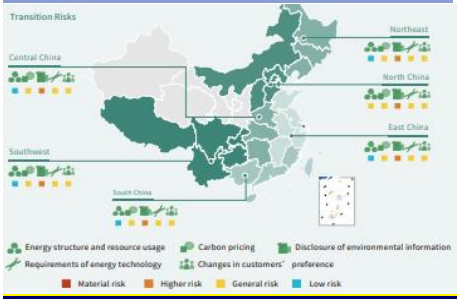
Physical risk identified across country



Source: Mengniu

Figure 100

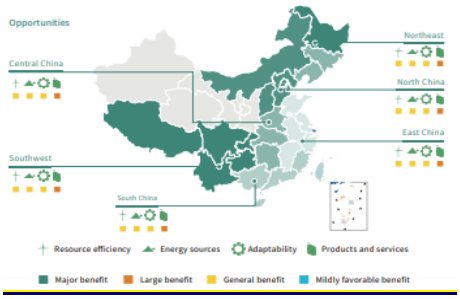
Transition risks identified across country



Source: Mengniu

Figure 101

Opportunities identified across the country



Source: Mengniu

Mitigation actions taken in response to short-term physical climate risks

We noticed that the most of the climate-related risks identified are related to raw milk production and manufacturing in the supply chain. In terms of mitigating climate-change risks (especially negative impact from extreme weather) over logistics, management mentioned that Mengniu has been gradually moving to a more diversified and stable logistics model by leveraging more on trains and boats rather than trucks for transportation. According to senior management, increasing use of train and boat transportation not only helps to mitigate negative impact from extreme weather on logistics but also gives an opportunity for the company to review and optimise its cost control.

Mengniu's journey in climate risk management

We point out that Mengniu identified climate-related risks for the first time in its 2021 Sustainability Report, which we appreciate as a critical initial step towards a comprehensive disclosure around the climate-related issues. Although no financial implication of the climate-related risks was gauged and disclosed at this stage, management showed determination in exploring the issue in the future.

What's the next step?

Overall, we see Mengniu's risk management as on track to best practices supported by a comprehensive risk management organisational structure and optimised framework, and led by senior management's strong determination to excel. We believe the key areas to improve could be the disclosure granularity, eg, quantitative disclosure about financial impacts.

Rising regulatory bar will ask for higher level of quantitative disclosure in the long term

Pressure for disclosures will increase. The Stock Exchange of Hong Kong and Hong Kong SFC required mandatory climate-related disclosures that align with the TCFD framework across relevant sectors not later than 2025. ISSB (IFRS) has launched the integrated reporting initiative using the TCFD framework; it is likely financial regulators will require companies to start reporting based on ISSB's sustainability-related Financial Information. Although HK and China will take a pragmatic approach in adoption of TCFFD and ISSB, the long-term path is still to proactively encourage large-cap companies to report the actual financial impact from climate change with information such as below:

- To what extent do the climate-related risks affect its business units and geographies under operation;
- Which operating assets are most exposed to climate-related physical risks and potentially might any assets facing impairment be written off;
- Value of assets at risk, loss avoided due to proactive measures, increase in capital expenditure as a result of more-frequent maintenance, etc.

While this information is hard to gauge and disclose, more forward-looking metrics showing financial impacts with sustainable data disclosure could be important for investors to track the company's actions and progress towards facing climate change.

Mengniu's action on upgrading climate risk disclosure so far

Mengniu's management mentioned that it is currently researching the TCFD standard this year with some disclosures expected in 2022's sustainability report. In the mid-term, the company aims to have a more comprehensive TCFD standard disclosure and framework.

4. Metrics and targets

We see Mengniu at the early stage of working towards a standardised disclosure of climate-related issues

Overall, we see Mengniu at the early stage of working towards a comprehensive and standardised disclosure of its ESG-related issues (including but not limited to climate-change-related topics), and think senior management shows strong determination to outpace domestic and foreign peers. The company has consecutively disclosed its GHG emissions and energy consumption in the past five years and has released its carbon neutrality strategies in 2021 for achieving carbon peaking in 2030 and carbon neutrality in 2050.

Metrics: revamping

We see Mengniu using several quantitative metrics to assess overall environmental impacts

Mengniu currently uses several quantitative metrics to assess overall environmental impacts, including GHG emissions (ie, Scope 1 and 2 in absolute amount and intensity), total energy used, total water withdrawal, etc. In our view, these are helpful for investors to partly understand the progress of the company's efforts; however, at the same time we are also expecting more granular disclosures, for example, by business units, to have a deeper and more-comprehensive understanding of its opportunities and risks.

Scope 1 and 2 emissions and intensity

Figure 102

Mengniu uses Scope 1 and 2 emissions and intensity to track its GHG emissions performance

	GHG emissions total (CO_2e)	Scope 1 (CO_2e)	Scope 2 (CO_2e)	GHG emission intensity (kg CO_2e/tonne)
2017	1,210,000			
2018	1,052,200			174
2019	1,169,600	260,100	909,500	168
2020	1,270,000	149,000	775,400	169
2021	1,360,000	260,000	1,100,000	171

Source: Mengniu, CLSA

Energy consumption

Figure 103

Mengniu discloses details in its energy consumption

	Solar power generation (m kWh)	Combined energy consumption (Tonnes of standard coal)	Energy use total (GJ)
2017	3.18	227,627	6,671,211
2018	2.90	259,959	8,310,844
2019	4.83	293,368	8,239,973
2020	4.66	316,061	8,441,214
2021	8.70	290,017	8,172,697

Note: Energy use total (GJ) is converted from combined energy consumption (tonnes of standard coal) by 29.307 GJ per tonne of standard coal. Source: Mengniu, CLSA

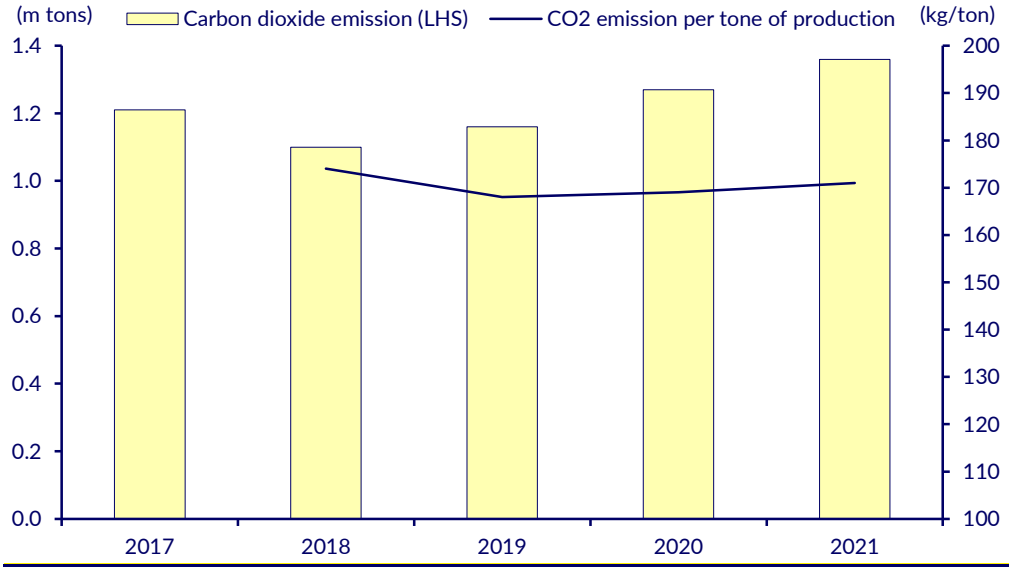
Trend analysis of emissions

Mengniu has reported its total GHG emissions since 2017. We noticed that Mengniu's total carbon emissions have been gradually increasing since 2018, driven by accelerated production volume. Its carbon emission intensity fluctuated slightly within the range of 168 kg/ton to 174 kg/ton from 2018 to 2021.

Total carbon emission

Figure 104

Mengniu's total carbon dioxide emission increased since 2018 due to accelerated production



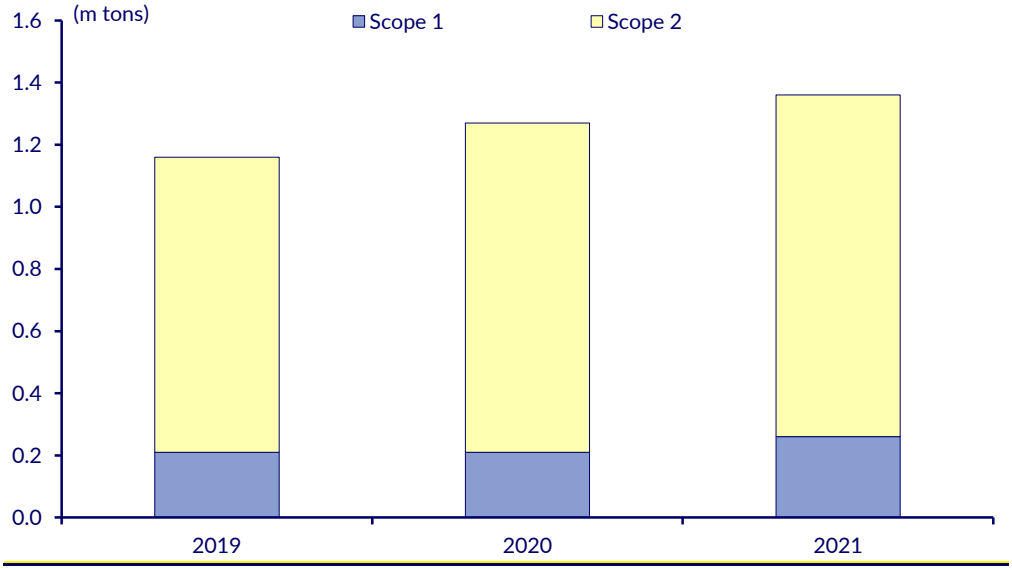
Source: Mengniu, CLSA

Total carbon dioxide emissions include Scope 1 and Scope 2 emissions, which account for around 20%/80% of total GHG emissions, respectively. Mengniu estimated 10-14m tons of Scope 3 GHG emission in 2021, which is similar in size to the combination of Scope 1 and 2 emissions.

Carbon dioxide emissions by scope

Figure 105

Mengniu's carbon dioxide emission by scope



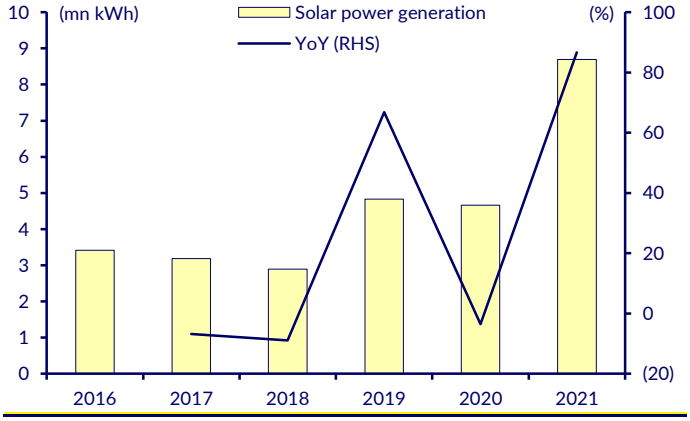
Source: Mengniu, CLSA

A transition in energy sources is happening quickly

Mengniu is gradually transitioning to low-emission and renewable energy resources; for example, solar power generation nearly doubled YoY in 2021, and coal consumption declined to zero in 2021 from c.7,503 tons in 2020.

Figure 106

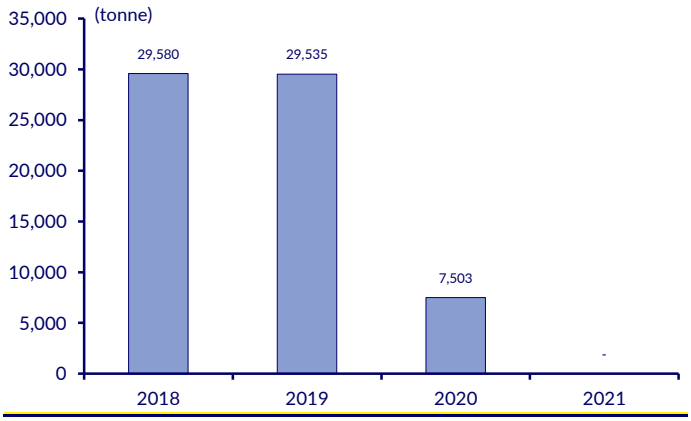
Mengniu's solar power generation nearly doubled in 2021 . . .



Source: Mengniu, CLSA

Figure 107

. . . while coal consumption declined rapidly in the past two years



Source: Mengniu, CLSA

Mengniu aims to achieve carbon peak by 2030 and carbon neutrality in 2050

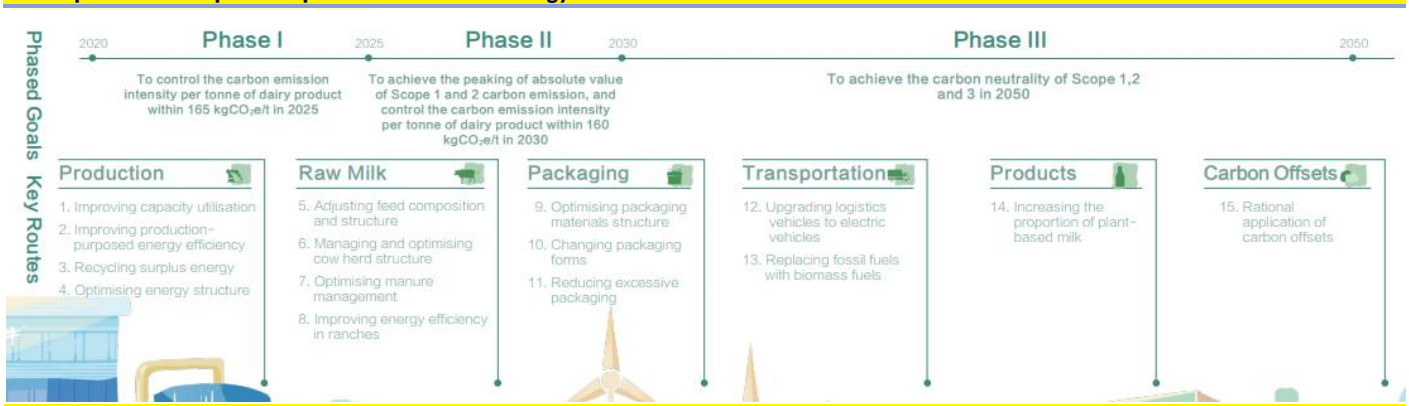
GHG targets & dual-carbon action: high commitment, patience needed

Mengniu formulated dual-carbon strategic planning with support from the Boston Consulting Group (BCG). It took a crucial initial step in 2021 by setting the strategic goal of "achieving carbon peak by 2030 and carbon neutrality by 2050." We see the target as an active response to China's carbon-neutral goal to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060. Aiming for 10 years before the national target for carbon neutrality is a showcase of Mengniu's strong commitment.

To complete this dual-carbon strategy, Mengniu designed a three-phase roadmap, with both absolute and intensity goals set at each stage.

Figure 108

Three-phase roadmap to complete dual-carbon strategy



Source: Mengniu

Mengniu disclosed scope 1 and 2 emissions with an estimation for scope 3

As disclosed in Mengniu's 2021 Sustainability Report, it aims to achieve its carbon mission goals by taking efforts in production, raw milk (ie, upstream production), packaging, transportation, products and carbon offsets.

We noticed that at this stage, Mengniu has already disclosed historical Scope 1 and 2 emission data consecutively since 2017. Mengniu has also disclosed an estimation of Scope 3 emissions, covering raw milk sourcing, packaging and auxiliary materials, upstream and downstream transportation, of around 10-14m tons in 2021 with no historical data available.

We understand the difficulties that Mengniu faces in calculating Scope 3 emission figures considering the large number of stakeholders involved in both its upstream and downstream value chain, as well as difficulties in encouraging each stakeholder to get involved. Looking ahead, we expect Mengniu to have a more accurate disclosure of Scope 3 emissions in the near-term future as the company has been taking efforts in calculating carbon footprint of the value chain, exchanging data with suppliers and inviting more suppliers to participate in the carbon ecology.

Key challenges lie in upstream participation

The key challenge, both to complete the dual-carbon strategy and to disclose emission indicators, is upstream participation. Mengniu collaborates with more than 1,000 dairy farms for raw milk supply, which may have limited understanding about the importance of ESG-related issues or have less intention to participate in the carbon emissions journey so far.

Mengniu's action to create incentives for suppliers to adopt carbon emission practices

To encourage suppliers' participation and raise their awareness, Mengniu links suppliers' interests closely with its carbon emission practices. For example, Mengniu provides free sensors to suppliers to monitor the health conditions of the animals so in return suppliers will share operational data with Mengniu. In our view, this model empowers upstream suppliers to improve operational efficiency, increase production and save costs, while at the same time enables Mengniu to collect data about emissions and waste and gauge the overall impact, which work as the foundation of analysis and strategy design in the future.

An example of suppliers' active action is at China Shengmu. With Mengniu holding c.30% of its shares, China Shengmu submitted an application to SBTi in 2021.

Mengniu has yet not disclosed GHG emission by business sectors/functions

We noticed that so far Mengniu has not disclosed details of GHG emissions and targets by business functions, which could be a direction for the company to work on to provide more-detailed disclosure of GHG emissions in the mid-to-long term future.

Science-based target setting in pipeline

Mengniu mentioned in its FY21 sustainability report that it thinks highly of the Science-Based Targets initiative (SBTi) and participated in the initiative as a phased task under its dual-carbon actions. The company is currently designing a proper schedule and scheme for participating in the SBTi.

Looking ahead, we expect Mengniu to continue its journey in improving carbon emission management (especially with its raw milk suppliers), carbon footprint calculation of the value chain, and data exchange with suppliers with an increasing number of them participating in Mengniu's emission-reduction and management ecology.

Adoption of more standardised disclosure methodology with improved granularity of the key measurements is also a watch point, while this will take an incremental, step-by-step approach.

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Shinhan Financial: Banking on the future

- First financial services firm in East Asia to commit to carbon neutrality by 2050, with interim reduction targets in place for 2030 and 2044
- A board-level ESG Strategy Committee drives climate policy and strategy in tandem with Risk Management Committee
- Potent demand from international institutional investors, particularly Europeans, has driven more robust strategy on climate
- A challenge for the lender to find climate-specific talent to sit on the board, but ESG incorporated in nomination skills matrix
- Consulting with corporate clients on ESG to mitigate knock-on effect of climate on lender's portfolio

Summary

Net zero target for internal carbon emissions by 2044, portfolio financed by 2050

It is hard not to notice Shinhan's competitiveness when reading the Group's disclosure materials. Many "firsts" jump out: the first financial company in Korea to establish an ESG Strategy Committee; the first commercial bank in the country to adopt the Equator Principles; also the first financial services firm in East Asia to have openly committed to carbon neutrality by 2050. There is no doubt that it has been an early mover. Its narrative on achieving this is quite holistic, classifying its ESG progression into three phases: initially being "passive" between 2005 and 2013, then "active" from 2014 to 2019 and finally "proactive" from 2020 to the present day. In its passive years, it released a CSR report, and in its active years it started to recognise the importance of ESG management, establishing a CSR Committee, which later became the ESG Strategy Committee as it is known today. Being more proactive, in 2020, the Group declared its Zero Carbon Drive, setting a goal to achieve net zero for internal carbon emissions by 2044 and net zero in the Group's asset portfolio's financed emissions by 2050. Shinhan management recognises of the financial implications and impact that climate change risks may bring and the focus is now on carrying out preventive measures to mitigate.

Background

The company is one of Korea's big five financial groups

Shinhan began its life as Shinhan Bank, which was founded in 1982 with capital from Korean residents in Japan. It was a small bank with 279 employees and three branches. Over the years, Shinhan has expanded and consolidated its range of businesses, providing financial solutions in the areas of corporate, private, investment and retail banking as well as asset management, brokerage and insurance. Today Shinhan is one of Korea's Big Five financial groups, along with KB Financial Group, NH Financial Group, Hana Financial Group and Woori Financial Group, with total assets of over KRW648.2trn (consolidated) and a market capitalisation of KRW19.01trn.

Ownership and operations

Pension fund and institutional investors are top three shareholders

Shinhan's top three shareholders are Korea's domestic public pension fund and largest investor, the National Pension Services (8.78%), BlackRock Fund Advisors (5.63%) and SFG Employee Stock Ownership Association (4.93%). Other major shareholders of Shinhan include global financial and investment institutions as well as foreign central banks and sovereign wealth funds.

Figure 109

Shinhan Financial Group major shareholders

Name of shareholder	Ownership (%)
National Pension Service	8.78
BlackRock Fund Advisors	5.63
SFG Employee Stock Ownership Association	4.93
Centennial Investment Limited	3.96
BNP Paribas SA	3.62
Supreme, L.P.	3.62
Citibank, N.A.	3.04
Norges Bank	2.02
The Government of Singapore	1.83
Vanguard Total International Stock Index	1.24
Peoples Bank of China	1.07

Source: Shinhan Annual Report 2021

Shinhan provides a full range of financial services through its subsidiaries, including banking, insurance, credit and leasing, investment and asset management, credit management, and digital and infrastructure:

Banking**: Shinhan Bank**, **Jeju Bank** and **Shinhan Savings Bank** are the three major banking subsidiaries under Shinhan, providing both traditional commercial and personal banking services as well as microfinancing.

Credit & Leasing: **Shinhan Card** is one of the top global credit card companies, serving customers throughout South Korea. Shinhan Card provides both personal and corporate credit cards as well as other financing activities, such as corporate lending, asset management and insurance services.

Insurance: **Shinhan Life** became the major life insurance arm of Shinhan after its merger with Shinhan's two subsidiaries, Shinhan Life and Orange Life, in 2021. The company provides a full line of life insurance products, including education, medical, saving and retirement.

Investment & Asset Management: Shinhan has five major investment and asset management arms: **Shinhan Asset Management**, which is one of the largest asset management companies in Korea, with assets under management of US$55.6bn (as of 2020); **Shinhan Investment**, providing services such as wealth management, financial asset management, proprietary trading services and stock trading transactions; **Shinhan Venture Investment**, an alternative investment management firm that focuses on earlier-stage and later-stage investments, and **Shinhan Asset Trust** and **Shinhan REITs Management** operating in the real estate investment trust business.

Credit Management: **Shinhan Credit Information** was established in 2002 as a subsidiary with a primary business in credit investigation and debt collection. The company was founded with an aim to centrally manage all the bad credits of Shinhan.

Digital & Infrastructure: **Shinhan DS** has positioned itself as specialized IT service provider within Shinhan while **Shinhan AITAS** provides general fund-related administrative services. **Shinhan AI** was established in 2019 as Korea's first investment consulting company using artificial intelligence capabilities.

Scope 2 accounts for most of the company's emissions

Main sources of emissions

Based on Scope 1, 2 and 3 GHG emissions data on Shinhan, Shinhan Bank, Shinhan Card, Shinhan Investment, Shinhan Life, Shinhan Asset Management, Shinhan Capital and Jeju Bank, Scope 2 accounts for the largest componenet of Shinhan's GHG emissions, which have been on an upward trend since FY19. Scope 1 is defined as the use of fuel for heating (stationary combustion) and fuel for vehicles (mobile combustion) of headquarters and branches; Scope 2 is indirect emissions that are generated to create electricity and steam that are purchased by headquarters and branches; and Scope 3 is external emissions caused by logistics, business trips, supply chain and product use.

Here are Shinhan's emissions in full

Figure 110

Shinhan GHG Inventory (tCO_2e), FY2019 to FY2021

	FY19	FY20	FY21
Total Scope 1&2	**90,195**	**98,789.2**	**96,610.4**
Scope 1	14,086.5	15,951.4	15,087.6
Scope 2	76,108.4	82,837.9	81,522.7
Scope 3	20,891.7	21,017.2	18,788.7

Source: Shinhan (Sustainability Report 2021)

Sustainability reporting is still entirely voluntary in Korea

Sustainability reporting standards

Currently, sustainability reporting is still on a voluntary basis in Korea. Although the Financial Services Commission unveiled a policy to require ESG reporting by listed companies in phases, this requirement will not take effect until at least 2025 for companies with KRW2trn in assets or more. It will take until 2030 for the rule to be applied to all listed companies on the Kospi. Meanwhile, the Korea Exchange, the Korea Accounting Institute and other bodies have been working to introduce a localised version of ISSB's ESG reporting standards.

Shinhan has taken a proactive approach on climate reporting

Voluntary climate reporting initiatives

Shinhan has been proactive with its sustainability reporting. The company released its first Social Responsibility Report as early as 2005 and has been doing so on an annual basis. Starting in 2020, Shinhan replaced the Social Responsibility Report with the current ESG Report. On top of compliance with TCFD and CDP, Shinhan has also joined a number of sustainability and climate change initiatives, including Net-Zero Asset Management Initiative, Net-Zero Insurance Alliance, Partnership for Carbon Accounting Financials, Equator Principles, Science-Based Targets Initiative, the UNEP FI Leadership Council and is a founding signatory of the Net-Zero Banking Alliance.

These are the goals and commitments it has made

Figure 111

Shinhan climate reporting, commitments and goals

Initiative	Status
Follows the TCFD disclosure framework	✓ since 2018
Annual sustainability report	✓ since 2005
Reports under the Carbon Disclosure Project (CDP)	✓ since 2007
Plan to achieve net zero by 2050	In progress
Interim GHG reduction targets by 2030	In progress
Aligns reporting with Global Reporting Initiative (GRI)	✓
Climate change strategy	✓ since 2020

Source: Shinhan

1. Governance

Board-level ESG and risk committees set the tone on climate change response

Shinhan prides itself on being the first financial group in Korea to have built a comprehensive climate change governance system that involves four levels of the group. At the top, there is a sub-committee of the board known as the ESG Strategy Committee (ESC) with a mandate to oversee all major decision-making related to ESG and climate change strategies. The Risk Management Committee meanwhile identifies, measures, monitors and controls risks, and in particular, increasing climate risks. Together they set the direction and tone of climate change responses, making group-wide decisions on its transition to a low-carbon economy. According to Shinhan's ESG report in 2021, the ESC makes a report to the board four to six times a year. Its 2021 TCFD report said four ESC meetings were held in 2021.

Shinhan shifted from CSR to ESG narrative in 2015

The ESC is a revamped version of the Corporate Social Responsibility Committee, which was initially set up in 2015 during Shinhan's "active" (or as it also describes it, "ESG 2.0") phase, when it entered a stage of its ESG evolution where it says it recognized the importance of ESG management and its increased responsibility to the environment and society. Shinhan's "passive" (or ESG 1.0) phase, which predated this (circa 2005 to 2013) was more focused on generic CSR. The ESC is chaired by an independent director, Sukeun Kwak, and has three other members: executive director and CEO Yongbyung Cho and independent directors Joseol Kim, Yangho Byeon and Jaewon Yoon.

A CEO-level committee coordinates climate efforts

Beneath this board-level committee sits an ESG Implementation Committee, set up in 2021 to coordinate climate change policy efforts across the group as a whole. It consists of CEOs from all the group's subsidiaries and meets on a monthly basis. The third layer of the ESG governance system consists of the Group ESG CSSO (Chief Strategy and Sustainability Officer) Council and beneath it sits the Group ESG Working Group Council. The latter two both produce a regular monthly report, according to Shinhan's 2021 ESG report.

Climate response is clearly split into risk and opportunity

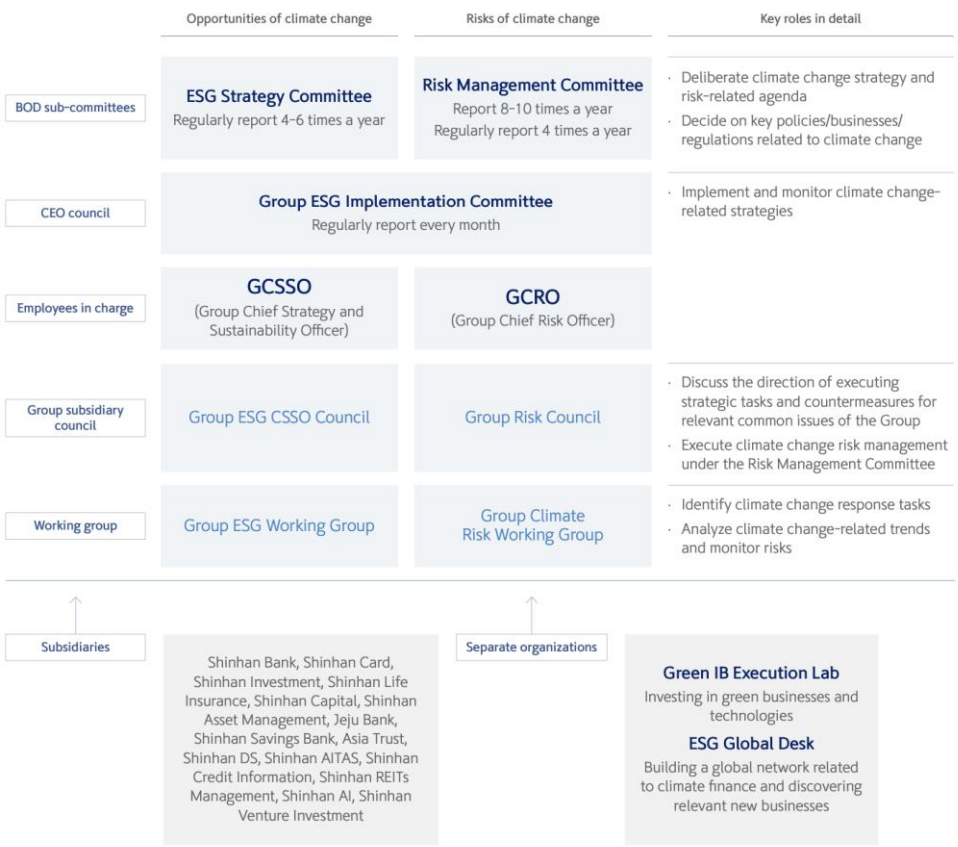
This is how Shinhan organizes its ESG and risk structures

Shinhan splits its response to climate change into two streams: opportunities of climate change and the risks. Thus its governance structure for ESG by and large operates in tandem with risk committees. For example, the ESC and Risk Management Committee are put on equal footing when it comes to reporting up to the board (the latter reports more regularly, around eight to 10 times annually, according to Shinhan's 2021 TCFD report). The Implementation Committee straddles both ESG and risk, while the next two levels again split into ESG and risk. As structures go, it is evidently well-organised, if not a bit cumbersome to follow at times:

These are details of the work considered by the committees during 2021

Figure 112

Shinhan's ESG organisation



Source: ACGA

Shinhan's TCFD report for 2021 provides refreshingly granular detail on the roles and issues considered by the various committees during the year (for example, major reported and decided matters of the ESC included reporting on an ESG dashboard, progress with implementing SBTi-approved-projects and results of measuring carbon emissions of its financial assets for 2020) based on Partnership for Carbon Accounting Financials (PCAF) criteria. Meanwhile, the Risk Management Committee, for example, reported on results of monitoring significant area exposure and financed emissions.

Pressure points

Global institutional investors sought a meaningful climate response

A major catalyst for Shinhan to organise itself along these lines to respond to climate goes beyond an obvious competitive streak. Mr. Jung Hoon Cho, head of Shinhan's ESG division, cites a "strong organisational culture" at the firm but also external demand for the company to respond to ESG issues since 2018, both from investors and in tandem with government policy. International investors played a large role in this: "International investors, especially those based in Europe, have been vocalizing ESG matters," Cho noted. Domestic investors played a role, although at a later stage. It is notable that international investors account for close to 65% of its shareholding.

Professors in abundance

Academics are in abundance on the board and climate decision-making committee

Shinhan, like many Korean companies, draws several of its independent directors from the world of academia. The chair of the ESC is Kwak Su Keun, who taught at Seoul National University for 30 years before he retired in 2018 (he remains an honourary professor there). Kwak also serves as the chair of the Advisory Committee of the Korea Listed Companies Association and is also a member of the Trustees of the IFRS Foundation (term expiring on 31 December 2022). CEO Cho Yong-byoung is also a member of the ESC and has degrees in law and economics, with an established career in finance (he joined Shinhan Bank in 1984). Two of the other independent directors who sit on the ESC are from academia: Kim Jo Seol teaches economics and the Osaka University of Commerce and Yoon Jaewon is a professor at the College of Business Administration at Hongik University. Byeon Yang-ho is the only independent director (also sitting on the ESC) with a business background, currently working as an advisor at VIG Partners and founder of Vogo Fund, the first private equity fund in Korea.

No obvious climate expertise on these committees

The Risk Management Committee has a more diverse array of backgrounds, from investment banking and economics to technology and law. Specific climate expertise is lacking on both committees, although management views each members' sphere of knowledge as advantageous in identifying risks and helping Shinhan report on its sustainability efforts. The company says it also invites external experts to run training courses (three- to four-hour sessions) on risk developments and ESG matters.

Will board hire with a climate agenda?

The board nomination process includes ESG as a selection criteria

Given this gap in climate expertise, management was asked whether climate and sustainability expertise will be a requirement when recommending new directors to the board. Shinhan replied that it employs an extensive process for board hires, with a long list of criteria. Shinhan has developed a board skill matrix for recruiting independent directors. In recent years, ESG has also been included as one of the selection criteria. "I think once the ESG strategy committee started to form, it was around that time that ESG [became] one of the criteria for the selection process," Cheolwoo Park, head of investor relations said, adding that while ESG is an important qualification, there are seven to eight other categories it considers during the recruitment process. The Independent Director and Audit Committee Member Recommendation Committee, the main responsible body for managing the independent director candidate pool, keeps a long list of potential candidates and updates the list on a quarterly basis. Once the actual recruitment process actually takes place, the Committee holds more frequent meetings to come up with a short list of candidates. Candidates also would need to go through a third-party compliance and reputation screening before they can be put on the agenda for shareholder approval at general meetings.

There is not a wide pool of candidates with climate expertise

Finding candidates with climate experience is a challenge, the company admitted, pointing to Shinhan's strict internal compliance policy in addition to NPS' restriction on allowing outside directors from taking another director position. This has limited the pool of potential candidates, making the recruitment process even more challenging than it already is. "I would say the difficulties to select our right candidate, particularly on the E side, in science, environmental or climate science, is very difficult at the moment because (the pool is) a bit too small,'' Group ESG Division Head Mr. Jung Hoon Cho said, describing the legwork on the E side as "our homework.'' Another pressing issue for Shinhan is to increase gender diversity on its board, which currently runs at 14% with just two female independent directors. Shinhan has set the goal to maintain a minimum 20% of female candidates in its long list of the candidate pool.

2. Strategy

Shinhan has mapped out its historical migration toward ESG issues

In 2020, Shinhan established an ESG strategy framework for the group. As mentioned in the section on governance, the company has charted its evolution on ESG over the years: initially, it was in a passive phase (ESG 1.0) between 2005 and 2013, when corporate social responsibility was the theme of the day. By 2014, Shinhan was in an active phase (ESG 2.0), establishing a CSR strategy, setting up a CSR committee and by 2019, establishing principles for climate change response of the group. By 2020, Shinhan had entered a proactive phase (ESG 3.0), when it sought to internalise ESG into its corporate culture and use it for evaluation.

It uses slogans to describe its strategy on ESG

Today its ESG strategy framework is guided under three strategic slogans, Green - "Do the Green Thing," Win-win - "Do the Brave Thing," and Trusted - "Do the Fair Thing." The framework includes five impact tasks and 10 strategic KPIs in total, which lead to one goal for each strategic direction. The three main strategic goals are cutting down carbon emissions to zero, nurturing 10 unicorns by fostering innovation and ensuring all stakeholders of the Group are 100% satisfied.

Net zero target for internal carbon emissions by 2044, portfolio emissions by 2050

Specifically for responding to climate change, Shinhan has set targets of 'Zero Carbon Drive' by using SBTi. The company has set a goal to achieve net zero for internal carbon emissions by 2044 and net zero in the Group asset portfolio's financed emissions by 2050. The Group is also targeting to achieve green financing at KRW30trn by 2030.

Interim targets to achieve net zero have also been set

The Group has established interim targets to reduce internal carbon emissions by 42% by 2030, 84% by 2040 and 100% by 2044. In terms of the asset portfolio, Shinhan seeks to reduce its aggregate emissions by 33.7% by 2030, 69.6% by 2040, and 100% by 2050. In 2021, Shinhan developed a financed emission measurement system to establish reduction goals by year and industry through 2050. This measurement system categorises Shinhan's loan and investment assets into six asset groups and collects relevant GHG emissions data as a way to determine and monitor finessed emissions.

The risk factor

Risk plays a pivotal role in climate considerations

Shinhan's decision to heavily involve the risk management committee in its ESG development reflects a view that actively measuring and monitoring risks is a critical part of combatting climate change. The group's Chief Risk Officer Dong Kwon Bang said the Risk Management Committee has established both short- and long-term goals. In the short term, the RMC is focusing on monitoring, analysing, and assessing climate-related risks that may have an impact on the overall group and establishing a management system to monitor climate-related risks. In the long term, the RMC will set credit limits for climate-related risks within the group's portfolio and also incorporate climate-related risks into the Group's capital management. According to management, Shinhan's climate risk management process is built on two fundamental factors: that climate-related risks will only get worse over time; and that transition and physical risks will have an inverse relationship since failure to respond to physical risks will lead to an increase in acute and chronic risks.

Physical and transition risks are identified

In its 2021 TCFD report, Shinhan has identified the potential financial impact of financial and transition risks: on the transition side, there is policy and legal risk (increased GHG emission rights prices and strengthened environmental disclosure obligations; as well as other potential related lawsuits), technology risk (investment into low-carbon technologies for transition), market risk (changing consumer behaviours and increased raw material prices) and reputation risk (changed consumer

and investor preferences and negative feedback from stakeholders.) On the physical side, it cites acute risk (short- to mid-term) in the form of increased frequency and intensity of extreme weather, and in the mid- to long-term, chronic physical risk (extreme volatility of weather, rise in sea levels and temperatures.) It cites examples such as a reduction in productivity and operating profit from the suspension of business sites, or the collapse of the supply chain and deteriorating worker health. It also factors in the increase in insurance premiums for high-risk asset groups and indeed, the possibility of reduced insurance availability. Shinhan defines short-term as one to two years, mid-term as three to five years and long-term as more than 10 years.

First scenario analysis took place in 2021

Shinhan has performed scenario analysis to identify the impact of climate change on its portfolio of assets. In its 2021 TCFD report, it noted that it did so for the first time in 2021 by using a top-down method which uses the Bank of Korea's analysis results based on Shinhan Bank's loan assets. It also adopted a bottom-up method using an external model. The company says it plans to make its scenario methodology more detailed. For transition risk, Shinhan has used the analysis results on the probability of defaults of high-, mid- and low-emitting industries and reflected them in Shinhan's portfolio to analyse its BIS ratio impact. The BIS ratio decreased 1.47% in case of the 2°C scenario based on 2050 and 2.30% in the 1.5°C scenario. Shinhan has also carried out an analysis of the potential financial impact on the group due to operating losses caused by climate change. The analysis is based on the annual average number of days of heavy rainfall and annual operating income. Shinhan estimated an income loss of approximately KRW440m should its business operation be suspended for 4.9 days due to heavy rainfall and around KRW660m if the period of suspension is increased to 7.3 days.

Getting customers, big and small, on the same page

Shinhan is at the mercy of its corporate clients

While Shinhan is committing to its net-zero targets, it recognises that it cannot do this alone. Its success very much depends on the performance of its corporate clients. "Our short-term target is to have to make that social understanding or an agreement on the climate-related goals. Right now, we have a commitment to climate-related issues, but it's not sufficient only for financial institutions to have this commitment to work [on] climate-related risks. We need to have that same similar level of commitment coming from our corporate clients," Bang said. In the long term, Shinhan believes that climate-related risks will result in a substantial impact on its capital management. As environmental regulation continues to tighten over time, the lack of commitment from corporate clients will eventually create a domino effect that will lead to an increase in loan loss provisions. "I think provisions will be an obvious outcome of the whole situation," Bang said. "If you look at it this way, if our corporate clients do not prepare themselves for these climate-related risks, they will have bigger transition risks, and bigger transition risks will translate into bigger costs for these corporate clients. Bigger costs for these corporate clients will mean that their corporate credit ratings will go down in the longer term. And then, because their credit ratings went down, banks will have to put more provisions for the loans that they have made or investments we have made to these corporate clients. So bigger provisioning coming from these risks will be an inevitable or will be an obvious outcome."

The company is engaging with clients to mitigate future loss provisions

To help prevent this outcome, Shinhan has been actively engaging with its corporate clients via individual consultations to prepare them for the risks. Investor relations' Park explained that while most large corporations share a similar sense of urgency on climate risks, it has been difficult to receive the same level of responsiveness from SMEs. "I think the large corporates are well aware of these targets. So they will be receptive to these changes. And, of course, often, they are the largest emitters of

carbon as well. However, they are very responsive, but the SMEs and the small merchants don't have the resources, the systems, or even the knowledge about climate change matters." In response to this challenge, Shinhan has created a dedicated ESG consulting team and a reward system to provide ESG support for clients, especially SMEs, who face difficulties with ESG transition. The ESG consulting team aims to raise ESG awareness through interviews and presentations to top management at its target client companies, work with ESG evaluation agencies to assess the client companies' ESG progress as well as help the companies establish ESG management goals and strategy. "These teams, a lot of their roles is engaging with SME clients, who don't have much of an awareness of these climate change matters. SMEs and small merchants still need to be trained and educated," Park said.

Lending to carbon-heavy entities

Shinhan is trying to turn a risk into an opportunity via green finance

As indicated in its 2021 ESG report, Shinhan is seeking to "change risk factors that may arise from fossil fuel-based power generation businesses to opportunity factors by increasing renewable energy-centred green finance investments." Between 2019 and 2021, Shinhan's fossil fuel exposure compared to total loan amounts within the Group lingered at a similar level. The company recorded a ratio of fossil fuel exposure compared to total loan amounts of 1.65% for 2019, then a slight increase to 1.71% in 2020 and then a decrease to 1.4% for 2021. While the absolute amount for fossil fuel exposure in 2021 (KRW5,224.2bn) is slightly higher than that in 2019 (KRW5,069.2bn), the group's total loan amount also increased, making the overall percentage of fossil fuel exposure lower in 2021.

Figure 113

Fossil fuel exposure is showing a decrease as a ratio of total loans

Fossil fuel exposure (KRWbn)

	2019	2020	2021
Fossil fuel exposure	5069.20	5,812.20	5,224.20
Ratio of fossil fuel exposure compared to total loan amounts within the Group (%)	1.65	1.71	1.40
Total loan amount	306,978.30	339,048.10	373,655

Source: Shinhan ESG Report 2021

Pledges are made to phase out coal

In 2021, both Shinhan Bank and Jeju Bank also made the pledge to phase out coal. Instead of financing coal projects, Shinhan dedicated KRW30trn from 2020 through 2030 to green financing. From 2020 to 2021, the company recorded a cumulative green financing performance of KRW5.37trn. For 2021 alone, green loans amounted to KRW284.6bn, green PF to KRW767.8bn, and green investment to KRW1,641.2bn. In 2021, Shinhan launched an ESG rating system that rates the credentials of companies in this respect: a "positive screening" strategy favours firms with a solid rating. In April the same year, it launched a loan program for companies with good ESG performance with an annual interest rate below that for general loans.

Silver linings

The company is engaging with clients to mitigate future loss provisions

Opportunities identified by Shinhan relating to climate include resource efficiency, greater use of low-carbon energy sources (and the use of government support policies) and the development of low-emission products and services: indeed, it cites the prospect of an increase in profits based on demand for the latter if they are able to capitalise on changing consumer preferences. The company says it has been exploring green finance on its own initiative. In 2022 it launched the Green IB Execution Lab within the investment banking division, which invests in green economy companies, initially domestic firms. The company has also been actively investing in building renewable energy plants in Japan, Vietnam and Turkey, as well as in Korea (but primarily Japan).

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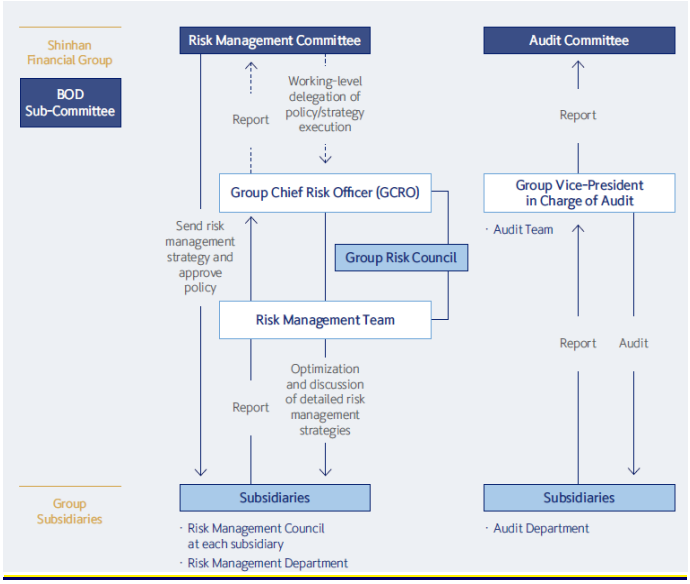
Risk management, metrics and targets: key highlights

- Shinhan Financial Group (Shinhan) has been emphasising social responsibility since 2005 and starting in 2014, Shinhan increased its responsibility towards the environment and society through establishing a CSR committee, outlining its ECO Transformation 20-20 plan and becoming a TCFD supporter.
- In accordance with its 'zero carbon drive,' which supports a low-carbon transition of industrial processes, land use, building, transportation and other infrastructure to meet the goals of the Paris Agreement, Shinhan set a goal for green financing at KRW30tn by 2030, which has reached KRW5.37tn as of 2021 on a cumulative basis.
- Shinhan has been one of the leaders among Korean financials on ESG, setting various goals and targets specifically on environmental aspects, including net-zero for the Shinhan Financial Group's internal carbon emissions by 2044, achieving net zero of financed emissions by 2050 and changing their vehicles to 100% pollution-free vehicles by 2030.
- Although Shinhan's ESG disclosure explains the broader goals for its overall business, one area of improvement could be to disclose details in how identified risks and efforts are tied to actual financial impacts in a summary to have an overall view and impact on the group.

3. Risk management

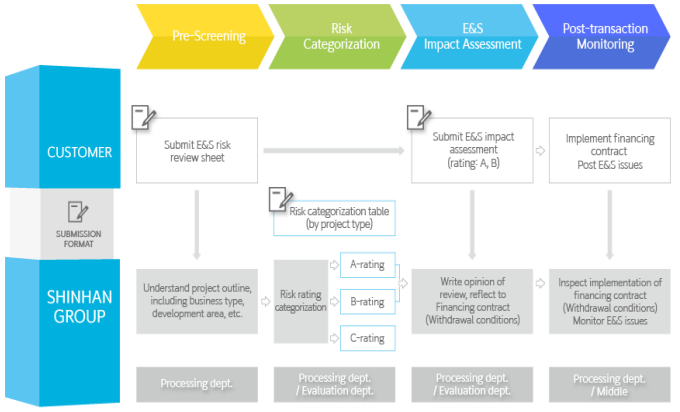
Under its risk management framework, the Risk Management Committee, which consists of independent directors, establishes the risk management guidelines and policies that the group must follow. Meanwhile, the Group Risk Council, which consists of Chief Risk Officers of each subsidiary, follows the guidelines and conducts thorough monitoring.

Figure 114
Shinhan's enterprise risk management framework



Source: Shinhan

Figure 115
Shinhan's environmental & social risk review process



Source: Shinhan

Shinhan's environmental & social risk review process consists of four main stages. During the pre-screening stage, the company reviews whether the risk can fall under the group's risk management policies. During the risk categorisation stage, Shinhan categorizes the risk into A, B and C ratings, according to its environmental and social impact. During the environmental & social impact assessment stage, Shinhan submits the final E&S impact assessment, and during the post-transaction monitoring stage, the company monitors whether the measures to minimise the E&S impact are being implemented correctly.

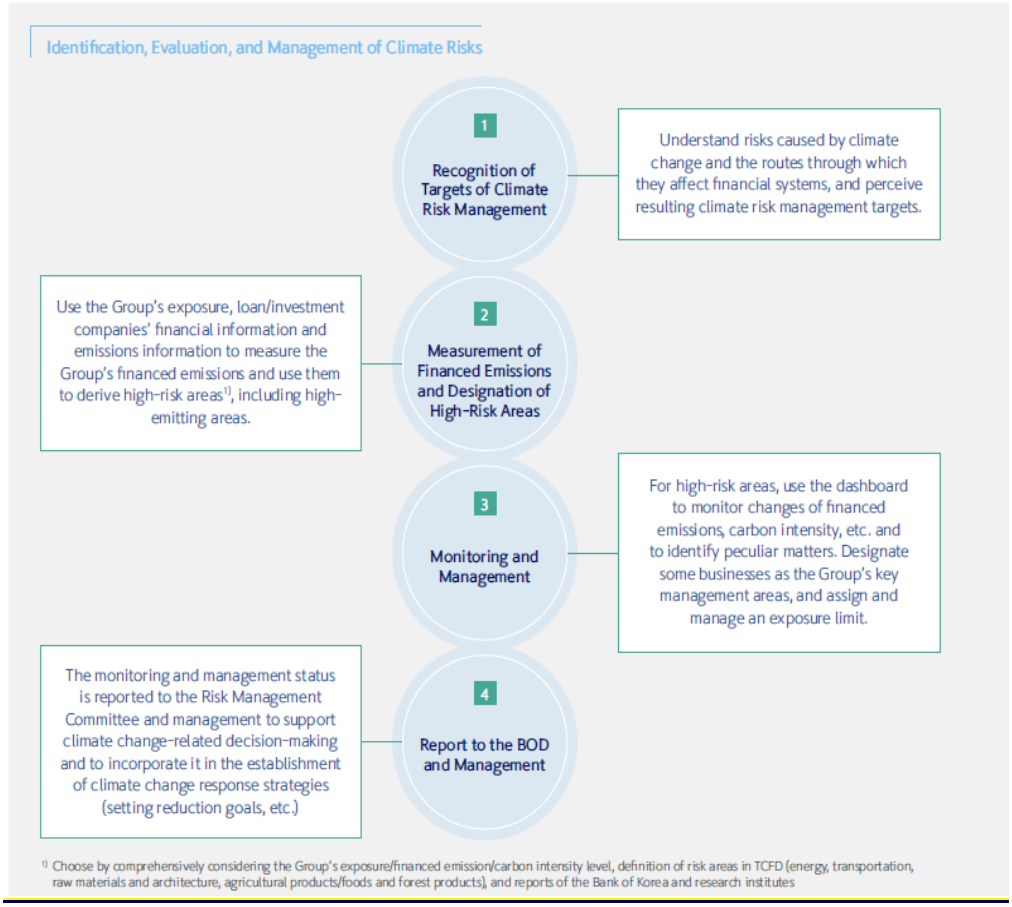
Climate-related risks assessment with reference to financed emissions

Climate-related risks are systematically assessed within the existing risk management process and also by referring to the financed emissions measurement system.

Figure 116

Four steps of climate-related risk management

Shinhan's climate risk management process



Source: Shinhan

Assessment of material environmental risks provides a foundation for TCFD disclosures

Materiality matrix provides the foundation for a solid risk identification

Every year, Shinhan Financial Group conducts a materiality assessment to identify the key ESG issues and categorise the financial/environmental/social impact on each stakeholder. Its key ESG issues include climate change governance, integrated management system, sound governance and ethical management. It applies the double materiality concept, which refers to the need to consider both impact materiality and financial materiality.

Figure 117

Shinhan materiality assessment

Classification		Level of Impact		Stakeholders				
		Environmental & Social	Financial	Employees	Customers	Shareholders & Investors	Partner Companies	Local Communities
1	Establish climate change governance and risk management system	●	●	●	●	●	○	○
2	Preemptively upgrade environmental management strategies, policies, systems, and disclosures	●	●	●	●	○	○	●
	Increase eco-friendly investments and develop products/services	○	○	○	●	●	●	●
	Improve energy efficiency and expand renewable energy	●	○	○	○	○	●	●
	Manage greenhouse gas emissions and take actions to reduce them	●	○	○	○	●	●	●
3	Protect stakeholders' human rights	○	●	○	○	○	○	○
4	Expand female leadership	○	●	○	○	○	○	○
	Build a horizontal, discrimination-free corporate culture	○	○	●	○	○	○	○
5	Protect customer information and strengthen cyber security	○	●	●	●	●	●	○
	Increase financial support for the low-income class and socially vulnerable	●	○	○	○	○	●	○
	Develop employee capabilities	●	○	○	○	○	○	○
	Fair performance evaluation and compensation	○	○	●	○	○	○	○
	Strengthen employee health management	○	○	○	○	○	○	○
6	Compliance and ethical management	●	●	●	○	○	○	●
	Strengthen integrated management of financial and non-financial risks	○	●	○	●	○	○	●
7	Establish an integrated ESG management system	●	●	○	○	●	○	●
8	Transparent disclosure of management activities and outcomes	○	●	●	●	●	○	●
9	Establish sound governance	●	●	●	○	●	○	○
	Develop financial products that are based on market and customer demand	○	○	●	●	○	●	○
	Increase digital platform accessibility and convenience	○	●	●	●	●	○	○

■ Core issue

● High Impact ● Medium Impact ● Low Impact

Source: Shinhan

Climate-related risks are identified as key emerging risks

Integration of climate-related risks into overall risk management

Financial institutions are exposed to financial impacts from a broad range of climate risks compared to other industries, as they give and receive financial impact to all industries. Shinhan categorises each climate risk based on the transition and physical climate risk classification system under the TCFD recommendations. After categorising the risks, Shinhan establishes reponse strategies by considering the possibilility and financial impact of each risk.

Clear categorisation of climate-related risks

Figure 118

Overview of Shnhan's climate-related risks

Risk type		Financial risk			Non-financial risk			
		Credit	Market	Reputation	Regulatory	Technology	Legal	Physical
Transition risk	Policy and Legal	●	●		●		●	
	Technology	●			●	●		
	Market	●	●			●		
	Reputation	●		●	●		●	
Physical risk	Acute	●			●			●
	Chronic	●			●			●

Source: Shinhan

Figure 119

Shinhan – Estimated financial implications of climate-related risks

Classification	Climate-related risk	Potential financial impact
Policy and legal risk	Increased GHG emissions rights prices, strengthened environmental disclosure obligations, environment-related lawsuits, etc.	❑ Increase in operation costs (Ex: rise in compliance costs, rise in insurance premiums) ❑ Depreciation due to policy changes ❑ Asset damage and early disposal of existing assets ❑ Increase in costs owing to fines and rulings or reduction in product and service demand
Technology risk	Transition to eco-friendly and low-carbon technologies, increased technology investments to improve energy efficiency and reduce emissions, failed new technology investments, etc.	❑ Depreciation and early disposal of existing assets ❑ Reduction in product and service demand ❑ New technology and alternative technology R&D costs ❑ Capital investment for technology development ❑ Costs incurred from adopting/distributing new practices and processes
Market risk	Changed consumer behaviour, increased raw material prices, change in supply and demand of products and services, market uncertainty, etc	❑ Reduction in demand for goods and services from changes in consumer preferences ❑ Increase in production costs owing to raised raw material prices and waste treatment cost changes ❑ Sudden, unexpected changes in energy costs ❑ Reduction in sales owing to sales performance changes ❑ Decrease in value owing to asset re-evaluation (Ex: amount of fossil fuel reserves, land value, stock value evaluation)
Reputation risk	Changed consumer and investor preferences or negative stakeholder feedback, business stigma, etc.	❑ Decrease in profits resulting from reduced product/service demand ❑ Decrease in profits owing to reduced production capacity (Ex. Delay in plan approval, suspension of the supply chain) ❑ Decrease in profits owing to negative impact on human resource management and plan (Ex: attracting and retaining employees) ❑ Reduction in capital availability
Acute physical risk	Increased frequency and intensity of extreme abnormal weather, including typhoon, flood, and forest fire	❑ Reduction in productivity and operating profit from suspension of business sites, collapse of the supply chain, deteriorated worker health, etc.
Chronic physical risk	Change in precipitation patterns and extreme volatility of weather patterns, rise in average temperatures, rise in sea levels, and other long-term change	❑ Increase in operation costs and capital costs owing to facility damage, early disposal of existing assets, etc. ❑ Increase in insurance premiums for high-risk asset groups and possibility of reduced insurance availability

Source: Shinhan 2021 TCFD report

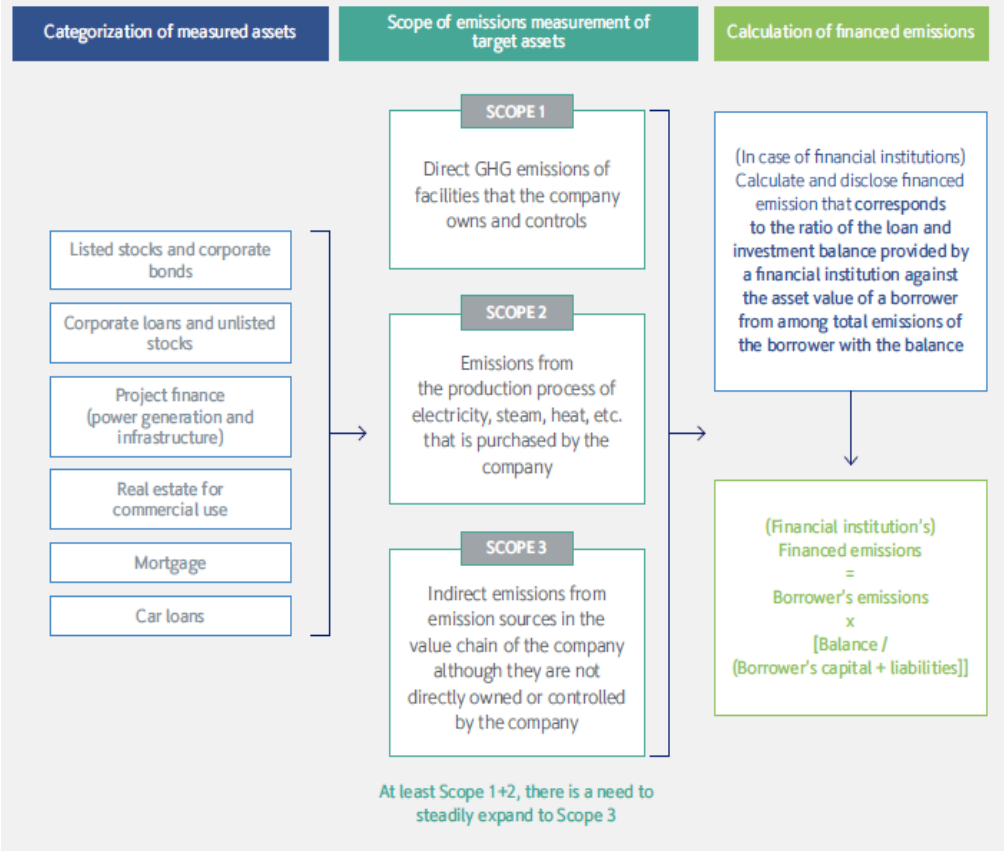
Financed emissions

Financed emissions represent a large portion of financial institutions' GHG emissions. As mentioned, Shinhan has referred to its internally-developed financed emissions measurement system to assess climate-related risks in accordance with PCAF GHG accounting standards. Currently the system covers six types of assets and at least Scope 1 and 2 emissions, with Scope 3 emissions to be expanded steadily.

Calculation of financed emissions

Figure 120

Shinhan's process for measuring financed emissions



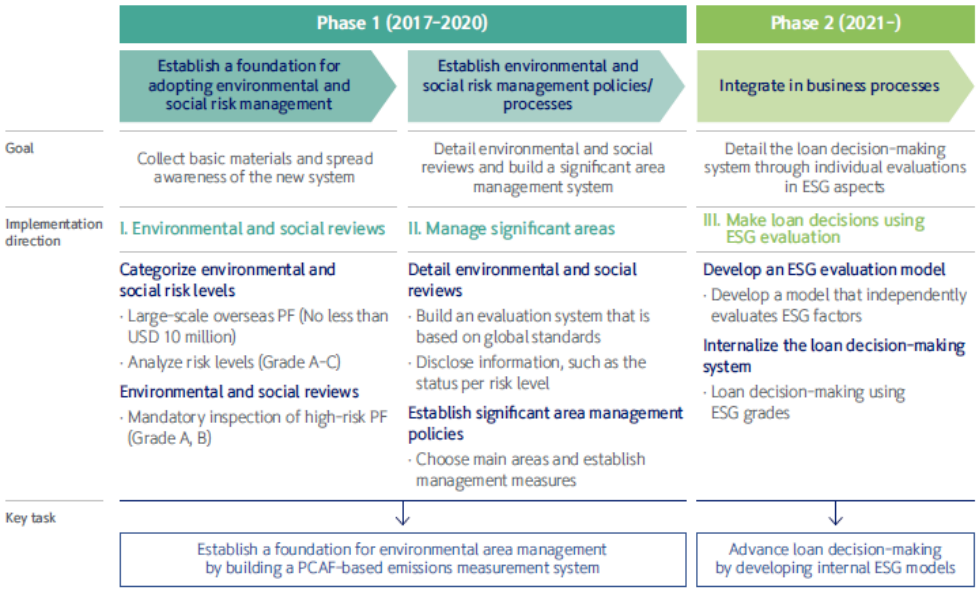
Source: Shinhan

Shinhan has stepped into phase II of financed emission risk management, which focuses on integration of ESG risks into business process.

Stepped into integration of climate-related risks into business process

Figure 121

Shinhan's environmetal and social risk management system



Source: Shinhan

Scenario analysis and carbon pricing

Shinhan has conducted scenario analysis with reference to NGFS and has used the Korean Emission Trading Scheme's KAU21 price ranging from KRW20,000 to KRW30,000 per ton for its Scope 1 and 2 emissions and established an internal carbon price leveraging NGFS resources for Scope 3 emissions to assess impact on assets from different geographical regions.

It is worth noting that Shinhan's NGFS scenario analysis is leveraged on work done by Bank of Korea and applies the BIS ratio in the assets determined to be affected.

Figure 122

Shinhan's scenario analysis based for physical and transition risks

	Classification	1 Top-down	2 Bottom-up
Transition Risk	Analysis method	Analyzed the level of impact by applying the Bank of Korea's analysis results on transition risk impact from climate change[1] (Targeting Shinhan Bank's portfolio)	Used the S&P Global climate scenario analysis model (Climate Credit Analytics)
	Analysis results	Level of impact, including Shinhan Bank's BIS ratio[2]	Level of impact on high carbon-emitting businesses

[1] Bank of Korea (December 2021), Climate Change Transition Risk and Financial Stability
[2] It is derived by dividing shareholders' equity by risk-weighted assets and then converting it into a percentage

	Classification	3 Shinhan internal operations aspect	4 Asset impact aspect
Physical Risk	Analysis method	South Korea's Detailed Climate Change Forecast Report[3]	Used Ewha Womans University-Financial Supervisory Service climate risk model
	Analysis results	Damage impact from suspension of operation of Jeju Bank's branches in the Jeju area	Expect bad debt expenses from decreases in domestic real estate collateral value of Shinhan Bank's loan assets

Source: Shinhan

Figure 123

Shinhan's internal carbon price based on NGFS scenarios

Scenario	Region	2025	2030	2035	2040	2045	2050
Below 2°C	World	41.5	77.3	109.1	134.8	184.4	265.8
Below 2°C	South Korea	41.5	77.3	109.1	134.8	184.4	265.8
Nationally Determined Contributions (NDCs)	World	30.1	80.1	83.2	95.8	124.3	157.2
Delayed transition	World	-	-	135.3	188.9	328.8	704.0
Delayed transition	South Korea	-	-	131.6	239.2	497.3	973.5
Divergent Net Zero	World	204.3	263.7	353.3	421.8	741.1	1,646.6
Divergent Net Zero	South Korea	198.1	314.1	419.3	499.2	905.7	1,826.2
Net Zero 2050	World	61.1	96.9	137.7	174.8	267.6	562.2
Net Zero 2050	South Korea	87.5	139.5	212.9	260.2	371.6	717.9

Source: Shinhan

4. Metrics and targets

When Shinhan announced its Zero Carbon Drive in 2020, it became the first financial group in Korea to declare net-zero. It plans to achieve net zero of the Group's internal carbon emissions by 2044 and achieve net-zero of financed emissions by 2050. By 2030, it plans to reached green financing of KRW30trn. Shinhan actively discloses its metrics and targets with its stakeholders.

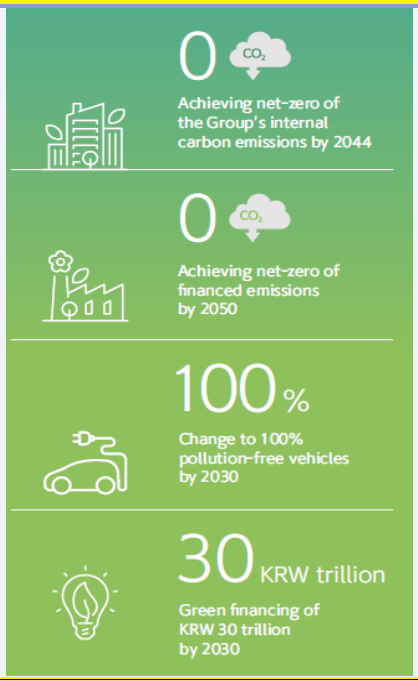
How metrics are set

Shinhan applied the Science-Based Target Initiative (SBTi) when setting its reduction goals. Accordingly, it plans to reduce the Group's internal carbon emissions by 42% by 2030 and 84% by 2040. When measuring carbon emissions, Shinhan categorizes its direct energy consumption under Scopes 1 and 2, and its asset portfolio emissions from investments and loans under Scope 3.

In addition to decarbonising its operation and financed portfolios, Shihan has also set up a roadmap to capture opportunities in green finance. The goal is to expand eco-friendly asset size through 1) discovery of new green growth, for example, green technologies and companies, renewable energy equity investments, 2) performance management in alignment with K-Taxonomy. These opportunities will be considered as potential carbon offset of the Group's GHG emissions, however, the details of how offset will be decided is yet to be disclosed.

Figure 124

Shinhan's Zero Carbon Drive



Source: Shinhan 2021 TCFD report

Figure 125

Shinhan's green finance goals for carbon offset investments

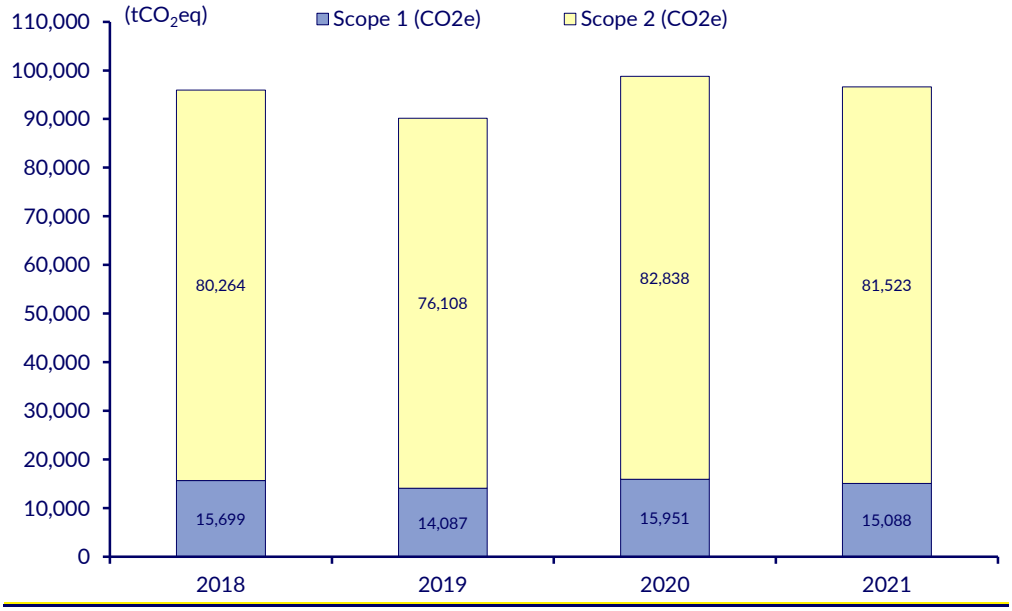
Source: Shinhan 2021 TCFD report

Emissions trend

In 2021, Shinhan recorded 96,610.4tCO2eq in Scope 1 and 2 emissions: 15,088 tCO2eq for Scope 1, and 81,523 tCO2eq for Scope 2. In total, this was a 2.2% drop YoY from 96,610.4tCO2eq in 2020. For Scope 3 emissions, it recorded 18,788.7tCO2eq, down by 10.6% YoY from 21,017.2tCO2eq in 2020.

Figure 126

Shinhan Scope 1 & 2 emissions



Source: Shinhan

Figure 127

Shinhan Scope 3 emissions

Emissions Status (Unit: KRW trillion, 10 thousand tCO_2eq)

Asset categorization	Calculated asset size	Financed emissions	Emissions weight	Emissions intensity	Data Score[1]
Listed stocks and corporate bonds	46.3	721	15.4%	15.6	2.8
Corporate loans and unlisted stocks	126.6	3,602	77.1%	28.4	3.6
Project finance	3.3	232	5.0%	70.7	3.7
Real estate for commercial use	17.5	53	1.1%	3.0	4.0
Mortgage	27.8	14	0.3%	0.5	4.0
Car loans	5.9	47	1.0%	8.0	4.3
Total	227.4	4,669	100%	20.5	3.5

Source: Shinhan

Emission reduction targets

Shinhan has committed to set near-term science-based targets since 2020, and we have seen it being active in moving the target-setting exercise forward. Currently, Shihan is in the process of sorting out its GHG emission inventory including financed emissions as the science-based targets have not yet been officially validated by SBTi.

According to its 2021 TCFD report, the group plans to reduce its internal carbon emissions (Scope 1 and 2) by 42% by 2030 and 84% by 2040 and achieve net zero by 2044 to align with the 1.5 degree Celsius ambition level of the Paris Agreement.

For financed emissions (the major source of financial institutions' Scope 3 emissions), Shinhan disclosed its intention to follow SBTi's Sectoral Decarbonisation Approach, which is based on a 2 degree Celsius scenario to reduce financial assets' carbon emissions by 34% by 2030, 60% by 2040 and 83% by 2050.

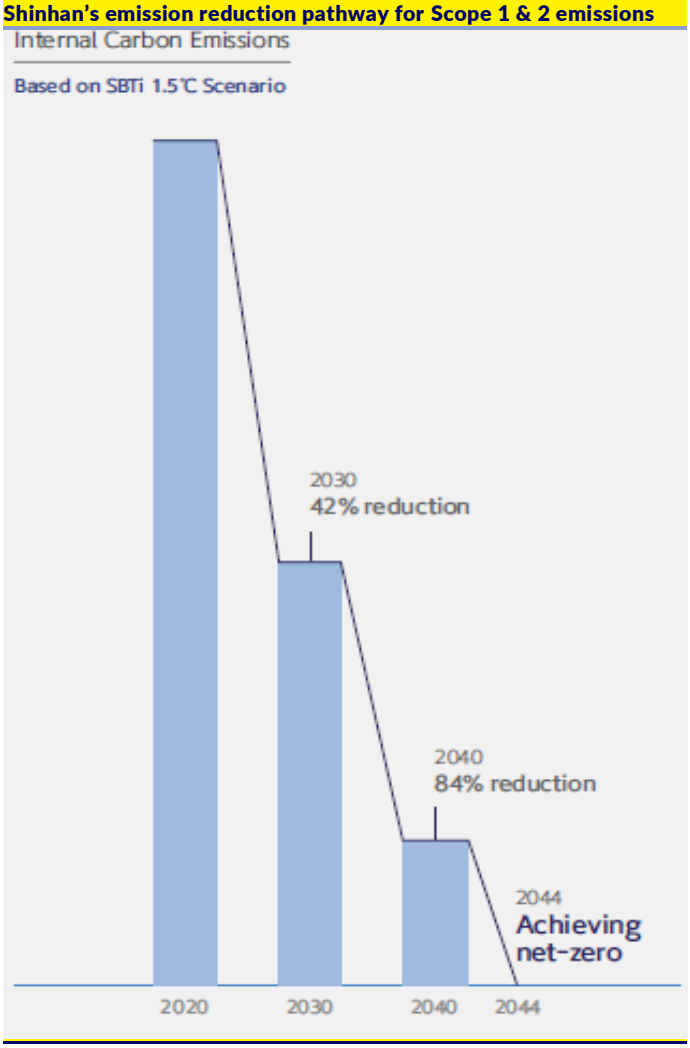
Green finance targets

Quantitative green finance targets are set up to 2030 to support its Zero Carbon Drive strategy. Basically, these are financing targets for low-carbon economy, ie, using green financing as offsets for Shinhan's carbon footprint and according to Shinhan, these investments will need to align with criteria set out in K-taxonomy and offset opportunity will depend on the development of a voluntary carbon market.

Currently, the planned offset goal is from photovoltaic/wind power-based renewable energy. Whether this renewable energy will reach commercial viability and subsequently not be appropriate to be treated as offsets and included in its offset goal is a watch point.

Figure 128

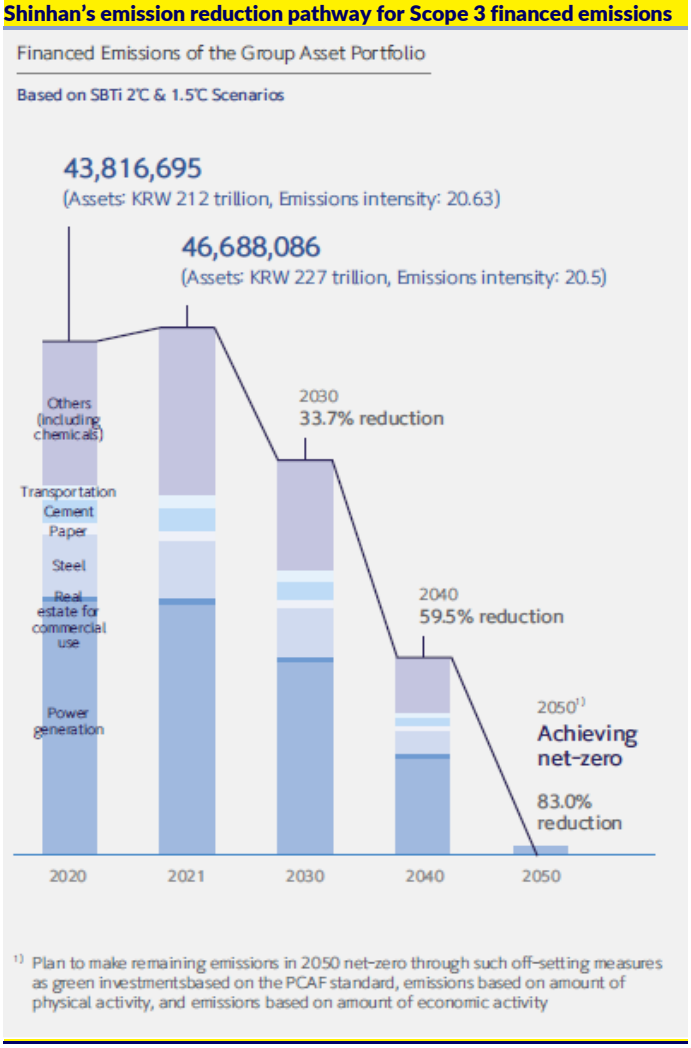
Shinhan's emission reduction pathway for Scope 1 & 2 emissions



Source: Shinhan

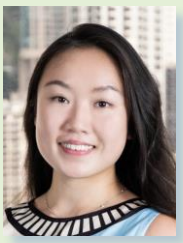
Figure 129

Shinhan's emission reduction pathway for Scope 3 financed emissions



Source: Shinhan

Thai Union Group: Baiting the hook



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- ❑ Solid risk management framework incorporated into business strategy: sustainability strategy, SeaChange, published in 2016, to be updated and published in 2023.
- ❑ Early mover on sustainability initiatives reflects global leadership position in the seafood industry: one of the first companies in Thailand to commit to TCFD reporting and to setting SBTi-aligned targets.
- ❑ New climate goals pending SBTi validation and approval: expected to announce next year with updated strategy and plans to report under CDP.
- ❑ Consideration for the significance of climate change impact on operations shown though mostly qualitative statements, both in sustainability reports and its first TCFD report in June 2022.
- ❑ TCFD Report and further discussions with management reveal company's willingness to consider systems and disclosures for financial impacts of climate change such as shadow and internal carbon pricing.
- ❑ Scope 1 and 2 GHG emissions disclosures since 2013, with recent step up to include Scope 3 in 2021: climate targets at the mercy of suppliers as bulk of emissions lie with outsourced tuna vessels and shrimp farms.
- ❑ Challenges in reporting: primary data collection, timing mismatch with guidance updates and more guidance needed on scenario analysis.

Summary

The company has made TCFD and SBTi commitments

Thai Union Group (TUG) is one of the world's biggest seafood companies, with a strong focus on sustainability since the mid-2010s. In part this was triggered by global concerns about the welfare of players in the fishing industry, if not the sustainability of the industry itself. More recently, the company has sharpened its lens on climate issues: rising sea levels and extreme weather events are obvious risks to the supply chain. It has committed to key climate targets and is in the process of revamping its strategy on sustainability. There are many hurdles in achieving its targets, the company's main source of emissions being Scope 3 and hinging on the response of legions of third-party fish vessels and shrimp farms, not to mention the transporters down the line. It pins its hopes on educating its suppliers, being transparent in doing so in hope that this will encourage others to follow suit. Collating consistent data to be able to respond to increasing investor and customer calls for action is a core challenge.

Sustainability efforts began in 2014 with board committees and reporting

On the governance side, the company has two board-level committees overseeing its sustainability risk management: Risk Management Committee ("RMC") and Sustainability Development Committee ("SDC"). When it comes to reporting, TUG demonstrated its initiative when it shared its first sustainable development policy in 2013, first full sustainability report in 2015 for FY2014, and first sustainability strategy in 2016. TUG has room for more climate-related disclosures and to further integrate climate risks across its business strategy; however, the company is charting a clear course in preparing for climate change while also updating various aspects of its business accordingly.

Background

Canned tuna was the original focus of the company formed in 1977

The company is a Thailand-based global seafood firm founded in 1977 as Thai Union Manufacturing Co. Ltd. It began as a processor and exporter of canned tuna and has since expanded across products and geography in the form of joint ventures, mergers, acquisitions and associated companies. Its brand portfolio outside Asia includes Chicken of the Sea in the United States, John West in the United Kingdom, Petit Navire and Parmentier in France, King Oscar in Norway, Rügen Fisch in Germany, Mareblu in Italy, as well as the restaurant company, Red Lobster, based in the United States. Thai Union manages its operations by dividing reporting lines by region. For example, John West Foods, TUG's importer and distributor of canned seafood in the UK, is a 100% wholly owned subsidiary of UK Seafood Investment, which comes under the company's Europe entity. As for Red Lobster, holding company Thai Union North America ultimately owns 25% of Red Lobster Holding Company.

Ownership

Government entities and family ownership make up majority shareholding

TUG went public on the Stock Exchange of Thailand ("SET") in 1994 as Thai Union Frozen Products PCL. As of 31 December 2021, its most significant shareholders consisted of government entities and family ownerships, as shown in Figure 1. There are no obvious board director links to the Thai government.

Two major families behind shareholding rooted in senior management

Figure 130

Significant shareholders of Thai Union

Entity	Shareholding (%)
Chansiri family	**19.60**
Kraisorn Chansiri, Founder/Chairman	3.66
Thiraphong Chansiri President/CEO	8.72
Chuan Tangchansiri	0.79
Thai NVDR Co., Ltd (99.99% owned by the Stock Exchange of Thailand (SET))	**13.26**
Mitsubishi Corporation	**7.29**
Niruttinanon family	**6.87**
Cheng Niruttinanon, Chairman of the Executive Committee	4.20
Thailand Social Security Office (which manages social security and workmen compensation fund)	**4.54**

Source: Thai Union 2021 Annual Report

Families deeply rooted in senior management and operations

The Chansiri family started the firm in 1977. Kraisorn Chansiri, founder and chairman, brought his son, Thiraphong Chansiri (now President and CEO), onto the board in 1990, while Kraisorn's cousin, Chuan Tangchansiri, joined the board in 1988. On connected transactions, Thai Union and some subsidiaries pay rent to Chansiri Real Estate for their Bangkok office, approved by the board. Kraisorn Chansiri's wife and sons hold shares of Chansiri Real Estate along with Thriaphong Chansiri and Chuan Tangchansiri.

Alleged insider trading leads to resignation of two Chansiri directors in 2022

Two Chansiri directors step down in 2022

Thailand's Securities and Exchange Commission (SEC) investigated nine Thai Union shareholders who allegedly engaged in insider trading in 2017 ahead of its Q3 results going public. Two directors, Kraisorn Chansiri and Chuan Tangchansiri, were fined THB 3.4 million and THB 1.7 million respectively. In April 2022, Thai Union sent a letter to the Stock Exchange of Thailand (SET) announcing the resignation of the two directors. The letter was signed by President/CEO, Thiraphong Chansiri.

Niruttinanon and Boonmechote families also sit on the board with shares

The Niruttinanon family also sits on the board with significant shareholdings. Cheng Niruttinanon is the Chairman of the Executive Committee, has tenure of 22 years and 9 months as of December 31, 2021. Meanwhile his wife owns shares of connected companies, including Thai Union Feedmill PCL, a Thailand-based manufacturer and distributor of animal feeds owned 51% by TUG. Outside the top 5 shareholders/groups, the Boonmechote family also holds 1.77% shares. Rittirong Boonmechote, an executive director, had served on the board since 2002. Meanwhile, his wife, sons and siblings also own shares of Thai Union Feedmill PC and Thai Union Seafood, a Thailand-based manufacturer and exporter of frozen shrimp 51% owned by TUG.

Mitsubishi Corporation shares linked to TUG's non-executive director

As for Mitsubishi Corporation, Norio Saigusa is the link between TUG and Mitsubishi. Saigusa has been a non-executive director on TUG's board since 2019 with no shareholding. Meanwhile he has also served as Group CEO, Food Industry Group, Mitsubishi Corporation since 2019.

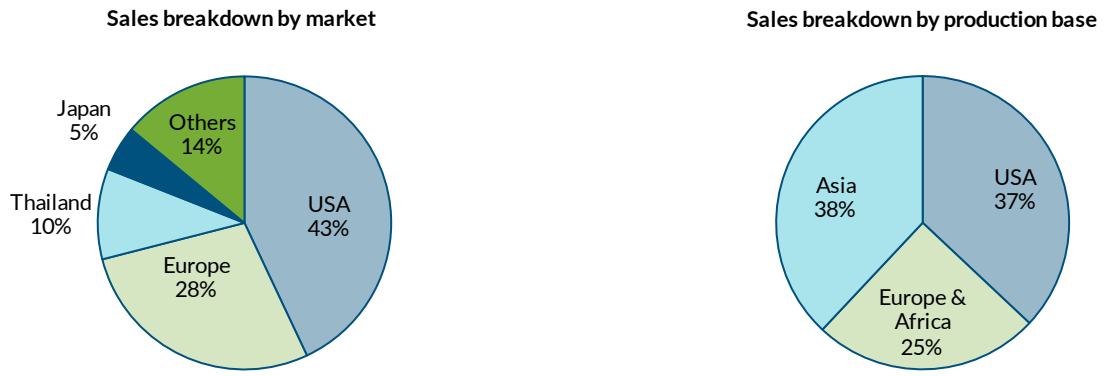
Operations

Production is mostly in the US, while Asia and US make up majority of sales

In 2021, TUG brought in just over THB 141 billion in sales and THB 8.3 billion in profit. As of 30 November 2022, TUG's market cap was just over THB 80 billion. In terms of geographic location by market, the United States make up 43% of sales, Europe 28%, Thailand 10%, Japan 5%, and others 14%. By production, Asia and the United States account for the bulk of the group's sales with 38% and 37%, respectively, while Europe/Africa make up the remaining 25%. These breakdowns are shown below in Figure 2.

Figure 131

Thai Union Group Sales breakdown by geography



Source: Thai Union Group (56-1 One Report, 2021), p153

Product categories include canned and frozen foods

Their core product categories include:

- ❑ Ambient seafood, or shelf-stable items, primarily sold to consumers through retail channels and occasionally wholesalers
- ❑ Frozen and chilled seafood, normally sold directly to restaurants, hotels and food catering units
- ❑ Other business categories include PetCare

Ambient seafood makes up 42% of the group's total sales, led by tuna products, while frozen and chilled seafood make up another 41%, with shrimp being the most important species in this category.

Supply chain management is key for TUG with outsourced fishing vessels and shrimp farms

Meanwhile on operations, TUG does not own any fishing vessels and operates only a handful of shrimp farms under its direct ownership, while keeping packaging in-house. Supply chain management is therefore at the foundation of TUG's carbon management and we will discuss below the breakdown of TUG's key GHG emissions.

Regulatory requirements in Thailand

Sustainability reporting made mandatory in Thailand since 2017

Corporate social responsibility ("CSR") reports have been mandatory in Thailand since 2014. The emphasis was shifted from CSR to sustainability reporting when the SEC revised its Corporate Governance Code in 2017, requiring companies to publish sustainability reports.

Companies refer to GRI for reporting

In particular, sustainability reporting is covered under the CG Code's Principle 7.4 which states simply: "The board should ensure sustainability report, as appropriate" with two bullet points within the guidelines that ask boards to ensure sustainability reporting on ESG issues "using a report framework that is proportionate to the company's size and complexity and meets domestic and international standards." Per the SET's guidelines, many companies refer to the Global Reporting Initiative ("GRI") for their reporting framework. However, according to SET, only 18% of its 716 surveyed listed companies in 2020 disclosed their sustainability performance in accordance with GRI standards.

One Report came into effect in 2022 which includes ESG issues

Furthermore, the SEC announced in 2020 that companies will be required to publish sustainability information in the Form 56-1 One Report from 2022 onwards. This form covers ESG issues and the emission of GHGs, as well as human rights. SEC is also engaging with the University of the Thai Chamber of Commerce to analyse the quality of ESG information disclosures in the market. As SEC pushes for better quality ESG reporting, it may push companies toward greater ESG assurance.

Financial reporting standards

Thailand broadly supports ISSB and carbon neutrality commitments

Thailand's SEC submitted its response to the International Sustainability Standards Board's ("ISSB") consultations in July 2022 with broad support while seeking clarification on expected timeframe of adoption. We have yet to see Thailand officially commit to aligning to ISSB reporting though Thailand has already committed to reaching carbon neutrality by 2050 and net-zero carbon emissions by 2065 at the UN Climate Change Conference in Glasgow in 2021. In the past, Thailand's standards for financial reporting have translated from IFRS with a one-year delay in effective date.

Climate reporting initiatives

TUG first committed to sustainable sourcing in 2013

In terms of ESG commitments, TUG first focussed on sustainable sourcing. It signed onto the United Nations Global Compact in June 2013, committing to its Ten Principles in developing, implementing and disclosing responsible and sustainable corporate policies and practices. TUG then slowly built onto various reporting styles as seen below in Figure 3.

Here are the company's commitments and goals on climate

Figure 132

Thai Union Group climate reporting, commitments and goals

Initiative	Status
Annual sustainability report	✓ since 2014
Aligns reporting with GRI	✓ since 2014
Sustainability strategy	✓ since 2016
Follows the TCFD disclosure framework	✓ since 2021, first TCFD Report in 2022
Plan to achieve net zero by 2050	Committed to SBTi in 2021, submitted targets to SBTi and awaiting verification - expected to publish next year
Interim GHG reduction targets by 2030	
To report under CDP	Next year: 2023

Source: Thai Union

Sustainability efforts were ignited by NGO pressure

All of TUG's sustainability reports have aligned with GRI, since its first publicly available report FY2014 published in July 2015. A major factor behind Thai Union's sustainability efforts has been intense negative publicity encountered in the seafood industry.

TUG's SeaChange strategy was developed in 2016

SeaChange, TUG's first sustainability strategy, was developed in 2016. Further details are found in the Strategy section below. The company's strategy has evolved from reacting to media coverage of malpractices in the industry, with a focus on social issues, to tackling climate issues ahead of regulations and policies.

The company is awaiting SBTi approval and only two Thai companies have been verified

TUG also committed to TCFD reporting and the SBTi last year, completing full GHG inventory accounting (Scopes 1, 2 and 3 emissions) for its 2021 sustainability report and its first TCFD report in June 2022. It also submitted its science-based GHG emissions climate targets earlier this year, and is awaiting SBTi's approval. As of 30 November 2022, only two other companies in Thailand have had their targets validated by SBTi.

The seafood industry came under the spotlight in the mid-2010s for labour abuses

Media spotlight on fishing methods and welfare

The mid-2010s were a turbulent time for the seafood industry as a whole, and Thai Union in particular. In March 2015, a report named one of TUG's suppliers to have been involved with forced labour and other abuses on Southeast Asian fishing trawlers. In October 2015, Greenpeace accused one of TUG's subsidiaries, John West, of violating its 2011 pledge to produce 100 percent sustainable tuna by 2016 with destructive fishing methods, and challenged their tuna traceability claims.

Thai Union axed suppliers and went high-tech in response

TUG responded by terminating relationships with 17 suppliers due to forced labour or human trafficking violations and published its Modern Slavery Act Transparency Statement 2016. It also developed a full digital chain from hatch to catch to consumption for all its major tuna brands. Today, consumers can scan QR codes to trace their products to the vessel level, and TUG is exploring new technology such as blockchain to further enhance consumer labelling.

Main source of emissions

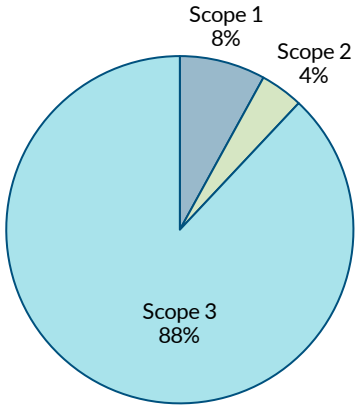
Full GHG inventory reporting since its 2022 TCFD Report

TUG started publishing its emissions data for Scope 1 and 2 since its first sustainability report for fiscal and calendar year 2014. As for Scope 3, it was not until last year when TUG began full GHG inventory disclosed in its 2021 Sustainability Report and its 2022 TCFD Report.

Scope 3 emissions make up the bulk of GHG emissions

Figure 133

Total GHG emissions in 2021: Scope 1, 2, 3



Source: Thai Union TCFD Disclosure 2022, p13

Decarbonisation targets

Supplier engagement is key in achieving reduction targets

The majority of Thai Union's emissions come from tuna, shrimp and packaging. As it doesn't own any vessels and only a handful of shrimp farms are under its control, TUG has limited Scope 2 emissions from their energy usage and is at the mercy of its suppliers in meeting its reduction targets (for Scope 3). According to TUG's Group Director of Sustainability, Adam Brennan, the company emphasizes supplier engagement as their biggest challenge in terms of general operations as well as its sustainability initiatives.

1. Governance

Double-board-committee structure for sustainability risk oversight

Thai Union's sustainability risks are overseen by its Risk Management Committee ("RMC") while the Sustainable Development Committee ("SDC") is in charge of implementing sustainability initiatives. Both are board-level committees, and there is obvious overlap between the two, given the broad mandate of the RMC in particular to consider all risk across the organisation from a holistic perspective. Brennan sits on both committees. He explained that "given how important sustainability is for Thai Union, it warrants its own committee."

Streamlined decision-making by involving executive non-directors

Figure 134

Composition of Thai Union Group's Risk Management Committee ("RMC")

RMC members	Other positions in Thai Union
Executive Directors	
Mr. Thiraphong Chansiri	President/CEO, Vice Chairman
Mr. Shue Chung Chan	Group Director, Corporate Office
Independent Directors (INEDs)	
Mr. Kirati Assakul	Chairman of Board and Chairman of RMC, Lead INED
Dr. Thamnoon Anonthothai	- (member of RMC)
Ms. Parnsiree Amatayakul	- (member of RMC)
Dr. Pakapun Leevutinun	- (member of RMC)
Administrators of the main business (non-directors)	
Mr. Adam Brennan	Group Director of Sustainability
Mr. Ludovic Garnier	Group CFO

Source: Thai Union

Risk committee oversees group risk management including sustainability

Risk Management Committee

The RMC was setup in November 2010 and comprises of the lead independent director ("INED") chairman, three other INEDs, two executive directors ("EDs") (including the President/CEO, Thiraphong Chansiri), and two administrators of the main business (including Brennan and Group CFO Ludovic Garnier), as shown in Figure 5. According to TUG's annual reports, the RMC oversees the effectiveness and efficiency of TUG's group-wide management of risks including raw materials, acquisitions, and sustainability. The committee considers sustainability risks as strategic and an emerging risk, and ensures TUG closely monitors physical and transition risks for long-term strategy plans. According to Brennan, the committee meets on a quarterly basis and gives progress reports to the board each quarter.

Sustainability committee focuses on strategy implementation and monitoring

Sustainable Development Committee

Also a board-level committee, the SDC was set up in 2014 and is in charge of advancing and monitoring their sustainability strategy. The SDC meets at least twice a year formally and reports to the full board at least once a year. There is also informal interaction between the SDC and the board, particularly as Thai Union's sustainability strategy develops. It is co-chaired by President/CEO Chansiri, and Group Director of Sustainability Brennan, with four other members on the committee: Group Director, Corporate Office, Shue Chung Chan and three other management executives including CFO Garnier. Brennan notes that the SDC provides strategic guidance, imposes sustainability policies and helps determine key changes that will assist Thai Union to deliver on its goals. It also tracks the progress of particular sustainability commitments.

The SDC's mandate in full:

- ❑ Provide strategic guidance and direction on the overall sustainable development strategies, policies and programs, in support of Thai Union's corporate goal 'Healthy Living, Healthy Oceans' and sustainability strategy, SeaChange.
- ❑ Determine key changes of sustainability policies and practices that will help Thai Union deliver against global sustainability goals and standards, and maintain our industry leadership position in sustainability.
- ❑ Review the progress of implementation of critical sustainability-related commitments, including but not limited to: the Tuna Commitment, Packaging Commitment, Climate Change Commitment, and Human Rights-related Policies.
- ❑ Establish sub-committees, as appropriate, to drive the implementation of key sustainability commitments across the organisation.

Sustainability strategy development includes all business functions' buy-ins

Brennan said the responsibility for setting sustainability targets sits with him and his team but target-setting is also an organisation-wide effort, with full buy-in from all business functions.

Remuneration/KPIs align with sustainability strategy

When it comes to key performance indicators ("KPIs"), sustainability strategy targets are, according to Brennan, "co-created and co-owned". This means that sustainability is embedded into the remuneration of directors and as the accountability is shifted from solely the company-level to director-level, targets are embedded into the strategy of operations. "We don't come top down and say 'this is what the targets are, please go and execute,"' Brennan explains. "It is more about creating an approach where targets are co-created and co-owned. It is about making sure the right people in Thai Union have accountability for delivering on these.''

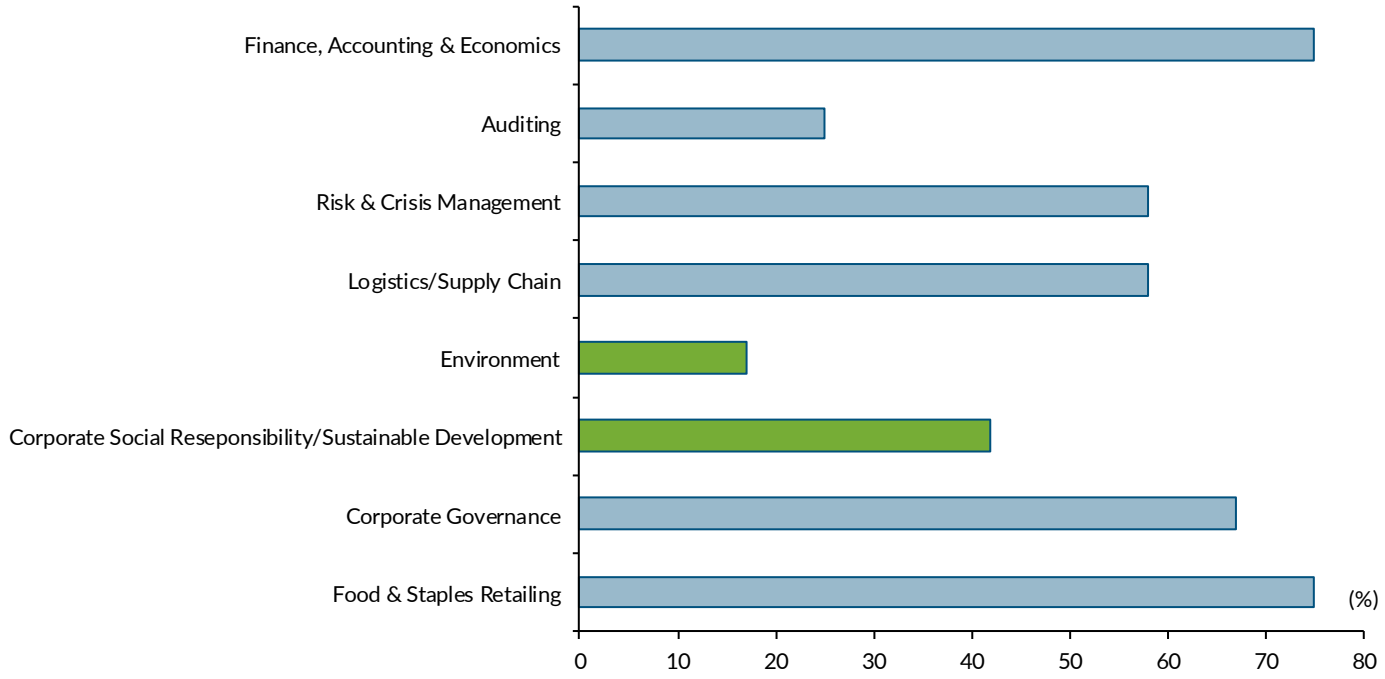
Two of twelve board directors list environment as a skill

Nomination and Remuneration Committee

The Nomination and Remuneration Committee (NRC) has not explicitly discussed a list of attributes it looks for in new directors. However, the most recent 2021 Annual Report discloses a list of board skills, including "Environment" and "Corporate Social Responsibility/Sustainable Development" as skills considered for a well-rounded board. The disclosure states that two of the 12 directors have "environment" as a skill and five CSR/Sustainable development, as illustrated in Figure 6. However, no specific information was given by director or per committee besides Rittirong Bonnmechote's biography page included his Energy Literacy course completed in 2019.

Figure 135

Selected board skills (% of board, 2021)



Source: Thai Union Group (56-1 One Report, 2021), p138.

Director training for sustainability strategy to come

As for director training, TUG generally does onboard training for its directors, while more targeted training, on sustainability issues for example, is done on more of an ad hoc basis. According to Brennan, the board had training on climate change a couple of years ago and the company looking into doing another round of training to get directors on board with their upcoming SeaChange strategy.

2. Strategy

TUG publishes its first TCFD Report in 2022

TUG, like many other Thai companies, had focussed more on its impact on the environment than the effect of climate change on TUG's operations and profitability. Physical risks of climate change only first made it into TUG's FY2020 sustainability report and transitional risks were first highlighted in its 2022 TCFD Report.

SeaChange strategy developed in 2016 with four pillars

SeaChange, TUG's first sustainability strategy, was developed in 2016. The strategy was organised into four thematic pillars:

- ❑ Safe and Legal Labour
- ❑ Responsible Sourcing
- ❑ Responsible Operations
- ❑ People and Communities

Responsible sourcing goal of 100% sustainable tuna

The 'Responsible Sourcing' pillar focuses on sourcing traceability and stakeholder engagement. This included the goal for all its branded tuna to be sustainably sourced (with a commitment of achieving a minimum of 75 percent by 2020). In TUG's 2021 Sustainability Report, it reported that 115 fishing vessels in the tuna Fishery Improvement Projects were audited against TUG's Vessel Code of Conduct. The process includes requesting additional information from the fishing companies, such as recruitment processes and procedures, and MOUs with the agencies, and the information from the agency is then provided to auditors for the purpose of conducting interviews with the agencies themselves.

Responsible Operations goal of 30% GHG intensity reduction by 2020

Meanwhile under the 'Responsible Operations' pillar of the strategy, TUG takes climate change, resource consumption and waste management into account. It set a 30% reduction goal for Scope 1 and 2 GHG emissions per ton of production by 2020, with 2016 as a base year. While the previous sustainability reports did not share TUG's progress on this target, its most recent 2022 TCFD report disclosed that TUG missed the 30% mark by 2%.

TUG seeks SBTi Validation for targets

Value chain push towards more streamlined data collection and reporting

Brennan also mentioned that SBTi is the "gold standard of how to set targets" and that limited internal discussion was needed in deciding to use SBTi for target setting. However, another reason behind TUG committing to SBTi is the upward influence from retail customers. As the industry moves towards improved sustainability reporting, more of the value chain are setting their own climate change targets. TUG's retail customers are asking their suppliers to report using SBTi and are including SBTi as a consideration in their vendor selection process.

SBTi approval is not without its challenges

Following the methodology of SBTi has distinct advantages, Brennan explains. "We would like to go out and announce our commitments or targets. But we also understand the need to have an aligned approach. It would not be good if every company was going their own way to set climate change targets, it causes complexity and confusion. We want to go out publicly with a methodology that all our stakeholders are aligned with.'' The process of dealing with SBTi has been in-depth, he adds, and more guidance would be helpful when doing the scenario analyses. Thai Union enlisted the help of consultants to ensure it was properly following SBTi guidance. "We were in the process of going through it, and they (SBTi) updated their guidance, which took us back a couple of months.''

TUG also plans to report under CDP

Brennan adds that the next logical step following TUG's full GHG inventory in 2021would be to report performance and progress under CDP, which TUG plans to begin next year.

Sustainability strategy to be brought up to date to 2030

SeaChange strategy update as SBTi targets pending approval

With its previous 2016 strategy document spelling out targets for 2020, TUG is currently finalizing a major update on SeaChange for its strategy and targets through to 2030. As it awaits targets to be validated by SBTi (expecting early next year), it aims to publicize their revamped strategy around the same timeframe.

Strategy takes holistic view toward sustainability

Brennan noted that SeaChange took a holistic view toward sustainability, prioritizing action on the water, and below it; for example, addressing social and labour conditions on vessels, and considering the sustainability of fish. "I think one of the biggest changes now as we look towards 2030," he says, "is taking an even broader holistic view as we look at our global footprint." In particular it is looking at terrestrial-based impact of climate (building on the work it has achieved beneath the ocean), and pressing topics such as Scope 3. As part of the update to SeaChange, Thai Union is examining its resources and looking at where the team needs to be going over the next eight years. As Brennan notes, key focuses in the past are not going to line up with the skill set. Once it starts implementing its new strategy, "we will make sure we have the right resources with the right skill sets going forward."

Casting the data net

Collating data is a huge issue

Thai Union is in its first year of creating a GHG inventory and to do this it enlisted external support. The company is also looking at how to upskill its team to be more self-sufficient in this process and to validate the work of consultants. "We also recognize as we move forward, we need the ability to understand carbon emissions at a very granular level," Brennan explains. He gave an example of the challenge: if they install solar energy at a shrimp farm, Thai Union needs an articulate method of capturing that intervention in what becomes "an increasingly complex model."

Scope 3 data reliance on supply chain and technology

With 88% of its emissions being Scope 3 (mostly from tuna and shrimp), TUG is increasingly looking at its supply chains: the fuel used for vessels, on-farm energy, and feed for shrimp, for example. There is an obvious challenge in asking a vessel to measure the fuel they are using and measuring emissions from that. Brennan views the main issue is that of scale: collecting credible and verified information on a large scale, in a coordinated and systematic manner. Standardization in the supply chain would help and Thai Union is working with industry groups to put the issue on the agenda. "We don't want to pick up the phone to ask how much fuel is used. We want it to be integrated into existing systems already in place." This takes time, he notes. "We don't have time," he says, explaining that Thai Union may take an early adopter position on this.

TUG looking into technology including blockchain and satellite

Meanwhile, TUG began piloting technological upgrades in late 2021, such as with the help of blockchain and satellite technology. TUG is also part of an accelerated incubator project where it pitches business challenges for start-ups to come back with solutions. Shrimp farm sensors have helped collect water quality data in addition to increasing energy efficiency and satellite technology have helped TUG understand its shrimp farms performance further.

Climate-related risk/opportunity and scenario analyses

First TCFD Report discusses physical and transitional risks and opportunities

In Thai Union's TCFD report, the company discloses its climate-related risks and opportunities in both the physical and transitional sense. Transitional risks have not previously been explored in detail within TUG's annual and sustainability reports,

while physical risks only started appearing in TUG's sustainability reports from 2020 as a risk factor with potential impact on business operations. Nevertheless, its TCFD report highlights possible effects over the mid-term through to 2030 and longer-term through to 2040.

Scenario analyses performed on transitional risks

In its scenario analyses, TUG rates transitional risks in terms of policy and legal compliance, market, and reputation - low-to-medium risk in the medium-term and medium-to-high in the longer-term 2040 scenarios - while it observes the direction in which legislations, policies and compliance move. In particular, under policy and legal compliance, TUG identified GHG policy requirements and carbon pricing mechanisms as main policy and legal risks. Under market, it identified climate-related product certification and customer climate requirements for suppliers as key market risks. And lastly under technology, it identified that new low-carbon aquaculture technologies would support climate-smart farmed seafood production.

Figure 136

Thai Union's Climate Physical Risks

Physical Risks

Extreme Heat	Sea Level Rise and Coastal Flooding
■ Shortages in raw materials (seafood and non-seafood) ■ Business interruptions due to damage to property and equipment ■ Increased cost and power demand for cooling ■ Workforce health & safety	■ Damage and disruption to aquaculture farms located near the coastlines, and to farmed seafood logistics. ■ Damage to finished products due to flooding and land loss ■ Damage to port infrastructure ■ Business interruptions due to damage to property and equipment of our operational sites that are located near the seas ■ Investment into asset and infrastructure adaptation ■ Workforce health & safety
Drought	**Cyclone**
■ Reduced water availability for drinking, sanitation and operations ■ Water stress on aquaculture production, which may result in conflicts for water among different user groups, such as agriculture ■ Shortage in raw materials (non-seafood) ■ Increased cost and power demand for water and cooling infrastructure	■ Disruption of upstream and downstream supply chain, particularly from coastal aquaculture suppliers ■ Business interruption due to loss of utilities supply or damage to property ■ Increased cost and power demand ■ Supply chain transportation delays ■ Workforce health & safety
Inland Flood	
■ Damage to finished products ■ Business interruption due to damage to property and equipment ■ Supply chain transportation delays ■ Workforce health & safety	

Source: Thai Union TCFD Disclosure 2022, p9.

As for physical risks, TUG's 2022 TCFD Report assessed a list of climate physical risks and their potential financial impacts to the business (see table in Figure 7). When asked to rank Thai Union's biggest physical risks in order, Brennan cited potential damage and destruction in the supply chain from sea level rise and coastal flooding. This would affect supplier operations in coastal areas, including agriculture farms and ports along the coast. Cyclone and other extreme weather events are the more significant physical risks it is concerned about.

Swapping prawns for plants

An OMG moment?

One area where TUG has adapted its business products to deal with climate change is by moving toward providing alternative sources of protein. It has a branded product, OMG Meat, in Thailand, available at supermarkets and other retail outlets. Launched in 2021, the plant-based protein "tastes and smells like meat."

Climate-related opportunities also identified

Product innovation was just one of four key climate-related opportunities identified in TUG's 2022 TCFD Report, along with energy efficiency, alternative fuels, and new financial instruments. On energy efficiency, TUG is working with start-ups to explore innovative technological solutions as mentioned earlier. An example is a pilot smart farm project at Okeanos Food, one of TUG's subsidiaries based in Thailand that specializes in frozen foods. Okeanos has installed water quality sensors in shrimp farms to automate the energy-intensive aeration.

TUG launched its first Sustainable or Blue Finance products in 2021

On sustainable finance opportunities, TUG launched its first sustainability-linked loans and bonds in 2021. These are classified as Blue Finance, where the financial products are linked to KPIs that benefit the ocean, and in TUG's case, KPIs include GHG emission reduction and increasing oversight in supply chains. TUG launched its Sustainability-Linked Syndicated Loan in February 2021, equivalent to THB 12 billion with a term of five years. TUG then issued the THB 5 billion seven-year Sustainability-Linked Bond for institutional investors on 20 July 2021. TUG has also set a target to have 75% of its long-term financing come from Blue Finance by the end of 2025.

Qualitative reporting vs. financial considerations in the works

Many Thai companies have not considered quantitative impacts of climate change

As with many Thai companies, TUG is at an early stage in its sustainability reporting. Most have focussed on qualitative statements when discussing climate change, and financial impacts change have yet to be part of the calculation. However, this may change as the SEC is keeping an eye on ISSB, along with other regulators around the world.

TUG looks into shadow and internal carbon pricing

TUG has yet to put financial price tags on climate change impacts on the business, either through carbon pricing or asset impairments. However, its 2022 TCFD Report did mention internal carbon pricing within its climate strategy as a potential method for risk integration into operations. According to Brennan, TUG will likely use shadow pricing initially, but there has yet to be a set plan or timeline of implementation.

ISSB also being considered

As for ISSB, Brennan mentioned it will look at the new guidance when it is ready, though it is still reflecting on how to manage all the movement that's happened in the ESG reporting space recently. "We will look at how to evolve our climate risk scenario process to include a financial price tag on it—that is a key are we will look at in future," he explains. He cites myriad reporting standards and the need to align. "Without saying we are going in a particular direction right now, I think there has been a huge amount of movement in the last six months and we have to reflect on that and figure out how we do this in a manageable way." Even within its investor and customer base, the company is asked for different types of disclosure, he adds. "We would love for there to be a more harmonized effort. I think we are still a few years away from that."

Seafood industry susceptible to extreme weather events

How does climate change affect a seafood producer?
In TUG's latest TCFD Report, it discusses physical and transitional risks of climate change. In terms of physical risks, TUG identified potential climate change impacts on its tuna and shrimp supply chains - namely extreme weather events, rising water temperatures and ocean acidification, as discussed earlier under climate-related risk/opportunity and scenario analysis. Extreme weather events have been categorized as current physical risks that TUG is facing, including sea level rise, coastal flooding inland flood, extreme heat, drought and cyclone.

Rising water temperatures and ocean acidification were listed under emerging risks for which TUG plans to conduct more in-depth assessments in the future. The TCFD Report points out how rising water temperatures may result in the migration of tuna stock and breeding grounds. According to the American Association for the Advancement of Science, when the water gets too warm, the enzymes that fish use for digestion and other functions are less efficient, impairing growth and reproduction. As a response, rising temperatures force fish to abandon their historic territories and move to cooler waters. In addition, rising temperatures and changing weather patterns may make aquatic species more susceptible to diseases and alter the expected disease season as well as geographical range of pathogens.

Similarly, TUG's TCFD Report also mentions how increased temperatures could affect shrimp farms' water evaporation rates and therefore pond salinity, impacting shrimp growth and the likelihood of pathogens and disease outbreaks. Ocean acidification has also been found to be correlated with decreased growth and survival of tuna.

These current and emerging climate physical risks can cause lower yields and higher operation costs, from transportation, to infrastructure or property damage.

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Risk management, metrics and targets: Key highlights

- Thai Union has set up a solid risk management framework and has incorporated sustainability strategy, SeaChange (introduced in 2016), as a part of its business strategy. These processes are overseen by its governance structure through Risk Management Committee and Sustainability Development Committee.
- Climate change importance is strongly recognised by the company given its leadership position as a global seafood player and potential impact on its operations and supply chain. It has created a proprietary Climate Strategy Framework to oversee the climate risk management.
- The company published its first TFCD disclosures in June 2022 which mainly comprised of qualitative assessment of risks. However, per discussions with management, the company is strongly committed in this matter and is willing to provide more detailed or quantitative metrics of financial impacts in upcoming periods.
- Thai Union has been disclosing Scope 1 and Scope 2 emissions regularly since 2013 in its suitability report. It has disclosed Scope 3 emissions in FY21 for the first time to assess emission hotspots and energy risks in its supply chain.
- The company is committed to announce a new climate goal that is aligned with the Science-Based Targets initiative (SBTi) later this year (pending SBTi's approval). It has also highlighted other environmental-related targets including using recycling packaging, using certified raw materials, reducing food loss and accessing sustainable-linked loan.
- We believe the company still has Scope not only to improve its climate-related disclosures but also fully integrate the climate risks into its risk management process. However, we also believe the company is heading in the right direction which should sustainably bode well for the company in the long-term.

Aware of importance in risk management including sustainability and is one of the pioneers who launched TCFD in Thailand

3. Risk management

Thai Union was listed on the Dow Jones Sustainability Indices (DJSI) for the eighth straight year in 2021. Its risk and crisis management received a score in the 100th percentile for the second straight year. The company continues to embed risk culture in business strategy and operations at all levels starting from Board of Directors, promote and enforces consistent and effective risk management.

The company's current risk management framework is in accordance with the international standards of COSO ERM and ISO 3100. Its risk management framework is designed to identify, assess, manage, monitor and communicate risks systematically. "High" and "Medium-High" are considered to exceed an acceptable level requiring immediate action or mitigation.

Thai Union published its first public sustainability report in 2013 before developing its first sustainability strategy SeaChange in 2016. It published the first TCFD in June 2022 and is considered to be one of the pioneers in Thailand in this respect. The company is committed to announce a new climate goal that is aligned with the Science-Based Targets initiative (SBTi) later within this year (pending SBTi's approval).

Being one of pioneers who launched TCFD disclosures in Thailand

The company is well recognised as one of the first movers in sustainability focus in Thailand under SeaChange strategy which it has communicated to investors and stakeholders. However, given that 2022 is the first year the company has published TFCD disclosures, we believe there is scope for more detailed/quantified information to be disclosed in upcoming periods.

Regularly engages stakeholders to update and identify potential emerging risks

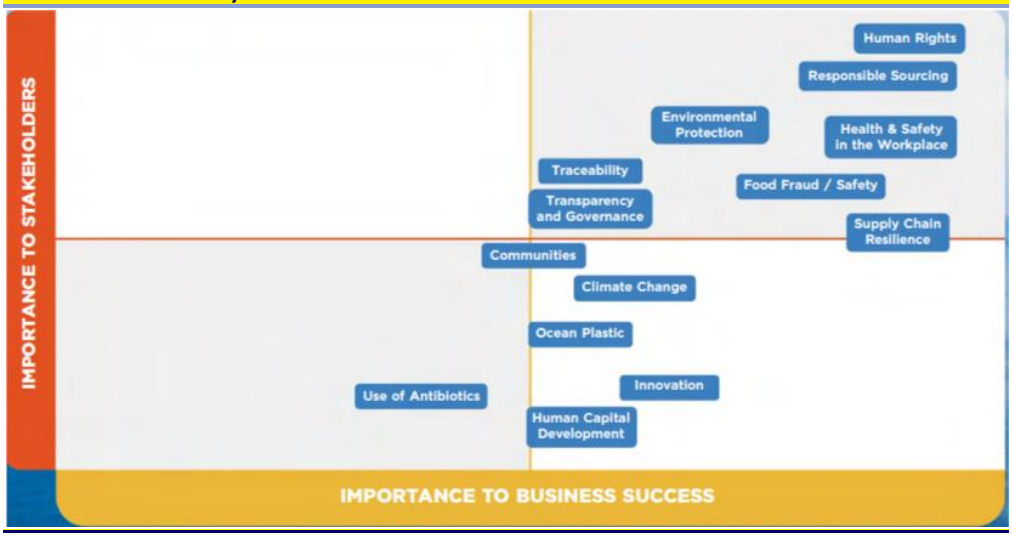
Materiality matrix to identify and prioritise sustainability-related risks

Through a materiality assessment, Thai Union is able to identify and prioritise the most important issues to its stakeholders and business. Thai Union engages with key stakeholders on regular basis to gain more understanding, prioritise the sustainability risks and define appropriate measures to respond to any emerging challenges. This includes conducting a stakeholder engagement process to review and input on its SeaChange goals (Thai Union's sustainability strategy was first introduced in 2016). Note that Thai Union will announce a major update to SeaChange in early 2023.

As demonstrated by the materiality matrix, climate change has been identified as one of the most pressing environmental issues, and is indeed relevant for decisions related to business and stakeholders. This provides a sound basis why risk management on climate change is important.

Figure 137

Thai Union: Materiality Matrix



Source: Thai Union

Well established framework of risk management running through its governance structure

Climate change consideration is vital to the group

To ensure awareness and understanding of climate-related risks, Thai Union integrates the oversight of the issues throughout its governance structure from the Board of Directors through to the Risk Management Committee. The Risk Management Committee reports quarterly to the Audit Committee and the Board of Directors. These issues are also overseen by the Sustainable Development (SD) Committee, chaired by the CEO and the Group Director of Sustainability to review progress of sustainability commitments and to consider, assess, make decisions and corporate initiatives on emerging issues. SD Committee reports its work and outcomes to the Board and shareholders via Thai Union's annual report. Note that the executive and employee compensation is also linked to the performance in advancing SeaChange goals, including climate-related commitments and targets.

Figure 138

Thai Union's risk culture

Source: Thai Union

Assessing level of key risks

Assessment of risk level is done on both top-down and bottom-up basis

According to its Risk Management Framework, the Global Leadership Team will conduct a top-down risk assessment annually to assess corporate risks, entities' common risks, and global emerging risks. Any material risks will be assigned to group risk owners who manage, monitor and report the risk status back to the Risk Management Committee and Board of Directors once a quarter. Meanwhile, its subsidiaries also conduct a bottom-up risk assessment, and material risks are managed by subsidiary-level risk owners or if the risk is high or has a group-level impact, it will generally be determined by group-level executives.

The company assesses risk level based on two scenarios over mid to long term

Thai Union Group has conducted a high-level qualitative analysis of climate-related risks and opportunities that may have a material financial impact on the organisation over mid-term (by 2030) and long-term (by 2040). This analysis was conducted taking into consideration two different climate-related scenarios for both physical and transition risks, as well as climate-related opportunities. The company recognizes the need to conduct quantitative and more detailed risk assessment in future.

Figure 139

Climate-related scenarios

Climate-related Risks and Opportunities	Scenarios	
Physical Risk Assessment	**Baseline Scenario** Historical data of natural hazards.	**IPCC RCP 8.5** High-emissions scenario developed by IPCC where warming reaches 4-5°C by 2100.
Transition Risk and Opportunities Assessment	**"Stated Policies Scenario" IEA STEPS[1]** Current trajectory of the world based on the stated climate policy ambitions.	**"Sustainable Development Scenario" IEA SDS[2]** Aligned with Paris Agreement to limit warming to "well below 2oC and pursuing efforts to limit to 1.50C by 2100.

[1] International Energy Agency's Stated Policies Scenario; [2] International Energy Agency's Sustainable Development Scenario. Source: Thai Union

Transition Risk level ranges from low to medium over mid-term and increases to medium to high over long-term

Thai Union classifies transition risks and their related impact as follows:

(i) Policy and Legal Compliance: the risks from potential enhancement of GHG policy requirements and carbon pricing mechanisms which might be more strictly deployed. It may impact seafood imports resulting in high OPEX.

(ii) Market: the risks from additional climate-related product certification and customer climate requirement from suppliers. It may lead to insufficient certified raw materials to serve market demand and affect Thai Union's pole position in the industry.

(iii) Technology: the risks from a lack of new low-carbon aquaculture technologies which may result in a loss on its competitive advantages.

(iv) Reputation: the risks from increasing stakeholder interest in climate-related risks which may result in a loss of investors, higher cost of capital and declining sales from negative image.

From the company's current assessment, the level for each risk in Stated Policy Scenario is low in mid-term and increases to medium in long-term. Whereas, under Sustainable Development Scenario, the level of each risk increases to medium in mid-term and high in long-term.

Figure 140

Thai Union: Climate Transition Risks

Scenario	Risk Level	
	2030 (mid-term)	2040 (long-term)
Policy and Legal Compliance		
Stated Policy	Low	Medium
Sustainable Development	Medium	High
Market		
Stated Policy	Low	Medium
Sustainable Development	Medium	High
Technology		
Stated Policy	Low	Medium
Sustainable Development	Medium	High
Reputation		
Stated Policy	Low	Medium
Sustainable Development	Medium	High

Source: Thai Union

Nevertheless, Thai Union believes that an increase in sustainability adoption i.e. more resource efficiency, implementation of renewable energy, development of low-carbon food products, increase in new sustainability-linked capital, etc - could lead to the opportunities for the company to reduce operating expense in the long term despite potential increase in short-term operating expenses and capital expenditures.

Physical risks could affect its supply chain from raw materials sourcing, production and farming through finished goods

Thai Union preliminarily assesses the physical risks that could financially affect the company to mainly involve extreme heat, sea level rise and coastal flooding, drought, cyclone and inland flood. Most of these risks could lead to supply chain (shortages in raw materials), production and farming disruption, hazard to finished products, etc.

In addition, given more environmental hazards over the past years, Thai Union will seek to conduct a deeper assessment of the impact of climate change on wild-caught tuna supply and shrimp aquaculture production in upcoming years as well as potential risks to Thai Union's supply chains. Note that the company has not disclosed the quantitative level for each risk in its latest TCFD Disclosure 2022 (published in June 2022).

Risk level is now assessed on a qualitative rather than quantitative basis

Thai Union's assessment does not yet disclose any monetary or financial impact to the company from both the transitional and physical risks. Also, it has not stated the magnitude of risk level e.g. what is the expected loss for low/medium/high risk level. However, based on our interaction with the management, the company will make efforts to disclose more details as well as potential monetary impact in the upcoming years. We believe more intensive assessment data will enhance stakeholder's understanding and awareness in the climate change matters.

Climate strategy introduced to oversee the climate-related risk and opportunities management

Climate strategy framework

Thai Union has created a climate strategy to oversee the management of climate-related risks and opportunities, as well as commitment to establish Science-based Targets, in line with other Seafood Business for Ocean Stewardship (SeaBOS) members. At this stage, the company has identified three key strategy pillars: (i) transition to a low-carbon organisation, (ii) engage with value chain, and (iii) manage climate risks and opportunities. To support the implementation of strategy, it has also addressed four key enablers as described in Figure below.

Risk integration is one of the key enablers to drive climate strategy

Risk integration is one of the four enablers to drive climate strategy - to escalate climate-related risks and opportunities up to strategic enabler level is a good starting point as connection with business strategy is important for climate risk management to be useful for decision making.

Figure 141

Four key enablers to drive climate strategy

Governance	Risk Integration
■ Integrate the climate agenda into governance at all levels, with regular board engagement ■ Establish teams for the low-carbon transition and supply chain management ■ Integrate climate performance KPIs into governance remuneration and incentives	■ Develop location-specific climate risk and opportunity metrics, including internal carbon pricing ■ Implement and integrate climate risks and opportunities into financial planning (e.g., capital expenditures (CAPEX)) and enterprise risk management
Data Management	**Transparency and Compliance**
■ Improve the GHG emissions data management system to incorporate scope 3 progress monitoring ■ Improve scope 3 GHG data collection to be supplier specific, where possible ■ Manage climate-related risk data ■ Monitor and report progress towards achievement of climate-related targets	■ Continue third party verification of emission disclosures ■ Commit to and continuously strengthen TCFD disclosure ■ Publishing a full GHG Protocol compliant inventory on an annual basis

Source: Thai Union

Three strategy pillars focusing on climate strategy are transitioning to low-carbon organization, engaging the value chain and managing climate risks and opportunities

One of three key pilars to drive climate strategy implementation includes strengthening internal resources by increasing renewable consumption and use low-carbon production technologies to ensure transition of low-carbon energy on-site. It aims to decarbonize its operations and reduce the potential impact of transition risks, such as a carbon tax and reputational risks. Another key pillar is to support and engage key parties along the value chain on climate matters. The last key pillar is to manage climate risks and opportunities.

Thai Union has developed an overarching plan to respond to climate risks, which includes developing a context-specific risk assessment and adaptation plan consisting portfolio screening and hotspot analysis, risk validation and quantification and impact assessment and adaption.

4. Metrics and targets

New emission goal in 2022 will be aligned with the SBTi (pending SBTi's approval)

When Thai Union first introduced SeaChange in 2016, it targeted to reduce Scope 1 and 2 greenhouse gas emission intensity by 30 percent by 2020, compared to the 2016 base year. By the end of 2020, it managed to cut the GHG emission intensity by 28 percent. For the new climate goal, the company will align it with the SBTi in 2022 (pending SBTi's approval).

Thai Union's GHG intensity per production has decreased since 2017 after its introduction of SeaChange in 2016

The company collects environmental data based on location including Factory, Farm & Hatcheries, and Office. The calculated Scope 1 and 2 GHG emissions in fiscal year (FY) 2021 serves as a base year from which it is in the process of developing near-term and long-term SBTi-aligned emissions targets. To better understand value chain emissions supporting its climate ambitions, the company also calculated and disclosed Scope 3 GHG emissions for the first time in FY21 in line with specifications of GHG Protocol - which will be also used as the base year for setting Science Based Targets. As a part of Scope 3 assessment, it mostly accounted for emissions from purchased goods and services - mainly purchase of tuna, shrimp and packaging (c.75% of total purchase).

Per statistics provided by management, the GHG emission in 2021 was mainly from the Factory operation which accounted for c.99% of total GHG emission Scope 1 and Scope 2. Whereas, GHG emission Scope 1, Scope 2 and Scope 3 accounted for 7.5%, 4.4% and 88.1%, respectively. For GHG emission Scope 3, the purchase of goods and services contributed 79.3% followed by investment (12.6%), transportation (5.2%) and other (2.9%). Although there was a rise in GHG emission in 2018, we note that it was pushed by production volume growth. On the other hand, the GHG emission intensity per production has continuously declined since 2017.

Figure 142

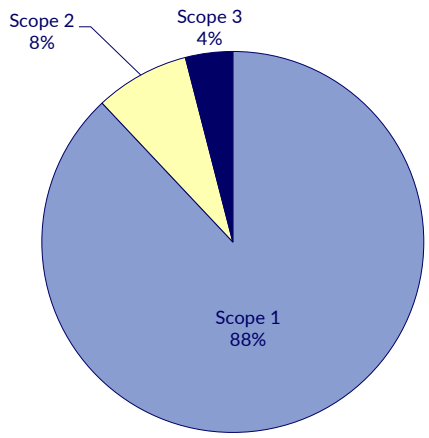
GHG Emissions Data for Thai Union

Year	GHG emissions total (CO_2e)	Scope 1 (CO_2e)	Scope 2 (CO_2e)	Scope 3 (CO_2e)	GHG total YoY (%)	Scope 1 YoY (%)	Scope 2 YoY (%)	Scope 3 YoY (%)
2017	484,639	366,642	117,997	na	(13.3)	(2.5)	(35.4)	na
2018	539,630	369,887	169,743	na	11.3	0.9	43.9	na
2019	509,741	337,317	172,424	na	(5.5)	(8.8)	1.6	na
2020	504,305	317,453	186,852	na	(1.1)	(5.9)	8.4	na
2021	511,612	323,493	188,119	3,785,759	1.4	1.9	0.7	na

Source: Thai Union

Figure 143

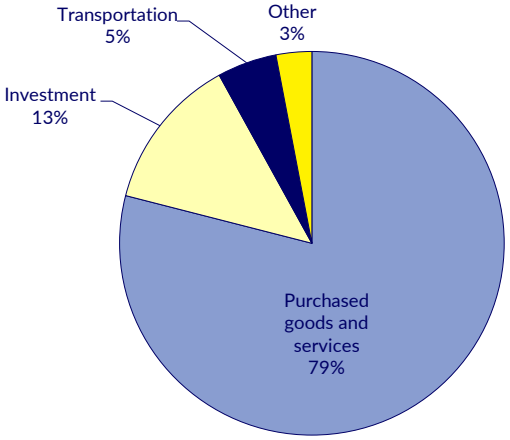
Total GHG emission 2021 breakdown by scope



Source: Thai Union

Figure 144

GHG emission Scope 3 breakdown by activity

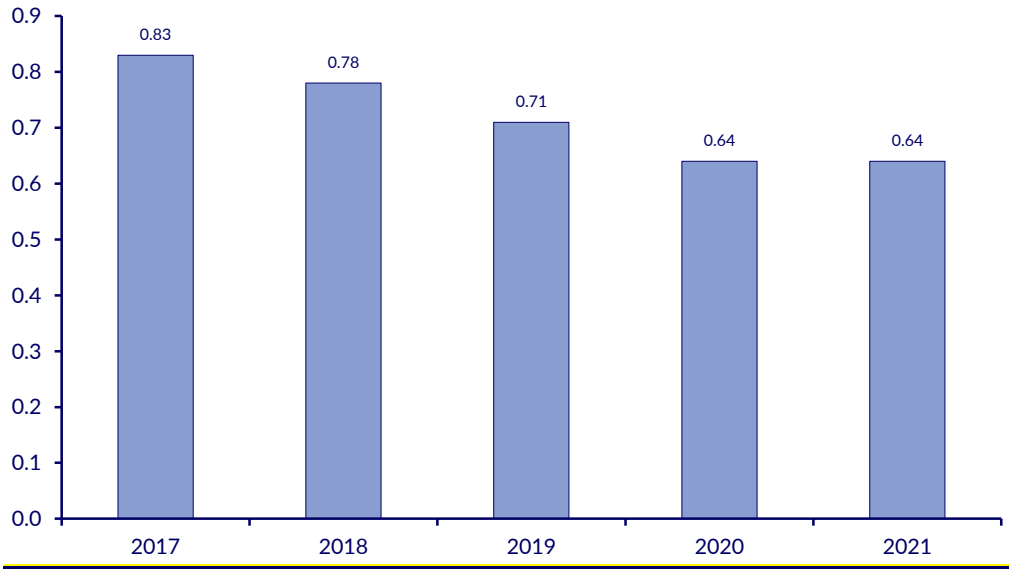


Source: Thai Union

GHG Intensity has declined since 2017

Figure 145

GHG Intensity (ton per ton of production)



Source: Thai Union

Key climate-related targets to support sustainability disclosed involve recyclable packaging, certified raw material sources, food loss, and sustainable-linked loan

New emission goals to be announced later

Thai Union does not currently disclose its climate target as the company is in the process of submitting the new emission targets across Scope 1-3 GHG emissions in alignment with the SBTi. The timeline of announcement is dependent on SBTi's approval. Note that per SBTi guidelines, companies are encouraged to halve emissions before 2030 and achieve net-zero emissions before 2050. Nevertheless, in its TCFD Disclosures 2022, the company has provided some climate-related targets including:

- Ensuring 100% reusable, recyclable or compostable materials in its packaging under its own brands within 2025 (vs 30% currently).
- Commitment to source certified palm oil from sustainable sources for use in Thai Union's branded products within 2025.
- Reducing food loss in its ambient and frozen seafood business by 50% from 2021 baseline.
- Obtaining the first ever sustainability-linked bond and loan in Thailand and Japan which incorporates climate change into Sustainability Performance Targets (SPTs) aiming to reduce GHG Scope 1 and 2 in manufacturing operations by 4% annually to meet 2023 and 2026 targets.

The company has a strong commitment to set emission targets and is fully engaged in climate change issues

We believe that Thai Union has strong commitment on the climate change issues although it is still in the process of setting new targets. The company has demonstrated that it fully engaged in this issue and has started to disclose the GHG emission Scope 3 data to affirm importance through its value chain. Given that it is the leading global seafood player and climate-related risks have a bearing on its operations, we expect to see more intense and detailed plan and targets from the company in the future.

Transurban: Resilient

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- Transurban was an early adopter of sustainability reporting, TCFD and SBTi among Australia's largest listed companies. Building and operating toll roads and tunnels with 30- to 40-year concessions was a major catalyst.
- Shifting rapidly to use of renewable energy over 2021 and 2022, leading to a 46% fall in Scope 2 emissions in FY22. Ramping up energy efficiency programmes. *(See text box in margin for note on fiscal years.)*
- Decarbonisation targets set for 2030 and 2050 (net zero), with interim targets validated by the Science-Based Targets initiative (SBTi) in 2020 and aligned with 1.5°C.
- Advice: Start doing scenario analysis and Scope 3 data collection as soon as possible. It is painful and time-consuming, but the pay-off is worth it.
- Directors add value by bringing comparative knowledge on climate change strategy from other major listed companies.
- Financial impacts: Though nascent and largely qualitative, analysis suggests the physical risks of climate change likely to be manageable over the short, medium and long term. Drivers also prefer modern roads during extreme weather.

Highways, tunnels and toll roads mixed with climate change equals plenty of risk

Summary

If you are designing highways and tunnels to last 30 to 40 years in huge urban areas that are increasingly suffering the effects of extreme weather, you have no choice but to think long-term about sustainability and climate change. Being the country's dominant toll road operator also brings a level of scrutiny and responsibility to get things right. As do the demands of partnering with some of the largest pension and investment funds in Australia and other parts of the world. Throw in the need to manage two different weather systems - heat and rain in Australia and "snowmeggedon" in North America - and you have a company that spends a lot of time thinking about risk.

Note: Fiscal years in Australia run from 1 July to 30 June. "FY22" is 1 July 2021 to 30 June 2022

Transurban was an early starter in assessing environmental impact

For all these reasons Transurban started focusing on the environmental impacts of its vast infrastructure projects early on, publishing its first sustainability report in 2006 and developing a climate change strategy in 2010. It was not the first listed company in Australia to sign up to TCFD, but it now produces a detailed annual climate report and has had its 2030 interim decarbonisation targets validated by SBTi in 2020 (see the figure below). It has a well-defined governance and management structure for dealing with climate risks and a good sense of where the opportunities are. Its assets proved to be resilient during the torrential rains in NSW and Queensland in the first half of 2022, with the biggest negative impact coming from the restrictions placed on travel during the Covid pandemic rather than the extreme weather. And Transurban is lucky: most drivers prefer modern toll roads and tunnels to the more chaotic and congested old road networks during periods of heavy rain. You don't get stuck on a flooded bridge when driving on a Transurban road.

Large capital projects are its biggest source of emissions

The nature of Transurban's business model does present some challenges, however. Its biggest source of emissions comes from the construction of major capital projects, as happened in fiscal year 2020 (FY20) when total Scope 3 emissions increased by 26% to 634,566 tonnes of C02-equivalent. This led to a material deviation from its 2030 decarbonisation pathway (detailed below) and lower scores from rating agencies such as the Carbon Disclosure Project and Infrastructure Sustainability. But the good news is that Scope 3 emissions dropped by 32.5% in

FY21 as major works were completed and Scope 2 emissions fell an even more impressive 46% in FY22 thanks to a big increase in the use of renewable energy. Transurban meanwhile is banking significant "embodied GHG emissions savings" from efficiencies in design and construction of projects and the use of lower-carbon materials. And it is confident that its ratings will improve in the near future.

The company is not too bleak on the financial impact of climate

As for the financial impact of climate change on its business, Transurban remains relatively sanguine. It does not believe that physical risks will be material over the short to medium term, although it is taking action to strengthen its response capabilities to extreme weather and is clearly conscious about the need to address transition risks. Even over the longer term, the impact on its bottom line may be limited: Transurban not only benefits from inflation-adjusted increases to its tolls, the cost of future maintenance and repairs will likely be tiny in comparison to the massive capital required to build its assets.

Decarbonisation targets are provided in full

Figure 146

Transurban 2030 decarbonisation targets (base year = 2019)

Scope	Target (%)	Type	Unit	SBTi approved
Scope 1 + 2	50	Absolute		2020
Scope 3 (purchased goods and services)	22	Intensity	tCO_2e per vehicle km travelled	2020
Scope 3 (major projects)	55	Intensity	tCO_2e per $m capex	2020

Source: Transurban

Background

The bulk of electronic toll roads and tunnels in Australia are operated by Transurban

Transurban is the dominant operator of electronic toll roads and tunnels in three major cities - Sydney, Melbourne and Brisbane - on the east coast of Australia. It owns additional assets in North America, though these contribute far less to its revenue and earnings. The firm was founded in Melbourne in March 1996 when it emerged from a consortium of Transfield Holdings, a private Australian company with investments in infrastructure, industrial services and renewable energy, and Obayashi Corporation, one of Japan's largest construction firms. In 1995 this consortium won the contract to build and operate the new CityLink network of tollways in Melbourne.

Drive on their roads and in their tunnels in most big cities

Today Transurban operates 21 highways and tunnels: one in Melbourne (CityLink), 10 in Sydney, six in Brisbane; two in the Greater Washington, DC area; and one in Quebec. It has a further seven infrastructure projects in development in Sydney, Melbourne and North America, and more than a dozen potential opportunities. It boasts 6m customers in Australia and 3.7m in North America.

Ownership and operations

The company listed in 1999

Transurban (TCL) went public on the Australian Securities Exchange (ASX) in 1999 and remains one of only two locally listed issuers operating toll roads. The other is Atlas Arteria (ALX), only a fifth the size in market-cap terms. Major shareholders of TCL as of 11 July 2022 included UniSuper, a large Australian pension fund, and three passive asset managers from the US: BlackRock, State Street and Vanguard.

It partners with four large Australian investors

The company owns 100% of six of its 21 assets, with the remainder held by joint ventures and co-owned with strategic partners. Its partners include four large Australian investors - Australian Super, UniSuper, IFM Investors and QIC - as well as the Canada Pension Plan Investment Board from Toronto, CDPQ of Montreal, and Tawreed, a unit of the Abu Dhabi Investment Authority. Typically, Transurban holds a stake of between 50% and 75% in each of these joint assets.

A recent project links Sydney's west with the inner city

While Transurban has designed and built a number of its roads and tunnels, some have been acquired from other operators or state governments. One of its newest projects is WestConnex, a network of toll roads which will shortly be joining Sydney's west with the southwest via a tunnel.. This complex opened in 2019 and is described by the company as "one of the world's largest road infrastructure projects." It was acquired by a consortium led by Transurban in two stages from the New South Wales government in 2018 and 2021.

Main sources of emissions

Construction accounts for most of its emissions

Construction typically accounts for the largest component of Transurban's GHG emissions (Scope 3) and, as the table below shows, can vary markedly from year to year. In second place is the company's location-based Scope 2 emissions, mainly the use of purchased electricity for road lighting and tunnel ventilation, followed by the purchase of goods and services (another Scope 3 line item). Scope 1 emissions are relatively negligible.

Renewable energy purchases help to reduce scope 2 emissions

As the table also shows, Transurban is making considerable progress in reducing its Scope 2 emissions through the purchase of renewable energy. From a mere 3,753 tonnes of CO_2 equivalent (tCO_2e) in FY 2020, it saved 87,930 tCO_2e in FY 2022. This represented a 46% reduction in emissions. (We delve further into the firm's renewable energy performance below under "Strategy.")

Those emissions in full

Figure 147

Transurban GHG Inventory (tCO_2e), FY2019 to FY2022

	FY19	FY20	FY21	FY22
Total Scope 1&2	**122,346**	**136,955**	**196,341**	**106,392**
Scope 1	3,393	4,213	4,598	5,046
Scope 2 (market-based)	**118,953**	**132,742**	**191,743**	**101,346**
(Renewables emissions savings)	(2,935)[1]	(3,753)	(6,343)	(87,930)
Scope 2 (location-based)	121,888	136,495	198,086	189,275
Scope 3	**503,423**	**634,213**	**428,367**	**412,593**
Purchased goods and services	135,447	161,607	168,785	173,982
Capital goods (major projects)	261,168	405,348	218,335	201,944
Investments (non-managed assets)	86,032	46,547	14,481	12,394
Upstream fuel and energy related activities	16,445	17,058	24,240	20,695
Waste	1,769	2,241	2,416	2,544
Business travel	2,562	1,412	109	1,034
Total Scope 1 & 2 & 3	**625,769**	**774,383**	**624,708**	**518,985**
Customer travel emissions[2]	995,571	1,156,130	1,227,450	1,184,369

[1] FY19 savings from purchase of carbon credits. [2] Under the GHG Protocol customer emissions are not counted towards Transurban's Scope 3 emissions. Source: Transurban. (FY19 figures from FY20 Sustainability Supplement; remainder from Climate Change Disclosure FY22 report.)

Australian sustainability reporting requirements

Reporting requirements for ESG are scattered

Unlike most markets in Asia, Australia does not publish a single guidance document for listed companies on ESG or sustainability reporting. Issuers are instead required to follow a number of provisions set by company law and financial regulators:

- The Corporations Act 2001 requires limited liability companies to prepare an annual directors' report that contains a review of operations during the year, any significant changes in the entity's state of affairs and details of any matter that has arisen since the end of the year and could signficantly affect the entity's operations in future financial years. (Section 299)

The Act further states that the directors' reports of listed companies must also contain information that shareholders would "reasonably require to make an informed assessment" of the entity's operations, financial position and business strategies, including prospects for future financial years. (Section 299A(1))

In Australia this part of the annual report is called the "Operating and Financial Review" (OFR) and is equivalent to the Management, Discussion and Analysis (MD&A) reports in other markets.

- ASIC publishes an regulatory guide (RG247) on "Effective disclosure in an operating and financial review." In an update in August 2019, ASIC clarified how the company law applied to the disclosure of climate risks, emphasising that climate change was a systemic risk that would likely affect future financial performance. It stated unequivocally that it is "likely to be misleading to discuss prospects for future financial years without referring to the material business risks that could adversely affect the achievement of those prospects. This includes climate risk." The regulator also reassured directors that forward-looking statements on these issues would most likely not be viewed as misleading if they were based on the "best available evidence at the time." Another notable feature of the update was explicit encouragement of TCFD reporting.

  Lest directors think that the regulator will turn a blind eye to poor climate-risk reporting, Cathie Armour, a then-commissioner of ASIC, noted in an article in February 2021 that it undertook a surveillance programme on TCFD and climate reporting in the first half of the 2019-20 fiscal year. She added: "ASIC intends to adopt a consultative approach as we continue to monitor the adoption of TCFD reporting and the development of climate-risk disclosure practices over the coming period. However, as is always the case, we may consider enforcement action should there be serious disclosure failures."

- Australia's CG code, the "ASX Corporate Governance Principles and Recommendations," last updated in February 2019, includes an explicit reference to the disclosure of ESG risks. According to Principle 7.4: "A listed entity should disclose whether it has any material exposure to environmental or social risks and, if it does, how it manages or intends to manage those risks." The code also recommends using the TCFD framework for climate risk reporting.

- In November 2021, the Australian Prudential Regulation Authority (APRA) issued a practice guide for banks, insurers and superannuation trustees on managing the financial risks of climate change.

Australia strongly supports global sustainability reporting standards

Australia and ISSB

Australian accounting and auditing standard setters have been strong supporters of the development of a set of internationally comparable sustainability reporting standards under the newly formed International Sustainability Standards Board (ISSB). In December 2020, the board wrote to the IFRS Foundation in response to its first consultation on this issue, saying, "We think there is a pressing need for an organisation to emerge as a global leader with respect to reporting sustainability information - especially with regard to climate-related information." In July 2022, it made a submission to ISSB's consultation on its first two standards (general requirements and climate change) and again expressed overall support for the "intended scope and direction" of its work. It did, however, warn that ISSB's proposed standards, in their current form, would be unlikely to achieve their stated objectives. (For details, see the website of the Australian Accounting Standards Board: https://aasb.gov.au/media/gjpbg5xr/issb_submission_ifrs_s1_and_s2a.pdf).

Transurban is ahead of the curve on sustainability reporting

Transurban climate reporting and commitments

Transurban has generally been ahead of the curve on sustainability reporting in Australia, publishing its first report in 2006 and developing a climate-change strategy as early as 2010. In 2017 it set a science-based target for a 52% reduction in GHG emissions by 2030 (later amended to a 50% reduction against a slightly lower base in 2019). In 2018 it committed to TCFD. In August 2020 it became the first large listed company (ASX20) to have its targets validated by SBTi, although it was not the first ASX issuer to achieve this accolade. And it has been reporting to the Carbon Disclosure Project (CDP) since fiscal year 2020.

The company's commitments and goals in full

Figure 148

Transurban climate reporting, commitments and goals

Initiative	Status
Follows the TCFD disclosure framework	✓ since 2018
Annual sustainability report	✓ since 2006
Reports under the Carbon Disclosure Project (CDP)	✓ since 2020
Plan to achieve net zero by 2050	✓ Commitment made in FY21
Interim GHG reduction targets by 2030	✓ (Scope1, 2 and 3)
Aligns reporting with Global Reporting Initiative (GRI)	✓
Climate change strategy	✓ since 2010

Source: Transurban

Climate risk disclosure in Australia is advancing

Climate risk reporting in Australia

Disclosure on climate risk and opportunities by Australia's largest listed companies has advanced rapidly over the past five years, according to annual surveys by the the Australian Council of Superannuation Investors (ACSI). In October 2020, ACSI reported a more than quintupling in the number of ASX200 issuers adopting TCFD - from 11 in 2017 to 60 in 2019 - with a majority (60%) disclosing the carbon footprint of their operations (Scope 1 & 2 emissions). At the time, ACSI said there remained much room for improvement, including TCFD disclosure not being linked to the financial statements, only a third of companies setting CO_2 emission reduction targets and only seven having science-based targets.

More issuers are now reporting on climate

In its most recent report from July 2022, ACSI found disclosure had continued to "significantly improve," but noted that challenges remained. On the plus side: 104 issuers now report in line with TCFD either fully or partially; 95 issuers or 70% of the ASX200 market cap have net zero commitments (almost double the number in their previous survey); 96 companies have set interim targets from 2026 to 2039 (a tripling since 2019); 29 firms are applying a shadow carbon price in their decision-making and 36 have had one or more of their targets verified by SBTi. Meanwhile, Scope 3 targets, though considerably fewer in number than Scope 1 and 2 targets, are increasing - 28 issuers now have them.

Detail on scenario analysis are thin and few companies quantify financial impact

As for the challenges, there are few surprises here: scenario analysis needs to be more consistent, detailed and quantitative; only 40 firms are stress-testing their businesses against a 1.5°C scenario; there was only a small increase in the number of companies disclosing the impacts of physical risks and few issuers are quantifying the financial impacts of climate change.

1. Governance

The company formed a CSR committee 20 years ago

In the early 2000s, Transurban formed a CSR Committee to advise and report to its board on creating a consistent corporate social responsibility policy across all its toll roads and in each market in which it operated. This entity became a formal committee of its board of directors in 2006 and at the time comprised two independent directors (one of whom, Susan Oliver, was the chair), three external specialist advisors and representatives of management and employees. It met four times a year and was supported by a CSR Management Group, chaired by then-Managing Director Kimberley Edwards, and which met as needed. Other supporting elements included a specialist full-time CSR advisor and a Good Company Group made up of employees who worked with management on new CSR programmes. Despite the "CSR" label, the committee considered sustainability matters as well as community outreach and other social programmes.

By 2010 Transurban was providing more detail on sustainability governance

By 2008 the committee had been renamed the Sustainability Committee and, curiously, received little mention in that year's sustainability report. But in 2010 both the focus on sustainability reporting and governance had again become detailed. The Sustainability Report 2010 explained that management had conducted a review of the committee and whether it was still needed in 2009. This review recommended a limited term for the committee of December 2010 on the grounds that since sustainability was becoming sufficiently embedded in Transurban's operation, there would be "no additional value" from a separate committee. Certain sustainability performance measures for management were set and in August 2010 the board duly decided to disband the committee. Going forward all major sustainability matters were overseen by the board.

Sustainability matters are centralised in the Audit and Risk Committee

Today Transurban centralises discussion of sustainability matters in the Audit and Risk Committee (ARC) of its board. Among its other duties, the ARC has primary responsibility for the oversight of climate risk management and strategic business opportunities. The Sustainability Leadership Team within management reports to the committee at least twice a year, providing an update on major areas of progress and key issues going forward. The ARC also needs to approve the company's reporting suite, which includes its climate change report and other ESG data. The Nomination Committee and the Remuneration, People and Culture Committee play a supporting role.

Several management entities coordinate and manage climate issues

Within management there are several entities with responsibility for climate-related matters. A Climate Change Governance Committee coordinates the company's overall work and comprises representatives from legal, finance, risk, strategy and investor relations. This team feeds into the Risk Team, which oversees the company's climate-related risk assessments, and the Sustainability Leadership Team, which has responsibility for developing and executing Transurban's sustainability strategy, annual action plans and longer-duration projects. It comprises a team of six specialists across Australia and North America, and that was, until recently, led by Matthew Brennan, an environmental scientist and former town planner who moved into sustainability in 2006, first in property in Dubai and then in infrastructure in Australia from 2009, before joining Transurban in 2015. Matt has recently stepped away from the business in order to spend more time with his young family.

Additional oversight was given to the CFO and general managers in 2022

In FY22, the company reorganised this structure somewhat by giving the CFO and general managers in charge of risk/compliance and corporate affairs/investor relations additional oversight duties. This change saw the Sustainability Team move

from the strategy group to the Corporate Affairs (CA) and Investor Relations (IR) division. While the rationale for such a move is not immediately obvious, the company argues that it is in fact a better way to integrate sustainability into the business. This is not just because CA and IR have responsibility for corporate reporting, which has been rapidly expanding to incorporate new elements such as TCFD and related climate content. It is also because CA and IR report to the CFO, Michelle Jablko, who has broad responsibility for sustainability. Jablko joined Transurban in 2021 and came from a career in commercial and investment banking.

The focus was on better integration of climate issues into the business

Jessica O'Brien, General Manager for Corporate Affairs, Investor Relations & Sustainability, comments further: "The Sustainability Team has operated as a very effective team, but the idea was to integrate them more into the business." O'Brien, who joined the company in 2015, says there is a lot of overlap between sustainability and IR, especially with increasing investor interest, while the goal today is not to focus on sustainability as a separate specialisation but to drive cultural change internally to "make sustainability everyone's business."

Figure 149

Transurban climate governance structure

Source: Climate Change Disclosure FY22, p11

Where the board adds value

An inquisitive board puts climate strategy to the test

In a broad sense, the board adds value by doing what boards are supposed to do: asking pertinent questions and stress-testing management's sustainability strategy. Directors also give feedback on management's "level of ambition," says Matthew Brennan, then Head of Sustainability, and have provided guidance on what other corporations are doing in terms of climate strategy. "This is invaluable from a competitive standpoint," he says. An example of a decision made with input from the board was the FY21 commitment to net zero by 2050.

Here are the climate issues the board examined in 2022

In terms of specific items discussed, over FY22 the board focussed on a number of climate-related matters. It:

- ❑ Assessed Transurban's climate change management framework against the key findings of the sixth assessment report from the Intergovernmental Panel on Climate Change.
- ❑ Examined the company's ratings for climate change threats and opportunities (see below for further details).
- ❑ Monitored progress towards Transurban's 2050 and 2030 emission reduction targets.

A specialist sustainability committee is not on the cards

It seems unlikely that Transurban will be reforming a specialist sustainability committee any time soon. It is comfortable with the ARC being the locus of discussion and notes that most directors attend all or most of its meetings. Moreover, the full board has regular general discussions on ESG issues.

Individual board members have been singled out for their particular input

Management also credits individual board members with helping Transurban get moving on sustainability and climate in the early days. Sue Johnson, Group Executive, Queensland and one of the company's longest serving executives having joined in 2001, cites for example Samantha Mostyn, a high-profile independent director in Australia who served on the Transurban board from 2010 to 2021, and Christine O'Reily, former chair of the ARC and an independent director from 2012 to 2020. Mostyn brought expertise in sustainability management to the board and was a member of the NSW Climate Change Council, while O'Reilly had experience in finance and infrastructure, and was a director of one of Australia's largest energy generator-retailers, Energy Australia.

Directors on subsidiary boards also add expertise

Directors add a further dimension of expertise through Transurban's subsidiary boards, which is where its partner shareholders have influence. Each joint venture entity is chaired by an independent director and includes directors with a mix of expertise. In Queensland, for example, the subsidiary board has some energy expertise that proved useful when planning the purchase of renewable energy.

Nomination

Board skills matrix includes climate change knowledge

While the company's "Corporate Governance Statement" does not include an explicit reference to climate change in the nomination process for new directors, the accompanying board skills matrix indicates that it does consider this as part of a broader "governance, compliance and sustainability" category. This is described as a "commitment to, and knowledge of, governance and sustainability issues (including the legal, compliance and regulatory environment applicable to transport infrastructure and climate change)". Just under half of the 11 directors are assessed as having a "deep" level of expertise in these areas, while the remainder are classified as "competent." No formal board training is provided to directors on sustainability or climate change, but this is something the company may look at in the future.

Remuneration

ESG targets are linked to short-term executive remuneration

A stronger and more explicit area of focus today is the linking of ESG targets to short-term executive remuneration. In October 2021, Transurban narrowly suffered a "first strike" of 25.74% against its remuneration report in that month's annual general meeting. A strike means a vote against of 25% or more. The opposition was mostly related to delays caused by an ongoing dispute in the West Gate Tunnel Project (WGTP) in Melbourne and arguments as to when executives should take a hit on their total pay. The board decided not to reduce compensation in FY21

because the WGTP dispute had not been resolved and it did not know the terms of the final settlement. Following resolution in March 2022, the board duly cut the short-term incentive (STI) awards to the CEO and other senior executives.

Performance measures have been adjusted for FY2023

At the same time, the board adjusted the performance measures in the STI remuneration framework for FY23 by including, among other things, a 15% weighting for "sustainability, reputation and leadership," It is understood that these changes were already in train prior to the first strike and that the board previously had the discretion to apply certain non-financial metrics to remuneration outcomes. This has now been formalised.

Remuneration report for 2022 saw just over 5% of shareholders vote against

As a result of these measures, the "second strike" did not come at Transurban's AGM in late October 2022 - just 5.17% of shareholders voted against the remuneration report. Under Australian law introduced in 2011, if companies receive two strikes in consecutive years they must immediately put forward a "spill motion" that allows shareholders to vote on whether another general meeting should be held within 90 days to "spill" the entire board. All directors, except the managing director, are then up for re-election. Transurban did not need to put this motion forward in 2022.

2. Strategy

The company was an early mover by publishing a climate change strategy in 2010

Transurban started developing a climate change strategy in August 2010, making it one of Australia's first movers in this space. The strategy contained a range of initiatives and action plans to assess such things as the impact of changing weather patterns on its toll roads, starting with CityLink in Melbourne, the potential impact of a proposed Federal government carbon pricing scheme on road assets (the tax was never introduced) and how to educate customers on reducing emissions when driving. The strategy also continued work already started by Transurban on developing an inventory of its own GHG emissions and how to reduce them.

Sustainability was identified as key challenge in 2006 sustainability report

While the strategy formalised Transurban's approach to climate change, it was not the company's first foray into the issue. Its inaugural Sustainability Report 2006 highlighted climate change as one of three major sustainability challenges the firm had to address. The other two were "managing growth" (maintaining environmental and social commitments as the company expanded) and how to respond effectively to the intense debate at the time on private investment in public infrastructure, the "public private partnership" model.

Transurban had been gathering data by then

The 2006 report illustrates the extent to which Transurban had already been thinking about climate change at the time. The document reported that the company had already gathered some data on its Scope 1, 2 and 3 emissions, provided examples of specific projects for reducing greenhouse gases (with targets by set dates), and contained a balanced argument highlighting both the environmental upside of toll roads ("vehicles travelling on toll roads where there are no cash toll booths produce lower volumes of greenhouse gases than they would to complete the same journey on alternative routes") and a downside ("there is no doubt that free flow roads induce demand").

Current climate strategy adopts six high-level themes

Jumping forward to the present, Transurban's current guiding strategies are outlined in its "Climate Change Strategic Risk Themes" and "Climate Change Framework", released in FY20. The first comprises six high-level themes (four threats and two opportunities) and addresses the material physical and transition risks associated with climate change over the short, medium and long term. Notably, Transurban sees the probability of negative impacts from climate change as more of a long-term issue.

The Framework divides the company's response into three broad areas: transition to net zero, resilient infrastructure and operations and governance.

Four risks

Four main risks are identified

The four main risks or "threats" identified by Transurban as potentially affecting its operations, financial performance or reputation include:

1. Unexpected changes to stakeholder expectations, government policies and regulation on climate change
2. Increased incidence of severe weather events and temperature affecting operations and increasing costs
3. Macroeconomic or land use changes resulting from government policies or regulations, and severe weather, altering city travel patterns
4. Access to and use of roads and tunnels restricted by extreme weather events

Transurban has applied a risk management analysis and response to each of these threats in its Climate Change Disclosure FY22 report, a standalone report that was formerly part of its Sustainability Supplement. Each threat is assessed against criteria such as their risk rating (low, medium, high), relevant climate change scenarios (ie, 1.5°C, 2°C, 4°C), possible impact on financial categories, relevant physical risk and transition categories, potential business impacts and management responses. One point worth highlighting is that despite emphasising climate risk as more of a long-term rather than short- or medium-term problem, Transurban outlines a range of "short-term focus areas" where it needs to act on each threat over the next one to three years. Long-term impacts, in other words, still require short-term preparation. Michelle Jablko, CFO, says the key is to get ahead of transition and other risks: "You need to de-risk into the future. I came from a bank. The allocation of capital will only go to those thinking about the long-term."

CRAMPs

Stress tests are performed on specific assets and a plan is devised to respond

An important new plank of the company's evolving strategy is its "Climate Risk and Adaptation Management Plans" (CRAMPs) initiative. This process stress tests specific assets and works up a plan for responding. To date three are covered: the first two in Queensland (a tunnel and open road) and a third in NSW (an open road). Queensland was chosen first because it suffers higher levels of rainfall than other states. To date, the three plans account for 14% of total assets.

A set of guidelines ensures the process is consistent

To ensure consistency across the different CRAMPs, the company has developed a Climate Change Risk and Adaptation Guideline. This aligns with the company's broader enterprise risk management system and "describes the process we use to identify, assess, manage and escalate climate-related risks," according to the Climate Change Disclosure FY22 report. The risks are then documented in "asset-specific CRAMPs which ensures we are operating as a business within our risk appetite."

Examples of assessments includes the impact of changing weather patterns

In practical terms, CRAMPs involve assessing such things as the impact of changing weather and temperature on road pavements, developing long-term maintenance plans as well as instant responses to urgent operational issues and thinking about how the design of roads and tunnels could be smarter. Sue Johnson, head of Queensland, says they are always looking globally for ideas and new technology, such as new composites, to extend the life of pavements, a major capital item that has a 10-year life. "I never thought I would be so passionate about pavement!" says Johnson.

Transurban attempts to gauge the lifecycle of assets

On maintenance, a key goal is to understand the lifecycle of assets and get ahead of the curve. Johnson notes that while the short-term impact of extreme rainfall in Brisbane in mid-February 2022 may not have been that damaging for Transurban in hindsight, "It was not without effort" on the part of their asset management team. They deserve credit for being prepared and ensuring that all the pumps and mechanical equipment was running and able to remove water quickly. "A lot of water in the tunnels had to be removed. The team did a stellar job." Such instant response and quick maintenance was the result of a lot of training and preparation.

Asset resilience

Its annual report shows how assets have weathered extreme climate

Transurban's latest climate change report for FY22 includes case studies on how well its assets in Melbourne, Sydney and Brisbane weathered a series of extreme climate events over 2019 to 2022. It looked at the impact of severe storms in Melbourne in January 2022, bushfire-related haze in Sydney over December 2019 and January 2020, and unusually heavy rainfall in Brisbane in February 2022. For each it concluded that the impacts, while real, were manageable, relatively minimal overall and short-lived.

Two opportunities

Transurban identifies two main climate-related opportunities

The two main opportunities identified by Transurban as potentially strengthening its market position, relationships and reputation include:

1. Opening new market opportunities by showcasing its leadership in climate-risk management
2. Taking proactive steps to reduce its own greenhouse gas emissions, help customers reduce their emissions and transition to net zero

Each opportunity is assessed against a similar range of criteria as used in the analysis of threats, followed by management actions and short-term responses needed. One interesting new opportunity is Transurban's involvement as a founding member of the Materials and Embodied Carbon Leaders' Alliance (MECLA), a new industry body formed in 2021 and funded by the NSW and South Australian state governments as well as more than 40 corporations and municipalities. MECLA's goal is to drive usage of lower- and low-carbon materials in the building and construction industry. But perhaps an even more exciting near-term opportunity is the rapid expansion of renewable energy in Australia.

The age of renewables

Renewables are gaining ground in some states

While the international perception of Australia in recent years has been of a country dragging its feet on climate change and renewable energy - something true of federal government policy until recently - the story at the state and corporate level has been more positive. State governments in NSW, South Australia and Victoria have advocated renewable energy for many years, with Queensland now joining the push. Tasmania's electricity sources are 100% renewable (mostly hydro, backed by wind), while South Australia is already at 60%+. And private sector investment has been considerable, especially in wind and solar, with big plans in the works for battery storage.

Growth in renewables is helping with Transurban's decarbonisation

This rapid growth of renewable energy has had a marked impact on Transurban's decarbonisation progress, in particular its Scope 2 emissions, which fell 46% in FY22. The company currently has four long-term power purchase agreements (PPAs) with different providers - two wind farms in New South Wales (NSW), one wind farm in Queensland and one in Victoria. The NSW and Queensland agreements came on stream in 2021 and 2022, while the Victorian one is due to

start in 2024 (see figure below for more details). By June 2022 the company was sourcing two thirds of its overall electricity needs from renewable energy, with some assets covered to a greater degree than others. For example:

- **Sydney:** 80% of assets covered by renewables since July 2021 (excluding NorthConnex, a new tunnel that opened in October 2020)
- **Brisbane:** 80% renewable since January 2022
- **Melbourne:** CityLink was 50% renewable since January 2022, with 100% expected by January 2024
- **Greater Washington Area:** 0% (relies wholly on the grid)
- **Montreal:** also relies on the grid, but this is 99% renewable

Not surprisingly, Transurban is exploring renewable opportunities in the US. Overall, the company's use of renewable energy increased from 56% to 66% over FY22 alone.

Savings have been palpable by using more renewables

While Transurban is coy about savings from moving to renewables, it readily admits they have been substantial - and helped considerably in 2022 due to a marked and unexpected rise in wholesale spot prices during the winter.

Here are details of state-wide renewable power purchase agreements

Figure 150

Renewable energy power purchase agreements (PPAs)

Name	State	Commenced	Contract length
Sapphire Wind Farm	NSW	May 2021	9 years 9 months
Bango Wind Farm	NSW	June 2022	9 years 9 months
Coopers Gap	Queensland[1]	January 2022	4 years 6 months
Origin Energy	Victoria	January 2024 (expected)	7 years (expected)

[1] A previous PPA signed with Lakeland Wind Farm to support the Queensland operations is no longer in effect.
Source: Transurban

Energy efficiency also plays a key role

Energy-efficiency drive

While renewable energy does the "heavy lifting" in reducing emissions, to quote former Head of Sustainability, Matthew Brennan, energy efficiency is playing a smaller but not insignificant part. In 2013, Transurban launched its "10 in 10" plan to deliver 10% energy efficiency savings over 10 years. The main focus has been tunnels, where ventilation and lighting account for the majority of energy used. In FY22, several major efficiency initiatives were completed, bringing total energy efficiency savings to a cumulative 8.3% and reducing annual consumption by 46,815 GJ.

The company is working with suppliers to help with scope 3 emissions

Supply chain emissions

Given that Scope 3 accounts for around 70% to 80% of its total emissions, with construction and purchased goods and services making up the bulk of these, Transurban is working more closely with suppliers to understand their approaches to managing climate risks. In FY22 it started asking its top 50 suppliers (not including those working on major construction and development projects) to report voluntarily to the Carbon Disclosure Project (CDP) on an annual basis. This will provide Transurban with a consistent and regular data set on how its suppliers are identifying, mitigating and managing risks, and reducing their own emissions.

Transurban gathers data on suppliers' transition risks

In the first year of this exercise, Transurban gathered information on 56 physical and transition risks provided by suppliers across a range of industries, including professional services, IT, engineering, intelligent transport systems equipment and telecommunications. The key risk hotspots were Japan, India, Europe, the Philippines and Australia, with lesser risks reported from suppliers in China, Taiwan, Chile, the US and UK. The company said supply chain risks highlighted in their FY2022 disclosure reflect quantity of risk, not necessarily significance. Quantum of risk may also be an indicator of supplier maturity, with greater maturity often reflected in a greater number of identified, reported and managed risks. In this context, the company says that suppliers in these markets do not face lower risks, just that there were fewer reported risks. Transurban will use this information in its sustainable procurement program and will continue to engage suppliers on their management of climate risk.

Advice on gathering scope 3 data: delay no more

While gathering Scope 3 data is challenging and "demands commitment from the organisation," says Matthew Brennan, former Head of Sustainability, "over time it definitely gets easier." His advice to companies starting on this journey is to get moving as soon as possible. "It is always clunky at the beginning."

Financial impacts

Covid had a bigger impact on finance than climate in 2021 and 2022

Despite the extreme rain and flooding across coastal areas of eastern Australia in 2021 and 2022, it was Covid rather than climate change that has had the biggest impact on Transurban's business and performance. Sydney had 100 days of lockdowns in 2021 during which time it was illegal to drive on Transurban's roads. Melbourne was even worse, as the following charts on daily traffic volume show. Interestingly, Brisbane was less affected. The financial impact of reduced customer journeys was balanced to a degree by what could be described as Transurban's natural hedge against the physical risks of climate change:

- **Online shopping:** With people working from home for much or all of the week, and restrictions in place on moving about, they shopped online more. This in turn led to a higher proportion of delivery vehicles on the roads. The good news for Transurban is that tolls for heavy vehicles are higher than for light vehicles and this freight pattern has not changed since the lockdowns.
- **Driver behaviour:** A FY21 case study on driver behaviour found that while the default option is not to travel during extreme rainfall events, those who do are more likely to drive their own cars and use safer, less-exposed toll roads and tunnels. Transurban says that the same driver behaviour was evident in 2022. It qualifies this by noting that the state of the suburban feeder roads to its highways also determines whether people are willing to drive and is not something it can control.

Longer term, climate may have a greater impact on finances

For all these reasons, the physical risks of climate change have not yet become a material issue for Transurban's financial performance or position, and the company believes this is unlikely to change in the short to medium term. What about the longer term? As its most recent Climate Change Disclosure report notes, a FY22 exercise focused on the M2 Hills motorway in Sydney helped to move Transurban closer to estimating the potential financial impacts of climate change and improved its confidence in "the likely success of planned and proposed adaptation measures," The report further states: "We acknowledge that there may be potential material financial risks in the future associated with climate change. At this stage, we have identified potential climate-related material impacts for the business and plan to quantify the potential financial impacts into FY23 and beyond."

Growing investment may offset these long-term risks

The key word here is "may." A major differentiator for Transurban is that the vast bulk of the capital it raises through debt and equity goes into the construction of assets that operate under concessions lasting 30-40 years. Users then pay for these assets over the term of their lives. While climate change will almost certainly have some impact on its roads and highways (see box below), driving up maintenance and other costs, such as the need to pump more water, these costs will likely be small relative to the investments already made in the physical infrastructure. "We see very little likelihood of impairment risk to our business," says Michelle Jablko, CFO. She also notes that Transurban takes a conservative approach to impairment testing and allows a lot of headroom. As for loss of revenue, experience to date suggests that even severe rainfall has only a short-term impact. People delay trips but then often do them later. And tolls are set by the concession agreements with government, with the majority rising in line with inflation.

Heat, floods and drought are all bad news for drivers

What climate change does to a road

Transurban has undertaken scenario analysis aligned with TCFD recommendations, Australian government commitments under the Paris Agreement and the three standard "representative concentration pathways" (RCP) recommended by the Intergovernmental Panel on Climate Change (IPCC), namely RCP 2.6, 4.5 and 8.5 covering warming to 1.5°C, 2°C and 4°C, respectively. An interesting case study in its Climate Change Disclosure FY22 report describes in some detail the possible impacts on roads of the most extreme 4°C scenario from today until 2100. The analysis covers structures and surfaces, non-structural elements such as landscaping and drainage. A few highlights:

- **Structures and surfaces:** Higher temperatures lead to accelerated deterioration of the road surface. Subsidence following drought reduces soil stability. Sea-level rise leads to increased salinity and corrosion of structures and materials, as well as permanent inundation of footings and low-lying structures.
- **Landscaping:** Higher temperatures damages plant health. Extreme weather causes landslides and erosion. Flooding also damages vegetation.
- **Drainage:** Higher temperatures cause accelerated deterioration of drainage surfaces and structures. Extreme weather reduces capacity and causes system overload. Drought leads to sediment build up and potential fire damage.

For each of these three areas, Transurban outlines the current controls it has in place and likely action required over the short and medium term. This is also why the design of its assets is so important. For its open roads it factors in the possibility of a once in a 100-year rainfall event and for its tunnels a once in a 1,000-year event.

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Risk management, metrics and targets: Key highlights

- Given climate change is considered a strategic business risk, climate risk management is included in Transurban's Group Enterprise Risk Management Framework.
- Transurban's climate-related disclosure is sound, in our view, reporting its climate related risks under six themes (four threats and two opportunities), which represent the most material and relevant climate risks to the company.
- Transurban is still in the process of understanding the financial impacts posed by physical climate change, but it does not believe these will be significant.
- It was slightly behind its 2030 interim target reduction pathway in FY22. This was due to delays in the construction of a windfarm, which is now fully operational. Hence it is expected that FY23 emissions will be back on track.

3. Risk management

As Transurban considers climate change "a strategic business risk," the company's climate-related risk management is included in its Group Enterprise Risk Management (ERM) Framework. This is highlighted by the fact that climate-related threats and opportunities are included in the overall businesses "Key risk - Opportunities and threats" within its recently released 2022 Corporate Report.

Transurban includes its climate-related risk in its overall ERM Framework . . .

The company has had an ERM Framework in place since 2015, with climate change risk management incorporated into the ERM as a whole since 2020. The ERM guides the identification, assessment, management and escalations of risk. It also highlights relevant reporting lines, while also outlining the roles and responsibilities of various business units/levels.

Figure 151

Transurban's ERM Framework

Annual activity	*Quarterly activity*	*Continuous activity*		
ARC/Board			**Business Resilience**	**Internal Audit**
Review ERM effectiveness and approve changes Review and update Risk Appetite	Review material and emerging risks		Provide assurance of resilience capability and preparedness Reporting on learnings from exercises and incidents	Update audit plan based on key risks and themes
Executive Committee				
Review ERM effectiveness and approve changes Review and update Risk Appetite	Review key business, strategic and emerging risks	Risk and Compliance status reporting	Consider emerging threats and catastrophic risks Exercise and test business response	Annual review of business compliance
Markets and Business units				
Set risk objectives and priorities in Business Plan Update risks in line with objectives	Consolidate and review key business and operational risks	Validate key risks and compliance requirements Review key risks and treatments	Exercise and test response to disruption risks Validate preventative controls	Internal Audit plan review and update to reflect any emerging risks
Projects, Development Proposals and Acquisition				
Set risk objectives and priorities in Business Plan Update risks in line with objectives	Formal review of Risk Registers	Validate key risks and compliance requirements Review key risks and treatments	Identification of risks that could disrupt the safe and continuous operations of our assets or critical business processes	Audit Reports issued including assessments of controls and management actions to enhance the control environment

Source: Transurban

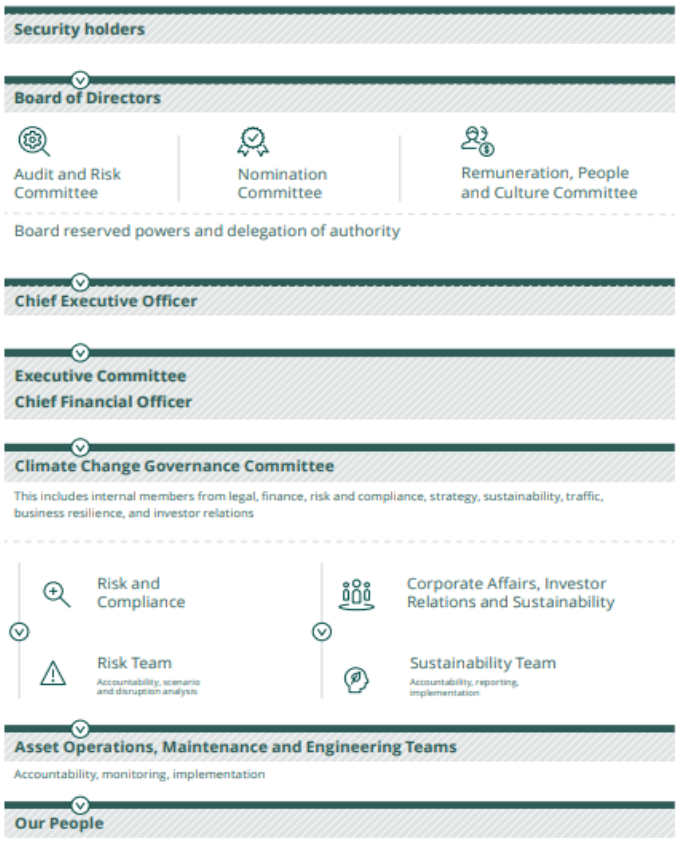
Disclosure of the risk management framework is robust, while incorporation of climate-related risks into overall business risk is consistent with TCFD Status Report 2021 (link). One point of disclosure we think could be improved is provision of additional information on how risks are actually identified and assessed.

. . . which is best practice under the TCFD Status Report 2021

The board and the Audit and Risk Committee (ARC) oversee the ERM Framework, while it is actively managed by the CEO and Executive Committee. An internal Climate Change Governance Committee (which includes internal members from legal, finance, risk and compliance, strategy, sustainability, traffic and business resilience, and investor relations) provides twice-yearly updates to the ARC and board on climate-related aspects.

Figure 152

Transurban's climate change governance structure



Source: Transurban

Figure 153

Transurban's assessment of TCFD's impact categories

TCFD Impact category[4]	Summary of potential organisational impact	Strategic climate-related threat or opportunity where this is monitored
Products and services	• Continued escalation in fuel prices affecting customers. • Cumulation of physical risk affecting customer access to our assets.	Threats 1, 3 and 4 and opportunity 1
Supply chain	• Cumulation of physical and transition risk affecting our supply chain leading to increased cost of materials, product availability shortage, and delivery delays. • Need for proactive engagement with supply chain to mitigate potential climate-related risks.	Threats 1 and 2, and opportunity 1
Adaptation and mitigation activities	• Increased maintenance and rectification cost for assets not designed for projected physical threats. • Need for proactive engagement with external stakeholders such as government partners to enhance climate resilience.	Threats 2 and 4, and opportunity 1
Investment in research and development	• Increased need for research and development; likely focused on the application of low-carbon materials.	Opportunity 1
Operations	• Cumulation of physical threats affecting customer and staff health and safety. • Increased operating cost due to changing environment (physical and transition).	Threat 2 and opportunity 2
Acquisitions or divestments	• Consideration of climate change as part of due diligence	Threat 1 and opportunity 1
Access to capital	• Need to demonstrate robustness and transparency of climate change commitments and asset resilience.	Opportunity 1

Source: Transurban

In FY22, Transurban engaged a climate specialist to complete a detailed review of key climate risk drivers across its operational assets. The review was undertaken to understand potential materiality across the organisation associated with climate change impacts. Materiality "has been determined by the potential long-term horizon of the risk, likelihood the risk will be realised and relationship with our organisational strategy and financial systems."

Financial implications of climate-related risks being formulated

Transurban reports its climate-related risks under six themes (four threats and two opportunities), which represent the most material and relevant climate risks to the company. Outside of the financial risks for each of them, disclosure is sound, highlighting the risk rating, relevant climate scenarios and timeframe, and risk category, potential business impacts and Transurban's response and near-term focus areas.

Figure 154

Transurban's climate-related risk themes

Threats

Threat 1

Unexpected changes to stakeholder expectations, government policies and regulations in relation to climate change create an unfavourable operating environment, impacting our reputation and financial performance

Threat 2

Increased incidence of severe weather events and average temperature affects lifecycle planning, disrupts operations, and increases operating costs

Threat 3

Macroeconomic and/or land use changes caused by government policies and regulations, and severe weather events, alter city travel patterns and toll road use impacting traffic models and revenue

Threat 4

Access to and use of our roads and tunnels are impacted during extreme weather events and in periods of extended rain or heat

Opportunities

Opportunity 1

Showcase our leadership in climate risk management to open new market opportunities, strengthen relationships with existing government partners, and capitalise on innovation

Opportunity 2

Take proactive steps to reduce Scope 1, 2 and 3 greenhouse gas emissions and customer emissions, and transition to net zero

Source: Transurban

Transurban is in the process of understanding the financial impacts of climate change, but does not expect them to be material

Transurban is still in the process of understanding the financial impacts posed by climate change. Its current understanding of climate financial risk is that it will have an impact on at least one of TCFDs four major financial categories (revenue, expenditures, assets and liabilities and capital financing), particularly over the long term.

Research and discussions with external advisors to this point suggests that the key impact areas of climate change include the impairment of assets, maintenance provisions, contingent liabilities and expenses. However, further work is required to more thoroughly understand the potential financial impacts before reporting those financial impacts. Even then the business does not believe that the physical risks will be material over the short, medium and long term.

The company also notes that future financial disclosures will also consider the ISSB's first two standards.

4. Metrics and targets

Transurban reports its climate related targets across two threats and two opportunities

Transurban discloses its climate-related targets across two threats and two opportunities consistent with the themes outlined in climate-related risk response under its ERM Framework. Each has a number of separate individual metrics that the company uses to monitor its progress against mitigating its climate-related risks. Against each metric is a balance for three consecutive years (in order to show trends), a description of the trend, metric type ("Improve" or "Monitor"), financial category and commentary.

For all metrics bar one, the unit of measure is quantitative, which we commend as it removes a level of judgment from the progress made against each over the years.

2050 net zero target set in FY21

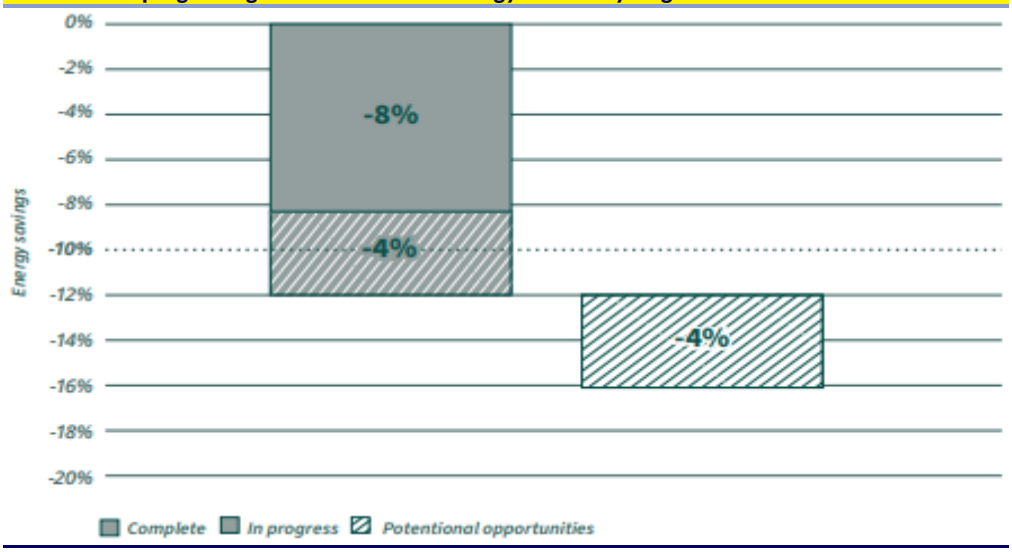
Transurban has reported Scope 1, 2 and 3 emissions since 2006 with data available back to 2003. The earliest sustainability target was also set in 2006 with the company targeting a reduction in greenhouse gas (GHG) emissions on its CityLink toll road by 5,000 tonnes per annum (pa) by 2011.

One of its most significant early climate related targets was its "10 in 10" programme, which looked to achieve 10% energy-efficiency savings by 2023 against a 2013 baseline. Transurban is making solid progress against this target and is exploring additional opportunities to achieve greater energy efficiency beyond the 2023 target year.

Transurban is making solid progress against its "10 in 10" energy-efficiency target

Figure 155

Transurban's progress against its "10 in 10" energy-efficiency target



Source: Transurban

Since that point, Transurban has released climate-related targets periodically, culminating in its first group GHG emissions reduction target in 2016 of 50% lower Scope 1 and Scope 2 emissions by 2030. A summary of Transurban's climate-related targets over years is provided in the table below.

Transurban has a number of targets

Figure 156

Transurban climate reporting, commitments and goals

Target	Detail
10 in 10 energy-efficiency target	Achieve 10% energy-efficiency savings by the end of FY23 from a 2013 baseline
2030 interim targets (2019 baseline)	50% absolute reduction in Scope 1 & 2 GHG emissions by 2030
	Reduce the carbon intensity across our major projects by 55% by 2030 (Scope 3 tCO_2e from supplier spending, per A$m project capital cost)
	Reduce the carbon intensity of the goods and services it purchases from suppliers by 22% by 2030 (Scope 3 tCO_2e from supplier spending, per km travelled on its roads as a measure of business output)
2050 net zero	Net zero GHG emissions across all scopes by 2050 using 2019 baseline

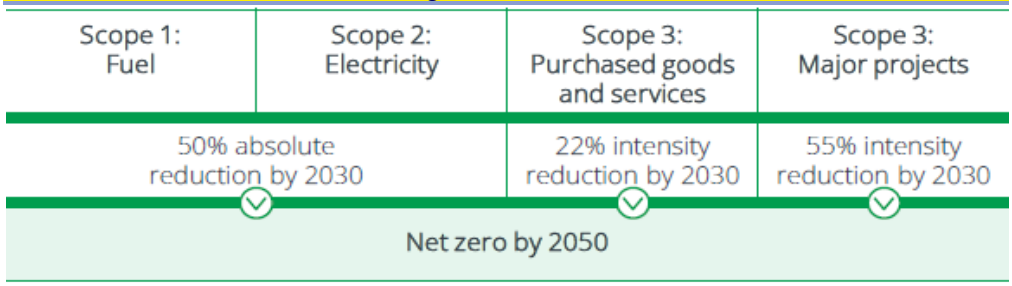
Source: Transurban

In FY20 the company joined the Science-Based Targets initiative (SBTi) and had its targets validated by the group. From that point, the targets were aligned with the UN Paris Agreement and encompassed Scope 1, 2 and 3 emissions. Shortly following this the company released its 2050 net zero target in FY21.

Transurban is making good progress against its 2030 targets

Figure 157

Transurban's SBTi validated emissions targets



Source: Transurban

Transurban making solid progress against its emissions targets

As a base, the business provides emissions definitions of its Scope 1, 2 and 3 emissions on its website.

Figure 158

Transurban's Scope 1, 2 and 3 definitions

Scope 1	Scope 2	Scope 3
Fuel emissions	**Electricity emissions**	**Supply chain**
Emissions from fuel used in our operations, including our own fleet and our incident response team contractor.	Emissions from electricity powering our roads and tunnels (such as lighting, ventilation, signage and tolling infrastructure), control centres, offices and electric vehicles.	Emissions associated with materials used in building or maintaining our roads and tunnels or from manufacturing and providing goods and services to us.

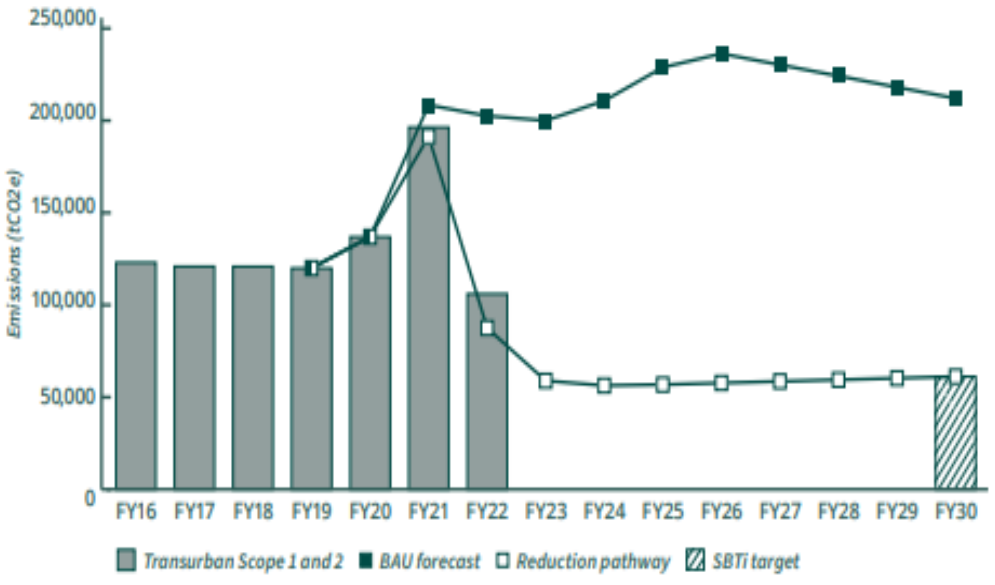
Source: Transurban

Transurban is making good progress against its 2030 targets

Through one of its opportunities, Transurban measures and discloses its emissions and progress against its 2030 and 2050 emissions targets. Scope 3 is the company's largest emission category, largely related to the construction and development of its toll roads. Scope 2 emissions are the next largest category with electricity purchased to illuminate roads at night along with lighting tunnels and tunnel ventilation. Scope 1 is the smallest category and largely relates to fuelling the company's vehicle fleet.

Figure 159

Transurban's progress against its "10 in 10" energy-efficiency target



Source: Transurban

Transurban was slightly behind its 2030 target pathway in FY22, but should be back on track in FY23

It is our understanding that the "10 in 10" programme along with its renewable energy program, have been key in driving emissions reductions to date. We understand that two-thirds of the company's electricity requirements are now being met by renewable energy.

As the figure above suggests, Transurban was slightly behind its reduction pathway in getting to its 2030 target in FY22. This was due to delays in the construction of a windfarm associated with one of its NSW PPAs. With the windfarm now fully operational, it is expected that FY23 emissions will meet its reduction pathway.

With the company's significant opportunities pipeline, we look forward to tracking the company's progress against its FY30 targets as we would expect emissions would increase as the company's network increases in size. We are confident that the company will meet its target but it will be important for it to find new renewable energy sources when current agreements end and energy requirements (given new opportunities) increase.

Companies mentioned

Abu Dhabi Investment Authority (N-R)
ACC (ACC IB - RS2,602.3 - O-PF)[1]
Alphabet (N-R)
Amazon (N-R)
Ambuja Cements (ACEM IB - RS581.9 - SELL)[1]
Apple (N-R)
Arla Foods (N-R)
Astra Graphia (N-R)
Atlas Arteria (N-R)
Australian Super Pty (N-R)
Bellamy's (N-R)
BHP (BHP AU - A$46.60 - O-PF)[1]
Boliden (N-R)
Boston Consulting Group (N-R)
Canada Pension Plan Investment Board (N-R)
Catcher Tech (N-R)
Cathay FHC (N-R)
CDPQ (N-R)
China Modern Dairy (1117 HK - HK$0.97 - BUY)[1]
China National Cereals, Oils & Foodstuffs (N-R)
China Resources Vanguard (N-R)
China Shengmu (N-R)
Chunghwa Pic Tube (N-R)
Cisco (N-R)
CLP (N-R)
Coca Cola Bottlers (N-R)
Cold Storage (N-R)
CR Gas (N-R)
Cycle & Carriage (N-R)
Dalmia (N-R)
Danone (N-R)
Dell (N-R)
Deloitte Touche Tomatsu (N-R)
DFI (DFI SP - US$2.82 - O-PF)[1]
Dumex Baby Food (N-R)
Energy Australia (N-R)
Gammon Construction (N-R)
Google (N-R)
Hana Financial (086790 KS - ₩44,100 - BUY)[1]
Hermes (N-R)
HK Electric (N-R)
HK Exchanges (388 HK - HK$321.20 - BUY)[1]
Hon Hai (2317 TT - NT$102.0 - BUY)[2]
Honda Motor (7267 JP - ¥3,287 - BUY)[1]
Hong Kong Air Cargo Terminals Limited (N-R)
Hong Kong Electric (N-R)
Hongkong Land (HKL SP - US$4.31 - O-PF)[1]
HOPU (N-R)
IFM Investors (N-R)
ITE Tech (N-R)
ITeX (N-R)
Jardin Motors Group (N-R)

Jardine Aviation Services (N-R)
Jardine C&C (JCNC SP - S$28.03 - U-PF)[1]
Jardine Engieering Corporation (N-R)
Jardine Matheson (JM SP - US$48.42 - BUY)[1]
Jardine Motors Group UK (N-R)
Jardine Pacific (N-R)
Jardine Strategic (N-R)
John West (N-R)
John West Foods Limited (N-R)
KB Financial (105560 KS - ₩50,800 - BUY)[1]
Komatsu (6301 JP - ¥3,084 - BUY)[1]
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MTR (66 HK - HK$37.10 - BUY)[1]
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Okeanos Food (N-R)
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Proterra Inc (N-R)
QIC (N-R)
Reb Lobster Holding Company (N-R)
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Sharp (N-R)
Shinhan (055550 KS - ₩37,250 - BUY)[1]
Shree Cement (SRCM IB - RS24,266.5 - U-PF)[1]
Singapore Stock Exchange (N-R)
Swire Beverages (N-R)
Taiwan Stock Exchange (N-R)
Tawreed (N-R)
Thai Union (TU TB - BT16.9 - BUY)[1]
Thai Union Feedmill PC (N-R)
Thai Union North America (N-R)
Thai Union Seafood (N-R)
Transurban (TCL AU - A$13.77 - O-PF)[1]
Tunas Ridean (N-R)
UK Seafood Investment (N-R)
UltraTech (UTCEM IS - RS7,162.2 - O-PF)[1]
UniSuper (N-R)
VIG Partners (N-R)
Vogo Fund (N-R)
Wellcome (N-R)
Woori Financial Group (N-R)
Yashili (N-R)
Yili (600887 CH - RMB31.75 - BUY)[1]
Young Micro Systems (N-R)
Zung Fu Motors Group (N-R)

[1] Covered by CLSA; [2] Covered by CLST

Analyst certification

The analyst(s) of this report hereby certify that the views expressed in this research report accurately reflect my/our own personal views about the securities and/or the issuers and that no part of my/our compensation was, is, or will be directly or indirectly related to the specific recommendation or views contained in this research report.

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