

# TASKFORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

MISC Group is committed to enhancing its climate disclosures by adopting the Taskforce on Climate-related Financial Disclosures (TCFD) framework. MISC Group became a TCFD Supporter in 2021 and this is our first report following this framework. This report should be read alongside the Our Pathway Towards Decarbonisation section. Decarbonisation strengthens the Group's primary approach to addressing climate change within the business's value chain.

The taskforce has developed four widely adoptable recommendations on climate-related financial disclosures that represent core elements of climate management: governance, strategy, risk management, and metrics and targets. Each of the TCFD thematic elements is reflected in the structure of our disclosures in the following pages. This is our inaugural TCFD report and we strive to continuously enhance our climate disclosures in the future reporting years.

In 2021, MISC embarked on a structured TCFD journey to embed climate-related risks and opportunities by:

- Conducting TCFD capacity building across MISC Group;
- Performing a gap analysis of our current processes against the TCFD framework;
- Developing climate scenarios;
- Identifying risks and opportunities specific to our core business namely, Gas Assets & Solutions (GAS), Petroleum & Product Shipping (AET), Offshore Business and Marine & Heavy Engineering (MHB);
- Conducting a TCFD Scenario Analysis workshop to map risks and opportunities against future climate scenarios;
- Enhancing our strategic planning and risk management processes to ensure climate-related risk and opportunities are well considered in annual strategic planning and risk register reviews; and
- Selecting additional climate-related internal monitoring indicators, other than the existing greenhouse gas emissions, that can quantify the financial impacts of climate-related risks and opportunities.



## GOVERNANCE

MISC Group signing up as a TCFD supporter demonstrates the Board and management's commitment to aligning the disclosure of climate-related risks and opportunities with TCFD recommendations. The Board is well informed and makes proactive executive decisions with senior management on strategies that contribute to a net-zero economy while managing climate risks and opportunities.

## CLIMATE GOVERNANCE

The BGRC is a standalone board committee overseeing risk management and sustainability including climate-related risks. The BGRC reviews, evaluates, reports and makes appropriate recommendations to the Board on matters including reviewing the adequacy and effectiveness of MISC's Risk Management Framework and ongoing activities in identifying, evaluating, monitoring and mitigating risks.

The BGRC ensures effective systems and processes are in place to monitor and manage identified risks and determine MISC's risk tolerance.

The BGRC reviews, evaluates, reports and makes appropriate recommendations to the Board on determining the direction of MISC's sustainability strategy in alignment with MISC's business strategy. The BGRC meets quarterly to review and deliberate on governance and risk-related matters, including climate-related issues.

Risk Oversight Structure	
Board level	<p><b>Risk Oversight Structure</b></p> <p>Responsible for the overall oversight of MISC Group risk management system and activities</p>
	<p><b>BGRC</b></p> <ul style="list-style-type: none"> <li>• Reviews the adequacy and effectiveness of MISC's Risk Management Framework and on-going activities for identifying, evaluating, monitoring and mitigating risks</li> <li>• Reviews the Group's risk tolerance level</li> </ul>
Management level	<p><b>RMC</b></p> <p>Provides a reasonable level of assurance to the BGRC that the Group's risks are being managed appropriately</p>
	<p><b>Corporate Planning (CP)</b></p> <ul style="list-style-type: none"> <li>• Reviews and monitors risk reporting quarterly</li> <li>• RMC secretariat</li> </ul>
Business unit/Service unit/Subsidiary	<p><b>Risk Owners</b></p> <p>Responsible for implementing risk management processes at respective units</p>

# TASKFORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

The Board is supported by multiple levels of working committees, chaired by the President and Group CEO (PGCEO). Members comprise Vice Presidents from each division and the Managing Directors/CEOs of MISC Group of Companies and teams with clear lines of reporting and accountability:

- The Management Committee (MC) is responsible for reviewing and approving the sustainability framework and initiatives for implementation within the company.
- The Risk Management Committee (RMC) is established to review and monitor the Group's risk management practices. Primarily, it is responsible for driving the implementation of the risk management framework and acts as the central platform for the Group. The RMC holds quarterly meetings to review the key risks and ensure that mitigation plans are in place to manage such risks. The adequacy and effectiveness of the controls and the robustness of the mitigation actions are also addressed. These are then further deliberated by the BGRC and also reported to the Board every quarter.
- The Health, Safety, Security and Environment (HSSE) Council serves as a platform to discuss the effective execution of key strategies and associated issues that affect group-wide HSSE key result areas including the carbon reduction performance against set targets and compliance status with current and future emerging regulations.
- The Corporate Sustainability department updates the MC and BGRC on the 'Towards Decarbonisation' Strategic Progress.
- Group HSSE provides updates to BGRC on the GHG performance against set targets each quarter.
- The Corporate Planning division plans to integrate climate-related risk and opportunities into the existing group-wide strategic planning exercise annually to facilitate the conceptualisation and formulation of strategic plans for the Group. During annual strategic planning meetings, the business and climate-related risks and opportunities will be considered before translating into short, medium and long-term business strategies for MISC Board's approval. Subsequently, the identified climate-related risks and mitigation strategies will be refined and cascaded into the Group's risk register. These issues and strategies will be monitored and brought to the RMC and the BGRC on a quarterly basis. Climate-related risks for each investment opportunities will be also assessed under Project Risk Assessments for approval by the Project Risk Assessments Steering Committee (PRASC), BGRC and MISC's Board.

Moving forward, MISC's Board and Management will enhance the climate risk review and include climate-related metrics as part of the remuneration process. In 2021, MISC Board approved the inclusion of climate-related strategic initiatives and annual GHG emission intensity as part of ESG-related key performance indicators (KPI) into the 2022 Group Balance Scorecard. In addition, our MISC 2022 Board KPI have included sustainability risks and opportunities.

## STRATEGY

MISC Group has defined its short, medium and long-term time horizon in identifying climate risks and opportunities.

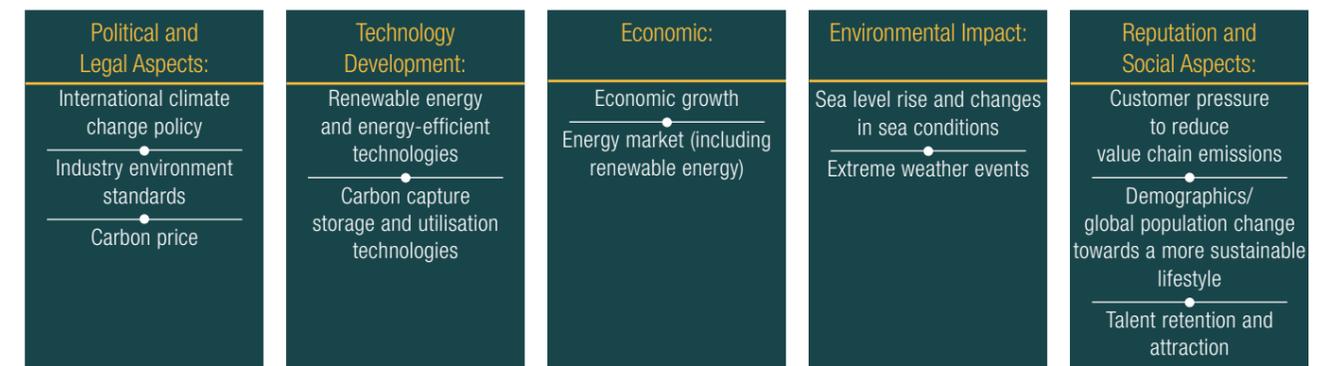


The following sections are aimed to share the climate-related risks and opportunities that has been identified (from our 2021 TCFD workshops) over the short, medium and long term and our resiliency taking into consideration different climate-related scenarios.

## SCENARIO ANALYSIS

MISC Group conducted a scenario modelling exercise for identified transition risks and physical risks to its core businesses. We selected two scenarios following the TCFD five principles of plausible, distinctive, consistent, relevant and challenging.

To understand and connect the political, business and social responses to climate change and associated global carbon budgets, emissions pathways and the expected physical climate-related impacts, the climate analysis and scenarios were derived based on the following driving forces:

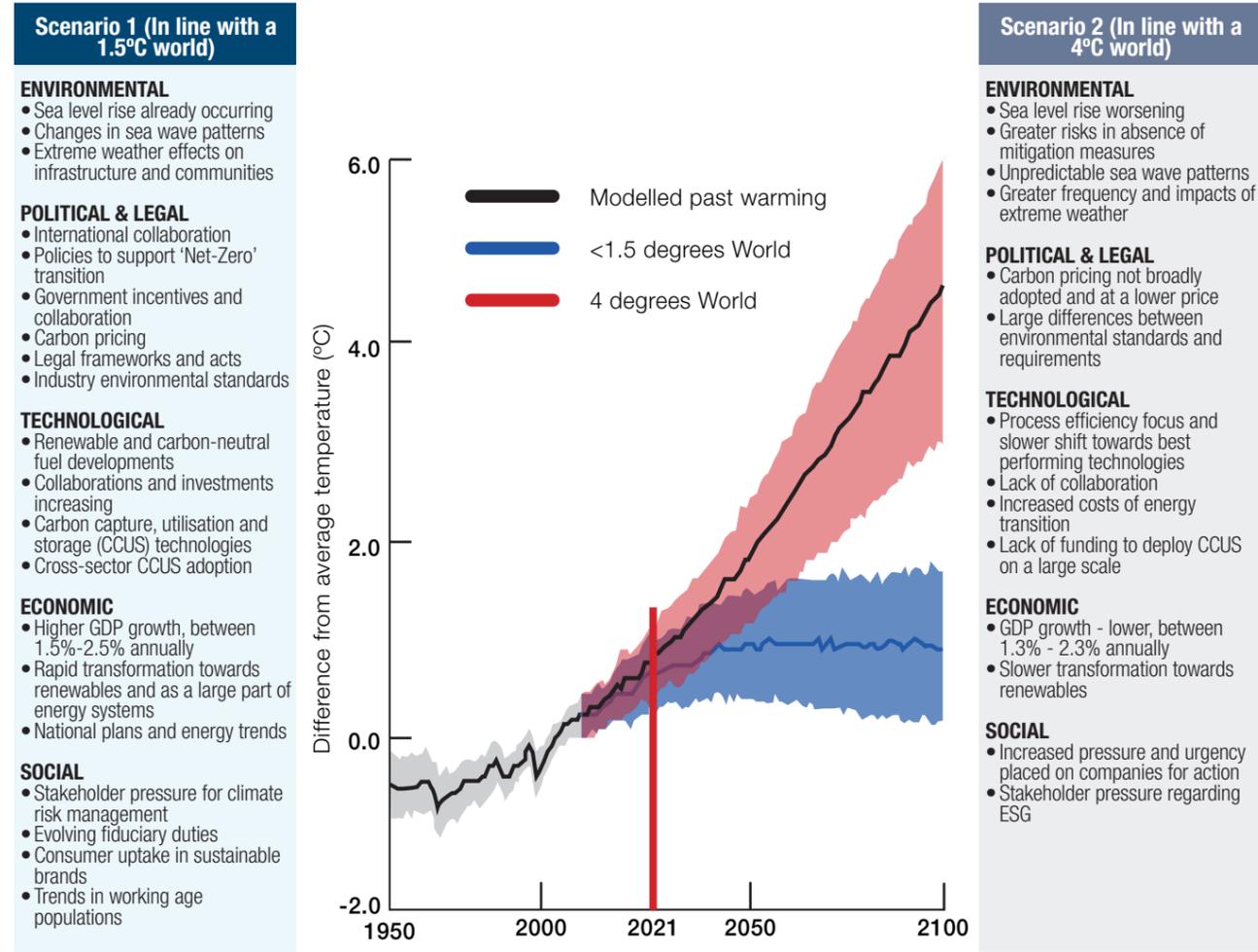


Two future climate scenarios in 2050 were considered in the climate-related scenario analysis: **global warming of 1.5 degree Celcius and 4 degree Celcius**

### The scenario modelling assumptions were sourced from:

- Intergovernmental Panel on Climate Change (IPCC);
- Representative Concentration Pathways (RCP);
- Shared Socioeconomic Pathways (SSP);
- International Energy Agency (IEA); and
- The International Renewable Energy Agency (IRENA).

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## SCENARIO ANALYSIS RESULTS AND RESILIENCE

MISC conducted four focused scenario workshops for our core businesses, namely GAS, AET, Offshore Business and MHB. These scenario analysis set an important foundation for identifying the overall Group climate-related risks and opportunities. We will conduct scenario workshops for the Group's remaining business segments in 2022.

The respective businesses heads and functional representatives from the Risk, Procurement, Projects, Sustainability, Group HSSE and Legal departments participated in the workshop. Focus areas discussed during the workshop included:

- How each risk and opportunity could manifest in the core businesses;
- The likelihood of occurrence and impact of each risk and opportunity could occur;
- The climate strategy to be developed or existing decarbonisation pathways to be intensified to mitigate the potential risks; and
- The business opportunities resulting from future scenarios that will benefit existing business revenues and new business ventures for MISC in 2050.

## 1.5 DEGREES SCENARIO

This scenario correlates and is aligned with the Paris Agreement to keep average global warming to well below 2 degrees Celsius and continue all efforts to limit the rise in temperatures to below 1.5 degrees Celsius. In this scenario, global governments are collaborating on carbon regulations and policies. There is higher gross domestic product (GDP) growth and a significant transition to renewables with continued growth in energy demand. Increased interest and demands are made from various stakeholder groups regarding climate change. Extensive research and development are conducted on alternative energy, renewables, carbon removal and rapid technological improvements on emissions reductions. There is a continued adoption and awareness of changing environmental regulations on carbon pricing and other legal frameworks, supported by climate action across industries.

In this scenario, MISC Group is impacted predominantly by climate-related transition risks. These risks range from increasing environmental/carbon policies and legislation to a faster energy transition to renewables, cleaner and/or non-fossil fuelled energy sources. Potentially, our shipping and offshore business segments would be affected by reduced market demand for petroleum production, storage and transportation. However, the Gas Assets & Solution segment will have short to medium term transitional opportunities from:

- Strong demand and market growth for cleaner sources of energy; and
- Reduced carbon tax for clean fuel such as LNG.

Beyond the medium-term horizon, LNG as a transition fuel may still see growth. Technological improvements to reduce methane slip emissions from LNG are driven by government policies to combat the effects of climate change.

Increased compliance costs will increase existing capital expenditure (CAPEX) and operational costs. Stringent environmental regulations may cause assets to be sold prematurely if they cannot be climate-proofed without considerable investment. However, these decommissioned assets open up other opportunities for repurposing these assets as floating storage for the alternative green fuel market and other circular economy opportunities in the future ocean economy.

Potentially, our Marine & Heavy Engineering segment will have an opportunity for increased revenue through existing business opportunities to:

- Offer modifications, retrofits and conversions to vessels and floaters, so they comply with EEXI, CII and other future potential legislation;
- Provide fabrication services to incorporate carbon capture and storage onto oil and gas offshore assets; and
- Provide fabrication services for renewable energy asset production.

Our shipping business segment; Gas Assets & Solutions and Petroleum & Product Shipping can benefit from increased revenue from new vessels and asset classes that can cater for the market demand to meet growing stringent environmental and low-carbon related legislation. These new business segment and low-carbon services, can allow MISC to enter new markets as an alternative energy transporter such as an alternative fuel transporter or stored renewable energy.

An increased global carbon tax may increase MISC's cost of operation in the short term. In the longer term, it will also promote investments in the carbon capture & storage (CCS) market and low-carbon or more efficient GHG abatement technologies. Our Shipping and Offshore Business segments will have an opportunity to collaborate with supply chain partners and customers to improve the GHG performance of assets in the medium to long term. We expect that our market reputation will improve as business partners recognise us as a low-carbon solution provider contributing to net-zero and the circular economy. Seizing opportunities to take leadership positions in the market will increase competitiveness and opportunities for new contracts. These opportunities may increase revenue and help attract and retain talents within the organisation.

In this scenario, collaboration across the value chain and the advancement of technology to build zero-carbon emission vessels with high energy efficiency and optimised resource utilisation will enable increased cost-sharing for retrofitting and investment plans. Sustainable annual cost savings from lower energy consumption may also compensate for higher research and development and CAPEX allocation.



For more details, please refer to our Climate Strategy section in this TCFD section

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## 4 DEGREES SCENARIO

Global climate action institutions are fragmented with most countries not supporting the transition to net-zero. Increased competition for scarce resources drives inequality and lower growth for renewables. There is lack of concerted action and hence technological progress towards effective solution is delayed. New technologies to reduce GHG and slow down the effects of climate change are adopted at a slower pace. There is also lack of information surrounding future risks with carbon prices increasing less rapidly and unclear legal frameworks. Sea level rise worsens with unpredictable sea wave patterns and greater frequency of extreme weather.

In this scenario, increased maintenance costs and CAPEX can be expected. Vessels and offshore assets require more frequent maintenance to withstand increasing intense extreme weather. Our shipping segments may experience reduced revenue due to delays and disruptions to operations and reparations. Decreased transportation routes or sudden route changes due to extreme weather events may further increase operating costs. There could also be increased exposure to liability from personnel injuries and asset damage caused by increasing storm surges, changes in precipitation, and greater intensity and frequency of typhoon/cyclone events. Additional CAPEX may be required to reinforce the building sites and fabrication yard infrastructure of our Marine & Heavy Engineering segment. Weatherproofing and protecting this infrastructure from floods will help them withstand strong waves from rising sea levels.

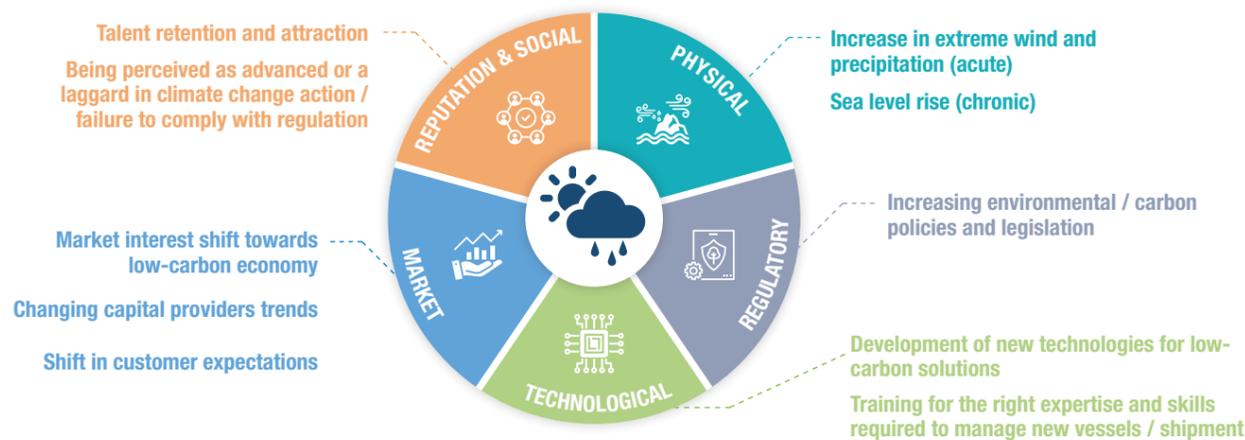
However, we believe this scenario will result in the rapid development of better ship designs that can withstand extreme climates. Our Marine & Heavy Engineering segment could offer modifications, retrofits or conversions on vessels and offshore structures to deal with or withstand extreme weather more effectively.

As the energy transition to alternative or renewable energy will be much slower, the oil and gas industry will grow and our Offshore Business and Petroleum & Product Shipping segments will see better growth opportunities.

### CLIMATE-RELATED RISKS AND OPPORTUNITIES

During our 2021 TCFD workshops, we identified several climate-related risks and opportunities, which are potentially financially material. These climate-related risks and opportunities were mapped across MISC's value chain including upstream suppliers and downstream customers. MISC acknowledges that its operations are directly affected by the physical and transitional risks created by climate change. More thorough analysis will be conducted to project monetary values and time horizons for climate change risks. This analysis will be completed in the near future.

#### Overview of MISC Group Climate-related Risks and Opportunities



Risk Type	Potential Risks & Opportunities	Impact to the Group	Opportunities for the Group
Physical	Increase in extreme wind and precipitation (acute)	Increased asset maintenance cost and CAPEX to withstand the increasing intensity of extreme weather <ul style="list-style-type: none"> <li>Disruption to operations</li> <li>Increased risk of personnel and asset damage incidents</li> </ul>	<ul style="list-style-type: none"> <li>Increased revenue from repair and refurbishment/maintenance services (Marine &amp; Heavy Engineering segment)</li> <li>Increased collaboration across the supply chain or research and development on ship design initiatives to better withstand extreme weather events and climate-related risks</li> </ul>
	Sea level rise (chronic)	Increased cost from delays/disruptions in operations and decreased availability of transportation routes (e.g. flooding, port closures)	
Transitional	<b>Regulatory</b> <ul style="list-style-type: none"> <li>Increasing environmental/ carbon policies and legislation</li> </ul>	<ul style="list-style-type: none"> <li>Higher capital and operational costs associated with implementing compliance measures</li> <li>Increased cost of borrowing and a reduction in capital availability</li> <li>Increased risk of decreased asset value and stranded assets</li> </ul>	<ul style="list-style-type: none"> <li>Short to medium-term increased demand and market for cleaner sources of energy such as LNG (Gas Assets &amp; Solution and Offshore Business segments) resulting in increased demand for low-carbon LNG carriers / tankers</li> <li>Medium to long term increased revenue from new vessel/asset class and new opportunities to transport alternative fuels or other sustainable energy sources (Gas Assets &amp; Solution and Petroleum &amp; Product Shipping segments)</li> <li>Increased revenue from repair and refurbishment/maintenance services (Marine &amp; Heavy Engineering segment)</li> </ul>
	<b>Technological</b> <ul style="list-style-type: none"> <li>Development of new technologies for low-carbon solutions</li> <li>Training for the right expertise and skills required to manage new vessels / shipment</li> </ul>	<ul style="list-style-type: none"> <li>Higher investment cost in research and development offering products and technologies aimed at generating renewable energy or substantially reducing carbon emissions</li> <li>Risk of new technology or technological uncertainty: technologies may not perform as expected nor provide solutions to meet emerging regulations</li> <li>Increased costs of reskilling the existing workforce/ acquiring new talents to meet new technologies skillsets requirements</li> </ul>	<ul style="list-style-type: none"> <li>Increased annual savings in terms of reduced energy consumption costs from the use of more energy-efficient technologies</li> <li>Increased revenue from refurbishing vessels in the areas of retrofitting carbon capture and low-carbon technology (Marine &amp; Heavy Engineering segment)</li> <li>Increased funding/incentives from financial providers for first movers to develop and take up new technologies</li> </ul>
	<b>Market</b> <ul style="list-style-type: none"> <li>Shift in customer expectations</li> <li>Changing expectations of capital providers</li> <li>Market interest shift towards a low-carbon economy</li> </ul>	<ul style="list-style-type: none"> <li>Reduced demand for assets due to transitioning to renewable energy</li> </ul>	<ul style="list-style-type: none"> <li>Medium to long term increased revenue from new vessel/asset class and new opportunities to transport alternative fuels or other sustainable energy sources (Gas Assets &amp; Solution and Petroleum &amp; Product Shipping segments)</li> <li>Increased revenue from new business opportunities that contribute to a circular and net-zero economy</li> </ul>
	<b>Reputation &amp; Social</b> <ul style="list-style-type: none"> <li>Stakeholder pressure to reduce value-chain emissions</li> <li>Talent retention and attraction</li> </ul>	<ul style="list-style-type: none"> <li>Reputation impact associated with climate risks</li> </ul>	<ul style="list-style-type: none"> <li>Taking a stewardship position and driving advancements in decarbonisation technology will attract and retain talents</li> </ul>

## TASKFORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

### PHYSICAL RISKS (ACUTE)

Acute physical risks, such as hurricanes and typhoons, can potentially impact MISC's business and operations as well as the safety of personnel, assets and cargo. Any interruptions in the value chain could result in a material adverse effect on our financial and operational results and our reputation in the marketplace.

MISC works continuously to improve the specifications of its newbuild vessels to address acute physical risks. In addition, stringent safety controls are applied to vessel navigation. A comprehensive set of procedures have been introduced that cover passage planning, vessel management in bad weather, navigational equipment maintenance, resources management and contingency plans for various vessel emergencies.

A Group Crisis Management Plan (GCMP) is in place to govern crises at the corporate level. Under the GCMP, the Group Crisis Management Team (GCMT) is responsible for:

- Identifying, evaluating and proactively addressing crises; and
- Providing appropriate recommendations for managing strategic issues of concern affecting people, the people, the environment, assets and reputation.

All operational-level emergency plans have clear linkages to the GCMP. These plans are integrated into our business continuity management and disaster recovery planning to mitigate risk.

### PHYSICAL RISKS (CHRONIC)

While MISC has been monitoring chronic physical risk on a continuous basis, starting 2022, these risks will be included as part of our risk register to facilitate management decisions. Chronic physical risks, including increasing mean temperatures and rising sea levels, may have impacts on our shipping operations, offshore floating facilities, marine repairs and heavy engineering yards. We understand that the conditions and severity of these risks may change over time. MISC continues to monitor these risk indicators/signposts and develop specific measures as part of its strategy to ensure the resilience of the business.

### LEGAL AND REGULATORY RISKS

Regulatory and compliance risks associated with current or emerging regulations have always been included in MISC's climate-related risk assessments. The compliance requirements and costs associated with relevant regulations in the countries in which we operate are considered as part of our compliance programmes and processes to ensure compliance with the requirements.

We proactively keep abreast with maritime legislation and the unilateral decisions of maritime nations. MISC is guided by the IMO regulations, guidelines and strategy in addressing GHG emissions from international shipping.

IMO's Marine Environment Protection Committee (MEPC) has adopted an initial strategy to reduce GHG emissions from ships. The MEPC aims to reduce total annual GHG emissions by at least 50% by 2050 compared to 2008 while pursuing efforts to phase them out entirely.

The Energy Efficiency Design Index (EEDI) has been driving technical efficiency improvements in new ships since 2013. Incrementally tightened every five years, the EEDI is expected to stimulate continued innovation and the technical development of all the components influencing the energy efficiency of a ship from its design phase. Its role will continue for the foreseeable future as it is explicitly identified in the levels of ambition of the Initial IMO Strategy for Reduction of GHG Emissions from Ships (Initial IMO Strategy). Amendments have already been adopted to tighten the EEDI requirements, with the Phase 3 EEDI requirements being brought forward to 2022 from an initial enforcement date in 2025. Emerging climate related regulations include:

- The Energy Efficiency Existing Ships Index (EEXI), which comes into force on 1 January 2023, adopted by IMO, requires existing ships to improve their technical efficiency to a required energy efficiency standard. Vessels that do not meet the minimum design efficiency standard will require technical modifications to achieve compliance.
- The carbon intensity indicator (CII) scheme is IMO's new requirement to be enforced commencing January 2023, which will rank ships on a scale of A (best) to E (worst) based on the ship's operational CO<sub>2</sub> intensity. Vessels rated D for three consecutive years or Rating E will be required to carry out corrective action plans to reduce their CO<sub>2</sub> intensity to achieve Rating C. The plan must be documented in the Ship's Energy Efficiency Management Plan (SEEMP).
- New and innovative emission reduction mechanisms are being considered, possibly including market-based measures (MBMs), to incentivise GHG emissions reductions.

MISC continually monitors any new or emerging regulatory developments as part of its risk assessment process via the following activities:

- Annual sharing sessions by industry experts and analysts to share insights on market outlook including any new or emerging regulatory developments.
- Participation in maritime industry forums to exchange ideas and keep abreast of developments in the climate-related legislations.
- Engagement with various stakeholders including but not limited to regulatory bodies, classification societies, flag states, marine departments of the various countries and customers.

### TECHNOLOGY RISKS

We have been improving the technological design of our vessels to improve energy efficiency and meet the expectations of our stakeholders. Initiatives undertaken for our newbuilds and retrofitting existing vessels with green technologies include energy efficiency measures and an emissions reduction system. For example, we have introduced an LNG dual-fuel system into our newer petroleum and LNG vessels.

As members of the Getting to Zero Coalition, we share its ambition of getting commercially-viable deep-sea zero-carbon emission vessels powered by zero-emission fuels into operation by 2030. MISC has partnered with several industry players on The Castor Initiative. This joint development project is aimed at developing commercially viable ammonia-fuelled tankers to support a decarbonised future for the shipping industry. The Castor Initiative is motivated by partners' shared belief that the maritime industry requires leadership and greater collaboration if shipping is to achieve the IMO's GHG ambitions. Ammonia is being considered as fuel by maritime stakeholders. However, partners also recognise that the shipping industry must explore multiple decarbonisation pathways. This collaboration aims to enhance the multi-party collaboration; and the involvement of different parts of value chain in the collaboration (i.e. involving engine maker, port, fuel supplier, shipyard, classification and MISC as the shipowner).

### MARKET RISKS

MISC's climate-related risk assessments include market risks such as changing stakeholders preferences for low-carbon and environmentally-friendly solutions. MISC monitors market and industry trends on continuous basis to futureproof our business. The Castor Initiative aimed to develop zero-carbon emission vessels (ZEV) and address the shift towards low-carbon and environmentally-friendly solutions. MISC expects to progressively change its fleet to ZEV from 2031 as part of its Net-Zero GHG Emissions commitment by 2050.



Read more on the Our Pathways Towards Decarbonisation section

In addressing the market risks on the potential market resizing of oil and gas business opportunities towards renewable energy typed opportunities, our MISC 2050 framework was developed to enable us to explore and develop low-carbon services as new income streams that will support both the circular and net-zero economy in the years leading to 2050.



Read more on our MISC 2050 Strategy in our Integrated Annual Report 2021

### REPUTATION AND SOCIAL RISKS

Reputational risks, including those related to climate challenges, are always included in MISC's risk assessments. MISC operates in maritime and energy industries, both of which are highly scrutinised by the stakeholders in terms of transparency on their environmental stewardship efforts.

MISC introduced several measures and initiatives to address reputational risks including:

- Setting GHG emissions intensity reduction goals;
- Committing to Net-Zero GHG emissions by 2050; and
- Communicating sustainability efforts and achievements to internal and external stakeholders.

MISC has a shared responsibility to demonstrate its commitment to driving positive industry change through its:

- Role as a strategic partner of the Global Maritime Forum; and
- Most recent 2021 Call for Action.

Our progress in addressing climate-related challenges will enhance our reputation, increase trust and strengthen our position as a leading global industry player.

## TASKFORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

At MISC, we believe that advancement in green technology will require new skill sets of talent. There is a need for better trained resources which may increase the operational expenditure. Nevertheless, we believe in investing in our people and as MISC moves forward with its climate strategy, the ability to attract new talents is critical. In addition, there is an increased opportunity for our Maritime Education & Training segment, ALAM to provide niche and structured training opportunities as required in managing new vessel classes.

### CLIMATE STRATEGY

At MISC, we believe that climate action must be taken to realise the 1.5 degrees scenario. MISC Group's climate strategy responds to the risks and opportunities posed by climate change in two parts:

- A transition plan for short and medium-term risks; and
- A longer-range climate strategy to mitigate our long-term financial impacts and position ourselves competitively in the net-zero economy.

#### Transition Plan (Short – Medium Term)

- As shipping operations constitute 98% of MISC's GHG emissions, we have set a target to reduce 50% of our shipping fleet's GHG intensity by 2030, compared with the base year of 2008. Read about our rationale and details of our short-medium term GHG reduction plans in the Our Pathway Towards Decarbonisation section.
- Each business segment has a decarbonisation agenda to contribute to MISC Group's Net-Zero commitment by integrating climate factors across MISC's business strategy and financial planning (including usage of internal carbon pricing) and deploying low-carbon technologies for our newbuilds.
- Progressive fleet renewal to LNG dual-fuel vessels with low methane slip engines and add on methane and nitrous oxide scrubbing technologies.
- Increase use of renewable energy where possible.
- Explore and invest in R&D on zero-carbon emission vessels. Read more about The Castor Initiative where we are collaborating with strategic value-chain partners to develop ammonia-fuelled vessels for deep-sea transportation.
- Explore and build strategic partnerships with key technology providers of carbon removal technologies for assets both in the shipping and offshore business segments.
- Explore new business along the value chain of Renewable Energy and Waste-to-Value, leveraging our floating ocean asset business knowledge.
- Continuously improve the technical and operational efficiency of existing ships.

#### Our Long-Term Plan

As part of our long-term plans to stay resilient to climate change, MISC's existing business model would continue to evolve in the following two dimensions:

##### Decarbonisation of Our Existing Operations

- 1 Decarbonisation of our operations to meet the growing demands of the market for the sustained growth of our existing portfolio (see Net-Zero GHG Emissions Commitment section).

##### Exploring New Income Stream

- 2 In parallel we will be exploring new income streams that can support the value chains of Renewable Energy and Waste-to-Value pillars (see MISC 2050 section).

#### Net-Zero GHG Emissions Commitment

MISC Group is committed to Net-Zero GHG emissions by 2050. This commitment covers our own operations and those impacted across our value chain. Our climate strategy to achieve net-zero GHG emissions includes:

- Progressively converting our fleet and ensuring all new-builds are zero-carbon emission vessels from 2031 or sooner if possible
- Retrofitting carbon removal technologies on recent (vessels with remaining lifespan of 15 years) low methane slip, LNG dual-fuel vessels
- Increasing the use of renewable energy on our vessels, offshore assets and land operations
- Continuously deploying digital energy-efficient technologies and increasing operational efficiencies



Read about our rationale and details of our 2050 Net Zero GHG abatement pathways in the Net-Zero GHG abatement pathways in the Our Pathway Towards Decarbonisation section

### MISC 2050

Leading to 2050, the world will focus on energy transition and circular economy to mitigate climate change impacts. We believe that energy transition will assist to reduce world's climate change issues. However, much of climate change issue should be addressed by how we extract, produce, distribute and use resources and manage the waste output, thus giving rise to a circular economy.

With the threat of diminishing land, water scarcity and increasing sea level due to climate change, we are seeing strong signs of renewable energy firmly expanding into the ocean (ie. ocean wind farms and wave technologies).

MISC 2050 is our long-range business strategy that will enable MISC to explore and innovate and be part of the supporting value chain of these two pillars of growth:

- Renewable Energy
- Waste-to-Value

We believe we are the connectors to bridge the land-based economy with the emerging ocean economy. Our Marine & Heavy Engineering segment is well positioned to construct sea-worthy assets that can support the ocean economy. Our offshore and shipping business segments have vast experience on operating and leasing large-scale assets that float on the seas. Our existing marine-related business engineering and operating expertise will be our fundamental strengths as we explore possibilities in the emerging ocean economy.

As our business evolves to be part of the renewable energy value chain, we see synergy to explore waste-to-value opportunities. In the context of climate change, we believe we can explore the opportunities to convert renewable waste materials or opportunities to convert captured carbon into useful resources that will fuel the circular economy.

Moving into 2022, our fundamental objective is to identify new business opportunities within the two value chain pillars (Renewable Energy and Waste-to-Value) that will allow us to build new businesses and asset portfolios to be added to our present business portfolio mix. Together, both the growth of our existing business portfolios and the new MISC 2050 business ventures will transform into a new MISC Group business model that will provide financial sustainability for MISC in a circular and net-zero economy come 2050.

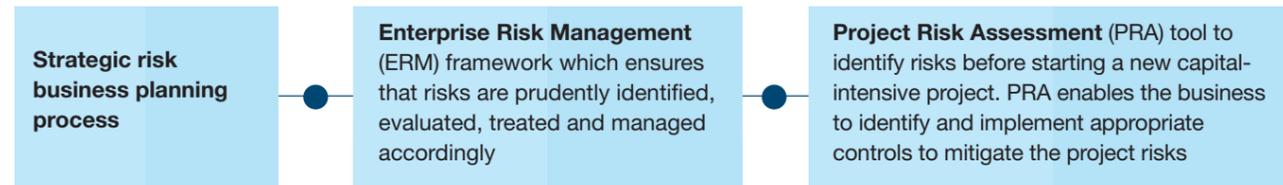


Read more on our MISC 2050 Strategy in our Integrated Annual Report 2021

## TASKFORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

### RISK MANAGEMENT

MISC Group evaluates climate risk as part of its:



### STRATEGIC RISK

Beginning 2022, our external environment analysis for our annual strategic and business planning exercise will be considering the impact of climate-related scenarios on our business outlook. Material risks and opportunities will be translated into strategic priorities as part of our five-year rolling business plan.

### ENTERPRISE RISK MANAGEMENT

Enterprise Risk Management (ERM) provides a guide for systematically identifying, assessing, evaluating, treating, reporting and monitoring risks. It aims to reduce the likelihood and impact of identified risks that may affect the achievement of business objectives.

Risk management activities are undertaken at the Group and business unit/subsidiary levels. Risk reports are reviewed and monitored by Corporate Planning division periodically before being escalated to the Risk Management Committee and deliberation by the BGRC.

As part of MISC's ERM process, the business units, service units and subsidiaries are required to perform an annual review of their risk profiles, with emphasis on linking risks to MISC's business objectives.

Climate-related risks and opportunities will also be considered in Project Risk Assessments beginning 2022.

MISC prioritises risks and opportunities, including those related to climate challenges, by evaluating them based on both quantitative and qualitative criteria. We also assess the severity of the potential impacts of the risk and the scale of the opportunities. MISC adopts the PETRONAS Resiliency Model (PRM), which provides an integrated view for managing risks. It is also guided by international best practice as per ISO 31000 and the Malaysian Code of Corporate Governance (MCCG) 2021.

On an operational level, risk registers will be developed and maintained from 2022 to include climate-related risks, to assess the impact and identify mitigation plans, where possible.

MISC Group's GHG emissions performance, including the evaluation of carbon reduction targets set at the strategic level, is presented to the MISC HSSE Council, which includes members of the RMC, on a quarterly basis.

Moving forward, MISC will enhance climate-related risks and opportunities in the existing risk register review process.

### METRICS AND TARGETS

MISC Group has been reporting its climate-related performance since 2016 in its Sustainability and Integrated Annual Reports.

In 2016, MISC Group set carbon intensity targets for 2016 to 2020 for the gas, petroleum and product fleet. In 2020, the targets were met with all three vessel segments achieving CO<sub>2</sub> intensity targets of 9.82, 3.33 and 9.59 gCO<sub>2</sub>/ton-nm for the gas, petroleum and product fleets, respectively. The reduction was attributed to:

- The addition of new-build vessels with improved carbon efficiency; and
- Overall energy-efficiency improvements of the existing fleet through technical and operational measures.

An overall 12% reduction in MISC Group's total greenhouse gas (GHG) emissions was recorded in 2020 compared to 2016, despite transport work increasing by 1% within the same period.

As MISC progressed with the current five-year Sustainability Strategy, setting short, medium and long-term carbon emission targets was one of the key activities in 2021. These targets formed part of the Towards Decarbonisation strategic priority in the Environment Pillar of the 2021-2025 MISC Group Sustainability Strategy.

### GREENHOUSE GAS METRICS AND TARGETS

MISC has set the following GHG targets and commitments:

#### Carbon Intensity Targets for Shipping Operations:

<b>Scope (Boundary)</b>	<ul style="list-style-type: none"> <li>• Gas and Petroleum shipping; and</li> <li>• Vessels owned or leased where MISC has the full authority to introduce its operational and HSE policies and are subjected to the GHG requirements of MARPOL Annex VI</li> </ul>	
<b>Base Year</b>	2008	
<b>Target Type</b>	CO <sub>2</sub> e intensity	
<b>Measurement Metric</b>	AER <sup>CO<sub>2</sub>e</sup> (gCO <sub>2</sub> e/t-nm)	
<b>Commitment Period</b>	2030 (commitment period)	
<b>Target Level (reduction from base year)</b>	<b>Fleet</b>	<b>AER<sup>CO<sub>2</sub>e</sup></b>
	MISC Group	50%
<b>Scope (Boundary)</b>	All Greenhouse gases (GHG);	
	<ul style="list-style-type: none"> <li>• Carbon Dioxide (CO<sub>2</sub>)</li> <li>• Methane (CH<sub>4</sub>)</li> <li>• Nitrous Oxide (N<sub>2</sub>O)</li> </ul>	

# TASKFORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

## MISC Group commits to Net-Zero Greenhouse Gas emissions by 2050

<b>Scope (Boundary)</b>	All Greenhouse gases (GHG); <ul style="list-style-type: none"> <li>Carbon Dioxide (CO<sub>2</sub>)</li> <li>Methane (CH<sub>4</sub>)</li> <li>Nitrous Oxide (N<sub>2</sub>O)</li> </ul>	MISC Group of Companies' Value Chain: <ul style="list-style-type: none"> <li>MISC operations (Scope 1 &amp; 2)</li> <li>Material upstream and downstream operations to MISC (Scope 3)</li> </ul>
<b>Measurement Metric</b>	Total GHG in CO <sub>2</sub> e	
<b>Commitment Period</b>	By 2050	

 Please refer to the Our Pathway Towards Decarbonisation Section for our GHG projections and rationale on setting these targets

Our GHG emissions monitoring and reporting is guided by the following key standards and references:

- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition), Third IMO GHG Study 2014
- The American Petroleum Institute (API) Compendium of GHG Methodologies for the Oil and Gas Industry

In 2021, the Group's organisational boundary for GHG reporting was expanded from just operational control to include all assets owned or leased that are used by MISC to gain economic benefits. However, the following assets and operations are excluded from our Scopes 1 and 2 inventory but included under our Scope 3 GHG inventory for MISC if material:

- Downstream leased assets, i.e. offshore assets and shipping vessels owned by MISC but leased out to other parties;
- Assets where MISC has minority equity ownership and no control;
- Upstream leased assets where MISC has no control, such as in-chartered vessels where MISC is only the commercial operator and is neither the vessel owner nor has technical control; and
- Short-term leases with a lease term of 6 months or less.

MISC Group also initiated the calculation of Scope 3 emissions in 2021 and expected to be completed in 2022.

 Our climate-related performance indicators are as shown in Performance Data section

### FUTURE ACTIVITIES

The Group plans to strengthen the management of climate-related risks in response to the TCFD recommendations. Evaluating climate-related risks quantitatively, when conducting scenario analysis, will allow us to measure the financial impacts of both the physical and transitional risks and opportunities more precisely. We will be expanding the scope of our TCFD initiatives to include key enablers business segments in 2022.

Moving forward, MISC will enhance climate-related risk integration measures into the existing risk management process. Integrating a formalised climate scenario analysis process into strategic business risks will provide a holistic approach to risk management and the comprehensive identification of climate-related risks and opportunities.

In 2022, MISC will be exploring the adoption of internal carbon pricing in our decision-making processes as well as collate financial climate-related indicators that can better quantify our risks and opportunities.

We will also actively promote low-carbon asset solutions to our customers. The Group will engage with customers, suppliers and other stakeholders throughout the value chain to strive for a mutual understanding of our approach to addressing climate change.

We will continue to make further enhancements to provide consistent and transparent annual disclosures to our stakeholders, in line with the TCFD recommendations.

