Climate Reporting

Empowering Mongolia's Green Future

22 August 2024

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Overview

- **Climate Change and Risk**
- **Sustainability Reporting**
  - Sustainability Reporting Standards and Frameworks
    - IFRS S1 and S2
    - Mandatory Sustainability Reporting in Singapore and around the World
- **Climate-Related Disclosures in Singapore**
  - Current Practices and Benchmarking Cases
- **Carbon Accounting and Challenges**
- **Concluding Remarks**

Climate Change and Risk

Copernicus: 2023 was the hottest year on record

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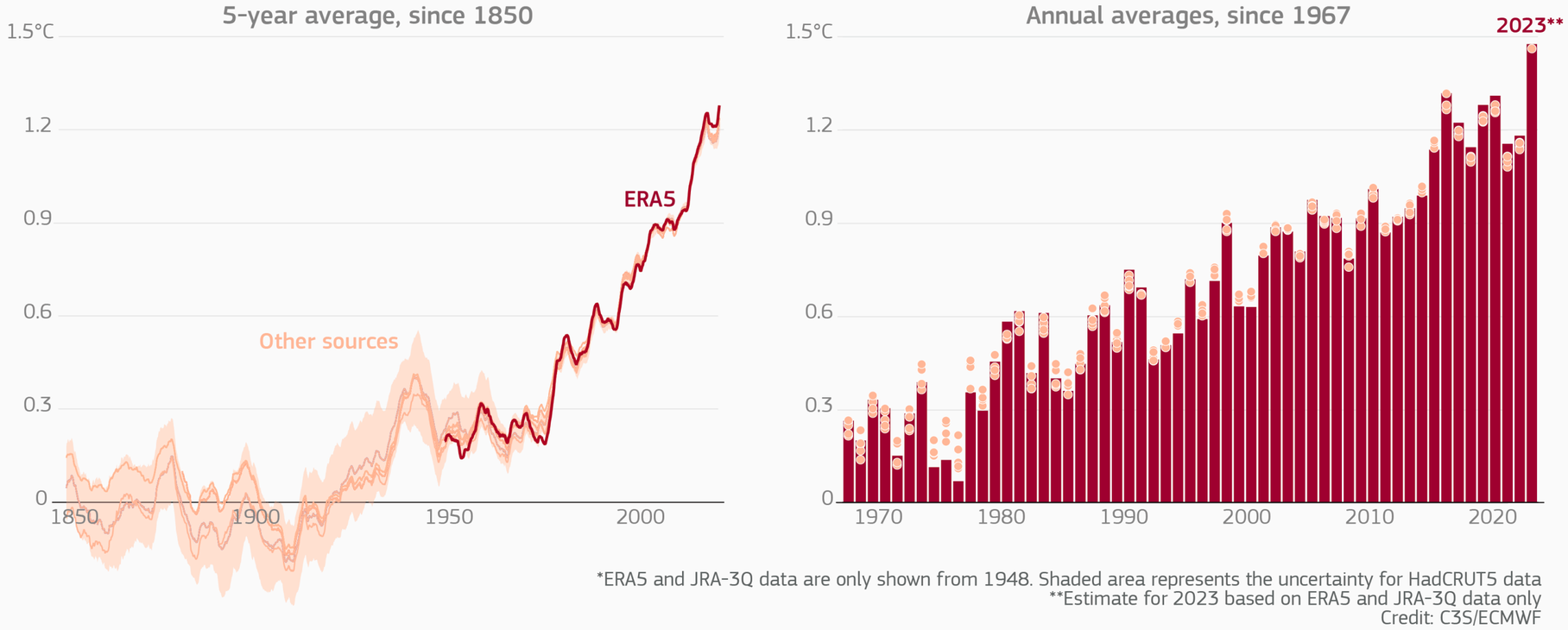

PROGRAMME OF THE EUROPEAN UNION

Copernicus Europe's eyes on Earth

ECMWF

Climate Change Service
climate.copernicus.eu

Source: https://climate.copernicus.eu/copernicus-2023-hottest-year-record

Copernicus:
2023 was the hottest year on record

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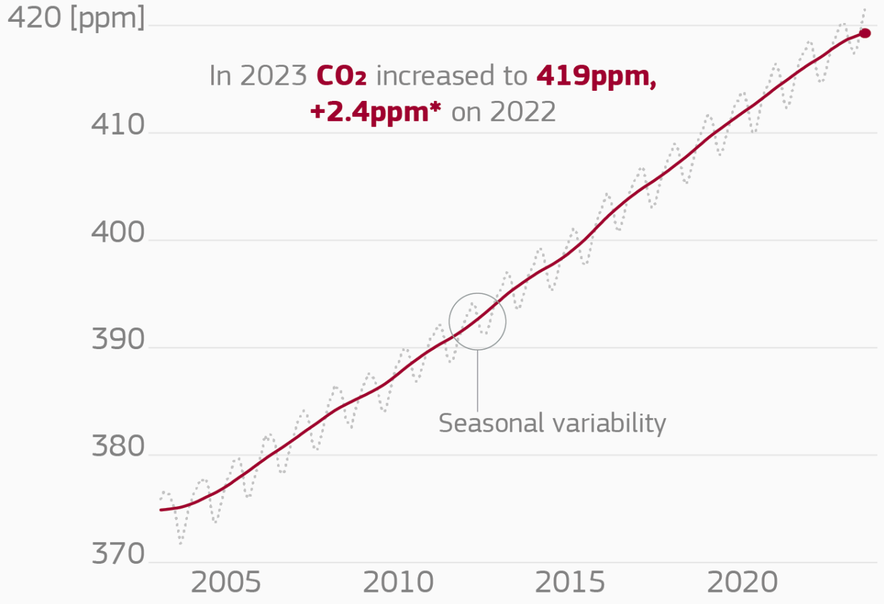
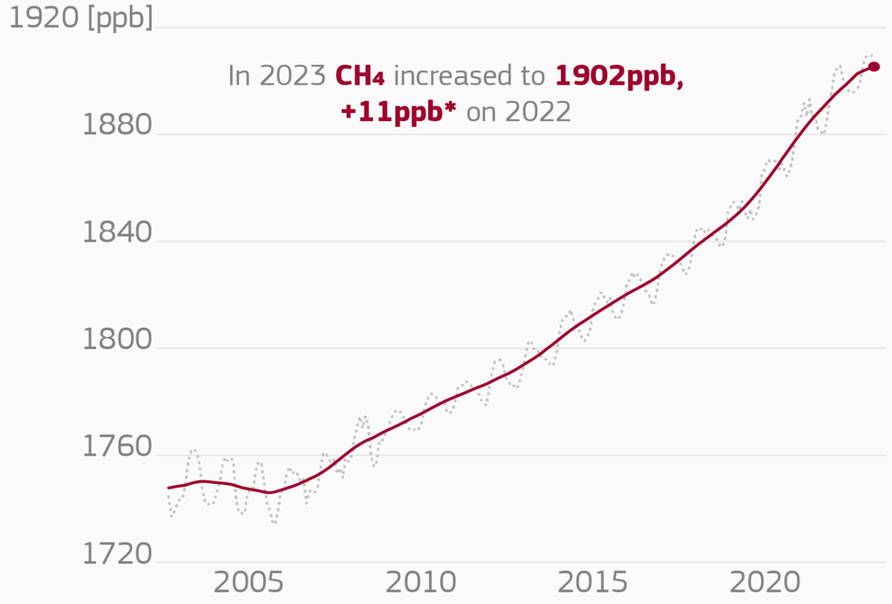
GLOBAL ATMOSPHERIC CONCENTRATION OF GREENHOUSE GASES

Monthly global mean column-averaged concentration — 12-month average

Carbon dioxide (CO_2)



Methane (CH_4)



*The uncertainty of the annual increase is CO_2 ±0.4ppm and CH_4 ±3ppb

Data: C3S/Obs4MIPs and CAMS • Credit: C3S/CAMS/ECMWF/University of Bremen/SRON

PROGRAMME OF THE EUROPEAN UNION · Copernicus Europe's eyes on Earth · ECMWF · Climate Change Service climate.copernicus.eu · Atmosphere Monitoring Service atmosphere.copernicus.eu

Source: https://climate.copernicus.eu/copernicus-2023-hottest-year-record

Copernicus:
22 July 2024 was the hottest day on record

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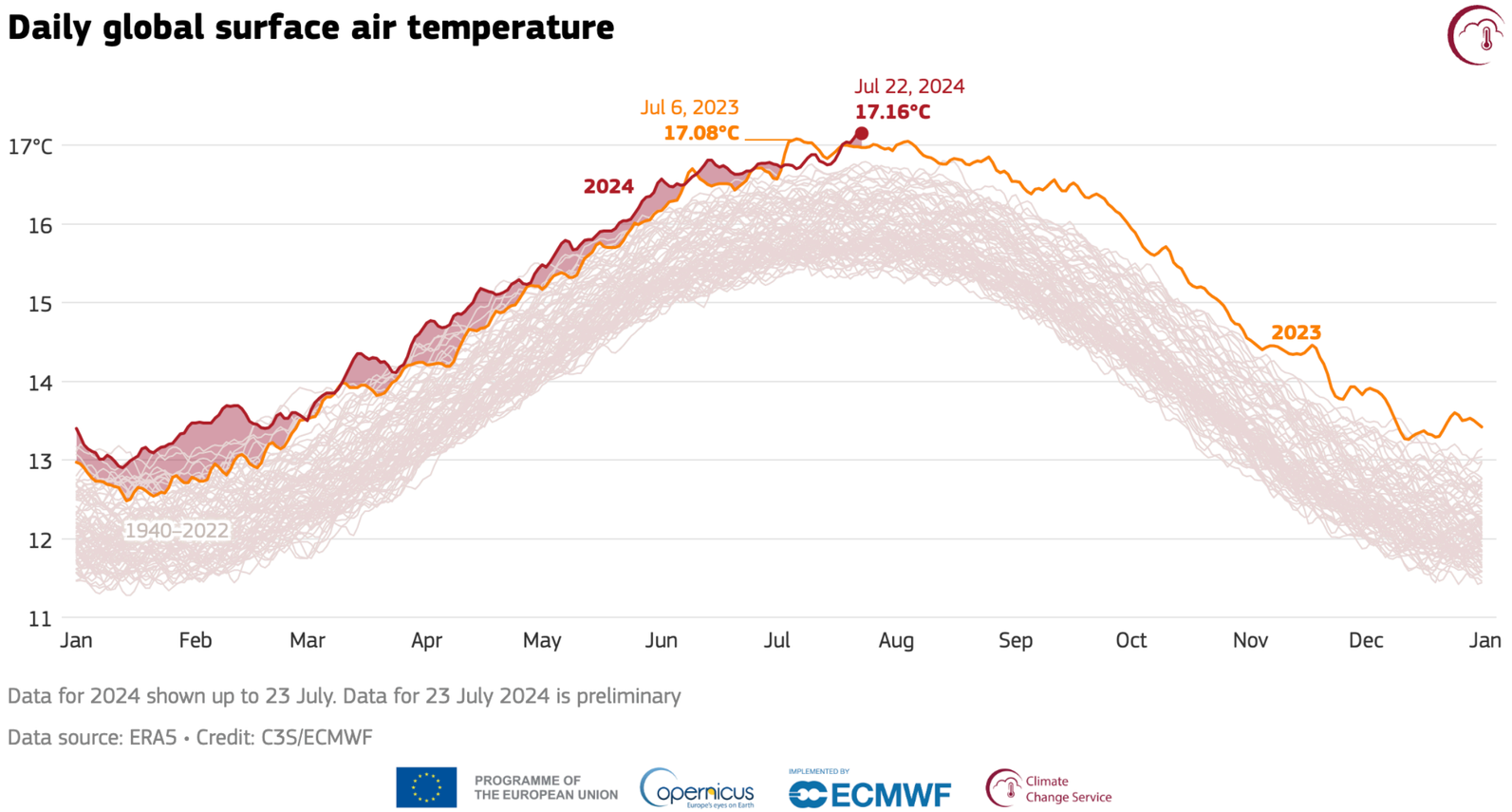
- The Earth has just experienced its warmest day in recent history, according to the Copernicus Climate Change Service (C3S) data.
- On 22 July 2024, the daily global average temperature reached a new record high in the ERA5 dataset*, at **17.16°C**.
- This exceeds the previous records of 17.09°C, set just one day before on 21 July 2024, and 17.08°C, set a year earlier on 6 July 2023.

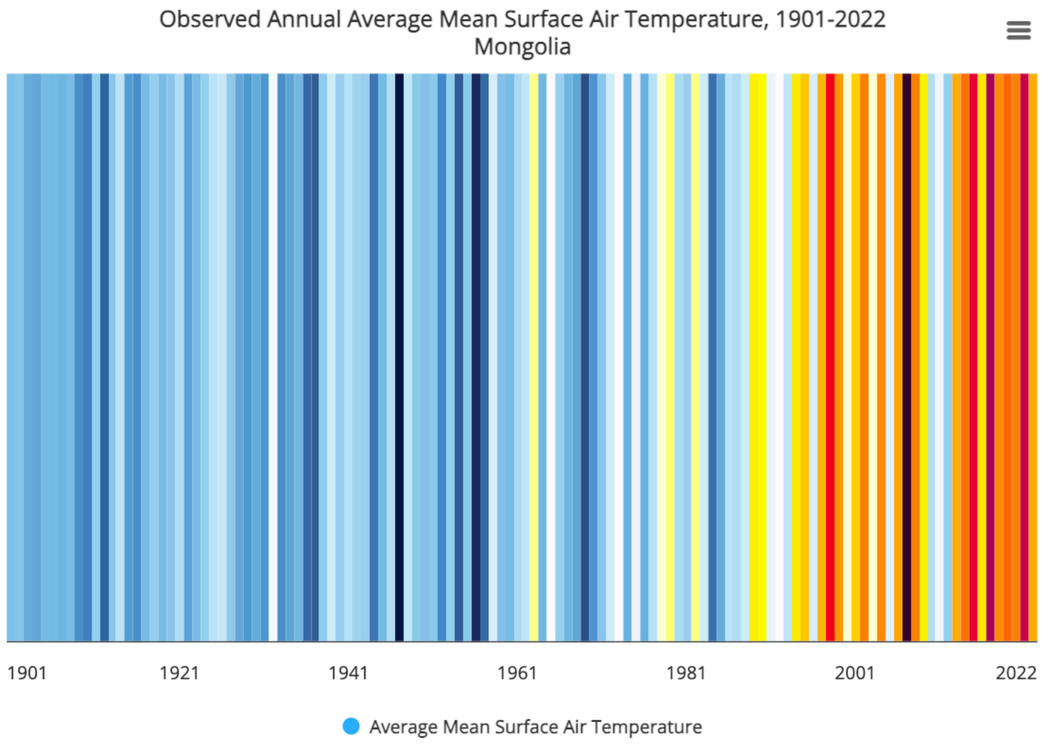


Daily global average surface air temperature for 2024 (red), 2023 (orange), and all years between 1940 and 2022 (grey). Red shading indicates the difference between the daily global average temperatures from 2023 to 2024, for days where 2024 has been warmer than 2023. Data for 22 July 2024 is preliminary. Data source: ERA5, via Climate Pulse. Credit: C3S/ECMWF

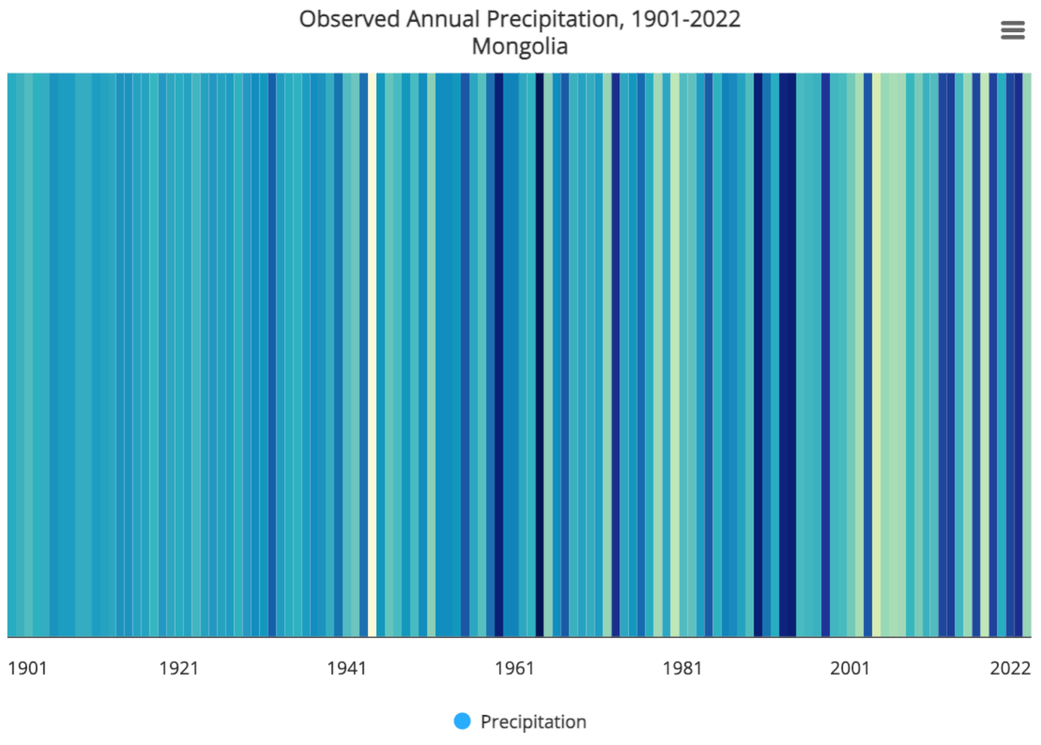
Source: https://climate.copernicus.eu/new-record-daily-global-average-temperature-reached-july-2024

Climate Change and Disaster Risk in Mongolia

Surface Air Temperature (1901-2022)



Precipitation (1901-2022)



Source: https://climateknowledgeportal.worldbank.org/country/mongolia

Climate Change and Disaster Risk in Mongolia

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HUFFPOST

Log In Suppc

ENVIRONMENT CLIMATE CHANGE EXTREME WEATHER MONGOLIA

Climate Change-Fueled Winter Extremes Put 90% Of This Country At 'High Risk'

So far this year upward of 2 million livestock animals have died, according to official statistics.

By Alexander C. Kaufman

Feb 25, 2024, 08:00 AM EST

197 COMMENTS

AP

WORLD U.S. ELECTION 2024 POLITICS SPORTS ENTERTAINMENT BUSINESS SCIENCE FACT CHECK ODDITIES

Live updates: DNC Russia-Ukraine war Mike Lynch and sunken yacht Deadly cholera outbreak Dolphins' Tagovailoa

CLIMATE

Heavy snows and drought of deadly 'dzud' kill more than 7 million head of livestock in Mongolia

THE DIPLOMAT

READ THE DIPLOMAT, KNOW THE ASIA-PACIFIC

Mongolia's Fight Against Desertification and Land Degradation

Mongolia's approach looks to incorporate both international experiences and the traditions of local communities.

By Bolor Lkhaajav

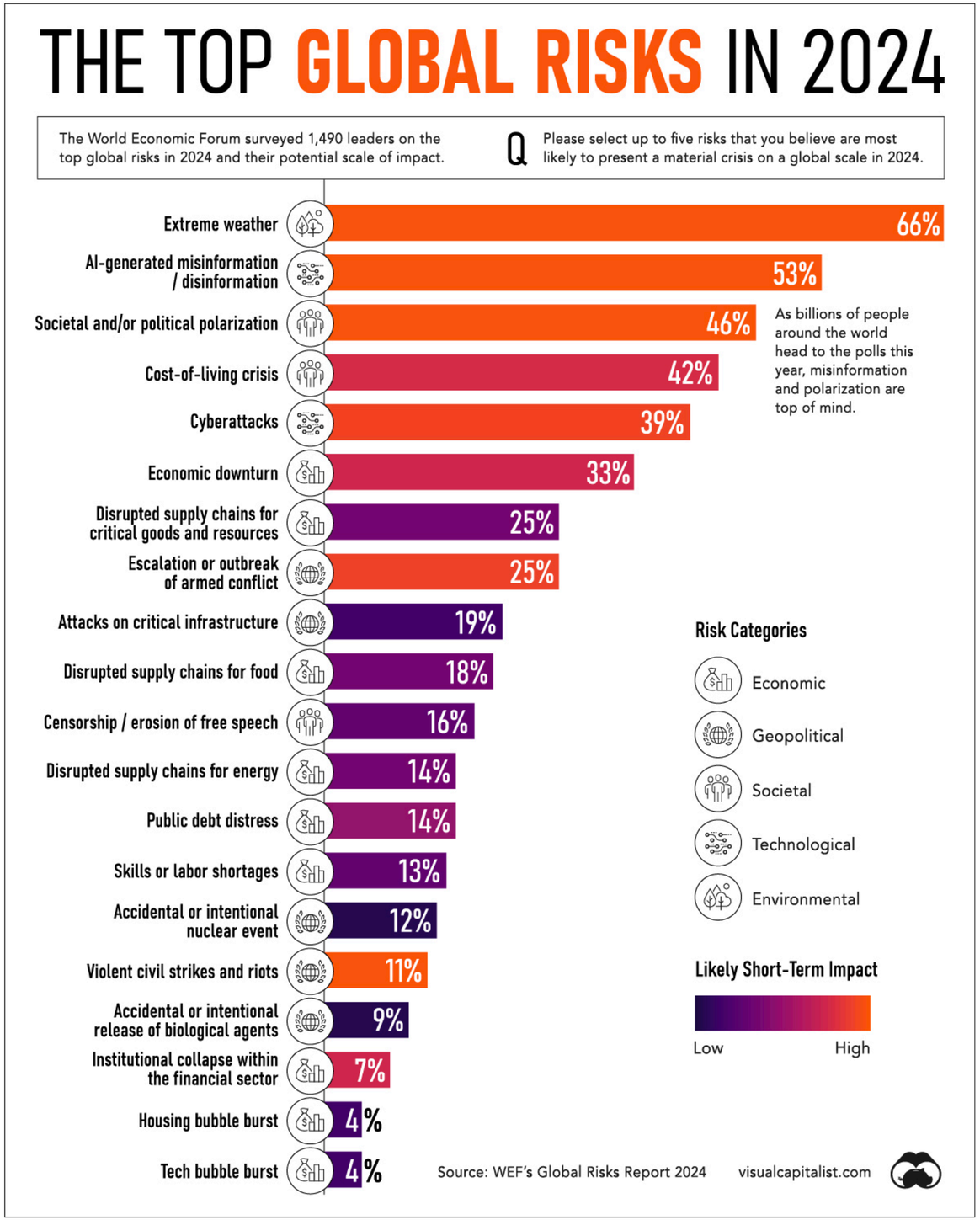
May 31, 2024

Climate Change and Disaster Risk in Mongolia

- United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)
  - Under the median range of simulations for RCP 4.5 (moderate scenario) and RCP 8.5 (business-as-usual scenario), future climate projections demonstrate
    - A warming trend across the country with an annual average temperature rise of 2.1 – 2.7°C by mid-century in comparison with a reference period of 1986-2005.
      - This increases the risks of **heatwaves**, **droughts,** and **permafrost melt** in the country.
    - A 2.3 – 2.8mm increase in monthly precipitation by 2040-2059, mainly in summer.
      - This increases the risks of **floods**, **landslides**, **mudslides,** and **mudflows**, especially in the mountainous regions.

Source: https://www.unescap.org/sites/default/d8files/event-documents/Mongolia%20-%20Climate%20Change%20and%20Disaster%20Risk%20Profile.pdf

Global Risks



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Global Risks

Rising Importance of Environmental Threats

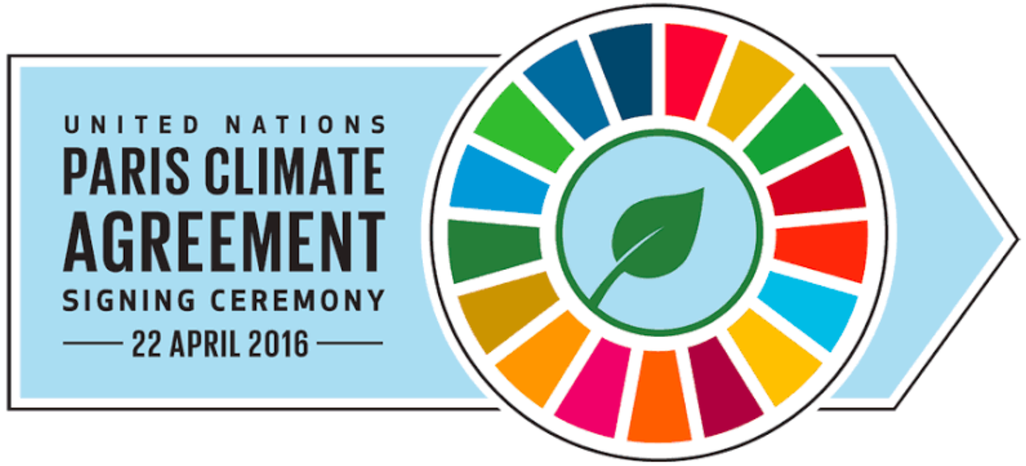
Trend in top five risks in terms of likelihood, 2015-2021

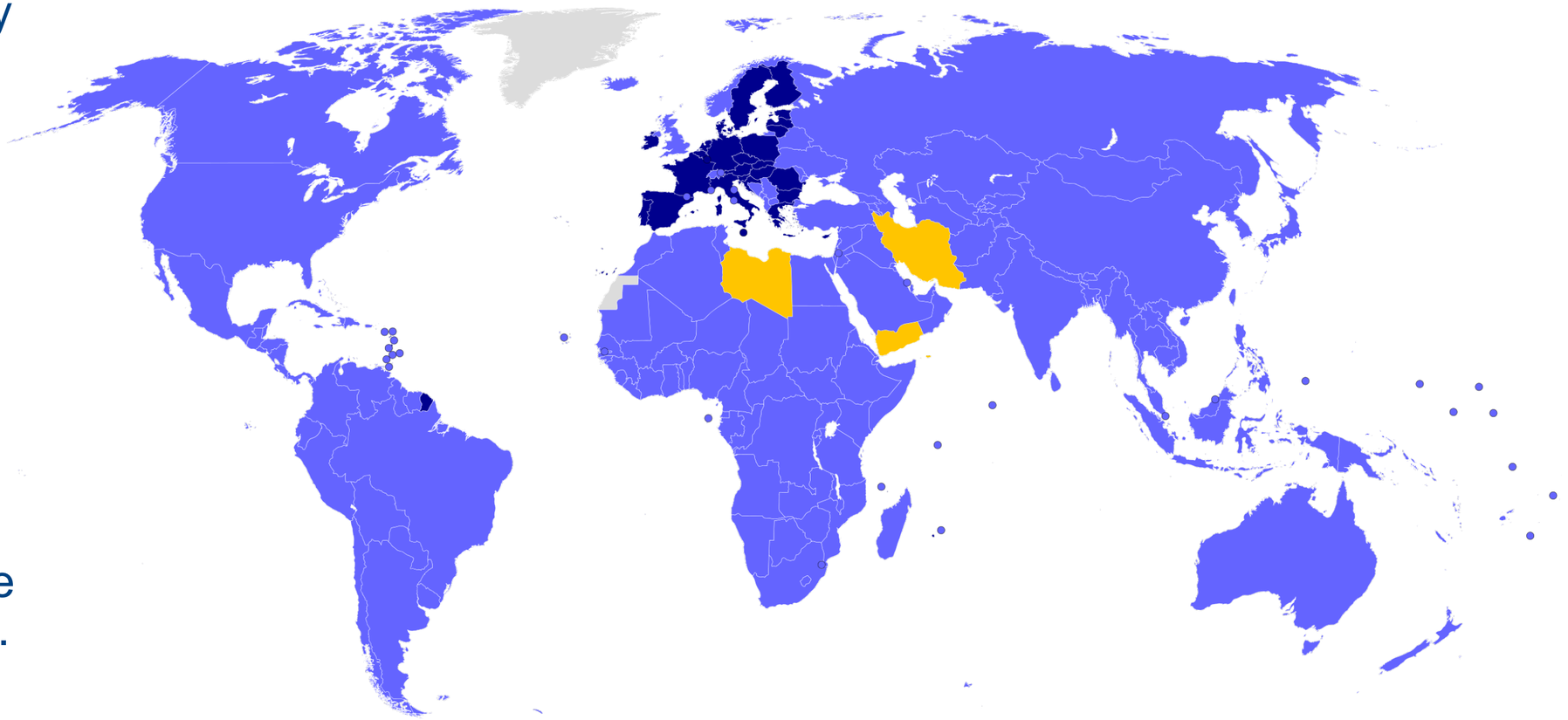
Environmental | Technological | Geopolitical | Economic | Societal

2015	2016	2017	2018	2019	2020	2021
Interstate conflict	Involuntary migration	Extreme weather	Extreme weather	Extreme weather	Extreme weather	Extreme weather
Extreme weather	Extreme weather	Involuntary migration	Natural disasters	Climate action failure	Climate action failure	Climate action failure
Failure of national governance	Climate action failure	Natural disasters	Cyberattacks	Natural disasters	Natural disasters	Human environmental damage
State collapse or crisis	Interstate conflict	Terrorist attacks	Data fraud or theft	Data fraud or theft	Biodiversity loss	Infectious diseases
Unemployment	Natural catastrophes	Data fraud or theft	Climate action failure	Cyberattacks	Human-made environmental disasters	Biodiversity loss

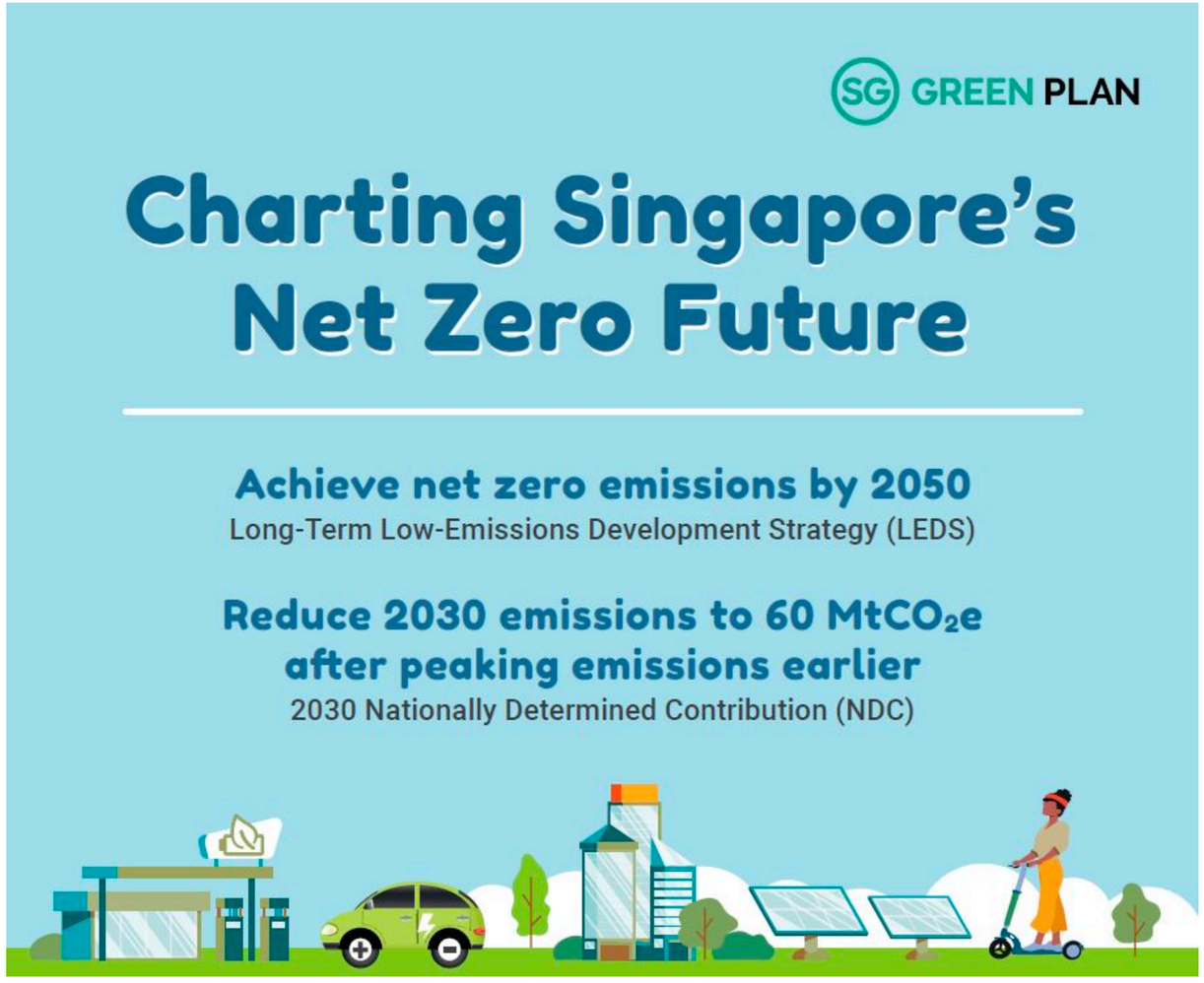
Source: WEF: Global Risks Report 2021

- The **Paris Agreement** is a legally binding global climate agreement.
- Its main goal is to limit global warming to well below 2°C above pre-industrial levels and ideally to 1.5°C.
- The agreement also aims to reduce greenhouse gas emissions and achieve a climate-neutral world by mid-century.
- **Nationally Determined Contributions (NDCs)** embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.





Net Zero by 2050: Singapore & South Korea



South Korea's pledge to achieve carbon neutrality by 2050

Briefing – 28-06-2021

As part of its plan for recovery from the coronavirus pandemic, South Korea has launched its own Green New Deal. Announced in July 2020, this initiative will invest €54.3 billion mostly for enabling a shift to green infrastructure, low-carbon and decentralised energy, for spurring innovation in green industry and for creating 659 000 jobs. The plan will also support the commercial development of technology for large-scale carbon capture utilisation and storage (CCUS). In October 2020, South Korea's President, Moon Jae-in, declared that the country would aim to reach carbon neutrality by 2050. He vowed to end dependence on coal and replace it with renewables as part of the Green New Deal. In December 2020, the government adopted a carbon-neutral strategy to chart a path towards a sustainable and green society. This strategy will support innovative climate technologies that will help South Korea achieve carbon neutrality and set a global example of success in accomplishing this goal. In December 2020, Seoul updated its nationally determined contribution (NDC) under the Paris Agreement. The target remains unchanged: by 2030, South Korea is to reduce its total greenhouse gas emissions by 24.4 % compared to 2017 levels. Aware of criticism about the country's weak ambition regarding emissions reduction, in May 2021 Moon Jae-in declared that a more ambitious target would be announced at the COP26 conference on climate change in Glasgow in November. Despite the relatively low levels of funding that South Korea has allocated to developing countries, it is taking ambitious action to demonstrate international leadership on climate change: in May 2021, it hosted the P4G summit focused on public–private partnerships, which yielded the Seoul Declaration. Climate change provisions in the EU–South Korea framework agreement highlight largely unused potential for cooperation; so far, these provisions have only been used for channelling EU support to Seoul's emissions trading scheme, for running a three-year EU-Korea climate action project and for holding the meetings of the joint working group on energy, environment and climate change.

Mongolia's NDC

GLOBAL
Climate Promise

ENGLISH | WHERE WE WORK | SEARCH

WHAT WE DO | NEWS & STORIES | RESEARCH & REPORTS

HOME / WHAT WE DO / WHERE WE WORK / MONGOLIA

MONGOLIA

Asia and the Pacific

0.16%	#59	#96	27.2%
Share of global GHG emissions	Climate Vulnerability Index ranking	Human Development Index ranking	Conditional emissions reduction target by 2030 (compared to business as usual)

NDC Status

Mongolia submitted its revised NDC in October 2020.

Key highlights from the NDC

- Mongolia enhanced its mitigation ambition with a conditional emissions reduction target of 27.2% by 2030 compared to business as usual.
- The country also set an unconditional emission reduction target of 22.7% by 2030 compared to business as usual.
- In addition, an optional component on forestry was included that would push total greenhouse gas emissions reduction to 44.9% by 2030.
- The revised NDC also increased sectoral coverage in agriculture, waste and some industrial sectors.
- The NDC targets are aligned with the national development strategy and policy framework.

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THE STRAITS TIMES

Carbon budget of listed firms to run out by October 2026: Research

Only 17 per cent of listed firms have set targets that align emissions with the Paris Agreement, said investment data provider MSCI. PHOTO: AFP

UPDATED MAY 16, 2023, 12:09 AM SGT

SINGAPORE - The world's listed firms are set to exceed their carbon budget – the amount of carbon dioxide emissions that would limit global temperature rises to 1.5 deg C – by as early as October 2026, new research showed on Monday.

The expiry date is two months sooner than a previous estimate made in October 2022, even though the number of global companies making commitments to combat climate change has risen 8 percentage points to 44 per cent over the period, investment data provider MSCI said in its latest Net-Zero Tracker.

It said only 17 per cent of listed firms have set targets ambitious enough that align emissions with the 1.5 deg C target set in the 2015 Paris Agreement, up 10 percentage points compared with 2022.

The tracker revealed "a significant gap" between the climate pledges of listed firms and their actual emissions, said Mr Sylvain Vanston, executive director of Climate Change Investment Research at MSCI.

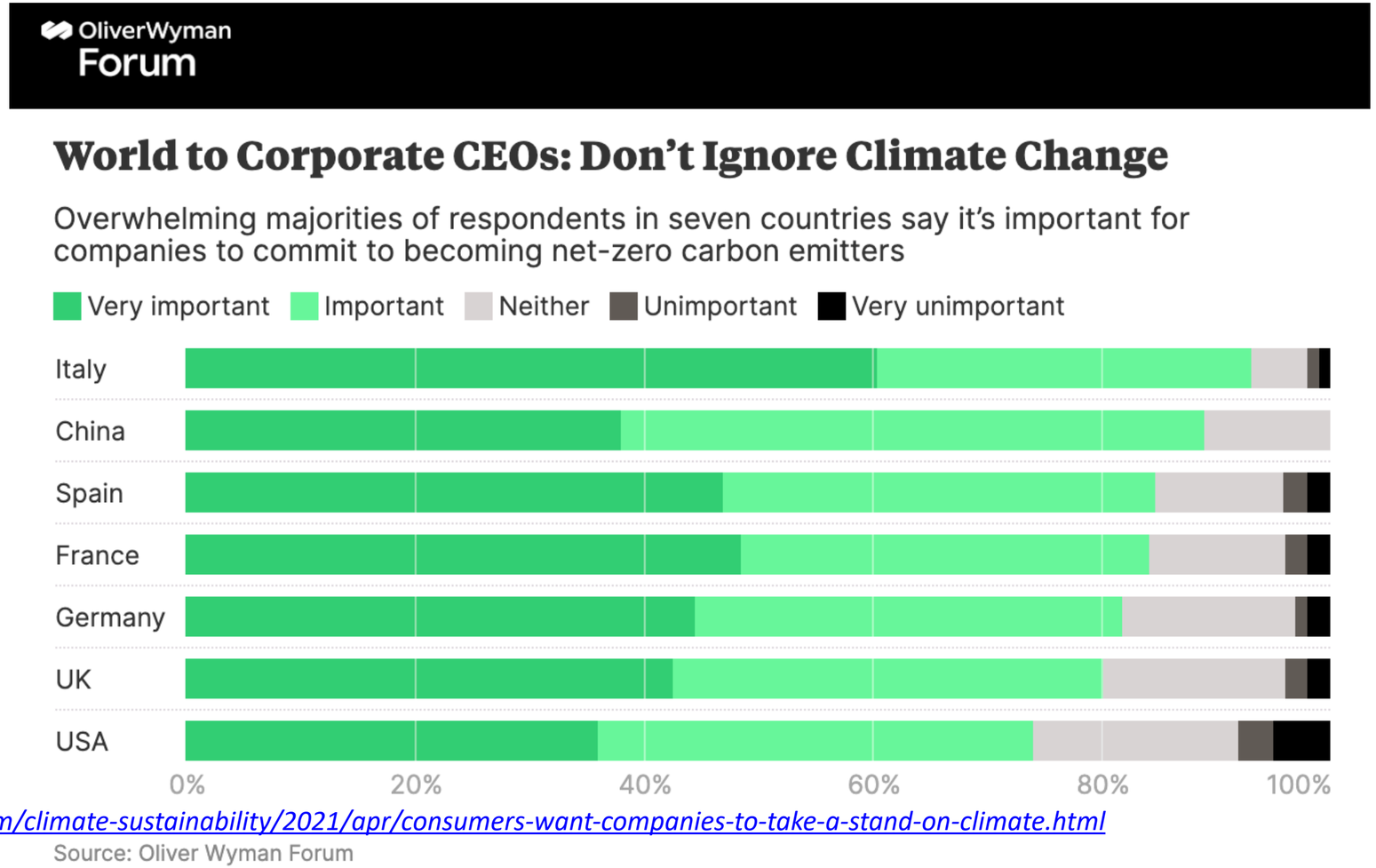
"Public and private companies and investors must act urgently, as this report clearly shows that time is running out and we are not on track to limit global warming to 1.5 degrees," said Mr Vanston.

Despite new pledges, public firms were expected to emit 11.2 gigatonnes of direct greenhouse gas emissions into the atmosphere in 2023, the same as 2022, putting them on track to warm the planet by 2.7 deg C by the end of the century, the report said.

Climate change is expected to become significantly more extreme if temperatures rise by more than 1.5 deg C above pre-industrial levels by the end of this century. Global mean temperatures in 2022 were 1.15 deg C above the 1850-1900 average, according to the World Meteorological Organisation. REUTERS

Oliver Wyman: Consumers Want Companies to Take a Stand on Climate

- Don’t Ignore Climate Change: Important for companies to commit to becoming net-zero carbon emitters



Source: https://www.oliverwymanforum.com/climate-sustainability/2021/apr/consumers-want-companies-to-take-a-stand-on-climate.html

BlackRock: Larry Fink's Letter to CEOs 2022

> **Putting your company's purpose at the foundation of your relationships with your stakeholders is critical to long-term success.**

> **We focus on sustainability not because we're environmentalists, but because we are capitalists and fiduciaries to our clients.**

> **Capitalism has the power to shape society and act as a powerful catalyst for change.**

Source: https://www.blackrock.com/corporate/investor-relations/larry-fink-ceo-letter

Sustainability Reporting

Sustainability Information and Disclosure

Importance of ESG Information Disclosure

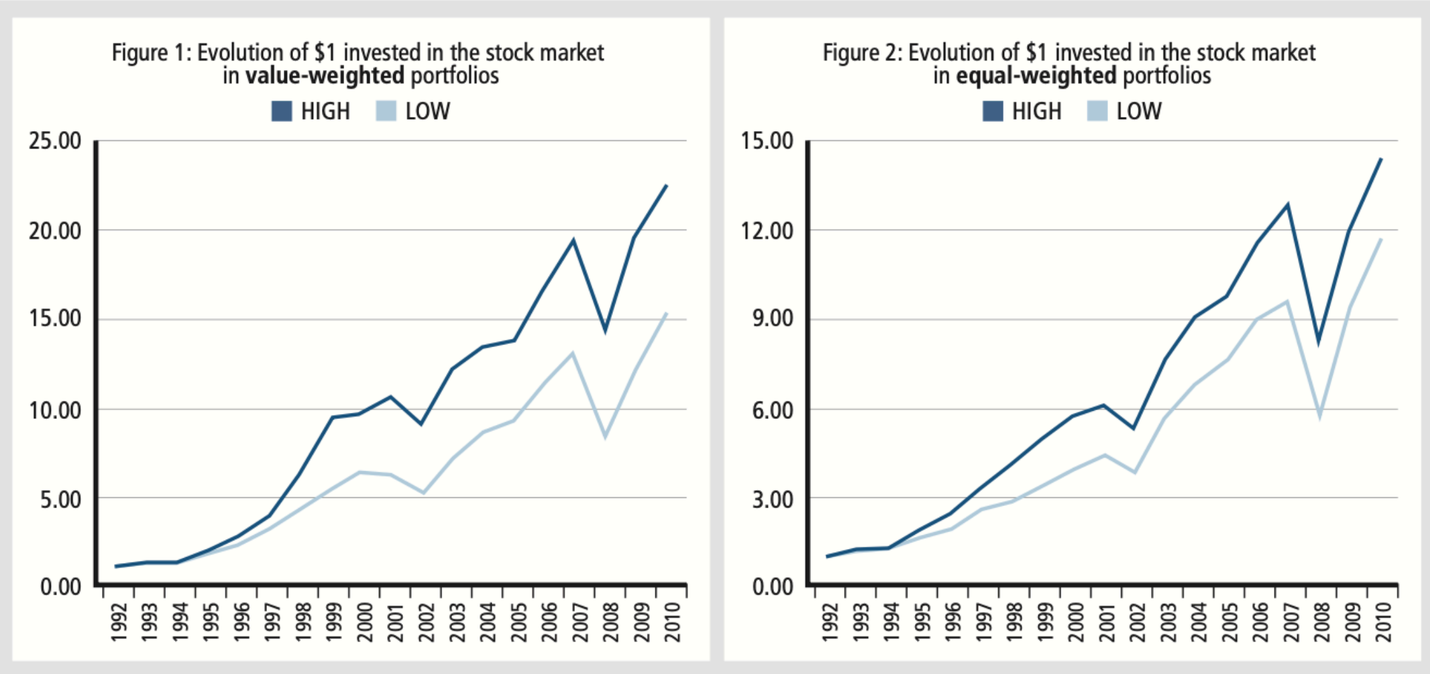
- Successfully **managing ESG factors**, alongside connecting internal management with external reporting can open opportunities to:
  - Improved investor ratings
  - Improved access to insurance
  - Preferential sustainable finance
  - Reputational benefits such as attracting and retaining customers and employees.

- **Disclosure of ESG information** is increasingly important for:
  - Internal decision-making
  - Regulatory compliance
  - Responding to requests from investors, lenders, and rating agencies

Source: TCFD Workshop

Demand for Sustainability Information

- **Investors** source quality sustainability information to meet their investment goals.
- Investment goals and accompanying strategies may include using the information to achieve above-market returns, assessing risk to protect against diminished returns and major losses, or evaluating the predictability of investment outcomes.
- The ability of investors to use **financially material sustainability information** to achieve enhanced outcomes is evidenced by an increasingly robust body of independent research.



Source: Robert G. Eccles, Ioannis Ioannou, and George Serafeim, "The Impact of Corporate Sustainability on Organizational Processes and Performance" (working paper), Harvard Business School, 29 July 2013

Source: TCFD Workshop

Demand for Sustainability Information

- **Sustainability data**, both qualitative and quantitative, can contribute to company success in the near, medium, and long term by improving the **management** of sustainability-related risks and opportunities.
- Where key performance indicators (KPIs) are measured and managed, companies may be better equipped to
  - identify and mitigate **risks**,
  - reduce **costs**,
  - optimize **efficiencies,**
  - increase market share and **revenue growth** through new products and services.
  - By demonstrating an ability to manage sustainability-related risks and opportunities to bolster company performance, companies can leverage sustainability disclosure to effectively communicate with investors and improve the **cost of capital**.
- Demand for sustainability information within companies is often (though not always) driven by the goal to improve bottom-line performance.

Source: TCFD Workshop

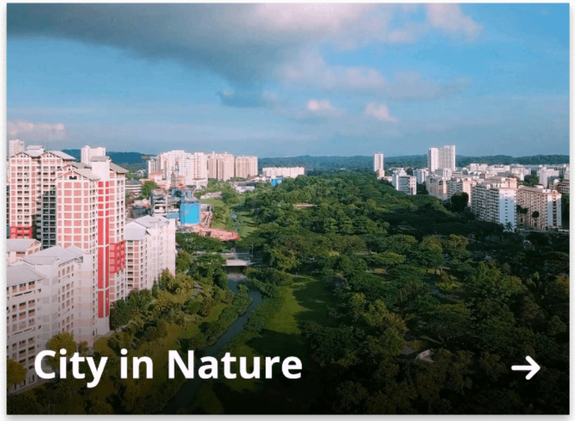
Mandatory Sustainability Reporting in Singapore and around the World

Singapore Green Plan 2030

Launched in February 2021, the Singapore Green Plan 2030 seeks to galvanise a whole-of-nation movement and advance Singapore's national agenda on sustainable development.

Spearheaded by five ministries - the Ministries of Sustainability and the Environment (MSE), Trade and Industry (MTI), Transport (MOT), National Development (MND), and Education (MOE) - and supported by the whole of Government, the Green Plan charts ambitious and concrete targets for the rest of this decade.

Explore the 5 pillars of the Singapore Green Plan 2030



Mandatory Reporting Standards 🇸🇬

Singapore regulators launch consultation on mandatory climate reporting for companies

Singapore's Accounting and Corporate Regulatory Authority and Singapore Exchange Regulation **launched** a public **consultation** on July 6 on recommendations that would require listed companies to report on their climate exposure as of financial year 2025. Non-listed companies with annual revenue of at least $1 billion would also have to report by financial year 2025, the regulators **said**. Companies would disclose by using reporting standards based on the ISSB's **recently announced** disclosure standards. Both listed and non-listed companies could opt to disclose more complex requirements such as Scope 3 greenhouse gas emissions — the indirect emissions that occur up and down a company's value chain — one to two years after the mandatory reporting takes effect, the regulators said. The consultation closes on Sept. 30.

Source: ACRA Announcement

Mandatory Reporting Standards 🇸🇬

Table 1: Proposed implementation timeline

	Report prescribed baseline CRD (with reliefs)	Report Scope 3 GHG emissions	Obtain external Limited Assurance over Scope 1 & Scope 2 GHG emissions
	FY beginning on or after 1 January		
All Listed Issuers	2025	2026	2027
NLCos with annual revenue of at least $1 billion	2027	2029	2029
NLCos with annual revenue of at least $100 million to less than $1 billion	A review will be conducted in 2027 with the view to require reporting a few years later, by around FY2030.		

Source: ACRA Announcement

Sustainability Reporting around the World

European Sustainability Reporting Standards

Coverage – Full ESG

Scope, who? – All companies subjected to CSRD must report

Timeline – Report 2025 covering fiscal year 2024

Focus – Multi stakeholder

IFRS Sustainability standard

Coverage – Only climate for now, eventually full ESG

Scope, who? – Hope to be adopted by national jurisdiction all over the world

Timeline – N/A *(dependent on local jurisdictions)*

Focus – Investor focus

SEC Climate disclosure

Coverage – Only climate for now

Scope, who? – All publicly reporting companies under SEC´s in the US must report

Timeline – Reports 2024 covering fiscal year 2023

Focus – Investor focus

Source: https://blog.worldfavor.com/esrs-issb-and-sec-standards-a-simple-comparison-guide

IFRS S1 and S2

Alphabet Soup: Sustainability Reporting Standards and Frameworks

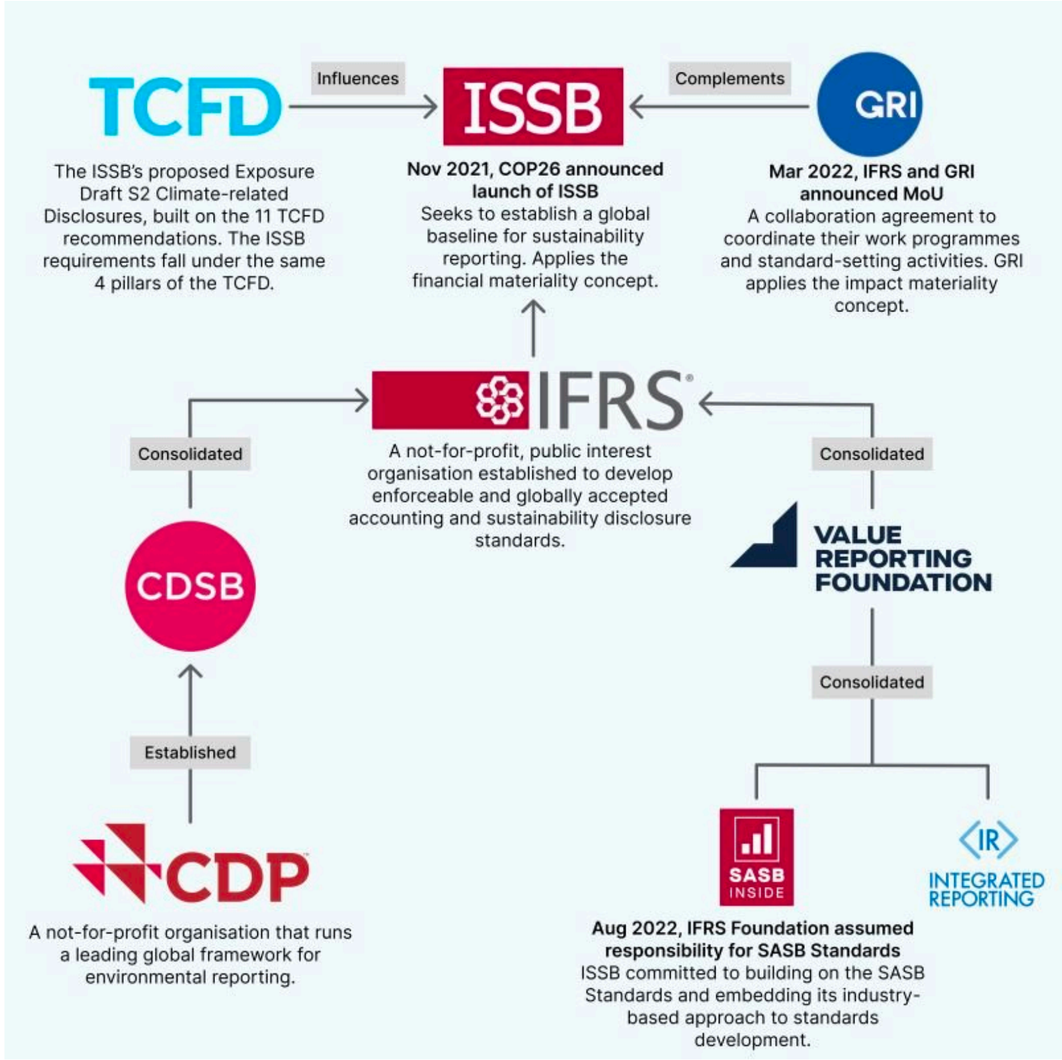
Figure 1: Comparison of established sustainability reporting standards

GREENHOUSE GAS PROTOCOL	GRI	CDP	VALUE REPORTING FOUNDATION	TCFD	CDSB	PRI
- Most popular greenhouse gas accounting standards - Calculation methodologies easy to follow	- Enables benchmarking against self and others - 40 different sector-specific standards	- Aligned with setting up a carbon Inventory - Low complexity: structured data is popular	- Helps identify most relevant, financially-material data to disclose - Popular with investors	- Uses scenario analysis to spot material future climate risks and opportunities - Popular with investors	- Slots in well with other standards - Low complexity and significant support materials	- Investor focused, financially material data - Low complexity, few disclosures required
- Coverage isn't sector-specific - Can be hard to choose correct section of guidance	- Less focus on indirect impacts in the supply chain - Guidance often cherry-picked by companies	- Minimal impact on direct decarbonization - Narrow scope (carbon, forests, water)	- Combination of three frameworks is complex - Little indication of relative performance	- Fairly lengthy guidance, complex implementation - Limited guidance on scenario analysis	- Low investor relevance, relative to other standards - Coverage isn't sector-specific	- Light on guidance documentation and detailed examples - Coverage isn't sector-specific

Source: BloombergNEF. Note: Green indicates advantages, red indicates disadvantages.

IFRS S1 and S2: Alignment and Harmonization

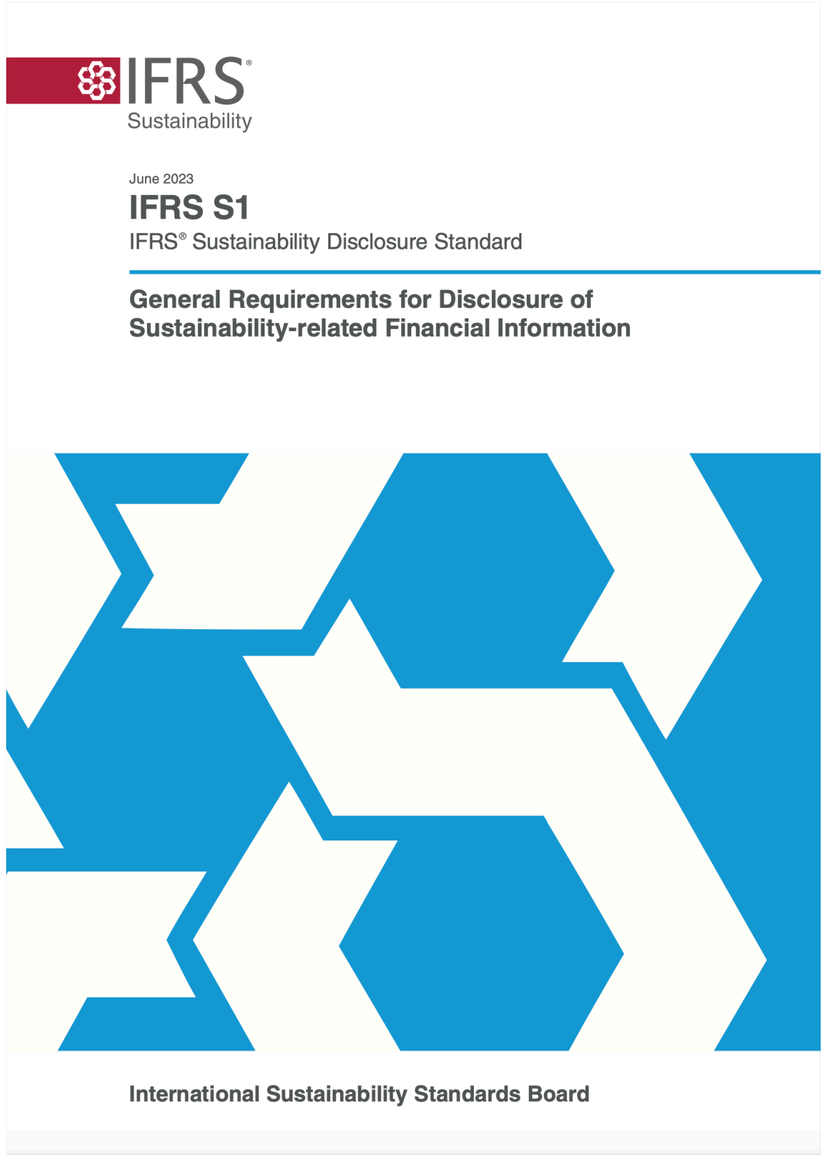
- Inevitably, there has been confusion about the different reporting frameworks and standards – especially in regards to where they align, and where they differ.
- There are differences between each, but they can very much be used in an **integrated** and **complementary** manner for the benefit of report preparers and users, encouraging **quality**, **consistency** and **comparability** (Interoperability).
- In 2020, the five reporting organizations (CDP, CDSB, GRI, IIRC, and SASB) announced a Statement of Intent to Work Together Towards Comprehensive Corporate Reporting and later published a detailed outline of how their frameworks and standards could be brought together to develop global standards for mainstream sustainability reporting, providing a prototype of a conceptual framework and climate standard. These provided positive steps towards a comprehensive reporting system for companies and report users alike.



IFRS S1 and S2

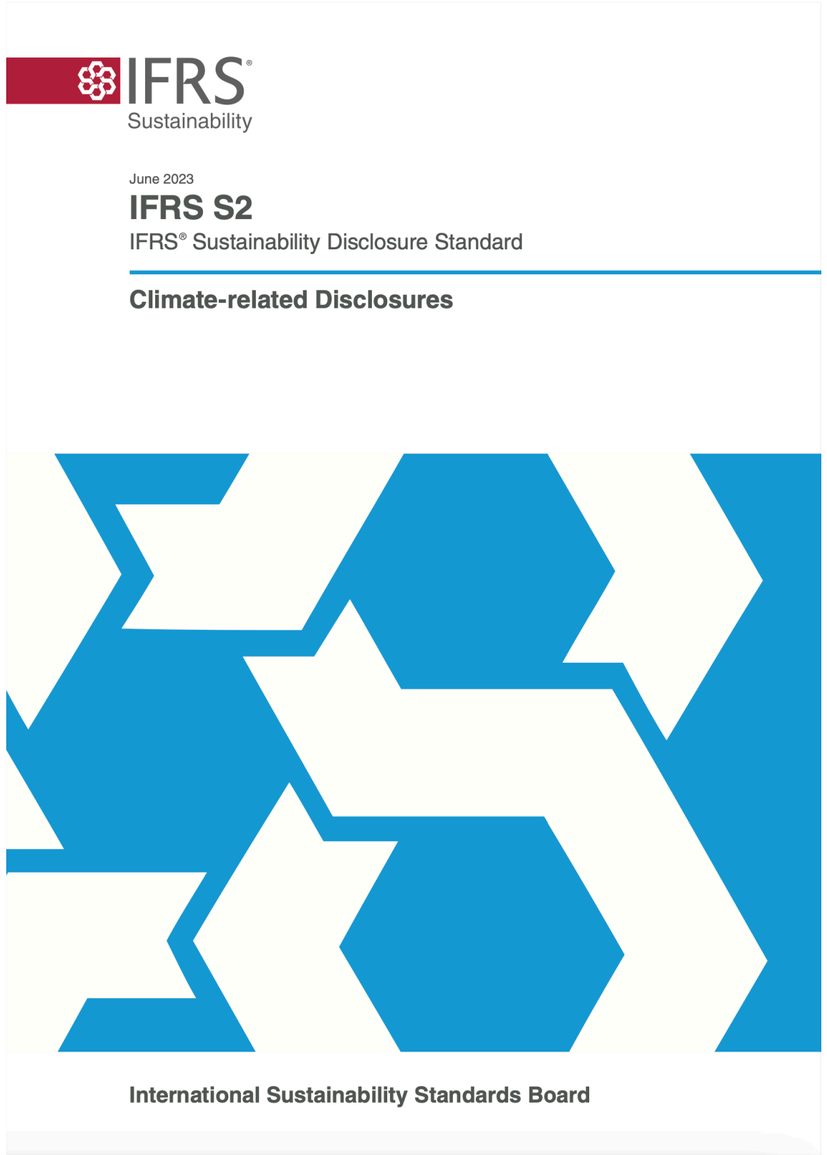
- In June 2023, the International Sustainability Standards Board (ISSB) issued its inaugural standards —**IFRS S1 and IFRS S2**—ushering in a new era of sustainability-related disclosures in capital markets worldwide.
- The Standards aim to improve trust and confidence in company disclosures about sustainability to inform **investment decisions**.

- **IFRS S1**: General Requirements for Disclosure of Sustainability-related Financial Information
  - Provides a set of disclosure requirements designed to enable companies to communicate to investors about the sustainability-related risks and opportunities they face over the short, medium, and long term.



IFRS S2

- **IFRS S2**: Climate-related Disclosures
  - Sets out specific climate-related disclosures and is designed to be used with IFRS S1.
  - For the first time, the Standards create a common language for disclosing the effect of **climate-related risks and opportunities** on a company's prospects.
  - Climate-related risks include:
    - **Physical** risks – e.g., storm, flood, or wildfire
    - **Transition** risks – i.e., risks associated with transitioning to a low-carbon economy
- IFRS S1 and S2 fully incorporate the **TCFD recommendations**.
  - **Four Pillars**: Governance; Strategy; Risk Management; Metrics and Targets
  - Requires the organization to undertake **climate-related scenario analysis**.



IFRS S1 and S2

Figure 2: Comparison of IFRS S1 and S2

Both standards require an entity to disclose all sustainability-related risks and opportunities that could reasonably be expected to affect the entity's cash flows, its access to finance or cost of capital over the short, medium or long term.

IFRS S1	IFRS S2
This standard sets out how an entity reports its sustainability-related financial disclosures, by introducing requirements on: ○ **Governance** - the processes and procedures the entity uses to monitor and manage sustainability-related risks and opportunities; ○ **Strategy** - the approach the entity uses to manage sustainability-related risks and opportunities; ○ **Risk management** - the processes the entity uses to assess, prioritize and monitor sustainability-related risks and opportunities; and ○ **Metrics and targets** - the entity's performance in relation to sustainability-related risks and opportunities, including progress towards any targets the entity has set	This standard sets out how an entity reports: ○ **Climate-related risks** to which the entity is exposed, which are climate-related physical risks and climate-related transition risks; and ○ **Climate-related opportunities.** • Specific requirements for climate-related disclosure also link to governance process, entity's strategy, processes used to identify, assess, prioritize and monitor climate-related risks and opportunities, and the entity's performance in relation to its climate-related risks and opportunities.

Source: BloombergNEF

SEC Climate-Related Disclosure Rules (March 6, 2024)

https://www.sec.gov/news/press-release/2024-31

FACT SHEET

The Enhancement and Standardization of Climate-Related Disclosures: Final Rules

On March 6, 2024, the Securities and Exchange Commission adopted final rules to require registrants to disclose certain climate-related information in registration statements and annual reports. The Commission proposed the rules on March 21, 2022. The public comment file is available online.

The final rules require a registrant to disclose, among other things: material climate-related risks; activities to mitigate or adapt to such risks; information about the registrant's board of directors' oversight of climate-related risks and management's role in managing material climate-related risks; and information on any climate-related targets or goals that are material to the registrant's business, results of operations, or financial condition.

Further, to facilitate investors' assessment of certain climate-related risks, the final rules require disclosure of Scope 1 and/or Scope 2 greenhouse gas (GHG) emissions on a phased-in basis by certain larger registrants when those emissions are material; the filing of an attestation report covering the required disclosure of such registrants' Scope 1 and/or Scope 2 emissions, also on a phased-in basis; and disclosure of the financial statement effects of severe weather events and other natural conditions including, for example, costs and losses.

The final rules include a phased-in compliance period for all registrants, with the compliance date dependent on the registrant's filer status and the content of the disclosure.

SEC Climate-Related Disclosure Rules (March 6, 2024)

https://www.sec.gov/news/press-release/2024-31

- Disclosure of **climate-related risks** that impact or could impact the company's business strategy, operations, or financial condition.
- Detailed reporting on the **material effects** of climate-related risks on the company’s strategy, business model, and outlook.
- If mitigating or adapting to climate-related risks, a report on the **costs incurred** and the **impacts on financial estimates** and assumptions.
- Description of **measures taken to mitigate or adapt** to climate risks, including transition plans, scenario analysis, or internal carbon pricing.
- **Board of directors’ oversight** and **management’s role** in assessing and managing climate-related risks.
- The processes in place for identifying, assessing, and managing climate risks, and their integration into the company’s overall **risk management**.
- Information on **climate-related targets or goals** that significantly influence the company's operations, financial results, or condition, including expenditures and impacts on financial forecasts.
- For certain filers, disclosure of material **Scope 1 and Scope 2 emissions**, and eventually, an assurance report on these emissions.
- Reporting of **financial impacts** due to severe weather events and other natural conditions, including the relevant costs and losses.
- Financial impacts related to **carbon offsets** and **renewable energy credits (RECs)**, if significant to achieving climate-related targets.
- Impact of climate-related risks and targets on the **financial statement estimates and assumptions**, with a qualitative description of these effects.

SEC Climate-Related Disclosure Rules

- https://www.sec.gov/news/press-release/2024-31

Compliance Dates under the Final Rules[1]						
Registrant Type	**Disclosure and Financial Statement Effects Audit**		**GHG Emissions/Assurance**			**Electronic Tagging**
	All Reg. S-K and S-X disclosures, other than as noted in this table	*Item 1502(d)(2), Item 1502(e)(2), and Item 1504(c)(2)*	*Item 1505 (Scopes 1 and 2 GHG emissions)*	*Item 1506 - Limited Assurance*	*Item 1506 - Reasonable Assurance*	*Item 1508 - Inline XBRL tagging for subpart 1500[2]*
LAFs	FYB 2025	FYB 2026	FYB 2026	FYB 2029	FYB 2033	FYB 2026
AFs (other than SRCs and EGCs)	FYB 2026	FYB 2027	FYB 2028	FYB 2031	N/A	FYB 2026
SRCs, EGCs, and NAFs	FYB 2027	FYB 2028	N/A	N/A	N/A	FYB 2027
	1 As used in this chart, "FYB" refers to any fiscal year beginning in the calendar year listed. 2 Financial statement disclosures under Article 14 will be required to be tagged in accordance with existing rules pertaining to the tagging of financial statements. *See* Rule 405(b)(1)(i) of Regulation S-T.					

CSRD/ESRS and Non-EU Companies

- Corporate Sustainability Reporting Directive (**CSRD**): A legislative directive of the European Union that aims to extend sustainability reporting requirements
- European Sustainability Reporting Standards (**ESRS**): Specific standards developed to define and standardize the content of the sustainability reports mandated by the CSRD
- The CSRD defines "who" should report and "what" broad areas need to be covered, while the ESRS specifies "how" to report these details.

Additional reporting for a non-EU headquartered company

Even if the ultimate parent does not have debt or equity securities listed on an EU-regulated market, global consolidated reporting will be required beginning in fiscal year 2028 (reporting in 2029) if:

At least one entity in the consolidated group is within the scope of the CSRD

OR

At least one EU branch generated net turnover (revenue) of more than €40 million in the preceding year (about $42 million as of September 30, 2023)

+

Consolidated net turnover (revenue) generated in the EU exceeds €150 million for each of the last two consecutive fiscal years (about $159 million as of September 30, 2023)

Source: PWC

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

TCFD Recommendations

TCFD Recommendations

- Climate change poses significant risks to the stability of the financial system. To mitigate and appropriately price these risks, organizations are increasingly being expected to provide narrative information about their exposure to, and strategies to mitigate, climate-related risk.
- In 2015, the G20 Financial Stability Board set up the **Task Force on Climate-related Financial Disclosures (TCFD)** to identify the information needed by investors, lenders, and insurance underwriters to assess and price climate-related risks and opportunities.
- In 2017, TCFD published its final recommendations for **voluntary disclosures** of **climate-related financial risks and opportunities**.
- The intention of these recommendations is to ensure all corporate entities provide clear, consistent, and reliable disclosures to help **providers of capital** better understand the risks and opportunities to which organizations are exposed, and how organizations oversee and manage these.

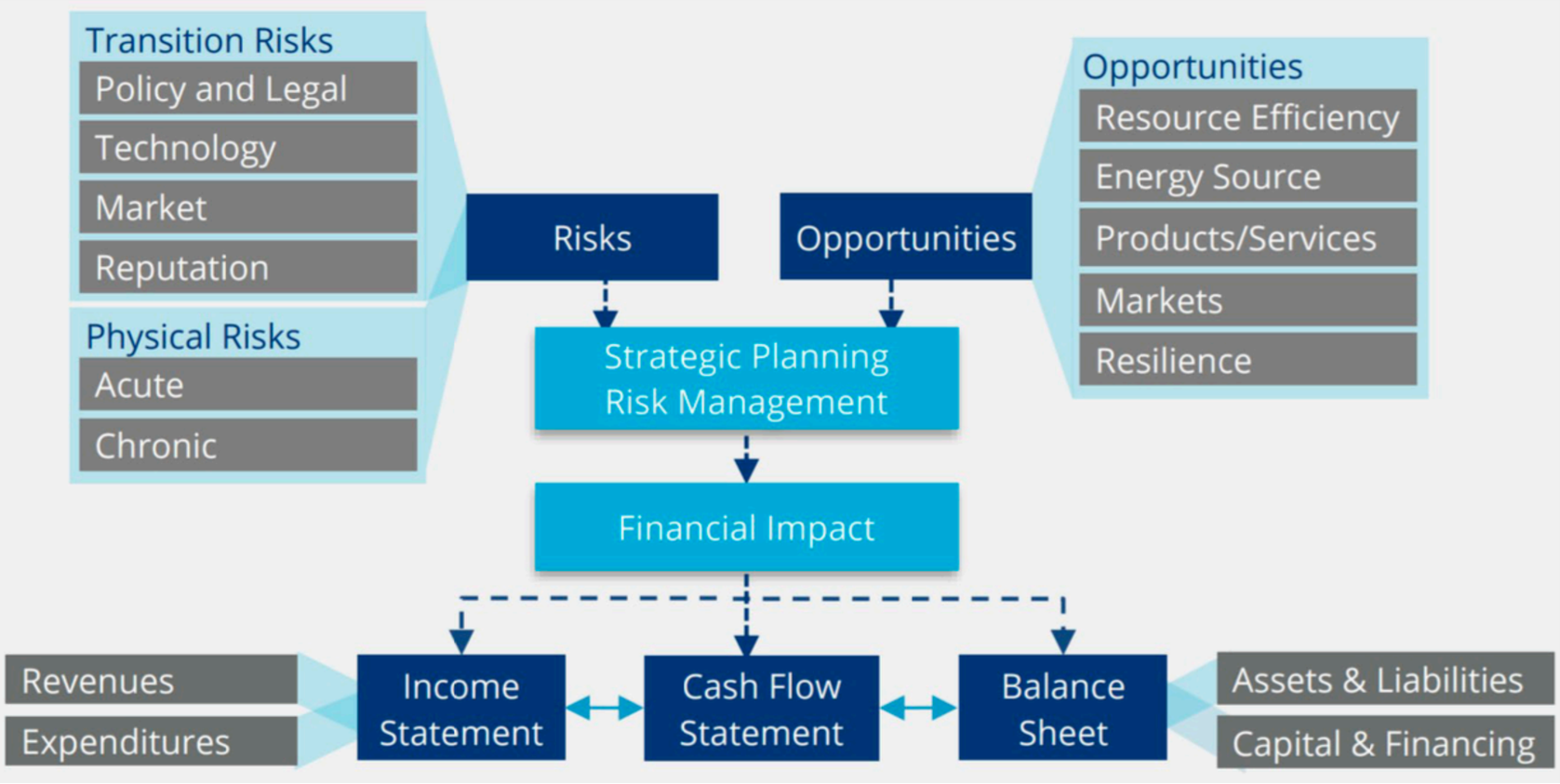
"In the future, disclosure will move into the mainstream, and it is reasonable to expect that more authorities will mandate it." - Mark Carney, Former Governor of the Bank of England

"Increasing transparency makes markets more efficient, and economies more stable and resilient." - Michael R. Bloomberg, Chair, TCFD

Source: TCFD Workshop

TCFD Recommendations

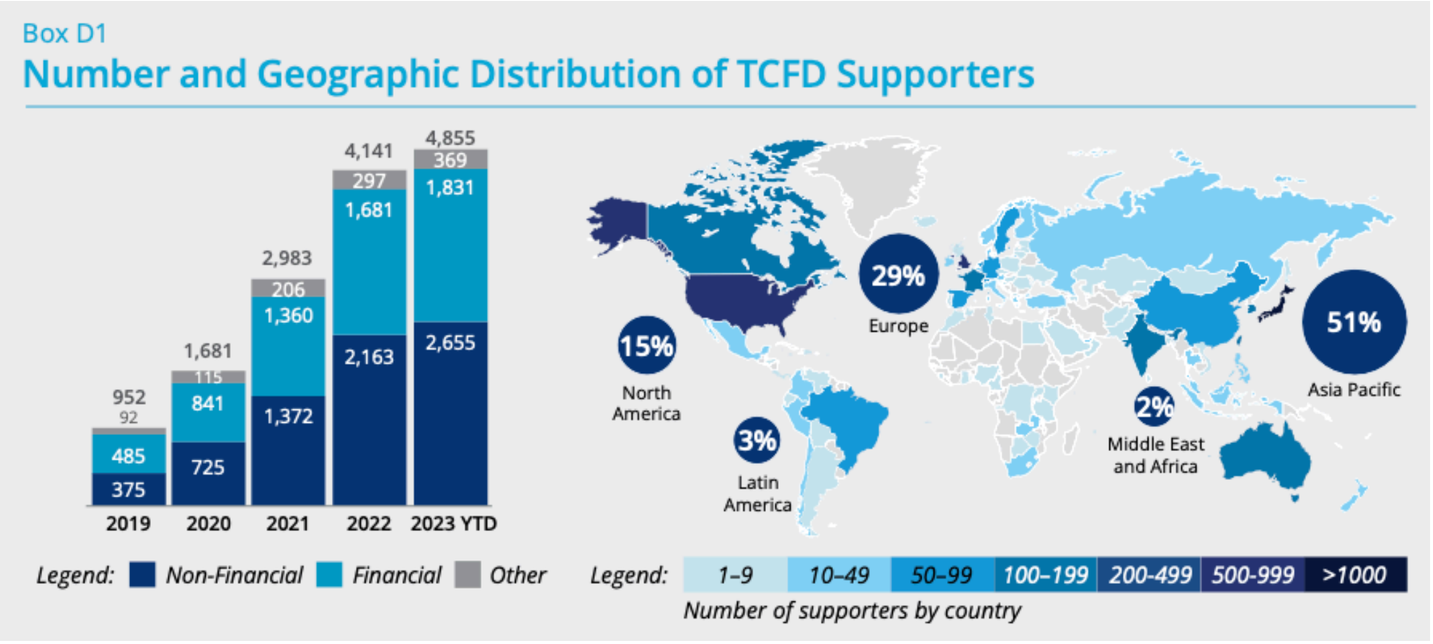
- Better disclosure of the **financial impacts** of **climate-related risks and opportunities** on a company is a key goal of the Task Force's work.



Source: TCFD

TCFD Recommendations

- A key part of the TCFD recommendations is in relation to **forward-looking** disclosures. In particular, companies are asked to demonstrate their understanding of the potential impacts associated with **climate change** and how these risks are managed in the **governance** and **risk management** processes.
- The recommendations focus on **four key thematic areas**, or **core elements**, that are relevant in virtually all types of organizations. These core areas are designed to interlink and inform one another.



Source: TCFD

TCFD Recommendations

Core Elements of the TCFD Recommendations

Governance

Disclose the company's governance around climate-related risks and opportunities

Strategy

Disclose the actual and potential impacts of climate-related risks and opportunities on the company's businesses, strategy, and financial planning

Risk Management

Disclose the processes used by the company to identify, assess, and manage climate-related risks

Metrics and Targets

Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities

Source: TCFD

TCFD Recommended Disclosures

NUS National University of Singapore

Recommendations and Supporting Recommended Disclosures

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

Source: TCFD

TCFD Recommendations and IFRS S2

Table 1: Comparison with TCFD recommendations

TCFD recommended disclosure and guidance	IFRS S2 (climate-related disclosures)
Governance Disclose the organization's governance around climate-related risks and opportunities	**Governance** Understand the governance processes, controls and procedures used to monitor and mange climate-related risks and opportunities
Recommended Disclosure a) Describe the board's oversight of climate-related risks and opportunities.	IFRS S2 is consistent with the TCFD governance recommendation. However, IFRS S2 requires the disclosure of additional information around governance including: - The identity of the body or individual within a body responsible for oversight of climate-related risks and opportunities. - How that body's responsibilities for climate-related risks and opportunities are reflected in the entity's terms of reference, board mandates and other related policies. - How the body ensures that the appropriate skills and competencies are available to oversee strategies designed to respond to climate-related risks and opportunities - Information about whether dedicated controls and procedures are applied to management of climate-related risks and opportunities and, if so, how they are integrated with other internal functions.
Recommended Disclosure b) Describe management's role in assessing and managing climate-related risks and opportunities.	

Source: BloombergNEF

Climate-Related Disclosures in Singapore

Getting Ready for the ISSB Standards

Study – Objectives and coverage

NUS National University of Singapore | Sustainable and Green Finance Institute

ACRA Accounting And Corporate Regulatory Authority

Lead:
Dr Sean Shin
Senior Lecturer of Accounting

Advisor:
Prof Mak Yuen Teen
Professor (Practice) of Accounting

Objectives

- Review <u>comprehensibility and analytical utility</u> of TCFD disclosures vis-a-vis **Guidance for All Sectors**
- Find the connectivity between <u>climate reporting and financial reporting</u>

Samples

- 51 entities listed on the Main Board
- Each with market capitalisation exceeding $1 billion as of 4 July 2023

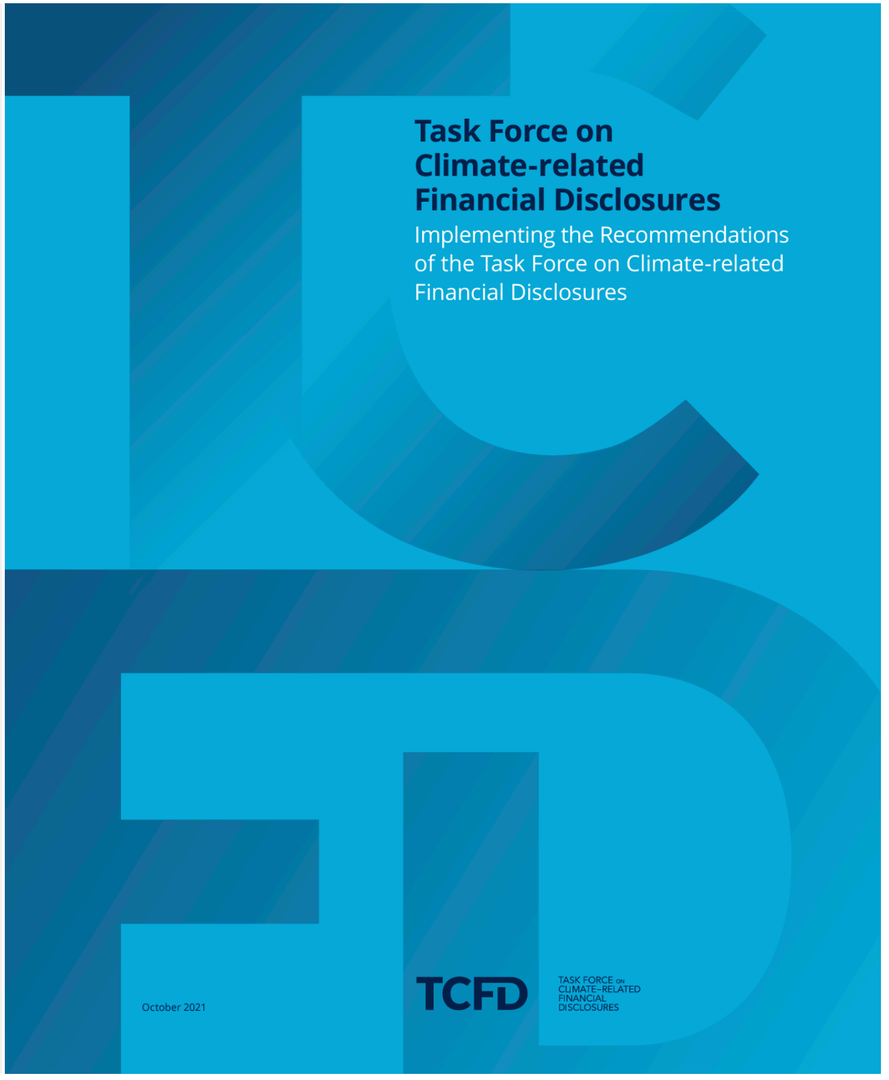
Source: https://www.acra.gov.sg/docs/default-source/news-events-documents/2024/acra-nus-study/report.pdf

TCFD Recommended Disclosures and Implementation Guidance

NUS National University of Singapore

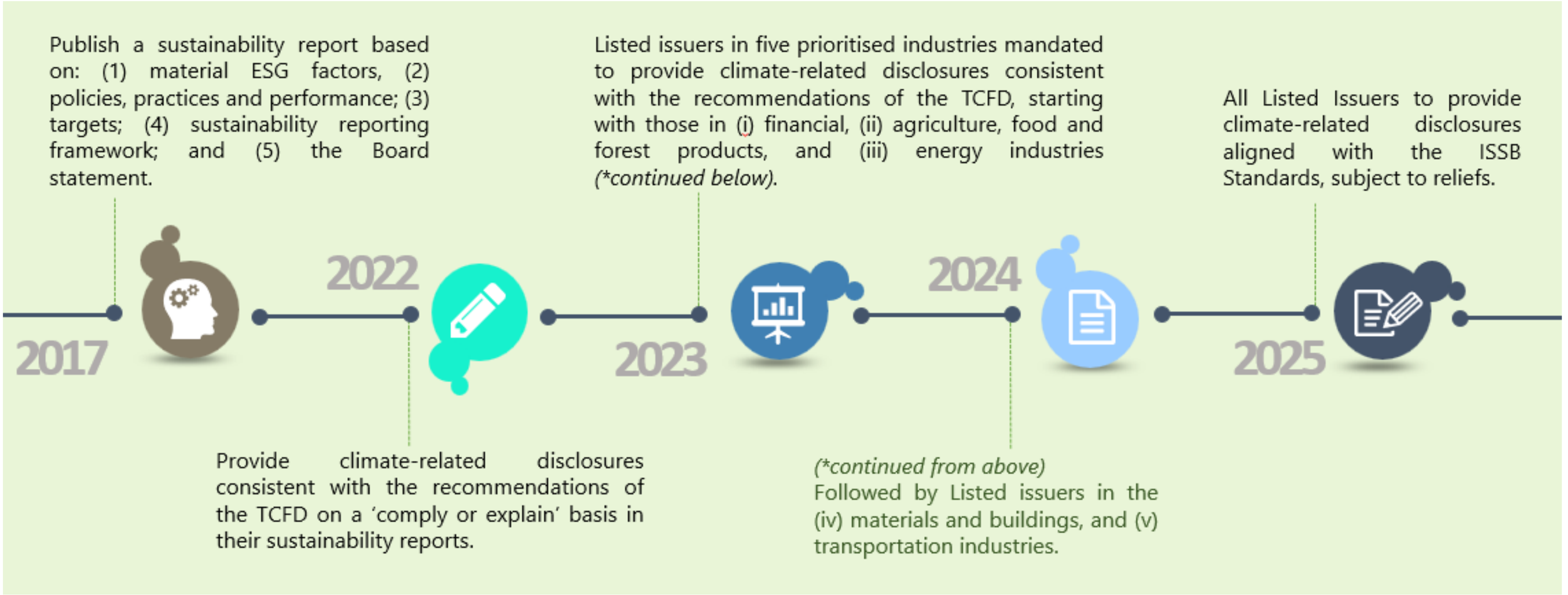
Recommendations and Supporting Recommended Disclosures

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



Climate reporting developments for listed issuers in Singapore

Since 2017, SGX RegCo has been gradually enhancing the climate reporting requirements.



Note:

- TCFD refers to Task Force on Climate-related Financial Disclosures

Benefits of climate reporting for companies

Manage climate risks

Robust measurement of emissions supports companies in planning for the green transition and managing emissions throughout their value chains.

Potential cost reduction

Focus on ESG can combat rising operating expenses, decrease likelihood of incidents/business interruptions, ease regulatory and legal interventions and the associated costs.

Potential increase in revenue

Presents greater business opportunities through demand for low emission products/services and shifting consumer preferences.

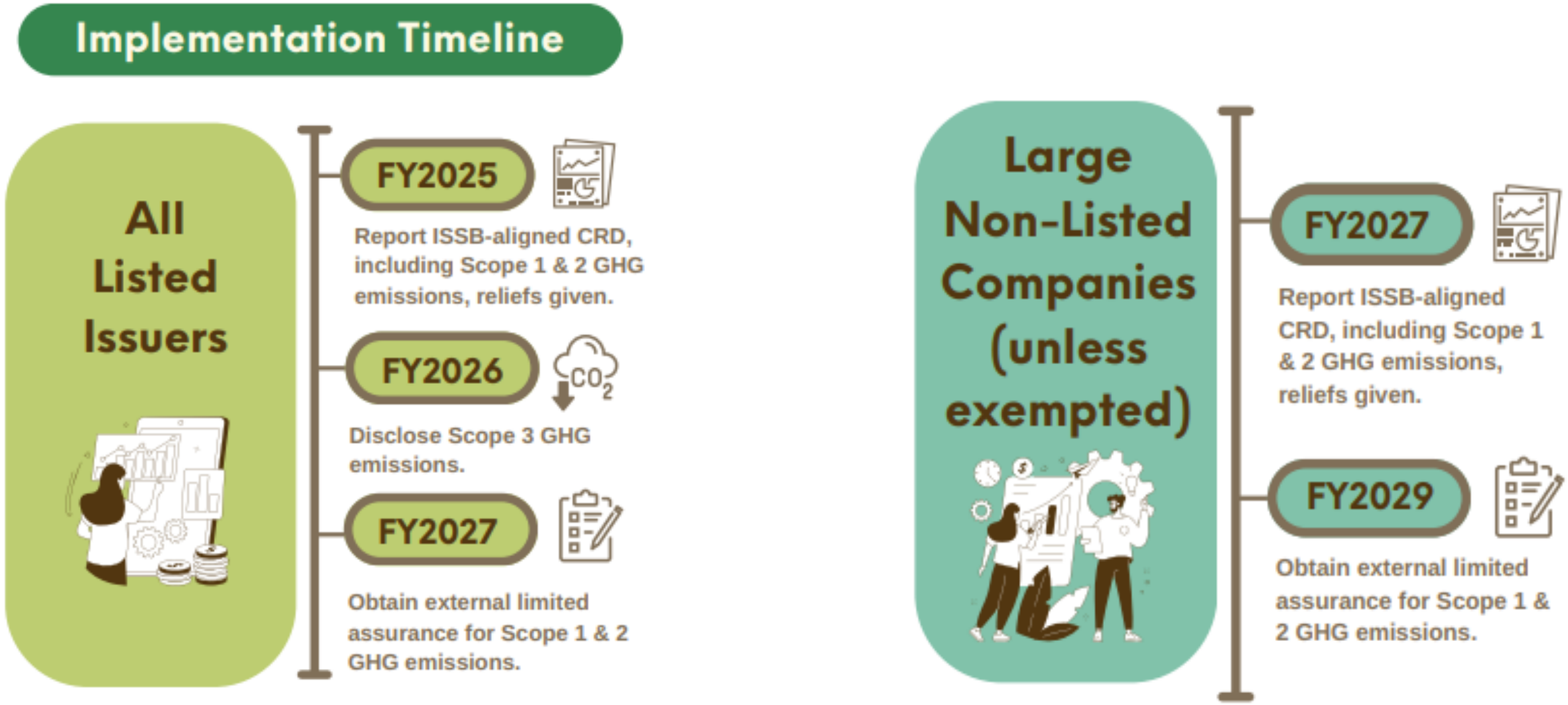
Employer of choice

ESG performance has become a competitive edge – in engaging today's employees and attracting tomorrow's talent.

Access to capital & lower cost of capital

Transparency on ESG information help financial institutions/investors understand companies' businesses, helps in attracting capital and lowers cost of capital.

Climate reporting and assurance roadmap in Singapore



Note:

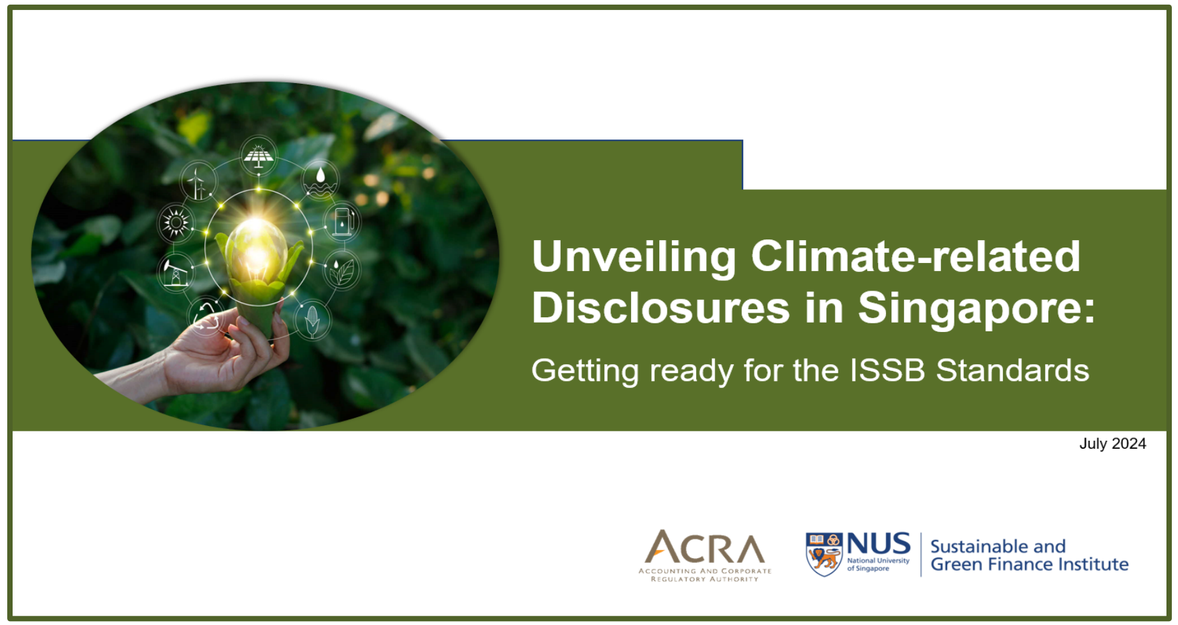
- ISSB refers to International Sustainability Standards Board
- CRD refers to Climate-Related Disclosures
- GHG refers to Greenhouse Gas, which can be categorised under GHG Protocol as follows:
  - Scope 1 emissions are direct emissions from owned or controlled sources.
  - Scope 2 emissions are indirect emissions from the generation of purchased energy.
  - Scope 3 emissions are all indirect emissions (not included in Scope 2) in the value chain of the reporting company, including upstream and downstream emissions.

Study – Methodology

Comprehensibility and analytical utility

Measures whether disclosures are useful for investors' analytical purposes, focusing on clarity, comprehensiveness and relevance.

- **No disclosure:** No information was provided
- **Partial:** Lacked adequate context or details
- **Full:** Included detailed and contextual information



Illustrative Example on Full Disclosures

Highlight some best practices in Singapore and overseas, with clear and actionable insights.

Caveats

- Our assessment involved some level of subjectivity and may not be perfectly consistent. However, it allowed us to identify trends in how companies were reporting in compliance with TCFD framework.
- Our selections might not represent the absolute best cases. The usefulness might vary depending on industry and specific company circumstances.

Governance – Our findings

Objective
Help investors and others to evaluate if climate-related matters are receiving appropriate Board and Management's attention

Observation
Almost all [94%] companies studied have assigned roles and/ or formed committees to deal with climate matters

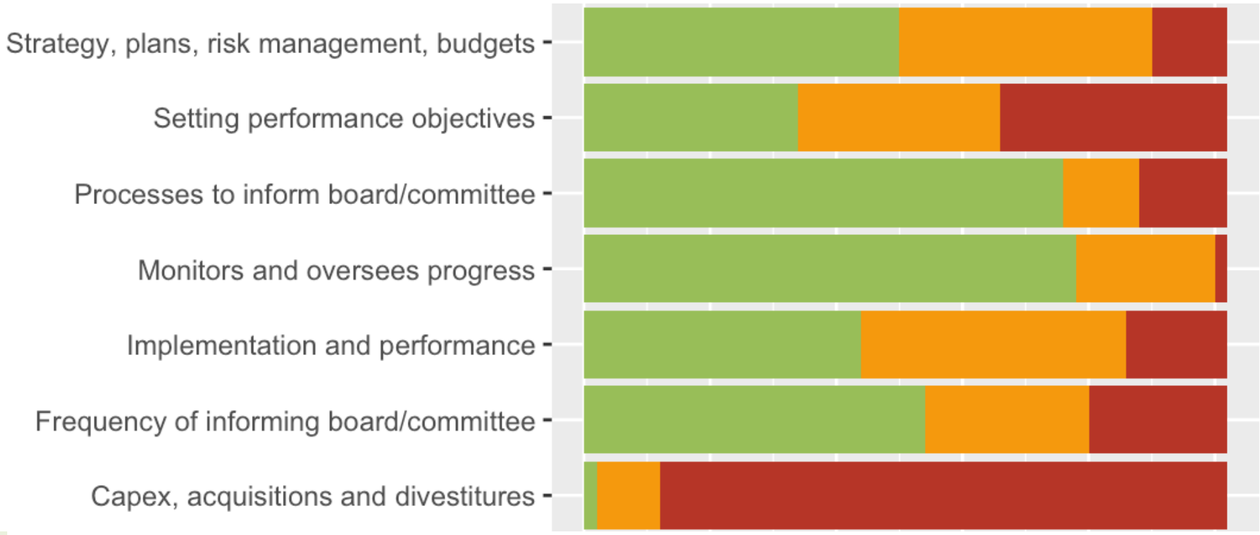
Three-quarters [75%] companies have fully described their process of reporting climate matters to the Board

What can companies disclose more?

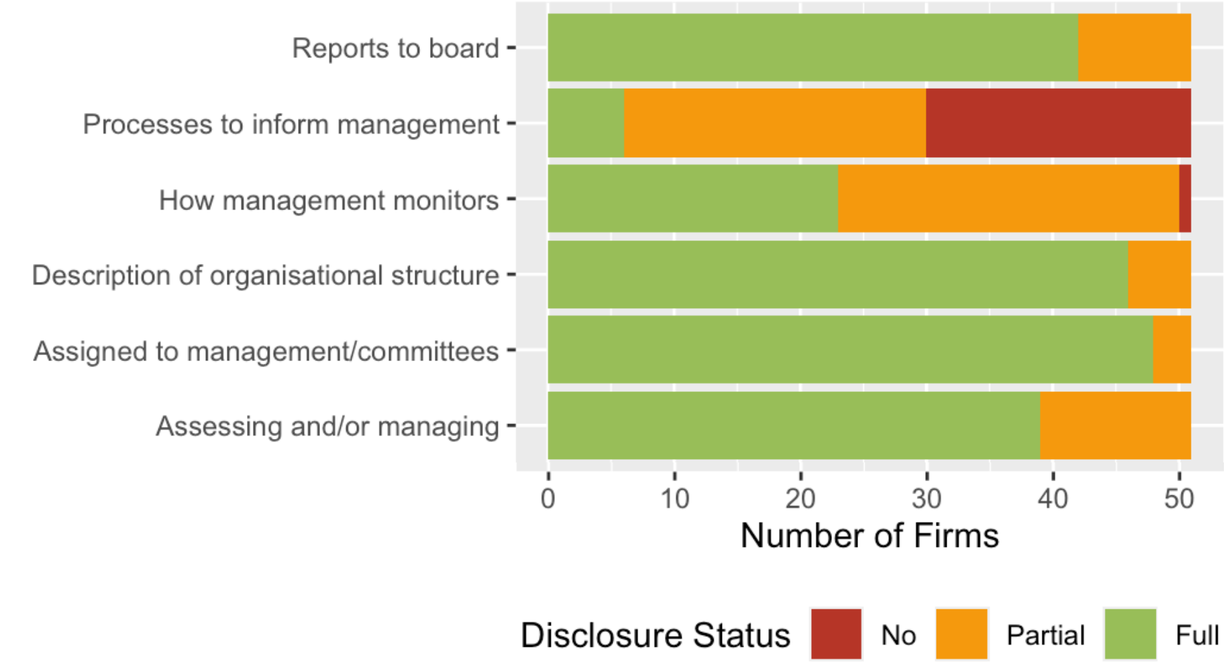
1. Board's oversight on **setting performance objectives** and the **frequency** of reporting the Board/committee

2. Board's oversight on **capital expenditures, acquisitions** and **divestitures**

Governance (a) – Board Oversight

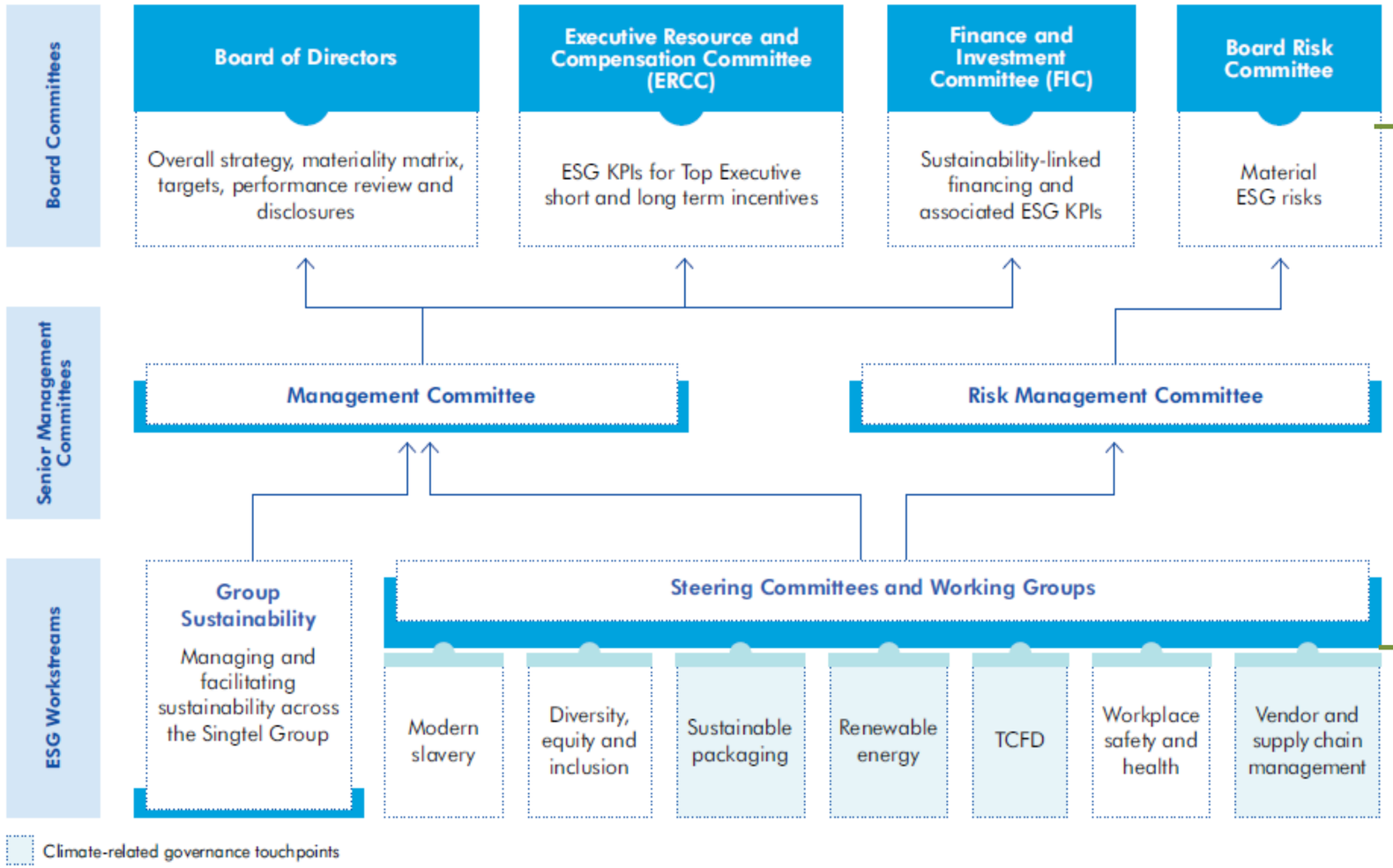


Governance (b) – Management's Role



Governance – Example on governance structure and roles (1)

Figure 5: Singtel Group sustainability governance structure



Singapore Telecommunications Limited, TCFD Report 2022, page 10

1 Described the roles of the Board and <u>three</u> Board Committees in developing the company's strategy and KPIs.

2 Described the roles of sustainability team and <u>seven</u> workstreams in supporting Management and Board

Governance – Example on governance structure and roles (2)

Table 2: : Singtel Group sustainability governance climate-related roles and responsibilities

Governance body	Climate-related roles and responsibilities	Meeting and reporting cadence
Board of Directors	The Board oversees the overall sustainability and climate-related strategies, approves the materiality matrix which includes climate-related topics, reviews the progress and performance of the Group's climate commitments and strategy, and approves disclosures in the Annual Report and Sustainability Report including climate-related disclosures and metrics.	Twice a year for ESG matters
Executive Resource and Compensation Committee (ERCC)	ERCC reviews and approves executive and management's compensation structure, and long and short term incentives. ESG KPIs comprise 20% of these incentives, with climate-related KPIs representing one in five targets for both groups.	Once a year to review KPIs and performance
Board Finance and Investment Committee (FIC)	FIC approves sustainability-linked financing and associated ESG KPIs.	Up to twice a year for ESG-related topics, as required
Board Risk Committee (RC)	RC reviews key climate risks, including emerging risks, mitigation plans and progress against targets, and reviews recommendations from the RMC.	At least twice a year for ESG-related risks, and once a year for climate-related risks
Group Chief Executive Officer (GCEO)	GCEO, a Board member and Chairperson of the Management Committee, is responsible for making climate-specific recommendations to the Board, related to strategy, performance, risks and disclosures.	Participates in meetings with Board and Management Committee
Management Committee (MC)	MC, comprising all C-level senior executives, plans, reviews and approves Singtel Group's climate strategy and other ESG decisions and investments across our Singapore and Australia operations.	Monthly to quarterly for different ESG topics
Risk Management Committee (RMC)	RMC reviews key climate risks, including emerging risks, mitigation plans and progress against targets, and makes recommendations to RC. RMC also ensures the Group's progress is in alignment with TCFD framework and disclosures.	Up to twice a year for ESG-related risks, and at least once a year for climate-related risks

Singapore Telecommunications Limited, TCFD Report 2022, page 11

3

Described the roles and responsibilities of <u>each</u> governance body, including setting KPIs and linking them to executive compensation

4

Highlighted the frequency and scope of discussion

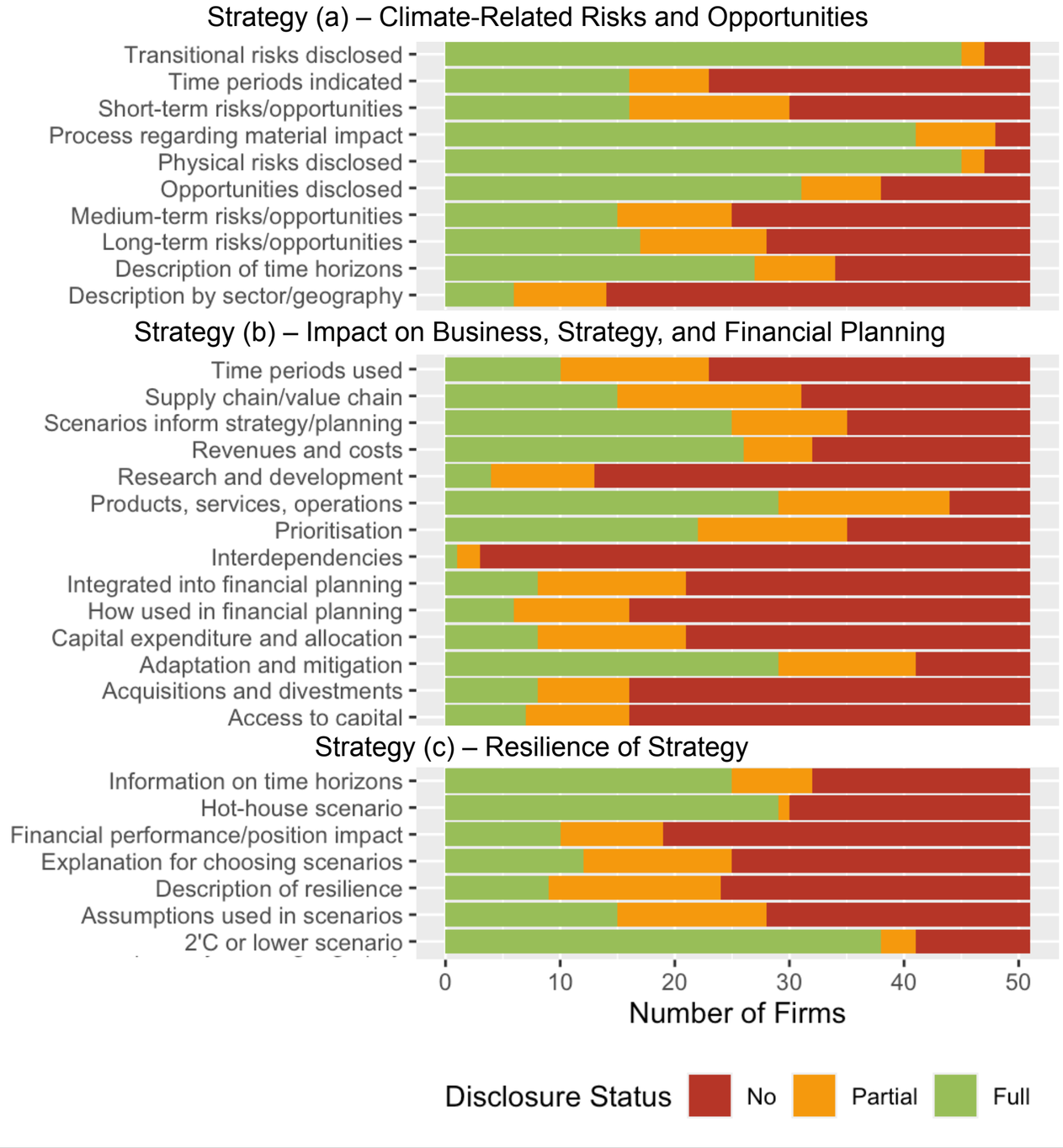
Strategy – Our findings

Objective
Help investors and others to form expectations about the future performance of a company

Observation
Most [88%] companies studied have disclosed both **physical and transitional risks** related to climate

What can companies disclose more?

- Only close to two-thirds [61%] disclosed **climate opportunities.**
- Although three-quarters [75%] have carried out scenario analysis, the critical content – **reasons for selected scenarios** [24%], **assumptions** [29%] and **description of resilience** [18%] – was often not clarified.
- Only a few companies [16%] fully described how climate-related issues served as an input and were integrated into their financial planning process.



Strategy – Example on the operational and financial impact for each risk

Risk Type	Risk Description	Potential Operational and Financial Impact
Long-term shifts and increased variability in weather patterns (chronic)	Heat stress	• Disruptions to ground operations (e.g workforce absenteeism from heat-related health stresses), and flight operations (e.g flight cancellations, delays, diversions). • Increased cooling demand for airport terminal buildings. • Revenue loss from operational disruptions, and increased maintenance or operational costs from airport infrastructure cooling needs.
	Precipitation stress	• Physical damage or impairment of runway and airport infrastructure due to periods of heavy or persistent rainfall. • Disruptions to ground operations (e.g. increased lightning activities during prolonged rainfall) and flight operations (e.g. flight cancellations and delays due to poor visibility during take-off and landing). • Revenue loss from operational disruptions, and increased costs of insurance or enhancements for critical assets.
	Sea level rise	• Physical damage to airport infrastructure due to storm surges, or periods of heavy or persistent rain, which overburdens drainage system. • Loss of access to offices, facilities, equipment. • Revenue loss from operational disruptions, and increased costs of insurance or enhancements for critical assets.
	Drought stress	• Disruptions to ground and flight operations due to water shortages such as simultaneous multiple grounded or delayed flights; reduced potable water uplift; restrictions to full water and toilet servicing of aircraft and in-flight food catering menu. • Revenue loss from operational disruptions.
	Fire weather stress	• Disruptions to ground and flight operations due to haze conditions from uncontrolled forest fires in neighboring countries. • Revenue loss from operational disruptions.

Singapore Airlines Limited, Sustainability Report FY2022/23, page 54

1

Classified **climate-related risks into:**

- **chronic** from long-term shifts and increased variability in weather patterns
- **acute** from increased severity of weather events

2

Disclosed **potential impact to financial performance for each risk**

Strategy – Example on resilience of strategy (1)

1

Scenario analyses covered:

- different warmer scenarios
- over different timeframes
- more countries over time

Scope and Parameters of the Three Studies

Parameters	1st Study: 2018	2nd Study: 2019-2020	3rd Study: 2021-2022
Climate Scenarios	2°C and 4°C warmer scenario	1.5°C and 2°C warmer scenario	Orderly scenarios – Net Zero by 2050 (1.5°C)[4] Disorderly scenarios – Delayed Transition (2°C)[4]
Types of Risks	Physical and Transition Risks		
Timeframe	2030	Short term: Present – 2030 Medium term: 2030 – 2050 Long term: 2050 – 2100	Short term: Present - 2030
Countries	1. Singapore 2. China 3. UK	1. Singapore 2. China 3. UK 4. USA	1. Singapore 2. China 3. UK 4. USA 5. New Zealand
Baseline year	2016	2018	2019 (with 2020 caveats included where relevant)
Business units	Development Properties (DP), Investment Properties (IP) and Hotel Operations		

City Development Limited, Integrated Sustainability Report 2023 (for FY2022), page 35

Strategy – Example on resilience of strategy (2)

Key Risks and Impact

- **Top three physical risks**[6]:
  i) green construction cost
  ii) maintenance cost (carbon price)
  iii) potential revenue loss of green rental premium*
- **Top three transitional risks**[6]:
  i) energy cooling costs
  ii) drop in labour productivity (construction cost increase)[7]
  iii) insurance premium increase[7]
- Transitional risks remain the dominant risk to CDL.
- Expected physical financial impact has almost tripled for 1.5°C scenario compared to 2°C scenario.
- For both 1.5°C and 2°C scenario, Singapore is the country with the highest estimated annual incremental financial risk.[8]
- Floods (river and flash floods) continue to be the extreme weather event that pose the largest acute physical risk to CDL.
- Estimated financial impact of year-round physical risks is more than extreme weather events. This includes climate-related insurance increase, increased labour costs due to heat stress, and energy cooling costs.

- DP are the most exposed to transition risks, whereas Hotels are most exposed to physical risks.
- Singapore is the most exposed country since it has by far the largest share of DP and IP, which are each affected by two out of the top three risks (by estimated annual incremental financial impacts).
- The likely estimated financial impact would be approximately **S$120 million** based on cost of inaction in addressing physical and transitional risks aligned with 1.5°C scenario in year 2030, against a 2019 baseline year.

2

Financial implications

- Highlighted that Singapore has the highest incremental financial risks (by geography)
- Highlighted potential implications to financial performance (insurance, labour, cooling costs)
- Quantified the cost of climate inaction

City Development Limited, Integrated Sustainability Report 2023 (for FY2022), page 36

Strategy – Example on resilience of strategy (3)

4 Showed how strategy changes to address risks and opportunities

3 Showed the **calibration** for risks and opportunities in 2030, **and prioritised markets**

High Risk | Moderate Risk | High Opportunity | Moderate Opportunity

* High Risk: financial impact amounting S$20 million and above
* Moderate Risk: financial impact below S$20 million

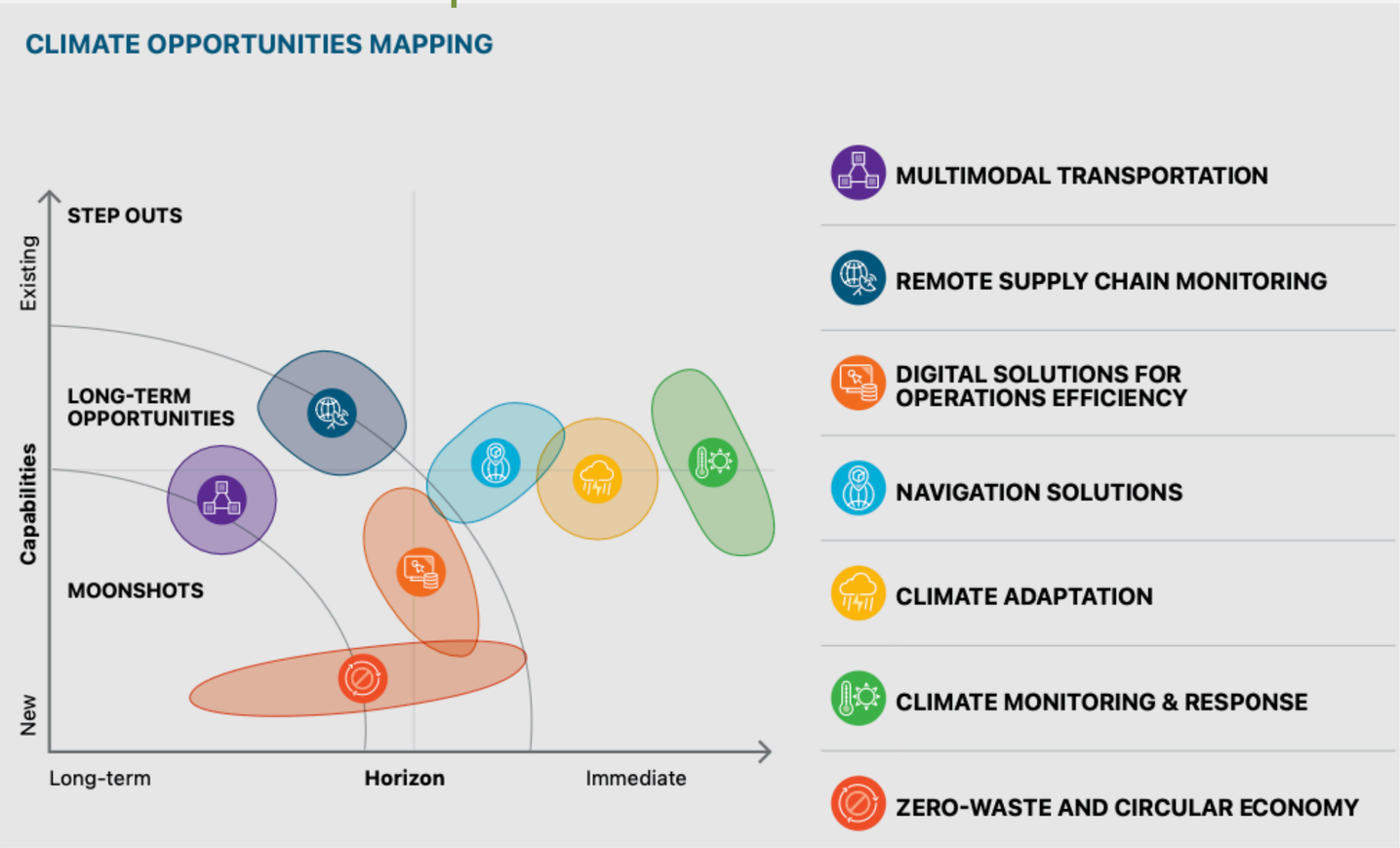
CDL GET Strategy Alignment	Adaptation and Mitigation Category	Climate Change Risks or Opportunities Covered	Level of Risk[9] or Opportunity in 2030	Description of Potential Financial Impact	Priority Markets
G Growth (Design and Build)	Sustainable Construction	Green features construction cost premium	High Risk	Designing and constructing new net zero buildings more cost-effectively	Singapore, China, US and UK
		Construction material cost increase (carbon price)	Moderate Risk		
		Labour cost increase due to heat stress **(New)**	Moderate Risk	Improving construction productivity and footprint; reducing outdoor work risk	Singapore, China
		Maintenance (Scope 1-3 GHGs), Waste and Water costs for DP	Moderate Risk		Singapore, China
E Enhancement (Manage)	Green Retrofits	Maintenance (Scope 1-3 GHGs), Waste and Water Costs for IP and Hotels	High Risk	Encouraging waste recycling and reduction	Singapore, US, UK
		Energy cooling costs	Moderate Risk / Moderate Opportunity	Improving energy and water efficiency in accordance to latest green building standards	Singapore, China, US and UK
		Potential loss of green rental premium revenue **(New)**	High Risk	Meeting increased customer preferences/ demand	Singapore, UK
T Transformation (Strategic review of portfolio and investments)	Extreme Events Adaptation and Mitigation	Business damage and loss to due to extreme events	High Risk	Avoiding or reducing exposure to extreme events risks for new developments	Singapore, UK
		Climate-related insurance premium increase **(New)**	Moderate Risk	Improving existing developments' resiliency to extreme events	Singapore, UK, US
		Changing demand patterns	Moderate Risk	Avoiding stranded assets	Singapore, China, US, UK, and New Zealand

City Development Limited, Integrated Sustainability Report 2023 (for FY2022), page 37

Strategy – Example on opportunities and relevance to business strategy

1 Disclosed climate opportunities by horizon and capabilities.

2 Explained business strategy to reap climate opportunities.



Maximising Opportunities
Amongst our diverse sustainability-linked offerings is a range of climate-focused products and solutions. The three focus areas of our sustainability-linked businesses include:

- **Reducing GHG emissions** – Our products and solutions reduce emissions by saving fuel, reducing waste, minimising road congestion and boosting energy efficiency
- **Solving urban and city challenges** – Our Smart City deployments and Internet-of-Things (IoT) -based connected solutions optimise operational efficiency and improve energy savings. We also develop and deploy sustainable hybrid and electric transportation solutions
- **The circular economy** – We design, build, operate and maintain sustainable waste management and waste-to-energy facilities that support eco-friendly waste disposal, management and wastewater recycling. Additionally, our aircraft and ship conversions provide a new lease of life through repurposing and reuse, thus saving significant resources

We reviewed our climate change opportunities in both our existing business areas as well as emerging ones in 2022. We identified opportunities in energy management and efficiency, recycling and reuse, and are also exploring technology-enabled carbon verification solutions.

Singapore Technologies Engineering Ltd, Sustainability Report 2022, pages 19 and 20

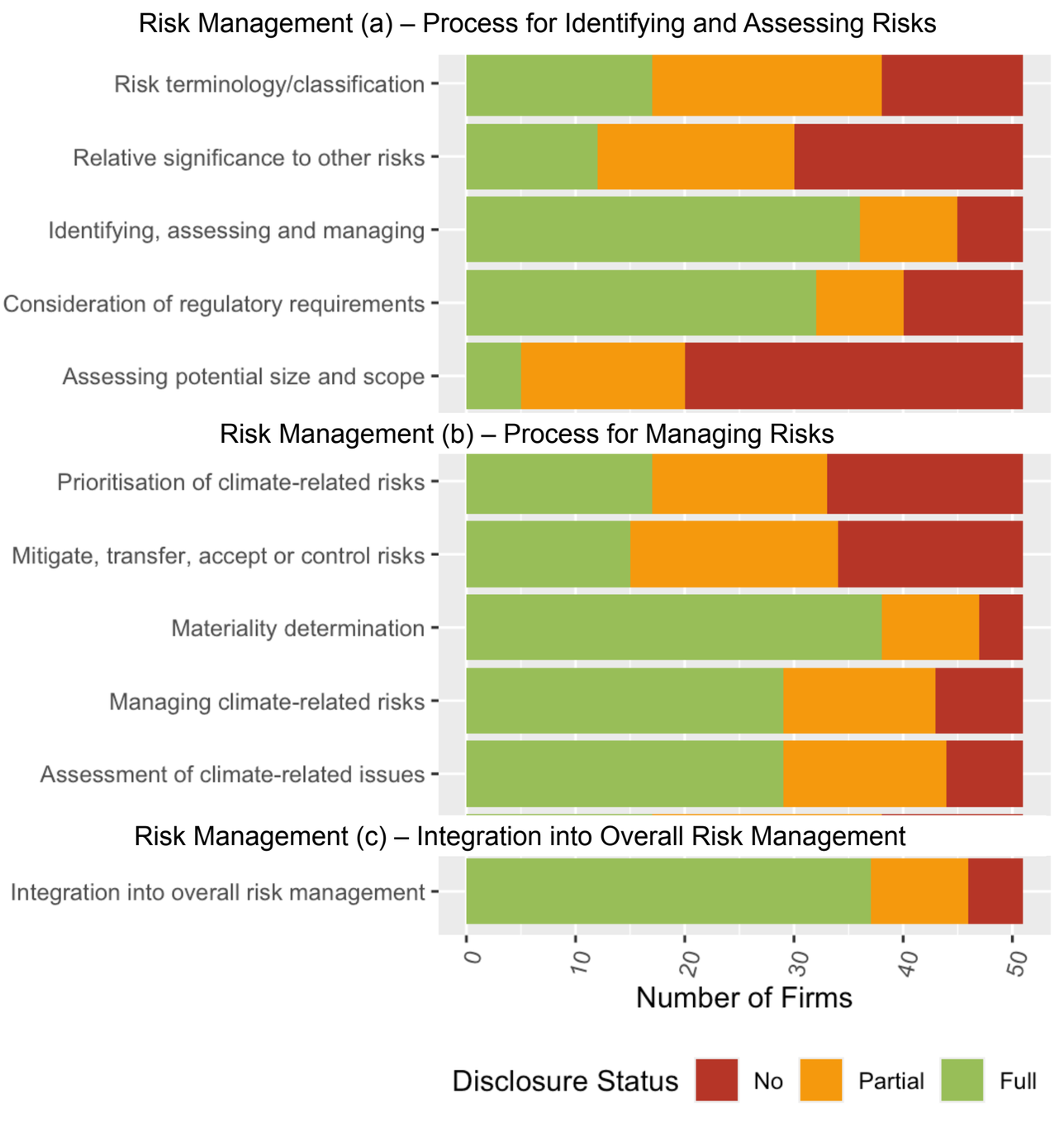
Risk management – Our findings

Objective
Help investors and other stakeholders to evaluate company's readiness to face the upcoming economic and regulatory changes, including the transition to a lower-carbon economy

Observation
Over two-thirds [71%] companies have fully disclosed how they identified, assessed and managed climate-related risks

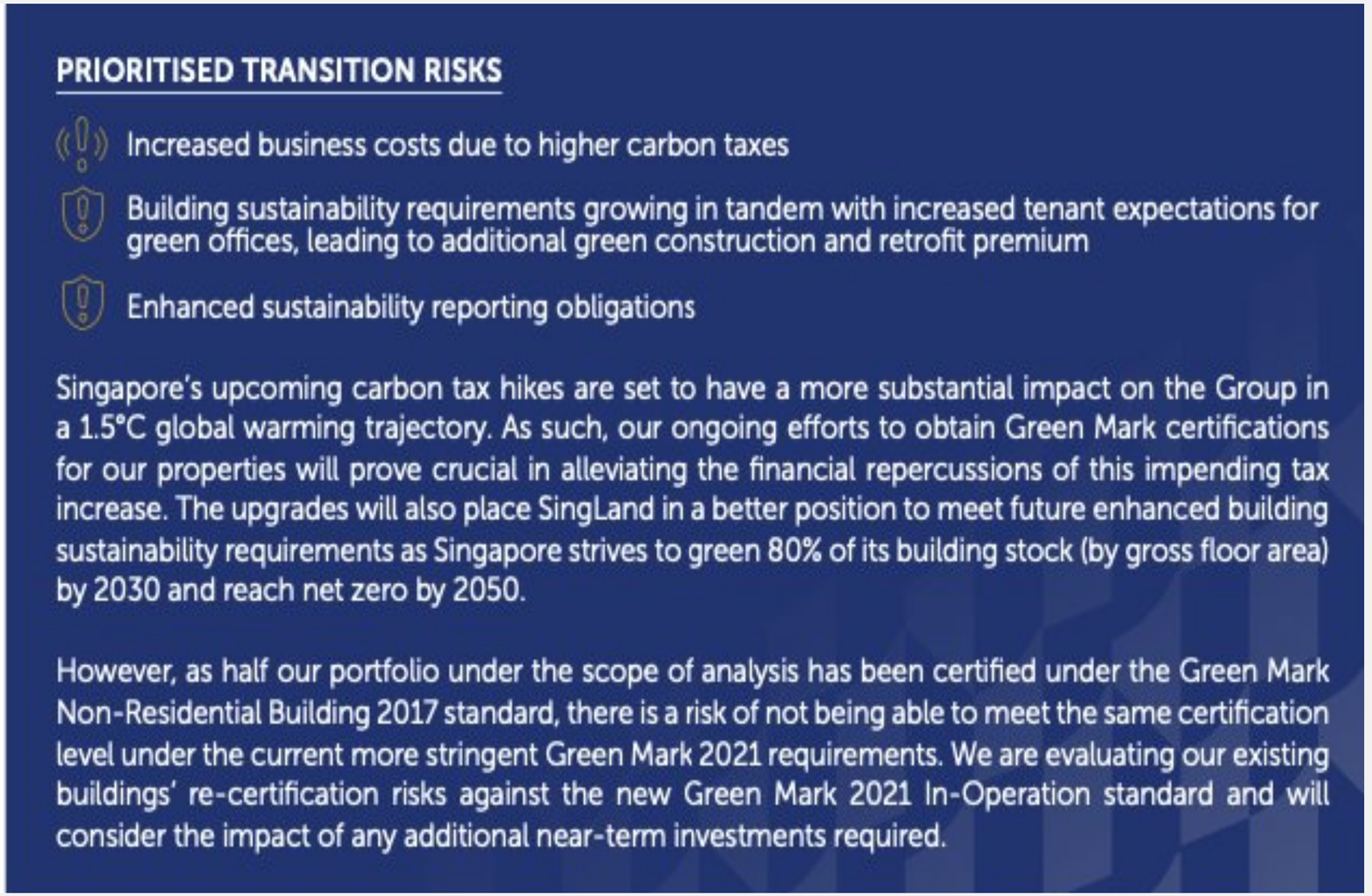
What can companies disclose more?

- Most companies did not disclose
  - **relative significance** of climate-related risks compared to other risks [only 24% fully disclosed]
  - **potential size and scope** of climate-related risks [only 10% fully disclosed]



Risk management – Example on risk prioritisation, consideration of emerging regulations and risk mitigation/transfer

1. Prioritised physical and transition risks
2. Considered emerging regulations
3. Described how risks are managed (with specific details)



PRIORITISED TRANSITION RISKS

- Increased business costs due to higher carbon taxes
- Building sustainability requirements growing in tandem with increased tenant expectations for green offices, leading to additional green construction and retrofit premium
- Enhanced sustainability reporting obligations

Singapore's upcoming carbon tax hikes are set to have a more substantial impact on the Group in a 1.5°C global warming trajectory. As such, our ongoing efforts to obtain Green Mark certifications for our properties will prove crucial in alleviating the financial repercussions of this impending tax increase. The upgrades will also place SingLand in a better position to meet future enhanced building sustainability requirements as Singapore strives to green 80% of its building stock (by gross floor area) by 2030 and reach net zero by 2050.

However, as half our portfolio under the scope of analysis has been certified under the Green Mark Non-Residential Building 2017 standard, there is a risk of not being able to meet the same certification level under the current more stringent Green Mark 2021 requirements. We are evaluating our existing buildings' re-certification risks against the new Green Mark 2021 In-Operation standard and will consider the impact of any additional near-term investments required.

Singapore Land Group Limited, Sustainability Report 2022, page 51

Metrics and Targets – Our findings

Objective:
Help investors and others to better assess company's potential risk-adjusted returns, general exposure to and progress in managing or adapting to climate-related issues

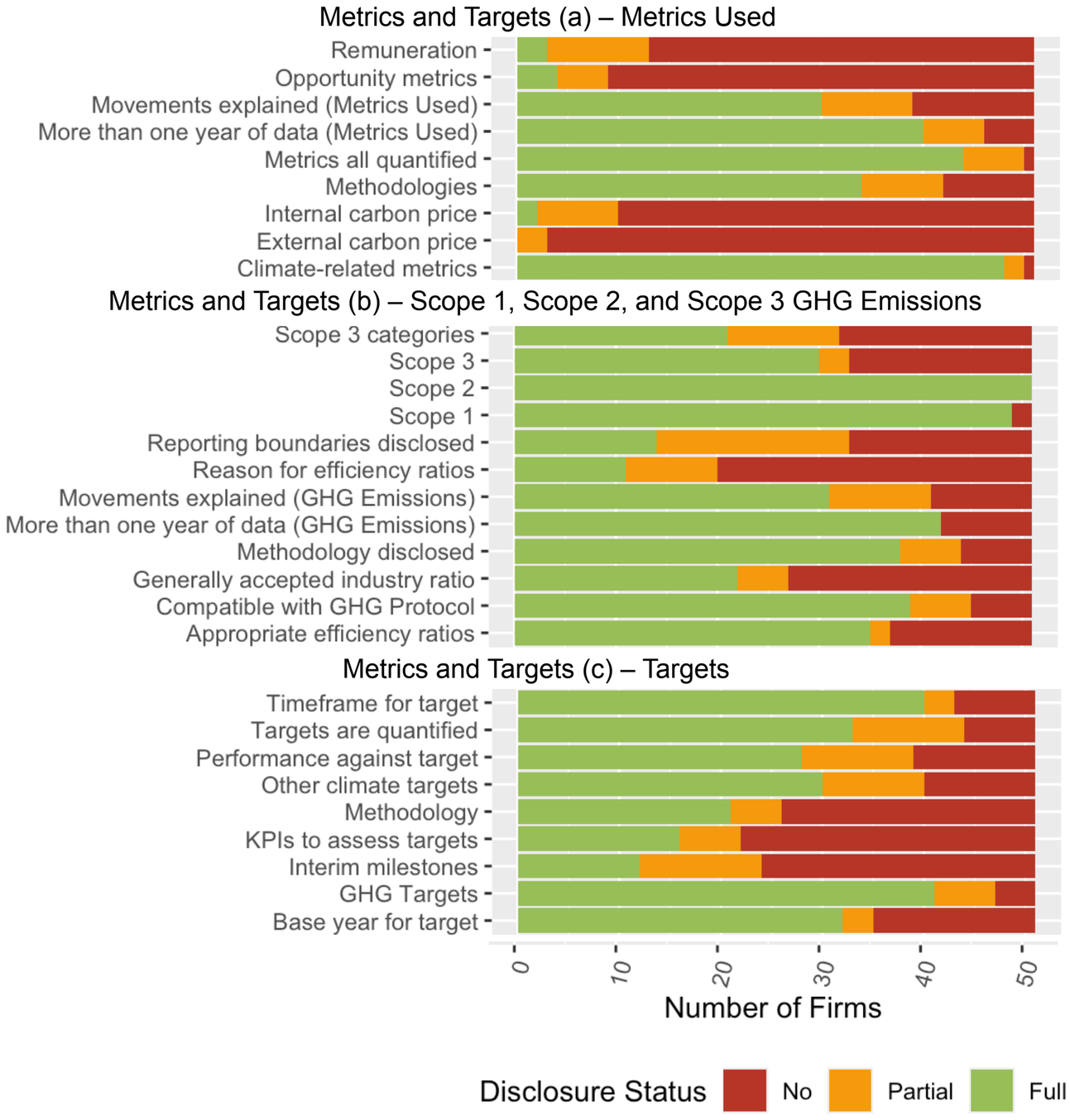
Observation:
A vast majority disclosed GHG Emissions – Scope 1 and Scope 2 [96% and 100%, respectively].

Notable progress for Scope 3 [59%].

What can companies disclose more?

- While most companies [80%] have disclosed targets and timeframe to reduce emissions, only 53% disclosed **interim milestones** to track company's progress

- Only a handful companies disclosed **opportunity metrics** [8%], and **how executive pay was tied to climate performance** [6%]



Metrics and Targets – Example on how executive pay was tied to climate goals

Accountability

- Chief Executive Officers (CEO) of respective business units (BU) within CLI are Sustainability Champions
- ISO 14001-certified Environmental Management System ensures accountability to all staff
- Key performance indicators (KPIs) are linked to remuneration for all staff; performance is tracked regularly

KPIs and Performance-linked Remuneration

- Set green rating for new acquisitions and major refurbishments
- Green existing property portfolio
- Set eco-efficiency targets and improve performance through tracking of energy and water usage, waste generation and carbon emissions

1 Linked climate-related KPIs to remuneration

2 Set interim targets and reported progress made

KEY PERFORMANCE INDICATORS (KPIS) TIED TO REMUNERATION

CLI's revised 2030 Sustainability Master Plan outlined the Group's 2030 targets and pathways to transit to a low-carbon business, improve resource use and enable a circular economy.

To measure its performance, CLI has incorporated KPIs, most of which are linked to remuneration for its staff, including top management.

2030 Sustainability Master Plan (SMP) Targets and Performance

	2030 Target		2022 Performance[4]
Low-carbon Transition	Achieve science-based target of reducing carbon emissions by 46% from 2019 baseline	○	• 6.8% reduction against 2019
	Reduce carbon emissions intensity by 72% from 2019 baseline	○	• 15.3% reduction against 2019
	Reduce energy consumption intensity by 15% from 2019 baseline (35% from 2008 baseline)	○	• 14.7% reduction against 2019 • 42% reduction against 2008
	45% of electricity consumption from renewable sources	○	• 5%
	100% of existing buildings[5] to achieve a minimum green rating	○	• 58%

CapitaLand Investment Limited, Global Sustainability Report 2022, pages 13 and 18

Metrics and Targets – Example on setting detailed targets (sector, interim)

1. Set targets by sector (9 of them)
2. Indicated whether targets were measured in absolute or intensity
3. Disclosed interim 2030 targets, and current year's progress

Sector	Sub-sectors & types of financings included	Emission scopes included	Target metric	Reference scenario	Baseline (and reference start-point)[16]	2022[17]	2030 (reduction vs. baseline)	2050
					Financed emissions		Decarbonisation targets	
Power 	• Power generation • Power equipment manufacturers	• Scope 1 (generation) • Scope 3 (equipment)	• Emissions intensity ($kgCO_2$ / MWh)	IEA NZE	260 (438)	227	138 (-47%)	0 (-100%)
Oil & Gas 	• Upstream • Downstream • Integrated	• Scope 1-3	• Absolute financed emissions ($MtCO_2e$)	IEA NZE[18]	38.6 (N/A)	35.6	27.7 (-28%)	3.0 (-92%)

DBS Group Holdings Ltd, Sustainability Report 2022, page 23

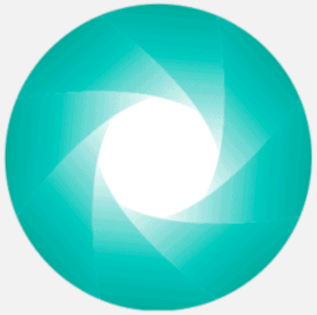
Carbon Accounting and Challenges

TCFD and Carbon Accounting

NUS National University of Singapore

Recommendations and Supporting Recommended Disclosures

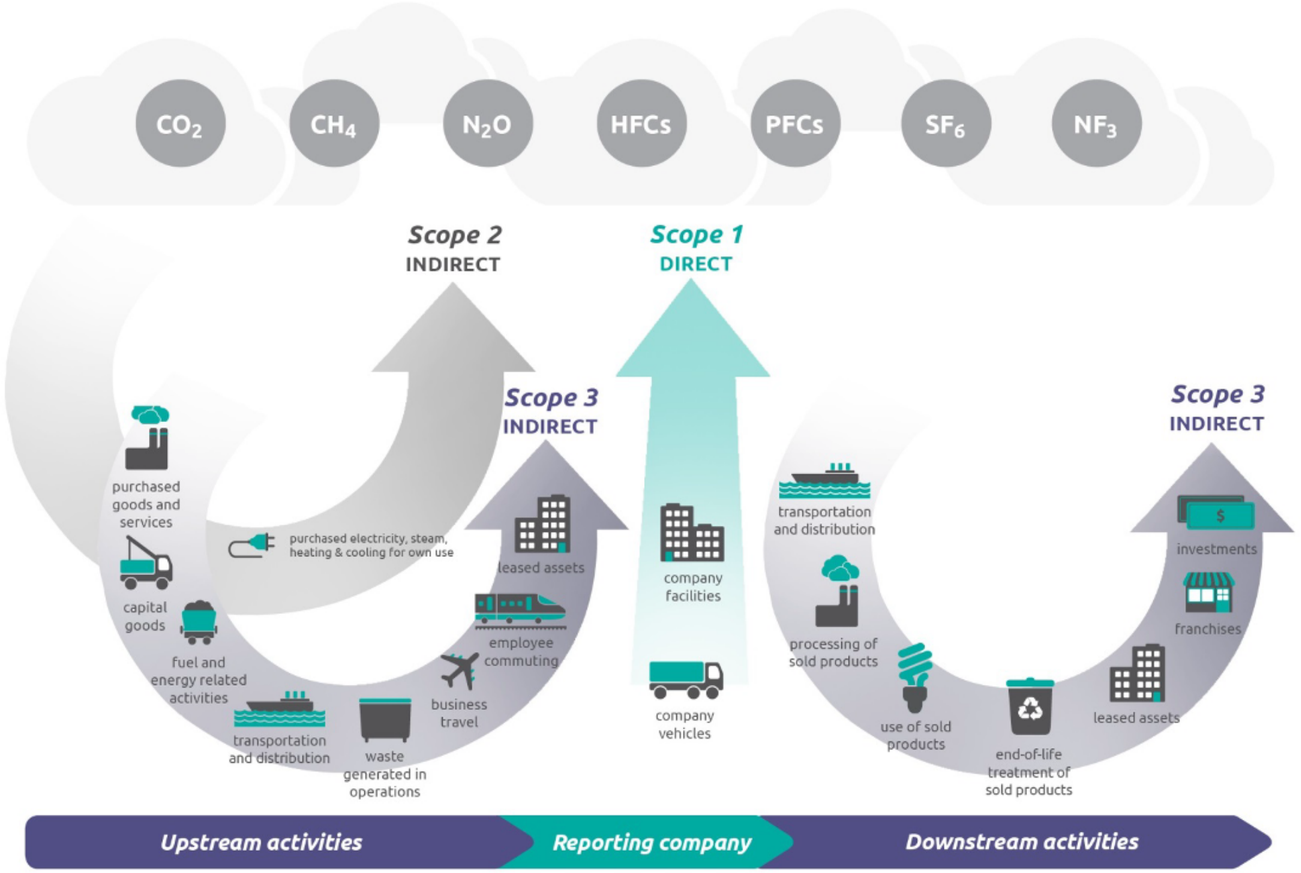
Governance	Strategy	Risk Management	Metrics and Targets
Disclose the organization's governance around climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where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



GREENHOUSE
GAS PROTOCOL

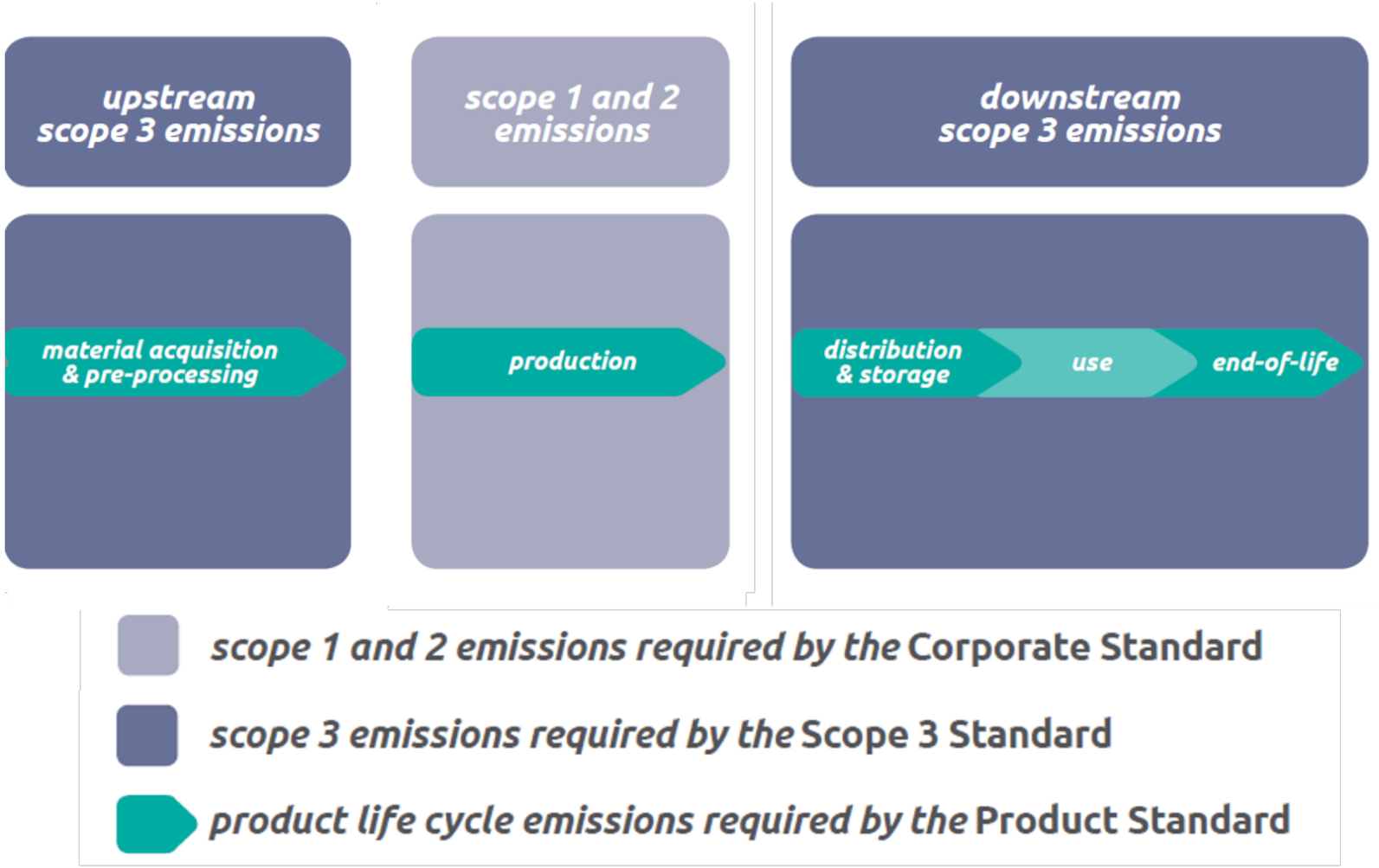
GHG Protocol Corporate Standard

Greenhouse Gas (GHG) Protocol



Source: World Resources Institute

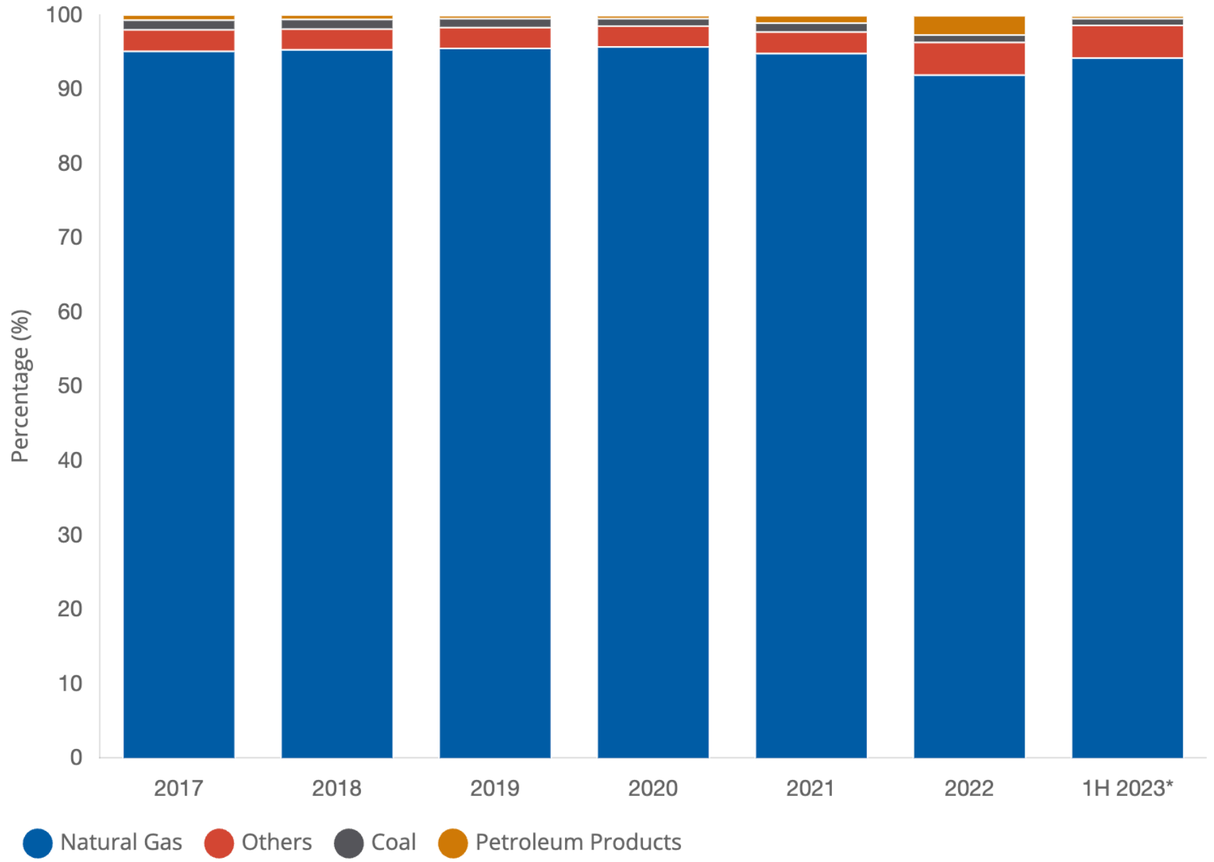
Greenhouse Gas (GHG) Protocol



Source: World Resources Institute

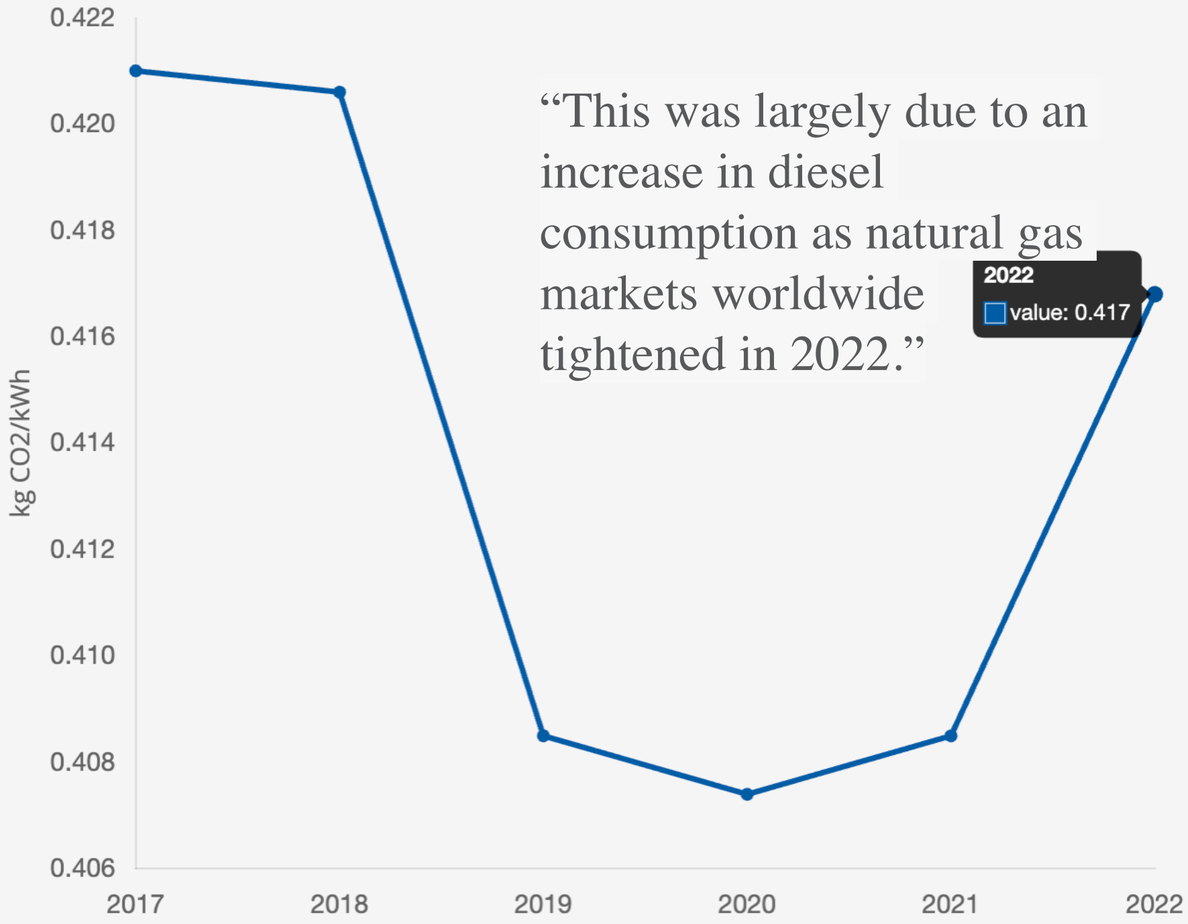
GHG Accounting: Scope 2
Singapore Electricity Grid Emission Factor

Electricity Generation Fuel Mix



**Data for 2023 is as at Jun-2023.*

Grid Emission Factor



"This was largely due to an increase in diesel consumption as natural gas markets worldwide tightened in 2022."

Source: https://www.ema.gov.sg/resources/singapore-energy-statistics/chapter2

GHG Accounting: Scope 2
Singapore Electricity Grid Emission Factor

Electricity Grid Emission Factor and Upstream Fugitive Methane Emission Factor, 2005 - 2022									
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Electricity Grid Emission Factors									
Average Operating Margin (OM) (kg CO_2 / kWh)	0.5255	0.5300	0.5046	0.4965	0.4973	0.5083	0.5085	0.4778	0.4388
Build Margin (BM) (kg CO_2 / kWh)	0.4205	0.4225	0.4352	0.4264	0.4208	0.4319	0.4578	0.4164	0.4137
Upstream Fugitive Methane Emission Factor (kg CH_4 / kWh)	0.00216	0.00218	0.00225	0.00221	0.00222	0.00222	0.00228	0.00218	0.00218
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Electricity Grid Emission Factors									
Average Operating Margin (OM) (kg CO_2 / kWh)	0.4277	0.4224	0.4237	0.4210	0.4206	0.4085	0.4074	0.4085	0.4168
Build Margin (BM) (kg CO_2 / kWh)	0.4086	0.3941	0.3977	0.4018	0.4031	0.4013	0.4022	0.3992	0.4057
Upstream Fugitive Methane Emission Factor (kg CH_4 / kWh)	0.00220	0.00217	0.00216	0.00198	0.00213	0.00212	0.00212	0.00210	0.00202
Source: Energy Market Authority (EMA)									

Electricity Generation Emission Factors (2024)

Released by Carbon Footprint Ltd as of 31 July 2024

Country	Scope 2 (kgCO2e/kWh)	Country	Scope 2 (kgCO2e/kWh)
Australia	0.595120	Malaysia	0.614561
Austria	0.117334	Mexico	0.405968
Bangladesh	0.596211	Mongolia	0.863488
Belgium	0.125245	Myanmar	0.310654
Bhutan	0.00000	Netherlands	0.309015
Brazil	0.074096	New Zealand	0.079960
Brunei	0.612617	Philippines	0.682465
Cambodia	0.471811	Portugal	0.166386
Canada	0.116000	Russia	0.464078
China	0.660804	Singapore	0.502494
France	0.070552	South Africa	0.773467
Germany	0.379949	South Korea	0.487551
Greece	0.337808	Spain	0.181109
Hong Kong	0.692938	Switzerland	0.023685
India	0.933549	Taiwan	0.636024
Indonesia	0.707110	Thailand	0.527935
Italy	0.314316	Turkey	0.423850
Japan	0.457733	United Kingdom	0.207408
Laos	0.265112	United States	0.374589
Macao	0.336845	Vietnam	0.437143

Scope 3 Emissions

Upstream or downstream	*Scope 3 category*
Upstream scope 3 emissions	1. Purchased goods and services 2. Capital goods 3. Fuel- and energy-related activities (not included in scope 1 or scope 2) 4. Upstream transportation and distribution 5. Waste generated in operations 6. Business travel 7. Employee commuting 8. Upstream leased assets
Downstream scope 3 emissions	9. Downstream transportation and distribution 10. Processing of sold products 11. Use of sold products 12. End-of-life treatment of sold products 13. Downstream leased assets 14. Franchises 15. Investments

Source: World Resources Institute

Quantification Methods

Table [7.1] Quantification methods

Quantification method	*Description*	*Relevant data types*
Direct measurement	Quantification of GHG emissions using direct monitoring, mass balance or stoichiometry **GHG = Emissions Data x GWP**	Direct emissions data
Calculation	Quantification of GHG emissions by multiplying activity data by an emission factor **GHG = Activity Data x Emission Factor x GWP**	Activity data Emission factors

Source: World Resources Institute

Types of Data

Data Type	Description
Primary Data	- Data from specific activities within a company's value chain - Example: supplier-specific data
Secondary Data	- Data that is not from specific activities within a company's value chain - Example: industry-average data

Source: World Resources Institute

Challenges for Collecting Primary Data from Suppliers

- A large number of suppliers
- Lack of supplier knowledge and experience with GHG inventories and accounting
- Lack of supplier capacity and resources for tracking data
- Lack of transparency in the quality of supplier data
- Confidentiality concerns of suppliers
- Language barriers

Source: World Resources Institute

Collecting Secondary Data and Filling Data Gaps

- Collecting Secondary Data
  - When using secondary databases, companies should prioritize databases and publications that are internationally recognized, provided by national governments or peer-reviewed.
- Using Proxy Data to Fill Data Gaps
  - If data of sufficient quality are not available, companies may use proxy data to fill data gaps.
  - Proxy data is data from a similar activity that is used as a stand-in for the given activity.
  - Proxy data can be extrapolated, scaled up, or customized to be more representative of the given activity
- Examples
  - An emission factor exists for electricity in Ukraine but not for Moldova. A company uses the electricity emission factor from Ukraine as a proxy for electricity in Moldova.
  - A company collects data for 80% of its production for a given product category, but 20% is unknown.

Source: World Resources Institute

Improving Data Quality over Time

- Collecting data, assessing data quality, and improving data quality is an iterative process.
- In the initial years of scope 3 data collection, companies may need to use data of relatively low quality due to limited data availability.
- Over time, companies should seek to improve the data quality of the inventory by replacing lower-quality data with higher-quality data as it becomes available.
- In particular, companies should prioritize data quality improvement for activities that have the following:
  - Relatively low data quality
  - Relatively high emissions
- Companies are reuiqred to provide a description of the data quality of reported Scope 3 emissions data to ensure transparency and avoid misinterpretation of data.

Source: World Resources Institute

Singtel's GHG Emission Disclosure

Environmental Performance Indicators

ENVIRONMENT	SINGTEL			OPTUS			SINGTEL GROUP		
	2022	2021	2020	2022	2021	2020	2022	2021	2020
Total Greenhouse Gas (GHG) emissions, (tonnes CO_2 equivalent)[1]	**3,630,397**	3,613,093	162,566	**4,180,961**	4,836,897	427,706	**7,811,358**	8,449,990	590,272
Scope 1 and Scope 2 (market-based) GHG emissions	**100,427**	104,403	157,391	**394,253**	428,458	415,072	**494,680**	532,861	572,463
(i) Scope 1	**4,743**	5,749	3,741	**1,579**	1,894	2,140	**6,322**	7,643	5,881
Fugitive emissions - refrigerants[2]	**3,184**	4,369	2,545	**195**	215	134	**3,379**	4,584	2,679
Fuel combustion - stationary	**1,059**	828	484	**286**	364	304	**1,345**	1,192	788
Fuel combustion - mobile	**500**	552	712	**1,098**	1,315	1,702	**1,598**	1,867	2,414
(ii) Scope 2									
Electricity (location-based)[3]	**109,535**	110,292	168,679	**425,015**	426,564	412,932	**534,550**	536,856	581,611
Electricity (market-based)[3]	**95,684**	98,654	153,650	**392,674**	426,564	412,932	**488,358**	525,218	566,582
(iii) Scope 3[4]	**3,529,970**	3,508,690	5,175	**3,786,708**	4,408,439	12,634	**7,316,678**	7,917,129	17,809
Category 1: Purchased goods and services	**1,776,125**	1,649,793	N.A.	**2,397,584**	3,124,287	N.A.	**4,173,709**	4,774,080	N.A.
Category 2: Capital goods	**687,465**	851,233	N.A.	**1,193,179**	1,055,409	N.A.	**1,880,644**	1,906,642	N.A.
Category 3: Fuel and energy-related emissions	**18,190**	18,283	N.A.	**43,007**	41,981	N.A.	**61,197**	60,264	N.A.
Category 4: Upstream transportation and distribution[5]	**0**	0	N.A.	**0**	0	N.A.	**0**	0	N.A.
Category 5: Waste generated in operations	**712**	694	N.A.	**189**	183	N.A.	**901**	877	N.A.
Category 6: Business travel[6]	**337**	4	3,040	**581**	95	4,853	**918**	99	7,893
Category 7: Employee commute[7]	**297**	441	1,731	**3,011**	4,517	6,643	**3,308**	4,958	8,374
Category 8: Upstream leased assets[8]	**0**	0	N.A.	**0**	0	N.A.	**0**	0	N.A.
Category 9: Downstream transportation and distribution[9]	**0**	0	254	**5,690**	9,385	1,138	**5,690**	9,385	1,392
Category 10: Processing of sold products[10]	**N.A.**	N.A.	N.A.	**N.A.**	N.A.	N.A.	**N.A.**	N.A.	N.A.
Category 11: Use of sold products	**92,295**	101,929	N.A.	**139,941**	168,718	N.A.	**232,236**	270,647	N.A.
Category 12: End-of-life treatment of sold products	**334**	376	N.A.	**1,027**	1,169	N.A.	**1,361**	1,545	N.A.
Category 13: Downstream leased assets	**127,578**	113,252	N.A.	**0**	0	N.A.	**127,578**	113,252	N.A.
Category 14: Franchises	**211**	149	150	**2,499**	2,695	N.A.	**2,710**	2,844	150
Category 15: Investments	**826,426**	772,536	N.A.	**0**	0	N.A.	**826,426**	772,536	N.A.
GHG emissions intensity (tCO_2e/S$million revenue)[11]	**482**	483	20	**535**	592	51	**509**	540	36
GHG emissions intensity (tCO_2e/TB)[12]	**0.0134**	0.0165	0.0325	**0.0598**	0.0778	0.1102	**0.0351**	0.0450	0.0665

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Sustainability-Linked Bonds and Carbon Accounting

- **Sembcorp**: Singaporean state-owned energy and urban development company

Sustainability-Linked Bonds and Carbon Accounting

Sembcorp's Sustainability-Linked Debt

1

Sustainability-Linked Bond (SLB)

1. **Series 002 (Issuance: Oct 2021)**
   Issue size: $675 million
   I/r = 2.66% p.a. (payable semi-annually)
2. **Series 003 (Issuance: Apr 2022)**
   Issue size: $300 million
   I/r = 3.735% p.a. (payable semi-annually)

2

Sustainability-Linked Loan

1. **Syndicated sustainability-linked revolving credit facility (Issuance: May 2022)**
   Amount: $1.2 billion
2. **Sustainability-linked Schuldschein (Issuance: Aug 2022)**
   Amount: €70 million
   Issuance in Aug 2022

Sembcorp's Sustainability-Linked Debt are all **subjected to achieving** specific Sustainability Performance Targets (STP).

Total borrowings subjected to meeting STPs	**$2.3 billion**

Sustainability-Linked Bonds and Carbon Accounting

Sustainability Performance Target (SPT)

If Sembcorp fails to meet STPs tied, it would face a 0.25% step-up on its borrowings

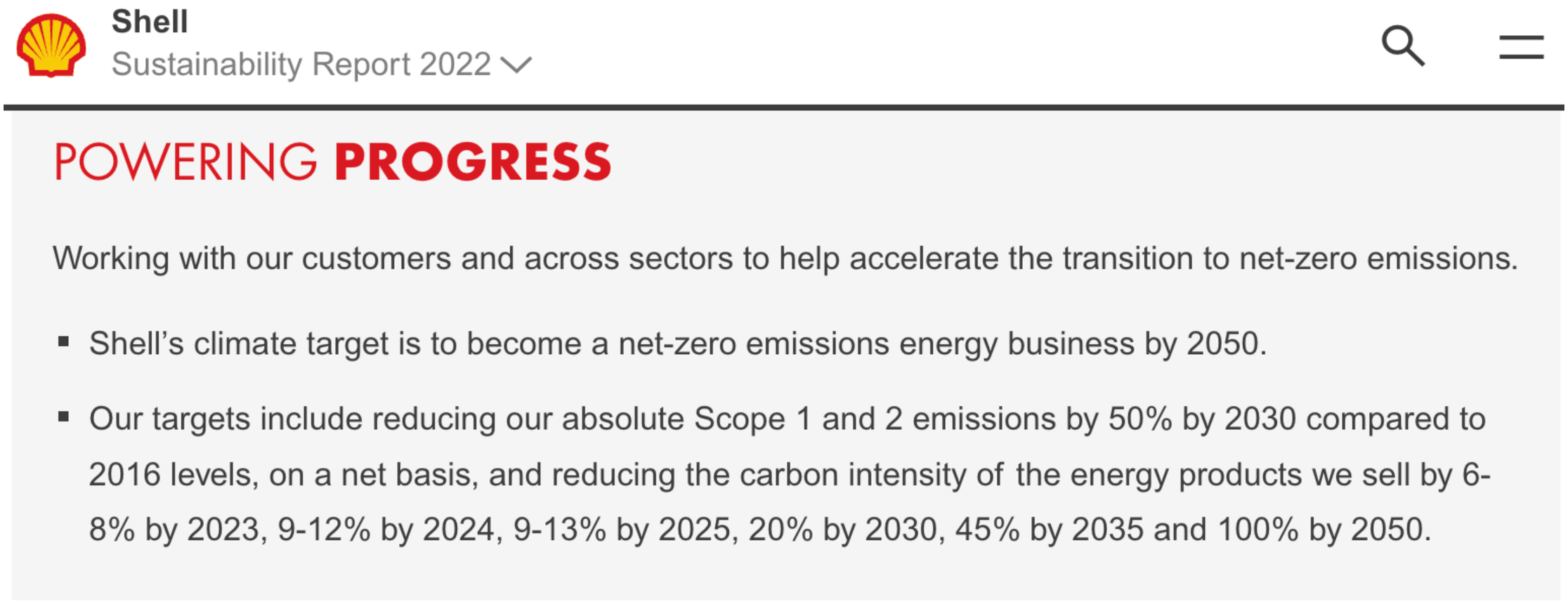
Reducing GHG emissions Intensity to **0.40 tCO2e/MWh or lower by 2025.**

- GHG emission intensity was at 0.51 and 0.50 tCO2e/MWh respectively in 2021 and 2022.
- **Unlikely to meet target** of 0.40 tCO2e/MWh or lower by 2025. However, target is achieved upon sale of SEIL.

Achieving Gross Installed Renewable Energy capacity of **10GW by 2025**

- Gross Installed Renewable Energy Capacity increased from 2.8GW to 6.8GW from 2021 to 2022.
- 6.8W as of 2022 does not include in-progress projects and acquisitions
- **Likely to be able to meet target** of 10GW by 2025

Tracking Emissions Over Time: Example - Shell



Tracking Emissions Over Time Example - Shell

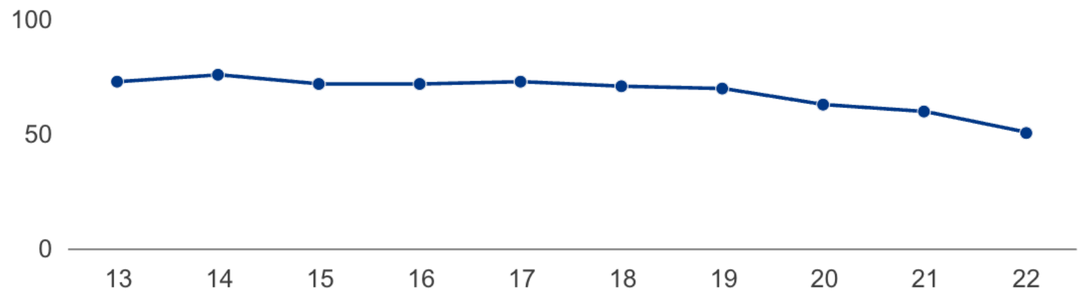
Greenhouse gas emissions performance

In 2022, our total combined Scope 1 and 2 absolute greenhouse gas emissions (from assets and activities under our operational control) were 58 million tonnes on a CO_2 equivalent basis, a 15% reduction compared with 2021 and a 30% reduction compared with 2016, the base year. Our Scope 3 emissions from energy products included in our net carbon intensity were 1,174 million tonnes of CO_2 equivalent.

Our direct (Scope 1) greenhouse gas emissions decreased from 60 million tonnes of CO_2 equivalent in 2021 to 51 million tonnes of CO_2 equivalent in 2022.

Direct greenhouse gas emissions

Million tonnes CO_2 equivalent



The reduction was achieved by divestments in 2021 and 2022 (including the Deer Park and Puget Sound refineries in the USA); the handover of operations in OML 11 in Nigeria in 2022; the shutdown or conversion of existing assets, including the shutdown of some units at the Shell Energy and Chemicals Park Singapore; and greenhouse gas abatement projects and the purchase of renewable electricity. These decreases were partly offset by the commissioning of Shell Polymers Monaca, our new polyethylene production facility, in the USA.

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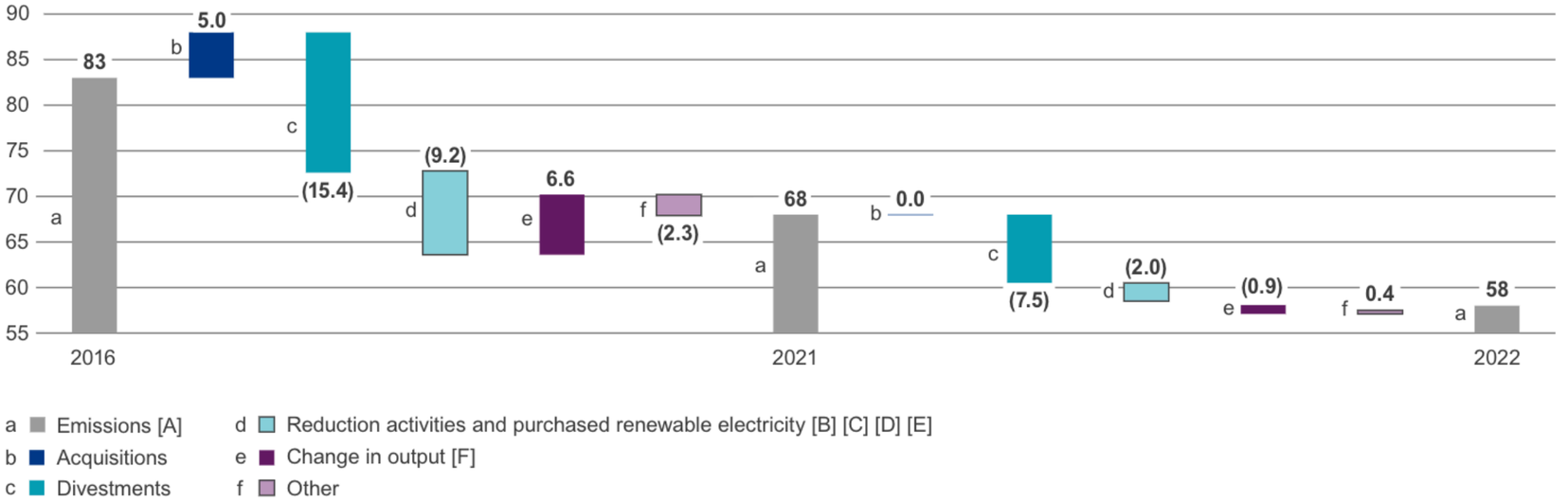
Tracking Emissions Over Time Example - Shell

Scope 1 and Scope 2 greenhouse gas emissions changes from 2016 to 2021 and from 2021 to 2022

Million tonnes carbon dioxide equivalent (CO_2e)



[A] Total Scope 1 and Scope 2 emissions, rounded to the closest million tonnes. Scope 2 emissions were calculated using the market-based method.
[B] In addition to reductions from GHG abatement and energy efficiency projects, this category also includes reductions from the permanent shutdown of the Convent and Tabangao refineries and the impact of transformational activities at our Shell Energy and Chemicals Park in Singapore.
[C] Excludes 5.80 million tonnes of CO_2 captured and sequestered by the Shell-operated Quest CCS facility in Canada in 2016-2021. Scope 1 and 2 GHG emissions from operating Quest are included in our total emissions.
[D] Excludes 0.97 million tonnes of CO_2 captured and sequestered by the Shell-operated Quest CCS facility in Canada in 2022. Scope 1 and 2 GHG emissions from operating Quest are included in our total emissions.
[E] Of the 2,010 thousand tonnes of reduction activities and purchased renewable electricity in 2022, around 80 thousand tonnes related to purchased renewable electricity.
[F] Change in output relates to changes in production levels, including those resulting from shutdowns and turnarounds as well as production from new facilities.

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GHG Protocol Calculation Tools

- https://ghgprotocol.org/calculation-tools-and-guidance
- Cross-Sector Tools
  - Stationary Combustion
  - Mobile Combustion
  - HFC Use
  - Uncertainty
- Sector-Specific Tools
  - Aluminum
  - Iron and Steel
  - Cement
  - Pulp and Paper
  - etc.

User supplied data							
Source ID	Sector	Fuel type (e.g., solid fossil)	Fuel	Amount of fuel	Units (e.g., kg or kWh)	Heating value basis	CO_2
		Liquid fossil	Gas/Diesel oil	100000	litres (l)		267.649
		Gaseous fossil	Natural gas	100000	metre3		188.496
		Biomass	Biodiesels	100000	Kg		191.160
		Liquid fossil	Crude oil	100000	litres (l)		248.047

Capacity Building

Benefits and Costs of Carbon Reporting

- **Benefits**
  - Enhanced risk management
  - Improved financial stability
  - Increased transparency and accountability
  - ***Access to green/transition finance***
  - Improved reputation and brand image

- **Costs**
  - ***Implementation costs***
  - ***Technological challenges***
  - ***Data availability and quality***
  - ***Human resource capacity***
  - Disclosure risks

- **Considerations**
  - Regulation
  - Government support
  - Industry collaboration

Capacity Building and Reducing Costs

- **Policy and Regulation**
  - Develop clear and standardized guidelines
  - Phased implementation
  - Exemptions for small entities
- **Capacity Building and Technical Assistance**
  - Develop training programs and workshops
  - Provide technical assistance
  - Create knowledge-sharing platforms
- **Financial Incentives and Support**
  - Provide grants or subsidies
  - Develop risk-sharing mechanisms
  - Facilitate access to green finance
- **Collaboration and Partnerships**
  - Encourage industry collaboration
  - Partner with academic institutions
  - Leverage international expertise
- **Technology and Innovation**
  - Promote open-source tools and platforms
  - Invest in digital

Capacity Building and Technical Assistance

- **Assessment and Capacity Mapping**
  - Comprehensive assessment of the existing capabilities and limitations
- **Develop Tailored Training Programs**
  - Offer training programs designed for smaller banks.
    - Carbon accounting methodologies and tools relevant to the Bangladesh context
- **On-site Support and Mentorship**
  - Guidance on implementing specific tools or methodologies, data collection, and report preparation
- **Develop Knowledge-Sharing Platforms**
  - Online platforms where banks can share best practices, case studies, and resources related to climate reporting and carbon accounting
- **Provide Access to Specialized Tools and Resources**
  - Develop or identify low-cost or open-source tools and software for carbon accounting and reporting
- **Promote Collaboration within the Banking Sector**
  - Encourage industry associations and larger banks to work together to develop standardized reporting templates, data collection systems, and best practices that can be adopted by smaller banks
- **Continuously Evaluate and Adapt**
  - Regularly monitor the effectiveness of the technical assistance provided and adapt the programs and resources based on feedback from banks and stakeholders

Developing Robust Data on Emission Factors

- **Difficulties**
  - **Data availability**: Data limitations hinder carbon accounting by companies. Starting with readily available data and improving it over time will benefit greatly.
  - **Resource constraints**: Cost-effective solutions, such as collaboration with international organizations and leveraging open-source tools
  - **Technical expertise**: Capacity building programs and partnerships with academic institutions and NGOs
- **Benefits**
  - **Improved transparency and accountability**: Accurate emission factors enable companies and banks to measure and report their emissions transparently, enhancing trust and investor confidence.
  - **Better risk management**: By understanding their emissions footprint, companies and banks can assess and manage climate-related risks effectively.
  - **Access to green finance**: Reliable emission factors facilitate participation in green finance initiatives and attract climate-conscious investors.
  - **Compliance with regulations**: Future regulations might mandate carbon reporting and disclosure, and having established emission factors will give Bangladeshi companies and banks a head start.
  - **Competitive advantage**: Companies with accurate carbon accounting can showcase their sustainability efforts and gain a competitive edge in the global market.

Support for Companies in Singapore

1 Sustainability Reporting Grant

EDB and Enterprise Singapore will launch grant for companies with annual revenue of $100 million and above **to cover a portion of their costs** in producing their first sustainability report in Singapore.

2 Green Skills Committee

Ministry of Trade and Industries and SkillsFuture Singapore, in collaboration with the private sector, established a committee to develop skills and training programs for the low-carbon economy. With Sustainability Reporting and Assurance as one of its focus areas, the initiative aims to upskill workers within companies and assurance providers in sustainable reporting capabilities to keep pace with the demand to transit into a sustainable, lower-carbon economy

3 Digital Solutions

The Infocomm Media Development Authority (IMDA) has curated a list of digital sustainability solutions, under the Advanced Digital Solutions (ADS) scheme, to help eligible enterprises kickstart their sustainability journey by measuring, monitoring and managing their emissions, enabling them to stay competitive with customers and improve the oversight and reporting of Scope 3 emissions within their supply chain. Beyond the ADS scheme, IMDA is also supporting enterprises who are keen to collaborate with value chain partners to drive sustainability through digitalisation.

4 Singapore Emission Factors Registry

Singapore Business Federation, in collaboration with A*STAR, PwC Singapore, and Singtel, are developing a **registry to provide conversion factors translating business activities into greenhouse gas emissions.**

Concluding Remarks

Credible Climate Reporting

1. Take the First Step:
Prioritise Progress over Perfection

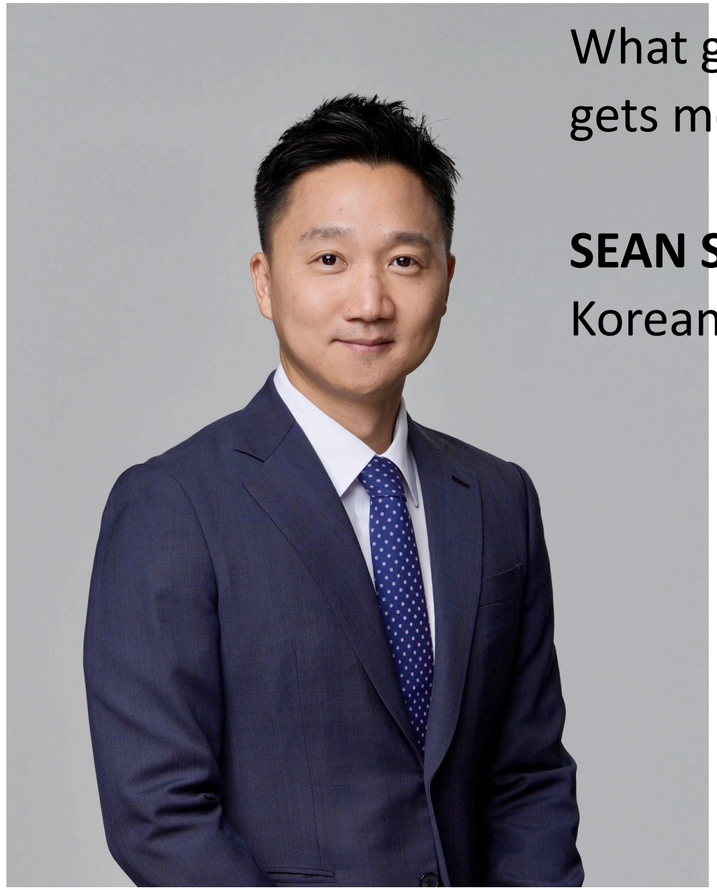
2. Stay Simple and Be Concise:
Meet Investors' Needs

3. Go Beyond Compliance:
Future-proof Strategy and
Business Model

4. Connect the Dots:
Link to Financial Reporting

What gets measured gets managed.

What gets managed gets measured and reported.



What gets managed,
gets measured and reported.

SEAN SHIN
Korean accounting professor

Climate Change and Risk

Sustainable and Green Economy