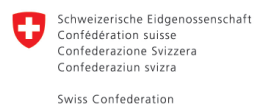


Climate Reporting in ASEAN State of Corporate Practices

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Centre for Governance and Sustainability
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Table of Contents

List of Figures	4
List of Tables	4
About GRI ASEAN	5
About Centre for Governance and Sustainability, NUS Business School	5
Executive Summary	6
Introduction	8
An Overview of Climate-related/Sustainability Reporting Requirements across ASEAN Countries	8
Scope of Study	12
Research Framework	12
Climate-related Reporting Practices in ASEAN	14
Reporting Framework	14
Materiality	15
Risks and Opportunities	17
Governance	20
Strategy	22
Targets	24
Performance	27
Rating of Companies on Climate-related Reporting	30
Highlights of Good Climate-related Reporting Practices	34
Conclusion	35
Abbreviations	36
References	37
Acknowledgment	39

List of Figures

Figure 1. Climate-related Reporting Assessment Framework	12
Figure 2. Materiality across Countries	16
Figure 3. Risks and Opportunities across Countries	19
Figure 4. Governance across Countries	21
Figure 5. Strategy across Countries	23
Figure 6. Targets across Countries	26
Figure 7. Performance across Countries	29

List of Tables

Table 1. Climate-related/Sustainability Reporting Requirements	9
Table 2. Climate-related Reporting Assessment Framework	13
Table 3. Climate-related Reporting Framework across Countries	14
Table 4. Climate-related Reporting Rating by Company	31

About GRI ASEAN

GRI (Global Reporting Initiative) is the independent, international organisation that helps businesses and other organisations take responsibility for their impacts, by providing them with the global common language to communicate those impacts. We provide the world's most widely used standards for sustainability reporting – the GRI Standards.

Based in Singapore and established with the help of a Consortium of 12 leading Singapore-based organisations operating across the region, the GRI ASEAN Regional Hub provides guidance and support to organisations as they progress on their sustainability journey to better communicate and improve sustainability performance

About Centre for Governance and Sustainability, NUS Business School

The Centre for Governance and Sustainability (CGS), formerly known as Centre for Governance, Institutions and Organisations (CGIO), was established by the National University of Singapore (NUS) Business School in 2010. It aims to spearhead relevant

and high-impact research on corporate governance (CG) and corporate sustainability (CS) issues that are pertinent to institutions, government bodies and businesses both in Singapore and Asia. This includes corporate governance and corporate sustainability, governance of family firms, government linked companies, business groups, and institutions. CGS also organises events such as public lectures, industry roundtables, and academic conferences on topics related to governance and sustainability.

CGS is the national assessor for the corporate sustainability and corporate governance performance of listed companies in Singapore.

More information about CGS can be accessed at <https://bschool.nus.edu.sg/cgs/>

Executive Summary

With the emerging consensus to raise climate change high on the agenda, ASEAN governments have stepped up to be proponents striving to take steps toward decarbonising their economies. However, the greening effort requires extensive contributions and commitment from corporations.

In this study, we seek to understand how companies across ASEAN do climate reporting. We focused on the top 100 companies by market capitalisation listed in the Indonesia Stock Exchange, Bursa Malaysia Securities Berhad, Philippines Stock Exchange, Singapore Exchange, Stock Exchange of Thailand, and Ho Chi Minh City Stock Exchange.

Of the total 600 top companies, we found that only 420 companies have published sustainability reports with disclosures relating to climate. This comprised of 55 companies in Indonesia, 98 companies in Malaysia, 66 companies in the Philippines, 98 companies in Singapore, 63 companies in Thailand, and 40 companies in Vietnam.

To analyze the state of climate reporting in ASEAN, we examined how the 420 companies reported on following seven key areas: reporting framework, materiality, risks and opportunities, governance, strategy, targets, and performance. In the development of the Climate reporting framework used to evaluate the completeness of the companies' climate disclosures, drawing on the Global Reporting Initiative (GRI), the Task Force on Climate-related Financial Disclosures (TCFD), the Greenhouse Gas (GHG) Protocol, the Science-based Target initiative (SBTi), the Carbon Disclosure Project (CDP) and the United Nations Sustainable Development Goals (SDG).



46%

The overall climate disclosure rate for all six ASEAN countries

Indonesia	Malaysia	Philippines
44%	48%	42%
Singapore	Thailand	Vietnam
48%	57%	24%

Thailand took the lead in climate disclosure rate, closely followed by Malaysia and Singapore.

Thailand

- Demonstrated the highest disclosure rate in materiality (74.6%), risks and opportunities (66.9%), governance (61.2%), targets (69.4%), and performance (59.4%)
- Highest disclosure of renewable fuel consumption (38%) alongside with Singapore (27%)

Malaysia

- Demonstrated the highest disclosure rate on identifying climate-related opportunities (74.5%)
- Defining what the organisation considers to be the relevant long-term time horizon with climate risk strategy (41.8%)

Singapore

- Excelled in tracking and disclosing metrics for historical periods to allow for trend analysis (77.6%)
- Comprehensively describes how climate targets are discussed (70.4%)
- Demonstrated links for remuneration to performance in managing climate related risks (14.3%) ahead of remaining ASEAN counterparts

Topics with the highest disclosure rate across the six key areas (Materiality, risks and opportunities, governance, strategy, targets, and performance)

- Material topics related to climate change
- Assigning climate-related responsibilities to a management-level committee
- Disclosing metrics for historical periods to allow for trend analysis

Topics with the lowest disclosure rate across the six key areas (Materiality, risks and opportunities, governance, strategy, targets, and performance)

- Describing medium-term time horizon regarding climate risk strategy
- Describe use of climate-related scenario analysis to inform strategy
- Describe whether remuneration is linked to ESG performance

The six countries adopted various reporting frameworks in their climate reporting though the GRI Standards and SDG frameworks were the most widely used. Of the sampled reports, 85% used the GRI Standards and 76% used the SDG framework in their sustainability reporting. In comparison, the other frameworks (i.e., IIRC, SDG, and SASB) were used by less than 50% of the sampled companies.

Echoing the findings in our earlier studies, Malaysia, Singapore, and Thailand are not merely stronger in sustainability reporting but also in climate-related reporting, as evidenced by their higher overall score which was above 83%.

Introduction

The global community recognises climate change as an urgent and existential threat. Southeast Asia is one of the planet's most vulnerable regions to climate change. Ranging from raging wildfires in Indonesia to deadly typhoons in the Philippines, ASEAN nations have been hard hit by adverse climate events. Given the interconnectedness of supply chains, extreme weather conditions in one country can lead to a ripple effect across the world.

There are rising expectations on the Association of Southeast Asian Nations (ASEAN) to address climate change as the region produces high emissions and are inextricably linked to large-scale productions and the supply chains of multinational companies. With the emerging consensus to raise climate change high on the agenda, ASEAN governments have stepped up to be proponents striving to take steps toward decarbonising their economies (ASEAN, 2019). However, the greening effort requires extensive contributions and commitment from corporations.

An Overview of Climate-related / Sustainability Reporting Requirements across ASEAN Countries

Sustainability reporting requirements continue to expand across most jurisdictions in Southeast Asia, although the requirements are tailored to each jurisdiction.

There is currently no common sustainability reporting framework across ASEAN (Loh et al., 2018) though there is a preferred sustainability standard/framework (either GRI Standards or TCFD recommendations) that each country espouses or mandates.

ASEAN countries covered in this report are Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam.

Table 1. Climate-related/Sustainability Reporting Requirements

ASEAN Countries	Reporting Status
Indonesia	<ul style="list-style-type: none">• Otoritas Jasa Keuangan (OJK) requires publicly listed companies (PLCs) to publish sustainability reporting through POJK51/POJK.03/2017, gradually starting in 2020.• Details of sustainability reports are stipulated under SEOJK16/SEOJK.04/2021 and include sustainability governance and performance.• The sustainability performance covers:<ul style="list-style-type: none">– Economic– Green environment– Social aspects• Indonesia Stock Exchange (IDX) became a TCFD supporter in June 2021 as part of its ambition to support sustainability in Indonesia's capital market.• In 2021, GRI signed a collaboration agreement with the Indonesian government that commits to support and provide reporting frameworks for the country's UN SDG commitments. The new ESG guidance will make clear how companies can fulfil their disclosure requirements by connecting the GRI Standards with SDG targets and indicators.
Malaysia	<ul style="list-style-type: none">• ESG reporting is required as a listing rule i.e., to disclose narrative statements of the management of material economic, environmental, and social (EES) risks and opportunities in annual reports.• Bursa Malaysia issued a Sustainability Reporting Guide in 2015 and a second edition in 2018 to help embed sustainability in reporting. Compliance with the Guide is voluntary.• Bursa Malaysia does not mandate the choice of sustainability framework.• The Malaysia's Joint Committee on Climate Change encourages disclosure using the TCFD recommendations.

Philippines

- The Securities and Exchange Commission (SEC) followed a “comply and explain” approach from the 2019 reporting period. However, beginning 2023 (2022 reporting period), all PLCs are mandated to comply with the sustainability reporting guidelines set by the regulator. The SEC is also seeking to introduce voluntary – and eventually mandatory reporting for non-listed companies.
- The sustainability reporting framework prescribed by the SEC is built on globally accepted standards and frameworks, particularly GRI Sustainability Reporting Standards, IIRC Integrated Reporting Framework, the SASB Sustainability Accounting Standards, and TCFD recommendations.

Singapore

- All Singapore Exchange listed companies to have sustainability reporting (effective from 2017) which requires 5 primary components of:
 - Reporting framework
 - Materiality assessment
 - Policy, practices, and performance reporting
 - Target setting
 - Statement by the Board

For Singapore listed companies:

- Minimally subject the sustainability reporting process to internal or external review (effective from 2022)
- Mandatory and ‘comply or explain’ based on TCFD recommendations (effective from 2022)
- Board diversity disclosures (effective from 2022)
- Proposed core ESG factors (27 factors) (effective from 2022)
- Mandatory board directors training (effective from 2022)

Thailand

- Since 2022, it is mandatory for all PLCs to report their ESG performance via Form 56-1 One Report (effective from financial period ending 31 December 2021). The submission must be within three months from the publication of the financial report.
- The Securities and Exchange Commission (SEC) Corporate Governance Code does not mandate the choice of sustainability framework, however GRI is common following Stock Exchange of Thailand (SET) guidance.
- On 17 November 2021, SET announced its support for the TCFD.

Vietnam

- The Ministry of Finance of Vietnam requires PLCs to consider the social and environmental consequences of their activities, and their social commitments in their annual report.
- This includes:
 - Environmental impact (e.g., GHG emissions)
 - Raw materials management
 - Energy and water consumption
 - Compliance with environmental protection laws
 - Employees policies
 - Report on responsibility for local community
 - Report on green capital market activities
- PLCs are encouraged to apply the globally accepted reporting and disclosure standards in preparing their sustainability reports.

Source: (Fang et al., 2022)

Scope of Study

In this study, we seek to understand how companies across ASEAN do climate-related reporting. We focused on the top 100 companies by market capitalisation listed in the Indonesia Stock Exchange, Bursa Malaysia Securities Berhad, Philippines Stock Exchange, Singapore Exchange, Stock Exchange of Thailand, and Ho Chi Minh City Stock Exchange.

Companies were included in the analysis if they published a standalone sustainability report or have an embedded sustainability report within their annual report in English that captures their climate disclosures in the financial year ending 2020 or 2021 communicated up to January 1, 2022.

Of the total 600 top companies, we found that only 420 companies have sustainability reports and we found that all these 420 companies reported on their climate disclosures. The companies comprised of 55 companies in Indonesia, 98 companies in Malaysia, 66 companies in the Philippines, 98 companies in Singapore, 63 companies in Thailand, and 40 companies in Vietnam.

Research Framework

In evaluating the climate performance of the companies included in this study, we drew on the Global Reporting Initiative (GRI), the Task Force on Climate-Related Financial Disclosures (TCFD), the Greenhouse Gas (GHG) Protocol, the Science Based Target initiative (SBTi), the Carbon Disclosure Project (CDP) and the United Nations Sustainable Development Goals (SDG) to synthesise a framework that evaluates the completeness of the companies' climate disclosures (Figure 1, Table 2).

The climate-related reporting framework that we used in our analysis covers seven key areas: reporting framework, materiality, risks and opportunities, governance, strategy, targets, and performance. Companies were evaluated on a varying number of indicators in each of the six key areas (excluding reporting framework) and they were awarded one if they disclosed that indicator, and zero otherwise. Scores were summed up to obtain the level of disclosure for each of the seven key areas.

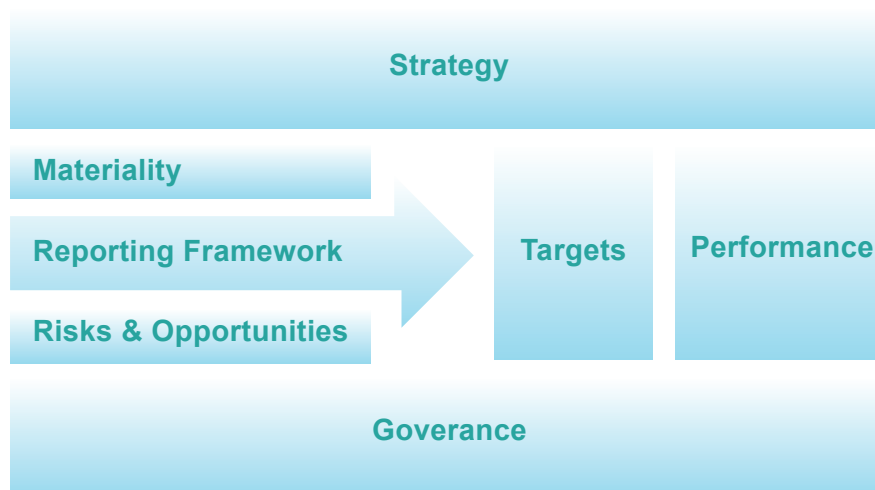


Figure 1. Climate-related Reporting Assessment Framework

Table 2. Climate-related Reporting Assessment Framework

Reporting Framework	Governance	Targets		
<ul style="list-style-type: none"> • CDP • IIRC • GRI • SASB • SBTi • SDG • TCFD 	<ul style="list-style-type: none"> • Processes by which the board committee are informed about climate-related issues • How does the board monitors and oversees progress against goals and targets for addressing climate-related issues • Has the organisation assigned climate-related responsibilities to management-level committees • Whether such management committees report to the board or a committee of the board • Remuneration policies for governance body and senior executives linked to climate-related risks objectives and performance 	<ul style="list-style-type: none"> • Are metrics provided for historical periods to allow for trend analysis? • Describe how targets are discussed • Describe the time frames over which the target applies • Describe key performance indicators used to assess progress against targets 		
Materiality	<th data-bbox="587 1267 1003 1350">Strategy</th> <td data-bbox="1042 869 1463 2110"> <th data-bbox="1042 869 1463 952">Performance</th> </td>	Strategy	<th data-bbox="1042 869 1463 952">Performance</th>	Performance
<ul style="list-style-type: none"> • Climate change identified as a material concern • Material topics pertaining to climate change • How does organisation determine the relative significance of climate-related risks in relation to other risks 	<ul style="list-style-type: none"> • Description of what the organisation considers to be the relevant short-term time horizons with climate-risk strategy • Description of what the organisation considers to be the relevant medium-term time horizons with climate-risk strategy • Description of what the organisation considers to be the relevant long-term time horizons with climate-risk strategy • Does the organisation use climate-related scenario analysis to inform its strategy 	<ul style="list-style-type: none"> • Disclose scope 1 /scope 2/ scope 3 GHG emissions total • Describe GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO equivalent • Disclose fuel consumption within the organisation and outside the organisation from non-renewable sources • Disclose fuel consumption within the organisation and outside the organisation from renewable sources • Disclose the amount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives 		
Risks and Opportunities				
<ul style="list-style-type: none"> • Processes for identifying climate-related risks and/or opportunities • Climate-related risks that the organisation has identified • Climate-related opportunities that the organisation has identified • Mitigate, transfer, accept, control climate-related risks • Describe processes for identifying / assessing / managing how climate-related risks are integrated into the overall risk management 				

Climate Reporting Practices in ASEAN

Reporting framework

The six countries used various reporting frameworks in their climate-related reporting. The GRI Standards and SDG framework were the most widely used framework across all the countries (Table 3).

	GRI	IIRC	SASB	SDG	TCFD
Indonesia	93%	4%	16%	93%	5%
Malaysia	73%	35%	11%	74%	19%
Philippines	82%	17%	35%	86%	38%
Singapore	99%	8%	10%	65%	18%
Thailand	89%	13%	10%	95%	27%
Vietnam	65%	8%	2%	42%	0%



Table 3. Climate-related Reporting Framework

Interestingly, the Philippines and Thailand demonstrated a higher uptake of TCFD, ahead of the remaining ASEAN countries. In the Philippines, the UN SSE, IFC, and CDP provide the market with a range of high-quality training on climate disclosure (Sustainable stock exchanges initiative, 2022). The stock exchange of Thailand goes beyond conducting TCFD workshops to preparing a translated version and published TCFD Good Practice Handbook which demonstrates the best practices from existing climate-related financial disclosures from across the G20 countries (Stock Exchange of Thailand, 2021). With the rise of investors and regulators vocally seeking both financial and non-financial disclosures, we will likely see a stronger uptake of the TCFD by more businesses globally.

■ Materiality

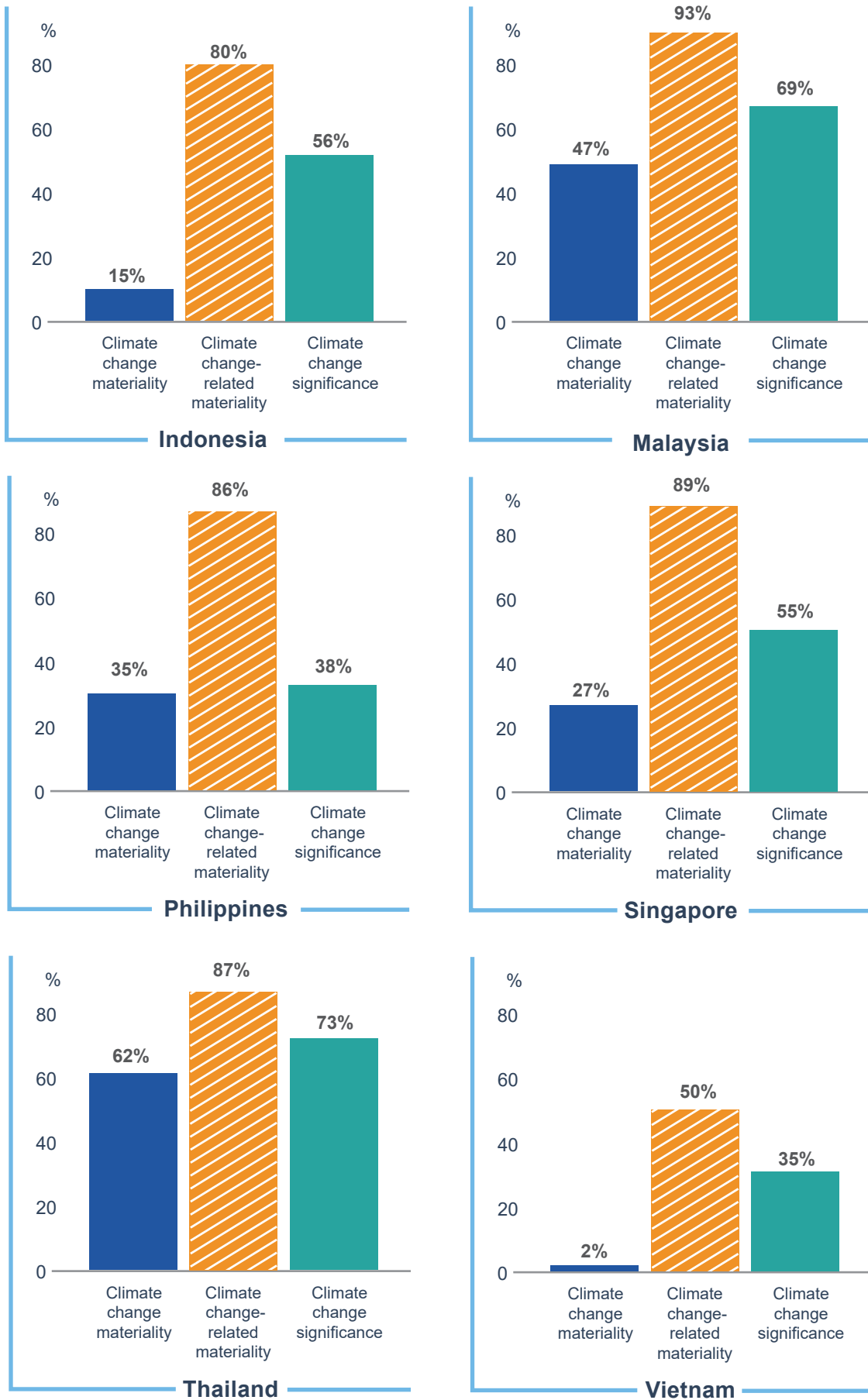
In ascertaining whether companies reported climate change as a materiality issue, we identified if companies mentioned in their sustainability report that

- 1) climate change is identified as a material concern
- 2) the material topics pertaining to climate change, and
- 3) how the organisation determines the relative significance of climate-related risks in relation to other risks.

In the proceeding graphs (Figure 2), we present the percentage of companies that reported 'Climate change materiality' climate change is identified as a material concern, 'Climate change-related materiality' the material topics pertaining to climate change, and 'Climate change significance' how the organisation determines the relative significance of climate-related risks in relation to other risks.

We found that while most companies did not explicitly detail climate change as a material concern, most of the companies identified material topics related to climate change, such as greenhouse gas emissions, energy, and air quality.

Figure 2: Materiality across Countries



Legend:

Climate change materiality: Describe if organisation identify climate change as a material concern

Climate change-related materiality: Describe if organisation identify climate change related material concern such as GHG emission, energy consumption

Climate change significance: Describe how organisation determine the relative significance of climate-related risks in relation to other risks

■ Risks and Opportunities

In determining whether companies account for climate change risks and opportunities, we identified whether companies mentioned in their sustainability report that

- 1) the organisation describes processes for identifying climate risks and/or opportunities
- 2) the climate-related risks that the organisation has identified
- 3) the climate-related opportunities that the organisation has identified
- 4) how the organisation mitigate, transfer, accept, control climate-related risks
- 5) processes for identifying/assessing/managing how climate-related risks are integrated into the overall risk management.

In the proceeding graphs (Figure 3), we present the percentage of companies that reported 'Process' describes processes for identifying climate-related risks and/or opportunities, 'Risks' list the climate-related risks that the organisation has identified, 'Opportunities' list the climate-related opportunities that the organisation has identified, 'Control risks' does the organisation mitigate, transfer, accept, control climate-related risks, 'Integrate climate risks' describe processes for integrating climate-related risks into overall risk management.

We found that in reporting risks and opportunities, majority of the companies described how they mitigate climate-related risks and climate-related opportunities. Findings revealed that businesses are aware of the risks associated with climate change and that climate risks equate to financial risks. With increasing pressures from stakeholders, companies unanimously identified the need to take more aggressive steps toward decarbonisation, recognising that a climate strategy is not only good for the environment but also good for business. It is heartening to note that companies in Singapore have been making concerted efforts in disclosing risks and risk management strategies related to sustainability, we found that only 24% of companies were reporting these issues in 2020 and this has risen to 34% for integrating climate-related risks into overall risk management and 38% for identifying climate-related risks in 2022 (Loh & Chee, 2020).

The climate risks identified by companies fall into four key areas: physical risk, regulatory risk, transition risk, and reputation risk. In terms of physical risks, extreme weather conditions resulting in floods, hurricanes, drought, and landslides were cited as a cause for concern because they can damage infrastructures, affect agricultural yield, and cripple supply chains, driving up the cost of doing business. Physical risks also include rising temperatures which can affect the health of workers, especially those who work outdoors and might lead to manpower shortage (Umar & Egbu, 2020).

With regulatory risk, companies are worried about fines if they fail to adhere to upcoming climate regulations. Organisations are also concerned about the transition into a greener economy, referring to carbon taxes and the switch to renewables as the potential for increasing their operating costs.

As consumers and stakeholders are increasingly demanding businesses to be sustainable, companies that are engaged in polluting businesses such as plastic manufacturing, dependent on pollutants such as coal to fuel their business or engaged in businesses with suppliers that have poor ESG records are worried about their reputation. It is noteworthy that some

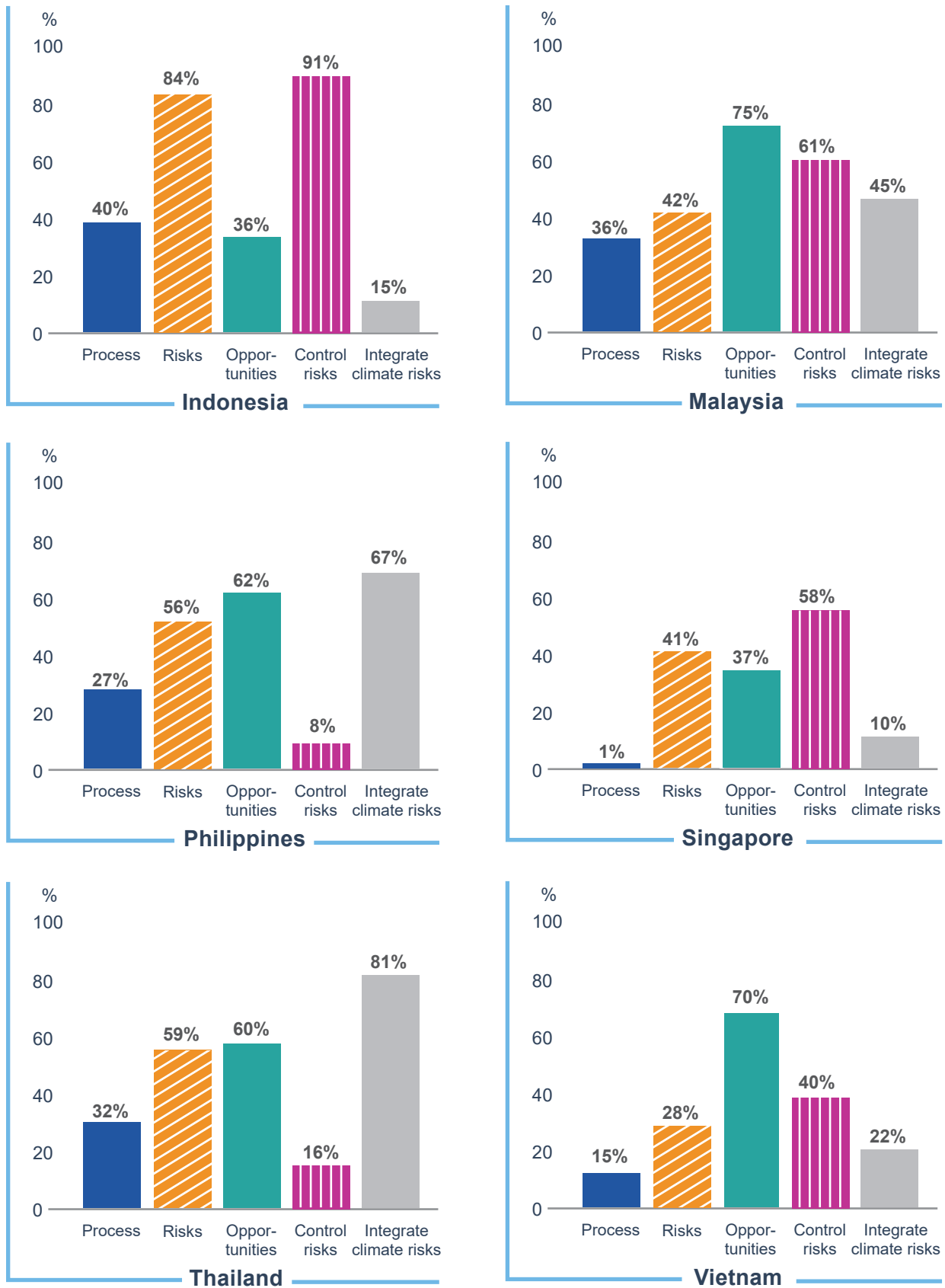
businesses such as financial institutions and holding companies that are not directly affected by climate risks did express concern about climate risks as well. Their primary consideration relates to investments in businesses that are vulnerable to extreme weather conditions and the effect that it would have on their portfolios.

The climate opportunities that organisations have recognised include partnerships with stakeholders such as employees, customers, and the community to encourage eco-friendly behaviours. Regarding behaviours, businesses also optimise air conditioning and electricity usage based on data of usage patterns and only turn them on when they are in use during peak periods resulting in huge savings.

Businesses are increasingly switching to energy-efficient devices in a bid to reduce energy costs and monitor energy consumption. The possibility of carbon taxes has also accelerated the switch to renewable technologies such as solar energy and hydropower energy. Companies have also been creative in finding new uses for by-products in their manufacturing process, for instance turning those by-products into compost, in the spirit of championing circular economy.

At the same time, businesses recognise consumers are increasingly seeking out eco-friendly alternatives, and they see an opportunity in pushing out a wider range of sustainable products. Financial institutions are not resting on their laurel and have seized the opportunity to offer green bonds and sustainable financing options.

Figure 3: Risks and Opportunities across Countries



Legend:

- Process:** Describe processes for identifying climate-related risks and/or opportunities
- Risks:** Describe the climate-related risks that the organisation has identified
- Opportunities:** Describe the climate-related opportunities that the organisation has identified
- Control risks:** Describe if the organisation mitigate, transfer, accept, control climate-related risks
- Integrate climate risks:** Describe processes for integrating climate-related risks into overall risk management

■ Governance

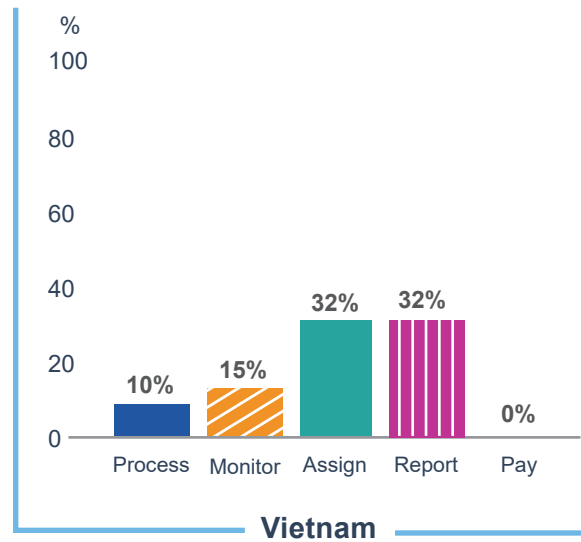
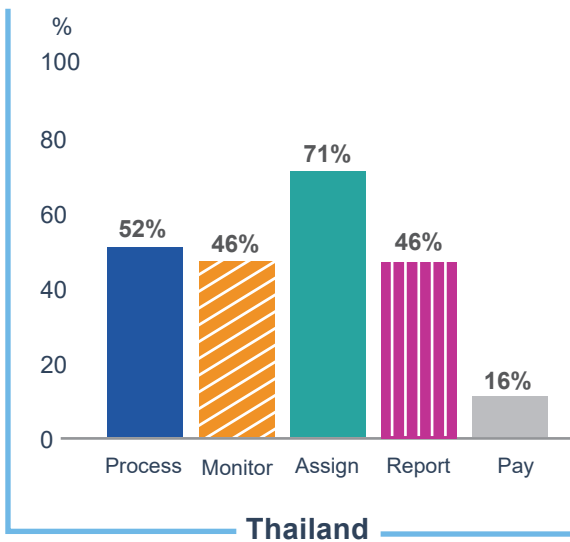
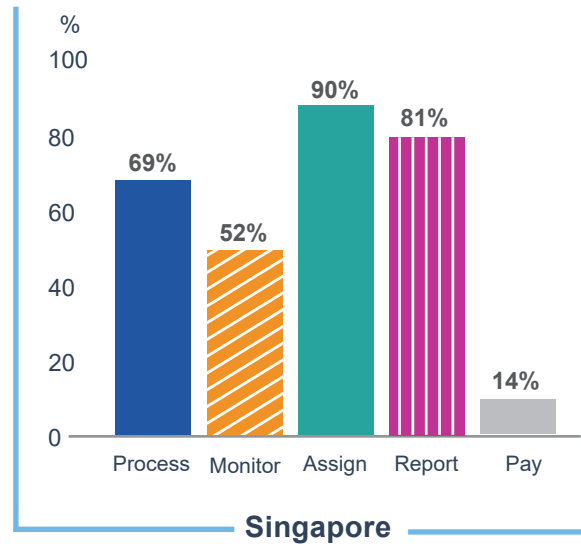
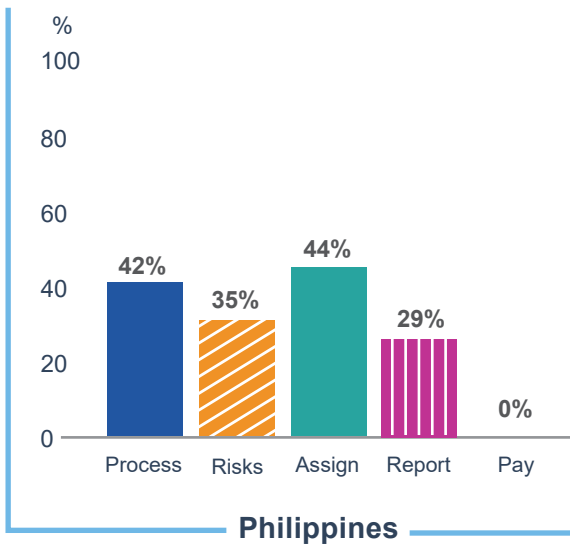
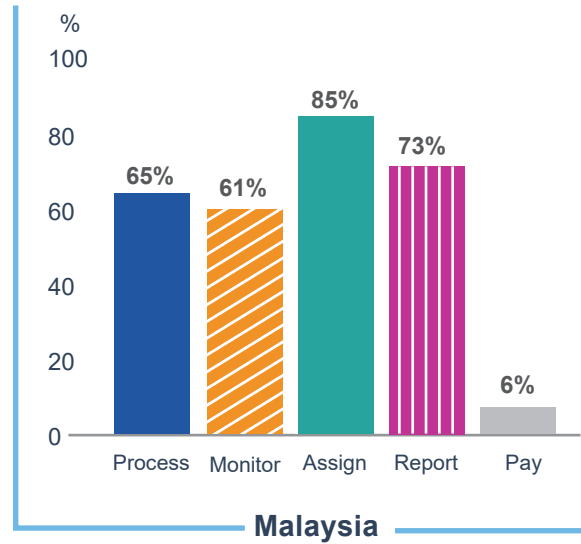
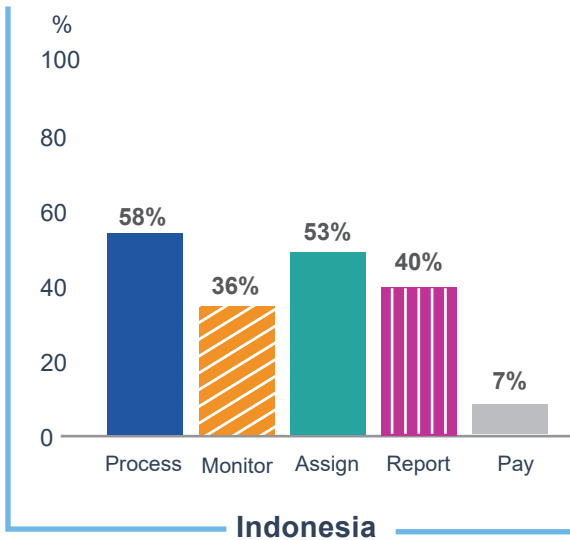
In understanding how board governance manages climate change, we identified whether companies mentioned in their sustainability report

- 1) the processes by which the board and/or board committee are informed about climate-related issues
- 2) how the board monitors and oversees progress against goals and targets for addressing climate-related issues
- 3) whether the organisation has assigned climate-related responsibilities to management-level positions or committees
- 4) whether such management positions or committees report to the board or a committee of the board
- 5) are the remuneration policies for members of the highest governance body and senior executives linked to their objectives or performance in managing the organisation's climate-related risks.

In the proceeding graphs (Figure 4), we present the percentage of companies that reported 'Process' describe the processes by which the board committee are informed about climate-related issues, 'Monitor' describe how the board monitors and oversees progress against goals and targets for addressing climate-related issues, 'Assign' describe whether the organisation has assigned climate-related responsibilities to management-level committees, 'Report' describe whether management committees report to the board committee, and 'Pay' describe whether remuneration is linked to ESG performance.

We found that most of the companies have assigned climate-related responsibilities to management-level positions or committees, and these committees tend to oversee the sustainability direction of the organisation, sitting on the organisation's sustainability committee. There has been growing interest among regulators and investors in the link between executive compensation and sustainability performance, with 45% of FTSE 100 companies having such a link (ASIFMA, 2021; Loh & Chee, 2020; O'Connor et al., 2021). ASEAN countries are in the early stages of witnessing this inclusion, with only a small share of the companies in our study reporting a similar disclosure. We found that companies in Vietnam and the Philippines do not link remuneration to sustainability performance, and in the other countries, only a small percentage of sampled companies linked remuneration to sustainability performance. For effective integration of sustainability, organisations should be prepared to link ESG targets and performance to board remuneration (Husnaini & Basuki, 2020).

Figure 4: Governance across Countries



Legend:

- Process:** Describe the processes by which the board committee are informed about climate-related issues
- Monitor:** Describe how the board monitors and oversees progress against goals and targets for addressing climate-related issues
- Assign:** Describe whether the organisation has assigned climate-related responsibilities to management-level committees
- Report:** Describe whether management committees report to the board committee
- Pay:** Describe whether remuneration is linked to ESG performance

■ Strategy

In understanding how organisations come up with strategies to manage climate change, we identified whether companies mentioned in their sustainability report

- 1) what the organisation considers to be the relevant short-term time horizon with regard to climate risk strategy
- 2) what the organisation considers to be the relevant medium-term time horizon with regard to climate risk strategy
- 3) what the organisation considers to be the relevant long-term time horizon with regard to climate risk strategy
- 4) whether the organisation uses climate-related scenario analysis to inform its strategy.

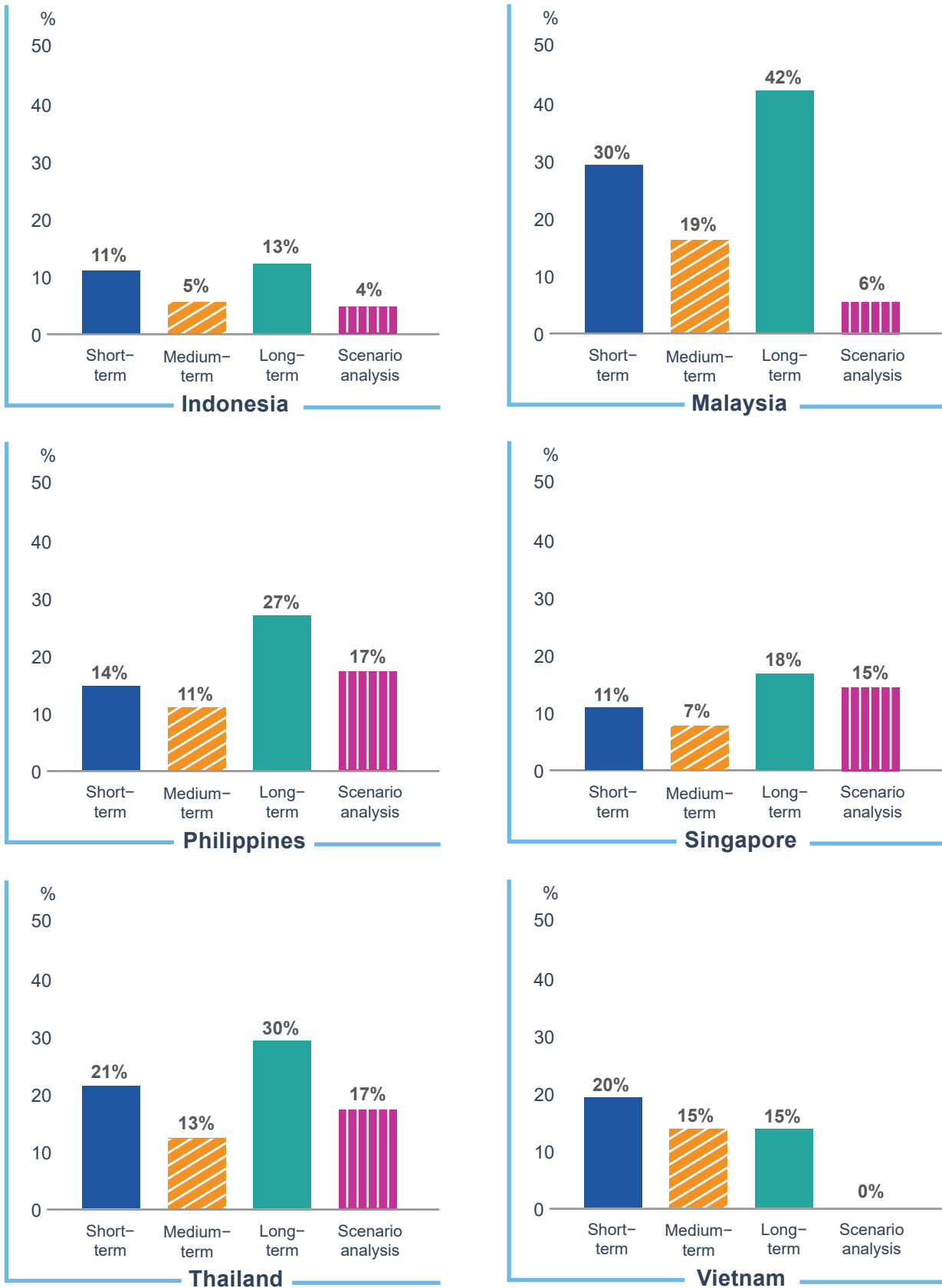
In this report, we define short-term strategy as having a time horizon of less than 2 years, medium-term strategy as having a time horizon of 2 to 5 years, and long-term strategy as having a time horizon of more than 5 years.

In the proceeding graphs (Figure 5), we present the percentage of companies that reported 'Short-term' description of what the organisation consider to be the relevant short-term time horizon with regard to climate risk strategy, reported 'Medium-term' description of what the organisation consider to be the relevant medium-term time horizon with regard to climate risk strategy, reported 'Long-term' description of what the organisation consider to be the relevant long-term time horizon with regard to climate risk strategy, and reported 'Scenario analysis' does the organisation use climate-related scenario analysis to inform its strategy.

We found that most of the companies have discussed the time horizon of their long-term strategy; however, this was not the case for short-term and medium-term strategies. Of the long-term strategies cited, reduction of greenhouse gas emissions and carbon neutrality goals were commonly presented. Companies with clearly defined climate strategies are a step closer to tracking and realising the financial benefits of their climate-related metrics. Demonstrating greater integration of targets and business strategy also provides an indicator to investors as to the degree to which the company has assimilated climate issues into its strategic and risk management (ASIFMA, 2021).

Establishing clear climate strategies are crucial apparatus in the fight against climate change. As the world race toward decarbonisation, we see a rise in the number of companies adopting a systematic approach to developing their climate strategies, particularly energy or carbon reduction related. It commonly starts with an active presentation of how a company measure and map its carbon emissions; having demonstrated a better understanding of its footprint, businesses then go on to present their carbon reduction strategies with thoughtful metrics. As this cycle of virtuous climate-related reporting continues, disclosures can serve to establish a baseline of consistent, comparable, and reliable information. Best practices can be shared, and it stimulates competition, all of which are critical steps to combatting climate change.

Figure 5: Strategy across Countries



Legend:

- Short-term:** Describe what the organisation consider to be the relevant short-term time horizon with regard to climate risk strategy
- Medium-term:** Describe what the organisation consider to be the relevant medium-term time horizon with regard to climate risk strategy
- Long-term:** Describe what the organisation consider to be the relevant long-term time horizon with regard to climate risk strategy
- Scenario analysis:** Describe if the organisation use climate-related scenario analysis to inform its strategy

■ Targets

In learning how organisations came up with targets to manage climate change, we identified whether companies mentioned in their sustainability report

- 1) the use of metrics for historical periods to allow for trend analysis
- 2) whether targets were discussed
- 3) the time frame over which the targets apply
- 4) the use of key performance indicators to assess progress against targets.

In the proceeding graphs (Figure 6), we present the percentage of companies that reported 'Metrics' are metrics provided for historical periods to allow for trend analysis, 'Targets' describe how targets are discussed, 'Performance indicators' describe key performance indicators used to assess progress against targets, 'Target timeframe' describe the time frames over which the target applies.

We found that most of the companies included metrics of greenhouse gas emissions and energy consumption over a few years to allow for trend analysis. Organisations were also active in their discussion of targets; however, many organisations did not discuss how they would assess progress against targets using key performance indicators.

Establishing and publicly communicating climate targets and key performance indicators (KPIs) drives ESG performance management and addresses stakeholder expectations. Companies that do not have clear targets may be disadvantaged as investors might doubt the veracity of their sustainability strategies, targets, and reporting.

In terms of target-setting, some of the targets that companies have set include reducing greenhouse gas emissions/intensity, increasing the use of renewables, improving energy efficiency, reducing the amount of waste generated, using recycled materials in the manufacturing process, reducing water usage, and planting trees to sequester carbon.

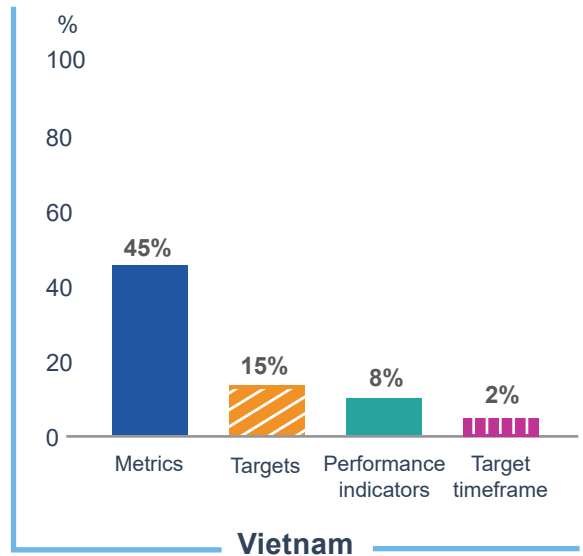
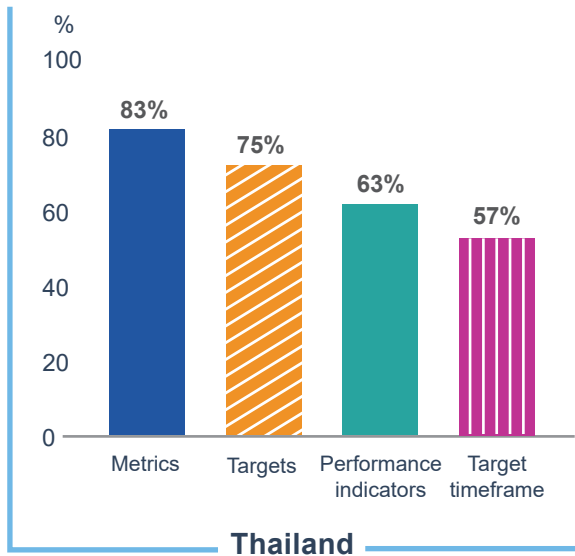
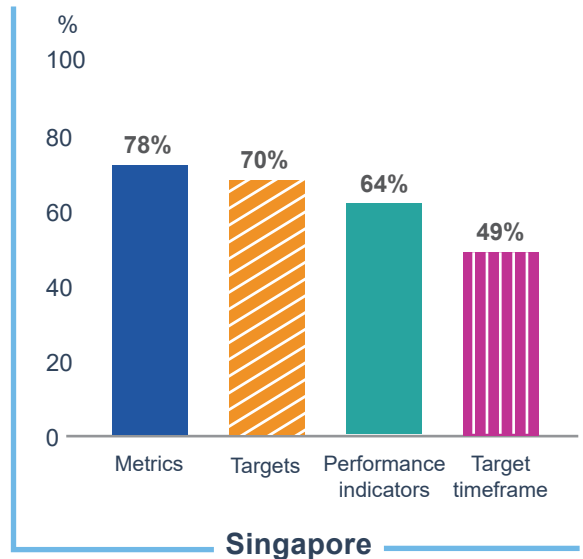
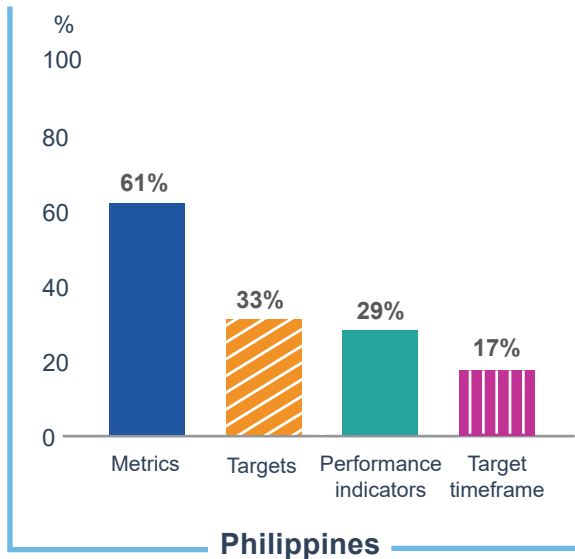
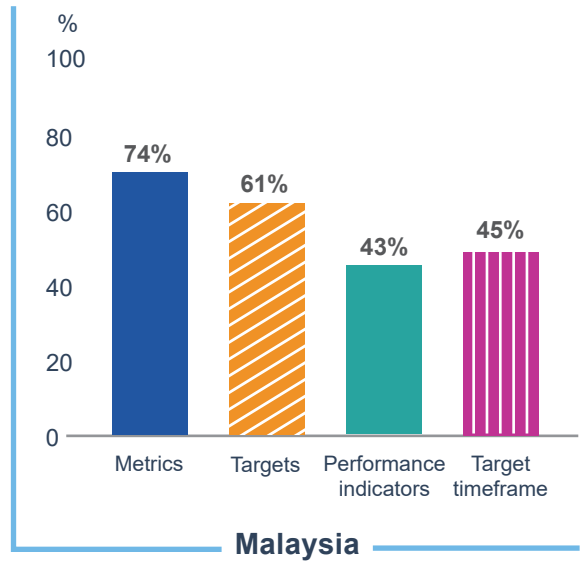
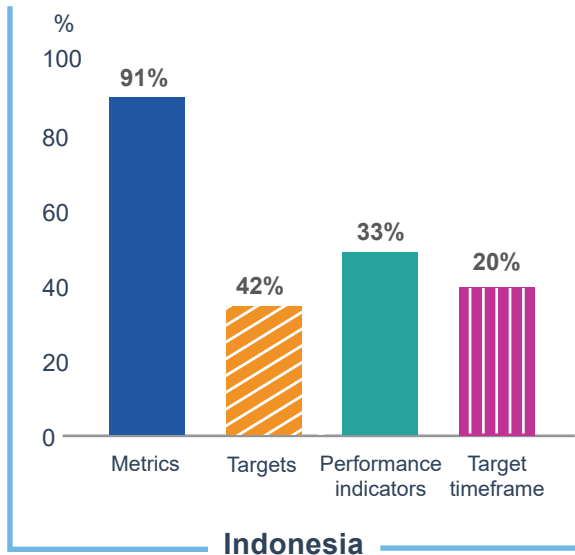
While most of the companies have inset measurable targets by detailing the percentage of reduction and comparison to baseline year, some companies did otherwise set targets that were vague like reducing energy and water usage, and noise pollution in all the group's projects. Such vague targets make it difficult to hold organisations accountable and they should aim to set targets that are quantitative, reportable, and provable (Winkler, 2008).

There was a preponderance of organisations that set targets to reduce greenhouse gas intensity rather than greenhouse emission. Setting greenhouse gas intensity instead of emission target can circumvent the problem of curtailing growth because emissions are pegged to growth; however, this form of target-setting might not be optimal because intensity can be decreasing even as emission increases, and this form of assessment requires a good assessment of both emission and growth data which might be arduous for record-keeping (Grand, 2016).

We sampled a total of 420 companies across six countries; however, only 91 (22%) companies have set targets related to increasing low-carbon energy consumption, 5 (1%) companies have set targets related to reducing methane, and only 40 (10%) companies have set targets to achieve net-zero carbon emissions. When it comes to low-carbon energy consumption, we found that the most common renewable alternative that the companies have adopted or will be adopting is solar energy, followed by a small percentage indicating hydropower. In terms of targets to reduce methane, the few companies with targets to reduce methane aim to reduce methane discharge through methane capture.

Companies need to set targets related to increasing low-carbon energy consumption, reducing methane, and achieving net-zero targets to achieve the Paris Agreement 1.5-degree Celsius goal. The UN chief warned that the world must accomplish carbon neutrality before 2050 and reduce carbon emissions by 45% by 2030 from 2010 levels (United Nations, 2021). While it is heartening to note that there are companies committed to being net-zero, a quarter of the companies in our study that have set such a target were nebulous with their net-zero target, merely reporting that they aim to be net-zero by a given date without being explicit about what that would entail. The companies that have offered clarity with their net-zero targets mentioned carbon offset, decarbonising their operation, and increasing their share of renewables. Climate change is no doubt a high probability risk that requires urgent action. Aside from setting bold net-zero ambitions, organisations are expected to establish clear targets with a detailed decarbonisation roadmap. Meeting global decarbonisation targets requires a transformation led by fundamental model change.

Figure 6: Targets across Countries



Legend:
Metrics: Describe if metrics are provided for historical periods to allow for trend analysis
Targets: Describe how targets are discussed
Performance indicators: Describe key performance indicators used to assess progress against targets
Target timeframe: Describe the time frames over which the target applies

■ Performance

In figuring out how organisations used performance data to manage climate change, we identified whether companies mentioned in their sustainability report

- 1) the disclosure of scope 1/scope 2/scope 3 GHG emissions total
- 2) disclosure of fuel consumption within the organisation and outside the organisation from non-renewable sources
- 3) disclosure of fuel consumption within the organisation and outside the organisation from renewable sources
- 4) description of GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO₂ equivalent
- 5) disclosure of the amount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives.

In the proceeding graphs (Figure 7), we present the percentage of companies that reported 'Total GHG emission' disclose scope 1/scope 2/scope 3 GHG emissions total, 'Reduced GHG emission' describe GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO equivalent, 'Non-renewable fuel' disclose fuel consumption within the organisation and outside the organisation from non-renewable sources, 'Renewable fuel' disclose fuel consumption within the organisation and outside the organisation from renewable sources, 'Reduced fuel' disclose the amount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives.

We found that most of the companies disclosed GHG emissions and non-renewable fuel consumption; however, disclosure of renewables was not as widespread which might be due to the use of renewables being not as commonplace.

We found that GHG emissions data are often incomplete, failing to capture all regions and scopes of the company's operations. Not all companies report scope 1 emissions disaggregated by sources and facilities, and scope 2 emissions by source type. All emissions sources and facilities should be included in the greenhouse gas emissions accounting to determine the attributes of emissions flows in the socio-economic system (Liu et al., 2019). Disclosing the sources and facilities will provide a clearer picture of the interaction in emission flows between an organisation's primary and secondary industries, and helps in mitigating emissions (Liu et al., 2019). In our sample of 420 companies, we found that only 80 companies (19%) reported their scope 1 emissions disaggregated by source type, 43 companies (10%) reported their scope 1 emissions disaggregated by facility, and only 75 companies (18%) reported their scope 2 emissions disaggregated by source type.

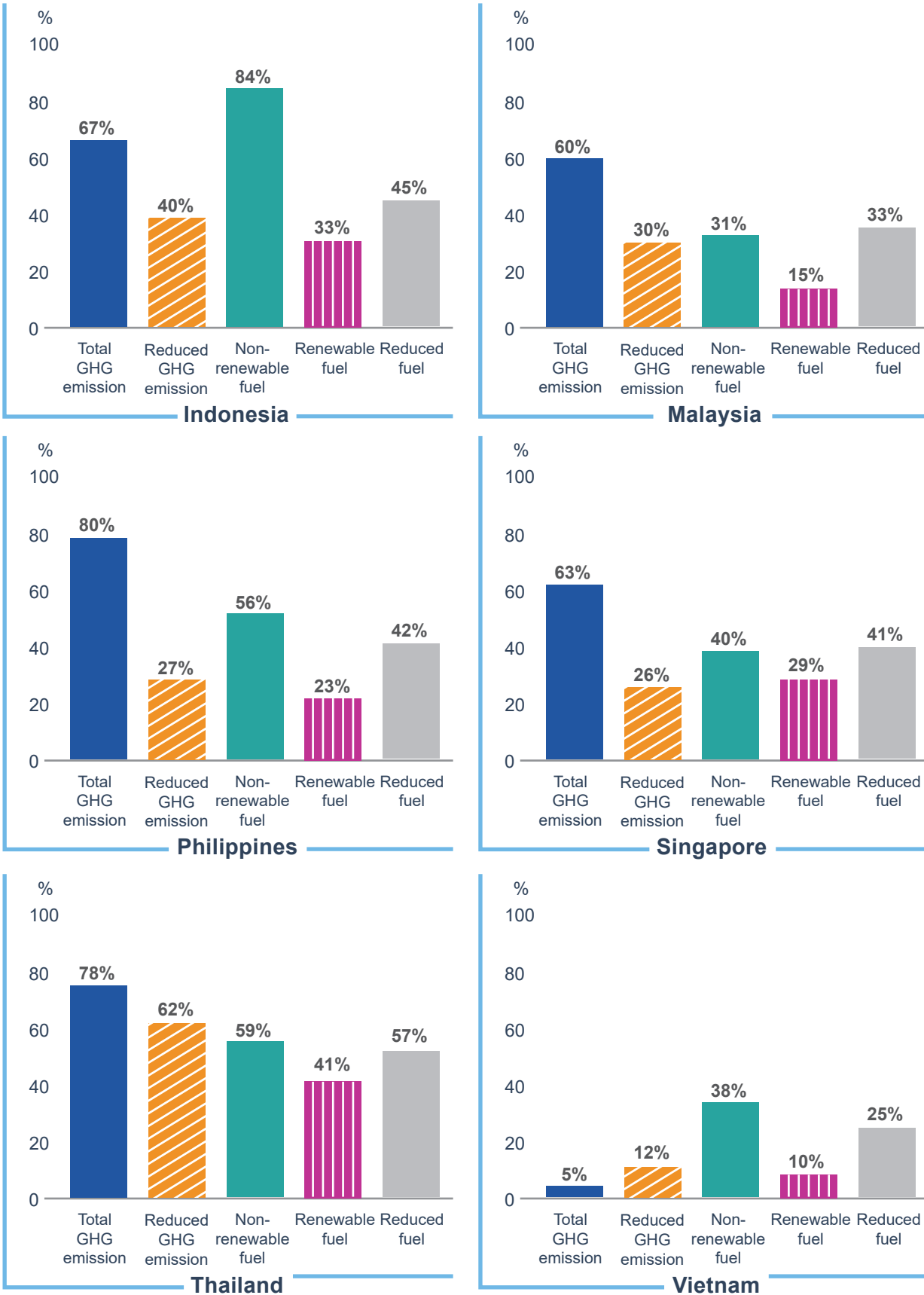
Organisations are expected to take stock of their climate-related reporting in terms of what is internal and external. Is information consolidated at a group level, certain geography, a segment, or specific to a division? A gap analysis can effectively aid companies in identifying the extent of processes and controls in place. These are critical steps to keeping abreast with addressing climate-related risk, monitoring scope 1 to 3 greenhouse gas emissions, and making inclusion for financial impact metrics, expenditure metrics, and financial estimates on scenario assumptions.

Keeping in mind that companies can fall under multiple scopes and that most would fall under scope 3, it is crucial for businesses to holistically disclose their carbon emissions (Stuart, 2020). Take for example the food and beverage industry which weighs heavily in scope 3 emissions, failing to report its scope 3 emissions would mask the full picture of an organisation's carbon emission footprint and prevent the organisation from optimising solutions to mitigate carbon emissions. Reporting scope 3 emissions will allow an organisation to understand whether it is direct or indirect emissions that require mitigation (Hertwich & Wood, 2018). In our sample of 420 companies, we found that only 53 companies (13%) reported their scope 3 emissions by source type and explain any exclusions.

Finally, we found that performance indicators across climate topics do not distil down into one standardised unit of measure, as is the case with the dollar in financial reporting. For example, energy consumption is measured differently by companies; some use gigajoules, while others use kilowatt-hours. The absence of accurate, relevant, and meaningful climate data that can be used to inform management decision-making and measure performance makes it challenging for companies to create value based on the information. Moreover, it cripples investors' ability to interpret and incorporate ESG purposefully into decision-making.

Therefore, it is important not only to collect accurate, consistent, and complete information but also to translate it into an appropriate unit of measure that can then be reported and interpreted. Just as the accounting profession set standards in the 1970s for financial reporting, we can expect changes in policies and sustainability accounting standards for factors such as energy consumption, use of renewables, and supply chain reporting implemented in the coming years.

Figure 7: Performance across Countries



Legend:

- Total GHG emission:** Disclose scope 1/scope 2/scope 3 GHG emissions total
- Reduced GHG emission:** Describe GHG emissions reduced as a direct result of reduction initiatives, in metric tons of CO equivalent
- Non-renewable fuel:** Disclose fuel consumption within the organisation and outside the organisation from non-renewable sources
- Renewable fuel:** Disclose fuel consumption within the organisation and outside the organisation from renewable sources
- Reduced fuel:** Disclose the amount of reductions in energy consumption achieved as a direct result of conservation and efficiency initiatives

Rating of Companies on Climate-related Reporting

We rated companies across the six countries in their climate-related reporting efforts and added up their scores across all the components: Materiality, risks and opportunities, governance, strategy, targets, and performance.

In Table 4, we have included the percentages for all the climate-related components and the overall percentage. We notice that Malaysia, Singapore, and Thailand are stronger in climate-related reporting as evidenced by their higher overall score. The results echo our earlier studies that found that Malaysia, Singapore, and Thailand are taking the lead in sustainability reporting (Loh et al., 2018; Loh & Singh, 2020). Thailand has consistently led the region in ESG disclosures (Zembrowski, 2019), Malaysia is also regarded as a world leader in sustainability reporting (Visuvaseven, 2020), and Singapore has improved substantially in climate-related reporting from 2019 to 2021 (Loh & Tang, 2021). Thailand's stellar performance in sustainability reporting echoes findings from an earlier study in which the Stock Exchange of Thailand (SET) was ranked ninth out of 47 stock exchanges internationally in 2019 by Corporate Knights. SET also necessitate that companies complete sustainability reporting when possible from 2014 (Walker, 2021). In addition, SET provides information on its Sustainable Capital Market Development page to support best practices (Walker, 2021). SET has also gone beyond conducting TCFD workshops to preparing translated version and publishing a TCFD Good Practice Handbook which demonstrates the best practices from existing climate-related financial disclosures from across the G20 countries and those workshops help companies learn about good ESG reporting practices and guidelines (Stock Exchange of Thailand, 2021). As for Singapore, the Singapore Exchange mandated sustainability reporting from financial year 2017 on a "comply-or-explain" basis, meaning that companies had to either report components as required or explain any omission. (Walker, 2021). Climate reporting is mandated from financial year 2022 which will help to accelerate climate-related reporting among companies in Singapore (Aravindan, 2021). In Malaysia, companies are expected to publish a statement of the administration of material economic, environmental, and social risks and opportunities in their annual reports based on Bursa Malaysia's guidelines from 31 December 2016 (Bursa Malaysia, 2015).

We also observed that companies across all the countries did not have a high score in the strategy component echoing results in earlier studies that climate-related strategy is not a forte for most companies (Loh & Yock, 2021). While most companies are aware of climate-related risks, they are less adept at linking those risks to the long-term impact on their organisation. Equally, so is the fact that most companies cannot assess their organisation's resilience in face of climate uncertainties.

Table 4: Climate-related Reporting Rating by Company

Indonesia	Total (Out of 100)
PT Semen Indonesia (Persero) Tbk	75
Astra International	71.4
PT Bank CIMB Niaga Tbk	71.4
PT Bank Rakyat Indonesia (Persero) Tbk	71.4
PT Indo Tambangraya Megah Tbk	71.4
PT Chandra Asri Petrochemical Tbk	64.3
PT Vale Indonesia Tbk	64.3
PT Cikarang Listrindo Tbk	60.7
PT Kalbe Farma Tbk	60.7
PT Medco Energi Internasional Tbk	60.7
Malaysia	
Sunway Berhad	89.3
CIMB Group Holdings Berhad	85.7
IOI Corporation Berhad	85.7
Gamuda Berhad	85.7
Tenaga Nasional Berhad	85.7
Hong Leong Bank Berhad	82.1
MISC Berhad	82.1
YTL Corporation Berhad	82.1
Fraser & Neave Holdings Bhd	78.6
Nestle (Malaysia) Berhad	78.6

Philippines	Total (Out of 100)
Ayala Corporation	82.1
BDO Unibank Inc	82.1
Globe Telecom Inc	75
Ayala Land Inc	71.4
Wilcon Depot Inc	67.9
Aboitiz Power Corporation	64.3
Golden MV Holdings Inc	64.3
PLDT Inc	64.3
Semirara Mining and Power Corporation	64.3
SM Prime Holdings Inc	60.7
Singapore	
City Developments Limited	96.4
Singapore Telecommunications Limited	96.4
United Overseas Bank Limited	92.9
Wilmar International Limited	89.3
Keppel Corporation Limited	82.1
Ascott Residence Trust	78.6
Fraser & Neave Limited	78.6
Sembcorp Marine Limited	78.6
SATS Limited	75
Singapore Airlines Limited	75

Thailand	Total (Out of 100)
Siam Cement Public Company Limited	99.9
Bangchak Corporation Public Company Limited	92.9
Thai Oil Public Company Limited	92.9
BTS Group Holdings Public Company Limited	89.3
Thai Group Holdings Public Company Limited	89.3
Indorama Ventures Public Company Limited	85.7
Eastern Polymer Group Public Company Limited	82.1
Kasikornbank Public Company Limited	82.1
Home Product Center Public Company Limited	78.6
Siam Commercial Bank Public Company Limited	78.6
Vietnam	
Bao Viet Holdings	53.6
Cong Ty Co Phan Sua	53.6
Imexpharm Pharmaceutical Joint Stock Company	53.6
Vietnam National Petroleum Group	53.6
Petrovietnam Drilling and Well Service Corporation	39.3
An Phat Holdings Joint Stock Company	35.7
Power Construction Joint Stock Company	35.7
Saigon Thuong Tin Commercial Joint Stock Bank	35.7
Vingroup Joint Stock Company	35.7
Phat Dat Real Estate Development Corporation	32.1

Highlights of Good Climate-related Reporting Practices

City Developments Limited (CDL) is exemplary at reporting on risks and opportunities. CDL clearly described their processes for identifying climate-related risks and opportunities through a climate change scenario planning exercise to establish the risks and opportunities linked to 4-degree Celsius and 2-degree Celsius warmer scenarios. They aligned their climate change scenario planning exercise to the guidance of TCFD, IPCC, and best approaches for climate risk analysis. Through their climate change scenario planning exercises, they were able to identify transition risks and physical risks as being their dominant climate-related risks. In tandem with identifying climate-related risks, they were able to determine climate-related opportunities such as incorporating natural cooling features into the design of new building and adjust existing building infrastructure to cope with heating and cooling capacity demands. CDL has also clearly outlined how they will mitigate climate-related risks through the formation of the Green Building and Technology Application team in 2020 to explore innovative carbon reduction solutions and partnerships. Finally, CDL has described their processes for managing how climate-related risks are integrated into the overall risk management.

Sunway Berhad is commendable in their reporting of governance. They elucidated the processes by which the board committee are informed about climate-related issues. Sunway's Berhad sustainability governance is helmed by the Group's Board Sustainability Committee, which consists of four directors from the Group's Board of Directors. The Board Sustainability Committee is backed by the Sunway Group Sustainability Department and the Jeffrey Sachs Center on Sustainable Development. In terms of monitoring and overseeing of progress against goals and targets for addressing climate-related issues, the Board Sustainability Committee meets at least twice annually to audit Sunway's sustainability plans. The Board Sustainability Committee has also assigned climate-related responsibilities to management-level committee members who serve on the Sustainability Committee which comprise of business division heads of department and line managers. Sunway Berhad has effectively demonstrated how remuneration of members in the Sustainability Committee can be linked to ESG performance.

Siam Cement Public Company Limited is laudable in their reporting of strategy. They explained what the organisation considers to be the relevant short-term, medium-term, and long-term horizons regarding climate risk strategy. They have outlined their plans to cut greenhouse gas emissions in the short-term by 2020, medium-term by 2025, and long-term by 2050. Water-related risk is a climate-related risk faced by the organisation and they have used scenario analysis together with local water data to appraise the organisation's water-related risks.

Ayala Corporation is commendable in their reporting of targets. They have provided metrics of energy consumption and emissions to allow for comparison across the years. They are also unambiguous in their discussion of targets and the timeframe of targets, for instance one of their targets is to increase their renewable energy portfolio to 5 GW by 2030 in the Philippines and its foreign markets. Most importantly, they make use of key performance indicators to assess progress against targets, such as reducing their carbon footprint by 30 percent based on their 2017 levels, by 2030.

Conclusion

In this study, we seek to understand how companies across ASEAN do climate-related reporting. We investigated how companies covered their climate-related reporting in six key areas: Materiality, risks and opportunities, governance, strategy, targets, and performance.

We found that companies in general were better at reporting issues pertaining to materiality, targets, and risks and opportunities. However, companies did not do as well in reporting about strategy. While most companies are aware of climate-related risks, they are less adept at linking those risks to long-term impact on their organisation. Companies might refer to resources such as those provided by TCFD on its website to get acquainted with reporting strategy and using scenario analysis.

We observed that there was a wide variance in depth of reporting across sampled companies in the six countries. Specifically, we found that companies in Malaysia, Singapore, and Thailand were stronger in climate-related reporting as evident by their higher overall scores. The relative strength of the three countries in climate-related reporting is due to a combination of mandate and consultation with stakeholders. Singapore Exchange (SGX) and the Stock Exchange of Thailand (SET) have both mandated listed companies to do sustainability reporting annually, as for Malaysia, the regulatory authorities have been active in engaging stakeholders on the best practices in sustainability reporting from as early on as 2007. Companies in Thailand led the pack in climate-related reporting, and this could be due to the extensive resources and trainings provided by SET, from Sustainable Capital Market Development webpage on its website that provides useful resources in getting companies started on their climate-related reporting journey to training and events pertaining to sustainability reporting. Based on our research, it seems that countries with mandatory sustainability reporting fare better in this regard. In addition, the provision of resources and trainings are effective in getting companies up to speed with sustainability reporting as in the case of Thailand.

Abbreviations

ASEAN	Association of Southeast Asian Nations
CDP	Carbon Disclosure Project
CSR	Corporate social responsibility
CO ₂	Carbon Dioxide
ESG	Environmental, social and governance
FTSE	Financial Times Stock Exchange
GHG	Greenhouse gas
G20	Group of Twenty
ID	Indonesia
IFC	International Finance Corporation
IIRC	International Integrated Reporting Council
ISO	International Organization for Standardization
KPIs	Key performance indicators
MY	Malaysia
PH	Philippines
SASB	Sustainability Accounting Standards Board
SBTi	Science Based Targets initiative
SDG	Sustainable Development Goals
SG	Singapore
TCFD	Task Force on Climate-related Financial Disclosures
TH	Thailand
UNFCC	United Nations Framework Convention on Climate Change
UN SEE	United Nations Sustainable Stock Exchanges
VN	Vietnam

References

- Aravindan, A. (2021, December 15). Singapore Exchange to mandates climate, board diversity disclosures. *Reuters*. <https://www.reuters.com/business/sustainable-business/singapore-exchange-mandates-climate-board-diversity-disclosures-2021-12-15/>
- ASEAN. (2019, November 2). *ASEAN joint statement on climate change to the 25th session of the conference of the parties to the United Nations framework convention on climate change (UNFCCC COP25)*. <https://asean.org/wp-content/uploads/2019/11/2-ASEAN-Joint-Statement-on-Climate-Change-to-the-UNFCCC-COP-25.pdf>
- ASIFMA. (2021, June). *Investors' ESG expectations: An Asian perspective*. <https://www.asifma.org/wp-content/uploads/2021/06/asifma-investor-esg-expectations-an-asian-perspective-english.pdf>
- Bursa Malaysia. (2015). *Sustainability reporting guide*. https://www.bursamalaysia.com/sites/5bb54be15f36ca0af339077a/content_entry5ce3b5005b711a1764454c1a/5ce3c83239fba2627b286508/files/bursa_malaysia_sustainability_reporting_guide-final.pdf?1570701456
- Fang, E.-L., Loh, L., Lim, L. H., Singh, A. A., Nguyen, T. T. A., Tan, S., & Thoi, V. (2022, May). *Sustainability counts: Understanding sustainability reporting requirements across Asia Pacific and insights on the journey to date*. PricewaterhouseCoopers and Centre for Governance and Sustainability, NUS Business School. <https://bschool.nus.edu.sg/cgs/wp-content/uploads/sites/7/2022/05/CGS-PwC-Sustainability-Counts-Asia-Pacific-Report-2022.pdf>
- Grand, M. C. (2016). GDP-related emission targets weaknesses: The case of Argentina. *Serie Documentos de Trabajo*, 599, 12. <https://ucema.edu.ar/publicaciones/download/documentos/599.pdf>
- Hertwich, E. G., & Wood, R. (2018). The growing importance of scope 3 greenhouse gas emissions from industry. *Environmental Research Letters*, 13(10), 104013. <https://doi.org/10.1088/1748-9326/aae19a>
- Husnaini, W., & Basuki, B. (2020). ASEAN corporate governance scorecard: Sustainability reporting and firm value. *The Journal of Asian Finance, Economics and Business*, 7(11), 315–326. <https://doi.org/10.13106/JAFEB.2020.VOL7.NO11.315>
- Liu, L., Huang, G., Baetz, B., Huang, C. Z., & Zhang, K. (2019). Integrated GHG emissions and emission relationships analysis through a disaggregated ecologically-extended input-output model; A case study for Saskatchewan, Canada. *Renewable and Sustainable Energy Reviews*, 106, 97–109. <https://doi.org/10.1016/j.rser.2019.03.001>
- Loh, L., & Chee, Z. (2020, December). *Corporate governance highlights 2020: Strengthening governance in a high-risk era*. Centre for Governance and Sustainability, NUS Business School. <https://bschool.nus.edu.sg/cgs/wp-content/uploads/sites/7/2021/03/CGS-SGTI-Corporate-Governance-Highlights-2020.pdf>
- Loh, L., & Singh, A. (2020, December). *Corporate sustainability reporting in ASEAN countries*. ASEAN CSR Network and Centre for Governance and Sustainability, NUS Business School. <https://bschool.nus.edu.sg/cgs/wp-content/uploads/sites/7/2021/07/ACN-CGS-Corporate-Sustainability-Reporting-in-ASEAN-Countries-Report-2020.pdf>
- Loh, L., & Tang, M. (2021, May). *Sustainability reporting review*. Singapore Exchange and Centre for Governance and Sustainability, NUS Business School. <https://bschool.nus.edu.sg/cgs/wp-content/uploads/sites/7/2021/05/SGX-CGS-Sustainability-Reporting-Review-Report-2021.pdf>

- Loh, L., Thomas, T., Lee, S. P., Lim, L., Pan, H., Malek, M., Tan, S., & Nguyen, T. P. T. (2018, November). *Sustainability reporting in ASEAN countries*. ASEAN CSR Network and Centre for Governance and Sustainability, NUS Business School. https://www.asean-csr-network.org/c/images/Resources/Reports/2018_Sustainability_Reporting_in_ASEAN_Countries.pdf
- Loh, L., & Yock, Y. (2021, August). *Climate change reporting in Singapore-listed companies: An assessment of early adopters of task force on climate-related financial disclosures*. Centre for Governance and Sustainability, NUS Business School. <https://bschool.nus.edu.sg/cgs/wp-content/uploads/sites/7/2021/08/CGS-TCFD-Technical-Report-August-2021.pdf>
- O'Connor, P., Harris, L., & Gosling, T. (2021, June 29). *Linking executive pay to ESG goals*. <https://www.pwc.com/gx/en/issues/reinventing-the-future/take-on-tomorrow/download/Linking-exec-pay-ESG.pdf>
- Stock Exchange of Thailand. (2021, November 17). *SET announces support for climate-related financial disclosure standard in tackling environmental problems*. <https://classic.set.or.th/setpdfnews.do?newsId=16371055663790&sequence=2021126834>
- Stuart, S. (2020, October 6). EPA emission classifications: What are they and why are they important? Flock Freight. <https://www.flockfreight.com/2020/10/06/epa-emission-classifications-what-are-they-and-why-are-they-important/#:~:text=Scope%203%20is%20the%20most%20common%20category%20%E2%80%94,emissions%2C%20such%20as%20Pepsi%2C%20Nestl%C3%A9%20and%20Coca%20Cola>
- Sustainable stock exchanges initiative. (2022). *Philippines: TCFD 102 – workshop training*. <https://sseinitiative.org/sse-event/philippines-tcf-102-workshop-training/>
- Umar, T., & Egbu, C. (2020). Heat stress, a hidden cause of accidents in construction. *Proceedings of the Institution of Civil Engineers - Municipal Engineer*, 173(1), 49–60. <https://doi.org/10.1680/jmuen.18.00004>
- United Nations. (2021, July 25). *No pathway to reach the Paris Agreement's 1.5°C goal without the G20: UN chief*. <https://news.un.org/en/story/2021/07/1096372>
- Visuvaseven, H. (2020, December 15). Malaysia among global leaders in sustainability reporting—KPMG survey. *The Edge Markets*. <https://www.theedgemarkets.com/article/malaysia-among-global-leaders-sustainability-reporting-%E2%80%94-kpmg-survey>
- Walker, R. (2021, May 27). Thailand leads ESG disclosure in Southeast Asia. *Fund Selector Asia*. <https://fundselectorasia.com/thailand-leads-esg-disclosure-in-southeast-asia/>
- Winkler, H. (2008). Measurable, reportable and verifiable: The keys to mitigation in the Copenhagen deal. *Climate Policy*, 8(6), 534–547. <https://doi.org/10.3763/cpol.2008.0583>
- Zembrowski, P. (2019, June 12). Thailand leads the region in ESG disclosures. *CFA Institute*. <https://blogs.cfainstitute.org/marketintegrity/2019/06/12/thailand-leads-the-region-in-esg-disclosures/>

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