



Joint Committee
on Climate Change

Report on Climate Data Catalogue
*Key Findings and Recommendations
to Bridge Data Gaps*

December 2022

Contents

Preamble	3
Executive Summary	4
1. Introduction	6
1.1 Climate and environmental data landscape	6
1.2 Data Catalogue: A stocktake on the availability of data required by the financial sector	7
2. A Stocktake of Malaysian Financial Sector's Climate and Environmental Data Needs	8
2.1 Methodology	8
2.2 Use cases and stocktaking exercise on data needs	9
2.3 Prioritisation of data needs	10
3. The Data Catalogue – Key Findings and Future Plan	12
3.1 Data Catalogue results	12
3.2 Data Catalogue findings on data needs, availability, and gaps	16
3.3 Data Catalogue maintenance and future plan	16
4. Data Challenges and Recommendations	18
4.1 Data challenges	18
4.2 Recommendations	22
5. Future Plans	28
Acknowledgements	29
List of Acronyms	30
List of Diagrams	32
Appendix: Climate Data Catalogue	33

Preamble

Climate change poses unprecedented challenges and opportunities for the financial sector, particularly in integrating climate considerations in business strategies, operations, and risk management. The availability of good quality climate data is therefore absolutely critical for the financial sector to enable it to track its progress in supporting an orderly transition to a low-carbon and sustainable economy. This is in line with the nation's commitment to achieve net zero as early as 2050.

Currently, the lack of quality and easily accessible climate-related data is one of the key factors that has hampered efforts by the financial sector to manage climate-related risks and support decarbonisation. In response to this, the Joint Committee on Climate Change (JC3) – the focal point for collective climate actions in the financial sector – established the Sub-Committee on Bridging Data Gaps (the Sub-Committee) in July 2021. This Sub-Committee was tasked to identify crucial climate data needed by the financial sector, determine the availability of credible data sources and subsequently the prevailing data gaps. Upon identifying these gaps, the Sub-Committee was then tasked to explore potential solutions and recommendations to address them.

In delivering its mandate, the Sub-Committee has compiled a Data Catalogue (DC). The DC identifies available climate data sources to support various use cases by the financial sector, similar to the approach by the Network for Greening the Financial System (NGFS) for its Directory.¹ The DC focuses on Malaysian climate and environmental data, thus complementing the NGFS Directory which is more global in nature. The content can also benefit a wider audience, such as members of the public to obtain information on data availability and sources. In the first iteration, the DC is compiled from known data sources. The data and sources in the DC are not exhaustive as of this point. As such, users are advised to undertake their own assessments to establish the relevance of the data for their use cases. While the DC currently focuses on the needs of the financial sector, it is envisioned that the DC will pave the way for the setting up of potentially a national-level climate DC, as part of the broader data ecosystem in the future to support the nation's climate aspiration.

¹ NGFS, "The NGFS Directory". [The NGFS Directory \(masdpk.io\)](https://www.masdpk.io)

Executive Summary

Malaysia's financial sector in recent years has stepped up its response to address the urgent and existential threats posed by climate and environment-related risks. This involves alignment of efforts toward global climate accords and the Sustainable Development Goals (SDG). The strategies and action plans on climate adaptation and mitigation need to be supported by a good information architecture, which consists of three building blocks: development of well-defined metrics and standards; a harmonised and consistent set of climate disclosure standards; and an established taxonomy.²

Towards this end, the Sub-Committee has compiled a DC that contains relevant and critical data needed by the financial sector to support pre-identified use cases based on engagements with members of JC3. The approach is modelled after NGFS' systematic process and protocols to identify data needs of various stakeholder groups for applicable use cases in the NGFS Directory.³ This is followed by identification of metric types and data items required to support the use cases and metric types. Specifically, the DC encompasses:

- 5 main stakeholder groups within the financial sector i.e. regulators, banking institutions, insurers and takaful operators, asset managers, and pension funds.
- 8 use cases, i.e. climate disclosure, exposure quantification, financial stability monitoring, investment and lending decisions, macro-economic modelling, scenario analysis, stress testing and product development.
- 6 metrics types, i.e. footprint, transition sensitivity, physical vulnerability, alignment, mobilisation, and combined metrics.
- 82 data items, with Top 8 data groups comprising greenhouse gas (GHG) emissions and forward-looking targets, green/sustainable lending/financing, non-renewable and renewable energy, exposure to physical risks, asset value-at-risk (VaR) arising from natural catastrophes, Environmental, Social and Governance (ESG) score/rating, water consumption and waste management, and biodiversity and forestry indicators.

The DC will serve as a source of reference on climate and environmental data for the financial sector. It includes data that are readily available, partially available and unavailable as well as observations on data gaps. Our research and engagement with data providers revealed that 49% of data items are available. Of the 49% of data items, only 18% are currently readily available. The remaining available data items suffer from gaps such as lack of granularity or accessibility. The latter either requires manual effort for data extraction or the data is proprietary in nature, hence requiring subscription. The remaining data items are not published due to confidentiality restrictions (11%) or not available (40%).

In the course of compiling the DC, the Sub-Committee has sought technical assistance from the World Bank to improve the comprehensiveness, relevance and organisation of its content.

² NGFS, "Final report on bridging data gaps", July 2022.

https://www.ngfs.net/sites/default/files/medias/documents/final_report_on_bridging_data_gaps.pdf

³ NGFS, "The NGFS Directory". [The NGFS Directory \(masdkp.io\)](https://www.mas.gov.my/masdkp.io)

The DC is currently owned and maintained by the JC3 in its role to address the data needs of the financial sector. JC3 will establish the appropriate framework and mechanisms to maintain and update the DC to reflect the latest data needs or disclosure requirements in line with global and domestic developments and standards. While the first publication of the DC is in Microsoft Excel and PDF formats, JC3 will explore ways to improve the DC to improve user experience for data search and navigation. Although the DC currently focuses on the needs of the financial sector, it is envisioned that it can pave the way for the setting up of a national-level climate DC. This may be driven by the relevant government agencies, given their authority and specialised competency to compile and publish climate-related datasets serving the needs of all sectors.

Readily available and reliable climate-related data is important for the financial sector to manage climate and environmental-related risks and provide green finance solutions. In compiling the DC, it is observed that the key data providers comprise mainly the public sector (e.g. government ministries and agencies), followed by private sector (e.g. financial institutions, corporations, Small and Medium Enterprises (SMEs) and private data providers). Due to these public-private interlinkages, there is a need for greater coordinated efforts between both sectors to address the identified data gaps and create a more open and extensive climate data ecosystem. Such public-private cooperation could take the form of joint data collection or facilitation of data access and sharing across the public and private sectors.

The identification of sources for critical climate data through the DC exercise has led to the discovery of several critical data gaps. Factors contributing to these gaps in public sector data include methodological differences, legal impediments and decentralised data compilation and publication. For the private sector, the main challenges are lack of capacity and motivation to collect and disclose climate data, particularly among the SMEs.

Addressing these challenges will be important to collectively bridge identified data gaps. One recommendation is to implement common definitions and methodologies for key climate data, which will improve data consistency and comparability at the national level. Following this, alignment of new disclosure requirements to established frameworks and standards will also facilitate comparability at the national and international level.

Disclosures can also be expedited to bridge data gaps through shifts to open data and the review of current data confidentiality restrictions. Enhancing capacity building to improve awareness, understanding and use of climate data disclosures are also needed. The barrier to disclosure can be further lowered by establishing an industry-led platform that facilitates efficient climate data disclosure by companies, particularly the SMEs.

Technology, existing data sources, and methodologies can be better leveraged to enhance the availability and quality of climate data. This could be achieved by utilising global and open-source platforms, along with making better use of new technologies and Application Programming Interfaces (APIs). Stakeholders in the climate data ecosystem may also consider using cutting-edge technologies, including machine learning and artificial intelligence, satellite imagery as well as statistical gap-filling approaches to bridge climate data gaps.

These findings underscore the importance of ongoing collaborations between the public and private sector actors in the climate data ecosystem to prioritise, plan for and ultimately close key data gaps, as part of a whole-of-nation strategy to support Malaysia's orderly transition to a low carbon economy.

1. Introduction

1.1 Climate and environmental data landscape

Climate change and environmental degradation are expected to have significant impact on the economic and financial landscape.⁴ The risks present themselves in the form of:

- **Physical risks** from extreme climate events;
- **Transition risks** due to changes in climate policies, shifts in consumer and investor preferences, regulatory pressures as well as technological advancements; and
- **Liability risks** such as legal action and liability cost for failures to address climate-related and environmental risks.

Nonetheless, the transition to a low carbon economy also creates opportunities for efficiency, innovation, and growth.

Over the past few years, Malaysia's financial sector has stepped up its response to address the urgent and existential threat posed by climate and environment-related risks, while aligning their strategies to support the Nationally Determined Contributions (NDCs) and SDG commitments. Formulating strategies and action plans on climate adaptation and mitigation require high-quality, reliable and comparable climate-related data. This is supported by good information architecture consisting of three building blocks: development of well-defined metrics and standards; a harmonised and consistent set of climate disclosure standards; and a broadly agreed upon taxonomy.⁵ However, based on survey findings from the JC3 Report on the Sustainable Finance Landscape in Malaysia,⁶ 96% of Malaysia's financial sector have cited poor data quality or availability as one of the key challenges in driving their sustainability agendas.

At present, there are wide-ranging climate and environmental data available from the public sector, including environment statistics and SDG indicators by Department of Statistics Malaysia (DOSM) and Malaysian Administrative Modernisation and Management Planning Unit (MAMPU)'s Open Data Platform. The National Data Sharing Policy (NDSP) that will be introduced by the Government will foster a more conducive data sharing ecosystem.

At the financial sector level, the implementation of the Climate Change and Principle-based Taxonomy (CCPT), Task Force on Climate-related Financial Disclosures (TCFD) Application Guide for Malaysian Financial Institutions and Principles-Based Sustainable and Responsible Investment Taxonomy for the Malaysian Capital Market (SRI Taxonomy) by Bank Negara Malaysia (BNM) and Securities Commission (SC) are pivotal to better promote availability, quality, and comparability of climate data.

⁴ Bank Negara Malaysia, "Financial Sector Blueprint 2022-2026", January 2022 on Strategic Thrust 4, page 90.

⁵ NGFS, "Final report on bridging data gaps", July 2022. https://www.ngfs.net/sites/default/files/medias/documents/final_report_on_bridging_data_gaps.pdf

⁶ Joint Committee on Climate Change (JC3), "Report on the Sustainable Finance Landscape in Malaysia", April 2022 on 'Challenges in sustainable finance', page 10.

Regulators are also driving the effort to improve climate data availability. For example, BNM pledged its commitment to improve availability, access, and use of data for tackling climate change and environmental degradation⁷ in its Financial Sector Blueprint 2022-2026. This could be achieved by the application of advanced digital tools and collaboration with government agencies, academic institutes, technology firms and other relevant players to identify critical data needs and facilitate open access to relevant data sources. Similarly, SC's Capital Market Masterplan 3 (CMP3) and Sustainable and Responsible Investment Roadmap for the Malaysian Capital Market (SRI Roadmap) include strategies to promote greater alignment towards TCFD recommendations for climate disclosures by corporations and capital market intermediaries in Malaysia,⁸ as well as development of platforms to provide SRI data⁹ to investors in the years to come. These initiatives encourage disclosures of more granular, reliable and comparable data which are vital for sustainable investment opportunities moving forward.

In addition to the conventional approach to make data more available, the financial sector can also leverage big data or data analytics approaches and technologies (e.g. open API) to better optimise the use of data for their climate transition needs.

1.2 Data Catalogue: A stocktake on the availability of data required by the financial sector

The DC is aimed to be a source of reference for climate and environmental data relevant to use cases in the financial sector. It includes data that are readily available, partially available, and unavailable as well as observations on data gaps. These observations will promote broader awareness on the missing pieces and serve as a call to action for data providers to improve the availability and accessibility of data. The DC is compiled by the Sub-Committee on Bridging Data Gaps established under JC3, based on data needs of the financial sector and data sources at the time of publication.

Given that the compilation is based on the collective contribution by the members of the JC3 and its sub-committees and compiled on a best effort basis, the information is neither exhaustive, nor do they reflect latest, new data sources that may emerge in between updates to the DC. Users would then need to make their own assessments of the information that best meet their needs.

⁷ Bank Negara Malaysia, "Financial Sector Blueprint 2022-2026", January 2022 on 'Improving accessibility to public data', page 73.

⁸ Securities Commissions, "Capital Market Masterplan 2021", September 2021 on Section 3.3.1.B, page 72.

⁹ Securities Commissions, "SRI Roadmap 2019", November 2019 on '5i-Strategy', page 13.

2. A Stocktake of Malaysian Financial Sector's Climate and Environmental Data Needs

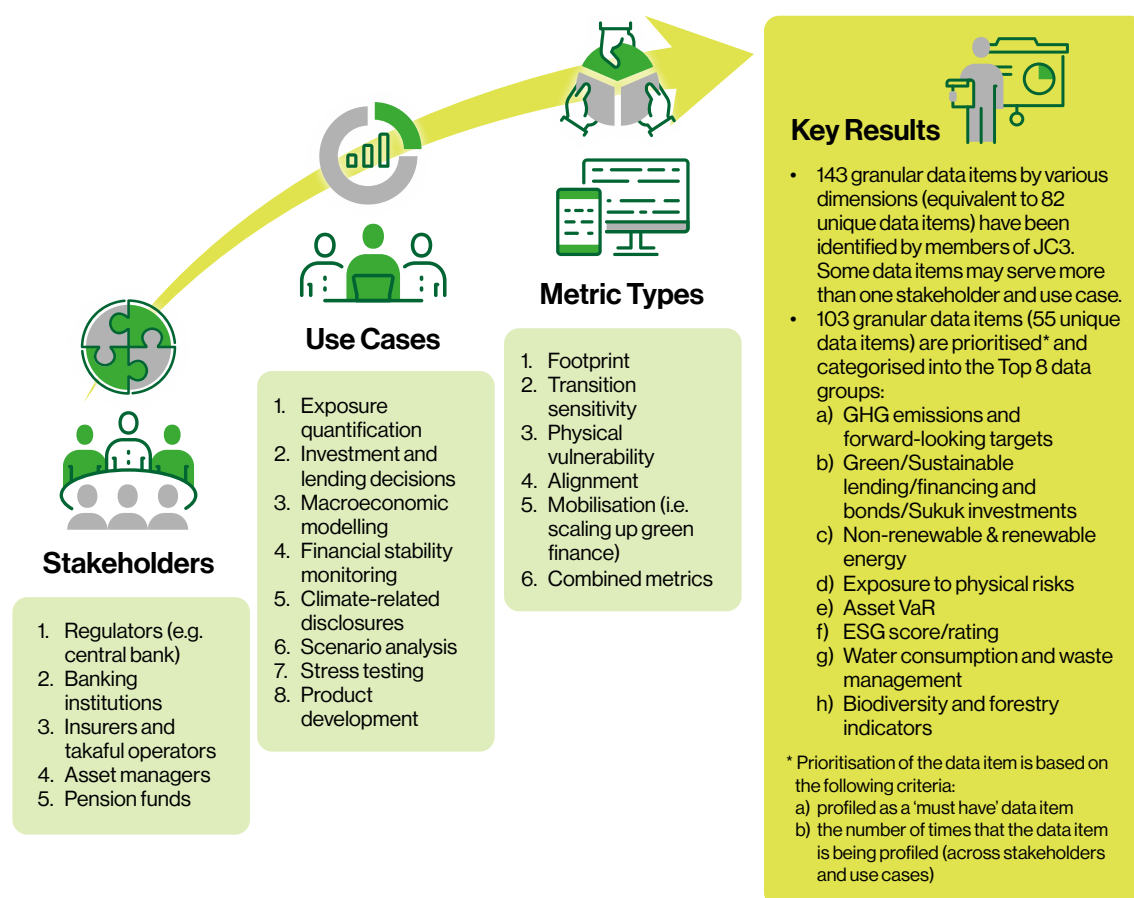
2.1 Methodology

The Sub-Committee has adopted NGFS' user-centric data need identification approach,¹⁰ whereby stakeholders will identify the applicable use cases, followed by metric types and eventually data items (Diagram 1). The mapping exercise is captured in a standardised template or DC.

The DC contains data items, characteristics, information on availability and sources as well as observations on data gaps.

This exercise also involves prioritisation of the data needs, based on the criticality of the data item (i.e. assessed as a "must-have") and number of times that the data item is profiled. This will help focus greater efforts toward bridging data gaps for the top priority data items.

Diagram 1: Identification Process of Climate-related Data



¹⁰ NGFS, "Progress report on bridging data gaps", May 2021 on 'A repository of data needs', page 5.

2.2 Use cases and stocktaking exercise on data needs

Establishment of the Use Cases

The Sub-Committee has identified eight use cases, as listed in Diagram 2. This is derived from the use cases established by NGFS¹¹ as well as engagements with five main stakeholder groups within the financial sector i.e. regulators such as BNM, SC and Bursa Malaysia; banking institutions, insurers and takaful operators, asset managers, and pension and provident funds. When compared to the NGFS' use cases, product development is an additional use case, considering the pivotal role of financial institutions in financing transitions through the expansion and upscaling of green financial solutions.

Diagram 2: Identified Use Cases Applicable for the Climate Data Catalogue

Use Case	Description
1. Climate-related disclosures	Climate-related disclosures refer to reports provided by corporations in addressing climate-related factors. Such disclosures provide the raw data for analysis, modelling, and monitoring by the stakeholders. Globally, climate-related reporting frameworks such as TCFD were established to facilitate more consistent and comparable climate-related disclosure amongst corporations. In Malaysia, Bursa Malaysia enhanced its Sustainability Reporting Framework in September 2022 with the aim of elevating the sustainability practices and disclosures by listed issuers. Amongst others, Main Market listed issuers will be required to provide TCFD-aligned disclosures by 2025 while ACE Market listed corporations will be required to provide a basic plan to transition towards a low carbon economy by 2026.
2. Exposure quantification	Exposure quantification refers to the measurement on potential loss on financial instruments. For example, financial institutions evaluate the probability of physical risk such as flood events and forecast future losses on their existing financial portfolio. While for transition risk, they assess the impact of portfolio adjustment towards a low-carbon economy, e.g. by reducing exposure in high emitting sectors like coal.
3. Financial stability monitoring	Financial stability monitoring refers to the assessment of financial systems vulnerabilities, defined as the collection of factors that contribute to the potential for widespread externalities. It is essential to recognise the systemic risks and multiple transmission channels (direct and indirect) of climate change-related risks and its impact to the economy and financial system. BNM and SC as regulators of Malaysia's financial sector, assess the potential impact of climate-related risks to financial system and capital market.
4. Investment and lending decisions	The decision made by both demand-side (investing) and supply-side (lending) on the amount of funds to be deployed for investment opportunities or to provide a loan. Factors such as footprint (carbon emissions), physical and transition vulnerabilities (exposure of investments to natural catastrophes and transition risk), mobilisation (prioritising financing needs to transition to low carbon activities) and alignment (measure the portfolios that would contribute towards internal/national target and goals) are embedded in the decision-making process.
5. Macro-economic modelling	Macroeconomic modelling is used to analyse the impacts of climate-related issues on macroeconomic indicators like Gross Domestic Product (GDP), employment, and inflation. In the case of Malaysia, the study is on macroeconomic and sectoral impact associated with transition risk (decarbonisation) and physical risk/vulnerability (extreme/volatile weather conditions).
6. Product development	The development of new financial products or solutions to support green growth or industry's alignment to the climate agenda, exploration of intermediation structures that embed consideration for climate risks, and increase in supply of financing and protection solutions that support climate risks mitigation and adaptation.
7. Scenario analysis	The assessment on the impact of different possible climate change pathways/scenarios to risk profile. The NGFS has designed 6 scenarios (Net Zero 2050, Below 2 °C, Divergent Net Zero, Delayed Transition, Nationally Determined Contributions (NDCs) and Current Policies) to assess physical and transition risks. ¹² In Dec 2022, BNM has issued the Policy Document on Climate Risk Management and Scenario Analysis (CRMSA) that sets out principles and requirements on climate risk management and scenario analysis for financial institutions to enhance the financial sector's resilience against climate-related risks and to facilitate a just and orderly transition to a low-carbon economy.
8. Stress testing	The risk framework method that focus on the impact climate change (the likelihood and sensitivity of the materialisation of climate-related risks) has on exposures' actual risk. In June 2022, BNM has issued a discussion paper on the proposed framework and elements of the industry-wide Climate Risk Stress Testing (CRST) exercise to be implemented in 2024.

¹¹ NGFS, "Progress report on bridging data gaps", May 2021 on 'Taking stock of stakeholders' needs', Section 2.1.

¹² NGFS, "NGFS Scenarios Portal". (<https://www.ngfs.net/ngfs-scenarios-portal/>)

Deriving metric types and data items

Drawing on the approach adopted by NGFS,¹³ six metric types consisting of footprint, transition sensitivity, physical vulnerability, alignment, mobilisation, and combined metrics are established (Diagram 3). Subsequently, the data items were identified and tagged to specific metric type.¹⁴

Diagram 3: Metric Types Established

Metric	Description
Footprint	GHG emissions caused directly or enabled by an individual, event, organisation, service or product.
Transition sensitivity	The disruption caused by adjusting to a low-carbon economy, which may be the result of policy changes, technological innovation, or social adaptation.
Physical vulnerability	The direct damage to assets or property that may come about owing to a changing climate (for example rise in sea levels) or extreme weather events.
Alignment	Tracks progress towards a 2°C world.
Mobilisation	Capture growth in green financing (i.e. scaling up green finance).
Combined metrics	Metrics aggregating a combination of the above metrics to provide insight on the extent to which a firm manages environmental, social and governance issues

Source: The NGFS Directory¹⁵

2.3 Prioritisation of data needs

In prioritising efforts to bridge data gaps, the Sub-Committee identified the top priority data items by assessing those profiled as ‘must-have’ by the stakeholders or those that are applicable to the most number of stakeholders or use cases.

Diagram 4: Top 8 Data Groups

Data group	Examples of data item	Applicable use cases
1. GHG emissions and forward-looking targets	- GHG emissions (Scope 1, 2 and 3) - GHG inventory - GHG emission targets - GHG emission intensity - Economic sectors' contribution to GDP and GHG emissions - Vehicle GHG emissions	- Climate-related disclosure - Exposure quantification - Financial stability monitoring - Investment and lending decision - Scenario analysis - Stress testing
2. Green/Sustainable lending/financing and bonds/Sukuk investments	- Green/Sustainable loan/financing, refinancing, outstanding, applied, approved, disbursed, repaid - Green/Sustainable bond/sukuk issuance - Green/Sustainable stock/bonds market indices - Green public investment, fiscal expenditures (including Public Private Partnerships) by portfolio - Percentage of investment in share capital with a green company (holding of ordinary or preference shares)	- Climate-related disclosure - Exposure quantification - Financial stability monitoring - Investment and lending decision - Product development - Scenario analysis - Stress testing

¹³ NGFS, “Progress report on bridging data gaps”, May 2021 on ‘Identifying common metrics’, Section 2.2.

¹⁴ Further explanation on the data needs identification approach can be found in Progress Report on Bridging Data Gaps issued by NGFS in May 2021.

¹⁵ NGFS, “The NGFS Directory”. [The NGFS Directory \(masdgp.io\)](https://www.masdgp.io)

Data group	Examples of data item	Applicable use cases
3. Non-renewable and renewable energy	- Electricity purchased/consumed - Fuel used - Renewable energy purchased/ produced - Final energy consumption - Oil energy consumption - Coal energy consumption - Energy prices	- Climate-related disclosure - Exposure quantification - Investment and lending decision - Macro-economic modelling
4. Exposure to physical risks	- Extreme weather and climate change data such as flood, temperature, sea level rise, rainfall, drought, storm, coastal vulnerability index, natural hazard data/statistics (occurrence/map), heatwave, humidity - Exposure-related data such as real estate exposure to potential extreme weather conditions, exposure to physical risks measured as a percentage of business value (e.g. assets, profit or revenue), flood emergency reliefs	- Exposure quantification - Financial stability monitoring - Investment and lending decision - Macro-economic modelling - Product development - Scenario analysis - Stress testing
5. Asset VaR	Asset VaR arising from natural catastrophes	- Financial stability monitoring - Product development
6. ESG score/rating	- Global Compact (GC) Score on human rights, labour right, environment, anti-corruption - ESG Score on environmental, social, and governance - Temperature score on emissions intensity ratio (EIR)	- Climate-related disclosure - Exposure quantification - Investment and lending decision
7. Water consumption and waste management	- Waste management indicators such as solid waste disposed or recycled. - Water management indicators such as water allocation and management, water consumption, treated wastewater such as proportion of wastewater that is treated to reduce pollutants before being discharged to the environment, by level of treatment	- Climate-related disclosure - Exposure quantification - Financial stability monitoring - Investment and lending decision
8. Biodiversity and forestry indicators	- Biodiversity indicators such as map of biodiversity risk hotspots and Environmentally Sensitive Areas (ESAs). - Forestry indicators such as map of ESAs, forest change (forest loss, tree cover loss, location of tree cover loss), Food and Agriculture Organisation of the United Nations (FAO) deforestation. - Other relevant indicators such as estimation of environmental costs and benefits (esp. ESAs/ high priority biodiversity hotspots).	- Exposure quantification - Financial stability monitoring

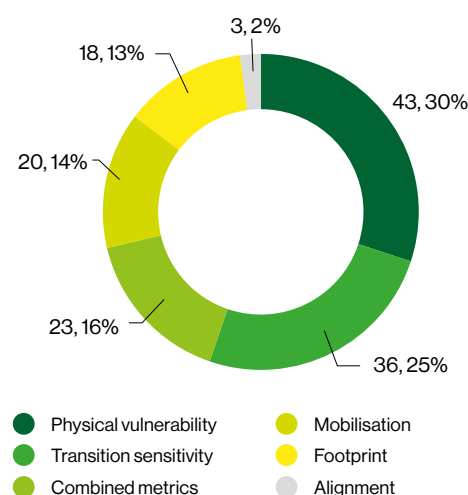
3. The Data Catalogue – Key Findings and Future Plan

3.1 Data Catalogue results

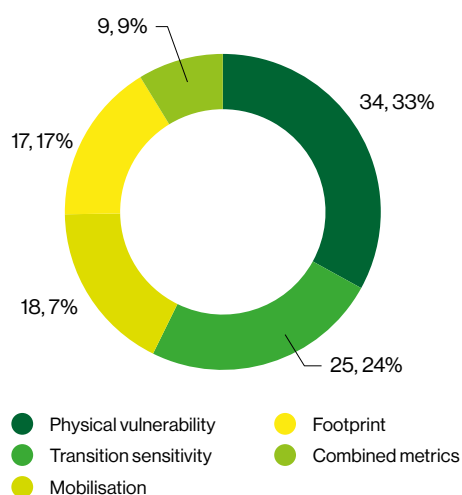
There are 82 data items in the DC, which can be further split into dimensions such as by sector, country, and entity, resulting in 143 granular data items. The prioritisation exercise has classified 55 data items or 103 granular data items as the Top 8 data groups. In terms of metric type, most granular data items can be classified under physical vulnerability (30%) followed by transition sensitivity (25%), as shown in Diagram 5.

Diagram 5: Data Items by Metric Type

All data items by metric type



Top 8 data groups by metric type



Use cases

The top use cases are financial stability monitoring (58% of data items), followed by investment and lending decisions (53% of data items).

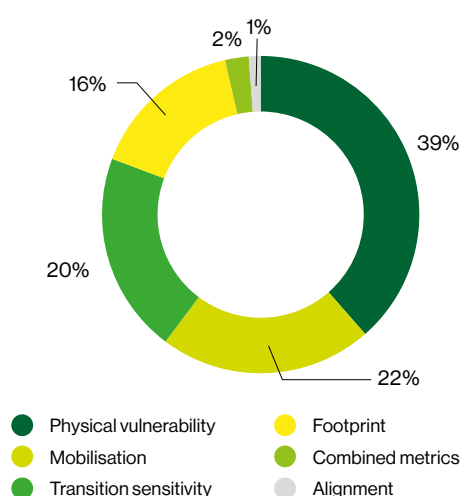
For financial stability monitoring, most data items relate to physical vulnerability (39%) such as data on flood and asset VaR arising from natural catastrophes, followed by mobilisation (22%), as shown in Diagram 6.

For investment and lending decisions, most data items are under the category of transition sensitivity (29%) such as final energy consumption and the Green Building Index, and combined metrics (29%) such as climate-adjusted Probability of Defaults (PDs) and Green Equities Index, as shown in Diagram 6.

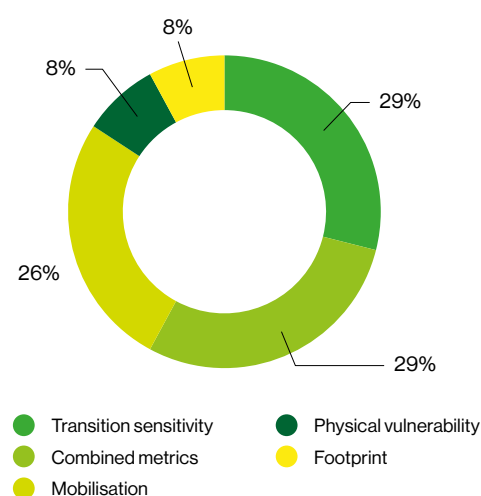
Data items such as green/sustainable financing and GHG emissions are among those that are applicable to almost all of the use cases.

Diagram 6: Share of Metric Types for Top 2 Use Cases – Financial Stability Monitoring and Investment Lending Decisions

Share of metric type in financial stability monitoring



Share of metric type in investment and lending decisions



Data Availability

Based on the data availability exercise via desktop research and engagements with data providers, all data items can be grouped into the “readily available”, “proprietary (sensitive data)”, to “not available” categories (Diagram 7).

Of the 49% of data items in the DC that are available:

- 18% are readily available (e.g. Green Building Index and litigation claims/cases);
- 18% suffer lack of granularity such as limited location data for green/sustainable bond/sukuk issuance, ESAs and forest change (e.g. deforestation/forest loss, tree cover loss, etc.), and energy data by sector that is not classified as per the Malaysia Standard Industrial Classification (MSIC) 2008;
- 11% are proprietary in nature that requires subscription to access (e.g. ESG and United Nations Global Compact (UNGC) scores);
- 1% has a limited time horizon since the information is published on a one-off basis (e.g. past flood events); and
- 1% lacks accessibility such as GHG emission targets that often reside in the sustainability report of companies. These data requires additional effort to extract and consolidate the data.

Meanwhile, 11% of the data items are available but not disclosed due to confidentiality restrictions (e.g. entity-level data of electricity consumption and insured and uninsured losses related to natural catastrophes).

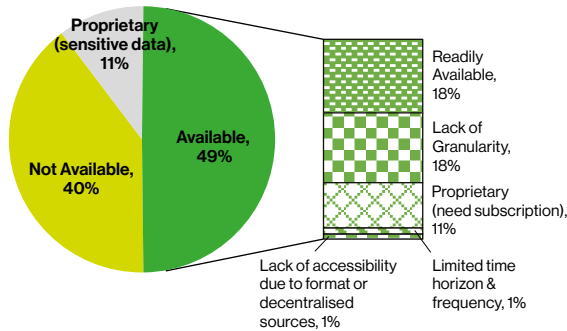
The remaining 40% are not compiled or reported by any party, such as circular economy indicators to measure resource efficiency by minimising resource consumption and waste generation.

Our findings are quite consistent with the NGFS final report,¹⁶ which showed that less than a quarter of data items are readily available in the form of official statistics or verified data, while more than 29% of all data items in their directory are currently unavailable, unknown or under construction.

¹⁶ NGFS, “Final report on bridging data gaps”, July 2022 on ‘Data accessibility and quality’, page 30.

Diagram 7: Data Availability

Data availability for all data items



Data availability for top 8 data groups

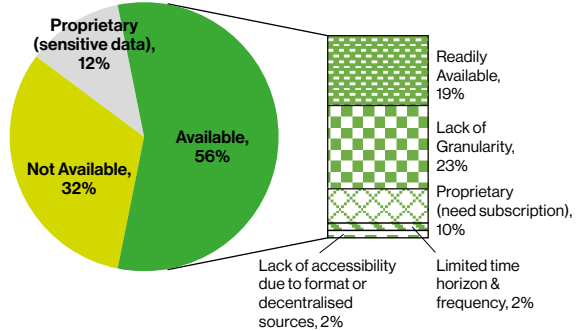
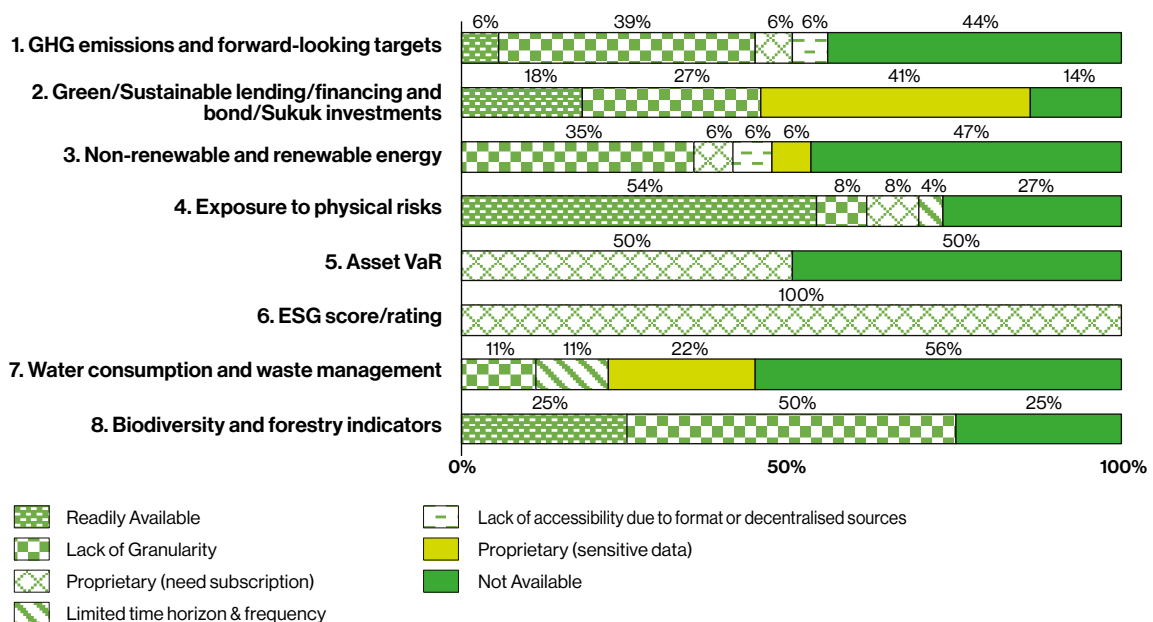


Diagram 8 shows that readily available data is highest (54%) in the “exposure to physical risk” data group, mostly comprising historical and current data on temperature, rainfall, flood and drought. Meanwhile, most forward-looking data by region/country (e.g. heatwave and Coastal Vulnerability Index) are not available.

On the other hand, the “water consumption and waste management” data group is the least available. These limitations pose some challenges to the financial sector as it requires granular data by sector and entity-level – which are currently not available – to conduct assessment for investment or lending purposes.

Of significance, there is minimal coverage of non-listed companies such as SMEs and emission intensity performance of buildings in Malaysia under the “GHG emissions” data group. Meanwhile, data on energy consumption by entity is not available in the “non-renewable and renewable energy” data group.

Diagram 8: Percentage of Data Availability for Top 8 Data Groups



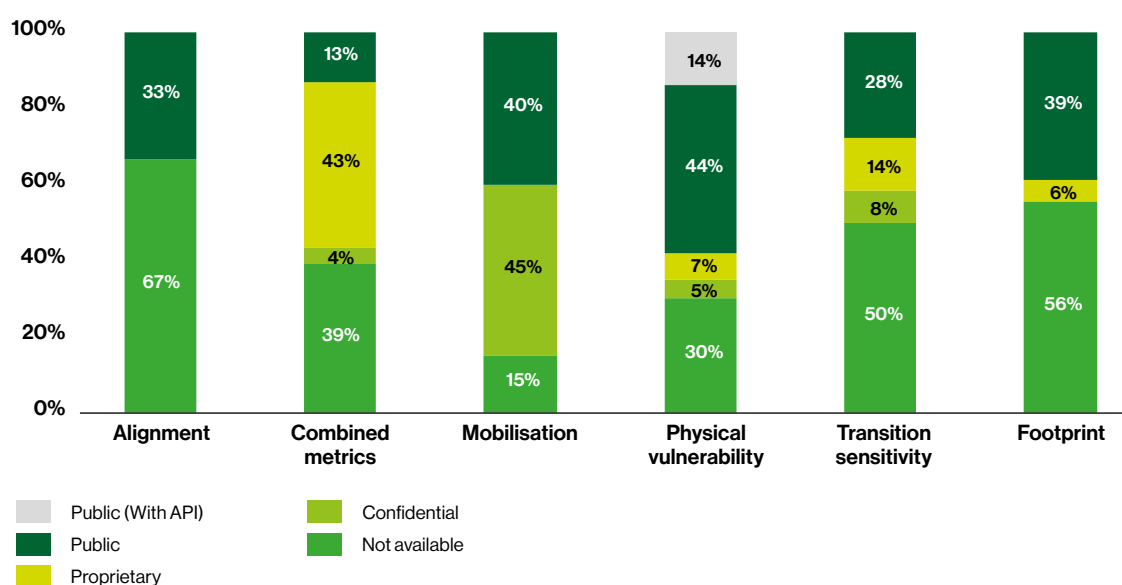
Data accessibility

The accessibility of data items varies across metric types (Diagram 9). Some are publicly available, while others are proprietary in nature that requires subscription, or are not accessible due to confidentiality reasons or non-availability. Broadly, about 30-40% of the data items are publicly available (mostly without APIs) across most metric types. They are mostly sourced from ministries/government agencies or company publications (e.g. annual reports). Data items with public API accessibility are only confined to the “physical vulnerability” metric. This is mostly provided by the World Bank.

When comparing data availability across the metrics, the “alignment” metric suffers from the highest data unavailability (67% of total data items in the metric). For example, detailed plans submitted to authorities to achieve carbon neutral or net zero and circular economy indicators are unavailable. This is then followed by the “transition sensitivity” metric (50%), such as data on internal carbon price and waste recycled.

It is observed that these findings are consistent with those by the Asia Securities Industry and Financial Markets Association (ASIFMA)¹⁷ and NGFS’ final report on bridging data gaps.¹⁸ One of the common observations in ASIFMA’s and NGFS’ reports is the lack of publicly available granular data. ASIFMA noted that “public and government data sources obtained through regulatory disclosure requirements are often incomplete and disorganised”.

Diagram 9: Data Accessibility by Metric Type



¹⁷ ASIFMA, “Data Challenges on Opportunities for ESG and Sustainable Finance in Asia Pacific”, December 2020. <https://www.asifma.org/wp-content/uploads/2020/12/asifma-fosda-esg-and-sf-data-challenges-and-opportunities-in-asia-f20201221c.pdf>

¹⁸ NGFS, “Final report on bridging data gaps”, July 2022. https://www.ngfs.net/sites/default/files/medias/documents/final_report_on_bridging_data_gaps.pdf

3.2 Data Catalogue findings on data needs, availability, and gaps

The Sub-Committee has obtained technical assistance from the World Bank to critically examine the comprehensiveness of the data items, its mapping to the use cases and metrics, and availability of data sources provided in the DC. In addition to that, the Sub-Committee also sought the World Bank's recommendations to improve the content and structure of the DC.

The World Bank found that the DC is comprehensive with 82 indicators (data items) covering multiple levels of aggregation, use cases and data attributes. Moreover, the DC demarcates the existing data gaps and highlights the limitations and possible alternatives in addressing the data gaps. The DC is also found to be readily accessible to a wide audience with low barriers of entry.

In the course of validation, the World Bank has provided valuable suggestions to refine the DC structure to improve user experience particularly in filtering and clustering data according to users' needs. The Sub-Committee has taken up some of the suggestions (e.g. harmonise categories and dimensions, clearly distinguish data items, segregate information based on data accessibility such as public sources accessible via API and include additional indicators).

Other suggestions pertaining to the structure will be considered in the future iteration of the DC. This includes the implementation of an alternative structure of the DC known as the relational spreadsheet structure (RSS) or relational database management system (RDBMS). This promises a superior balance on accessibility, maintainability, and consistency in labelling. Nonetheless, this will mostly cater to the more technical audience who are well-versed in database operations.

3.3 Data Catalogue maintenance and future plan

Maintenance of Data Catalogue

The DC is currently owned and maintained by JC3 to ensure it is relevant and useful in serving the financial sector's needs. The DC will be published in two formats, namely in PDF and Microsoft Excel. The PDF version, as attached in this report, will provide an overview on the data items and observations to guide the general users. Meanwhile, the Microsoft Excel version is more useful for filtration and search purposes.

The DC will be updated on an annual basis, such that it reflects current data needs and disclosure requirements in line with global and domestic developments and standards.

Users and the general public are welcome to provide feedback on the existing content or suggest additional data items. The feedback on additional data items will be assessed based on the criteria¹⁹ for inclusion by a Review Committee, comprising members with relevant qualification and experience. The recommendation on data updates and inclusion will be tabled to the Sub-Committee for approval, and subsequently reflected in the DC published on the BNM's Climate Change Microsite and SC's SRI Microsite.

¹⁹ The criteria for inclusion of data items in the DC are that the data items should be:

- i. Related to climate and environmental data; and
- ii. Required in use cases which are applicable to financial sector stakeholders

Diagram 10: Data Catalogue Maintenance – Process Flow



Future Plans for the Data Catalogue

This first version of the DC compiles the data needs across a relatively narrow set of stakeholders, namely the members of the JC3 and its sub-committees. The primary focus in this first version is content development, with the aim of providing an overview on data availability for users. Naturally, the usage of the DC and volume of data items is likely to grow over time. In order to cope with the potential growth in usage and data items, JC3 will explore on ways to improve user experience in navigation, data search and filtration, e.g. through digitalising the DC on a web interface.

Importantly, the findings in the DC will serve as a basis to engage data providers to adopt common or interoperable data definitions and standards, and open data policy. It is hoped that over the longer term, this will improve the availability and comparability of climate data. It is also envisioned that this DC for financial sector will pave the way for the creation of climate data catalogue/databases at the national level by the relevant government agencies in the future. Government agencies will have greater authority and competencies to compile and publish climate-related datasets to meet the data needs of a much broader set of users and stakeholders.

4. Data Challenges and Recommendations

It is observed that the major providers of climate and environment-related data are mainly government ministries and agencies, followed by financial-related institutions, corporations and private data providers. The 2021 Irving Fisher Committee on Central Bank Statistics (IFC) Report no. 14 on sustainable finance data for central banks echoed similar observations, whereby sustainable finance data are usually sourced from government agencies, government linked corporations, National Statistical Offices (NSOs), supervised financial institutions, private rating agencies and commercial data providers.²⁰

Considering this public-private interlinkage, there is a need for greater coordinated efforts between both sectors to create a more conducive climate data ecosystem. More seamless public-private data sharing will help inform better decisions to tackle climate-related issues. Such public-private cooperation could take the form of more systematic data collection or facilitation of data access and sharing across the public and private sectors.

The next section will delve on the existing factors hindering data availability and recommendations to overcome some of these challenges.

4.1 Data challenges²¹

An immediate priority lies in identifying and understanding the main constraints in obtaining and providing climate data. The financial sector still grapples with the lack of data disclosure and sharing by companies and public sector agencies, inefficiencies in aggregating across multitude of data sources, lack of a standardised global reporting framework and poor data quality.²²

i. Differences in methodology

At present, the main motivation for GHG emissions data publications by public sector is to track the country's progress in fulfilling international commitment as Malaysia is a Party to the UNFCCC.²³ Such data publication tends to be highly aggregated in nature. In contrast, the financial sector often requires data that is more granular at the sector and entity level.

Examples of the differences in methodology for GHG emissions data compilation:

- Compilation of GHG National Inventory is based on the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories for the purpose of fulfilling the NDCs and commitments under UNFCCC. In contrast, the financial sector requires GHG emission inventory data based on the GHG Protocol Corporate Accounting and Reporting Standard²⁴ (i.e. Scope 1, Scope 2 and Scope 3).

²⁰ Schmieder et al., "IFC Report No.14: Sustainable finance data for central banks", December 2021.

²¹ The challenges outlined in this report and gaps observed in the Data Catalogue are solely from the perspective of the financial sector, due to the mismatch between i) data needed for financial sector use cases and ii) the available data at the time of publication.

²² A-Team Group, "A-Team ESG Handbook 2021", 2021. https://www.solidatus.com/app/uploads/2021/08/A-Team_Group_ESG-Handbook-2021-July-2021.pdf?hsCtaTracking=9f70f103-6af2-42a3-a52c-b226c716fe60%7Ce46f8ec2-5721-4876-b81f-f1508ecf1366

²³ Malaysia is Non-Annex I Party to the UNFCCC [Malaysia | UNFCCC](#)

²⁴ PCAF, "The Global GHG Accounting and Reporting Standard for the Financial Industry", November 2020.

- National sectoral data for GHG inventory data is guided by the 2006 IPCC Guidelines (i.e. Energy, Industrial Processes and Product Use, Agriculture, Waste and Land Use, Land Use Change and Forestry sectors). They are not comparable against the Malaysian Standard Industrial Classification (MSIC) which is widely used by the financial sector.

Establishing a more comparable methodology and definition will allow the financial sector to fill the missing entity or sector level data using public sector data.

ii. Legal impediments and restrictions

Some climate-related data owned by public and private sector agencies are subjected to sharing restrictions. Some examples:

- Forward-looking national flood risk map is not readily available, due to sensitivity issues and potential legal implication. While historical and current national flood hazard maps are available, they are not downloadable in geographic information system (GIS) file format to facilitate spatial analysis. This information is important for the financial sector to conduct climate risk assessment and to deliver sustainable finance solutions in partnership with public agencies, especially given increasing incidences of flood events.
- Energy consumption data at entity level that are required by the financial sector for investment and lending evaluations (particularly to finance energy-efficient organisations) are often deemed as confidential. Although the data is compiled by the energy provider, disclosures are subjected to the utility providers' policies. Under Tenaga Nasional Berhad (TNB)'s Personal Data Protection Policy,²⁵ personal data may be shared with third parties for payment of electricity bill purposes only and not for other purposes including for climate-related assessments.

Moreover, for entity level data, the current PDPA does not explicitly cover data portability rights for individuals to transfer their data in a structured machine-readable format across providers. This is in contrast to the European Union's General Data Protection Regulation (GDPR)²⁶ which accords the rights to data subject to get access to his or her data in a structured, machine-readable format which can be transferred from one data controller to another data controller.

iii. Decentralised data compilation and publication

Climate-related data are currently compiled by various federal ministries and public sector agencies. At the same time, compilation of certain data relating to land use and forestry falls within the purview of state governments. Each data owner has established its own practices and governance in terms of data compilation, methodologies and publication. This contributed to lack of uniformity in publication practices, thus creating considerable frictions for data users to access quality climate data, in a timely manner.

²⁵ [BUKU TATAMALAN 2.0 EN.pdf \(tnb.com.my\)](#) , [TNB_PDP_Policy_ENG_\(rev\).pdf](#)

²⁶ [REGULATION \(EU\) 2016/ 679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 27 April 2016 - on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/ 46/ EC \(General Data Protection Regulation\) \(europa.eu\)](#)

Furthermore, government agencies' platforms adopt different data format and granularity, that add a layer of complexity for data users to find and download the required climate data for analysis. For instance:

- GHG emissions data by year, published in the Malaysia's Third Biennial Update Report to the UNFCCC are available in PDF format. As an alternative, MAMPU Open Data Portal or Compendium of Environment Statistics at DOSM's eStatistik portal²⁷ offer similar yearly GHG emissions data in csv or excel format.
- Number of flood events by state in Malaysia is not readily available in the Department of Irrigation and Drainage's (DID) 'InfoBanjir' website. However, DOSM's eStatistik portal has flood data at high level from year 2016 to 2020 and MAMPU portal has granular information on flood e.g. name of rivers and date of flood from year 2001 to 2010.
- Portals such as Malaysia Informative Data Centre (MysIDC), openDOSM and Statistics Data Warehouse (StatsDW) provide data on emissions and floods, in addition to the Ministry of Natural Resources, Environment and Climate Change (NRECC, formerly known as KASA) and DID. However, financial users may not be aware of the differences between these platforms and the most efficient way to extract the required information from these portals.

The financial sector also requires more granular GHG emissions data by types of vehicles, to assess their estimated Scope 3 emissions data for disclosure purpose and lending decision. Given the absence of any national database on GHG emissions by types of vehicles, users may refer to the high-level gas emissions by motor vehicles data published by the Department of Environment (DOE) in the annual Environmental Quality Report²⁸ as proxy data.

iv. Various climate disclosure requirements/frameworks

There are many reporting frameworks and standards identified in the United Nations (UN) Sustainable Stock Exchange initiative's ESG Guidance Database such as TCFD, Global Reporting Initiative (GRI), Climate Disclosure Standards Board (CDSB), and Sustainability Accounting Standards Board (SASB). A study by PwC Malaysia on ESG in financial reporting showed that the GRI is the most adopted standard, while TCFD is becoming more popular among Bursa-listed companies.²⁹ The different reporting frameworks could give rise to comparability issue for investors.

In response to this, Bursa Malaysia through its enhanced Sustainability Reporting Framework issued in September 2022, requires disclosures of a common set of prescribed sustainability matters and indicators that are deemed material for all listed issuers. This includes Scope 1, Scope 2 and limited Scope 3 GHG emissions disclosures. In addition, Main Market listed issuers will be required to provide TCFD-aligned disclosures while ACE Market listed corporations are required to disclose their plans to transition towards a low carbon economy.³⁰

²⁷ Data published in DOSM's eStatistik and MAMPU Portal is being supplied by the respective ministries, agencies and departments owning the data, based on agreed terms between the data supplier and these portals.

²⁸ Department of Environment (DOE) Environmental Quality Report 2020 EQR-2020-1.pdf (doe.gov.my) which contains emission loads for 'motor vehicles' category.

²⁹ PwC Malaysia, "ESG Matters – Driving Change through Financial Reporting", December 2020. <https://www.pwc.com/my/en/assets/publications/2020/esg-matters-driving-change-through-financial-reporting.pdf>

³⁰ Bursa Malaysia, "Bursa Malaysia Enhances Sustainability Reporting Framework With New Climate Change Reporting", September 2022. [26Sept_2022_Bursa_Malaysia_Enhances_Sustainability_Reporting_Framework_With_New_Climate_Change_Reporting.pdf](https://www.bursamalaysia.com/26Sept_2022_Bursa_Malaysia_Enhances_Sustainability_Reporting_Framework_With_New_Climate_Change_Reporting.pdf) (bursamalaysia.com)

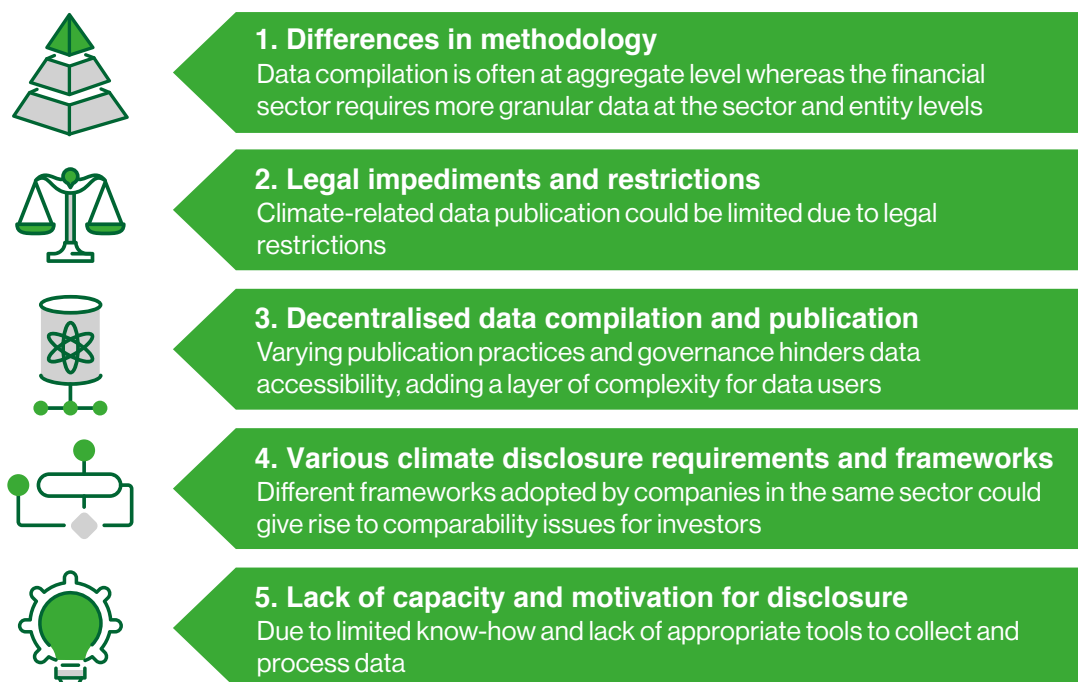
v. Lack of capacity and motivation for disclosure by companies

Collecting data for the purpose of climate-related disclosures requires extensive resources and effort. Companies have limited data at the primary source and tend to spend many hours in data collection, due to limited know-how and tools to facilitate data collection. The Financial Stability Board (FSB) also noted that data gaps are particularly acute in some emerging markets and developing economies, where there are less resources to collect and process data.³¹

There is also lack of incentives to collect and disclose data as it is not deemed as a business priority or value-add to their businesses. Some businesses are also concerned about disclosing proprietary information. In particular, the reporting of company-wide GHG emissions can be a complex undertaking, more so in reporting GHG Scope 3 due to its unclear boundaries and definitions.

While there are several platforms developed by private data providers such as ESG Book,³² ESGpedia registry,³³ Refinitiv and Bloomberg that record and aggregate ESG data of public listed companies across various sectors, data from SMEs are generally not captured. SMEs' contribution on the economy is significant, comprising 97.2% of business establishments and contributing 38.2% to GDP (2020).³⁴ Lack of data from SMEs hinders analysis to identify material risks and growth opportunities to support investment and lending decision by financial institutions.

Diagram 11: Data Challenges



³¹ FSB, "The Availability of Data with Which to Monitor and Assess Climate-related Risks to Financial Stability", July 2021. [PLEN202136 Climate data availability \(fsb.org\)](#)

³² ESG Book. [ESG Book - We power financial markets for a sustainable future.](#)

³³ STACS. [ESGpedia - the ESG Data Encyclopedia](#)

³⁴ OECD iLibrary, "Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard", 2022. <https://www.oecd-ilibrary.org/sites/3bc2915c-en/index.html?itemId=/content/component/3bc2915c-en>

4.2 Recommendations

To overcome some of the above constraints, JC3 is advocating a more coordinated strategy to encourage greater disclosures of climate and environmental data, with common data definition and standards, while leveraging on available technology and data.

A. Implement Common Definitions and Methodologies

i. Common/interoperable data definition and methodology at national level

It is important to establish consistent definitions and methodologies at the national level for climate data. This will not only improve the availability of quality, reliability and comparability of data, but will also facilitate common understanding among data users.

Greater reconciliation of national level and corporate level of GHG emissions should be explored. Common methodology to calculate emissions at the corporate level could be considered for adoption to improve the availability of entity-level GHG emissions data. Some considerations:

- Partnership for Carbon Accounting Financials (PCAF)³⁵ provides guidance to calculate emissions at the corporate level leveraging on physical activity data and emissions factor. It is based on verified calculation methodologies approved by a credible independent institution such as the IPCC.
- 2019 Refinement to the 2006 IPCC Guidelines provides guidance on how best to use facility-level data in national greenhouse gas inventories^{36 37} (i.e. information related to emissions from an individual plant, installation or factory).

For vehicle GHG emissions data, relevant public agencies may consider collaborating to establish a national database for public consumption. The database could be based on the pollutant emissions standards for new models of petrol-powered vehicles issued by the DOE.³⁸ There are several examples of databases in other jurisdictions available for reference:

- Database on fuel consumption and Carbon Dioxide (CO₂) emissions data³⁹ by the United Kingdom (UK) government. The emission information by vehicle make and model is easily accessible in csv table format; and
- Fuel economy information⁴⁰ by the United States (US) Environmental Protection Agency via their website. Users can select specific car types in the US to derive its GHG emissions.

One other potential area for consideration is the common adoption of MSIC standard by all relevant ministries, agencies and private sector for data collection and sharing purposes. Since MSIC is aligned to the International Standard

³⁵ Equations to calculate financed emissions [The Global GHG Accounting and Reporting Standard for the Financial Industry \(carbonaccountingfinancials.com\)](https://www.carbonaccountingfinancials.com/), page 52.

³⁶ Buendia et al., "2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories", 2019. [CHAPTER 1 \(ipcc.ch\)](https://www.ipcc.ch/)

³⁷ Use of Facility-Specific Data in National Greenhouse Gas Inventories [TFI_Technical_Bulletin_1.pdf \(iges.or.jp\)](https://www.iges.or.jp/public/2019gl/src/TFI_Technical_Bulletin_1.pdf)

³⁸ Environmental Quality (Control of Emissions from Petrol Engines) Regulations 1996 – P.U. (A) 543/96 [Environmental Quality \(Control of Emissions from Petrol Engines\) Regulations 1996 – P.U. \(A\) 543/96 – Department of Environment \(doe.gov.my\)](https://www.doe.gov.my/)

³⁹ Car fuel and CO₂ emissions data, [Car fuel and CO₂ emissions data - GOV.UK \(www.gov.uk\)](https://www.gov.uk/)

⁴⁰ The official U.S. government source for fuel economy information, [Find and Compare Cars \(fueleconomy.gov\)](https://www.fueleconomy.gov/)

Industrial Classification (ISIC), such adoption will lay a good foundation for enabling interoperability of climate data usage between public and private sectors at both the national and international level. This will be particularly useful when comparing climate data based on a national taxonomy against ASEAN Taxonomy or other taxonomies in the future, which is universally based on ISIC standards.

A data ecosystem with standardised definitions and methodologies will foster data comparability across companies and sectors. Such standardisation will support the implementation of BNM's CCPT and SC's SRI Taxonomy. Both of these taxonomies are developed to enable financial and capital market participants to assess economic activities and their associated impacts on climate and the broader environment. As a result, the financial sector can effectively monitor progress and accelerate the financing of transition to a low-carbon economy.

ii. Alignment of disclosure requirements to established standards/frameworks

Increasingly, there has been more consolidation or convergence of climate disclosure standards and frameworks. It is also observed that regulators or standard setting organisations are striving to align disclosure requirements with established standards/frameworks.

A case in point is Bursa Malaysia's⁴¹ enhancement of its Sustainability Reporting Framework with climate change-related disclosures. These enhancements are aligned with the TCFD Recommendations in addition to prescribing a common set of sustainability matters and indicators that are deemed material for all listed issuers among others. This is aimed at putting listed issuers on a good footing to progress and adopt international reporting frameworks and standards such as the GRI, SASB and the International Sustainability Standards Board (ISSB) standards that are currently under development.

The International Financial Reporting Standards (IFRS) Foundation has achieved significant progress in this area by consolidating the Value Reporting Foundation (VRF) into the IFRS Foundation, following commitment made at Conference of the Parties (COP) 26 to support the establishment of ISSB.⁴² The VRF's SASB Standards, now governed by the ISSB, serve as a key starting point for the development of the IFRS Sustainability Disclosure Standards. In March 2022, the ISSB launched a consultation on two proposed standards on climate-related disclosures and general sustainability-related disclosures. When finalised, the standards would form a comprehensive global baseline of sustainability-related disclosures designed to meet the information needs of investors in assessing enterprise value.⁴³

⁴¹ Bursa Malaysia's Media Release 'Bursa Malaysia Enhances Sustainability Reporting Framework With New Climate Change Reporting' 26Sept_2022_Bursa_Malaysia_Enhances_Sustainability_Reporting_Framework_With_New_Climate_Change_Reporting.pdf ([bursamalaysia.com](https://www.bursamalaysia.com))

⁴² IFRS Foundation completes consolidation with Value Reporting Foundation [IFRS - IFRS Foundation completes consolidation with Value Reporting Foundation](https://www.ifrs.org/News-and-events/News/2022/03/ifrs-foundation-completes-consolidation-with-value-reporting-foundation/)

⁴³ Current stage of Climate-related Disclosures [IFRS - Climate-related Disclosures](https://www.ifrs.org/News-and-events/News/2022/03/ifrs-foundation-completes-consolidation-with-value-reporting-foundation/)

iii. Open data standards and platforms to facilitate data sharing

The public sector should consider using common interoperable data standards, APIs and open data platforms. This will enable climate data to be organised in a manner that is easily accessible by users. Some considerations based on open data elements⁴⁴:

- Availability and accessibility: Data must be available in a convenient and modifiable format;
- Re-use and redistribution: Data to be provided under terms that allow users to re-use and redistribute or intermix with other datasets; and
- Universal participation: Everyone must be able to use, re-use and redistribute the data.

While MAMPU has launched the Public Sector Open Data platform to share public sector datasets, the decision to publish or release data is currently left to the discretion of respective government agencies which are responsible in compiling these data.

There should be greater effort to establish an overarching national framework that determines whether data can be published or otherwise. Ideally a central body should be formed to lead the initiative, and subsequently enforce the implementation of open data across government agencies.

Further improvements to the implementation of open data can be guided by two main policies on open government data currently in progress, i.e. the Public Sector Data Sharing Policy (DPDSA) and the National Data Sharing Policy (NDSP).

- DPDSA guides public sector agencies on data sharing with other public sector agencies (G2G), with the business community (G2B), and with the people (G2C). This policy also provides guidance on implementing authentic, secure, and effective data sharing initiatives in accordance with a set of prescribed data sharing principles.
- NDSP is envisioned to set out Malaysia's long-term strategy designed to create a holistic, conducive, and inclusive data ecosystem to support Malaysia's socio-economic development agenda. As such, NDSP should provide guidance on measures that would address issues relating to legacy regulations that impede the implementation of open data or prohibit data sharing.

It is observed that public sector data is also shared via other data sharing platforms such as eStatistik, MysDIC, openDOSM and StatsDW.

It will be useful to provide guidance on how the climate datasets are organised across these platforms. Providing a centralised data inventory or catalogue of open data that are available, together with firm commitments for data publication will provide better visibility for data users.

⁴⁴ The Open Data Handbook Guide 'What is Open Data', by Open Knowledge Foundation. [What is Open Data? \(opendatahandbook.org\)](https://opendatahandbook.org/)

Over and above these policies, the public sector can also strengthen the implementation of common interoperable data standards in available forums, such as the National Statistics and Data Council's (MSDN) i.e. the highest advisory body for guidance and direction in strengthening governance of the national statistical system. This makes it the ideal body and the natural starting point to spearhead the use of standards by public sector agencies and to ensure implementation by respective statistics and data council at the state and regional level (MSDNgW).

B. Promote and enforce greater disclosures

i. Shift to embrace open data concept and review current data confidentiality restrictions

Another consideration for both the public and private sector is to address current legal impediments through necessary reforms (e.g. reviewing existing data confidentiality restrictions).

As explained earlier, currently there are restrictions that hinder the availability of entity-level energy consumption data. The public and private sectors in Malaysia may consider emulating the Green Button⁴⁵ initiative in the US, which allow sharing of customers' utility information, upon customers' authorisation. Such arrangement can be facilitated with more explicit data portability rights, which is being considered under the PDPA review.

In the meantime, financial sector users may continue to leverage on the most granular information available, such as sector-level non-renewable energy data via MAMPU Open Data Portal for Consumption of Energy by Sector.

ii. Enhance capacity building and improve awareness and understanding on importance of climate related data usage and disclosure

Another focus area is to strengthen the awareness and understanding on the importance of climate-related data usage and disclosure.

This could be done through intensifying multidisciplinary collaboration and technical upskilling efforts amongst relevant stakeholders in both public and private sectors. The financial sector can also benefit from more knowledge sharing and sharing of best practices, drawing on expertise of peers that have made greater progress towards integrating climate risks into their business strategies, operations and risk management.

As for the SMEs, the Capital Markets Malaysia (CMM), in collaboration with NRECC (formerly known as KASA), is now developing an ESG Disclosure Guide tailored to Malaysian SMEs which will address one of the key impediments in enhancing capacity building and guidance. This will provide practical guidance and the baseline exposures expected of SMEs in relation to ESG, to encourage greater transparency and improve the quality of SMEs' ESG disclosure.

Such adoption will pave way for alignment with global disclosure frameworks, including the one being developed by the ISSB, to promote comparability and minimise compliance costs for businesses and financial institutions going forward.

⁴⁵ The Green Button's Connect My Data (CMD) allows both utility customers and providers to share information securely while protecting customers' personal data. Utility providers will provide information on utility usage upon customers' authorisation of the transfer of information to third party. Green Button Alliance, "Connect My data – CMD". [Green Button Alliance](#)

iii. Industry-led platform to facilitate efficient climate data disclosure

Regulators may support and catalyse the establishment of an industry-led platform to accelerate climate data disclosure by companies. The coverage should extend beyond publicly listed companies, to also cover smaller firms such as the SMEs.

The platform should ideally address the current fragmentation and uneven progress in disclosures. One means is by setting a low barrier to disclosure among the companies, thus improving the coverage of climate data disclosure for the use of financial sector.

In order to mitigate greenwashing risks, such platform may also embed additional feature to support verifiability and auditability of the disclosures by companies.

C. Leverage on Technology and Available Data Sources

Leveraging on available data, approaches and tools is one of the common recommendations to address data gaps,⁴⁶ pending significant progress being made to improve the availability of more granular and forward-looking data. While these recommendations would require expert knowledge, the financial sector can bridge the knowledge gaps through partnerships with academia and field experts.

i. Technology

Users can refer to existing global and open-source platforms (for example Open Source - Climate,⁴⁷ European Space Agency Climate Data Dashboard⁴⁸ and the World Resources Institute Climate Watch⁴⁹), along with using new technologies such as APIs, machine learning, artificial intelligence as well as satellite imagery to bridge data gaps and improve user interactions.

For example, the financial sector users can utilise real-time weather forecast from satellite imagery as inputs in extreme weather risk modelling to better manage and assess physical risks, e.g. use of historical and forecast data by reinsurers in flood risk scenario model to estimate potential business loss.⁵⁰ Other climate change observations such as land use and cover, crop, bodies of water are also readily available from satellite imagery.⁵¹

ii. Statistical gap-filling approach

Apart from satellite data, statistical gap-filling approaches could also be considered which exploits spatial, temporal, and multivariate information to create estimates for missing values in earth observations.⁵²

⁴⁶ NGFS, "Final report on bridging data gaps", July 2022. https://www.ngfs.net/sites/default/files/medias/documents/final_report_on_bridging_data_gaps.pdf

⁴⁷ OS-climate - <https://os-climate.org/>

⁴⁸ ESA Climate Data Dashboard - <https://climate.esa.int/en/odp/#/dashboard>

⁴⁹ World Resources Institute - <https://www.wri.org/>

⁵⁰ Risk Management for Specific Risk Types – Liquidity Risk [Climate Risk Management and Scenario Analysis - Policy Document \(bnm.gov.my\)](#)

⁵¹ Climate change analysis using satellite data - https://www.researchgate.net/publication/325491309_Climate_Change_Analysis_using_Satellite_Data

⁵² CLIMFILL v0.9: A framework for intelligently gap filling Earth observations - [GMD - CLIMFILL v0.9: a framework for intelligently gap filling Earth observations \(copernicus.org\)](#)

An example is the collaboration between the UNFCCC secretariat with the Greenhouse Gas Management Institute to develop a data collection and management tool called Sectoral Activity Data for GHG Emissions (SAGE) for the Energy and Industrial Process and Product (IPPU) sectors based on IPCC sectors. The tool will convert proxy data into appropriate variables and units and filling in completeness and time series gaps, to support the estimation of GHG emissions and removals.⁵³

iii. Use of available and proxy data

Available and proxy data have also been used to construct climate change risk indicators and taxonomies.⁵⁴ The financial sector can explore incorporating existing data in their ESG rating methodology to rate and assess borrowers during onboarding and annual reviews of exposures as part of their climate risk management and assessment.⁵⁵

Such information will assist in evaluating potential and existing borrowers and mitigating actions that can be taken in supporting the borrowers to adopt more environment-friendly and sustainable practices.

Diagram 12: Recommendations to Bridge Data Gaps



A

Implement Common Definitions and Methodologies

- i. Adopt common definitions and methodologies for key climate data at the national level
- ii. Align new disclosure requirements to established/prominent frameworks/standards
- iii. Adopt common interoperable data standards/platforms to encourage data sharing and facilitate accessibility



B

Promote and Enforce Greater Disclosures

- i. Shift to embrace open data concepts and review current data confidentiality restrictions
- ii. Accelerate climate data usage and disclosure via capacity building and guidance
- iii. Establish industry-led platform to facilitate efficient climate data disclosures, especially by smaller firms



C

Leverage on Technology, Available Data Sources

- i. Application of technology such as APIs, machine learning, artificial intelligence and satellite imagery to bridge data gaps and improve user interaction
- ii. Statistical gap-filling approaches to create estimates
- iii. Use of available or proxy data in constructing climate change risk indicators

⁵³ Data collection and management tools, [GHG Support | UNFCCC](#)

⁵⁴ How proxies and publicly available data can be used to construct indicators on transition risk, physical risks, and green taxonomies - https://www.bis.org/ifc/publ/ifcb56_27.pdf

⁵⁵ Principle 8: Financial institutions shall consider climate-related risks as part of comprehensive risk assessments to identify and measure all material risks. [Climate Risk Management and Scenario Analysis - Policy Document \(bnm.gov.my\)](#)

5. Future Plans



Moving forward, the Sub-Committee on Bridging Data Gaps will pursue efforts to collaborate with relevant stakeholders to bridge data gaps. An immediate area of focus for 2023 is to work with data providers to improve the availability of a number of data items in the Top 8 data groups.

The Sub-Committee will update the Data Catalogue on an annual basis, to ensure its relevance based on the latest data requirements, standards and data sources. To this end, the Sub-Committee welcomes feedback through email (climatedc@bnm.gov.my), particularly on the usefulness and comprehensiveness of the Data Catalogue. Such feedback will be invaluable in further enriching the content, format and functionalities of Data Catalogue in the future.

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List of Acronyms

ACE	Access, Certainty, Efficiency
API	Application Programming Interface
ASEAN	Association of Southeast Asian Nations
ASIFMA	Asia Securities Industry & Financial Markets Association
BNM	Bank Negara Malaysia
CCPT	Climate Change and Principle-based Taxonomy
CDSB	Climate Disclosure Standards Board
CMD	Connect My Data
CMM	Capital Markets Malaysia
CMP3	Capital Market Masterplan 3
CO₂	Carbon Dioxide
COP	Conference of the Parties
CRMSA	Climate Risk Management and Scenario Analysis
CRST	Climate Risk Stress Testing
DC	Data Catalogue
DID	Department of Irrigation and Drainage
DOE	Department of Environment
DOSM	Department of Statistics Malaysia
DPDSA	Public Sector Data Sharing Policy
EIR	Emissions intensity ratio
ESA	Environmentally sensitive area
ESG	Environmental, Social and Governance
FAO	Food and Agriculture Organisation of the United Nations
FSB	Financial Stability Board
GC	Global Compact
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GHG	Greenhouse gas
GIS	Geographic Information System
GRI	Global Reporting Initiative
G2B	Government-to-Business
G2C	Government-to-Citizen
G2G	Government-to-Government
IFC	Irving Fisher Committee on Central Bank Statistics
IFRS	International Financial Reporting Standards
ISIC	International Standard Industrial Classification
ISSB	International Sustainability Standards Board

List of Acronyms

IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Process and Product
JC3	Joint Committee on Climate Change
MAMPU	Malaysian Administrative Modernisation and Management Planning Unit
MSDN	National Statistics and Data Council
MSDNgW	State/Regional Statistics and Data Council
MSIC	Malaysia Standard Industrial Classification
MysIDC	Malaysia Informative Data Centre
NDSP	National Data Sharing Policy
NDC	Nationally Determined Contributions
NGFS	Network for Greening the Financial System
NRECC	Ministry of Natural Resources, Environment and Climate Change (formerly known as Ministry of Environment and Water (KASA) and Ministry of Energy and Natural Resources (KeTSA))
NSO	National Statistical Office
PCAF	Partnership for Carbon Accounting Financials
PD	Probability of Default
PDPA	Personal Data Protection Act 2010
RDBMS	Relational Database Management System
RSS	Relational Spreadsheet Structure
SAGE	Sectoral Activity Data for GHG Emissions
SASB	Sustainability Accounting Standards Board
SC	Securities Commission
SDG	Sustainable Development Goals
SMEs	Small and Medium Enterprises
SRI	Sustainable and Responsible Investment
StatsDW	Statistics Data Warehouse
TCFD	Task Force on Climate-related Financial Disclosures
TNB	Tenaga Nasional Berhad
UK	United Kingdom
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNGC	United Nations Global Compact
US	United States of America
VaR	Value-at-risk
VRF	Value Reporting Foundation

List of Diagrams

- Diagram 1** Identification Process of Climate-related Data
- Diagram 2** Identified Use Cases Applicable for the Climate Data Catalogue
- Diagram 3** Metric Types Established
- Diagram 4** Top 8 Data Groups
- Diagram 5** Data Items by Metric Type
- Diagram 6** Share of Metric Types for Top 2 Use Cases - Financial Stability Monitoring and Investment Lending Decisions
- Diagram 7** Data Availability
- Diagram 8** Percentage of Data Availability for Top 8 Data Groups
- Diagram 9** Data Accessibility by Metric Type
- Diagram 10** Data Catalogue Maintenance – Process Flow
- Diagram 11** Data Challenges
- Diagram 12** Recommendations to Bridge Data Gaps

Appendix: Climate Data Catalogue
December 2022

1. The Data Catalogue is compiled by the Sub-Committee on Bridging Data Gaps (the Sub-Committee) of the Joint Committee on Climate Change (JC3), based on data needs of Malaysia's financial sector and data sources at the time of publication.
2. The DC is aimed to be a source of reference for climate and environmental data relevant to use cases by Malaysia's financial sector.
3. The DC mainly covers Malaysian climate and environmental data that includes data that are readily available, partially available, and unavailable as well as observations on data gaps. For other global climate data, users may refer to the NGFS Directory (<http://ngfs.dev.masdkp.io>).

Disclaimer:
Inclusion of information in the Data Catalogue does not indicate use of or endorsement by the Sub-Committee on Bridging Data Gaps (the Sub-Committee), any member of the Joint Committee on Climate Change (JC3) or any affiliated organisation and neither the Data Catalogue's scope nor the data sources are meant to be comprehensive. The Sub-Committee and the members of JC3 do not make any warranty as to the results that may be obtained from use of the Data Catalogue, or as to the accuracy, adequacy, validity, availability, completeness, reliability or content of any information provided through the Data Catalogue, and users are responsible to make their own assessment of the information that is suitable for their purpose.

No.	Data Needs						Use Cases								Data Availability					Observations on data availability/gaps																			
	Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂)	Dimension (e.g. Sector, Customer)	Time horizon	Climate-related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro-economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency	Time series																				
1	Green House Gases (GHG) emissions Scope 1, Scope 2	Footprint	1. GHG Protocol Corporate Accounting and Reporting Standard 2. 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories / Malaysia Biennial Update Report to UNFCCC	percentage (%)	By Entity	Backward-looking	✓	✓	✓	✓			✓	✓	1. ESG Book 2. Entity	1. https://app.esgbook.com/dashboard 2. a) Petronas (https://www.petronas.com/sustainability/reporting) b) Tenaga Nasional Berhad (https://www.tnb.com.my/sustainability/performance-highlight/) c) Axiata (https://sustainability.axiata.com/wp-content/uploads/2021/05/Axiata-SNCR2020.pdf) d) Allianz (https://www.allianz.com.my/personal/allianz-at-a-glance/allianz-4-good/sustainability-reports.html) e) CIMB (https://www.cimb.com/en/sustainability/sustainability-cimb.html) f) DRB Hicom (https://www.drb-hicom.com/investors/annual-report_f/)	Public	Annual	Varies by companies	ESGBook provides the disclosure of GHG emission scope 1 and 2 for public-listed companies that disclose this information in the annual report. Users can sign up with no cost to obtain this data as ESGBook is a freemium platform. Upon sign-in, go to company directory > search and click the desired company > disclosure > emissions framework. There are a total of 1,564 Malaysian corporations in ESGBook. However, not all companies disclose their GHG emissions.																			
																					Forward-looking (projection)	1. Refinitiv 2. Bloomberg	1. https://www.refinitiv.com/en/sustainable-finance/esg-scores 2. https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/	Proprietary	Annual	Not available	Refinitiv and Bloomberg provide the disclosure of GHG emission scope 1 and 2 for public-listed companies that disclose these information in the annual reports. However, subscription fee is required.												
																												Entity	Not available	Not available	Not available	Data is not available.							
				Tonnes CO ₂ e	By Sector	Backward-looking									Forward-looking (projection)	NRECC (formerly known as KASA)	https://unfccc.int/documents/267685	Public	Biennial	1990-2016	GHG emissions published by NRECC (formerly known as KASA) is based on sectors and sub sectors (IPCC Guidelines) instead of scopes 1 and 2. The sectors are Energy, Industrial Processes and Product Use, Land Use, Land-Use Change, and Forestry, Agriculture, and Waste instead of industrial sector classification as per MSIC 2008.																		
																						NRECC (formerly known as KASA)	https://unfccc.int/sites/default/files/resource/Malaysia%20NC3%20BUR2_final%20high%20res.pdf	Public	Biennial	2005-2030	Projections under 3 scenarios: 1. Business-as-usual (BAU) 2. Planning scenario incorporates existing policies and planned initiatives that would be implemented until 2030 (PLAN) 3. Ambitious scenario looks at potential emissions reduction when additional mitigation measures are implemented (AMB) GHG emission published by NRECC (formerly known as KASA) is based on sector and sub sector (IPCC Guidelines) instead of scopes 1 and 2. The sectors are Energy, Industrial Processes and Product Use, Agriculture Forestry and Other Land Use, and Waste instead of industrial sector classification as per MSIC 2008.												
				Tonnes CO ₂ e	By Asset Class	Backward-looking									Forward-looking (projection)	Entity	Not available	Not available	Not available	Not available	Data is not available.																		
																Entity	Not available	Not available	Not available	Not available	Data is not available.																		
				2	GHG emissions Scope 3	Footprint									1. GHG Protocol Corporate Accounting and Reporting Standard 2. 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories / Malaysia Biennial Update Report to UNFCCC	Tonnes CO ₂ e	By Entity	Backward-looking	✓	✓	✓	✓			✓	✓	1. ESG Book 2. Entity	1. https://app.esgbook.com/dashboard 2. a) Allianz (https://www.allianz.com.my/personal/allianz-at-a-glance/allianz-4-good/sustainability-reports.html) b) Shell (https://reports.shell.com/sustainability-report/2021/services/downloads.html) c) Nestle (https://www.nestle.com/sites/default/files/2022-03/creating-shared-value-sustainability-report-2021-en.pdf)	Public	Annual	Varies by companies	ESGBook provides the disclosure of GHG emission scope 3 for public-listed companies that disclose this information in the annual report. There are 25 Malaysian companies which disclose their Scope 3 emission. Users can sign up with no cost to obtain this data as ESGBook is a freemium platform. Upon sign in, go to company directory > search and click the desired company > disclosure > emissions framework. The freemium access has a delayed scoring of 3 months, while real-time data and scoring require paid subscription. The information can also be obtained from respective companies' annual reports/sustainability reports.							
																																	Forward-looking (projection)	1. Refinitiv 2. Bloomberg	1. https://www.refinitiv.com/en/sustainable-finance/esg-scores 2. https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/	Proprietary	Annual	Not available	Refinitiv and Bloomberg provide the disclosure of GHG emission scope 3 for public-listed companies that disclose this information in the annual reports upon subscription.
Tonnes CO ₂ e	By Sector	Backward-looking	Forward-looking (projection)				NRECC (formerly known as KASA)	https://unfccc.int/documents/267685	Public	Biennial	1990-2016	GHG emissions published by NRECC (formerly known as KASA) is based on sector and sub sector (IPCC Guidelines) instead of Scope 3. The sectors are Energy, Industrial Processes and Product Use, Land Use, Land-Use Change, and Forestry, Agriculture, and Waste instead of industrial sector classification as per MSIC 2008.																											
													NRECC (formerly known as KASA)	https://unfccc.int/sites/default/files/resource/Malaysia%20NC3%20BUR2_final%20high%20res.pdf		Public	Biennial	2005-2030									Projections under 3 scenarios: 1. Business-as-usual (BAU) 2. Planning scenario incorporates existing policies and planned initiatives that would be implemented until 2030 (PLAN) 3. Ambitious scenario looks at potential emissions reduction when additional mitigation measures are implemented (AMB) Report to UNFCCC contains GHG emissions improvement plan, but no specific quantitative projections. GHG emissions published by NRECC (formerly known as KASA) is based on sector and sub sector (IPCC Guidelines) instead of Scope 3. The sectors are Energy, Industrial Processes and Product Use, Agriculture Forestry and Other Land Use, and Waste instead of industrial sector classification as per MSIC 2008.												
Tonnes CO ₂ e	By Asset Class	Backward-looking	Forward-looking (projection)				Entity	Not available	Not available	Not available	Not available	Data is not available.																											
							Entity	Not available	Not available	Not available	Not available																												
3	GHG inventory	Footprint	2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories / Malaysia Biennial Update Report to UNFCCC				Gg CO ₂ e	By Sector	Backward-looking		✓																NRECC (formerly known as KASA)	https://unfccc.int/documents/267685	Public	Biennial	1990-2016	The latest available report to UNFCCC is for 2020, which contains data from 1990 to 2016. The data published by NRECC (formerly known as KASA) is based on sectors (Energy, Industrial Processes and Product Use, Agriculture, Forestry and Other Land Use, and Water) instead of industrial sector classification as per MSIC 2008.							

Data Needs		Use Cases										Data Availability				Observations on data availability/gaps			
Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂ e)	Dimension (e.g. Sector, Customer)	Time horizon	Climate-related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro-economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency	Time series	
4	GHG emission targets	Footprint 1. GHG Protocol Corporate Accounting and Reporting Standard 2. 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories / Malaysia Biennial Update Report to UNFCCC	Tonnes CO ₂ e	By Sector	Forward-looking (projection)	✓		✓				✓	✓	1. NRECC (formerly known as KASA) 2. UNFCCC	1. https://www.kasa.gov.my/resources/alam-sektar/Low-Carbon-Mobility-Blueprint-2021-2030/4/ 2. https://unfccc.int/sites/default/files/NDC/2022-06/Malaysia%20NDC%20Updated%20Submission%20to%20UNFCCC%20July%202021%20final.pdf	Public	Annual	2021-2030	GHG emission target details are in aggregated format, with no target per sector. The data provided by SBTi can be filtered to show Malaysian companies that have publicly committed to science-based targets, and companies that have their targets approved by SBTi.
			Tonnes CO ₂ e	By Entity	Forward-looking (projection)										1. Entity 2. Science Based Targets initiative (SBTi)	1. Entity a) Sunway (https://www.sunway.com.my/sustainability-report/wp-content/uploads/2022/07/Sunway-SR2021-interactive.pdf#page=76) b) Top Glove (https://www.toglove.com/sustainability-disclosure) c) IOI Group (https://www.ioigroup.com/Content/IR/PDF/SR/2021_SR.pdf) 2. https://sciencebasedtargets.org/companies-taking-action	Public	Annual	Varies by companies
5	GHG emission intensity	Combined metrics GHG Protocol Corporate Accounting and Reporting Standard	CO2 equivalent per unit of physical or economic output e.g. 1. kg CO ₂ e/RM million 2. g CO ₂ e/kWh	By Entity	Backward-looking	✓	✓	✓	✓			✓	✓	Entity	Not available	Not available	Not available	Not available	Data is not available.
			1. Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories (BUR3)	CO2 equivalent per unit of physical or economic output e.g. 1. kg CO ₂ e/RM million 2. g CO ₂ e/kWh	By Sector	Backward-looking									1. UNFCCC/NRECC (formerly known as KASA) 2. International Energy Agency 3. European Environment Agency	1. https://unfccc.int/documents/267685 and https://unfccc.int/sites/default/files/resource/MALBUR1.pdf 2. https://www.iea.org/data-and-statistics/charts/development-of-co2-emission-intensity-of-electricity-generation-in-selected-countries-2000-2020 3. https://www.eea.europa.eu/fmsi/greenhouse-gas-emission-intensity-of-1	Public	1. Biennial (NRECC) 2. Upon update (IEA & EEA)	1. Selected years (KASA) 2. 2000-2020 (IEA) 3. 1990-2030 (EEA)
6	Economic sectors' contribution to Gross Domestic Product (GDP) and GHG emissions	Combined metrics	International Standard Industrial Classification and GHG Protocol	MYR Million / CO ₂	By Sector	Backward-looking			✓					1. Economic Planning Unit (EPU) 2. UNFCCC/NRECC (formerly known as KASA)	1. https://www.epu.gov.my/sites/default/files/2021-12/MEIF%202021.pdf 2. https://unfccc.int/documents/267685	Public	1. Annual 2. Biennial	1. 2005-2021 2. 1990-2016	EPU provides data on economics sector's contribution to GDP, whilst NRECC (formerly known as KASA) provides data on sectoral GHG emissions. Both however use different set of sector classification.
7	Vehicle GHG emissions	Footprint 1. GHG Protocol Corporate Accounting and Reporting Standard 2. 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories / Malaysia Biennial Update Report to UNFCCC	Grams/km	By Type	Backward-looking	✓						✓	✓	1. US Department of Energy 2. UK Vehicle Certification Agency	1. https://www.fueleconomy.gov/feg/findacar.shtml 2. https://www.gov.uk/co2-and-vehicle-tax-tools	Public	Upon update	Upon update	1. Data for Malaysian car types is not available in the links. 2. The United Kingdom's government via its Vehicle Certification Agency has a vehicle GHG emission database on fuel consumption and CO2 emission data, whereby emission information by vehicle make and model is easily accessible in csv table format. 3. Department of Environment (DOE) via Environmental Quality Report 2020 (https://enviro2.doe.gov.my/ekmc/wp-content/uploads/2021/09/EQR-2020-1.pdf) publishes high-level air pollutant emission load data (Figure 5.10), and CO (Carbon Monoxide) load by sources (Figure 5.14) including by motor vehicles. 4. DOE had issued pollutant emission standards for new models of petrol-powered vehicles which aims to improve pollutant emissions in Malaysia using new engine designs and emission control technologies (https://www.doe.gov.my/en/environmental-quality-control-of-emissions-from-petrol-engines-regulations-1996-p-u-a-543-96/)
8	Portfolio temperature	Footprint 1. Morgan Stanley Capital International (MSCI) 2. Carbon Disclosure Project (CDP) - World Wide Fund for Nature (WWF)	Degree Celsius	By Sector	Backward-looking			✓				✓		1. MSCI 2. CDP	1. https://www.msci.com/our-solutions/climate-investing/implicit-temperature-rise 2. https://www.cdp.net/en/investor/temperature-ratings	Proprietary	Not available	Not available	Data is available upon subscription. The CDP-WWF temperature rating methodology is an open-source methodology which translates targets into an intuitive metric. It consists of three steps- a target protocol that converts emission targets to temperatures; a company protocol that aggregates the targets into an overall score; and a portfolio protocol that weights the scores across an investment portfolio.
				By Type of Entity / Issuer	Backward-looking									Not available	Not available	Not available	Not available	Not available	Data is not available.
9	Internal Carbon price	Transition sensitivity	UN Framework Convention on Climate Change Kyoto Protocol	USD/Tonnes CO ₂ e	By Entity	Backward-looking						✓	✓	Entity	Not available	Not available	Not available	Not available	Data is generally not available. Reporting of internal carbon price is voluntary (e.g. Sunway, CIMB). Data users have to rely on news article or publications by entities to obtain relevant data. 1. Sunway (https://www.sunway.com.my/stories/sunway-sets-carbon-pricing-strategy-in-lofty-net-zero-targets/) 2. CIMB (https://www.cimb.com/en/newsroom/2022/cimb-establishes-scope-3-financed-emissions-baseline-towards-achieving-net-zero-ambition-sets-interim-sector-climate-targets-for-thermal-coal-and-cement.html)
10	Green or Net Zero Carbon Buildings Commitment	Footprint	2°C aligned companies/ Net Zero Carbon by 2050	Not available	By Sector	Forward-looking (projection)	✓							World Green Building Council	https://www.worldgbc.org/thecommitment#:~:text=Net%20zero%20carbon%20,s%20when,renewable%20energy%20sources%20and%20offsets.	Public	Upon update	Not available	Data is readily available.
11	Emission intensity performance of buildings in Malaysia	Footprint	Climate Bonds Standard - Low Carbon Building Criteria	kgCO ₂ e/m ²	By Type of building	Backward-looking					✓			1. EC 2. Entity	Not available	Not available	Not available	Not available	Data is not available. Energy intensity performance can be found from this research journal: https://www.researchgate.net/publication/46496808_Energy_consumption_energy_savings_and_emission_analysis_in_Malaysian_office_buildings
12	Green/Sustainable loan/financing, refinancing, outstanding, applied, approved, disbursed, repaid	Mobilisation 1. Climate Change and Principle based Taxonomy (CCPT) reporting • Climate supporting: C1 • Transitioning: C2 & C3 • Watchlist: C4 & C5 2. ASEAN Taxonomy: An activity can be classified in one of six ways: • Green FF: Green Foundation Framework • Amber FF: Amber Foundation Framework • Red FF: Red Foundation Framework • Green PS: Green Plus Standard • Amber PS: Amber Plus Standard • Red PS: Red Plus Standard	Currency (e.g. MYR)	By Entity	Backward-looking	✓	✓	✓	✓		✓	✓	✓	1. Financial institutions 2. BNM	Not available	Confidential	Periodic	Periodic	Data is compiled by financial institutions. Certain data being compiled by financial institutions containing aggregated level exposure based on CCPT classification is submitted to BNM.
			By Type	Not available											Periodic		Periodic		
			By Product	Not available											Periodic		Periodic		
			By Customer (SME and Non-SME)	Not available											Periodic		Periodic		
			By Sector	Not available											Periodic		Periodic		
			By CCPT Classification (C1 to C5)	Not available											Periodic		Periodic		
			By Classification of retail loans/ financing (green/ sustainable product)	Not available											Periodic		Periodic		
			By Location of utilisation	Not available											Periodic		Periodic		
			By Climate-supporting/ transitioning/ watchlist financing sector	Not available											Periodic		Periodic	Climate-supporting (C1)/ transitioning (C2 & C3)/ watchlist financing (C4 & C5) loan data by sector being compiled by financial institutions based on CCPT classification is submitted to BNM.	

Data Needs		Use Cases												Data Availability				Observations on data availability/gaps		
Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂)	Dimension (e.g. Sector, Customer)	Time horizon	Climate- related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro- economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency		Time series	
24	Oil energy consumption	Transition sensitivity	Not applicable	1. Currency (e.g. MYR) 2. Volume	By Entity	Backward- looking				✓				EC	Not available	Not available	Not available	Not available	Data is not available. Final consumption of crude oil and petroleum products at the aggregate level is published by MEIH: https://meih.st.gov.my/statistics (National Energy Balance)	
25	Coal energy consumption	Transition sensitivity	Not applicable	1. Currency (e.g. MYR) 2. Volume	By Entity	Backward- looking				✓				EC	Not available	Not available	Not available	Not available	Data is not available. Final consumption of coal at the aggregate level is published by MEIH: https://meih.st.gov.my/statistics (National Energy Balance)	
26	Gas energy consumption	Transition sensitivity	Not applicable	1. Currency (e.g. MYR) 2. Volume	By Entity	Backward- looking				✓				EC	Not available	Not available	Not available	Not available	Data is not available. Final consumption of natural gas at the aggregate level is published by MEIH: https://meih.st.gov.my/statistics (National Energy Balance)	
27	Energy prices	Transition sensitivity	National Energy Balance	1. MYR/MMBtu 2. USD/MMBtu	By Type	Backward- looking	✓			✓				1. EC 2. World Bank	1. https://www.st.gov.my/en/web/download/listing/111 https://meih.st.gov.my/ 2. https://www.worldbank.org/en/research/commodity-markets	Public	1. Annual (EC- MEIH) 2. Monthly (World Bank)	1. 1990 - 2019 (EC - MEIH) 2. 1970 - 2022 (World Bank)	MEIH statistics webpage provides energy prices for retail petroleum (latest available data for retail petroleum is 2015), petroleum products, liquefied petroleum gas and natural gas. Meanwhile EC's National Energy Balance 2019 provides energy prices for crude oil, coal & coke.	
			World Bank Commodities Price Forecast	USD/MMBtu	By Type	Forward- looking (projection)							World Bank	https://www.worldbank.org/en/research/commodity-markets	Public	Annual	2021 - 2024	Energy prices forecasts are available for Australia, Europe, US, Japan (but no specific reference for Malaysia).		
28	Fossil fuel/oil/gas sales as a proportion of total revenue	Footprint	Not applicable	Currency (e.g. MYR) or % (percentage)	By Sector	Backward- looking			✓				✓		Not available	Not available	Not available	Not available	Data is not available.	
					By Entity	Backward- looking							Not available	Not available	Not available	Not available				
29	Energy-efficiency indicators	Transition sensitivity	International Energy Agency (IEA)	Currency (e.g. MYR) or % (percentage)	By Sector	Backward- looking		✓					✓	✓	International Energy Agency (IEA)	1. https://www.iea.org/data-and-statistics/data-product/energy-efficiency-indicators 2. https://www.iea.org/countries/malaysia	Proprietary	Not available	2009 onwards	Types of indicators were generally mentioned in page 47 of the National Energy Efficiency Action Plan, without any supporting data. (https://www.pmo.gov.my/wp-content/uploads/2019/07/National-Energy-Efficiency-Action-Plan.pdf) IEA website contains energy efficiency indicators for its members, with limited energy-related indicators on Malaysia country page (Malaysia is not a member country).
30	Temperature	Physical vulnerability	1. Regional Hydro-Climate Model (Reg HCM) 2. INFORM 2019 Risk Index 3. Notre Dame Global Adaptation Initiative (ND-GAIN) Index 4. Representative Concentration Pathway (RCP) Emission pathway 5. Coastal Vulnerability Index	Degree Celsius	By District & State	Backward- looking			✓	✓	✓			1. MetMalaysia 2. DOSM	1. https://www.met.gov.my/penerbitan/laporan-tahunan/ 2. https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam	Public	1. Annual 2. Weekly (MetMalaysia)	1. 1981-2019 (MetMalaysia) 2. 2009-2022 (DOSM) 3. 1901-2020 (World Bank)	MetMalaysia provides Malaysian meteorological data such as highest and lowest recorded temperatures along with temperature variations. DOSM provides historical data on annual mean temperature, rainfall volume, and mean relative humidity in Malaysia, broken down to registered measures across selected meteorological stations in various states. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 1	
														World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia	Public (With API)			Historical data from World Bank is at the national level.	
						Forward- looking (projection)							MetMalaysia	https://www.met.gov.my/projection/temperature/	Public		MetMalaysia provides weather forecasts up to 7 days ahead under the 'Forecast' tab.			
													World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/climate-data-projections	Public (With API)		Data is readily available. Multi-model projected mean or anomaly temperature: 1. Monthly data with a 10-year interval, up until the year 2100 2. Annual data up until the year 2100			
			1. National database 2. World Bank's Climate Change Knowledge Portal (CCKP) 3. Coupled Model Intercomparison Project Phase 5 (CMIP5) models, which are utilized within the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC)		By Country	Forward- looking (projection)							World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/climate-data-projections	Public (With API)	Annual	1995-2100	Data is readily available. Multi-model projected mean or anomaly temperature: 1. Monthly data with a 10-year interval, up until year 2100 2. Annual data up until the year 2100		
31	Sea Level Rise	Physical vulnerability	1. Reg HCM 2. INFORM 2019 Risk Index 3. ND-GAIN Index 4. RCP Emission pathway 5. Coastal Vulnerability Index 6. National Hydraulic Research Institute of Malaysia (NAHRIM)	Metre	By Geography / Location (Region)	Backward- looking		✓		✓			✓	✓	World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/impacts-sea-level-rise	Public (With API)	Monthly	1993-2015	The World Bank provides monthly historical data on sea level anomaly and sea surface temperature.
						Forward- looking (projection)								World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/impacts-sea-level-rise	Public (With API)	Annual	2020-2100	The World Bank provides projection of sea level rise up to 2100.	
														NAHRIM	https://mycoast.nahrim.gov.my/www/index.php?id=18&page_id=71&jenis=RCP	Public	Annual	2030, 2050 & 2100	For sea-level rise projections, NAHRIM issued a report in 2017 with projections up to 2100 for different RCP.	
32	Rainfall	Physical vulnerability	1. Regional Hydro-Climate Model (Reg HCM) 2. INFORM 2019 Risk Index 3. ND-GAIN Index 4. RCP Emission pathway 5. Coastal Vulnerability Index 6. MetMalaysia	Millimetre	By District & State	Forward- looking (projection)		✓	✓	✓	✓			1. MetMalaysia 2. DOSM 3. DID	1. https://www.met.gov.my/penerbitan/laporan-tahunan/ 2. https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam	Public	1. Annual 2. Weekly (DID)	1. 2004-2020 (MetMalaysia) 2. 2009-2022 (DOSM)	DID publishes rainfall data for the past 7 days at the state, district and station levels. MetMalaysia discloses their historical data through their Annual Reports. They use the tendency of low/high rainfall (historical), and also provides a 6-mth forward looking weather forecast (Tinjauan Cuaca Jangka Panjang).	
						Backward- looking								1. https://www.met.gov.my/ 2. https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam 3. https://publicinfobanjir.water.gov.my/hujan/data-hujan/?lang=en	Public		DOSM provides data on mean temperature, rainfall volume and mean relative humidity (in %). Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 1 Springer publishes an article that shows the projected rainfall and temperature changes over Malaysia at the end of the 21st century based on Providing Regional Climates for Impacts Studies (PRECIS) modelling system: https://link.springer.com/article/10.1007/s13143-016-0019-7			
					By Region	Backward- looking							DOSM	https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam	Public	Annual	2009-2022		DOSM provides data on mean temperature, rainfall volume and mean relative humidity (in %). Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 1 (1.1 Mean temperature, rainfall volume and mean relative humidity, Malaysia)	
					1. National database, 2. World Bank's CCKP, CMIP5 models, which are utilized within the AR5 of the IPCC		By Country	Forward- looking (projection)						World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/climate-data-projections	Public (With API)	Annual		1995-2100	Data is readily available.
33	Drought	Physical vulnerability	1. Reg HCM 2. INFORM 2019 Risk Index 3. ND-GAIN Index 4. RCP Emission pathway 5. Coastal Vulnerability Index 6. National Disaster Management Agency (NADMA)	SPI Index	By Geography / Location	Backward- looking		✓	✓					1. DID 2. MetMalaysia	1. http://infokemarau.water.gov.my/drought_report_page.cfm 2. https://www.met.gov.my/iklim/pemantauan-kemarau/	Public	Monthly	2022	DID publishes a monthly drought report that includes stations that record rain deficits based on the long-term means from the past 3 months. MetMalaysia provides a 6-month forward-looking projection for Standardized Precipitation Index (SPI) by station (latest available report - Dec 2022, under 'Drought Monitoring' tab)	
						Forward- looking (projection)														
		1. National database 2. World Bank's CCKP, CMIP5 models, which are utilised within the AR5 of the IPCC		SPI Index	By Country	Forward- looking (projection)								World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/climate-data-projections	Public (With API)	Annual	1995-2100	World Bank provides data on the temperature projection and projected number of consecutive dry days.	

Data Needs		Use Cases														Data Availability					Observations on data availability/gaps
Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂)	Dimension (e.g. Sector, Customer)	Time horizon	Climate- related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro- economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency	Time series			
34	Flood	Physical vulnerability	1. DOSM 2. DID 3. CoastalDEM 4. National database, 5. World Bank's CCKP 6. CMIP5 models, which are utilized within the AR5 of the IPCC	1. Number of flood incidents (also shows the 3 states with the highest flood incidents) - DOSM 2. Number of flood events and year of worst flood incident - DID 3. Number of days affected per year or Number of incidents per year	By Region	Backward-looking		✓	✓						1. DOSM 2. DID 3. Climate Central	1. https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam 2. https://www.water.gov.my/jps/resources/auto%20download%20images/5844e46d37d56.pdf https://go.climatecentral.org/coastaldem/	Public	1.Monthly 2. Annual	1. 1995 2. 2009-2022 (DOSM) 3. 1980-2000 (DID)	DOSM provides data on Extreme Events and Disasters. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 4 (4.1 Number of flood incident reported by state) DID has a publication which lists flood incidents from 1980 to 2000. CoastalDEM by Climate Central is a near-global DEM, of which their dataset is proprietary.	
						Forward-looking (projection)										1. https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam 2. https://www.water.gov.my/jps/resources/auto%20download%20images/5844e46d37d56.pdf https://go.climatecentral.org/coastaldem/	Proprietary			Public	Proprietary
		NADMA	Number of days affected per year or Number of incidents per year	By Region	Backward-looking										1. DOSM 2. DID	1. https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam 2. https://www.water.gov.my/jps/resources/auto%20download%20images/5844e46d37d56.pdf	Public	Annual	1. 2009-2022 (DOSM) 2. 1980-2000 (DID)	DOSM provides data on Extreme Events and Disasters. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 4 (4.1 Number of flood incident reported by state)	
		1. National database 2. World Bank's CCKP, CMIP5 models, which are utilized within the AR5 of the IPCC	Number of days affected per year or Number of incidents per year	By Country	Backward-looking										World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/climate-data-projections	Public (With API)	Monthly	1995-2099	World Bank provides data on the projection of precipitation on an annual basis.	
35	Water level at various river gauges	Physical vulnerability	DID	Metre	By Location	Backward-looking							✓		DID	https://publicinfobanjir.water.gov.my/aras-air/data-paras-air/?state=SEL&lang=en	Public	Daily	Daily	Data on water levels are available and frequently updated, with accompanying analysis of the danger level.	
36	Flood-related impacts: 1. Households impacted 2. Number of buildings damaged/impacted 3. Estimated economics loss and insured loss 4. Past flood Footprint	Physical vulnerability	DOSM	1. Number of households impacted 2. Number of buildings damaged/impacted 3. Economics loss and insured loss 4. Past flood Footprint	By Location	Backward-looking							✓		DOSM	https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam	Public	One-off	2021	DOSM publishes a one-off report on flood impacts which does not contain historical events. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Special Report on Impact of Floods in Malaysia 2021'	
37	Flood emergency relief	Physical vulnerability	Not applicable	Currency (e.g. MYR)	By Type	Backward-looking							✓		Ministry of Finance (MOF)	https://bantuanbanjir.com/	Public	Upon update	2021	Reliefs provided include cash and rebates at the individual and communal level.	
38	Storm	Physical vulnerability	1. MetMalaysia 2. DOSM 3. World Meteorological Organisation	Number of days affected per year or Number of incidents per year	By Country	Backward-looking		✓	✓						1. MetMalaysia 2. World Meteorological Organisation	1. https://www.met.gov.my/en/iklim/maklumat-iklim/ 2. https://severeweather.wmo.int/thunder/b3/stations.html	Public	Daily	Daily	MetMalaysia publishes a general climate information on thunderstorm data in their summary report (Highest number of days with thunderstorm in a year). World Meteorological Organisation reports historical data for the past 24 hours.	
			Not applicable		By Region	Backward-looking								World Meteorological Organisation	https://severeweather.wmo.int/thunder/b3/stations.html	Public	Daily	Daily	Data is readily available.		
			1. National database 2. World Bank's CCKP, CMIP5 models, which are utilized within the AR5 of the IPCC		By Country	Forward-looking (projection)								1. MetMalaysia 2. World Meteorological Organisation	1. https://www.met.gov.my/data/ICN20032.html 1. https://www.met.gov.my/data/AmaranRibutPetir.jpg 1. https://www.met.gov.my/data/NWR30002.html 2. https://worldweather.wmo.int/en/country.html?countryCode=20	Public	Daily	Daily	Data is readily available.		
39	Coastal Vulnerability Index	Physical vulnerability	1. NAHRIM 2. PLANMalaysia, KPKT	No. of areas, size of area, category of severity (1-5)	By State	Backward-looking		✓	✓						PLANMalaysia, KPKT	https://myplan.planmalaysia.gov.my/www/	Public	Upon update	2021	PLANMalaysia publishes data on the Coastal Vulnerability Index under the Second National Coastal Zone Physical Plan. The link contains two volumes of publications, with sufficient granularity data based on coastal areas of each state in Malaysia.	
			1. National database 2. World Bank's CCKP, CMIP5 models, which are utilized within the AR5 of the IPCC	No. of areas, size of area, category of severity (1-5)	By Country	Forward-looking (projection)									Not available	Not available	Not available	Not available	Data is not available.		
40	Natural Hazard Data/Statistics (Occurrence/Map)	Physical vulnerability	World Bank's CCKP	1. Longitude & Latitude 2. Number of occurrence	By Location	Backward-looking		✓							Not available	Not available	Not available	Not available	Not available	DOSM provides data on Extreme Events and Disasters. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 4 https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam Number of disaster incidents reported by states: 1. Flood 2. Earthquake 3. Landslide 4. Coastal erosion areas Natural hazard location by longitude & latitude is currently not available.	
					By Country	Backward-looking									World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/vulnerability	Public (With API)	Annual	1980-2020	Data is readily available.	
41	Heatwave	Physical vulnerability	NADMA	Number of days affected per year or Number of incidents per year	By Region	Forward-looking (projection)		✓	✓						NADMA	Not available	Not available	Not available	Not available	Forward-looking data is not available, however a snapshot of the current heatwave status is available in the following link: https://www.met.gov.my/en/iklim/status-cuaca-panas/	
			1. National database, 2. World Bank's CCKP, Coupled Model Intercomparison Project Phase 6 (CMIP 6) models, which are utilized within the AR5 of the IPCC	Number of days affected per year or Number of incidents per year	By Country	Forward-looking (projection)									World Bank	https://climateknowledgeportal.worldbank.org/country/malaysia/climate-data-projections	Public (With API)	1. Annual 2. Quarterly 3. Monthly	2020-2099	World Bank provides data on temperature projections and projected number of consecutive dry days.	
42	Humidity	Physical vulnerability	1. DOSM 2. MetMalaysia	Grams/m ³ , %	By District & State	Backward-looking					✓				1. DOSM 2. MetMalaysia	1. https://newss.statistics.gov.my/newss-portalx/ep/epFreeDownloadContentSearch.seam?cid=96850 2. https://m.met.gov.my/projection/humidity/48623?lang=en	Public	1. Annual 2. Daily	2016-2022	DOSM publishes data on environmental condition and quality. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 1 (1.1 Mean temperature, rainfall volume and mean relative humidity, Malaysia) (%) MetMalaysia: Snapshot data is available, but not historical.	
43	Real estate exposures to potential extreme weather conditions	Physical vulnerability	1. National database 2. World Bank Climate Change Knowledge portal	Currency (e.g. MYR) or % (percentage)	By Sector	Backward-looking			✓						Not available	Not available	Not available	Not available	Not available	Data is not available.	
44	Exposure to physical risks measured as a percentage of business value (e.g. assets, profit or revenue)	Physical vulnerability	Not applicable	Sensitivity measure expressed as a percentage of business value e.g. X% of Revenue	By Entity	Backward-looking							✓	✓	Not available	Not available	Not available	Not available	Not available	The disclosure among Malaysian companies is limited as most have yet to perform/disclose their scenario analysis/stress testing. The data available is mainly from Europe (https://www.spglobal.com/_division_assets/images/special-editorial/understanding-climate-risk-at-the-asset-level/sp-trucost-interplay-of-transition-and-physical-risk-report-05a.pdf).	

Data Needs							Use Cases							Data Availability							Observations on data availability/gaps
Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂)	Dimension (e.g. Sector, Customer)	Time horizon	Climate-related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro-economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency	Time series			
45	Asset value at risk (VaR) arising from natural catastrophes	Physical vulnerability	Climate VaR	% of asset value	By Area	Backward-looking			✓				✓		Easy XDI	https://easyxdi.com/	Proprietary	Annual	Not available	Easy XDI helps to ascertain value at risk for building replacement cost. It covers different perils at individual asset level and location.	
						Forward-looking (projection)										https://easyxdi.com/	Proprietary	Annual	Until 2100		
					By Entity	Backward-looking									MSCI	https://www.msci.com/www/research-report/value-at-risk-for-asset/019081046	Proprietary	Not available	Not available	Data is available upon subscription.	
						Forward-looking (projection)										https://www.msci.com/www/research-report/value-at-risk-for-asset/019081046	Proprietary	Not available	Not available		
46	Environmental, Social & Governance (ESG) score/rating	Combined metrics	1. Rating provider's methodology 2. ESG Book: Arabesque S-Ray Methodology (Global Compact (GC) Score, ESG Score, Temperature Score) 3. R1ESGo	1. Climate Risk / ESG Score rating 2. GC Score: (0-100) on human rights, labour right, environment, anti-corruption 3. ESG Score: (0-100) on environmental, social, and governance 4. Temperature Score: • (tCO ₂ /m\$US) on emissions intensity ratio (EIR) • range from (1.5°C, 2°C, 2.7°C, >2.7°C, 3°C) on the temperature score and is reflected on scenario category	By Sector	Backward-looking	✓	✓		✓					1. arabesque s-ray 2. Sustainalytics 3. FTSE4Good 4. ESGBook	1. sray.arabesque.com 2 https://www.sustainalytics.com/esg-ratings 3. https://www.bursamalaysia.com/trade/our_products_services/indices/tse4good-bursa-malaysia-f4gbm-index 4. https://app.esgbook.com/	Public	Latest update	Latest update	Different methodologies and scales would require internal evaluation, as it is not transparent on how the ESG scoring is derived. The coverage of companies also varies across these platforms. RAM Sustainability offers complimentary R1ESGo industry ratings covering 43 sectors (Level 2) upon registration. R1ESGo industry ratings of up to 94 sub-sectors (Level 3) are available upon subscription.	
					By Entity	Backward-looking	1. MSCI 2. Bloomberg 3. FTSE Russell 4. S&P Global 5. RAM Sustainability	1. https://www.msci.com/our-solutions/esg-investing/esg-ratings 2. https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/ 3. https://www.ftserussell.com/data/sustainability-and-esg-data 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards 5. https://analytics.ram.com.my/ESGRatings	Proprietary												
						Backward-looking	1. arabesque s-ray 2. Sustainalytics 3. FTSE4Good 4. ESGBook	1. sray.arabesque.com 2 https://www.sustainalytics.com/esg-ratings 3. https://www.bursamalaysia.com/trade/our_products_services/indices/tse4good-bursa-malaysia-f4gbm-index 4. https://app.esgbook.com/	Public												
						Backward-looking	1. MSCI 2. Bloomberg 3. FTSE Russell 4. S&P Global 5. RAM Sustainability	1. https://www.msci.com/our-solutions/esg-investing/esg-ratings 2. https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/ 3. https://www.ftserussell.com/data/sustainability-and-esg-data 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards 5. https://analytics.ram.com.my/ESGRatings	Proprietary												
					By Location	Backward-looking	1. arabesque s-ray 2. Sustainalytics 3. FTSE4Good 4. ESGBook	1. sray.arabesque.com 2 https://www.sustainalytics.com/esg-ratings 3. https://www.bursamalaysia.com/trade/our_products_services/indices/tse4good-bursa-malaysia-f4gbm-index 4. https://app.esgbook.com/	Public												
						Backward-looking	1. MSCI 2. Bloomberg 3. FTSE Russell 4. S&P Global	1. https://www.msci.com/our-solutions/esg-investing/esg-ratings 2. https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/ 3. https://www.ftserussell.com/data/sustainability-and-esg-data 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards	Proprietary												
						Backward-looking	1. arabesque s-ray 2. Sustainalytics 3. FTSE4Good 4. ESGBook	1. sray.arabesque.com 2 https://www.sustainalytics.com/esg-ratings 3. https://www.bursamalaysia.com/trade/our_products_services/indices/tse4good-bursa-malaysia-f4gbm-index 4. https://app.esgbook.com/	Public												
					By Fund	Backward-looking	1. MSCI 2. Bloomberg 3. FTSE Russell 4. S&P Global	1. https://www.msci.com/our-solutions/esg-investing/esg-ratings 2. https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/ 3. https://www.ftserussell.com/data/sustainability-and-esg-data 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards	Proprietary												
						Backward-looking	1. arabesque s-ray 2. Sustainalytics 3. FTSE4Good 4. ESGBook	1. sray.arabesque.com 2 https://www.sustainalytics.com/esg-ratings 3. https://www.bursamalaysia.com/trade/our_products_services/indices/tse4good-bursa-malaysia-f4gbm-index 4. https://app.esgbook.com/	Public												
						Backward-looking	1. MSCI 2. Bloomberg 3. FTSE Russell 4. S&P Global	1. https://www.msci.com/our-solutions/esg-investing/esg-ratings 2. https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/ 3. https://www.ftserussell.com/data/sustainability-and-esg-data 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards	Proprietary												
47	Waste management indicators (e.g. Solid waste disposed)	Transition sensitivity	Ministry of Local Government Development (KPKT)	1. Number 2. tonnes	By Entity	Backward-looking	✓		✓	✓					Not available	Not available	Not available	Not available	Not available	DOSM publishes data on municipal waste treated by types of treatment and disposal by state, and quantity of scheduled wastes generated by industry. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 3 Data on solid waste disposed by facility and by category is published on a quarterly basis by KPKT.	
					By Sector	Backward-looking								Not available	Not available	Not available	Not available	Not available			
48	Waste recycled	Combined metrics	Ministry of Local Government Development (KPKT)	tonnes	By Entity	Backward-looking	✓		✓	✓					Not available	Not available	Not available	Not available	Not available	DOSM publishes data on recycling rates (in percentage form). Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 3	
					By Sector	Backward-looking								Not available	Not available	Not available	Not available	Not available	KPKT published data on recyclable waste collection on its statistical report: https://www.kpkt.gov.my/index.php/pages/view/700?mid=586		
49	Water management indicators (e.g. water allocation and management)	Transition sensitivity	National Water Services Commission (SPAN)	Million litres per day	By Country	Backward-looking	✓	✓	✓	✓				National Water Services Commission (SPAN)	https://www.span.gov.my/document/upload/ExULH8APaxLhLE4vailErDx5v4KJXDCx.pdf	Public	Annual	2017-2021	SPAN publishes data on raw water extraction and production in the annual water and sewerage fact book. However, only Peninsular Malaysia states and W. P. Labuan are under the coverage of SPAN.		
50	Water consumption	Transition sensitivity	National Water Services Commission (SPAN)	Cubic metre	By Sector	Backward-looking	✓	✓	✓	✓				DOSM	https://newss.statistics.gov.my/newss-portalep/ep/Product/FreeDownloadSearch.seam	Public	1. Annual (Compendium) 2. One-off (MySEEA PSUT)	1. 2016-2022 (Compendium) 2. 2015 (MySEEA PSUT)	DOSM publishes data on metered water consumption by sector (domestic and non-domestic) and state. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 2 (2.49 in the PDF version of the Compendium) DOSM also publishes data on uses of abstracted water by sector. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'MySEEA PSUT Water 2015' SPAN publishes total water consumption by states (Peninsular Malaysia states and W. P. Labuan): https://www.span.gov.my/document/upload/ExULH8APaxLhLE4vailErDx5v4KJXDCx.pdf		
					By Entity	Backward-looking								Water utility companies by state	Not available	Confidential	Not available	Not available	Data is not available.		
51	Treated wastewater (Proportion of wastewater that is treated to reduce pollutants before being discharged to the environment, by level of treatment)	Transition sensitivity	National Water Services Commission (SPAN)	Cubic metre	By Sector	Backward-looking	✓	✓	✓	✓				Not available	Not available	Not available	Not available	Not available	DOSM publishes data on wastewater flows by sector. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'MySEEA PSUT Water 2015'		
					By Entity	Backward-looking								SPAN	Not available	Confidential	Not available	Not available	SPAN publishes data on public sewage treatment plant by states (Peninsular Malaysia states and W. P. Labuan): https://www.span.gov.my/document/upload/ExULH8APaxLhLE4vailErDx5v4KJXDCx.pdf Data by operator is compiled by SPAN however, the data is not available publicly.		

No.	Data Needs							Use Cases							Data Availability					Observations on data availability/gaps
	Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂)	Dimension (e.g. Sector, Customer)	Time horizon	Climate- related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro- economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency	Time series	
52	Map of Biodiversity Risk Hotspots (e.g. high conservation value forests, high biodiversity value ecosystems etc.)	Physical vulnerability	Convention on Biological Diversity (CBD)	Not Applicable	By Geographical area	Backward-looking		✓	✓						1. DOSM 2. Malaysia Biodiversity Information System (MyBIS) of NRECC (formerly known as KeTSA) 3. Protected Planet 4. Global Biodiversity Information Facility 5. Natural Capital Finance Alliance	1. https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam 2. https://www.mybis.gov.my/one/pamaps.php 3. https://www.protectedplanet.net/country/MYS 4. https://www.gbif.org/country/MY/about 5. https://encore.naturalcapital.finance/en/map	Public	Annual	1. DOSM: 2016-2022 2. MyBIS: Not available 3. Protected Planet: 2021 4. GBIF: 1700 - 2022 5. ENCORE: Not available	1. DOSM complies various biodiversity data such as number of fauna species by category, endemic fauna species by class, number of flora and fauna species in gazetted and totally protected areas. Go to DOSM eStatistik > click on 'Free Download' on the left pane on the page > search 'Compendium of Environment Statistics' > Table of Component 1. 2. MyBIS provides a list of protected areas in Malaysia (Protection Forest Reserve, Virgin Jungle Reserve etc). 3. Protected Planet provides interactive maps of Terrestrial and Inland Waters Protected Areas, and Marine Protected Areas. Other effective area-based conservation measures in Malaysia are sourced by NRECC (formerly known as KeTSA) and other relevant agencies. Latest update was in 2021. Also provides information on the assessment of management effectiveness of selected areas and IUCN Green List of Protected and Conserved Areas. 4. GBIF provides data on biodiversity locations in Malaysia, through polygons which consists of data of 'occurrences' of species 5. ENCORE Tool: explores how economic activities impact ecosystem services and natural capital. Impact drivers from certain terrestrial ecosystem categories can be selected and the available data is heat map data of different types of land cover in 2021. Some categories also have external links that explain more heat map data (statistical data, line charts). The map is available as a snapshot.
53	Estimation of environmental costs and benefits (esp. ESAs/high priority biodiversity hotspots)	Physical vulnerability	Convention on Biological Diversity (CBD)	Currency (e.g. MYR)	By Geographical area	Backward-looking		✓	✓						Not available	Not available	Not available	Not available	Not available	Data is not available.
54	Map of environmentally sensitive areas (ESAs)	Physical vulnerability	1. Forestry Department of Peninsular Malaysia 2. National Forestry Act 1984 3. Malaysian Criteria and Indicators for Sustainable Forest Management (MC&I SFM)	Not Applicable	By Geographical area	Backward-looking		✓	✓						PLANMalaysia	https://myplan.planmalaysia.gov.my/www/#	Public	Every 5 years since 2016	1. 2014 (3rd NPP) 2. 2020 (4th NPP)	1. 3rd NPP (2016) page 26 -27 has maps on ESAs of Peninsular Malaysia (2014) and Sabah and Federal Territory of Labuan (2030-2033 plans) 2. 4th NPP (2021) is available only in Bahasa Melayu and short of information on Sabah & Sarawak, as map in 'Pelau 5-10' on page 42 is on Peninsular Malaysia and Federal Territory of Labuan.
55	Forest Change (Forest Loss, Tree Cover Loss, Location of Tree Cover Loss, FAO Deforestation)	Physical vulnerability	1. Forestry Department of Peninsular Malaysia 2. Forest Department Sarawak 3. Sabah Forestry Department 4. National Forestry Act 1984 5. Malaysian Criteria and Indicators for Sustainable Forest Management (MC&I SFM)	Unit for land area	By Geographical area	Backward-looking		✓	✓						1. Forestry Department of Peninsular Malaysia 2. Forest Department Sarawak 3. Sabah Forestry Department 4. Global Forest Watch 5. World Bank	1. https://www.forestry.gov.my/en/2016-06-07-02-53-46/2016-06-07-03-12-29 2. https://forestry.sarawak.gov.my/page-0-461-1170-FACTS-FIGURES.html 3. https://forest.sabah.gov.my/ https://forest.sabah.gov.my/images/pdf/publication/annualreport/AR2021%28Final%29.pdf 4. https://www.globalforestwatch.org/ 5. http://wdi.worldbank.org/table/3.4#	Public	Varies	1. 2011 - 2020 (Peninsular Malaysia) 2. 2020 (S'wak) 3. 2020 (Sabah) 4. 2001-2022 (Global Forest Watch) 5. 1990 and 2020 (World Bank)	1. Forestry Department of Peninsular Malaysia provides forestry statistics (e.g. forested and non forested area) from 2011 to 2020. 2. Forest Department Sarawak Facts and Figures page has data on forest covered area for 2020 only. 3. Sabah Forestry Department provides forest resource management information (e.g. forest cover) and 2021 Annual report mentioned on forest cover loss in 2020 compared to 2018. 4. Global Forest Watch provides analysis of primary forest loss, tree cover loss etc in Malaysia. This can be done by clicking the map of Malaysia and 'Analyse' 5. World Bank provides data on forest area (sq. km) in 1990 and in 2020, data on forest loss can be derived from the data. 6. Article by Friends' of the Earth Malaysia (https://foe-malaysia.org/articles/statistical-data-on-forested-and-conservation-areas-in-malaysia-2/) has information on size of forested areas in Peninsular Malaysia, Sabah and Sarawak from 1990/2005 to 2018 and links to various sources.
56	Share of cost of raw materials with high environmental impact against revenue	Combined metrics	Not applicable	% or ratio	By Entity	Backward-looking				✓					Not available	Not available	Not available	Not available	Not available	Data is not available.
57	Climate Change Target	Transition sensitivity	Plans submitted to the UNFCCC should be taken as key reference	Scenarios, Tonnes CO ₂ e	By Country	Forward-looking (projection)	✓		✓	✓	✓		✓	✓	1. EPU 2. NRECC (formerly known as KASA) 3. UNFCCC	1. https://www.epu.gov.my/en/sustainable-development-goals 2. https://www.kasa.gov.my/resources/alam-sekitar/Low-Carbon-Mobility-Blueprint-2021-2030/4/ 3. https://unfccc.int/sites/default/files/NDC/2022-06/Malaysia%20NDC%20Updated%20Submission%20to%20UNFCCC%20July%202021%20final.pdf	Public	Varies among countries, at least annual	2018 & 2019 (EPU) 2021-2030 (NRECC & UNFCCC)	EPU provides overall information on Malaysia SDGs, with links to SDGs for 2018 and 2019. NRECC (formerly known as KASA) & UNFCCC provides information on Nationally Determined Contribution targets.
58	Percentage of customer preference on sustainability products/services	Transition sensitivity	Market study	Scenario, %	By Sector	Backward-looking			✓			✓			Customer survey / study	Not available	Not available	Not available	Not available	Data is not available.
						Forward-looking (projection)									Customer survey / study	Not available	Not available	Not available	Not available	
					By Customer segment	Backward-looking									Customer survey / study	Not available	Not available	Not available	Not available	
						Forward-looking (projection)									Customer survey / study	Not available	Not available	Not available	Not available	
59	Exposure to transition risks	Combined metrics	1. OECD 2. IMF	Sensitivity measure expressed as a percentage of business value e.g. percentage of Revenue	By Sector	Backward-looking		✓		✓			✓	✓	Not available	Not available	Not available	Not available	Not available	Country-level data is published by IMF: https://climatedata.imf.org/pages/fi-indicators/#f1
						Forward-looking (projection)									Not available	Not available	Not available	Not available	Not available	
					By Entity	Backward-looking									Not available	Not available	Not available	Not available	Not available	
						Forward-looking (projection)									Not available	Not available	Not available	Not available	Not available	
					By Location	Backward-looking									Not available	Not available	Not available	Not available	Not available	
						Forward-looking (projection)									Not available	Not available	Not available	Not available	Not available	
60	Indicators capturing technological innovation	Transition sensitivity	Not applicable	Not Applicable	By Sector	Backward-looking			✓	✓					Not available	Not available	Not available	Not available	Not available	Data is not available.
				Not Applicable	By Entity	Backward-looking									Not available	Not available	Not available	Not available	Not available	
				Not Applicable	By Country	Backward-looking									Not available	Not available	Not available	Not available	Not available	
61	Price of permit under the emission trading scheme	Footprint	World Bank Carbon Pricing Dashboard	USD/Tonnes CO ₂ e	By Region	Backward-looking	✓								World Bank	https://carbonpricingdashboard.worldbank.org/map_data	Public	Annual	2005-2022	Data is only available for the EU region, starting from 2005.
						Forward-looking (projection)									Not available	Not available	Not available	Not available	Not available	Data is not available. Another mechanism for carbon pricing is the Voluntary Carbon Market (VCM) which currently is an initiative under the purview of the Ministry of Finance (MoF) and Ministry of Natural Resources, Environment and Climate Change (NRECC, formerly known as KASA), and Bursa Malaysia Berhad (Bursa). Bursa has launched the Bursa Carbon Exchange (BCX) on 9 Dec 2022, which is a voluntary carbon market (VCM) and the world's first shariah-compliant carbon exchange. The first trade via auction on the BCX is expected to commence in March 2023. https://www.bursamalaysia.com/sites/5bb54be15136ca0a339077a/content_entry617bfd2839ba20f54a06574/632bbd555b711a1976102da6/files/Bursa_Malaysia_VCM_Exchange.pdf?1664349271 https://www.theedgemarkets.com/article/bursa-malaysia-launches-first-shariahcompliant-carbon-exchange
62	Government's sustainability-related financing needs	Mobilisation	Not applicable	Currency (e.g. MYR)	By Sector	Forward-looking (projection)				✓					Government Agencies	Not available	Not available	Not available	Not available	Climate finance provided by developed countries can be found at: https://www.oecd.org/env/climate-finance-provided-and-mobilised-by-developed-countries-aggregate-trends-updated-with-2019-data-03590fb7-en.htm
63	Private sector's financing needs	Mobilisation	Not applicable	Currency (e.g. MYR)	By Sector	Forward-looking (projection)				✓					Not available	Not available	Not available	Not available	Not available	List of certified companies and projects by Green Technology Financing Scheme (GTFS) can be found here: https://www.gtfs.my/certified

No.	Data Needs						Use Cases								Data Availability					Observations on data availability/gaps
	Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂)	Dimension (e.g. Sector, Customer)	Time horizon	Climate-related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro-economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency	Time series	
64	Insured and uninsured losses related to natural catastrophes	Physical vulnerability	Insurance and takaful claims due to natural catastrophes	Currency (e.g. MYR)	By Entity	Backward-looking			✓						1. Insurance Services Malaysia 2. Insurers and takaful operators	Not available	Confidential	Not available	Not available	Data by entity can be requested on ad-hoc basis from Insurance Services Malaysia. ISM collects data on insured related natural catastrophes, but only applicable to flood under fire class. Munich RE, Swiss RE and BoE have reported this information but on a global basis and aggregated level. Global for Munich RE only: 1. https://www.munichre.com/content/dam/munichre/mrwebsitelaunches/natcat-2022/2021_Figures-of-the-year.pdf/_jcr_content/trenditions/original/2021_Figures-of-the-year.pdf 2. https://www.swissre.com/institute/research/sigma-research/sigma-2021-01.html 3. https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2017/the-banks-response-to-climate-change.pdf?_a=en&hash=7DF676C781ESFAEE994C2A210A6B9EE44879387 Data on "Number of Policies/Certificates", "Number of Claims", "Gross Claims Incurred" and "Net Claims Incurred" by climate change-related products, such as Flood under Motor class, Fire class and Other class are collected from insurers and takaful operators on a half-yearly basis by BNM via CCPT reporting.
65	Exclusion of controversial sectors in the investment/ lending policy	Transition sensitivity	1. Sustainability rating providers (e.g., RobecoSAM, International Capital Market Association (ICMA), MSCI, CBI, S&P Global) 2. International organisations (i.e., UNEP FI, IFC) 3. Research bodies (i.e., Institute for Energy Economics and Financial Analysis (IEEFA), Bursa Malaysia, Shariah, SRI Responsible Financing guidelines)	Qualitative	By Sector	Does not apply				✓					1. Entities a) BNP Paribas b) CIMB c) RHB Group d) Amundi e) Robeco 2. Institutions/organisations a) IFC b) IEEFA c) UNEP FI 2. Institutions/organisations a) https://www.ifc.org/wps/wcm/connect/28a1d656-dfec-4295-8b9-a9be7e45549a/IFC%2BExclusion%2BList.pdf?MOD=AJPERES&CVID=kplOITY b) https://about.amundi.com/files/nuxeo/dl/c44a7bb2-813b-4346-96e0-e3d695241d9b c) https://www.robeco.com/docm/docu-exclusion-list.pdf 2. Institutions/organisations a) https://www.ieefa.org/coal-divestment b) https://www.unepfi.org/publications/turning-the-tide-recommended-exclusions/ c) https://www.unepfi.org/publications/turning-the-tide-recommended-exclusions/	1. Entities a) https://group.bnpparibas/uploads/file/2021_eu_sustainable_finance_disclosure_bnp_paribas_asset_management_english.pdf b) https://www.cimb.com/content/dam/cimb/group/documents/sustainability/2019%20CIMB%20Bank%20SDG%20Bond%20Framework_Final.pdf c) https://www.rhbgroupp.com/files/others/sustainability/RHB_Our_Approach_to_Sustainability_Mar_2020_v3_1.pdf d) https://about.amundi.com/files/nuxeo/dl/c44a7bb2-813b-4346-96e0-e3d695241d9b e) https://www.robeco.com/docm/docu-exclusion-list.pdf 2. Institutions/organisations a) https://www.ifc.org/wps/wcm/connect/28a1d656-dfec-4295-8b9-a9be7e45549a/IFC%2BExclusion%2BList.pdf?MOD=AJPERES&CVID=kplOITY b) https://www.ieefa.org/coal-divestment c) https://www.unepfi.org/publications/turning-the-tide-recommended-exclusions/	Public	Periodic	Periodic	Some financial institutions and asset managers publish list of sectors or categories deemed to be controversial. The IFC provides a list of projects that IFC does not finance. IEEFA has data on coal divestment by banking institutions, asset managers and insurers/reinsurers. UNEP FI data is accessible upon registration. The updated document provides an overview of the recommended activities to exclude from financing in the sustainable blue economy, based on market-first 'Turning the Tide' and 'Diving Deep' guidance for financial institutions.
66	Sustainability Index Membership	Transition sensitivity	Based on index providers	Status	By Entity	Forward-looking (projection)				✓					1. MSCI 2. FTSE Russell	1. https://www.msci.com/our-solutions/indexes/esg-focus-indexes 2. https://www.ftserussell.com/index/spotlight/sustainable-investment-data-and-indexes	Proprietary	1. Quarterly (MSCI) 2. Not available (FTSE Russell)	Not available	Data is accessible upon subscription. MSCI ESG Focus Indices target companies with positive ESG characteristics. FTSE Russell integrates Environmental, Social and Governance (ESG) considerations into index benchmarks.
67	Revenue mix of environmental opportunities (renewable energy, clean tech, energy efficiency, pollution control, sustainable growth, and green technology)	Combined metrics	Not applicable	% or ratio	By Sector	Backward-looking				✓					Not available	Not available	Not available	Not available	Not available	Data is not available.
68	Insurance premium for coverage against natural disasters	Physical vulnerability	Not applicable	Currency (e.g. MYR)	By Sector	Backward-looking			✓						Insurers, takaful operators	Not available	Confidential	Not available	Not available	Data on "Gross Earned Premium/Contribution" and "Net Earned Premium/Contribution" by climate change-related products, such as Flood under Motor class, Fire class and Other class are collected from insurers and takaful operators on a half-yearly basis by BNM via CCPT reporting. Aggregated data on premiums/contributions and claims by general business classes such as Fire, Motor, Medical and Health from insurance and Takaful industry are published on the BNM website via https://www.bnm.gov.my/publications/mhs since 2009 on a half-yearly basis. However, there is no specific information/category for natural disasters. Insurance Services Malaysia (ISM) publishes the ISM Statistical Yearbook on an annual basis via https://www.ism.net.my/news-updates/ (requires free registration to access/download). The Yearbook provides key data on Malaysian insurance and takaful industry, such as premiums/contributions by line of business, net earned premiums/contributions, net claims incurred ratio etc. However, there is no specific information/category for natural disasters.
69	Government legislation, masterplan, blueprint, announcements, strategy and policy on sustainability and climate change	Alignment	Not applicable	Not applicable	By Country	Backward-looking / Forward-looking (projection)	✓								1. DOE 2. NRECC (formerly known as KASA) 3. SEDOA - Renewable Energy Act 2011 4. NRECC (formerly known as KeTSA) 5. EPU 6. Climate Action Tracker	1. https://www.doe.gov.my/portal/1/en/tentang-jas/pengenalan/dasar-alam-sekitar 2. https://www.kasa.gov.my/resources/alam-sekitar/Low-Carbon-Mobility-Blueprint-2021-2030/12/ 3. https://www.seda.gov.my/ms/polis/akta-tenaga-boleh-baharu-2011/ 4. https://www.pmo.gov.my/2019/07/national-policy-on-climate-change/ 5. https://www.epu.gov.my/sites/default/files/2022-09/National_Energy_Policy_2022-2040.pdf 6. https://climateactiontracker.org/	Public	Annual	1. 2021-2030 2. 2016-2030 (Climate Action Tracker)	Information is readily available but not exhaustive. Climate Action Tracker provides information on the policies in multiple countries, however Malaysia is not included.
70	Capital requirements from insurance exposure to weather-related catastrophic events as a percentage of total capital available	Physical vulnerability	Not applicable	Currency (e.g. MYR) or % (percentage)	By Sector	Backward-looking			✓						Not available	Not available	Not available	Not available	Not available	Capital requirement on catastrophe risk (including natural catastrophe) is currently not explicitly accounted for in the Risk Based Capital (RBC) Framework. As part of the ongoing holistic review of RBC framework, BNM is exploring to include catastrophe risk as a new risk category in insurance/takaful risk capital requirement.
					By Entity	Backward-looking									Not available	Not available	Not available	Not available	Not available	
71	Climate Risk Score of Listed Companies	Combined metrics	Rating provider's methodology	Climate Risk / ESG Score rating	By Sector	Backward-looking				✓					1. Transition Pathway Initiative 2. Bursa Malaysia	1. https://www.transitionpathwayinitiative.org/ 2. https://www.bursamalaysia.com/trade/our_products_services/indices/ftse4good-bursa-malaysia-f4gbm-index	Public	Varies by data providers	Varies by data providers	Methodologies, assumptions and models vary across different providers and would require internal evaluation.
						Backward-looking									1. Carbon Disclosure Project (CDP) 2. Fitch 3. MSCI 4. S&P 5. Sustainalytics	1. https://www.cdp.net/en/companies/companies-scores#446647786929955804cc9a3a08ef1eb4 2. https://www.fitchratings.com/products/subscribe 3. https://esgdirect.msci.com/ 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards 5. https://www.sustainalytics.com/esg-rating	Proprietary	Varies by data providers	Varies by data providers	
					By Entity	Backward-looking									1. Transition Pathway Initiative 2. Bursa Malaysia	1. https://www.transitionpathwayinitiative.org/ 2. https://www.bursamalaysia.com/trade/our_products_services/indices/ftse4good-bursa-malaysia-f4gbm-index	Public	Varies by data providers	Varies by data providers	
						Backward-looking									1. Carbon Disclosure Project (CDP) 2. Fitch 3. MSCI 4. S&P 5. Moody's 6. Sustainalytics	1. https://www.cdp.net/en/companies/companies-scores#446647786929955804cc9a3a08ef1eb4 2. https://www.fitchratings.com/products/subscribe 3. https://esgdirect.msci.com/ 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards 5. https://esg.moody's.io/climate-solutions 6. https://www.sustainalytics.com/esg-rating	Proprietary	Varies by data providers	Varies by data providers	
					By Location	Backward-looking									1. Transition Pathway Initiative 2. Bursa Malaysia	1. https://www.transitionpathwayinitiative.org/ 2. https://www.bursamalaysia.com/trade/our_products_services/indices/ftse4good-bursa-malaysia-f4gbm-index	Public	Varies by data providers	Varies by data providers	
						Backward-looking									1. Carbon Disclosure Project (CDP) 2. Fitch 3. MSCI 4. S&P 5. Moody's 6. Sustainalytics	1. https://www.cdp.net/en/companies/companies-scores#446647786929955804cc9a3a08ef1eb4 2. https://www.fitchratings.com/products/subscribe 3. https://esgdirect.msci.com/ 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards 5. https://esg.moody's.io/climate-solutions 6. https://www.sustainalytics.com/esg-rating	Proprietary	Varies by data providers	Varies by data providers	
						Backward-looking									1. Transition Pathway Initiative 2. Bursa Malaysia	1. https://www.transitionpathwayinitiative.org/ 2. https://www.bursamalaysia.com/trade/our_products_services/indices/ftse4good-bursa-malaysia-f4gbm-index	Public	Varies by data providers	Varies by data providers	
						Backward-looking									1. Carbon Disclosure Project (CDP) 2. Fitch 3. MSCI 4. S&P 5. Moody's 6. Sustainalytics	1. https://www.cdp.net/en/companies/companies-scores#446647786929955804cc9a3a08ef1eb4 2. https://www.fitchratings.com/products/subscribe 3. https://esgdirect.msci.com/ 4. https://www.spglobal.com/ratings/en/research-insights/special-reports/esg-in-credit-ratings/sector-report-cards 5. https://esg.moody's.io/climate-solutions 6. https://www.sustainalytics.com/esg-rating	Proprietary	Varies by data providers	Varies by data providers	

No.	Data Needs						Use Cases								Data Availability					Observations on data availability/gaps
	Data Items	Category/ Metric	Methodology/ Standard/ Classification/ Taxonomy/ Reference	Unit (e.g. CO ₂)	Dimension (e.g. Sector, Customer)	Time horizon	Climate-related disclosures	Exposure quantification	Financial stability monitoring	Investment and lending decisions	Macro-economic modelling	Product development	Scenario analysis	Stress testing	Data Source/Compiler/ Provider	Link	Accessibility (Public/Proprietary/ Confidential/Public (With API)/Not available)	Frequency	Time series	
72	Executive remuneration linked to climate considerations	Transition sensitivity	Not applicable	Currency (e.g. MYR) or % (percentage)	By Entity	Backward-looking			✓						Entity	Not available	Not available	Not available	Not available	Companies which are incorporating ESG/climate considerations into executive remuneration did not provide much details on how these are linked to remuneration. For ESG-linked remuneration practiaces in ASEAN, refer to https://www.sfnstitute.asia/wp-content/uploads/2022/05/integrating-esg-remuneration-final-version.pdf Data is generally not available. Data users have to rely on news article or publications by entities to obtain relevant data.
73	Detailed plans submitted to authority to achieve carbon neutral or net zero	Alignment	GHG Protocol Corporate Accounting and Reporting Standard for Accounting	CO ₂ mil MT per year	By Entity	Forward-looking (projection)	✓								Entity	Not available	Not available	Not available	Not available	Data is not available.
74	Climate-adjusted Probability of Defaults (PDs)	Combined metrics	Not applicable	Climate Risk / ESG Score rating	By Sector	Backward-looking				✓					Not available	Not available	Not available	Not available	Not available	Data is not readily available, requires methodology to model climate risk and embed this into the PDs of customers or counterparties.
					By Loan purpose	Backward-looking									Not available	Not available	Not available	Not available	Not available	
					By Entity	Backward-looking									Entity	Not available	Confidential	Not available	Not available	
					By Location of utilisation	Backward-looking									Not available	Not available	Not available	Not available	Not available	
75	List of companies with ISO 14000	Combined metrics	ISO 14000	Number of companies	By Entity	Backward-looking	✓								Certification Body	Not available	Not available	Not available	Not available	There is currently no centralised database for Malaysia that stores the comprehensive list of companies with ISO 14000 certification. Each certification body keep their own copy of companies or products that are certified by themselves. They are not required to submit the list of the data/companies that they have certified to the standard setters e.g. Standard Malaysia (Dept of Standard Malaysia) or UKAS, however they are being audited (sampling basis) by the standard setters.
76	Litigation claims and cases	Physical vulnerability	1. Laws and policies (International and local) 2. DOE	Number of claims/cases	By Sector and Case	Backward-looking			✓						1. DOE 2. Climate Case Chart 3. London School of Economics (LSE)	1. https://www.doe.gov.my/portalv1/en/awam/maklumat-umum/paparan-kes-mahkamah 2. http://climatecasechart.com/climate-change-litigation/non-us-climate-change-litigation/ 2. https://climate-laws.org/litigation_cases 3. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/07/Global-trends-in-climate-change-litigation_2021-snapshot.pdf	Public	1. Monthly (DOE) 2. Varies (Climate Case Chart, LSE)	1. 2014-2022 (DOE) 2. Varies (Climate Case Chart, LSE)	Department of Environment (DOE) publishes court cases on their website with the name of offender, type of offence, and penalty on monthly basis. Only Global Climate Change Litigation data is available. Simplified trend of total cases data for certain countries (including Malaysia) is available at https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/07/Global-trends-in-climate-change-litigation_2021-snapshot.pdf eLaw.my is a database for Malaysian court judgements and legislations and can be accessed via paid subscription: https://www.elaw.my
					By Entity										DOE	https://www.doe.gov.my/en/court-case-list/	Public	Monthly	2014-2022	Department of Environment (DOE) publishes/announces information on court cases related to environmental offences. The information published/announced include name of company/individual, date, Act, offences, court & date of decision and penalties.
77	Circular economy indicator: Percentage of Circular economy to the GDP Sector	Alignment	1. European Commission (EC) 2. Organisation for Economic Co-operation and Development (OECD)	Percentage (%)	By Sector	Backward-looking			✓						Not available	Not available	Not available	Not available	Not available	Data is not readily available and will require further relevant indicators for the calculation of percentage of circular economy to the GDP.
78	Green Buidling Index	Transition sensitivity	1. Green Building Index (GBI) rating system 2. GreenRE Tools and Design Reference Guide	Number	By Project/ Building	Backward-looking				✓					1. Green Building Index (GBI) 2. GreenRE	1. https://www.greenbuildingindex.org/how-gbi-works/gbi-executive-summary/ 2. https://www.greenre.org/rating_tools	Public	Latest Update	1. 2013-2022 (GBI) 2. Periodic update (GreenRE)	Data is readily available.
79	Notre Dame - GAIN Country Index	Transition sensitivity	Notre Dame - Gain Country Index	Score	By Country	Backward-looking			✓						University of Notre Dame	https://gain.nd.edu/our-work/country-index/	Public	Annual	1995-2020	The Notre Dame Index is derived from readiness & vulnerability index data.
80	United Nations Global Compact (UNGC) Score	Combined metrics	UNGC	% / Range	By Entity	Backward-looking				✓					1. arabesque s-ray 2. ESGBook	1. https://sray.arabesque.com/ 2. https://app.esgbook.com/dashboard	Public	Upon update	Upon update	The UNGC scores are accessible by the public with minimal registration through ESGBook. The coverage of companies, methodologies and scales vary across these platforms and would require internal evaluation, as it is not transparent on how the GC scoring is derived.
															1. MSCI 2. Moody's	1. https://esgdirect.msci.com/ 2. https://esg.moody's.io/	Proprietary	Upon update	Upon update	Data is available upon subscription. Moody's also collects data on detailed scores for each of the core UNGC themes.
81	Mortality rate arising from climate change	Physical vulnerability	World Bank	Number of deaths per 1000 live births	By Country	Backward-looking							✓	✓	Not available	Not available	Not available	Not available	Not available	The general mortality rate is published by several organisations: 1. World Bank (https://data.worldbank.org/indicator/SP.DYN.IMRT.IN?locations=MY) 2. WHO (https://www.who.int/data/gho/data/countries/country-details/GHO/malaysia?countryProfileId=56662d20-4890-4511-a55b-77132f6dd227) 3. UN DESA Population Division (https://population.un.org/wpp/Download/Standard/Mortality/) 4. DOSM (https://www.dosm.gov.my/v1/index.php?r=column1cone&menu_id=c93U2RhZk9HNmxQ53hTOSuMVVLdz09)
					By State/ Territories										Not available	Not available	Not available	Not available	Not available	DOSM publishes data on the general mortality rate by states: https://newss.statistics.gov.my/newss-portalx/ep/epProductFreeDownloadSearch.seam . Go to DOSM eStatistik > click 'Free Download' on the left pane on the page > search 'Abridged Life Tables'
82	Morbidity rate arising from climate change	Physical vulnerability	Ministry of Health (MOH)	Number of people getting a disease over a population	By State	Backward-looking							✓	✓	Not available	Not available	Not available	Not available	Not available	Only general data on specific years are available based on the National Health & Morbidity Survey conducted by National Institute of Health, Ministry of Health Malaysia: https://ku.gov.my/nhms (On the NHMS Report, Infographics and Fact Sheet section)

Climate Data Catalogue

Glossary

Metric Type	Definition
Footprint	GHG emissions caused directly or enabled by an individual, event, organisation, service or product.
Transition sensitivity	The disruption caused by adjusting to a low-carbon economy, which may be the result of policy changes, technological innovation, or social adaptation.
Physical vulnerability	The direct damage to assets or property that may come about owing to a changing climate (for example rise in sea levels) or extreme weather events.
Alignment	Tracks progress towards a 2°C world.
Mobilisation	Capture growth in green financing (i.e. scaling up green finance).
Combined metrics	Metrics aggregating a combination of the above metrics to provide insight on the extent to which a firm manages environmental, social and governance issues.

Source: NGFS

Use Cases	Definition
Climate-related disclosures	Reports provided by corporations about climate-related factors, including indicators such as carbon footprint
Exposure quantification	The measurement on the maximum potential loss on financial instruments
Financial stability monitoring	The assessment of financial systems vulnerabilities, defined as the collection of factors that contribute to the potential for widespread externalities
Investment and lending decisions	The decision made on the amount of funds to be deployed in investment opportunities
Macroeconomic modelling	The study on the impacts of climate-related issues on macroeconomic indicators
*Product development	The development of new financial products to support green growth or industry's alignment to the climate agenda
Scenario analysis	The assessment on the impact of different possible climate change pathways/scenarios to risk profile
Stress testing	The risk framework methods that focus on the sensitivity of portfolios and the impact climate change (the likelihood and severity of the materialisation of climate-related risks) has on exposures' actual riskiness

* Product development is an additional use case as compared to NGFS' use cases

Source: NGFS

Climate Data Catalogue

List of Acronyms

Acronyms	Meaning
ACMF	ASEAN Capital Markets Forum
API	Application Programming Interface
AR5	Fifth Assessment Report
ASEAN	Association of Southeast Asian Nations
BNM	Bank Negara Malaysia
BPAM	Bond Pricing Agency Malaysia
BoE	Bank of England
Btu	British Thermal Unit
CBD	Convention on Biological Diversity
CBI	Climate Bonds Initiative
CCKP	Climate Change Knowledge Portal
CCPT	Climate Change and Principal-based Taxonomy
CDP	Carbon Disclosure Project
CMIP 5	Coupled Model Intercomparison Project Phase 5
CMIP 6	Coupled Model Intercomparison Project Phase 6
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CoastalDEM	Coastal Digital Elevation Model
DID	Department of Irrigation and Drainage
DOE	Department of Environment
DOSM	Department of Statistics Malaysia
Easy XDI	Easy eXtensible Data Interchange
EC	Energy Commission
EEA	European Environment Agency
EIR	Emissions Intensity Ratio
ENCORE	Exploring Natural Capital Opportunities, Risks and Exposure
EPU	Economic Planning Unit
ESA	Environmentally Sensitive Area
ESG	Environmental, Social & Governance
EU	European Union
EUR	Eurodollar
FAO	Food and Agriculture Organization
FAST	Fully Automated System for Issuance/Tendering
FTSE	Financial Times Stock Exchange
GBI	Green Building Index
GBIF	Global Biodiversity Information Facility
GC	Global Compact
GDP	Gross Domestic Product
Gg	(Giga) gram
GHG	Greenhouse Gases
GreenRE	Green Real Estate
GSO	Grid System Operator
GTFS	Green Technology Financing Scheme
ICMA	International Capital Market Association
IEA	International Energy Agency
IEEFA	Institute for Energy Economics and Financial Analysis
IFC	International Finance Corporation
IMF	International Monetary Fund
INFORM	Index for Risk Management
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardisation
IUCN Red List	International Union for Conservation of Nature's Red List

Acronyms	Meaning
KPKT	Ministry of Local Government Development
ktoe	(Kilo) Tonne of Oil Equivalent
kWh	(Kilo) Watt Hour
LSE	London School of Economics
MC&I SFM	Malaysian Criteria and Indicators for Sustainable Forest Management
MEIH	Malaysia Energy Information Hub
METAR	METEorological Aerodrome Report
MetMalaysia	Malaysian Meteorological Department
MGTC	Malaysian Green Technology and Climate Change Corporation
MMBtu	(Metric Million) British Thermal Unit
MoF	Ministry of Finance
MOH	Ministry of Health
MSCI	Morgan Stanley Capital International
MSIC	Malaysia Standard Industrial Classification
MWh	(Mega) Watt Hour
MyBIS	Malaysia Biodiversity Information System
MYR	Malaysian Ringgit
MySEEA	Malaysia System of Environmental-Economic Accounting
NADMA	National Disaster Management Agency
NAHRIM	National Hydraulic Research Institute of Malaysia
NASDAQ	National Association of Securities Dealers Automated Quotations
ND-GAIN Index	Notre Dame Global Adaptation Initiative Index
NGFS	Network for Greening the Financial System
NPP	National Physical Plan
NRECC	Ministry of Natural Resources, Environment and Climate Change (formerly known as Ministry of Environment and Water (KASA) and Ministry of Energy and Natural Resources (KeTSA))
OECD	Organisation for Economic Co-operation and Development
PD	Probability of Default
PDPA	Personal Data Protection Act 2010
PLANMalaysia	Department of Town and Country Planning
PLC	Public Listed Companies
PRECIS	Providing Regional Climates for Impacts Studies
PSUT	Physical Supply & Use Table
PV	Photovoltaic
PVMS	PV Monitoring System
RBC	Risk Based Capital
RCP	Representative Concentration Pathway
Reg HCM	Regional Hydro-Climate Model
S&P	Standard and Poor's
SBTi	Science Based Targets initiative
SDG	Sustainable Development Goals
SEB	Sarawak Energy Berhad
SEDA	Sustainable Energy Development Authority
SESB	Sabah Electricity Sdn. Bhd
SME	Small and Medium-sized Enterprise
SPAN	National Water Services Commission
SPI	Standardized Precipitation Index
SRI	Sustainable and Responsible Investment
TAF	Terminal Area Forecast
TCFD	Task Force on Climate-Related Financial Disclosures
TNB	Tenaga Nasional Berhad
UKAS	United Kingdom Accreditation Service
UN	United Nations

Acronyms	Meaning
UN DESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNFCCC	United Nations Framework Convention on Climate Change
UNGC	United Nations Global Compact
US	United States of America
USD	United States Dollar
VaR	Value at Risk
WHO	World Health Organisation
WWF	World Wide Fund for Nature