
Discussion Paper

on

Climate Risk and Sustainable Finance



Reserve Bank of India

Department of Regulation



TABLE OF CONTENTS

Sr.	Particulars	Page No.
1.	Introduction	2
2.	Strategy on Climate Change	4
A.	Overview of climate related risk and its unique characteristics as applicable to REs	5
B.	Broad guidance for all REs to have (i) appropriate governance (ii) strategy to address climate change risks and (iii) risk management structure to effectively manage them from a micro-prudential perspective	8
C.	Exploring how forward-looking tools like stress testing and climate scenario analysis can be used to identify and assess vulnerabilities in REs	14
D.	Climate risk related financial disclosures and reporting for REs	15
E.	Capacity Building	20
F.	Voluntary Initiatives	20



1. Introduction

1.1 Mr. Kofi Annan, the erstwhile Secretary-General of the UN, remarked at the Paris Climate Agreement, “The world is reaching the tipping point beyond which climate change may become irreversible. If this happens, we risk denying present and future generations the right to a healthy and sustainable planet - the whole of humanity stands to lose”. These words ring truer today than ever before. There is no denying the fact that the climate of Earth has varied throughout its history given the vagaries of the forces of nature. However, multiple independent lines of investigation¹ have provided increasingly compelling evidence that anthropogenic activities² have significantly exacerbated the process of climate change since the industrial revolution.

1.2 As per the report of the UN's Intergovernmental Panel on Climate Change dated August 9, 2021³, the emissions of greenhouse gases (GHGs) from human activities are responsible for ~1.1°C of warming since pre-industrial times. While this change is seemingly small, the current temperatures are unprecedented in comparison to the levels over the past 12,000 years affecting living conditions in many parts of the world. Further, limiting global warming to close to 1.5°C or even 2°C over pre-industrial levels will be “beyond reach” without “immediate, rapid and large-scale reductions” in greenhouse gas emissions. This may have a profound adverse impact on the ecosystem, health, infrastructure and the economy. As per a recent study⁴ by CarbonBrief, a 1.5°C - 2°C temperature increase will shave nearly 8-13 per cent off the global GDP by 2100. The Global Risks Report⁵ 2022 published by the World Economic Forum presents the results of the latest Global Risks Perception Survey (GRPS) and an analysis of key risks emanating from the current economic, societal, environmental and technological events. According to the Survey, over the next five years, respondents signal societal and environmental risks to be of foremost concern. Over a 10-year horizon, environmental risks are perceived to be the five most critical long-term threats to the world as well as the most potentially damaging to people and planet, with “climate action failure”, “extreme weather”, and “biodiversity loss” ranking as the top three most severe risks.

¹Multiple studies published in peer-reviewed scientific journals show that 97 per cent or more of actively publishing climate scientists agree. Source: <https://climate.nasa.gov/scientific-consensus/>

²Anthropogenic activities, inter alia, include the burning of fossil fuels, deforestation, land use and land use changes, livestock production, waste management and industrial processes.

³This refers to the August 2021 IPCC Working Group I report, “Climate Change 2021: The Physical Science Basis”, available at: <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>

⁴CarbonBrief has extracted data from around 70 peer-reviewed climate studies to show how global warming is projected to affect the world and its regions. Available at: https://interactive.carbonbrief.org/impacts-climate-change-one-point-five-degrees-two-degrees/?utm_source=web&utm_campaign=Redirect

⁵The report and an interactive data platform are available at www.wef.ch/risks22



1.3 Closer home, the latest annual report⁶ by the India Meteorological Department (IMD) on the country's climate stated that 2021 was not only the fifth warmest year since 1901, but in the last decade, 2012-2021, was also the warmest on record. Moreover, 11 of the 15 warmest years on record were between 2007 and 2021. The rise in average temperatures could have a cascading effect on extreme weather events, crop patterns and urban disaster management. India recorded 756 instances of natural disasters⁷ (landslides, storms, earthquakes, floods, droughts, etc.) since 1900, with a total of 402 and 354 events recorded during 1900-2000 and 2001-2021 respectively, indicating the preponderance of tail events of late.

1.4 A report of the Ministry of Earth Sciences⁸, Government of India has concluded that since the middle of the twentieth century, India has witnessed a rise in average temperature; a decrease in monsoon precipitation; a rise in extreme temperature, droughts, and sea levels; as well as increase in the frequency and intensity of severe cyclones. There is compelling scientific evidence that human activities have influenced these changes in regional climate. These developments pose challenges for humanity and warrant an immediate, large-scale and rapid reduction in GHGs.

1.5 Concurrently, climate change is increasingly being recognized⁹ globally as a source of financial risk for banks. The uncertainty about the timing and severity of climate-related and environmental risk certainly threatens the safety, soundness and resilience of individual Regulated Entities (REs) and, in turn, the stability of the overall financial system. It is therefore recognized that the REs should steadily manage the risks and opportunities that may arise from climate change and environmental degradation. Further, with the increasing threat of climate change and the associated physical damage, change in market perception and shift in preferences towards more environmental-friendly products and services, the financial, reputational and strategic risk implications are becoming increasingly prominent.

1.6 Furthermore, recognizing climate-related financial risk may pose risks to global financial stability, Financial Stability Board (FSB) has chalked out a roadmap to ensure that climate risks are properly reflected in all financial decisions. The roadmap¹⁰ supports international

⁶https://mausam.imd.gov.in/imd_latest/contents/ar2020.pdf.

⁷SBI Ecowrap Issue No. 46, FY 22 dated November 26, 2021.

⁸This refers to June 2020 report titled, "Assessment of Climate Change Over the Indian Region", available at <https://reliefweb.int/report/india/assessment-climate-change-over-indian-region-report-ministry-earth-sciences-moes>

⁹In a recent international survey ([How resiliency in risk management is the new top priority for banks | EY - Global](#)), climate change topped the list of long-term risks for banks for the first time since its inception over a decade back. More than nine in ten (91%) of the surveyed bank chief risk officers (CROs) viewed climate change as the top emerging risk over the next five years.

¹⁰[FSB Chair's letter to G20 FMCBG February 2022](#)



coordination by bringing together the work of international organisations and national authorities on the various initiatives in this area. The FSB will focus on four pillars namely, disclosures, data, vulnerabilities analysis, and regulatory and supervisory approaches. More specifically, it would be monitoring and helping to support progress in the achievement of consistent climate-related financial disclosures.

2. Strategy on Climate Change

Globally the efforts to address climate change have been growing across jurisdictions and an increasing number of central banks are either contemplating or are in the process of taking action on this aspect as part of their mandates¹¹. Further, climate change risk is also ascending the hierarchy of threats to financial stability across advanced and emerging economies alike and consequently, the need for an appropriate framework to identify, assess and manage climate-related risk has become imperative¹². Notwithstanding the need to mitigate the risks arising out of extreme climate events, there is an increasing need for the financial system to move towards green financing, keeping in mind the social and developmental objectives of the country. Therefore, keeping in view our national commitments and priorities, the Reserve Bank intends to prepare a strategy based on global best practices on mitigating the adverse impacts of climate change, learnings from participation in standard-setting bodies and other international fora¹³. The broad thrust of the strategy is presented under the following heads:

- A. Overview of climate related risk and its unique characteristics as applicable to REs
- B. Broad guidance for all REs to have (i) appropriate governance (ii) strategy to address climate change risks and (iii) risk management structure to effectively manage them from a micro-prudential perspective
- C. Exploring how forward-looking tools like stress testing and climate scenario analysis can be used to identify and assess vulnerabilities in REs
- D. Climate risk related financial disclosure and reporting for REs
- E. Capacity Building
- F. Voluntary Initiatives

¹¹www.bis.org/bcbs/publ/d502.pdf - BCBS - Climate related financial risks: a survey on current initiatives - April 2020.

¹²<https://www.rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=1174>

¹³Reserve Bank of India is a member of the Task Force on Climate Risk set up by the Basel Committee on Banking Supervision, NGFS, Financial Stability Board's Working Group on Climate Risk and Workstream on Climate Disclosures and the International Platform on Sustainable Finance.



Discussion Question 1: What should be the immediate priorities in shaping the policy discourse on climate risk in India? What actions would help foster a more sustainable and resilient financial system?

The Discussion Paper (DP) starts with an overview of climate related risk, followed by suggestions regarding the strategies outlined above. The objective of outlining these measures is to evoke discussion and solicit feedback from REs / stakeholders on the proposals contained in the DP.

A. Overview of climate related risk and its unique characteristics as applicable to REs

A.1 An overview of climate-related issues

Climate-related risks refer to the potential risks that may arise from climate change or from efforts to mitigate climate change, their related impact and the economic and financial consequences. It can impact the financial sector through two broad channels i.e., physical risks and transition risks.

(i) Physical Risks

It refers to the economic costs and financial losses resulting from the increasing frequency and severity of:

- extreme climate change-related weather events (or extreme weather events) such as floods, heatwaves, landslides, storms and wildfires (i.e., acute physical risks);
- longer-term gradual shifts of the climate such as changes in precipitation, extreme weather variability, ocean acidification, and rising sea levels and average temperatures (i.e., chronic physical risks); and
- indirect effects of climate change such as loss of ecosystem services (e.g., water shortage, degradation of soil quality, or marine ecology)

Physical risk impact depends on geographical locations, as different regions display varied climate patterns. For example,

- Expected cash flows to the REs from an exposure may be stressed on the occurrence of a local / regional weather event
- Chronic flooding or landslides may present a risk to the value of the collateral that REs have taken as security against loans



- Severe weather events may damage a RE's owned or leased physical property and data centers, thereby, affecting its ability to provide financial services to its customers

(ii) Transition Risks

It refers to the risks arising from the process of adjustment towards a low-carbon economy. A range of factors influences this adjustment, including changes in climate-related policies and regulations, the emergence of newer technologies, shifting sentiments and behaviour of customers. The process of transition i.e., reducing carbon emissions may have a significant impact on the economy. Transition risk drivers can be categorized as:

- Climate related mitigation policies could include reduction in financial valuation or downgrade in credit ratings of businesses adversely affecting the climate or introduction of subsidies to encourage the use of energy efficient goods/processes.
- Technological advances can contribute to energy transition, increase the use of non-fossil fuels that reduce GHG emissions.
- Shifts in public sentiment including that of consumers and investors can affect the economy and financial system.

For example,

- Technological innovations such as production, storage, and transport of cleaner energy may decrease the value of assets dependent on the older technologies, i.e., the stranded assets¹⁴, causing mark-to-market losses on investment portfolios or reduction in cash flow of certain borrowers.
- Customers may request REs that their savings or investments be directed towards businesses with more climate-friendly policies or projects having a positive environmental impact.

Climate change may also give rise to liability risks¹⁵ arising from parties who have suffered losses from physical or transition risk, seeking to recover losses from those they hold responsible.

¹⁴The International Energy Agency defines stranded assets as “those investments which have already been made but which, at some time prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return as a result of changes in the market and regulatory environment brought about by climate policy” (IEA, 2013, p. 98).

¹⁵Liability risks are often categorised as operational risks.



A.2 Unique characteristics of climate change and the implications

A.2.1 Climate change has the following distinctive characteristics requiring focused attention and has to be managed differently from other conventional financial risks.

- i. Its impact is far-reaching in terms of its breadth and its magnitude is relevant to multiple lines of businesses, sectors, and geographies.
- ii. Although there is a high degree of certainty that some combination of physical and transition risks will materialise in the future, the exact timing, outcome and future pathways remain uncertain, and the impacts are unevenly distributed both among and within countries. Accordingly, historical data and traditional backward-looking risk assessment methods are unlikely to adequately capture future impact.
- iii. Climate change on account of the concentration of GHG emissions in the atmosphere above a certain threshold will have irreversible consequences on our planet. Thus, the magnitude and nature of future impact will be determined by the actions taken today. Consequently, collective actions by central banks, financial market participants, firms and households, governments, sectoral regulators, are crucial.

A.2.2 The materialisation of physical and transition risks depends on multiple non-linear dynamics that interact with each other in complex ways and are therefore subject to deep uncertainty. Despite the limitations of the use of climate-economic models in characterizing these interactions, forward-looking methodologies¹⁶ may play an important role in exploring the potential vulnerabilities. Further, as tackling climate change requires collective efforts by all stakeholders, there would be an increasing expectation on the financial sector, whose core function is to allocate capital resources and to channel finance, to support the transition.

A.2.3 It is, therefore, important for the REs to understand the interaction between climate-related and environmental risks and their business activities and identify the potential effect of such risks through various prudential risk categories including:

- **Credit risk:** Rising frequency and severity of extreme weather events can impair the value of assets held by the banks' customers, or impact supply chains affecting customers' operations and profitability, and their viability.
- **Market risk:** Exposed to decline in valuation and increased volatility in their investments because of shifts in investor preferences or climate induced adverse effects on the underlying economic activity.

¹⁶Source: BCBS, Climate-related financial risks - measurement methodologies, April 2021.



- **Liquidity risk:** Increased demand for liquidity to respond to extreme weather events or the difficulties that may be faced in liquidating assets given their negative impact.
- **Operational risk:** Disruption in business continuity due to the impact on the bank's infrastructure, processes, staff and systems. In addition, exposure to claims from stakeholders who have suffered climate related losses and who then seek to recover those losses.

Apart from aforesaid risks, REs may also need to incorporate climate related risks in their processes for other risk- types including credit concentration risk, underwriting risk, reputational risk, strategic risk, etc. Banks also need to take into account these risks while preparing their Internal Capital Adequacy Assessment Process (ICAAP) document under Pillar 2 as prescribed under the Master Circular¹⁷ - Basel III Capital Regulations dated July 01, 2015, as updated from time to time. It is recognised that climate-related financial risks will probably have to be incorporated into ICAAPs iteratively and progressively, as the methodologies and data used to analyse these risks mature over time and analytical gaps are addressed. Brief guidance on overarching aspects related to the management of climate-related and environmental risks, viz. Governance, Strategy, Risk Management, Stress Testing, Scenario Analysis and Disclosure has been covered in the subsequent sections.

Discussion Question 2: What should be the way forward for the regulatory policy framework for climate risk in an emerging market like India keeping in view its aspects such as demography, geography, etc.? Is there any plan / contemplation in the REs to integrate climate and environmental considerations in their core activities of lending and investment?

B. Broad guidance for all REs to have (i) appropriate governance (ii) strategy to address climate change risks and (iii) risk management structure to effectively manage them from a micro-prudential perspective

Governance

B.1 The Board of Directors would have to play a critical role in identifying climate-related and environmental risks and opportunities and assessing the actual and potential impact of these risks on REs' strategies and plans. They may also need to understand and regularly assess the current and future financial risks arising from climate change and environmental degradation that may affect the RE.

¹⁷The Circular is accessible at: https://www.rbi.org.in/Scripts/BS_ViewMasCirculardetails.aspx?id=9859



B.2 The Board of Directors would have to oversee the development and implementation of the environment and climate-related risk strategy of the RE by ensuring that the strategic goals are in line with their vision; systems and controls are in place to support implementation of the strategy; foster a risk culture that includes climate related and environmental considerations into decision-making process and both the business and the assurance functions dealing with it are adequately staffed. As the 'tone at the top' plays a key role in shaping the risk culture, there may be need to clearly define the roles and responsibilities of senior management as regards the management of climate-related and environmental risk.

B.3 The Board of Directors would also have to exercise effective oversight on risk management and controls and ensure that sufficient internal / external expertise is available for managing the financial risks arising from climate change and environmental degradation. To facilitate effective oversight, the Board of Directors and Senior Management may regularly seek relevant management information, as well as updates on major policy initiatives and developments concerning climate-related and environmental issues.

Good Practices

REs may have a committee / sub-committee at the Board level comprising experts from sustainability and risk domain with the following responsibilities:

- Guiding climate-related policy, strategy, objective-setting, and performance monitoring
- Mandating processes to identify and manage climate-related and environmental risks and opportunities
- Monitoring timely and regular updation of the internal risk reports, the mitigation measures and their effectiveness thereof
- Monitoring and overseeing the progress on relevant goals and targets
- Guiding external disclosures.

Strategy

B.4 The effectiveness and resilience of REs in navigating climate-related and environment risk needs to be supported through proper formulation, planning and implementation of climate and environment strategy, and embedding climate and environment considerations within the organization. REs may determine impact of climate-related and environmental risk on their business strategy in the short, medium and long-term.

B.5 The financial risk emanating from climate and environmental degradation would have to be assessed and addressed within the overall business strategy and risk appetite. The risk appetite framework of REs could include the risk exposure limits and thresholds¹⁸ of financial risks that

¹⁸Risk exposure limits/thresholds refer to limits on credit exposures and collaterals on sectors and geographical areas exposed to climate risks.



the RE is willing to take. While formulating the risk appetite framework, the Board would need to ensure that it considers the factors like the long-term financial interest of the RE, results of stress testing and scenario analysis.

B.6 Senior Management may ensure that adequate resources with appropriate expertise are allocated through capacity building and training, to implement climate strategy. REs may also need to ensure that the organizational structure and business processes are reviewed to support effective communication and co-ordination among different businesses and operation units.

Good Practices

REs may clearly assign responsibilities of management of climate-related financial risks to suitable Committees. It may also be ensured that material climate-related financial risks are considered as a part of the RE's business strategy and risk management framework.

REs may ensure that the Board and Senior Management have a sufficient understanding of climate-related financial risks and senior management is equipped with the suitable capabilities and experience to deal with these risks. REs may like to take steps for capacity building and upskilling of the Board and Senior Management on climate-related issues through internal workshops and training, or external collaboration.

Risk Management

B.7 REs should address financial risks arising from climate change and environmental degradation, through its risk management framework, in line with Board-approved risk appetite statement, risk management strategy and business plan. REs could also identify, measure, monitor, manage, and report the exposure related to climate-related and environmental risk in a manner proportionate to the size, complexity of its business operations and risk profile. Some climate-related risks may also materialise beyond a bank's traditional two-to-three-year capital planning horizon but within the maturities of longer-dated exposures. Other climate-related risks may materialise over a much longer time horizon. The high degree of uncertainty around the timing of these risks suggests that REs may take a prudent and dynamic approach towards developing their risk management capacities.

Good Practices

REs may integrate climate-related risk indicators in their risk appetite framework. These climate-related risk indicators shall consist of objective and measurable metrics. The limits may cascade down to the sector and portfolio level contingent on the type of indicator. It may comprise both qualitative and quantitative elements. To illustrate, the climate-related risk indicators are:

- Concentration in CO₂ / GHG-intensive assets
- Carbon emission footprint of portfolio



REs may integrate a climate-risk assessment as part of their due diligence process. This climate-risk assessment not only includes physical and transitional risks the customer is exposed to but also how these risks may materialise into any reputational risks for the RE. The assessment may result in a climate-risk rating for customers having material exposure to such risks. High risk ratings may be periodically monitored to assess the climate-related risks for the RE.

Policies and Procedures

B.8 REs should integrate climate-related and environmental risk in their risk management framework in a consistent and systematic manner. They may need to put in place robust policies and processes which would include a clear articulation of roles and responsibilities of business lines and risk functions in accordance with the three lines of defence model. The first line of defence is provided by business line staff, who may assess climate and environmental risk before accepting new business and throughout the ongoing management of business relationships, particularly for sectors with higher climate-related and environmental risk. The second line of defence provided by the risk management function may monitor the implementation of the bank's climate risk management policies by business lines. The third line of defence provided by the internal audit function may conduct independent review and evaluate the robustness of the bank's risk management framework in managing climate-related and environmental risk.

Good Practices

REs may frame a climate-related policy by taking into consideration material physical and transition risks. It should have a clear definition and assignment of responsibilities and reporting lines across the three lines of defence.

- First line should have sufficient awareness and understanding to identify potential climate-related financial risks
- Second line should undertake independent climate-related risk assessment and monitoring, including reassessment of the initial assessment conducted by the frontline staff. The compliance function should ensure adherence to applicable rules and regulations and adopt formal escalation procedures to report material risks to the Board.
- Third line should carry out regular reviews of the overall internal control framework and systems, including the quality of underlying data.

Risk Identification and Assessment

B.9 REs may develop a comprehensive methodology to identify risks arising from environmental and climate change and its effect on their business models. The identification and assessment of climate-related and environmental risk may be done at a customer, sector and portfolio level. They may also incorporate the customer's exposures to transition risk in its assessment. The



scope and extent of this assessment may be attuned to factors including the sector, customer's operations, and nature and size of the transaction.

Good Practices

REs may develop a model / framework, for example, a heat map to identify which of its activities are exposed to climate-related physical and transition risks. This mapping may be segmented across sectors depending on the nature of the risks. This model / framework may form the basis of a more granular analysis by assessing climate-related concentrations the RE is exposed to, which may be based on the following metrics, among others:

- CO₂-intensive assets (or other GHGs)
- Energy label distribution of Residential Real Estate (RRE) and Commercial Real Estate (CRE) portfolios and their green energy ratings
- Collateral positioned in higher-risk flood prone areas, coastal areas, etc.
- Exposures to businesses that will be impacted by the melting glaciers of Himalayas due to climate change.

B.10 Given its forward-looking nature, REs may use stress testing and scenario analysis with a short, medium and long-term horizon for the risk identification process. This is further detailed in Section C.

Risk Monitoring

B.11 REs may consider a range of quantitative / qualitative metrics and tools to monitor their exposure to financial risks arising from climate change, proportionate to the entity's size, business activities and complexity of business operations. In determining the climate-related and environment risk metrics, the REs may consider the materiality of the climate-related and environment risk factors, and risks of greater materiality may be prioritised and monitored more closely.

Good Practices

REs may develop a method to assess the correlation between the carbon footprint of their customers and the associated climate-related risks for them. This method may be evolved for unique CO₂ / GHG intensive sectors. REs may assess such exposure to climate-risk on multiple dimensions, such as

- Extent to which the customers may be subjected to current and potential climate-related regulations
- Extent to which the customers that may not be directly impacted by the climate-related regulations but are impacted through shifting customer demands and technological advances.
- Extent to which customer's climate risk is transferred to the RE through its financing (e.g., whether impact materializes within tenor of financing). The assessment may be made on a periodic basis and its outcomes may be used to update policies and procedures of the entity.



B.12 In case the necessary information to assess the impact of climate-related and environment risk is not available, REs may engage with their customers to form an understanding of the extent to which the impact may be material. REs may encourage their customers to provide relevant climate-related disclosures to foster greater awareness of climate risk and engender responsible behaviour. They may further monitor the impact that climate risks may have on outsourced arrangements, supply chains and business continuity planning.

Risk Management and Mitigation

B.13 Once the potential impact of the financial risks arising from climate change are assessed to be material, REs may establish and implement plans to manage its exposures and mitigate these risks, as well as regularly review and assess the effectiveness of those plans.

Good Practices

REs may carry out substantial measures to mitigate or refrain from climate-related risks that are not in accordance with their risk appetite. These measures can be developed in response to the RE's own assessment of the climate-related risk concentrations. These mitigation measures may include:

- Customers in sectors which are highly vulnerable to emerging climate risk may be subject to tenor limitations.
- Customers with real estate collateral that do not meet minimum sustainability criteria may be subject to a lower loan-to-value limit.
- Customers for which production is directly dependent on weather conditions may require taking out insurance against extreme weather events (e.g., seasonal droughts, floods).
- Customers in CO₂ / GHG intensive industries may require having a sustainable energy transition strategy

B.14 REs may also consider taking adequate measures to safeguard business continuity in case of extreme climate change causing disruptions to their own facilities, operations and major outsourced arrangements.

Good Practices

RE may geographically scatter / locate their critical functions (e.g., centralised processing centres, data centres, servers, etc.) across various regions keeping in view flood, earthquake and other climate-related and environmental dangers identified with its own operations. This may be a part of the REs' Business Continuity Plan.

Risk Reporting

B.15 Timely and regular reports on climate-related risk exposures including adherence to risk appetite, progress of strategic and business plans, information on implementation of control and mitigation should be provided to the Board of Directors. The frequency of reporting may be tailored to the nature and magnitude of the risks to which the RE is exposed to.



B.16 Where reliable or comparable climate-related data is not available, REs may consider using reasonable proxies and assumptions as alternatives in their internal reporting as an intermediate step. Limitations that prevent full climate risk data assessment may be made explicit to stakeholders where relevant.

Discussion Question 3: What are the main challenges in integrating the climate risk framework in Governance, Strategy and Risk Management? What is needed to overcome these? Are there plans in place / being contemplated regarding the same by the REs?

C. Exploring how forward-looking tools like stress testing and climate scenario analysis can be used to identify and assess vulnerabilities in REs

C.1 REs may need to incorporate an assessment of both physical and transition risks across a range of climate-related scenarios¹⁹. They may identify and simulate plausible and relevant scenarios, factor in the inter-linkages between climate-related risk and other risks and explore resilience to financial losses under a variety of scenarios. The scenario analysis may include a range of relevant time horizons (taking into consideration the future temperature rise, economic transition pathway, etc.) of the REs' exposure to financial risk arising from climate change in line with its business strategy for strategic planning and risk management purposes. The scenarios may include forward looking information in addition to historical data in view of the uncertainties and longer time horizon associated with changes in the climate.

C.2 Scenario analysis may also be used to explore the sensitivities in longer-term business plans. As part of capital planning, REs would have to assess their capital adequacy based on scenario analysis.

C.3 REs which lacks the data or expertise to conduct climate risk stress testing with quantitative assessments, may use narrative-driven scenario analysis, and assess potential risk exposures. Banks may need to conduct a review of their vulnerabilities through stress testing, as part of the ICAAP.

C.4 Where the climate-related and environment risk is found material, the results may be communicated to the Board of Directors and senior management and should be used for business planning and strategy setting. REs may ensure that the mitigation measures proposed

¹⁹REs may explore the work of Network for Greening the Financial System (NGFS) on Climate Scenarios, available at <https://www.ngfs.net/ngfs-scenarios-portal> which explores a range of plausible climate scenarios for forward looking climate risks assessment. Launched at the Paris One Planet Summit on December 12, 2017, the NGFS is a group of central banks and supervisors willing to share best practices and contribute to the development of environment and climate risk management in the financial sector while mobilising mainstream finance to support the transition towards a sustainable economy.



based on the scenario analysis are not only achievable but realistic, credible, consistent with regulatory environment. The results of stress testing and scenario analysis may also be used when reviewing the climate risk management policies and practices.

C.5 The field of climate scenario analysis is highly dynamic, and practices are expected to evolve rapidly, especially as climate science advances. Climate scenario models, frameworks and results may be subject to challenge and regular review by a range of internal and/or external experts as well as by independent assurance functions.

Good Practices

REs should develop climate scenarios to identify emerging risks in the short, medium and long term. These scenarios can cover the conventional business planning cycle (3-5 years) as well as longer term horizons (5+ years). The results of these scenario analyses may be used in the strategic decision-making.

- An example of such a scenario may include impacts of India's NDCs in the Paris Agreement²⁰ as updated during COP26²¹:
- Reduce carbon intensity by 45% by 2030;
- An electric power capacity target of 50% installed capacity from non-fossil-based energy resources by 2030, to be achieved with international support; and
- A carbon sink expansion target of creating an additional (cumulative) carbon sink of 2.5–3 GtCO_{2e} through additional forest and tree cover by 2030.
- Another scenario may be based on the projected increase in the global average temperature to 2°C above pre-industrial levels. This scenario may include assumptions such as:
- The impact of climate-related policy and technology shocks.

Discussion Question 4: What are the potential challenges in developing climate risk stress testing and a scenario analysis framework for REs? How do you think the potential effects arising out of such exercise should be analysed?

D. Climate risk related financial disclosure and reporting for REs

D.1 Consistent and comparable disclosure of climate-related information by REs has several important benefits for stakeholders. It enables them to understand better the financial system's exposures to climate-related risk and the concentration of carbon-related assets in the financial

²⁰Paris Agreement was adopted in 2015, when for the first time ever, in a momentous decision, every country agreed to work together to limit global warming to well below 2 degrees and aim for 1.5 degrees, to adapt to the impacts of a changing climate and to make funds available to deliver on these aims.

²¹UN Climate Change Conference of the Parties (COP26) was held at Glasgow during 31 October - 13 November 2021 and the Conference brought parties together to accelerate action towards the goals of the Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC).



sector. For investors and other market participants, robust disclosures can improve the pricing mechanisms for climate-related risks. It may also facilitate them to identify and capitalize on climate-related opportunities, thereby contributing to the scaling up of green finance. Further, disclosures may require REs to establish the necessary procedures, and build the necessary skills, to better identify and manage climate-related risks and improve risk pricing. Accordingly, preparation of climate disclosures may serve as a mechanism for internal due diligence and impose discipline that may ultimately lead to better risk management.

D.2 Among the various disclosure frameworks concerning climate and sustainability, the most prominent one is Task Force on Climate-related Financial Disclosures (TCFD) set up by the FSB which has published a set of recommendations in 2017 to help businesses disclose risks and opportunities arising from climate change²². The TCFD recommendations have gone through extensive consultations and gained broader support among preparers and users internationally²³. These are also widely recognized, adopted or referenced by regulators and authorities.

D.3 TCFD recommendations, as such, may therefore be considered as a desirable framework by the REs to rely upon, at least at the initial stage²⁴. Referencing a common framework may also facilitate consistency and comparability among the REs. In this backdrop, a climate-related disclosure framework has been proposed in the next section.

D.4 Climate-related disclosure framework

D.4.1 Approach to disclosure

Climate-related disclosure is an important source of information for different stakeholders (e.g., customers, depositors, investors and regulators) of REs to understand relevant risks faced by it and its approach to addressing such issues. REs have an existing requirement to disclose

²²In December 2015, the FSB established the industry-led TCFD to design a set of recommendations for consistent “disclosures that will help financial market participants understand their climate-related risks”. The TCFD released its final recommendations in June 2017.

²³Source - TCFD October 2021 status report. The report further notes that, as support from the private sector has grown, governments around the world have begun to codify aspects of the TCFD recommendations into policy and regulation, using the TCFD’s work as a foundation for climate-related reporting requirements. In addition to the support of dozens of regulators and supervisors, Brazil, the European Union, Hong Kong, Japan, New Zealand, Singapore, Switzerland, and the United Kingdom have announced requirements for domestic organizations to report in alignment with the TCFD recommendations. The IFRS Foundation has established an International Sustainability Standards Board (ISSB) to develop a baseline global sustainability reporting standard, built from the TCFD framework and the work of an alliance of sustainability standard setters.

²⁴SEBI has replaced the erstwhile Business Responsibility Reporting framework with a detailed Business Responsibility and Sustainability Reporting (BRSR) framework in May 2021 under which filing of BRSR has been made mandatory for the top 1000 listed companies (by market capitalization) with effect from the financial year 2022-23. The BRSR framework covers some of the disclosures recommended by TCFD.



information on material risks under their Pillar 3 disclosures²⁵. REs may develop an appropriate approach to disclosing climate-related information to enhance transparency. At a minimum, REs may make climate-related disclosures aligned with TCFD recommendations.

D.4.2 Disclosure Framework

The TCFD's 11 recommendations on four thematic areas (i.e., governance, strategy, risk management, and metrics and targets) address the financial risks and opportunities posed by climate change. The recommended TCFD disclosures are presented below. REs may strive to work along these recommendations factoring in their unique circumstances.

(i) Governance - Disclose the organisation's governance around climate-related risks and opportunities.	
<i>Recommended Disclosure</i>	<i>Illustrative Examples</i>
a) Describe the Board's oversight of climate-related risks and opportunities. b) Describe management's role in assessing and managing climate related risks and opportunities.	REs may disclose: <ul style="list-style-type: none"> • Governance structure responsible for setting, implementing and monitoring specific policies on climate-related matters • Role and responsibilities of the Board regarding climate related policies • Roles and responsibilities assigned to Senior Management related to climate risk management • Processes and frequency by which the Board or dedicated Committees on climate risk are informed of climate related issues • How the Board monitors and oversees progress against goals and targets for addressing climate-related issues • Committee or key personnel in charge of overseeing the climate-related issues within the RE and / or setting RE's climate strategy • Key aspects and issues of climate-related risks and opportunities as discussed and reviewed by the Board and Senior Management during the reporting period
(ii) Strategy - Disclose the actual and potential impacts of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning where such information is material.	
<i>Recommended Disclosure</i>	<i>Illustrative Examples</i>
a) Describe the climate-related risks and opportunities the organisation has identified over	REs may disclose: <ul style="list-style-type: none"> • Relevant short, medium and long-term time horizons, as considered and determined by it, regarding the

²⁵ [Reserve Bank of India - Master Circulars \(rbi.org.in\)](https://www.rbi.org.in)



<p>the short, medium, and long term.</p> <p>b) Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy and financial planning.</p> <p>c) Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.</p>	<p>useful life of assets</p> <ul style="list-style-type: none"> • Specific climate-related issues identified for each time horizon (short, medium, and long term) that can have a material financial impact (in terms of business lines, revenue, costs, balance sheet assets) • The materiality assessment process undertaken by it, e.g., process and methodology used to identify the impacts of climate-related risks and opportunities • Any scenario analysis conducted, such as the scenario, assumptions, methodology, coverage of business lines and portfolios • Results of scenario analysis conducted and any implications on its strategy
(iii) Risk management - Disclose how the organisation identifies, assesses and manages climate-related risks.	
<i>Recommended Disclosure</i>	<i>Illustrative Examples</i>
<p>a) Describe the organisation's processes for identifying and assessing climate-related risks.</p> <p>b) Describe the organisation's processes for managing climate related risks.</p> <p>c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management.</p>	<p>REs may disclose:</p> <ul style="list-style-type: none"> • Key processes for identifying and assessing climate risks • Methods or techniques in measuring, monitoring and mitigating climate risks (e.g., relevant models) • Identification of significant concentration of credit exposure to carbon-related assets • Description of significant climate-related risks (physical and transition) in business activities • Definitions of risk terminology used or references to existing risk classification framework • REs may consider characterizing their climate-related risks in the context of traditional risk categories such as credit risk, market risk, liquidity risk, and operational risk • Progress being made in enhancing risk management capabilities and incorporation of climate risk into existing risk management framework
(iv) Metrics and Targets - Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	
<i>Recommended Disclosure</i>	<i>Illustrative Examples</i>
<p>a) Disclose the metrics used by the organisation to assess and manage relevant climate-related risks and opportunities where such information is material.</p>	<p>REs may disclose:</p> <ul style="list-style-type: none"> • Risk and alignment metrics and targets used to assess the impact of (physical and transition) climate-related risks and opportunities on their business activities in the short, medium, and long



<p>b) Disclose Scope 1, Scope 2 and, if appropriate and feasible, Scope 3 GHGs emission²⁶, and the relevant risks.</p> <p>c) Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.</p>	<p>term</p> <ul style="list-style-type: none"> • Breakdown of metrics and targets by industry, geography, credit quality and average tenor • Scope 1 and 2 emissions of RE's own operation • Scope 3 emissions for their lending, investing and other financial intermediary business activities where data and methodologies may allow • Amount and percentage of carbon-related assets relative to total assets as well as the amount of lending and other financing connected with climate-related opportunities • Methodology used in relation to such metrics and targets (e.g., calculation, standard adopted) • Any verification and assurance of the disclosed metrics (e.g., emission) • The extent to which their lending and other financial intermediary business activities, where relevant, are aligned with a well below 2°C scenario, using whichever approach or metrics best suited to their organizational context or capabilities
--	--

D.4.3 Operating Guidelines

- a. REs may explore aligning their Climate-related Financial Disclosures on the lines of the FSB's TCFD framework, which has increasingly been recognised as a suitable basis for climate-related financial disclosures. Adapting the same would also help improve the consistency and comparability of the Climate-related Financial Disclosures of the REs with their counterparts globally.
- b. REs may make such disclosures annually, to begin with. They may use their sustainability reports, annual reports, website, or a combination of them to facilitate public access.
- c. In view of the evolving developments in climate-related disclosures, a “comply-or-explain” approach may be adopted by the REs, considering:
 - the significance of an RE's operation, including the nature and size of its business, and,
 - the materiality of climate-related risks RE is exposed to.

²⁶Scope 1 GHGs emissions are direct emissions from owned or controlled sources. Scope 2 GHGs emissions are indirect emissions from the generation of purchased energy. Scope 3 GHGs emissions are all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. For guidance on reporting Scope 3 GHG emissions, REs may refer to GHG Protocol's The Corporate Value Chain Accounting and Reporting Standard, accessible at https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf.



D.4.4 Considering the evolving disclosure landscape, REs may keep themselves updated on the global and domestic developments²⁷ in this regard and should plan to progressively enhance their disclosures. For instance, while most REs may be less ready at this stage to report Scope 3 emissions or concentrations of credit exposure to carbon-related assets, they should start chalking out a plan to obtain relevant information such as by collecting emission data from their customers.

Discussion Question 5: What could be the overall timeline for implementation of disclosure / TCFD framework, and which recommendations should be prioritized? Should it begin with disclosure around the qualitative aspects first, followed by disclosure around quantitative aspects or both together?

E. Capacity Building

There is a growing need to sensitise India's financial sector to the importance and benefits of green finance with special emphasis on capacity building and creating awareness of climate risk and sustainable finance to tackle the challenges posed by climate change. Therefore, to give impetus to the same, a series of training programmes, capacity building programmes, webinars, conferences, seminars, etc. may be organised by the REs for their employees through their own training establishments as also through the training establishments associated with RBI. To address the capacity building requirements, it is suggested that the Indian Banks' Association (IBA) may set up a working group on capacity building in the area of climate risk and sustainable finance to assess the training requirements for bankers and ways and means to meet the same through the available training establishments, certification programmes, online courses, etc. Tie-ups with multilateral institutions like the IFC, etc. which have vast experience in this area may also be suitably considered for this purpose.

F. Voluntary Initiatives

The REs on their own volition could lead by taking the following initiatives:

F.1 Voluntary Target for Green Finance

As a part of their commitment to scale up lending for green finance, the Reserve Bank would seek to encourage REs to set a voluntary funding target to increase green funding with the

²⁷For example, the IFRS Foundation's initiative to establish a new International Sustainability Standards Board, TCFD publications, etc.



approval of their Board. In other words, they may set an incremental target for green finance over short, medium and longer term towards certain identified sectors. The achievement of these targets may be reviewed annually to assess the positive environmental outcomes.

F.2 Green Branches and Green Data Centres

In order to green the banking processes by making them more environment-friendly, REs could consider converting their branches to green branches by eliminating the use of paper in their operations, introducing option of e-receipts (i.e., providing the receipt, if required, as a link on the registered mobile number) at their ATMs, etc. REs may look at ways and means to incentivise adoption of e-receipts. Likewise, the REs may also like to convert all their data centres²⁸ to green data centres by switching over to renewable energy for sourcing power for the data centres, etc. and implement guidance provided by established frameworks like the Green Data Centre Rating Systems²⁹.

Discussion Question 6: What measures would you suggest that the Reserve Bank of India could consider with respect to climate risk and sustainable finance?

²⁸According to Para 107 of the Budget for the year 2022-23, Data Centers and Energy Storage Systems including dense charging infrastructure and grid-scale battery systems will be included in the harmonized list of infrastructure. This will facilitate credit availability for digital infrastructure and clean energy storage.

²⁹Indian Green Building Council (IGBC) Green Data Centre (DC) Rating System was released during the Green Building Congress 2016 in Mumbai. It is a first of its kind standard for DCs. It primarily addresses energy efficiency in DCs, while introducing many other green concepts.