Greening the Financial System
Climate Financial Risks and How ADB Can Help

Bruno Carrasco, Junkyu Lee

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<th>Abbreviation</th>
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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>BCBS</td>
<td>Basel Committee on Banking Supervision</td>
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<td>BIS</td>
<td>Bank for International Settlements</td>
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<td>DFI</td>
<td>development financial institution</td>
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<td>ECB</td>
<td>European Central Bank</td>
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<td>ESRB</td>
<td>European Systemic Risk Board</td>
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<td>EU</td>
<td>European Union</td>
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<td>FSB</td>
<td>Financial Stability Board</td>
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<td>IMF</td>
<td>International Monetary Fund</td>
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<td>LCY</td>
<td>local currency</td>
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<td>MNB</td>
<td>Magyar Nemzeti Bank</td>
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<td>NGFS</td>
<td>Network for Greening the Financial System</td>
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<td>RISE</td>
<td>Regulatory Indicators for Sustainable Energy</td>
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<td>TCFD</td>
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Climate change has profound economic consequences, impacting sectors and regions globally. Extreme weather events are already and will increasingly damage infrastructure and disrupt economic activity, resulting in significant economic and financial losses, and are posing risks to financial and economic stability and growth. To mitigate the impacts of climate change, substantial investments are needed in renewable energy, energy efficiency, and climate-resilient infrastructure.

Financial markets play a vital role in mobilizing and channeling funds for clean energy projects and sustainable infrastructure, facilitating the transition to a low-carbon and climate-resilient economy. This transition comes with opportunities for financial institutions, but it also generates risks for them and for the financial system at large.

Financial regulators and supervisors, together with central banks play an important role too in setting up a regulatory and supervisory framework, as well as climate disclosure standards, conducive to greening financial markets and making them more resilient to climate risks. Multilateral development banks can also contribute to developing this framework, directly and through support to their member countries' financial authorities.

This report presents the main policy options in this direction available to the Asian Development Bank (ADB). It first summarizes what central banks and supervisors know about climate risks for financial institutions and then presents the policy options they have highlighted for financial authorities to manage climate risks and scale up green finance. Finally, it discusses how ADB can contribute to this effort.

What Do We Know about Climate Risks and Opportunities in the Financial System?

Climate change and the transition to a low-carbon and climate-resilient economy pose two types of risks: physical and transition risks. The materialization of these risks generate economic costs that affect firms and households, which can jeopardize their financial soundness. This translates into potential losses for financial institutions that are engaged in business with them. Physical and transition risks are thus financial risks and as such fall squarely within the mandate of central banks and financial supervisors.

Climate risks are starting to materialize and are already affecting the economy and the population in some areas, and their costs will accelerate significantly in the next decade. The Asia and Pacific economies are substantially exposed to both physical and transition risks. Climate risks have also severe distributive consequences. They are not evenly distributed in economies and finance sectors, as well as across the population, with the poorest being the most affected.
Climate risks are widespread in the financial system and affect all institutional finance sectors. They are also inevitable: they will materialize in one form or the other – i.e., by a combination of physical and transition risks. They can be potentially systemic and affect financial stability. The magnitude, horizon, and form that climate shocks will take are largely determined by the policy decisions taken now to support the transition to a low-carbon and climate-resilient economy.

An early and orderly transition is the scenario that minimizes climate risks for financial institutions and the financial system. Financial institutions and markets are key drivers of this transition but, currently, they are not sufficiently delivering. Financial institutions, as well as supervisors, already have data to better manage climate risks and scale up green finance, although significant gaps remain.

Managing Climate Financial Risks in the Financial System

The role of central banks and supervisors regarding climate change has been explored in detail through the work of the Network for Greening the Financial System (NGFS). ADB has followed this work in its NGFS role as an observer. The NGFS recommends the following actions:

- **Assess and identify climate risks for domestic financial institutions as well as for the financial system.**

  Financial authorities must develop a clear understanding of the sources of climate risks for their finance sector, as well as of the transmission channels of climate risks to the economy and financial system. Supervisors around the world are at different stages of this assessment, and several of them have emphasized that such exercises are an excellent opportunity to engage with financial institutions, share experience, and build up capacities on both sides.

  Methodologies to assess climate risks are still in development, and supervisors are using a wide range of approaches—both quantitative, like climate scenario analysis, and qualitative—for that. They are however largely dependent on often scarce, available data. They also face methodological challenges as climate risk assessments rely on forward-looking approaches for which past data is of limited usefulness.

- **Develop and implement climate risk management expectations for supervised financial institutions.**

  The quality of climate risk management by financial institutions is paramount to their resilience. Yet, financial institutions are not all well prepared and most of them still must implement the institutional processes, data, and tools for that. International supervisors’ bodies thus recommend supervisors to set supervisory expectations for financial institutions in terms of climate risk management in their governance, business strategy, risk management, scenario analysis, stress testing, and disclosure.

  Assessing the performance of supervised institutions against supervisory expectations is a full part of the policy framework around supervisory expectations. When gaps are found, supervisors should also plan coercive mitigation measures. Some supervisors like the European Central Bank are currently at this stage.

- **Support and implement climate risk disclosure framework for firms.**

  Climate risk disclosure is key to ensuring that market participants have adequate information to assess financial institutions’ soundness, as well as their opportunities in the transition. Several supervisors expect financial institutions to disclose information and metrics on the climate and environmental risks they are exposed to, their potential impact on the institution, and how they manage those risks.
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A key hurdle to the disclosure of meaningful climate information is the proliferation of disclosure frameworks and guidance. Supervisors can actively participate in setting these standards to ensure that they will get the data relevant to their supervisory activities. In this context, the disclosure of firms’ transition plans toward aligning their activities on a low-carbon and climate-resilient economy is key to assessing financial institutions’ exposure to climate risks, as well as their contribution to the transition.

- Implement climate risk-mitigating actions where appropriate.

At the micro-prudential level, climate risks must be accounted for in the estimation of capital requirements. Supervisors can follow guidelines from international supervisory standard setters for that. In addition, additional capital should also be required for banks that do not manage climate risks adequately. Central banks and supervisors are also currently exploring their options in terms of macroprudential policies.

Scaling Up Green Finance

If good climate risk management practices, underpinned by an adequate supervisory and regulatory framework, are key for guaranteeing financial stability, scaling up green finance is central to providing the funding that is necessary for an early and orderly transition in Asia and the Pacific. Financial regulators and supervisors can contribute to this in several ways:

- Financial incentives through regulatory requirements

Easing regulatory requirements—e.g., capital requirements—for loans that fund projects aligned with the transition is one option considered by central banks and supervisors. This would provide financial institutions with a financial incentive to fund transition projects. A few financial authorities have started experimenting with such schemes. However, at this early stage, empirical evidence is not yet available on the effectiveness of such schemes. They also raise concerns about potential side effects on financial stability and on spillovers across jurisdictions.

- Supporting disclosure frameworks and sustainability reporting standards

Climate disclosure is crucial to mobilize investment toward transition opportunities. Disclosure frameworks should provide information on firms’ and projects’ contributions to the transition to make opportunities in the low-carbon space become more visible to investors and improve investment decisions. They also increase transparency and help protect them against greenwashing. Financial authorities, as well as multilateral development banks, can support such comprehensive global disclosure frameworks and reporting standards.

- Coordination with other authorities

Supervisors cannot be the sole and main players to address climate change. Shifting the economy to a sustainable path requires the implementation of comprehensive policy packages that touch on several policy fields, with fiscal measures being first in line. The coordination between government authorities, including financial authorities, is necessary to implement a comprehensive policy mix that allows the economy to enter a virtuous cycle in which emissions are dampened, growth sustained, and bank stability enhanced. Multilateral development banks are among the institutions that can support coordination on such packages.
How Can ADB Help Green the Financial System?

ADB has several options to support supervisors in the management of climate risks to financial institutions and the financial system. First, ADB can increase and disseminate knowledge on climate risks at the regional level by, for example, conducting surveys on financial institutions’ practices, collecting data on regional exposure, and providing regional climate scenarios. ADB can ensure that supervisors in the region set homogeneous regional expectations and support the adoption of regional and international disclosure frameworks and standards. Finally, ADB can contribute to the exploration of mitigation measures through regulatory requirements.

In addition to this support to financial authorities in managing climate risks and scaling up green finance, ADB can directly contribute to scaling up climate investments through the following actions:

- **Scale up its own financing (direct and indirect) and syndication.**

  ADB has set ambitious targets for its own climate finance until 2030. This could include dedicated financial intermediation loans to financial institutions (FIs) earmarked for climate investments. Also, syndication in private sector operations and other forms of FI cofinancing could be enhanced.

  Even more important is the catalyst role ADB can play in terms of unlocking substantial amounts of private capital for climate investments, and from FIs in particular beyond syndication. Key levers are as follows:

- **Build an enabling environment for green investments in ADB’s developing member countries.**

  A key prerequisite for private investment—and FI financing of such investments—is a clear, stable, and robust policy and regulatory framework. The World Bank Regulatory Indicators for Sustainable Energy database shows that most developing Asian countries lag behind advanced countries in this regard.

  ADB could support willing developing member countries (DMCs) in plugging gaps (e.g., organize to structure and conduct reverse auctions for new renewable energy capacity, design carbon pricing schemes, etc.) through a mix of advocacy and convening, supported by technical assistance and possibly policy-based loans (where financial needs are substantial and there is headroom for sovereign borrowing).

- **Facilitate local currency financing for green investments.**

  The ability of project owners and governments in DMCs to raise local currency for their projects is a key success factor as it eliminates the risk of a currency mismatch. For the same reason, FI are more comfortable lending in local currency (LCY) when they are not obliged to do so in certain jurisdictions.

  ADB can deliver LCY financing through three main mechanisms: (i) LCY loans where ADB can hedge the risk through a swap or other derivative-based transaction; (ii) being an anchor investor in LCY bond issuances by FIs or other issuers; and (iii) credit enhancing borrowers so that they can meet the financing criteria of LCY financiers.
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- **Facilitate the issuance of green or sustainability bonds.**

  Green bonds are one way to expand the funding pool for climate investments by tapping international and local investors (green bonds in LCY expand the pool of LCY funding for climate investments).

  ADB can provide technical assistance to would-be issuers to help front some of the issuance and certification costs. As anchor investor in a foreign currency– or local currency-denominated green bond, ADB can send a strong signal to other investors by showing interest and trust in the bond and issuer(s). ADB could also act as a credit enhancer of such bonds (or part of it) through a guarantee.

- **Deploy innovative financing instruments such as blending or results-based financing.**

  ADB can use instruments such as *blending* (the strategic use of a limited amount of contribution to mobilizing financing from partner financial institutions and the private sector to enhance the development impact of investment projects) or results-based financing.

  They can only be raised from donors (typically shareholders) through a trust fund arrangement or charities. As an Accredited Entity of the Green Climate Fund, and partner of the Climate Investment Funds managed by the World Bank, ADB is also able to source grant funding from these organizations. An example is the 2021 ASEAN Catalytic Green Finance Facility.

- **Support the establishment of green investment banks**

  Commercial financial institutions are limited in providing affordable finance especially for activities with uncertain returns. As such, recognition is growing that public financial institutions need to play a greater role in scaling up investment in climate action and the Sustainable Development Goals.

  Green investment banks (GIBs) are public or nonprofit financial institutions mandated and sometimes purpose-built to develop, facilitate, and scale investment in greenhouse-gas-reducing (and potentially other green) projects.

  Multilateral development banks such as ADB can play a key role in establishing (either through the creation or conversion of existing public development banks) GIBs through their convening role and ability to engage their recipient countries and provide technical assistance and capitalizing them through low-cost loans and guarantees.
Climate change has profound economic impact. It affects all economic agents across sectors and regions. Extreme weather events such as floods, typhoons, and droughts attributed to climate change are already damaging infrastructure and disrupting economic activity, leading to financial losses for businesses and individuals. These costs will increase in the coming years and could undermine economic stability and growth by displacing many people, threatening food security, and exacerbating health problems. To mitigate the economic and social consequences of climate change, significant investments are needed in renewable energy and energy efficiency, as well as in climate-resilient infrastructure.

Financial markets have a crucial role to play: they are central in mobilizing and channeling the funding to develop and implement clean energy projects and sustainable infrastructure to transition to a low-carbon and climate-resilient economy. Indeed, although this transition comes with important risks for the financial system—such as in stranded assets linked to the fossil fuel industry—it represents economic opportunities for many firms. To deliver the funding, financial institutions must factor in climate change in lending to support the greening of economies and in physical and transition risk management, to guarantee financial stability.

Multilateral development banks such as the Asian Development Bank (ADB) also play a critical role in greening the financial system. Naturally, they can add to financial flows for climate investments by financing sustainable development projects directly and by leveraging private sector investment through risk mitigation instruments or guarantees. And perhaps more importantly, they can contribute to setting up a regulatory and supervisory framework, as well as climate disclosure standards, conducive to greening financial markets.

Multilateral development banks are not starting from scratch. Over the last few years, supervisors have rapidly built up their understanding of climate risks and opportunities for financial institutions and for the financial system. They have also developed an extensive policy agenda for greening financial markets. This agenda touches upon several dimensions: from better assessing climate risks to considering mitigating measures, and from setting up supervisory expectations on climate risk management to initiatives for scaling up green finance. The agenda involves coordinated actions across several stakeholders: from supervisors themselves to financial institutions, from financial data providers to standard-setting bodies.

This report explores how ADB can contribute to the greening of the financial system. It focuses first on how the institution can support its developing member country (DMC) supervisors in better managing climate risks and in scaling up green finance. Although indirect, such supportive actions from ADB can help develop a regulatory and supervisory framework conducive to sustainable investment at large at the regional level, and thus leverage ADB’s action beyond its direct funding.
The report summarizes what supervisors know about climate risks for financial institutions and the financial system in section 2 and then examines recommended actions for supervisors to better manage climate risk (section 3). One key lesson for supervisors is that transition to a low-carbon and climate-resilient economy minimizes risks for financial institutions and the financial system. The report thus then indicates the main actions that supervisors can take to scale up green finance and mobilize funding to support this transition (section 4).

The report then suggests how ADB—particularly through its finance sector work—can help DMC supervisors better manage climate risks in financial institutions and in the financial system. It looks at how ADB can contribute to scaling up green finance to support the transition to a low-carbon and climate-resilient economy.
2. What Do We Know about Climate Risks and Opportunities in the Financial System?

Climate change and transition pose two types of risks: physical and transition. Physical risks arise from changes in climate conditions. They can be acute when related to extreme climate and weather events or chronic when related to progressive shifts in climate and weather patterns. Firms and households located in the regions impacted by physical risks will be more affected than others. Transition risks result from the structural adjustments toward an environmentally sustainable and resilient economy. In this process, some economic activities will become obsolete, their assets may become stranded, and they will have to be wound down—such as coal-fired power generation plants—ideally in an orderly fashion. Firms and households relying on them will be more affected than others. Some economic activities will also gain importance in the transition. The transition thus represents an opportunity for some firms and households.

Climate risks are financial risks. When they materialize, physical and transition climate risks generate economic costs that affect firms and households. Individual firms and households can be directly impacted—e.g., by a flood or coastal erosion, among physical risks, or the termination of a polluting plant, for transition risks—and indirectly through the overall economic impact of these costs. These costs can jeopardize firms’ and households’ financial soundness—by reducing their income, increasing their expenses, or reducing the value of their assets—and can trigger credit defaults and declining financial value. This translates into potential losses for financial institutions owning their loans or financial assets, and thus represents financial risks for them. Box 1 describes how climate risks translate into risks for financial institutions.

Box 1: From Climate Risks to Financial Risks

Climate change and the transition to a net-zero economy pose two types of risks for the economy and the financial system: physical and transition. The materialization of these risks has economic consequences for firms and households, impacting their economic activities, incomes, and wealth. Such economic impacts translate into financial outcomes that can affect financial institutions’ soundness and thus represent risks for the financial system.

Physical and Transition Risks

Physical risks are economic and financial risks arising from changes in climate conditions in a region. They can be categorized as either acute—if they arise from extreme climate and weather-related events like droughts, floods, wildfires, or storms—or chronic—if they arise from progressive shifts in climate and weather patterns like average temperatures increase or changes in rainfall cycles. Such extreme events and long-term changes will affect some firms and households more than others, depending on their economic activities and their region.

For example, the market capitalization of the 20 largest oil companies, which are directly exposed to transition risk, amounted to more than $4 trillion in October 2021.
Transition risks are economic and financial risks that result when the economy shifts toward an environmentally sustainable and resilient model. Such a transition requires a substantial shift in economic activities, from polluting production and consumption processes to low-carbon equivalents. In many regions, it also requires substantial investments in adaptation measures to mitigate the costs of physical risks. Such a transition is mainly driven by (i) the implementation of climate policies, (ii) advances in technology, and (iii) shifts in public sentiment, demand patterns, and preferences and expectations. In this process, some business plans will become obsolete, others will gain importance. This transition will hurt some firms and households but benefit others, thus entailing risks and opportunities.

**Economic Impact on Businesses and Households**

Climate shocks directly affect the economic conditions and performance of businesses and households. Physical risks, for example, can alter firms’ cash flows by reducing revenues, from lower production capacity (e.g., due to supply chain interruptions after a flood or worker absenteeism in a period of extreme heat) as well as higher capital costs (e.g., due to damage to facilities). Households also face lower income (e.g., due to lower work productivity), higher prices (e.g., due to disruptions in goods value chains following extreme weather events or lower agricultural production due to changes in precipitation patterns), and wealth losses (e.g., due to damage or destruction to their properties following extreme weather events).

Similarly, transition risks affect firms’ cash flows in several ways, including, for example, research and development expenditures on new and alternative technologies, costs to adopt and deploy new practices and processes, reduced demand for carbon-intensive products and services, as well as increased production costs due to changing input prices (e.g., for energy and water) and output requirements (e.g., for carbon emissions and waste treatment). Firms with activities relying heavily on nonrenewable energy and products will need to fundamentally revise their business model to adapt to a net-zero economy. Such firms are likely to see large parts of their assets stranded (i.e., no longer of economic value in a transitioned economy). Households depending on such economic activities for their livelihood also face job and wage losses.

**From Economic Impact to Financial Risk**

As noted, climate risks impact economic and financial soundness (income, wealth) of firms and households. Firms’ and households’ climate weaknesses reverberate through to the financial system and can affect the financial institutions engaged in business relationships with them. For instance, the increased risk of flooding for residential properties can result in changes in the debt repayment capacity of borrowers and the value of their collateral, thereby affecting the mortgage portfolios of banks. Climate policies, technological breakthroughs, or changes in societal preferences could lead to less demand for companies not compliant with a net-zero objective, leading to reductions in their financial valuations and credit downgrades, because they no longer earn an economic return on past investment (stranded assets). This can result in losses for the financial institutions exposed to these carbon-intensive companies and jeopardize their financial soundness.

International supervisory bodies have shown climate risks are an increasing source of risk but not a new category of risk: they materialized within the risk categories used by financial institutions and supervisors to manage financial risks.

**Risk Categories**

- **Credit risk**: Physical and transition risk drivers increase a bank’s credit risk as soon as those drivers undermine a borrower’s ability to service debt (the income effect) or curtail a bank’s ability to fully recover the value of a loan after default because the value of any pledged collateral or recoverable value has been reduced (the wealth effect).

- **Market risk**: Physical and transition risks could lead to the re-pricing of financial instruments and corporate debt, affecting the value of securities held on financial institutions’ balance sheets and the value of the collateral used in some operations.
Liquidity risk: Climate risk drivers may impact banks’ liquidity risk directly through their ability to raise funds or liquidate assets or indirectly through customers’ demands for liquidity. There is some evidence that disasters can lead to liquidity risk within banks. These effects could impact the ability of a bank to fund increases in its assets and meet obligations as they come due without incurring unacceptable losses.

Insurance risks: For the insurance sector, climate risk factors translate into underwriting risks caused by higher-than-expected insurance claims for an array of property and casualty insurance business lines. In some extreme cases, insurance coverage is prohibitively costly or no longer available as for example property insurance in homes built too close to the sea.

Operational and litigation risk: Extreme weather events can undermine financial institutions’ business continuity by damaging critical functions of the financial entity or of its main providers, for example. In addition, corporations and banks may be exposed to increasing legal and regulatory compliance risks, as well as litigation and liability costs, associated with climate-sensitive investments and businesses.  

Channels and Spillovers for the Materialization of Physical and Transition Risks

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Box 1: continued

Source: Bolton et al. (2020).

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\[a\]  Hino and Burke (2020).
\[b\]  Hirsch and Hahn (2018).
\[c\]  BCBS (2021a).
\[d\]  NGFS (2021f).

Source: Authors.
Climate risks fall squarely within the mandate of central banks and financial supervisors. Climate risks translate into financial risks but do not constitute a new type of risk. They are rather a new source of risks for financial institutions. This means that climate risks materialize through conventional prudential risk types for the financial system: credit risk, market risk, liquidity risk, operational risk, and reputational risk (BCBS 2021a). As with any financial risk, climate risks fall squarely within financial supervisors’ and regulators’ mandates (NGFS 2019). As such, they can also be potentially addressed with the prudential tools developed for these categories. Climate risks also represent a potential systemic risk for the finance sector. This potential systemic risk has been highlighted by almost all international and national financial supervisors. As such, climate risks also fall into the financial stability mandate of central banks and must be factored in their assessments of financial stability risk, as well as into macroprudential measures when appropriate.

Climate risks are widespread in the financial system and inevitable. Climate change and the transition to a net-zero economy affect all agents in the economy, across all sectors and geographies (NGFS 2019). In the finance sector, climate risks impact all financial actors—banks, insurance companies, investment managers, etc. Climate risks also imply international leakages. Thus, seizing the climate risk exposure of one specific financial system requires assessing climate risk beyond its borders. It is important to keep in mind that climate risks will inevitably play out in reality in one form or the other—i.e., by a combination of physical and transition costs. The only uncertainties are how, when, and at what scale of economic and financial system impact. Climate-related risks thus differ from traditional systemic risks addressed by supervisors, which are possible and likely to happen at one point but may not materialize.

Climate risks are irreversible and depend on current policies. Climate-related risks are characterized by non-linearities and commonly manifested in physical tipping points. Once they are reached, the economic and financial costs of climate change become irreversible. Environmental tipping points thus represent a risk of permanent damage rather than a temporary downturn (Vaccaro 2022). In this context, the decision process that is clear and involves implementing policies that prevent climate shocks from happening is probably the most prudent policy to adopt (Ford et al. 2022) and where much of the focus should apply. The evolution of climate risks is largely determined by the extent and the shape that the transition will take. Although developing in the long term, the paths that climate risks will take are contingent on the policy measures taken in the short term. This suggests that the longer society delays investing in climate mitigation and adaptation, the larger the downside physical risks severely impacting the financial system.

Climate risks are starting to become a reality and will accelerate over the next decade. Climate risks are not distant risks: climate change economic impacts are materializing today. Overall, worldwide economic costs from disasters have exceeded the 30-year average of $140 billion a year in 7 of the last 10 years. The share of weather-related catastrophe losses has increased steadily to account for over 90% of insured catastrophe losses in 2021 (Swiss Re Institute 2021). Between 2015 and 2022, extreme weather events caused about $397 billion in direct physical losses in Asia and the Pacific (Figure 2). Transition risks have also started to affect companies. For example, BP wrote down $17.5 billion in assets in June 2020 and Total Energies took a $7 billion hit on Canadian oil sands assets in July 2020.4 The severity and frequency of such climate risk materialization will increase significantly over the next decade.

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2 This includes the NGFS with its 116 global members and 19 observers, including the Financial Stability Board (FSB), the Bank for International Settlements (BIS), and the International Monetary Fund (IMF).
3 Semenik et al. (2022), for example, show that 15% of global stranded assets risk outside Organisation for Economic Co-operation and Development economies are borne by investors based in those economies.
4 As a comparison, the market capitalization of the 20 largest oil companies, which are directly exposed to transition risk, amounted to more than $4 trillion in October 2021.
What Do We Know about Climate Risks and Opportunities in the Financial System?

Figure 1: Insured Losses since 1970
($ billion, 2021 prices)

2017 Hurricanes Harvey, Irma, Maria
2011 Japan and NZ earthquakes, Thailand flood
2005 Hurricanes Katrina, Rita, Wilma

Source: Swiss Re Institute (2021).

Figure 2: Extreme Weather Event Losses in Asia and the Pacific

DMC = developing member country, PRC = People’s Republic of China.
Note: The amounts for total losses refer to the monetary amount of damage to property, crops, and livestock at the year of the event.
Source: The Centre for Research on the Epidemiology of Disasters.
The Asia and Pacific economies are substantially exposed to climate risks. The region is vulnerable to the adverse effects of climate change, with key physical risks identified to infrastructure and people because of sea level rise, storm surges, droughts, heat waves, wildfires, and flooding. Many of the countries in the region most exposed to the direct physical impacts of climate change are also among those least able to adapt. In addition, large metropolises such as Jakarta and Bangkok are sinking. Vulnerable low- and middle-income countries need assistance to implement specific climate change adaptation measures, such as more resilient infrastructure or coastal protection. The region is also one of the world’s most carbon-intensive, for example, with the world’s two largest consumers of coal (People’s Republic of China [PRC] and India) accounting for two-thirds of total coal consumption in 2021. The inevitable shift toward decarbonization will require deep, structural changes, with significant implications for the real economy and the financial system. Furthermore, the lack of consumer awareness, financial services penetration, including insurance (particularly in emerging and developing economies), enforcement of mandatory insurance and imperfections in reinsurance markets increase vulnerabilities in the region. The climate risks faced by developing countries show how important it is that sufficient funding for climate action is mobilized. That is where multilateral development banks such as ADB have a vital role to play.

Climate risks are unevenly distributed in economies and finance sectors. Physical risks are very dependent on geographic location. They are thus unevenly distributed across regions. Some regions are much more exposed to specific climate events than others (see Figure 3 for the euro area). The firms and households in these regions are relatively more exposed to physical risks than others. Climate risks also impact some economic activities more than others. Agriculture and food security will be particularly affected by changes in temperatures and rainfall patterns. Industries extensively relying on fossil energy are much more exposed to transition risks than others. Within sectors, too, transition risks vary considerably between individual firms. Their exposure depends on their business and production model, as well as the actions they are taking to adjust for the transition. Finally, climate risks are not homogeneously distributed in the finance sector. Physical risks directly impact the insurance sector. Within the banking sector, climate risks are concentrated in some institutions more than in others (ESRB-ECB 2021). Climate risks are thus more likely to affect some groups of households, firms, or financial institutions than others.

Climate risks have severe distributive consequences. The impact of climate change disproportionately affects the poorest households. First, poorest households are more exposed to natural hazards like floods and heat stress5 and, second, poorer households tend to lose more (in fraction of their wealth) when affected by a disaster.6 In addition, poorer households have less access to support and coping mechanisms, from savings and borrowing to social protection and insurance. Jafino et al. (2020) estimate that climate change could drive up to about 130 million additional people in extreme poverty in adverse scenarios. They also find that the impact on food prices is the main channel through which climate change affects poverty over the short run.

Climate risks are potentially systemic. Climate risks have a clear systemic dimension. Their consequences not only affect all agents in the economy and occur across all sectors and geographies, but can also be amplified by financial system spillover effects and interlinkages (FSB 2022). Furthermore, some physical risks have already been locked in, posing a major challenge to financial systems, even if efforts are implemented to address climate change. The enormous magnitude of estimated losses due to physical and transition risks could severely impact systemically important financial institutions and broader financial markets. This potential systemic risk for the financial system has been highlighted by almost all international and national financial supervisors.7 Climate risks thus warrant financial regulators’ heightened scrutiny and adequate mitigation efforts, both at the micro and macroprudential levels.

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6 See, e.g. Walsh and Hallegatte (2020).
7 This includes the Network for Greening the Financial System (NGFS) with its 116 global members and 19 observers (see https://www.ngfs .net/en/about-us/membership), including the Financial Stability Board (FSB), the FSB, the BIS, and the IMF.
Figure 3: Forward-Looking Physical Risk Score of Euro Area Firms

ECB = European Central Bank.

Notes:
1. Physical-risk scores are forward-looking and reflect the intensity and magnitude of catastrophes triggered by natural hazards over a 30-year horizon. The data—which are provided at address level—have been aggregated and averaged at NUTS3 level for the purpose of this chart. Of the seven risk categories available, only three are included in the framework for the ECB climate stress test, namely wildfire, flooding and sea level rise. This is due to the fact that the other categories are assumed to affect the economy as a whole, while the selected categories can have an impact at a more granular level, i.e., on individual firms (heat stress, water shortage, hurricanes and earthquakes will have large-scale effects, while wildfire will only affect the specific area in which a firm is located).
2. ECB calculations based on Four Twenty Seven data (2018).
Source: Alogoskoufis et al. (2021).
A rapid, orderly transition is the best scenario for financial stability. Several supervisors have highlighted that an early and orderly transition to a low-carbon and climate-resilient economy generates lower financial risks than scenarios with a late and sudden transition—high transition risks—or scenarios with no transition at all—high physical risks (ECB 2022a; Alogoskoufis et al. 2021; Helmersen, Korsgaard, and Roulund 2020). For financial stability reasons, supervisors have thus an interest in supporting and implementing measures for the transition and thus for lower climate systemic risks. As the magnitude and nature of climate systemic risk are determined by actions taken today, prompt actions can generate considerable benefits in reducing the nature and severity of disruptions to economies and financial markets. Coordination among authorities is key to delivering a coherent and ambitious transition policy package. Supervisors can contribute to this package directly with financial policy measures and indirectly by supporting and contributing to transition policies and initiatives taken by others.

Financial markets are a key driver of the transition but are so far not sufficiently delivering. The transition requires significant investments not only in awareness raising but in carbon-neutral technologies and in infrastructure and economic activities resilient to climate change. At the same time, new investments in polluting economic activities must be drastically cut. Financial institutions are key actors in conveying private and public funding to environmentally sustainable investments and to support firms in the transition of their activities. However, financial markets overall are currently not aligned with a portfolio allocation that leads the transition to a sustainable economy. This misalignment supports the buildup of physical risks for the economy and the financial system. Shifting financial portfolios to an allocation compatible with an early and orderly transition implies substantial adjustments (ESRB-ECB 2020). Furthermore, despite the considerable development of green financial markets, there is broad agreement among supervisors that climate risks are currently not fully priced-in by financial markets, which makes them prone to corrections (ESRB-ECB 2020 and IMF 2020).

Reliable financial data on climate are still scarce but are improving. Reliable and comparable climate data are crucial for financial institutions to assess the financial risks and opportunities of climate change and the transition. Currently, there are significant gaps in available forward-looking and granular data, in verification and audit mechanisms to ensure the quality of the data, and in the accessibility of the available data (NGFS 2021a). Several disclosure initiatives are under way to provide comparable international standards. For example, these include the Task Force on Climate Related Financial Disclosures (TCFD) and International Sustainability Standards Board; and regionally, such as the European Union disclosure standards. However, as climate impacts are yet to be observed, climate data mainly rely on methodologies in development and based on complex models, as well as on assumptions that cannot be tested. This makes it difficult, by definition, to translate climate risks and opportunities into disaggregated and robust financial indicators. Financial institutions and supervisors must thus adapt their risk management and policy decision frameworks to such data features.

Financial institutions and supervisors can already use the available data. As highlighted by several central bankers and supervisors, uncertainty and lack of data are not an excuse for inaction. Numerous data providers and public initiatives do provide financial institutions with climate metrics that can already be used to guide their investment decisions and risk management. To account for possible data deficiencies, the Basel Committee on Banking Supervision (BCBS) recommends that financial institutions add a margin of conservatism for climate data of poor quality and rely on a conservative application of expert judgment when data are not immediately available (BCBS 2022b). Bingler, Colesanti Senni, and Monnin (2022) also show that investors, financial institutions, and supervisors can combine different climate indicators to get a more robust estimation.
of climate risks and identify assets most exposed to them. Focusing on large firms, for which data are more available or on economic activities that are most at risk from climate change and the transition is another option available to them (Monnin 2022). As Andrew Bailey, the Governor of the Bank of England, puts it: supervisors expect financial institutions “to make reasonable judgements rather than default to zero” when it comes to the assessments of climate risks (Bailey 2020).

Climate risks are financial risks and thus fall squarely under supervisors’ mandates (NGFS 2019). It is then expected from all supervisors to take the supervisory, regulatory, and disclosure-related measures to assess, measure, and mitigate climate financial risks for the finance sector. For that, the BCBS recommends taking a holistic approach across the three pillars of prudential regulation for banks and insurance companies (regulatory capital requirements, risk management and supervisory review, and market discipline and disclosure).

International supervisory bodies have issued several recommendations for supervisors to address climate risks in the finance sector (e.g., NGFS 2020a and BCBS 2022a). Their recommendations go in four directions:

(i) Assess and identify climate risks for domestic financial institutions as well as for the financial system.
(ii) Develop and implement climate risk management expectations for supervised financial institutions.
(iii) Support and implement climate risk disclosure framework for firms.
(iv) Implement climate risk-mitigating actions where appropriate.

These recommendations are detailed below. In addition, supervisors acknowledge that an early and orderly transition to a low-carbon and climate-resilient economy is the option that lowers climate risk the most for the finance sector (see section 2). Supervisors thus have an interest in supporting such a transition. They can do this in several ways, which are described in section 4.

Assess and Identify Climate Risks for Domestic Financial Institutions as well as for the Financial System

Assessing climate risks for financial institutions and the financial system is a complex task but, as for any other source of risk, is required from supervisors both by the BCBS (2012) and the IAIS (2019). Two dimensions are important in this process: (i) determining how climate risks transmit to the economies and finance sectors and identifying how these risks are material for financial institutions, and (ii) identifying the exposures of financial institutions and assessing the potential losses (NGFS 2020a). This assessment requires pulling together several resources within supervisory institutions, as well as engaging with external national stakeholders. It must be part of a general climate strategy supported by supervisory authorities’ boards. It also implies building up capacities on climate issues inside supervisory institutions.

Jurisdictions are at different stages of this process (see Figure 4). Most supervisors (64%) have already implemented or are implementing climate risk assessments, and 78% of supervisors have included climate risks in their supervisory activities in one form or another. However, few supervisors have already implemented climate risk and exposure assessments (NGFS 2021b).
Figure 4: Identifying Climate Risk and Exposure by Central Banks and Supervisors

Recommendation 1 - Determine how climate-related and environmental risks transmit to the economies and finance sectors in the jurisdictions and identify the risks that are likely to be material for the supervised entities

Recommendation 3 - Identify the exposures of supervised entities that are vulnerable to climate-related and environmental risks and assess the potential losses should these risks materialize

NGFS = Network for Greening the Financial System.
Note: Results for a sample of 53 NGFS members in 47 jurisdictions across all continents.
Source: NGFS (2021b).

Supervisors should focus on four areas to assess and identify climate risks for financial institutions and the financial system (NGFS 2021b), with a possible role for multilateral development banks including ADB:

(i) **Develop a clear understanding of sources of climate risks.** Different jurisdictions experience different sources of climate risk. Supervisors must work with financial institutions and other public and private stakeholders to determine the relevant material sources of climate risk to leverage their expertise, as the know-how is not always available in-house. Multilateral development banks are part of the stakeholders that can support supervisors in this process.

(ii) **Understand the transmission channels of climate risks to the economy and financial system.** Transmission channels of climate risk to financial risks are now generally well documented (e.g., NGFS 2019 and BCBS 2021). However, supervisors must highlight which ones are most relevant in their jurisdiction. Multilateral development banks are well placed to identify the relevant transmission channels regionally and inform national supervisors in their local analysis.

(iii) **Assess financial exposures arising from climate through quantitative and qualitative approaches.** Supervisors have taken a wide range of approaches—both quantitative and qualitative—to assess climate risk exposures of financial institutions and the financial system. However, the choice of methods is largely driven by the data available to supervisors. Multilateral development banks can play a role in collecting and making regional climate data available and in sharing their own experience in climate risk assessments.
Assess potential loss and impacts using forward-looking methodologies. Assessing potential losses from climate risks comes with its own challenge: it must rely on forward-looking approaches for which past data is of limited usefulness. This requires developing new methodologies mostly based on forward-looking scenarios. Multilateral development banks can help in developing these methodologies and crafting adequate scenarios regionally.

The assessment of climate risks for financial institutions at the micro and macro levels requires the involvement of dedicated resources by supervisors. The NGFS estimates that it takes approximately 1 year for a dedicated team fully supported by senior management to produce a report on climate and environmental risks for the finance sector from scratch (NGFS 2020a). This exercise usually follows a preparatory, an analytical, and a concluding phase.¹⁰

Four building blocks play a key role in the assessment and identification of climate risks for financial institutions and the financial system:

- **Engaging financial institutions.** Involving financial institutions from an early stage of the supervisory process is central. The interactions between supervised entities and the supervisors build up knowledge of climate risks as well as of the resources and gaps they both face. Supervisors have engaged with financial institutions in different ways: from initial surveys of their practices regarding climate risk management and sustainable investment practices to work on stress tests with them.

- **Developing scenarios.** Most forward-looking methodologies—climate scenario analysis, stress testing, and sensitivity analysis—rely on scenarios (BCBS 2021b).¹¹ To conduct climate scenarios, high-level scenario requirements and specifications must be determined, as well as a scenario’s ambition and speed. For this, supervisors can build on the scenarios developed by NGFS (2022). These scenarios are built at an international macro level. Supervisors might thus also need to develop their own scenarios to reflect regional specifics and build on domestic knowledge about climate change and economic structure. The NGFS set also falls short of significantly adverse scenarios—e.g., they do not provide scenarios for the case in which committed climate policies are not implemented.

- **Choosing exposure metrics.** The key determinants for physical risks are the firm, sector, and household sensitivity to climate hazards or long-term changes. Crucial information for that is their geographic location and location of their counterparties along value chains (FSB 2021). This information is not always easily available. For transition risks, the sensitivity of the exposures to policy change and other transition triggers (technology, consumption preferences) and the tenor of the exposures are essential. Supervisors typically use financial institutions’ carbon intensity¹² as a proxy, but this metric is far from capturing all transition risks and opportunities. Forward-looking indicators, taken for example from firms’ transition plans, are better suited for this purpose.¹³ Impact metrics should also be used to assess transition risks (Boissinot et al. 2022).

- **Performing stress tests.** Climate stress tests are increasingly being used to assess financial institutions’ resilience to climate shocks as well as to assess systemic risk from climate change and the transition. Two approaches are possible for supervisors: a top-down approach, in which supervisors analyze the impact of stress scenarios at the macroeconomic level and then match this information with the individual institutions’ data they have, or a bottom-up approach, in which supervisors provide stress

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¹⁰ See Box 10 in NGFS (2020a, 25) for more details on these steps.

¹¹ In Asia and the Pacific, the People’s Republic of China; Hong Kong, China; and Japan have already undertaken such analysis, while India, Indonesia, the Republic of Korea, and Singapore are doing an analysis and Malaysia is planning one (FSB and NGFS 2022).

¹² Annual greenhouse gas emissions divided by a relevant measure of firms’ activity.

¹³ For example, see CDP (2021) for guidelines on metrics that transition plans should disclose.
scenarios to financial institutions and collect their estimation of its impact. The NGFS published its guideline for such exercises (NGFS 2020b). Supervisors usually start with a pilot exercise before implementing a fully-fledged stress test. Most stress test exercises have focused on transition risks. Stress tests have not yet led to, and were not even intended to lead to, conclusions about the capital adequacy of tested financial institutions. Also, given their methodological limitations, current stress tests understate climate exposure and vulnerabilities (FSB and NGFS 2022).14

Develop and Implement Climate Risk Management Expectations for Supervised Financial Institutions

Financial institutions’ ability to manage climate financial risk is paramount to their resilience to those risks. Yet, initial surveys of risk management practices highlight that financial institutions are not prepared to manage climate risks (see, e.g., ECB 2022b, Bank of England 2018). They have not yet implemented the institutional processes, the data, and the tools for that. In Europe, for example, the ECB found that virtually none of the institutions it supervises meets all supervisory expectations in climate-related risk management (ECB 2022c).

Against this background, international supervisors’ bodies, like the NGFS (2020a), the BCBS (2022a) and the FSB (2022), recommend setting supervisory expectations for financial institutions. The recommended expectations cover key aspects of governance, business strategy, risk management, scenario analysis and stress testing, and disclosure in financial institutions when it comes to climate risks. International supervisors’ bodies also recommend engaging supervised entities in the implementation of the supervisory expectations and, when needed, taking necessary mitigation measures.

According to the NGFS, overall, ongoing efforts and the progress made in setting supervisory expectations for climate risk management have greatly improved in the last few years (NGFS 2021b). More than 80% of supervisors are implementing supervisory expectations, while more than 10% have already implemented them (see Figure 5). However, supervisory expectations are very heterogeneous: they range from detailed expectations like, e.g., in Europe (ECB 2020) to initial principles like, e.g., in South Africa (South African Reserve Bank 2022). The supervisory expectations developed so far in different jurisdictions have been intentionally largely high-level and nontechnical, but supervisors generally expect to refine their guidance over time to be more precise and prescriptive as expertise and regulation development and capabilities improve (BCBS 2022a). Table 1 gives more examples of supervisory expectations collected by the NGFS.

Implementing supervisory expectations comes with challenges. Supervisors that have gone through this exercise often cite limited capacities—their own and of financial institutions— as important obstacles. They see cooperation with peers and international organizations, including multilateral development banks, as one way to overcome this challenge. The development banks can also support financial institutions in the implementation of supervisory expectations. Another possible hurdle supervisors mention is a lack of common international standards or guidelines. Here too, multilateral development banks can contribute to the definition of such standards and guidelines.

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14 The FSB and the NGFS surveyed the different stress tests that supervisors have already implemented in different jurisdictions (FSB and NGFS 2022). They note that measures of exposure and vulnerability from current stress tests are likely understated, because they usually do not capture second-round effects, potential nonlinearities in climate-related risks, and other potentially large sources of risk, such as those stemming from abrupt correction in asset prices when transition shocks result in fire sales of assets in exposed sectors.
When it comes to the assessment of whether financial institutions meet supervisory expectations, supervisors have employed different approaches, such as engaging in supervisory dialogue with supervised entities, requesting self-assessment by these entities, undertaking a direct assessment themselves, or a combination of approaches (NGFS 2021b).

Note that, while some supervisors have proceeded to such assessments and found gaps in the implementation of the supervisory expectations by financial institutions, no coercive mitigation measures have yet been taken. The ECB is, to our knowledge, the most advanced in this direction: after concluding on several occasions that banks do not have the right climate risk management processes in place, it has now given a detailed work plan to each institution and set a deadline to the end of 2023 for the implementation of these work plans before taking potential mitigation measures (ECB 2022d).

Support and Implement Climate Risk Disclosure Framework for Firms

Public disclosure by financial institutions of information related to their climate and environmental risks greatly contributes to market efficiency by ensuring that market participants have adequate insight into the risk exposures, risk assessment processes, and capital adequacy of financial institutions. From that perspective, several supervisors expect financial institutions to disclose information and metrics on the climate and environmental risks they are exposed to, their potential impact on the safety and soundness of the institution, and how they manage those risks (NGFS 2022b).

Against this background, a crucial action that supervisors can take is giving guidelines to companies around the world on how to disclose climate financial risks and opportunities, which will allow financial markets to price them correctly. It will also help companies that face a rocky transition to a low-carbon economy, with sudden value shifts or cost surges, should they have to adjust rapidly to the new landscape.
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A survey from the NGFS finds that 42% of supervisors have set supervisory expectations for climate disclosures, and over half have assessed the disclosures of their regulated financial institutions. Climate-related disclosures were found to be sparse and heterogeneous. In this survey, most supervisors stressed that no single framework or set of standards was sufficiently comprehensive for disclosures by regulated financial institutions. About 40% of supervisors are considering introducing or strengthening existing disclosure requirements, and a majority are in favor of mandatory disclosure requirements (NGFS 2012c).

A key hurdle for the disclosure of meaningful climate information by firms is the proliferation of disclosure frameworks and guidance that adopt different definitions for materiality and address the needs of different stakeholders (NGFS 2021b). The TCFD recommendation (TCFD 2017), supported by the FSB, currently constitutes the reference framework for financial institutions. However, this industry-led framework does not always provide consistent, comparable, and reliable disclosures for supervisors. Several initiatives are in development to provide international and local standards for climate reporting: examples include one led by the International Sustainability Standards Board under the umbrella of the FSB (ISSB 2022), the Non-financial Reporting Directive by the European Commission,15 and binding standards on Pillar 3 disclosures on environment, social, and governance risks by the European Banking Authority.

Supervisors have an interest in actively participating in the definition of such standards to ensure that the metrics they will require are relevant to their supervisory activities. This includes being relevant, granular, comparable, and exhaustive enough to be used in financial regulation. Note that supervisors are particularly interested in forward-looking metrics to get more accurate assessments of climate risk. The disclosure of firms’ transition plans toward aligning their activities on a low-carbon and climate-resilient economy is a key element in providing such forward-looking information (Dikau et al. 2022). The firms should also disclose information about the impact of their activities on climate change, as this informs both their risk exposure and the policies aimed at mitigating the overall impact of the economy on climate change (Boissinot et al. 2022). Finally, climate disclosure by financial institutions is important for supervisors, but for financial institutions to be able to assess their exposure and impact, firms in the nonfinance sectors—i.e., the counterparties financial institutions lend to, invest in, or insure—must also disclose the relevant information. Financial institutions stress that a lack of disclosure by these firms hinders their ability to provide decision-useful disclosures on their side.

Implement Climate Risk Mitigating Actions where Appropriate

When financial institutions do not adequately manage climate risk, then supervisors must take mitigating measures. So far, supervisors have not taken such steps, but about half of them are implementing them and an additional 30% have actions planned (Figure 6).

Several options are being assessed to mitigate climate risks in financial institutions and in the financial system. First and foremost, given the impact of climate change on traditional risk categories (see section 2), they must be accounted for in Pillar 1 capital requirements (BCBS 2012). The BCBS has recently clarified that this should be done by financial institutions (BCBS 2022b). These recommendations include factoring in the material climate financial risks in all internal and external risk assessments financial institutions are relying on, reflecting climate risks into the entire credit life cycle with due diligence in the onboarding process and ongoing monitoring.
of clients’ risks, as well as establishing an effective process to obtain and update relevant and material climate information on the borrowers’ financial condition. However, currently, the risk weights underpinning capital requirements are likely not to capture climate risk to the full extent. One reason for that is the divergence between the medium-to-long-term nature of climate risks and the short-term nature of a bank’s risk management framework (Restoy 2021). A second reason is that financial institutions are currently not managing climate risks adequately (see, e.g., ECB 2022b, ECB 2022c, Bank of England 2018). A third reason is the remaining gaps in climate risks data. On this last point, the BCBS recommends adding a margin of conservatism to climate risks assessments to account for poor or scarce climate-related data, as well as for other sources of additional uncertainties. The BCBS precis that financial institutions should rely on expert judgments when data are not immediately available. Proposals exist for the rapid implementation of such measures by focusing on clearly identified risks. For example, as new fossil fuel exploration is incompatible with a transition to net zero (IEA 2021), loans for such activities can be considered highly exposed to transition risks and thus imply higher capital requirements (Finance Watch 2020).

Climate risk mitigation measures can also be part of macroprudential policies. With some adaptation, the current macroprudential framework provides instruments to address the systemic risks associated with climate risks (Baranović et al. 2021, Chaves et al. 2021, Monnin 2022, Hiebert and Monnin 2023). Two instruments stand out in the macroprudential toolbox available to central banks for addressing climate risks: systemic risk buffers (Monnin 2021) and concentration limits (Miller and Dikau 2022). Supervisors already have experience in implementing such tools. Systemic risk buffers, for example, are already being used by several supervisory authorities in Europe (the so-called SyRB). They are currently aimed at other systemic risks and could be deployed to address climate systemic risks as well. Concentration limits are fully part of the prudential toolkit used by supervisors in different contexts (BCBS 2014).

The implementation of micro and macroprudential measures faces two important challenges. First, supervisors need to adapt their policy decision and implementation processes (Hiebert and Monnin 2023, Monnin 2022). At present, they base policy decisions and calibrate supervisory instruments using data that have been observed over financial cycles and that cover most of the financial institutions they supervise, as well as most of the firms

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Figure 6: Ensuring Adequate Climate Risk Management by Central Banks and Supervisors

Recommendation 5 - Ensure adequate management of climate-related and environmental risks by financial institutions and take mitigating action where appropriate

PROGRESS (%)  
Environment  Climate

STATUS (%)  
Environment  Climate

NGFS = Network for Greening the Financial System.  
Source: NGFS (2021b).
these institutions engage with. This is not possible for climate risks, which are yet to materialize. In this context, supervisors need to move from backward-looking and relatively complete data to forward-looking data that are relatively scarcer and subject to greater uncertainty. In these conditions, implementing prudential tools for climate risk requires supervisors to be less averse to implementing prudential measures even if warning signals of systemic risk are not clear-cut. In the context of climate risks, acting with caution might be less problematic than not mitigating a potentially very costly crisis. It might also call for implementing measures in some parts of the finance sector instead of looking for comprehensive coverage. For example, supervisors could start with instruments focused on the largest financial institutions. Climate risk data are much more available for such large financial institutions than for small ones, and the risk they pose to the financial system is also larger. Supervisors could also first focus on economic activities that are most at risk from climate change and the transition. Firms within the thermal coal value chain are a case in point, as they are clearly much more at risk of being stranded soon.

Second, supervisors must be cautious of possible side effects of the prudential measures they are taking. Higher capital requirements increase the buffer that financial institutions have for absorbing losses from shocks. They thus enhance the resilience of financial institutions. However, higher capital requirements also reduce risk-taking by financial institutions. The side effect of this is that higher capital requirements might reduce investment in projects with high social value but high risk—e.g., loans to risky clean-energy technologies. Oehmke and Opp (2022) show that a combination of a brown penalizing factor and a green supporting factor might be the optimal policy in such a case. A green supporting factor could also be considered an incentive to reduce climate risk by investing in the transition to a low-carbon and climate-resilient economy. However, de-fossilized pathways are rarely linear. It is thus important to avoid linear extrapolation to calibrate prudential measures as this can create counterproductive incentives and raise risks.
4. Scaling Up Green Finance

As section 2 highlights, an early and orderly transition minimizes climate risks for financial institutions and the financial system. Supervisors thus have an interest in taking action to support such a transition. One of their key contributions in this direction is to implement a regulatory and supervisory environment that supports financial institutions in providing the funding that is necessary for this transition. Ensuring that climate risks are well managed and considered by financial institutions and in the supervisory framework is a crucial element for that (see section 3). However, supervisors can take additional measures to mobilize private capital toward the transition to a low-carbon and climate-resilient economy.

Financial Incentives through Capital Requirements

One option different circles are looking at is to reduce the capital requirements for loans that fund projects aligned with the transition to a net-zero economy—i.e., the so-called “green supporting factor” (e.g., Dafermos and Nikolaidi 2021, 2022). Lower capital requirements imply lower financing costs for financial institutions and thus provide them with a financial incentive to fund transition projects. Two examples of such a scheme are seen in the preferential capital requirements for green loans recently implemented in Hungary (MNB 2019, 2020) (Box 2). With the first program, the Magyar Nemzeti Bank (Hungary’s central bank) temporarily lowered capital requirements for loans to energy-efficient properties. With the second program, the central bank is relaxing part or all of the capital requirements prescribed in Pillar 2 of capital regulation for environmentally sustainable corporate and municipal exposures, based on the European Union (EU) taxonomy.

Box 2: Green Supporting Factor—The Hungarian Experience

On January 2020, the Magyar Nemzeti Bank (MNB)—the Hungarian central bank—implemented a “Green Preferential Capital Requirement Programme” to support the growth of green financial products and to improve the energy efficiency of the Hungarian building stock as well as to mitigate transition risk in the banking sector. This program was followed in 2021 by the introduction of preferential capital requirements for green corporate and municipal financing. Both programs are examples of green supporting factor measures—i.e., financial incentives for the green transition through lower capital requirements for loans to economic activities in line with the transition. These programs run until the end of 2024. Based on an early assessment of these measures, the MNB envisages extending them beyond these dates.

Programs Description

The first program applies to green housing loans and mortgages—i.e., loans that are used to improve the energy efficiency of the housing stock in Hungary. The second program applies to environmentally sustainable corporate and municipal exposures—loans for renewable energy production, electric mobility, ecological agriculture, sustainable commercial real estate, and energy efficiency investments. It also applies to green bond exposures and other exposures originated under
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Box 2: continued

green lending frameworks. Under both schemes, banks can release a part or all of the capital requirements prescribed in Pillar 2 of Capital Regulation.

Note that, for the second scheme, the green supporting factor applies to exposures to financial instruments that are classified as green and not to the qualification of the borrower. This corresponds to a green classification at the economic activity level, not at the firm level. The scheme grants a baseline capital deduction of 5% to green exposures, but if these exposures prove to be aligned with the European Union taxonomy’s “do no significant harm” requirements, which are more stringent criteria, the capital deduction increases to 7% of these exposures.

An Iterated and Progressive Approach

For both programs, the MNB chooses to start with a limited scope and then extends the programs to additional economic activities and entities. For example, the first program started by applying only to new buildings and then was extended to renovations achieving a minimum of 30% energy savings. The second program initially applied to renewable energy production before being extended to electric mobility, ecological agriculture, energy efficiency improvements, sustainable commercial real estate, and financing under green frameworks.

With the experience gained from the implementation of the program, the MNB also modified the conditions at which it grants capital requirement reliefs. In the residential housing program, for example, the MNB started to require banks to pass on a significant part of the capital cost reduction to customers to be eligible for the programs. This requirement seemed to be too constraining for banks, limiting their adoption of the new facilities. The MNB thus waived this requirement but maintained the prohibition to charge upfront fees to customers for eligible loans.

The calibration of the green supporting factor proved also to be a challenge. The MNB cannot base its calibration on past and observable data to determine the level of capital requirements, as it usually does. Since climate change and the transition to a low-carbon economy are yet to come, the MNB must mostly rely on forward-looking and experimental data for that.

The MNB also opted for this approach to progressively adapt capital requirements and check their impact. By starting with a narrow scope and progressively expanding it, as well as by using cautious calibrations, the MNB aims at a smooth progressive adoption by banks to avoid turbulences in case these tools are not adequately calibrated.

Intended Impact

The MNB does not expect to generate material financial incentives for green loans with these programs. Its intention is rather to increase marginal incentives that set a direction for banks to restructure their portfolios and align them with the transition to a low-carbon economy. The central bank hopes that such programs will trigger new reflections by banks on their more global strategy regarding their role in the transition and draw attention to green financial products. It sees these programs not as game changers, but as a forward-looking tool to support better transition management by financial institutions and a signal to banks that they will need to restructure their assets for transition.

Finance Sector Reaction

The two programs have not yet had a significant impact on the structure of banks’ portfolios and there is no evidence yet that banks have adjusted the interest rates on their loans to reflect them and thus pass the lower capital costs through to their customers. However, these facilities are used by banks and the exposure to loans eligible for them is building up. It might therefore be too early to draw definitive conclusions on their impact.

Another encouraging sign is that, following the implementation of these programs, major credit institutions in Hungary have started developing and implementing green financing frameworks. They have also developed new financial products eligible for these programs such as, for example, energy-efficient mortgages.

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Although green supporting factors are gaining traction on supervisors’ policy agendas, they raise several concerns. First, no strong evidence yet exists that loans for sustainable projects face lower risks than others (NGFS 2022c). A green supporting factor is thus hardly justified on a risk basis. Since climate-related risks are not fully accounted for in current capital requirements, the general view in the supervisors’ community is that additional capital should be added to current capital requirements to account for them rather than reducing them with a green supporting factor (e.g., Dankert et al. 2018). Note that, increasing capital requirements would, by generating a differential in capital costs, also create a financial incentive in favor of loans aligned with the transition to a low-carbon and climate-resilient economy. Second, the impact of green supporting factors to achieve transition goals might be limited (Oehmke and Opp 2022). High capital requirements applied to a limited scope of harmful economic activities are the option that is likely to maximize the effectiveness of measures using capital requirement differentials (Chamberlain and Evain 2021).
Supporting Disclosure Frameworks and Sustainability Reporting Standards

As this report has highlighted several times, climate disclosure is key to better managing climate risks in the financial system. But it is also crucial to mobilize investment toward transition opportunities. For this, disclosure frameworks should not only provide information on exposures to climate risks, but also on the contribution (possibly negative) of firms and projects to the transition, e.g., the carbon footprint of projects. With such disclosure, opportunities in the low-carbon space become more visible to investors. Taxonomies are a useful ingredient in this endeavor and can help investors, companies, issuers, and project promoters navigate the transition to a low-carbon, resilient, and resource-efficient economy. They can also help protect investors against greenwashing and impact reporting (Box 3).

Box 3: Taxonomies

A taxonomy is a list of definitions of climate activities, such as that pioneered by the European Union (EU) in 2020–2021 (and the People’s Republic of China [PRC] before for the narrower purpose of green bonds) to create a common understanding of what activities can be considered environmentally sustainable.

As the United Nations Environment Programme Finance Initiative recently noted, “The EU Taxonomy is a first-of-its-kind classification scheme that creates a common understanding of how economic activities can qualify as environmentally sustainable. It has been designed to bring clarity to investors and businesses by presenting reliable, coherent, and comparable sustainability-related indicators for several economic activities. […] it allows for consistent definitions of what can be considered an environmentally sustainable economic activity, underpinning disclosure requirements of economic actors, corporates and financiers alike, to improve the availability and comparability of ESG [environmental, social, and governance] data.”

At this stage, the EU Taxonomy is only used as a basis for the disclosure requirements created for financial institutions and some non financial institutions firms. But the Network for Greening the Financial System also called for a more ambitious application of such taxonomy. In its Recommendation no. 6, “Supporting the development of a taxonomy of economic activities,” the Network for Greening the Financial System (NGFS) called for policymakers to

- ensure that the taxonomy is robust and detailed enough to (i) prevent greenwashing, (ii) allow for the certification of green assets and investments projects, and (iii) facilitate risk analysis;
- leverage existing taxonomies available in other jurisdictions and in the market and ensure that the taxonomy is dynamic and reviewed regularly to account for technological changes and international policy developments; and
- make the taxonomy publicly available and underline the commonalities with other available taxonomies. Eventually, it should strengthen global harmonization to ensure a level playing field and prevent the dilution of green labeling.

Progress toward a global taxonomy or at least compatible regional taxonomies is underway, as shown by the publication under the auspices of the International Platform on Sustainable Finance of the “Common Ground Report,” drafted by a working group composed of EU and PRC experts. This Common Ground Taxonomy (which will be expanded) includes 72 climate mitigation activities recognized by both the EU Taxonomy and the PRC’s Green Bond Endorsed Project Catalogue.
At the request of the G20 Sustainable Finance Working Group, the International Platform on Sustainable Finance and the United Nations Department of Economic and Social Affairs issued an input paper mapping and analyzing existing taxonomies and those under development. This input paper sets out the seven high-level principles for jurisdictions and markets for the development of coherent approaches to identify and align investments with sustainability goals. 

b NGFS (2019).
d UN DESA and IPSF (2021).
Source: Authors.

Box 4: ADB’s Support for Green Bond Market Development in ASEAN+3

Formation of Asian Bond Markets Initiative

Efforts to develop the green bond market in ASEAN plus the People’s Republic of China (PRC), Japan, and the Republic of Korea (collectively known as ASEAN+3) are underway under the Asian Bond Markets Initiative (ABMI). The ABMI was launched in December 2002 by the finance ministers and central bank governors of the ASEAN+3 member countries to boost development of local currency bond markets to help mitigate the currency and maturity mismatch problems.

Road Map to Develop Green Bond Markets

Activities of the ABMI are guided by the ASEAN+3 ABMI Medium-Term Road Map 2019–2026, which was endorsed by the ASEAN+3 finance ministers and central bank governors in May 2019. One of the key initiatives highlighted in the road map was to develop the green bond market to support much-needed infrastructure investment, taking into account exposure to a range of climate conditions and extreme events facing the region. Despite increased awareness among issuers and investors of the impact of disasters and climate change, the majority of green bonds issued in ASEAN+3 was denominated in hard currencies (such as the United States dollar) to attract responsible investors in more mature markets, where green verification and certification are well-recognized. Accordingly, it is important for ASEAN+3 policymakers to create an accommodative environment to facilitate green bond issuance in local currencies.

Technical Assistance for Issuers

Together with national authorities in ASEAN+3 member countries, ADB introduced a technical assistance (TA) program to create the necessary ecosystems for green local currency bonds for infrastructure development in ASEAN+3 in March 2020. The primary objective of this TA is to support corporate bond issuers in bringing green bonds to the market, from both the supply and demand sides.

On the supply side, the TA will partner with industry experts such as the Climate Bonds Initiative (CBI), the Private Sector Operations Department (PSOD) of ADB and the Credit Guarantee and Investment Facility (CGIF), the International Capital Market Association, national securities regulators, stock exchanges, bond market associations, and rating agencies in ASEAN+3 to address binding constraints in issuing green bonds, including but not limited to the lack of market awareness, additional issuance costs, and lack of understanding on eligible projects and underlying assets. The TA contributes to creating an environment conducive to the development of green bond markets in the region, paving the way to establishing regional market practices. The TA also explores the feasibility of enhancing the capacity of service providers such as rating agencies and guarantee companies to provide advice and external review services to issuers in the region.

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The NGFS highlights four important developments to increase the mobilization of private finance in the transition (NGFS 2021c). First, supervisors should support global disclosure frameworks and efforts to establish a comprehensive corporate disclosure standard, as well as the development of a global set of sustainability reporting standards. Multilateral development banks can also support such efforts.

Second, multinational financial institutions should adopt and promote global sustainability standards and disclosure frameworks in the different jurisdictions they operate in. This also applies to multilateral development banks.

Third, credit and environment, social, and governance rating providers must enhance transparency on how they build their assessments. Multilateral development banks could request greater public transparency from them.

Fourth, the NGFS emphasizes a need for national and multilateral development banks to strengthen their support to mobilize capital toward green investment projects, particularly in developing and emerging markets.

**Coordination with Other Authorities**

Supervisors cannot be the sole and main players to address climate change. Fiscal authorities are of course first in line when it comes to implementing policy supporting the transition to a low-carbon economy. A carbon pricing framework and subsidies are the most direct measures. However, shifting the economy to a sustainable path requires implementation of comprehensive policy packages that touch on several policy fields. The coordination between government authorities can, for example, produce a policy mix of green capital requirements, green credit guarantees, and carbon-risk adjustments in credit ratings allowing the economy to enter a virtuous cycle in which emission growth is dampened significantly, growth is higher, and bank stability is enhanced (Lamperti et al. 2021). Multilateral development banks are among the institutions that can support coordination on such packages.

Alongside supervisors, central banks also have options to support the transition to a low-carbon economy. Central banks have studied the consequences of climate change and the transition for monetary policy extensively (e.g., NGFS 2020b and ECB 2021). Several options can reflect climate issues in their policies, in particular through monetary policy operations (NGFS 2021d). Likewise, several options are available to them to adjust their credit operations, their asset purchases, and their collateral framework. A few central banks have started to implement such options (NGFS 2020c). Central banks can also contribute to a better climate disclosure framework by disclosing their own climate exposure and impact (NGFS 2021e).
5. How Can ADB Help Green the Financial System?

This section discusses the possible roles for multilateral development banks like ADB in supporting supervisors for greening its members’ financial systems. The previous sections have highlighted the imperative for financial supervisors to ensure that climate risks are well managed by financial institutions and climate risks to be factored into financial stability considerations, to take mitigating measures if they are not, and to support the transition—the scenario that minimizes climate risks—by scaling up green finance to mobilize the funds needed for the transition.

This section summarizes the relevant strategic framework that underpins ADB’s role in supporting its developing member countries’ supervisors and in scaling up funding for the transition. It then outlines possible actions that ADB can take to directly support DMC supervisors in management of climate risks. Finally, it describes the possible generic roles that ADB can play to catalyze financial flows for climate investments by financial institutions in its DMCs, and thus support the transition.

Relevant ADB Strategic Framework

In 2018, ADB launched Strategy 2030 to serve its vision of achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific. It sets out seven operational priority areas, one of which (#3) is climate change and environmental sustainability (Figure 7).

![Figure 7: ADB’s Seven Operational Priorities](source: ADB (2019).)
To operationalize the strategy, ADB developed operational plans for the seven priority areas to articulate the strategic focus, specific areas of engagement, approaches, and broad skills requirements. Country partnership strategies will further refine priorities at the country level. Climate change and environmental sustainability are the focus of the Operational Plan “Tackling Climate Change, Building Climate and Disaster Resilience, and Enhancing Environmental Sustainability, 2019–2024” of September 2019 (Box 4).16,17

Box 5: The Operational Plan “Tackling Climate Change, Building Climate and Disaster Resilience, and Enhancing Environmental Sustainability, 2019–2024”

The operational plan is based on three strategic priorities:

(i) **Climate change mitigation increased.** ADB will support developing member countries in implementing their nationally determined contributions and reducing greenhouse gas emissions through projects and programs in areas such as clean energy, sustainable transport and urban development, and sustainable agriculture and land-use management.

(ii) **Climate and disaster resilience built.** ADB will apply a comprehensive approach to build climate and disaster resilience by systematically assessing and addressing climate and disaster risk and supporting holistic development solutions to manage climate and disaster risk.

(iii) **Environmental sustainability enhanced.** ADB will support developing member countries in improving environmental management, including pollution control; investing in natural capital conservation and restoration; improving environmental governance; addressing competing water demands for food and energy production; and ensuring that projects contribute to water, energy, and food security. ADB will expand its investments and technical assistance in supporting ocean health and coastal and marine resource management.

The figure shows the associated Theory of Change.

GHG = greenhouse gas, NDCs = nationally determined contributions.

Source: ADB (2019).

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16 See ADB (2019).
17 ADB also has a Climate Change Operational Framework 2017–2030 of July 2017 supporting the regional shift toward low greenhouse gas emissions and climate-resilient development. The operational framework provides guidance across all ADB sector and thematic groups to strengthen climate action, operationalizing ADB’s commitment to significantly increase climate change financing.
Going beyond the specific 2030 climate (finance) targets, ADB and other multilateral development banks committed in 2018 to aligning all new operations against the mitigation and climate resilience goals of the Paris Agreement, ramping up climate finance, providing capacity-building support for countries and other clients, plus an emphasis on climate reporting (Figure).

Methods and tools identified are screened based on the following criteria:

- Rigor
- Potential for cross MDB standardization
- Applicability
- Ease of implementation
- Feasibility

*Implemented according to ambition and timeline that can be differentiated by each bank

MDB = multilateral development bank.
Source: ADB (2019).

ADB is committed to ensuring that at least 75% of the number of ADB’s committed operations (on a 3-year rolling average) will support climate change mitigation and/or adaptation by 2030 and climate finance from ADB’s own resources to reach $80 billion cumulatively from 2019 to 2030. In 2021, ADB raised its climate finance ambition to $100 billion by 2030.

Despite the challenges of the COVID-19 pandemic, ADB committed $7,111 million in climate finance in 2022, of which $4,279 million (60%) is expected to contribute to mitigating climate change and $2,831 million (40%) to adaptation—the highest amount for adaptation since 2011. ADB provided more than $6,723 million from its own resources and mobilized $387 million from external resources.

Recognizing the increasing impact of disasters and climate change on marginalized and vulnerable countries and populations, ADB also approved a Revised Disaster and Emergency Assistance Policy in October 2021. The policy will increase the impact of ADB’s support to its developing member countries in strengthening resilience and responding to disasters and emergencies.

Source: Authors.
The Strategy 2030: Finance Sector Directional Guide provides overall direction for finance sector operations to support Strategy 2030 and its seven operational priorities, including climate change and environmental sustainability.

Based on a review of the finance sector landscape in developing countries in Asia and the Pacific and of past operations, the Finance Sector Directional Guide suggests six areas for finance sector operational focus, proposes an implementation plan with modalities and results framework, and suggests how to acquire the needed expertise and knowledge.

The six areas for finance sector operational focus are as follows:

(i) Enhance support to emerging areas such as financing aligned with the Sustainable Development Goals, including green and blue financing.
(ii) Promote long-term finance and quality infrastructure.
(iii) Leverage digital technology to deliver financial services for financial inclusion.
(iv) Expand financing to micro, small, and medium-sized enterprises and women.
(v) Establish frameworks for disaster and epidemic risk financing.
(vi) Strengthen finance sector foundations.

Operational focus #1 is particularly relevant to the topic of this paper as it includes

(i) aligning ADB’s investments and lending portfolio (sovereign and nonsovereign) with the Paris Agreement to make the organization’s financial flows consistent with a credible transition pathway toward low greenhouse gas emissions and climate-resilient development;
(ii) creating a pipeline of bankable green projects through a facilities approach;
(iii) developing and utilizing diverse innovative green financial instruments;
(iv) developing and implementing globally aligned green taxonomies and frameworks;
(v) incorporating climate and other environmental and sustainability-related risks and impacts in all risk assessments and financial decision-making processes;
(vi) catalyzing blue financing for projects designed to protect and restore marine ecosystems; and
(vii) creating an enabling environment and building the capacity of financial institutions for agricultural value-chain financing.

But operational focus #6 is also crucial, in particular as it contemplates “enhancing the banking system through the upgrading of the regulatory and supervisory framework and promotion of sound governance and risk management and designing and implementing macro-prudential and micro-prudential policies.”

Framework for Defining ADB’s Possible Roles in Supporting DMC Supervisors

To delineate the possible ADB roles in supporting DMC supervisors in the management of climate risks, it is necessary to consider four factors: (i) the set of needed actions from supervisors, (ii) the likely challenges to implementation of these actions, (iii) the legitimacy and additionality of ADB action in this area, and (iv) the toolbox of financial and nonfinancial instruments available to ADB in this endeavor.
Section 3 details the four needed actions from supervisors. The other factors are analyzed below.

Challenges to Implementing Needed Actions

The challenges to the implementation of the needed actions by supervisors and financial institutions vary from country to country, but are likely to fall under these main categories:

- lack of ambition for domestic climate policies, especially in fossil-fuel resource-rich countries;
- no policy and financial supervisory body empowered to set templates, expectations, and standards at the regional level;\(^\text{18}\)
- lack of awareness and/or understanding of climate risks in some countries;
- capacity gaps of both supervisors and financial institutions;
- lack of data on risks and opportunities; and
- implementation cost for small financial institutions.

Legitimacy and Additionality of ADB Action in this Area

In light of the above strategic frameworks, ADB has a role to play in “greening financial systems”. A well-functioning and vibrant financial system that is resilient to climate-related risks and able and willing to play its part in scaling up climate finance is a pre-condition to achieving low-carbon and climate-resilient development in developing countries in this region, in line with the Paris Agreement. This fits squarely with ADB’s mandate and strategic objectives.

Not only should an ADB intervention fit with its strategic frameworks, but it should also be additional to what markets and other public sector players can deliver in addressing the issues at hand.

Additionality is mostly invoked by multilateral development banks and other development finance institutions in the context of private-sector operations, because of the risk of distortion to markets that public intervention could entail (MDB 2018). The term additionality captures a clear and simple premise: interventions by multilateral development banks to support private sector operations should make a contribution beyond what is available in the market and crowd in the private sector. In the context of greening the finance sector, this principle can also apply to public sector operations such as those of supervisors. Additionality is a core principle that guides ADB’s support for its operations and is classified as either financial or nonfinancial additionality. Financial additionality entails the provision of financing that is not readily available from the commercial market at reasonable terms. Nonfinancial additionality is provided through contributions to risk mitigation, standards setting, or capacity building (ADB 2022).

The principle of additionality should also apply to public institutions: interventions by multilateral development banks should contribute beyond what other public institutions, like financial supervisors, are already doing or could do. In other terms, can a multilateral development bank such as ADB add a value beyond what other public institution can in greening the financial system? It can. First, ADB has a regional outreach that DMC supervisors do not have. ADB is thus ideally placed to contribute to setting up the needed regional standards. Second, ADB is positioned to provide national supervisors with a regional outlook on climate change issues, which supports

\(^\text{18}\) In the eurozone, for example, the ECB can set expectations and take regulatory measures that are mandatory for all banks in the whole euro area, while the European Union (sometimes directly by the European Commission) can take policy measures that apply to all economic agents in the territory of the Union. The Delegated Act of 6 July 2021 (setting disclosure standards for financial institutions and certain nonfinancial institutions) is an example of such direct European commission rule-making power.
regionally coordinated action. Third, with its expertise in climate change, ADB can support its members in capacity building for supervisors. And in its interactions with other national authorities, ADB can complement DMC supervisors’ outreach to those authorities.

**ADB’s Toolbox**

As a “solutions” bank, ADB can deploy a variety of instruments to address the challenges in implementing the recommended actions. They include the following:

- **Advocacy through policy dialogue.** Engaging DMC authorities for policy reforms (e.g., regulatory and prudential policies) via technical assistance or otherwise.
- **Support to implementation of reforms and standards across international institutions and standard-setting bodies.** e.g., ADB is an associate member of International Organization of Securities Commissions, global standard setter for the securities sector, and a member of the International Capital Market Association, which promotes resilient well-functioning international and globally coherent cross-border debt securities markets and has issued the voluntary Green Bonds Principles.
- **Convening.** In the regional context, especially to facilitate coordination and cooperation among Asia’s developing countries and with international bodies on technical assistance matters or otherwise.
- **Strategic partnerships.** At the intersection of advocacy and convening, ADB has established strategic partnerships with the Bank for International Settlements (BIS) (in 2021) and the Glasgow Financial Alliance for Net Zero (GFANZ) (2022)—a practitioner-led, global coalition of finance sector institutions working to accelerate the world’s transition to net-zero greenhouse gas emissions by 2050. Launched in 2022 by the BIS, in close collaboration with ADB, the BIS Asian Green Bond Fund will help channel central bank reserves to green projects in Asia and the Pacific. The GFANZ Asia Pacific Network will support engagement with financial institutions and policymakers across the region, incorporating feedback and ensuring its work on net zero is inclusive and applicable to all. The network will enable mutual knowledge-sharing and open dialogue on the opportunities and challenges of net zero. Through these partnerships, ADB can reach out to relevant stakeholders, in addition to its work on its members’ finance sectors. ADB is also an observer of the NGFS.
- **Capacity building.** Both for DMC supervisors and financial institutions through technical assistance.
- **Knowledge creation.** Through technical assistance (e.g., constituting databases, collecting and disseminating best practices through conferences, webinars, publications, etc.).
- **Loan conditionality.** Intermediated loans to financial institutions could include conditionalities requiring beneficiary financial institutions to implement the country regulator’s recommendations or expectations regarding climate risk management.
- **Investment financing.** Through long-term financing (via dedicated climate-related intermediated loans to financial institutions or equity investment in funds, and possibly policy-based loans to DMC governments) and/or risk mitigation (guarantees to reduce financial institutions risk aversion but also through changes to enabling environment that can be promoted via one of the above levers: advocacy and technical assistance).

For the actions described below, which have a regional dimension, it may be sensible to start with pilot initiatives that allow developing prototype approaches in one country, building on strong technical assistance support, and replicating across other jurisdictions after successful testing.
Recommended ADB Roles and Actions in Managing Climate Risks

For each recommendation made to better manage climate risks in financial institutions and in the financial system (see section 3), ADB could implement the following activities to support supervisors in DMCs:

Assess and Identify Climate Risks for Domestic Financial Institutions as well as for the Financial System

This usually follows a gradual approach consisting of three steps: (i) a survey of financial institutions (questionnaires), (ii) exposure assessments, and (iii) stress tests. Supervisors are responsible for such actions, but supervisors in DMCs may not have the competence or adequate resources to do this. This opens a possible (additional) role for ADB. Possible ADB contributions, working in support of and close coordination with supervisors, could include

- increasing and disseminating knowledge on climate risks, their exposure outlook, and their transmission channels at the regional level;
- designing a template for questionnaires and conducting the survey (e.g., the World Bank does that for some countries);
- collecting data to assess regional exposure; and
- providing scenarios for stress tests (at the regional level).

Possible ADB instruments would be a mix of convening, advocacy, and technical assistance. Note that supporting financial institutions in capacity building to assess climate risks would also be conducive to improving the adequate pricing of climate risks on financial markets.

Develop and Implement Climate Risk Management Expectations for Supervised Financial Institutions

The purpose would be to create a certain level playing field in the region. Here too a gradual approach is needed, consisting of three steps: (i) set expectations (e.g., the ECB for eurozone banks in 2021), (ii) survey banks’ adherence to expectations (e.g., the ECB in 2021 and 2022), (iii) inform banks about actions to take, and (iv) set a deadline before risk mitigating action (e.g., the ECB has set a deadline of end of 2023 for eurozone banks).

Working in support of and close coordination with supervisors, possible ADB contributions could include

- supporting the setting of homogeneous expectations regionally; and
- ensuring that ADB’s counterparties implement the DMC’s supervisory expectations.

Possible ADB instruments would be a mix of convening, advocacy, and technical assistance, as well as conditioning loans. Collaboration with organizations such as AMRO on these issues could be a first step for ADB.
Support and Implement Climate Risk Disclosure Framework for Firms

As noted, financial authorities need to support (i) disclosure frameworks and efforts to establish a comprehensive corporate disclosure standard, as well as financial instruments disclosure standards, such as securities; and (ii) the development of a global set of sustainability reporting standards. Building on the work of the TCFD, some policymakers have issued disclosure requirements such as the EU; the United Kingdom; Hong Kong, China; and the PRC. It is essential that more and more countries join the fray, and ideally on a regional, harmonized, and coordinated basis, ultimately to reach a global standard on consistent, comparable, and reliable disclosures.

Such disclosure requirements should concern themselves with exposures to climate-related risks, as well as to the impact of climate action. For example, this would include in the case of mitigation projects the expected or actual emissions of greenhouse gas reduced or avoided through such action—a relatively neglected area of the international debate on these matters.

Against this background, possible ADB contributions could include the following actions:

- Support elaboration and widespread adoption of a meaningful disclosure framework at the regional (and international) level, which would include impact measurement and monitoring.
- Support work to harmonize existing taxonomies and their widest dissemination and use in DMCs.

Possible ADB instruments would be a mix of convening, advocacy, and technical assistance. Note that improving climate risk disclosure would also provide financial market participants with data to better price in climate risks on financial markets.19

Implement Climate Risk Mitigating Actions where Appropriate

Measures such as reflecting climate risk and opportunities in capital requirements are still being debated among supervisors and other international stakeholders. Likewise, there is no consensus on the materiality of climate systemic risk and the instruments to implement them. Hence, specific ADB actions cannot yet be prescribed; but it would be judicious for ADB to get involved and take a full role in these international discussions.

Possible ADB contributions, again working hand in hand with supervisors, could include

- assessing systemic risk at the regional level (through models); and
- helping regulatory authorities build shadow testing on what the pathways for capital requirements could be in different scenarios.

Possible ADB instruments would be a mix of convening, advocacy, and technical assistance.

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How Can ADB Help Green the Financial System?

ADB Roles and Action in Supporting the Provision of Additional Financial Flows for Climate Investments

A transition to a low-carbon economy, resilient to climate change minimizes climate risks for financial institutions and the financial system. It is thus in the interest of supervisors to support such a transition. ADB can play a key role in this process.

As highlighted by the NGFS (2021c): “Particularly in developing and emerging markets, mobilization towards climate/sustainable investments is still constrained. This is mainly due to a lack of projects, insufficient information related to their environmental and social impacts, as well as the potential underestimation of the riskiness of high-carbon investments. Given the limited capacity and shorter-term focus of commercial banks, national and multilateral development banks are well suited to raise support to mobilize sustainable investment projects.”

It is useful at this point to outline the possible generic roles of multilateral development banks in scaling up climate finance, defined as “local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change.”

The “Theory of Change” (Figure 8) is an attempt at categorizing these different (and evolving) roles and the causal pathways through which outcomes and impact can be achieved, starting from multilateral development bank inputs/resources.

A key distinction is between a multilateral development bank’s own flows (mostly from its own resources) and third-party flows, for whose mobilization those institutions can play a catalytic role.

A key role of multilateral development banks, besides their obvious and traditional direct financing, is mobilization of additional public or private finance for climate investments, including indirect mobilization when particular private flows occur that are not linked to multilateral development bank financing (as in a syndication). Multilateral development banks indeed can play a key role in transforming markets through their action on enabling environments, a key pillar of which is the policy and regulatory framework of a country.

Possible ADB contributions in supporting the provision of additional financial flows for climate investments are the following:

- Scale up its direct financing and mobilization of private (and possibly) climate finance for green investment projects.

Direct ADB financing of climate investment is well-known and need not be further discussed in this paper. As mentioned in Box 4, ambitious targets have been set. But the catalyst role of ADB—how it can contribute to unlocking substantial amounts of private capital for climate investments—can certainly be enhanced and is the object of the developments described below.

- Build an enabling environment for green investments in ADB’s developing member countries.

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21 ADB is creating the Innovative Finance Facility for Climate in Asia and the Pacific (IF-CAP), a tool that will increase ADB’s lending capacity through leverage. IF-CAP is piloting a guarantee mechanism where every $1 guarantee can generate up to $5 in new loans to accelerate climate action. IF-CAP will be vital to achieve ADB’s $100 billion climate ambition by 2030.
**Figure 8: Theory of Change**

<table>
<thead>
<tr>
<th>IFI Inputs</th>
<th>IFI Internal Processes</th>
<th>IFI Activities</th>
<th>Outputs</th>
<th>Outcomes</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Resources</td>
<td>Preparatory and appraisal work on projects and sectors, including results frameworks</td>
<td>Direct financing</td>
<td>Physical investments financed</td>
<td>Increased IFI finance flows</td>
<td>More and better climate action implemented</td>
</tr>
<tr>
<td>Expertise</td>
<td>Independent Evaluation</td>
<td>Thought leadership and knowledge management</td>
<td>Multilateral climate finance channeled</td>
<td>Increased public finance flows</td>
<td>2015 Paris Agreement goals met</td>
</tr>
<tr>
<td>Soft Power</td>
<td>Collaboration with other donors/IFIs/FIs</td>
<td>Accredited entity of GCF</td>
<td>Knowledge produced and shared</td>
<td>Increased private finance flows</td>
<td>Mobilization</td>
</tr>
<tr>
<td>TA Funding</td>
<td>Engagement with governments and other stakeholders</td>
<td>Support to green bonds**</td>
<td>Demonstration effects</td>
<td>Enabled frameworks created or improved</td>
<td>Catalytic role</td>
</tr>
<tr>
<td></td>
<td>Collaboration with other donors/IFIs/FIs</td>
<td>Syndication</td>
<td>Carbon pricing expanded</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support to carbon markets</td>
<td>De-risking (including enhanced FI climate-related risk management)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk-sharing (guarantees, junior debt, structured funds)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TA for reform + capacity building</td>
<td>TA for reform + capacity building</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Policy dialogue (advocacy, convening)</td>
<td>Policy dialogue (advocacy, convening)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GCF = green climate fund, FI = financial institution, IFI = international financial institution.

* Including credit lines to FIs + investment in funds.

** Via acting as issuer, anchor investor, or guarantor.

Source: Authors.
A key prerequisite for private investment is a clear, stable, and robust policy and regulatory framework. The Regulatory Indicators for Sustainable Energy (RISE) is a set of indicators designed to help compare national policy and regulatory frameworks for sustainable energy. It assesses countries’ policy and regulatory support for each of the four pillars of sustainable energy—access to electricity, access to clean cooking (for 55 access-deficit countries), energy efficiency, and renewable energy.

The RISE database shows that most developing Asian countries lag behind advanced countries in this regard (the score for France is 86, Germany is 92, and the United Kingdom is 91, but the United States only 82) (Figure 9).

ADB could support willing DMCs in plugging gaps (e.g., organize to structure and conduct reverse auctions for new renewable energy capacity; design carbon pricing schemes; etc.) through a mix of advocacy and convening, supported by technical assistance and possibly policy-based loans (where financial needs are substantial and there is headroom for sovereign borrowing).

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**Figure 9: Selected RISE Scores of a Sample of Asia and Pacific Countries**

![Figure 9: Selected RISE Scores of a Sample of Asia and Pacific Countries](image)

<table>
<thead>
<tr>
<th>Country</th>
<th>Electricity Access</th>
<th>Energy Efficiency</th>
<th>Renewable Energy</th>
<th>Clean Cooking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td></td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC*</td>
<td></td>
<td></td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td></td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Lao PDR</td>
<td></td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia*</td>
<td></td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mongolia</td>
<td></td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td></td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singapore*</td>
<td></td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solomon Islands</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand*</td>
<td></td>
<td></td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Vanuatu</td>
<td></td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viet Nam*</td>
<td></td>
<td></td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>Maldives*</td>
<td></td>
<td></td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td></td>
<td></td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sri Lanka*</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

PRC = People’s Republic of China, Lao PDR = Lao People’s Democratic Republic, RISE = Regulatory Indicators for Sustainable Energy.

* Countries not evaluated for Electricity Access pillar.


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23 This modality is increasingly superseding feed-in tariffs in a number of countries. The World Bank’s Scaling Solar program has been quite successful in promoting and supporting auctions for utility-scale solar PV projects. https://www.scalingsolar.org/.
Facilitate local currency financing for green investments.

The ability of project owners and governments in DMCs to raise local currency for their projects is a key success factor as it eliminates the risk of a currency mismatch.

Local currency financing can be delivered through three main mechanisms:

(i) the derivative-based approach in which the financier issues local currency financing and hedges the resulting currency risk using foreign currency derivatives markets;
(ii) the second approach relies on local currency bond issuances by the financier; and
(iii) the third approach is to credit enhance local entities so that they can meet the financing criteria of existing local currency financiers.

In addition, a group of donors, development financial institutions (DFIs) and microfinance investment vehicles and donors jointly created in 2007 the Currency Exchange Fund, known as TCX, a special-purpose fund which focuses on providing currency solutions for its investors in frontier and development markets. These solutions consist of financial instruments—swaps and forward contracts—that enable TCX’s investors and clients to provide their borrowers with financing in their own currency, while shifting the currency risk to TCX. These have accounted for over 90% of the volumes transacted by TCX to date. The remainder is primarily provided through commercial banks to make local currency finance available to their borrowing clients in developing countries.

The Local Currency Facility is an example of a contingent facility set up by the International Development Association to enable the International Finance Corporation to offer local currency loans when other options are not available.25

Promote green bonds through ADB partial underwriting (anchor investments) and credit enhancement of green bonds issued by DMC governments, financial institutions or nonfinancial institutions (and support the development of robust global standards and certification processes).

Green bonds are an instrument well suited to deepen domestic (and international) capital markets, as bonds can be traded (at least public bonds) and are thus much more liquid than loans.

As anchor investor in a foreign-currency or local currency–denominated green bond, ADB can send a strong signal to other investors by showing interest and trust in the bond and issuer(s). The anchor investment can facilitate the attractiveness for other less-experienced, investors to join, as well as to support new national issuers that have not been active on the market before. Especially for new and/or “landmark” issuances of green bonds, this support can attract more investors. ADB can also accompany it with technical assistance, such as for creating the required framework first.

ADB could also act as a credit enhancer of such bonds (or part of it) through a guarantee.26 Guarantees are provided by a third party (guarantor) to borrowers (issuers of a bond) and lenders (investors into a bond) in financing instruments (here: bonds) to credit–enhance the obligations of the issuer. Usually, guaranteed or partially guaranteed bonds are structured as a first loss arrangement between the issuer and the guarantor, making the guaranteed amount of money available by the guarantor to cover any missed payment by the issuer. If the issuer fails to pay, the guarantor is obliged to pay the investors.

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Essentially, ADB would act as this third-party guarantor, entering into a guarantee agreement with the issuer. With (partial) guarantees in place, the investors (e.g., banks) can increase their lending in volume (lower perceived risk) and maturity. The overall cost (coupon rate) should decrease too as the lower spread derived from an AAA-rated guarantor is not fully offset by the guarantee fee (this depends on how the guarantor and investors’ risk perceptions diverge). The major advantage of partial green bond guarantees is thus that private capital can be mobilized with limited donor resources (the guarantor’s obligation is only contingent on default). Another advantage is that the application of guarantees is highly scalable, although limited by the guarantor’s risk-taking capacity, and currently, the incentive for DFIs to offer guarantees in emerging markets has been limited by the fact that the amounts are not official development assistance-eligible.

- De-risk commercial lending for green investments through partial credit or partial risk guarantees.

ADB guarantees could also be deployed to unlock additional bank lending in DMCs most adverse to risk and for banks sufficiently liquid so as to not require a financial intermediation loan.

The EU is increasingly relying on this tool to scale up financing in emerging markets. It provides guarantees under its European Fund for Sustainable Development+ program\(^\text{27}\) to eligible implementing partners which are multilateral development banks and bilateral DFIs.

- Deploy innovative financing instruments.

ADB can also use other instruments such as blending (the strategic use of a limited amount of contribution to mobilizing financing from partner financial institutions and the private sector to enhance the development impact of investment projects) or results-based financing\(^\text{28}\). Since these instruments rest on grants, they are not part of ADB’s ordinary resources (its balance sheet). They can only be raised from donors (typically shareholders) through a trust fund arrangement or charities.

As an Accredited Entity of the Green Climate Fund and partner of the Climate Investment Funds managed by the World Bank, ADB is also able to source grant funding from these organizations.

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\(^\text{28}\) Results-based financing is defined as any program where the principal sets financial or other incentives for an agent to deliver predefined outputs or outcomes and rewards the achievement of these results upon verification. In results-based financing in development cooperation, the principal is usually a national or subnational government body of a developing country. The agent is an implementing agency (in the case of performance-based financing) or an individual (in the case of a conditional cash transfer). Results-based financing may be funded by domestic funds, by donor funds, or by a combination of both. If results-based financing targets the supply side, it is also called performance-based financing and aims at setting incentives for service providers to deliver good performance. Indicators are set by the principal, often together with the agent. Payment takes place against achievement of these predefined indicators (Grittner 2013).


Greening the Financial System
*Climate Financial Risks and How ADB Can Help*

This publication of the Asian Development Bank (ADB) Finance Sector Group presents the need for substantial investments to mitigate the impacts of climate change. It highlights the opportunities for multilateral development banks to contribute towards greening financial markets and making them more resilient to climate risks. Such contribution can be extended by multilateral development banks through supporting their member countries’ financial authorities. As this report provides policy options for ADB, the role of ADB’s strategic framework, the needed actions from supervisors, the challenges for implementation, the legitimacy and additionality of ADB actions, and the availability of toolbox will help ADB implement activities in managing climate risks in its operations.

About the Asian Development Bank

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 68 members—49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.