

A Green and Just Planet

**The 1.5°C Agenda
for Governing Global
Industrial and
Financial Policies in
the G20**

**Independent
Report of the
G20 TF-CLIMA
Group of Experts**

October 2024

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List of Acronyms	4
The Group of Experts of the Task Force on a Global Mobilization against Climate Change	8
Acknowledgements	10
Foreword by the Co-Chairs	12

Rising to the Challenge of the Climate Crisis **17**

1.1 The costs of inaction	21
1.2 G20 inertia	22
1.3 From ambition to action	28
1.4 Debunking myths around climate and growth	29
1.5 Hardwiring equity into the global governance of climate action	31
1.6 Summary of recommendations	32

Delivering Green Industrial Strategy **37**

2.1 The case for a new approach to green industrial strategy	43
2.2 A whole-of-government approach to green industrial strategy	47
2.3 Redesigning public-private collaboration to align with climate goals	50
2.4 Governing green industrial strategy and low carbon technology access equitably on a global scale	52

Financing the Green Transition

61

3.1	High-income countries should lead the way in financing the climate agenda	65
3.2	Creating fiscal space for investing in the green transition	67
3.3	Aligning national, regional and multilateral development banks around climate goals	75
3.4	Debt as a global threat to climate response capacity	81
3.5	Governing green finance equitably on a global scale	83
3.6	Aligning the actions of central banks, supervisory and regulatory authorities with climate goals	85

Conclusion

101

References

106

Annex

124

List of Acronyms

4P Paris Pact for People and the Planet

ADF African Development Fund

AFD *Agence Française de Développement*
(French Development Agency)

AfDB African Development Bank

AFI Alliance for Financial Inclusion

ANEEL *Agência Nacional de Energia Elétrica*
(Energy Agency, Brazil)

BCBS Basel Committee on
Banking Supervision

BEPS Base Erosion and Profit Shifting

BIS Bank for International Settlements

BNDES *Banco Nacional de Desenvolvimento
Econômico e Social* (National Bank for
Economic and Social Development, Brazil)

BNM Bank Negara Malaysia

CAF *Corporación Andina de Fomento*
(Development Bank of Latin America and
the Caribbean)

CBAM Carbon Border
Adjustment Mechanism

CCPI Climate Change Performance Index

CCUS Carbon Capture, Utilisation
and Storage

CISL Cambridge Institute for
Sustainability Leadership

CNDI *Conselho Nacional de Desenvolvimento
Industrial* (National Industrial Development
Council, Brazil)

CRDC Climate Resilient Debt Clause

DBSA Development Bank of Southern Africa

DFI Development finance institution

ECA Export credit agency

ECB European Central Bank

ECLAC United Nations Economic
Commission for Latin American and
the Caribbean

EDGAR Emissions Database for Global
Atmospheric Research

ESCAP Economic and Social Commission
for Asia and the Pacific

EV Electric vehicle

FAT *Fundo de Amparo ao Trabalhador*
(Workers' Social Security Fund, Brazil)

FICS Finance in Common

GEF Global Environment Facility

GHG Greenhouse gas

GMT Global minimum tax

GtCO₂e Gt of CO₂ equivalent

ICVCM Integrity Council for the Voluntary
Carbon Market

IDA International Development Association

IEA International Energy Agency

IFIs International Financial Institutions

IFRS International Financial Reporting Standards

IISD International Institute for Sustainable Development

IMF International Monetary Fund

IOSCO International Organization of Securities Commissions

IPCC Intergovernmental Panel on Climate Change

IPSF International Platform on Sustainable Finance

ISSB International Sustainability Standards Board

JET-IP Just Energy Transition Investment Plan, South Africa

LCTF Low Carbon Transition Facility

LDCs Least developed countries

LSE London School of Economics and Political Science

LSE London School of Economics and Political Science

MDB Multilateral development bank

NDB National development bank

NDC Nationally determined contribution

NGFS Network for Greening the Financial System

Novo PAC *Novo Programa de Aceleração do Crescimento* (New Growth Acceleration Plan, Brazil)

NPM New Public Management

ODI Overseas Development Institute

OECD Organization for Economic Co-operation and Development

PBOC People's Bank of China

PCC Presidential Climate Commission, South Africa

PDB Public development bank

PEI *Polski Instytut Ekonomiczny* (Polish Economic Institute)

PROINFA *Programa de Incentivo a Fontes Alternativas de Energia Elétrica* (Program of Incentives for Alternative Electricity Sources, Brazil)

RDB Regional development bank

RST IMF's Resilience and Sustainability Trust

SAMSOC State Asset Management SOC Ltd.

SBTI Science Based Targets Initiative

SDGs Sustainable Development Goals

SDRs Special Drawing Rights

SIPRI Stockholm International Peace Research Institute

SMEs Small and medium-sized enterprises

SNIB Scottish National Investment Bank

SOE State-owned enterprise

TF-CLIMA Task Force on a Global
Mobilization against Climate Change, (G20)

TPT Transition Plan Taskforce

UNCTAD United Nations Trade
and Development

UNDP United Nations
Development Programme

UNECA United Nations Economic
Commission for Africa

UNEP FI United Nations Environment
Program Finance Initiative

UNEP United Nations
Environment Programme

UNFCCC United Nations Framework
Convention on Climate Change

WHO World Health Organization

WMO World Meteorological Organization

WTO World Trade Organization

The Group of Experts of the Task Force on a Global Mobilization against Climate Change

The Brazilian Presidency of the G20 has launched the Task Force on a Global Mobilization against Climate Change (TF-CLIMA) which aims to articulate a coordinated G20 response to climate change to 2030 and beyond. By promoting dialogue among governments, financial institutions, and international bodies, the TF-CLIMA is intended to prepare action-oriented proposals to promote alignment between global macroeconomic and financial frameworks and the implementation of the commitments made under the United Nations Framework Convention on Climate Change Paris Agreement of 2015 to keep the world within the parameters of the 1.5°C global warming target. The TF-CLIMA has convened a Group of Experts, co-chaired by Professor Mariana Mazzucato and Dr. Vera Songwe, comprised of 12 independent experts in sustainable development, climate change, economics, and finance, to chart possible courses of action to achieve this objective. This is their report.

Due to the independent nature of the Group of Experts, this report does not necessarily reflect the views of the G20 Presidency, individual G20 countries, or TF-CLIMA as a whole.

Acknowledgements

The Brazilian G20 Presidency commissioned this report from an independent Group of Experts, co-chaired by Mariana Mazzucato (Professor in the Economics of Innovation and Public Value at University College London and Founding Director of the UCL Institute for Innovation & Public Purpose) and Vera Songwe (Founder and Chair of the Liquidity and Sustainability Facility and Non-Resident Senior Fellow at the Brookings Institution), to provide assessments and insights on the topics selected for discussion under the G20's Task Force on a Global Mobilization against Climate Change (TF-CLIMA).

The Group of Experts includes Amir Lebdioui (Associate Professor of the Political Economy of Development at the University of Oxford), Barbara Buchner (Global Managing Director of the Climate Policy Initiative), Carlos Lopes (Honorary Professor at the University of Cape Town's Mandela School of Public Governance), Daniela Gabor (Professor of Economics at SOAS, University of London), Juliano Assunção (Associate Professor of Economics at PUC-Rio), Lucas Chancel (Associate Professor of Economics at Sciences Po), Luisa Palacios (Adjunct Professor at Columbia University's School of International and Public Affairs), Ma Jun (Founder and President of the Institute of Finance and Sustainability), Renu Kohli (Senior Fellow at the Centre for Social and Economic Progress), and Ulrich Volz (Professor of Economics at SOAS, University of London and Senior Research Fellow at the German Institute of Development and Sustainability)—all actively contributing to the production of this report.

We extend our thanks to Luiz de Andrade Filho (Head of Climate Change and Environment, Embassy of Brazil in Paris) for supporting TF-CLIMA's Group of Experts and facilitating

communication with the Brazilian G20 Presidency, and to Ambassador André Corrêa do Lago (Secretary for Climate, Energy, and Environment at the Brazilian Ministry of Foreign Affairs) for his role in coordinating the group's engagement with TF-CLIMA and representatives of G20 countries.

The Brazilian G20 Presidency also invited the Brazilian Center for Analysis and Planning (CEBRAP) to form the Executive Secretariat, composed of Arilson Favareto, Bianca Tavolari, Arthur Sadami, Giordano Magri, Linnit Pessoa, and Pedro Lange, to whom we extend our thanks, for supporting the research organization and communication activities of TF-CLIMA's Group of Experts. Alex Shankland also supported the Executive Secretariat and served as the copy editor for the final version of this document. We also express our gratitude to the members of UCL's Institute for Innovation and Public Purpose, including Francesca Edgerton, Joe Morrisroe, Luca von Burgsdorff, Sarah Doyle, and Ulla Heher, for their support in the preparation of this report. We would also like to thank Chloe Boehm and Dileimy Orozco for their support throughout this process.

Finally, we offer our heartfelt thanks to Daniel Machado da Fonseca (former Head of the Climate Action Division at the Ministry of Foreign Affairs), who sadly passed away earlier this year. His efforts in planning TF-CLIMA and its Group of Experts made this report possible

Foreword by the Co-Chairs

Green growth is possible. It is also necessary to achieve the Paris Agreement goal of limiting global warming to 1.5°C above preindustrial levels. Dominant models of economic growth and development have placed the world on an unsustainable path, with severe human, planetary and economic consequences.

The G20 has a crucial and urgent role to play in leading the shift towards a sustainable, equitable, and resilient future. The report of the Group of Experts to the G20 Task Force on a Global Mobilization against Climate Change calls on all G20 countries to commit to new economic development pathways that reconcile economic growth with ambitious climate action.

This means advancing green industrial strategies and green financial policies that are oriented around Nationally Determined Contributions (NDCs) as key drivers of country transition plans. Without green industrial strategy, economic development will continue to exceed planetary boundaries, and without green financial policies, investing in green industrial strategy and climate change mitigation and adaptation will remain out of reach for too many countries. Ambitious policy reform in both areas is needed to achieve the 1.5°C goal.

National green industrial strategies can mobilize an economy-wide transformation by fostering innovation and investment across sectors oriented around NDC targets—in contrast to traditional approaches, which have picked specific sectors or technologies to support. Green industrial strategies can create new market opportunities for businesses across sectors, while ensuring that businesses receiving public support are held to a high standard in terms of climate goals and broader public value creation—and that differential support is provided to companies depending on their size, technological maturity and the economic context they are operating within.

All government ministries share responsibility for climate action, and for adapting key policy tools and public institutions to bring them into alignment with green industrial strategies, while ensuring an equitable sharing of risks and rewards between the public and private sectors. This should include a rapid repurposing of subsidies away from fossil fuel intensive activities.

Vitality, green industrial strategy requires a global lens. New global governance structures that prioritize equity are needed to ensure that all countries are able to pursue green industrial strategies and benefit from green growth. Climate goals are global, and therefore require collaboration across countries—including in the

form of green technology and knowledge transfer agreements and support for building green manufacturing capacity in low- and middle-income countries.

There will be no transition to a green economy without substantial, additional and affordable financial resources. While all G20 countries have a responsibility to make this shift, and indeed stand to benefit from it, it is clear that not all countries—within and beyond the G20—have the fiscal space to invest in green growth. The quantity and quality of green finance must be enhanced, and countries with greater financial means, in particular those who have historically contributed more to greenhouse gas emissions, should shoulder more of this burden.

National governments must be in the driver's seat to green their economies, but this means they need the fiscal space for green investments. Increasing revenues, closing international tax loopholes and introducing new global levies are tools that governments can deploy independently and collectively. For low and middle-income countries, additional long-term concessional and grant financing will be critical: countries should not be required to increase their debt burdens in order to achieve their NDCs. The G20 should reinforce existing calls, such as those of the Bridgetown Initiative, for a more equitable global financial architecture that provides low- and middle-income countries with debt relief and affordable access to green finance.

National development banks play a critical role in mobilizing and directing green finance. The G20 should seek to support greater collaboration between multilateral and national development banks in financing the Sustainable Development Goals, building on the work of Finance in Common. This can help to leverage the local knowledge and resources of national development banks and accelerate technology transfer and innovation, while empowering them to deliver finance that is patient, long-term and oriented around NDCs. Well-structured blended finance that leverages risk-tolerant and patient capital to unlock private finance for projects in sectors and geographies that would otherwise struggle to attract funding could further increase their impact.

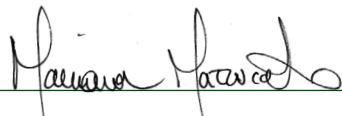
A stable financial sector that takes systemic climate risks into account provides the macroeconomic authorizing environment for a green transition. Central banks and prudential regulators are working to embed climate risks in their analysis. The G20 could encourage regulators to work with the standard setting bodies to develop

more robust interoperable taxonomies to improve disclosures, build better data, and improve predictive climate models. Within their mandates, central banks can also support countries in achieving NDCs, recognizing that “market neutrality” may have the unintended consequence of creating favorable financing conditions for carbon-intensive activities.

Our report sets out a framework for making green growth achievable across the G20 and globally—through well-designed green industrial strategy and green finance, supported by global governance structures that prioritize equity within and between countries.

We call on the G20 to act urgently to bring about the global economic transformation that is needed to achieve the 1.5°C goal. Collectively, with ambition and solidarity, it can be done. It must be done.





Mariana Mazzucato

Professor in the Economics of Innovation and Public Value at University College London and Founding Director of the UCL Institute for Innovation & Public Purpose





Vera Songwe

Founder and Chair of the Liquidity and Sustainability Facility and Non-Resident Senior Fellow at the Brookings Institution

Co-Chairs of the Group of Experts to the G20 Taskforce on a Global Mobilization Against Climate Change (TF CLIMA)



Rising to the Challenge of the Climate Crisis

The climate crisis is becoming more dangerous and volatile. Under the Paris Agreement, countries committed to pursue efforts to keep global warming to less than 1.5°C above pre-industrial levels, but actions to date lack the urgency and commitment to global economy-wide transformation that are required to achieve this goal. Failure will have severe impacts, with temperature increases, extreme weather events, sea level rise, and species loss and extinction leading to heavy and irreversible consequences for human wellbeing and livelihoods, food and water security, economic growth and planetary health. The consequences will be most severe for lower-income populations (IPCC, 2023). G20 countries, which are responsible for about 80% of both current and past greenhouse gas (GHG) emissions (UNEP, 2023b; IEA, 2024a; see Figures 1 and 2), should act urgently and decisively to chart new pathways for economic development that are compatible with the 1.5°C goal—before it becomes out of reach.¹

G20 countries... should act urgently and decisively to chart new pathways for economic development that are compatible with the 1.5°C goal—before it becomes out of reach.

Addressing climate change as a standalone problem will not work. This crisis demands an economy-wide transformation and a whole-of-government response. For the private sector, tackling the climate crisis is not just about renewable energy. It includes transforming all sectors: for example, how we eat (sustainable agriculture and food), how we build (green infrastructure), how we consume (sustainable mining and manufacturing), and how we travel (sustainable mobility). For the public sector, climate change is not just a responsibility for environment ministries. It is a challenge that all

1. The term “development” extends beyond economic growth, encompassing social, political, environmental, and economic dimensions (Slim, 1995; Sen, 1999; Oxfam, 2017). For the purposes of this report, however, we use “development” more narrowly to refer to countries’ economic growth trajectories, with an emphasis on aligning these trajectories with climate goals and the SDGs.

ministries and departments are responsible for tackling—including, but not limited to, ministries of health, industry and finance, and central banks. Critically, environmental, industrial, and financial policies should be brought into alignment.

...climate change is not just a responsibility for environment ministries. It is a challenge that all ministries and departments are responsible for tackling—including, but not limited to, ministries of health, industry and finance, and central banks.

We need new policies and frameworks, on both the national and international levels, to steer growth in a sustainable direction. There is no time to waste. This report calls for a paradigm shift in three critical areas. Section 1 argues that success requires G20 countries to focus their national transition plans on ambitious green industrial strategies that will catalyze investment, innovation, and transformation aligned with Nationally Determined Contribution (NDC) targets, as the driver of new development pathways. Section 2 makes the case for financing these strategies by rapidly reorienting public and private investments away from carbon-intensive activities and towards sustainable, NDC-aligned ones, leveraging country platforms to coordinate and direct investment. G20 countries, especially high-income² ones, should shoulder more responsibility for providing and scaling up the financing required for this transformation. It is vitally important that the global governance of industrial strategy and finance should prioritize justice and equity. Given its significance, this point is reflected throughout the report.

2. For the purposes of this report, we adopt the World Bank's 2024-2025 classification of countries into high-income (GNI per capita of USD 13,846 or more), middle-income (GNI per capita between USD 1,136 and 13,845), and low-income (GNI per capita of USD 1,135 or less) (Metreau et al., 2024). This does not imply that other classifications, such as "developed"/"developing" or "Global North"/"Global South", are not relevant. Instead, the choice is driven by practical considerations relevant to the scope of this report. For instance, middle-income countries may experience fiscal constraints similar to those of low-income countries, and yet be deemed sufficiently developed to be excluded from many financial aid programs.

G20 countries have a fundamental role in delivering the Paris Agreement goal of 1.5°C, the decisions emanating from the United Nations Framework Convention on Climate Change (UNFCCC) process—including the UAE Consensus from COP28—and the 2030 Agenda for Sustainable Development. They can also reinforce related global agendas, such as the New Delhi Leaders’ Declaration with its commitment on multilateral development bank (MDB) reform, the Bridgetown Initiative, and the Paris Pact for People and the Planet (4P).

These agendas necessarily intersect. Climate action requires re-designing economies and redirecting growth, tackling the debt crisis and reforming the architecture for global finance, and addressing growing global inequalities head-on to ensure all countries have the fiscal space to invest in climate change mitigation and adaptation and that the benefits of green growth are distributed widely and fairly. This report sets out how green industrial strategy and green financing, under robust, equitable global governance frameworks, can deliver on core objectives that span these and related agendas.

G20 countries need new development pathways to achieve inclusive and sustainable growth. This report sets out a new framework for aligning economic development with climate goals. The current pace and scale of climate action remains insufficient to tackle climate change and limit warming to 1.5°C (UNFCCC, 2023). Urgent, concrete and outcomes-oriented action is required to direct economic growth and finance towards achieving this goal, within modernized global governance frameworks that prioritize equity.

1.1 THE COSTS OF INACTION

The climate crisis is becoming more dangerous and volatile. In 2023, global warming surpassed the 1.5°C mark set by the Paris Agreement across an entire year for the first time (Poynting, 2024). Heat-related deaths of people over 65 increased by 85% between 2000 and 2024, heat exposure-related loss of labor capacity resulted in an average income loss equivalent to USD 863 billion in 2022 alone, while heat-waves have left 127 million more people in food insecurity in 2021 compared to 1981-2010 (Romanello et al., 2023). Dubai—the venue for the UNFCCC COP28 Summit—witnessed floods in April of this year, and temperatures of 50°C in July, reaching a “feels like” temperature of 62°C (Ratcliffe, 2024). In 2021, atmospheric levels of GHG

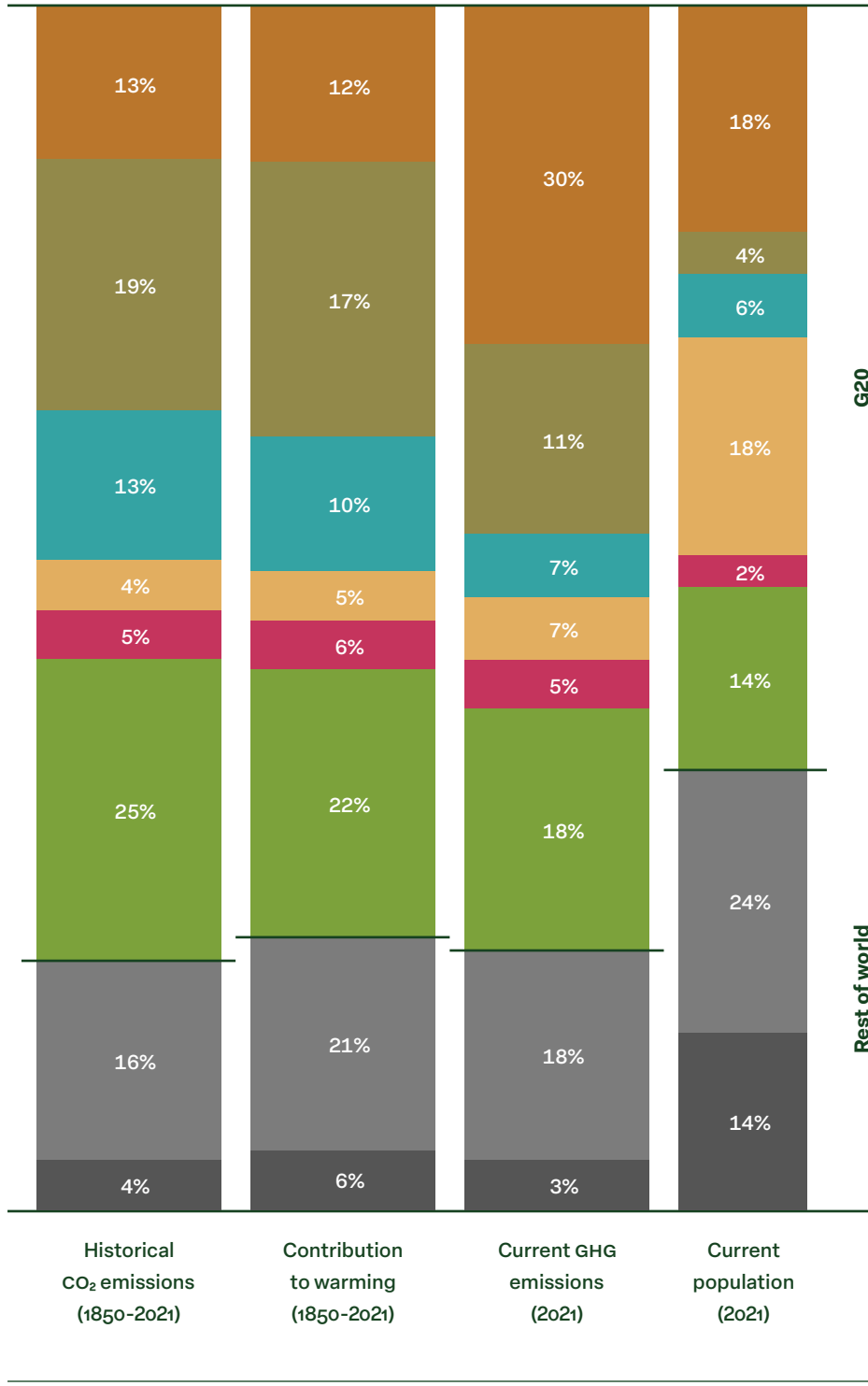
emissions reached new highs. The increase in CO₂ emissions from 2020 to 2021 was higher than the average annual growth rate over the last decade (Romanello et al., 2023). Similarly, the growth in methane emissions from 2020 to 2021 was the largest annual increase on record. According to six data sets, 2022 was either the fifth or the sixth warmest year on record (Copernicus, 2022).

Under current policies, warming is projected to exceed 3°C—twice as much as the 1.5°C target set in Paris in 2015. A temperature increase on this scale would lead to macroeconomic losses of at least 18% of GDP by 2050 and 20% by 2100. The costs of inaction are far greater than the costs of action (Swiss Re, 2021; NGFS, 2022).

1.2 G20 INERTIA

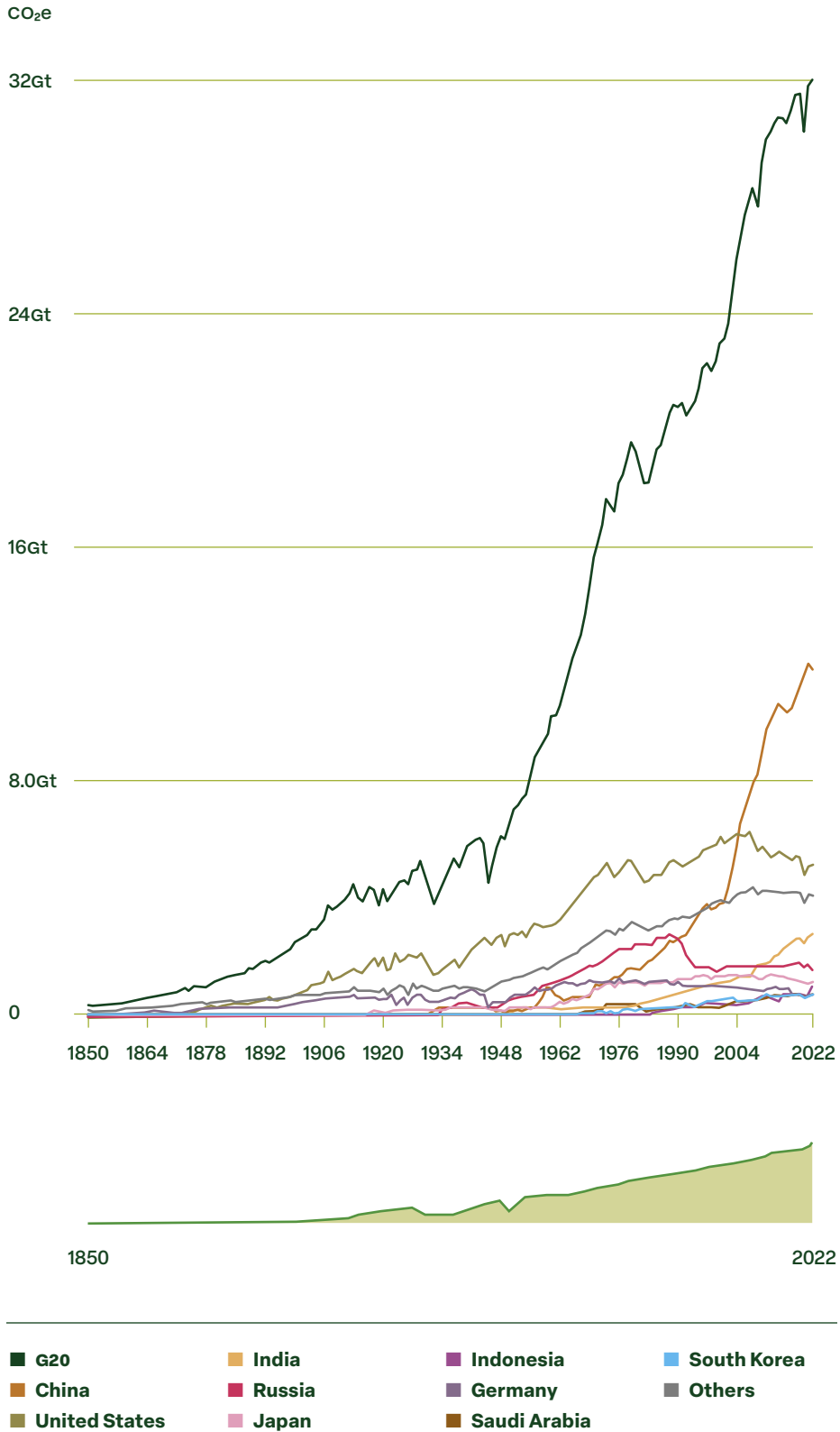
The G20 as a whole is responsible for about 80% of both current and historic GHG emissions, though there are differing levels of emissions within the group (UNEP, 2023b; IEA, 2024a; and see Figures 1 and 2). Per capita emissions vary considerably among G20 countries, reflecting different levels of development and of access to finance and technology (see Figure 3 for coal power emissions data). While today's biggest emitters include China, the U.S., India, Russia and Japan, the U.S., EU and China are the largest emitters on a cumulative historical basis (Vigna et al., 2024). A rapid change in absolute emissions trajectories is essential for staying within reach of the 1.5°C target (IPCC, 2023). However, despite the clear warnings and social and economic costs incurred, emission levels amongst G20 countries and globally continue to rise (UNEP, 2023b). G20 countries are not using their full potential to avert the climate crisis, especially with respect to the transition towards renewable energy (CCPI, 2024; see Figure 4).

Figure 1. Current and Historic CO₂ Emissions: G20 vs. Rest of World

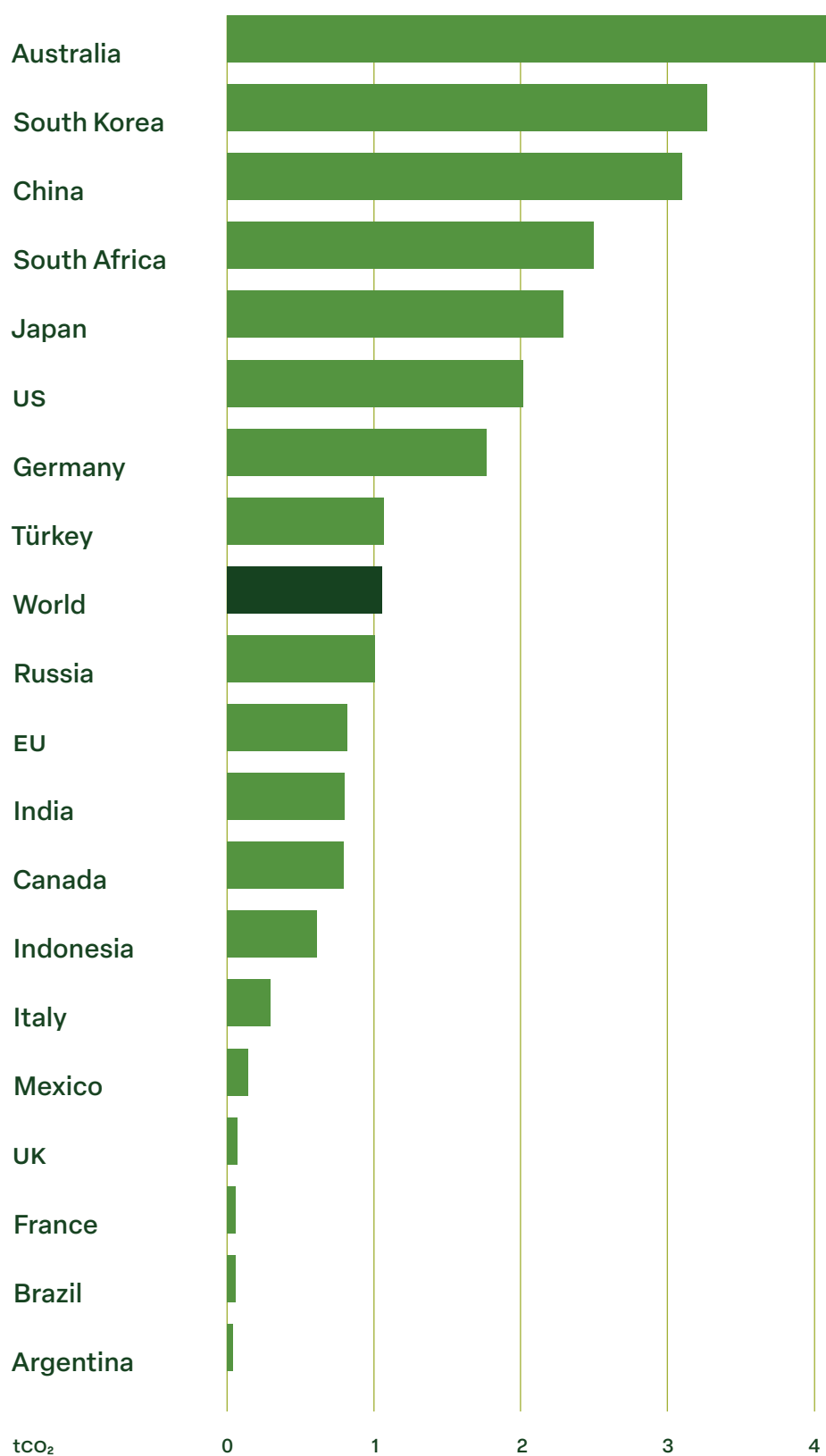


SOURCE: UNEP, 2023B.

**Figure 2. Current and Historic CO₂ Emissions:
G20 and G20 countries**



SOURCE: CLIMATE WATCH, 2022.

Figure 3. G20 Coal Power Per Capita Emissions in 2022

SOURCE: EMBER, 2023.

Figure 4. G20 GHG Emissions in 2022

Country	GHG emissions Mt CO₂eq/yr (2022)	Share of total emissions % (2022)
Argentina	382.992	1.0
Australia	571.382	1.5
Brazil	1,310.499	3.3
Canada	756.810	1.9
China	15,684.627	39.9
France and Monaco	430.363	1.1
Germany	784.005	2.0
India	3943.265	10.0
Indonesia	1,240.833	3.2
Italy including San Marino and Holy See	394.748	1.0
Japan	1182.77	3.0
South Korea	725.744	1.8
Mexico	819.873	2.1
Russia	2,579.798	6.6
Saudi Arabia	810.512	2.1
South Africa	534.532	1.4
Türkiye	687.526	1.8
United Kingdom	426.562	1.1
United States	6,017.443	15.3
Total	39,284.284	100.0

SOURCE: CRIPPA ET AL., 2023. Data sourced from the Emissions Database for Global Atmospheric Research (EDGAR), developed by the European Commission Joint Research Center in partnership with the IEA. Other methodologies for measuring emissions exist, and may yield different results.

Climate change is inextricably linked with the water crisis and biodiversity loss. Wetlands and forests are the world's largest carbon stores, and they depend on a stable water cycle and thriving biodiversity. Terrestrial carbon sinks absorb about 25% of our CO₂ emissions (Ruehr et al., 2023). Yet action to address the global mismanagement of water has similarly been insufficient (Global Commission on the Economics of Water, 2023).

Countries are falling short of their commitments—including in their NDCs, but also in global agreements aimed at helping all nations advance and benefit from a global transition to net zero. For example, the commitment made at COP15 in 2009 to mobilize USD 100 billion per year by 2020 for climate action in low- and middle-income countries—representing only a small fraction of their climate-related finance needs (IEA, 2023a)—was until very recently unmet, which contributed to a widespread loss of trust (Bhattacharya et al., 2023).

The aim of G20 countries should not only be to increase climate investments, but also to shift existing investment away from carbon-intensive activities (Climate Policy Initiative, 2023). The continued prevalence of fossil fuel subsidies provides a powerful example of policy choices among G20 countries that are undermining efforts to reach climate goals.

At the 2009 Pittsburgh Summit, G20 countries committed to phase out and rationalize inefficient fossil fuel subsidies over the medium term. Yet, in 2022, fossil fuel subsidies cost USD 7 trillion globally, encompassing both explicit and implicit subsidies—including undercharged environmental costs and forgone consumption taxes (Black et al., 2023). Global upstream oil and gas investment is still expected to rise by 7% in 2024, reaching USD 570 billion (IEA, 2024d). Additionally, the coal sector has approved investments for an increase of 50 gigawatts of unabated coal-fired power, marking the highest level since 2015 (IEA, 2024d). This is despite the International Energy Agency (IEA) finding that meeting the global target of net zero by 2050 requires “no new oil and gas fields approved for development, and no new coal mines or mine extensions” (IEA, 2021). Since the 2022 energy crisis following the invasion of Ukraine, fossil fuel subsidies implemented by G20 countries have more than doubled—totaling USD 1.4 trillion in 2022 (Laan et al., 2023)—simultaneously exacerbating the climate crisis and widening inequalities. Consumer subsidies in response to market volatility drove this surge. However, fuel subsidies are a notoriously inefficient way to help low-income

populations during a crisis, as they tend to be poorly targeted and have been shown to increase inequality (Coady et al., 2015).

Continued increases in spending on the production and consumption of fossil fuels are in stark contrast to countries' 2009 commitment to reduce public subsidies for fossil fuels and fossil fuel-intensive industries, and to their pledges under the Paris Agreements and Sustainable Development Goals (SDGs) to increase climate investment and redirect funding away from activities that are harmful to the environment. These subsidies not only place a burden on public budgets, using resources that could otherwise be put towards, for example, health, social welfare, and a green transition; they also continue to lock in carbon-intensive activities, technologies, and infrastructure (IISD et al., 2020). Ending these subsidies could also save thousands of lives by decreasing fossil fuel-related air pollution, which is responsible for over 5 million deaths annually in G20 countries and one in five deaths globally (Laan et al., 2023).

Putting the immense amount spent by G20 countries on fossil fuel subsidies in context leads to a sobering conclusion: the amount spent on subsidizing fossil fuels remains much higher than the current USD 4.3 trillion climate financing gap (Black et al., 2023). This is just one example of how the current policy paradigm—which continues to actively enable economic activity that is causing the climate crisis—must change if climate goals are to be achieved.

1.3 FROM AMBITION TO ACTION

There are positive signs that G20 countries increasingly agree on the international architecture required to mitigate the climate crisis. While more can be done to raise ambitions, current proposals demonstrate the willingness of G20 countries to collaborate multilaterally and bilaterally to make greater progress on shared objectives.

First, NDCs, as stipulated by the Paris Agreement, are now an established mechanism for setting consistent overarching goals for countries' intended emissions reductions. NDCs allow for a cross-comparison of effort and ambition and can link policy to quantifiable goals. Progress on these targets should be transparent and monitored. However, NDCs across G20 countries are not yet ambitious enough (Climate Action Tracker, 2022). Estimates show that to achieve the goal of limiting warming to 1.5°C, global emissions must be reduced from 57.4 Gt of CO₂ equivalent (GtCO₂e) in 2022 to

27 GtCO₂e by 2030 (UNEP, 2023b). Since G20 countries account for 80% of global GHG emissions, they should be responsible for 80% of the required reduction, and G20 countries' NDCs should reflect this. NDCs could also be strengthened by including additional indicators related to climate adaptation.

Since G20 countries account for 80% of global GHG emissions, they should be responsible for 80% of the required reduction, and G20 countries' NDCs should reflect this.

Second, to deliver on NDC targets, there is growing recognition that these should be underpinned by robust “transition plans”—not only to ensure the implementation and credibility of NDCs, but also to engage the range of institutions and actors that will need to deliver on emissions reductions. Putting ambitious green industrial strategies at the center of these plans would set a clear direction for sustainable growth and better enable economic actors to innovate, invest and collaborate around climate goals.

Third, since COP26, “country platforms” have been developed with a view to strengthening cross-country collaboration and ensuring that green transition plans are adequately resourced and supported and achieve climate objectives. Country platforms should not be seen only as ways to attract capital or de-risk private finance—rather, they can provide a clear plan on how to mobilize, direct and coordinate international and domestic finance, technical expertise and knowledge sharing to deliver on key elements of transition plans.

These initiatives and mechanisms should be joined up, and brought to life through a fundamental redesign of how economies function and finance flows, underpinned by a wider system of global governance and cooperation that prioritizes equity and inspires trust.

1.4 DEBUNKING MYTHS AROUND CLIMATE AND GROWTH

To catalyze the urgent action required, we need to break down false myths about the incompatibility between growth and green transitions. Although this report clearly shows that a green growth transition is possible, there are a series of myths that contribute

to inertia and undermine political will for transformative action on climate change. These myths stem from vested interests and intentional amplification of misinformation, as well as from outdated assumptions and misunderstandings. They shape the discourse and adversely impact the formulation and implementation of climate policies and actions.

This report identifies, discusses and debunks five specific myths. Understanding and addressing the underlying reasons for the pervasiveness of these five myths is critical to the implementation of the report’s recommendations.

Common myths blocking urgent action	Counter argument
<p>MYTH 1 “Market signals can drive decarbonization without direct government intervention.”</p>	<p>Markets alone cannot coordinate the rapid and large-scale economic transformation that is needed.</p>
<p>MYTH 2 “Climate action will slow economic growth.”</p>	<p>Climate action and economic growth are not mutually exclusive.</p>
<p>MYTH 3 “Industrial strategy does more harm than good due to government failure and capture.”</p>	<p>A greater risk of government failure arises from underfunded states that lack adequate capacity to implement industrial strategies that direct growth and shape markets, and that are therefore more prone to state capture.</p>
<p>MYTH 4 “Governments don’t have the resources to address climate needs.”</p>	<p>The problem is not a lack of funding but a lack of willingness to direct it towards climate action.</p>
<p>MYTH 5 “Blended finance—using public funds to ‘de-risk’ private investments—is always cheaper than public investment.”</p>	<p>Blended finance can lead to higher long-term costs compared to public financing, particularly for low- and middle-income countries.</p>

1.5 HARDWIRING EQUITY INTO THE GLOBAL GOVERNANCE OF CLIMATE ACTION

The climate crisis continues to exacerbate existing inequalities, disproportionately affecting those who contribute the least to GHG emissions.

Over the past 60 years, for example, Africa has recorded a warming trend that has been more rapid than the global average—but the continent is responsible for just 4% of global GHG emissions (IPCC, 2021; Songwe & Adam, 2023; Vigna et al., 2024). Across low- and middle-income economies, the World Meteorological Organization (WMO) reports that the rate of temperature increase is accelerating, leading to extreme weather events and climate-related hazards occurring with more frequency and intensity, fueling food insecurity, economic volatility, displacement, migration, and conflict over dwindling resources (WMO, 2023). Africa already lost a staggering USD 7-15 billion in 2020 due to climate change, and this figure could rise to USD 45-50 billion annually by 2040, equivalent to 7% of the continent's GDP by 2100 (AfDB, 2022). In Asia-Pacific countries, over 64 million people suffered from the effects of severe weather in 2022 alone, with the economic damage totaling nearly USD 60 billion (ESCAP, 2023). By mid-century, nearly a billion people in Asia-Pacific megacities such as Mumbai, Dhaka, Bangkok, Ho Chi Minh City, Jakarta, and Shanghai run the risk of being submerged, while for small Pacific Island Countries, such as Kiribati, the Marshall Islands, and Tuvalu, rising sea levels pose an existential threat (Dabla-Norris et al., 2021).

These disparities force low- and middle-income countries, which bear the least responsibility for the crisis, to allocate an increasing share of their limited financial resources to managing its impacts. Prime Minister Mia Mottley of Barbados has highlighted the double jeopardy faced by low- and middle-income countries: they are disproportionately impacted by climate change due to historical emissions from high-income countries, yet lack the financial resources necessary for a robust response (Greenfield et al., 2022). For instance, African countries spend an average of 5-15% of their GDP on addressing climate-related challenges, even as their natural resources play a crucial role in absorbing carbon emissions (Songwe & Adam, 2023).

In a context of escalating debt, achieving inclusive and sustainable growth becomes increasingly difficult. Low- and middle-income countries face significant constraints on their fiscal capacity to invest in climate mitigation and adaptation or in green industrial strategies.

Yet these countries are pivotal to the global climate agenda. While sharply bending the emission trajectories of high-income countries is a must, redirecting the growth trajectories of low- and middle-income countries is also necessary for achieving the goal of limiting warming to 1.5°C. What is more, while the loss of natural capital in low- and middle-income countries could lead to irreversible damage both locally and globally, this natural wealth could be enabled to provide cost-effective ecosystem services for the entire planet if better burden sharing mechanisms were created to support the ability of peatlands, rainforests and other key biomes to act as carbon sinks (Bhattacharya et al., 2023).

Changing course requires a fundamental redesign of how economies function and how finance flows, but this will only be possible if equity is hardwired into their design. While accelerating progress on tackling the climate crisis means that all countries will need to align economic development with climate goals, higher-income countries that have contributed most to GHG emissions over time should accept greater responsibility for financing this transition. New governance frameworks are needed to ensure global cooperation on green industrial strategy and reform of the architecture of global finance. Equity is not only important in and of itself, but also because global climate action will fail without it.

1.6 SUMMARY OF RECOMMENDATIONS

Green industrial strategies

1. All G20 states should adopt ambitious green industrial strategies to drive sustainable, inclusive economic growth. While the design of these strategies will be specific to each country, instead of picking sectors, they should be oriented around clear, bold climate goals or “missions”, drawn from NDCs, to catalyze cross-sectoral investment, innovation and transformation, as well as engagement at all levels of government and across civil society.
2. In line with the mandate of TF-CLIMA, G20 countries should shift towards a whole-of-government approach in their response to the climate crisis, recognizing that responsibility for climate action is shared by all ministries, including ministries of health, industry and finance.

3. Green industrial strategy should be enabled through changes to the design of country-level governance structures (prioritizing centralized governance and cross-ministerial collaboration), policy tools (like procurement), and public institutions (like SOEs), to bring them into alignment with green industrial strategies. Industrial strategy should include a reorientation of existing subsidies—including fossil fuel subsidies—away from carbon-intensive activities and towards sustainable ones.
4. Climate action requires breaking down the false dichotomy between public and private action: governments and businesses should work in partnership to tackle climate change and deliver public value. Subsidies, grants and loans provided to the private sector can become levers for a just, sustainable transition if they are conditional on, for example, climate-aligned investment, commitments to fair wages, good quality jobs, and worker training, as well as risk and reward sharing.
5. The G20 should explore the development of new global governance structures that enable national-level green industrial strategies while emphasizing global equity, shared ownership, and collaboration around shared climate goals. This could include the creation of a global facility for industrial strategy coordination, potentially housed within a reformed WTO. This facility could provide a platform for dialogue on how to design and coordinate green industrial strategy in a way that is in line with global climate goals while also being equitable and not distortionary.
6. Commitments to equitable green technology and knowledge transfer and to building distributed manufacturing capacity should be scaled up to ensure that all G20 countries are able to advance along new pathways for development that bring urgent climate action together with economic growth goals.

Greening finance

7. Responsibility for the economic transformation required to limit warming to 1.5°C is shared by all countries, and in particular by those with the largest cumulative contributions to global GHG emissions. However, G20 countries—and especially high-income

G20 countries—should show leadership by providing and scaling up the financing required for this transformation.

8. The G20 should reinforce existing calls for an equitable global financial architecture that supports countries' ability to create fiscal space and raise capital for green investment. This includes access to cheaper long-term capital, especially for low- and middle-income countries, improvements in domestic resource mobilization, carbon taxes and other international levies, issuance and on-lending of SDRs and adequate funding of MDBs and the IMF. Improvements in the debt management and resolution system are critical for this process.
9. Recognizing that delivering on NDCs needs both a higher quantity and improved quality of climate finance, the G20 should emphasize the role of PDBs, including NDBs, RDBs, and MDBs. G20 countries should empower NDBs to deliver patient long-term lending that is outcomes-oriented, and directed towards projects that will contribute to achieving NDCs—and the SDGs more widely.
10. The G20 should align the financing strategies of NDBs, RDBs, and MDBs to respond to global and regional climate challenges. Country platforms can be used to pool, structure, and direct finance towards shared climate objectives, and to embed conditionalities that ensure that the efforts of private sector recipients contribute to achieving these objectives. This is not only about “de-risking” but also about sharing risks as well as the resulting rewards.
11. The G20 Sustainable Finance Working Group and the NGFS should work together to develop strategies for enhancing inclusive green finance.³ The G20 Global Partnership for Financial Inclusion should expand its work to develop explicit strategies for enhancing inclusive green finance, to ensure that economically vulnerable groups across the G20—including low-income households and

3. We use the term “inclusive green finance” to represent a comprehensive approach that integrates both environmental and social dimensions into financial strategies. This terminology has now been embraced by various fora and by the central banking community to emphasize these aspects, setting it apart from other terms with a similar meaning (AFI, 2024; Asktrakhan et al., 2024).

SMEs—have access to affordable finance to allow them to invest in adaptation and build resilience, contribute to mitigation efforts, and benefit from economic opportunities in the context of a just green transition. To this end, the G20 Global Partnership for Financial Inclusion should work together with the G20 Sustainable Finance Working Group and the NGFS.

12. Central banks, supervisory and regulatory bodies should—within their mandates—implement policies that mitigate climate-related financial risks and foster the conditions for mobilizing private sector finance towards green investments and away from carbon-intensive ones. Appropriate tools for greening the financial system and the economy will vary by country and mandate, ranging from advancing more robust, globally standardized interoperable taxonomies and disclosure requirements, to reforming risk assessment processes by addressing data gaps, to adopting adequate forward looking climate risk models, and taking proactive measures to phase out carbon-intensive financing in collateral frameworks or corporate bond portfolios, and green credit allocation. The G20 should work with regulatory bodies to implement these actions within their mandates.

2

Delivering Green Industrial Strategy

The climate crisis is a direct result of economic policy choices. Addressing this crisis requires governments to steer economic activity proactively towards inclusive and sustainable outcomes. Market forces alone will not deliver the pace of innovation and deployment of clean technologies required, let alone the structural shifts needed in the economy (see Myth 1). This section focuses on how countries can design and implement industrial strategies that reconcile growth, decarbonization and social welfare goals and shape markets to deliver on these goals, and on how industrial strategies can be equitably governed on a global scale to ensure that all countries can realize this opportunity. More fundamentally, this section sets out a framework for economic development that recognizes the importance of mobilizing investment and innovation not in order to achieve growth alone, but rather to shape markets to deliver growth that is aligned with climate goals and with the SDGs more broadly. This approach to industrial strategy recognizes that decisions about how to generate growth, boost productivity and create jobs cannot be separated from social and environmental priorities.

...for green growth to become possible globally, new global governance structures are required that enable green industrial strategy for all countries, not just high-income ones.

Industrial strategy can be broadly defined as the strategic effort by the state to encourage the structural transformation of an economy, to enhance productivity and competitiveness (Chang, 2011). It is experiencing a renaissance globally (Juhász et al., 2023) and is increasingly being recognized for its ability to target multi-dimensional objectives (Rodrik, 2014; Aiginger & Rodrik, 2020; Anzolin & Lebdioui, 2021; Mazzucato et al., 2024a; Lebdioui, 2024) and co-benefits (Ürge-Vorsatz et al., 2019) that extend beyond short-term competitiveness and growth. Tying industrial strategy to social and environmental targets, such as lower carbon emissions, can foster productivity, competitiveness and growth while also generating long-term gains for people and the planet (Ilyina et al., 2024). The concern that climate action will slow growth is a misconception (see Myth 2). It can, in fact, catalyze and direct growth if climate and economic goals are brought into alignment.

Achieving green growth requires states to leverage a wide array of policies, tools, public institutions and partnerships to shape markets and catalyze innovation and investment in the service of climate goals (Mazzucato et al., 2024a). This reflects a broader paradigm shift in the global policy discourse away from neoclassical orthodoxy and towards prioritizing the state's role in directing growth and shaping (not just "fixing") markets to create a mutually reinforcing relationship between climate action and economic growth (Meckling & Allan, 2020; Mazzucato, 2021) (see Myth 3). But for green growth to become possible globally, new global governance structures are required that enable green industrial strategy for all countries, not just high-income ones.

Green industrial strategy aligned with NDC targets should be the central plank of countries' transition plans, serving to coordinate whole-of-government, cross-sectoral climate action and giving states the ability to absorb and deploy green finance in a coherent, strategic way.

Green industrial strategy aligned with NDC targets should be the central plank of countries' transition plans, serving to coordinate whole-of-government, cross-sectoral climate action and giving states the ability to absorb and deploy green finance in a coherent, strategic way. For countries in need of global finance, green industrial strategy can create a clear bridge between national and international climate and development goals, via country platforms. Green industrial strategy is critical for enabling all states, including low- and middle-income countries, to navigate the complicated political economy of accelerating and managing the transition to sustainable, equitable economies.

MYTH 1

"Market signals can drive decarbonization without direct government intervention."

If GHG emissions and other externalities were accurately reported, and their costs taxed, price fluctuations could show which

investments are sustainable and which are not. However, the price mechanism faces challenges in coordinating a rapid transformation of this magnitude. The market will not find the required direction on its own.

Prevailing economic thinking limits the role of the state to intervening only when there are clear market failures. This approach has fostered a belief that simply de-risking private finance will suffice to achieve climate goals, neglecting the diverse range of tools needed for ensuring sustainable growth (Gabor, 2021).

Markets are an outcome of the actions of government, business, labor and other economic actors. Coordinated action is required amongst these actors to decarbonize all sectors of the economy—including agriculture, energy, manufacturing, mining, tourism, and transportation. The scale of this transformation requires governments to take an active role in shaping and co-creating markets that will incentivize some activities and disincentivize others, while creating new opportunities for businesses to innovate and invest in ways that contribute to achieving NDC targets (Mazzucato, 2023b; Mazzucato et al., 2024b). They can use green industrial strategy and green financial policy to deliver this. Indeed, climate goals will not be achievable unless they do so.

MYTH 2 “Climate action will slow economic growth.”

Climate and growth are not a trade-off. The goal of economic policy should be green and inclusive growth.

Green industries could be worth more than USD 10 trillion globally by 2050, which would be equivalent to more than 5% of global GDP, and eleven of the highest-potential low-carbon technologies could generate revenues equivalent to about 10% of the global economy (Arup & Oxford Economics, 2023). Evidence suggests that the development of the green economy has fostered overall economic growth in EU countries (PEI, 2022). Climate finance is an investment, not a cost.

The Stern Review on the Economics of Climate Change showed already in 2006 that the costs of inaction are much greater than the costs of action (Stern, 2006). Even if global temperature rises are kept to well below 2°C, global GDP growth will be down 4.2% in 2050 relative to a world without climate change (Swiss Re, 2021). Several studies indicate that under current policies, warming will exceed 3°C,

resulting in macroeconomic losses of at least 18% of GDP by 2050 and 20% by 2100 (Swiss Re, 2021; NGFS, 2022). Recent studies confirm that the costs will rise the longer action is delayed; more specifically, sticking to business-as-usual would create more than double the losses of a 1.5°C scenario. Countries that do not invest sufficiently in adaptation and resilience risk sliding into a vicious circle of greater climate vulnerability, more extensive loss and damage, and deteriorating public finances (Volz et al., 2020a; Beirne et al., 2021).

On the other hand, increasing climate investments to the levels needed by 2050 will lead to considerable reductions in social and economic losses by 2100 (Climate Policy Initiative, 2023). The energy transition alone—if executed quickly and effectively—could save USD 12 trillion compared to business-as-usual (Swedish Energy Agency & Oxford Smith School, 2023). Investing in and shaping new climate-neutral technologies and markets now can accelerate cost declines and reduce the amount of stranded assets.

Moreover, climate change tends to have a larger negative impact on low- and middle-income economies and on the poorest in society. The evidence underscores the conclusion that climate action will safeguard development gains and promote economic growth—and therefore that it is key for achieving a future that is more just and inclusive.

MYTH 3 **“Industrial strategy does more harm than good due to government failure and capture.”**

Critics suggest that industrial strategy carries considerable risks associated with “governmental failures” (Tullock et al., 2002). These include capture by private interests—e.g. nepotism, cronyism, corruption or rent-seeking (Krueger, 1974)—misallocation of resources—“picking losers” (Falck et al., 2011)—or unfair and damaging competition with private initiatives— “crowding out” (Buiters, 1977). One manifestation of this mindset is New Public Management (NPM), which posits that to mitigate the risks of government failure, governments should incorporate private-sector strategies to optimize value in public services (Hood, 1991; Osborne & Gaebler, 1993; Mazzucato & Ryan-Collins, 2022).

Frameworks like NPM have perpetuated a self-defeating view of government as incompetent, corrupt and lazy. This has contributed to the damaging trend of downsizing government institutions and

outsourcing core capacities to big consulting firms (Mazzucato & Collington, 2023). In fact, a greater risk of government failure and capture stems from states that are underfunded and lack capacity.

The urgency of the climate crisis demands that governments act, particularly through industrial policy. Hence, it is critical to couple any industrial strategy with measures and policies to build public sector capacity. Past policy failures can be a valuable source of institutional learning for the green transformation.

2.1 THE CASE FOR A NEW APPROACH TO GREEN INDUSTRIAL STRATEGY

Industrial strategy existed well before its recent surge in application and public attention; however, across the G20 and beyond, governments are increasingly using industrial strategy to direct their economies towards a green transition.

Notably, in the context of its wider industrial strategy, China has invested in expanding production and adoption of electric vehicles (EVs) through infrastructure development and consumer incentives (as well as disincentives for buyers of fossil fuel vehicles), transforming China into a global leader in EV adoption, with one of the world's largest EV markets (IEA, 2024d; Bloomberg News, 2024). The U.S., since April 2022, has been rolling out a “modern” industrial strategy that includes a focus on energy security and tackling climate change (White House, 2022b). Brazil's new industrial strategy, announced in January 2024, includes explicit goals related to decarbonization and the energy transition (CNDI, 2024). The United Kingdom has recently committed to implementing a mission-oriented industrial strategy that includes the goal of delivering clean power by 2030 (Labour Party, 2023). Investments in industrial strategy have so far been uneven, and some measures have been criticized for being protectionist and for undermining the ability of low- and middle-income countries to achieve green growth. However, by bringing climate-related goals to the center of industrial strategy these examples signal a growing interest in a new approach to industrial strategy—one which could be extended to make green growth a global reality.

This new approach requires a shift in the prevailing mindset, which has focused on providing targeted subsidies and other support to specific sectors, technologies, or companies (“picking winners”).

Industrial strategy should instead be oriented around policy goals that require cross-sectoral investment, innovation and transformation—notably, those identified in NDCs. This approach—also referred to as “mission-oriented” industrial strategy (Mazzucato, 2021)—turns challenges like climate change into business opportunities and investment pathways (see Box 1). In doing so, it sends a signal of long-term government commitment to specific priorities, which can bolster investor confidence, making it easier for businesses and other partners to invest alongside governments (Mazzucato et al., 2024a).

The climate crisis requires transitioning away from fossil fuel-based energy systems, but it is not only about renewable energy. It requires mitigation, adaptation and transition investments that amount to an economy- and society-wide transformation—including of how we eat (sustainable food), how we build (green infrastructure), and how we travel (sustainable mobility) (Mazzucato et al., 2024a). To tackle the climate crisis, all sectors—from agriculture and mining to manufacturing and transportation, as well as services—will need to decarbonize. Sectors remain important, but instead of providing sector-based subsidies without a clear direction—which risks increasing profits but not investment—this approach focuses on transforming sectors.

Importantly, green industrial strategy is more likely to succeed if it resonates with and engages communities, civil society actors and subnational governments, which can help to bring a place-based lens to how it is implemented in different regions. Labor unions should have a meaningful role in shaping industrial strategy, to inform measures to support workers who are negatively impacted by economic restructuring, to ensure that green economy jobs are well-paid and to engage workers in participatory innovation processes (Mazzucato et al., 2024a).

Well-designed green industrial strategy catalyzes the cross-sectoral investment and innovation needed to transform economies in line with NDC targets. In the process, it generates spillovers, jobs, productivity gains and economic development, with a potential multiplier effect—i.e., where public investment generates a much higher impact on GDP than the amount invested (Deleidi & Mazzucato, 2019). For instance, the International Monetary Fund (IMF) estimates that the multiplier effect associated with investments in renewable energy is higher (1.1-1.5 times) than that associated with fossil fuel energy (0.5-0.6 times), underscoring that investments in green infrastructure can be a key driver of economic growth (Batini et al., 2022).

BOX 1 **Mission-Oriented Innovation and Industrial Strategy in the EU Horizon Europe Program**

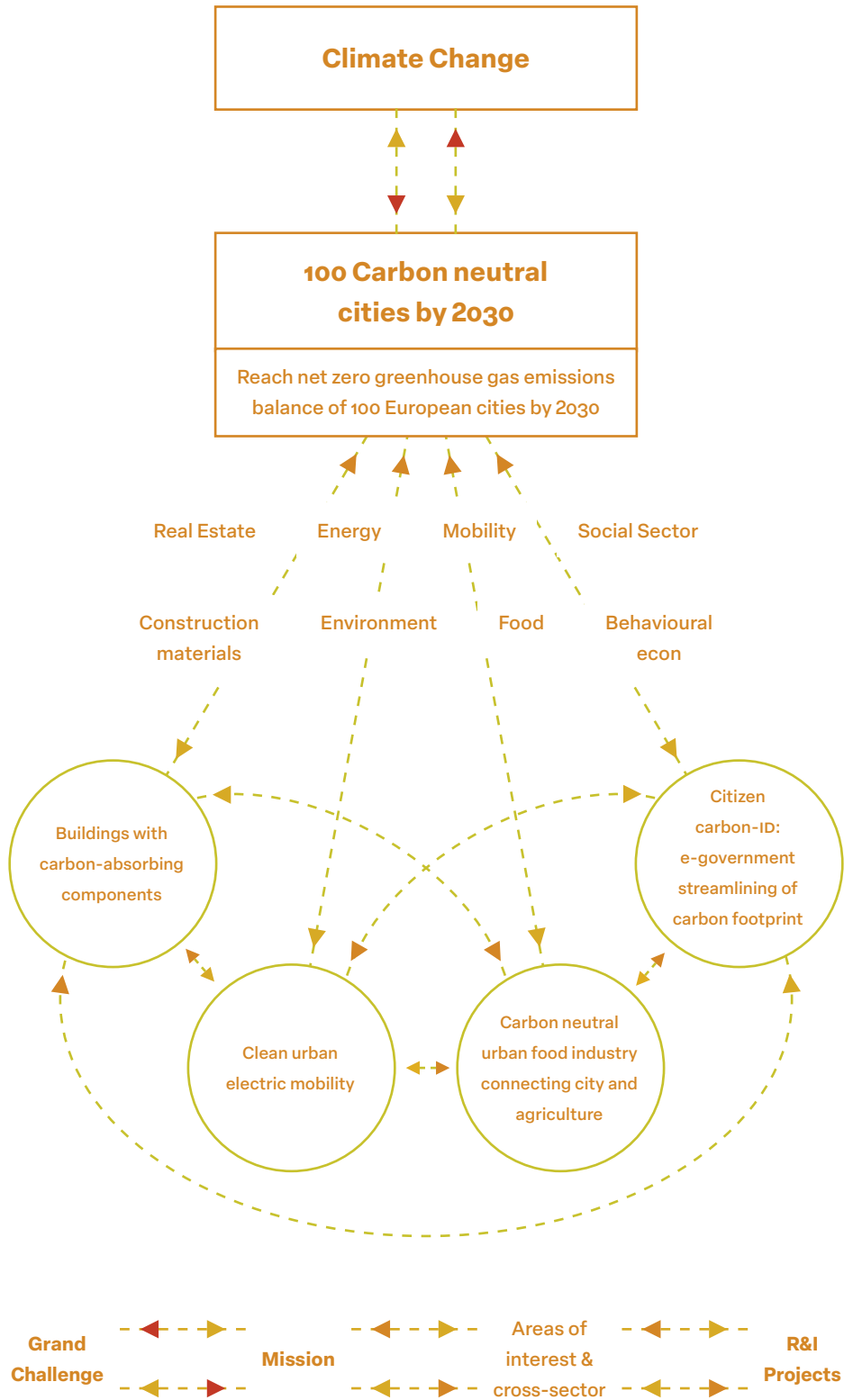
Missions that are capable of catalyzing and directing growth as part of a mission-oriented industrial strategy have the following characteristics: they are bold, inspirational and resonate with citizens; they are **clear in setting a direction** with a measurable goal, so that it is evident whether the mission has been achieved; they are **ambitious while realistic**, leveraging and transforming existing capacity; they are **cross-sectoral, interdisciplinary and cross-ministerial**, engaging a wide array of actors to contribute to solutions; and they are **conducive to driving bottom-up solutions**, enabling new ideas and collaborations to emerge (Mazzucato, 2019).

An example is the adoption in 2019 by the European Commission of a mission-oriented approach as part of its Horizon Europe research and development program (Mazzucato, 2018; Mazzucato, 2019). The five EU mission areas chosen were: (i) **Adaptation to Climate Change** (supporting at least 150 European regions and communities to become climate-resilient by 2030); (ii) **Cancer** (working with Europe's Beating Cancer Plan to improve the lives of more than 3 million people by 2030 through prevention, cure and solutions enabling them to live longer and better); (iii) **Ocean and Waters** (achieving restoration by 2030); (iv) **Climate-Neutral and Smart Cities** (reaching net zero for 100 cities by 2030); and (v) **A Soil Deal for Europe** (establishing 100 living labs and lighthouses to lead the transition towards healthy soils by 2030).

It is worth noting that the Directorate-General for Research and Innovation was given the mandate to coordinate the five missions, which limited them to coordinating research and development investments under the Horizon Europe program and made it more difficult for the missions to be coordinated in a whole-of-government way. The Secretariat-General's Office, which supports the Commission President's mandate and is responsible for overall coherence of the Commission's work, could instead have ensured the missions were governed as part of a wider innovation and industrial strategy, with stronger links between different Directorates-General.

Mission maps help to illustrate how a mission-oriented approach works in practice. The following example of a mission map informed the Horizon Europe program:

Figure 5. Mission for 100 climate neutral cities in Europe



Grand challenges are difficult but important, systemic, and society-wide problems that do not have obvious solutions. For example, limiting global warming to 1.5°C above pre-industrial levels.

Missions are concrete goals that, if achieved, will help to tackle a grand challenge. They set a clear direction for the different actors and sectors whose investment, innovation and effort is required to develop solutions. To mobilize as much cross-sectoral collaboration as possible, missions should focus less on economic outcomes and more on societal and environmental outcomes. Missions can help transform complex challenges into clear investment pathways. To leave room for innovation, they should set a clear direction without prescribing exactly how the end goal will be achieved. NDC targets are good examples of missions.

Sectors are the economic sectors that need to be involved in developing solutions to specific missions, generally in collaboration with one another.

Projects are activities or programs that solve particular problems and, in so doing, help to achieve the broader mission. For example, an initiative aimed at expanding the use of EVs could be a project contributing to mission success.

This mission map description draws on Mazzucato, 2018 and Mazzucato et al., 2024a—reproduced with permission.

2.2 A WHOLE-OF-GOVERNMENT APPROACH TO GREEN INDUSTRIAL STRATEGY

Advancing green industrial strategy requires adopting a whole-of-government approach. A country's industrial strategy should not be isolated within ministries of industry, innovation, or economy, but should instead be seen as the engine for a wider growth strategy that all ministries are responsible for implementing. At the same time, climate change is not just for ministries of environment or energy but should be treated as a challenge that all ministries, as well as other public entities—including central banks, prudential regulators, national development banks (NDBs) and national innovation agencies—should contribute to solving (Mazzucato et al., 2024a; Chang et al., 2024).

To avoid ministerial or departmental silos, green industrial strategies should be governed centrally, with clear backing from heads of state (Mazzucato et al., 2024a). Malaysia's Economic Planning Unit, for example, which sits within the Prime Minister's office, is responsible for inter-ministerial coordination of economic planning based on five- and ten-year development plans. In the UK, the government is in the process of setting up a new structure within the Cabinet Office to oversee the implementation of the government's five key missions, including through "mission delivery boards", to break down government silos and foster a joined-up approach. Brazil's decision to house its Ecological Transformation Plan in the Ministry of Finance sends an important signal of its centrality in the government's overarching agenda (Mazzucato, 2023c).

A whole-of-government approach to green industrial strategy may require new structures to be created—like the UK's new mission boards—and existing public institutions to be redesigned to strengthen the alignment of their activities with climate goals. State-owned enterprises (SOEs), for example, can play an important role due to their intermediary position between the public and private sectors (Mazzucato & Gasperin, 2023). However, they have often been set up as independent, arm's-length entities, instead of as instruments for achieving policy goals. If governed as part of a green industrial strategy, SOEs can help to drive economic transformation and shape markets in alignment with industrial strategy goals. Some countries have explicitly aligned SOE mandates with economic policy. One example is France's SOE holding company *Agence des participations de l'État*, which considers the 83 SOEs it oversees to be tools for achieving national policy objectives through its "shareholding doctrine" (Mazzucato & Gasperin, 2023).

BOX 2**SOE Transformation in South Africa**

The Government of South Africa is in the process of establishing a new state-owned holding company for SOEs, called the State Asset Management SOC Ltd. (SAMSOC), through the National State Enterprises Bill introduced in January 2024. SAMSOC will consolidate the state's shareholdings in state enterprises and enable the oversight, restructuring, coordination and management of the SOEs within its portfolio with a view to enhancing their impact on the

South African economy, while ensuring appropriate governance and accountability.

While the focus is partly on responding to past recommendations flowing from the Judicial Commission of Inquiry into Allegations of State Capture, SAMSOC also offers an opportunity to bring key SOEs into closer alignment with South Africa's sustainable development and industrial strategy goals (Mazzucato & Gasperin, 2023; SA News, 2024; Reyburn et al., 2024; Parliament of the Republic of South Africa, 2024).

Effective green industrial strategy should also make use of a wide array of policy tools that will vary by country, including a mix of supply-side interventions—incentives such as grants, subsidies, loans, preferential tax treatment or regulatory changes—and demand-side ones—aiming to create new markets or expand existing markets through mechanisms such as public procurement, advanced market commitments, price guarantees, consumer tax credits and local content rules (Mazzucato et al., 2024a). Critically, industrial strategy should include a repurposing of existing subsidies—including fossil fuel subsidies—away from carbon-intensive activities and towards sustainable ones, to help sectors transform in line with NDCs.

Effective green industrial strategy should also make use of a wide array of policy tools that will vary by country, including a mix of supply-side interventions... and demand-side ones—aiming to create new markets or expand existing markets through mechanisms such as public procurement...

In Brazil, there is a growing recognition that key policy tools must be brought into alignment with the country's economic transformation agenda. Notably, public procurement is recognized as a strategic lever in Brazil's New Growth Acceleration Plan (Novo PAC), Ecological Transformation Plan, and New Industrial Policy (Mazzucato et al., 2024c).

Public procurement is a critical and often under-used lever, with a total global value of about USD 13 trillion per year (World Bank, 2022), accounting for about 20-40% of national public spending among OECD countries (OECD, 2023b). It is a highly influential tool for implementing industrial strategies as it can shape new market opportunities that act as a stimulus for innovation and investment aligned with government policy priorities.

Green procurement policies can support the creation of low-carbon markets during the emergence phase and accelerate adoption during the diffusion phase (Mazzucato, 2020). For example, the public sector can guarantee a certain level of demand through establishing “off-take agreements” or feed-in tariff programs to provide greater market certainty and unlock additional private investment. For the most part, public procurement has focused on securing the lowest price, reducing risk and promoting fairness and anti-corruption. While these factors are important, maximizing the public value of public procurement requires procurement budgets to be seen as tools for advancing strategic priorities. It is worth noting, however, that public procurement as an instrument of industrial strategy is in many cases being used to give preference to local products. As discussed in section 2.4, global collaboration and equitable governance will be critical to inform the extent to which tools such as procurement should be allowed to privilege local green products, rather than focusing on green products which can be sourced from anywhere.

2.3 REDESIGNING PUBLIC-PRIVATE COLLABORATION TO ALIGN WITH CLIMATE GOALS

Achieving climate targets requires collaboration between public and private actors. The nature of these partnerships matters, however.

To maximize the public value of green industrial strategy investments, it is important to design public-private collaboration with care, focusing on shared goals, risks and benefits. Providing public finance and other benefits to firms should come with conditions that ensure these firms—domestic and international—make commitments related to sustainability, innovation, and equity. Conditionalities create a framework that clarifies responsibilities and obligations among all actors involved (Mazzucato & Rodrik, 2023). They can, for instance, be used to ensure the affordability

of green goods and services, mandate clear sustainability standards, and require profit-sharing or reinvestment of profits in productive and sustainable business activities, while limiting shareholder buybacks. Principles of inclusion and equity should also be embedded in partnerships, for example through conditions related to fair wages, good quality jobs and worker training. In this way, public-private collaboration can be structured with a just, green transition as a common goal (Mazzucato, 2023b).

To maximize the public value of green industrial strategy investments, it is important to design public-private collaboration with care, focusing on shared goals, risks and benefits.

For example, the U.S. CHIPS and Science Act, which is providing USD 53 billion in incentives for semiconductor research, development and manufacturing, gives preference to companies that commit to lower the carbon content of production, make their supply chains more sustainable, and invest in workforce development (White House, 2022a).

More broadly, to succeed, governments will need to confront deep vested interests and incentive systems. By focusing on climate targets rather than subsidies for specific sectors, and on crafting partnerships with care, green industrial strategy is less susceptible to capture by private interests.

BOX 3 **A New Approach to Public-Private
Collaboration to Promote Alternative
Energy Sources in Brazil**

One effective model for reshaping the relationship between the public and private sectors is demonstrated by the Program of Incentives for Alternative Electricity Sources (PROINFA). Launched in 2004, PROINFA established a regulatory framework to commission alternative energy sources for Brazil's national grid, requiring that 60% of the total construction costs for projects be sourced

domestically (IEA, 2024b). This policy enabled WEG, a company from southern Brazil, to transition from producing electric motors for refrigerators to manufacturing advanced wind turbines for wind farms. Government regulation gave WEG the security it needed to project returns on their investments in this new technology. This helped Brazil to emerge as one of the fastest-growing markets for wind power. WEG maintained a commitment to research and development, high governance standards, and investments in human resources and training (Gala & Parronchi, 2017).

The 60% national content requirement of PROINFA was later revised by the Brazilian National Bank for Economic and Social Development (BNDES), incorporating a new method for calculating the percentage of locally produced components. Staged targets were set to promote a gradual increase in local wind turbine production. By 2014, WEG had announced a product with 100% Brazilian technology. This achievement in productive diversification and sophistication was due to sustained public and private investment, which enabled WEG to enter global markets and establish Brazil as a competitive player in the international wind turbine market (Gala & Parronchi, 2017).

2.4 GOVERNING GREEN INDUSTRIAL STRATEGY AND LOW CARBON TECHNOLOGY ACCESS EQUITABLY ON A GLOBAL SCALE

While climate action requires individual states to advance green industrial strategies, they should not be pursued at the cost of other countries' ability to invest in and benefit from their own green industrial strategies.

As governments around the world increasingly embrace industrial strategy, global tensions in trading arrangements are being exacerbated. While industrial strategy is essential for national governments to restructure their economies away from fossil fuels, the global nature of the climate crisis and the interconnectedness of supply chains and trade networks means that green industrial strategy should not be pursued as a series of isolated domestic agendas. Impacts across countries should be considered.

Notably, the transition to decarbonized economies offers a significant opportunity to build local industrial capacity in low- and

middle-income countries—for example, leveraging the fact that electrification agendas are increasing demand for critical minerals typically found in these countries—but this opportunity will only be realized if global governance structures adapt to emphasize equity, shared ownership, and collaboration around shared goals.

The surge of interest in green industrial strategy is a signal that countries are adopting a new approach to economic development, one motivated by a recognition that the low carbon transition offers significant opportunities that early movers can seize (Perez, 2016; Lema et al., 2020; Anzolin & Lebdioui, 2021), but also by geostrategic interests—as exemplified by the U.S. focus on reducing China’s low carbon technology dominance (White House, 2023).

Many countries are pursuing industrial strategies that include various forms of trade barriers and preferences given to domestic products. “Green protectionism” is increasingly contentious as specific orthodox macroeconomic principles are applied less rigidly to high-income countries but more inflexibly to low- and middle-income economies. This disparity fuels perceptions that the global governance system operates in favor of and for the greater benefit of high-income nations (African Climate Foundation, 2023). However, green industrial strategy does not have to worsen these tensions. How it is designed will determine whether it reinforces systemic inequalities or helps to address them, driving innovation and economic growth with positive global spillovers (Mazzucato et al., 2024a).

There is a need for a new set of principled norms that enable green industrial strategy and are fair for all countries. This should include, but not be limited to, reform of the World Trade Organization (WTO). Given that high-income nations can bend—or deliberately not comply with—trade rules, the purpose of the WTO in the age of ecological crises should be to coordinate an equitable global green transition agenda and to resolve trade disputes arising from green industrial strategy. One way to foster more effective and fair coordination of green industrial strategy would be to create a global facility for industrial strategy coordination, housed within the WTO or a similar international entity. This facility would foster dialogue on how to get green industrial strategy right in the context of global ecological responsibilities, and how to coordinate key industrial strategy and financial tools on a global scale.

Coordinating and implementing green industrial strategy and technology partnerships on a global scale requires robust

governance structures founded on shared ownership (Tagliapietra, 2022). This involves establishing frameworks where decisions on what qualifies as green or sustainable are made collectively, ensuring that the perspectives and interests of low- and middle-income economies are reflected in, for example, the development and coordination of green taxonomies.⁴ By encouraging dialogue and cooperation on global standards for green and sustainable practices, countries can mitigate conflicts arising from divergent regulatory approaches and foster a more cohesive global economic environment conducive to sustainable development.

In establishing new fora and negotiating new norms, all countries should maintain a commitment to designing governance structures that will best enable the achievement of climate goals through equitable green growth. The goals of tackling climate change and of ensuring equity should be hardwired into these structures, to avoid creating new fora that are focused on a race to the bottom rather than a journey to the top. New norms and fora should take a global approach, to avoid trading blocs being pitted against each other.

High-income economies have a responsibility to support and assist low- and middle-income countries to transition their economies towards sustainable growth in line with climate goals (Ismail, 2023). Specifically, they should scale up country commitments to green technology and knowledge transfer, building distributed manufacturing capacity and increasing access to climate finance through country platforms (explored in the next section of this report).

Deeper commitments to low carbon technology transfer (which is at the core of the UNFCCC), are necessary to ensure equitable access, notably by increasing support to institutions such as the Global Environment Facility (GEF). The GEF, since its inception in 1991, has been financing transfers of green technologies to low- and middle-income countries. International agreements should push for greater private sector cooperation and accountability in supporting low-carbon technology transfers and innovation cooperation. While the path to green growth will vary by country, ensuring equitable global access to affordable emerging technologies and innovations

4. The use of "green" does not imply that these taxonomies should be limited to climate-related matters. Rather, as demonstrated by the Brazilian and Mexican examples, these taxonomies can and should be linked to broader social goals.

that can contribute to green growth is a necessary precondition for enabling decarbonization of key systems globally, rather than only within a few countries (WHO Council on the Economics of Health for All, 2021; Mazzucato, 2024).

Relatedly, building distributed innovation and manufacturing capacity is critical to ensure that all countries are able to advance along new pathways for development that bring urgent climate action together with economic growth goals. This requires high-income countries as well as companies to take steps to enable the local manufacture of green technologies in low- and middle-income countries, as well as ensuring the advancement of spillover innovations, including through licensing or transferring IP-protected technologies and providing financial support to establish robust green manufacturing infrastructure. Public procurement policy can also be used to nurture the development of domestic low-carbon manufacturing capacity, while relevant industries are nascent. Strategies such as powershoring—moving production to places with clean, affordable energy that are close to big markets—also have potential to help cut emissions and boost green growth in certain low- and middle-income economies (Arbache, 2023).

The G20 can play a key role in promoting new structures for global collaboration on industrial strategy and in fostering an inclusive dialogue on green industrial strategies that share benefits across countries. Vitally, these structures should include ongoing forums like TF-CLIMA which allow ministers responsible for environment, finance and industry to come together to advance coordinated action.

In aligning economic development with climate action, green industrial strategy must necessarily incorporate a global lens. The 1.5°C goal will not be reached if high-income countries achieve their NDCs and others (especially large economies) do not. Just as it is vital for states to embed sustainability and equity principles in the design of domestic industrial strategy tools, institutions and partnerships, global collaboration and trade relationships should also safeguard and reflect these principles. Global climate goals will not be achieved without proactive global collaboration.

BOX 4 **Carbon Border Adjustment Mechanism**

The EU Carbon Border Adjustment Mechanism (CBAM) entails levying a carbon tariff on goods imported into the EU to reflect the cost of the carbon emissions embedded in various products. The purpose of CBAM is to avoid carbon leakage—the shifting of the production of carbon intensive goods to non-EU countries.

CBAM is part of a broader package of policies within the EU that are intended to facilitate the green transition through industrial strategy. Similar regulations already exist for countries inside of the EU. CBAM aims to ensure that the carbon price of imports is equivalent to the domestic carbon price (European Commission, 2024). CBAM is aligned with WTO rules, meaning that it cannot treat imported goods less favorably than the same goods produced domestically. The European Commission argues that putting a global price on carbon intensive goods encourages global improvements in industrial production and represents a concrete step by the EU towards net zero (European Commission, 2024).

However, critics of CBAM say that such policies by high-income nations may diminish prospects for consensus on collaborative climate action. According to UNCTAD, a carbon tax of USD 44 per ton could increase income in high-income countries by USD 2.5 billion, while reducing income in low- and middle-income countries by USD 5.9 billion due to a projected 1.4% decline in exports to the EU (UNCTAD, 2021). Another global study on CBAM's implications for low- and middle-income countries highlighted that they are particularly vulnerable to negative externalities from their major trading partners' environmental policies, given their heavy reliance on exporting natural raw materials (Rumble & Gilder, 2024). In a scenario where all exports to the EU are covered by CBAM and at a carbon price of EUR 87 per ton, African exports to the EU could be reduced by 5.72% (Pleeck & Mitchell, 2023). The head of the African Development Bank (AfDB) warned that CBAM would negatively affect Africa's development and economic growth, despite the fact that Africa only accounts for 4% of global carbon emissions (Adesina, 2023). The African Climate Foundation's economic assessment concluded that, in its current form, CBAM could reduce Africa's GDP by 0.18-0.91%, and that some of the least developed countries (LDCs) in Africa would be among those most impacted by its implementation, while if CBAM was to be expanded to all

imported goods, there would be a moderate to large negative impact, in the range of 1.5-8.4%, on the GDP of 11 African LDCs (African Climate Foundation & LSE, 2023).

While CBAM represents a powerful tool for the battle against climate change, more could be done to mitigate adverse effects on other economies—for example, through a differentiated approach that considers varying levels of development and through financial and technical support to help low- and middle-income countries to meet the EU’s carbon standards.

Section 2 Recommendations

1. All G20 states should adopt ambitious green industrial strategies to drive sustainable, inclusive economic growth. While the design of these strategies will be specific to each country, instead of picking sectors, they should be oriented around clear, bold climate goals or “missions”, drawn from NDCs, to catalyze cross-sectoral investment, innovation and transformation, as well as engagement at all levels of government and across civil society.
2. In line with the mandate of TF-CLIMA, G20 countries should shift towards a whole-of-government approach in their response to the climate crisis, recognizing that responsibility for climate action is shared by all ministries, including ministries of health, industry and finance.
3. Green industrial strategy should be enabled through changes to the design of country-level governance structures (prioritizing centralized governance and cross-ministerial collaboration), policy tools (like procurement), and public institutions (like SOEs), to bring them into alignment with green industrial strategies. Industrial strategy should include a reorientation of existing subsidies—including fossil fuel subsidies—away from carbon-intensive activities and towards sustainable ones.
4. Climate action requires breaking down the false dichotomy between public and private action: governments and businesses should work in partnership to tackle climate change and deliver public value. Subsidies, grants and loans provided to the private

sector can become levers for a just, sustainable transition if they are conditional on, for example, climate-aligned investment, commitments to fair wages, good quality jobs, and worker training, as well as risk and reward sharing.

5. The G20 should explore the development of new global governance structures that enable national-level green industrial strategies while emphasizing global equity, shared ownership, and collaboration around shared climate goals. This could include the creation of a global facility for industrial strategy coordination, potentially housed within a reformed WTO. This facility could provide a platform for dialogue on how to design and coordinate green industrial strategy in a way that is in line with global climate goals while also being equitable and not distortionary.
6. Commitments to equitable green technology and knowledge transfer and to building distributed manufacturing capacity should be scaled up to ensure that all G20 countries are able to advance along new pathways for development that bring urgent climate action together with economic growth goals.

3



Financing the Green Transition

Keeping global temperatures under 1.5°C above pre-industrial levels requires substantial scaling up of green public and private investment that is affordable and accessible to all. The consequences of the current financing gap are most acute for low- and middle-income economies, which lack the fiscal space required to invest in climate mitigation and adaptation, or to realize the transformative potential of a green industrial strategy.

Keeping global temperatures under 1.5°C above pre-industrial levels requires substantial scaling up of green public and private investment that is affordable and accessible to all.

Some of the most vulnerable African countries spend between 3-5% and up to 15% of their GDP on tackling the impacts of climate change (Songwe & Adam, 2023). Projections suggest that climate change could lower African GDP levels by 2-4% by 2040 (Afreximbank Research, 2024). The recent wildfires raging across Brazil and elsewhere illustrate the extent of the resources needed to address the consequences of a changing climate. The climate crisis is increasing the frequency of climate-related disasters at a rate which is worse than scientists originally predicted (IPCC, 2023). Action is urgently needed to build resilience and change habits.

Delivering on climate goals is estimated to require over USD 8 trillion of climate finance each year until 2030, rising to USD 10 trillion after 2030. While sizable, these amounts are achievable (see Myth 4). However, despite consistent growth over recent years, global annual climate financial flows are only around USD 1.7 trillion, most of which is concentrated in high-income countries and China (Songwe et al., 2022; Climate Policy Initiative, 2023).

Meanwhile, public and private finance continues to fund fossil fuel and coal related activities. In addition to public fossil fuel subsidies estimated at USD 7 trillion globally (Black et al., 2023), nearly USD 7 trillion of private finance has continued to enable carbon-intensive energy since the Paris Agreement was signed—a “carbon lock-in” risk bubble that threatens to undermine the green transition (von Dulong et al., 2023; Rainforest Action Network et al., 2024). The

world's eight largest banks spent over USD 1 trillion funding fossil fuels between 2016 and 2023 and in 2023, their investment in coal projects amounted to about USD 95 billion (Rainforest Action Network et al., 2024). In 2022, private finance flows towards activities causing direct harm to nature were estimated to be at least USD 5 trillion (UNEP, 2023c). This ongoing financing of the climate crisis could put climate goals out of reach. On the other hand, redirecting these investments could fill the current climate finance gap.

Directing finance towards climate goals and addressing the inequities in its distribution requires increasing the fiscal space available to governments for green investments, redesigning the global financial architecture to increase the amount of long term concessional finance available and support its effective and just use, to improve the debt resolution framework, to strengthen collaboration between NDBs, regional development banks (RDBs) and MDBs and the private sector—including scaling up inclusive green finance—while aligning the policies of central banks, prudential regulators and supervisors with climate goals. Most of all, achieving climate goals requires G20 economies to take leadership in securing the quantity and quality of finance needed for a global, just, green and resilient transition.

MYTH 4 **“Governments don’t have the resources to address climate needs.”**

Adopting a broader perspective on global spending underscores the possibilities for increasing public investment from high-income economies to help close the climate finance gap: global military spending in 2022 was estimated to reach USD 2.2 trillion (SIPRI, 2024); fossil fuel subsidies worldwide reached USD 7 trillion in the same year (Black et al., 2023); and in 2020 governments worldwide announced approximately USD 11.7 trillion in emergency fiscal measures to address the COVID-19 pandemic (IMF, 2020).

The problem is not the quantity of finance available; it is the willingness of high-income countries to make it available where and when it is needed. If finance can be mobilized to fund wars or address crises like the COVID-19 pandemic, it can also be mobilized to tackle climate change. However, this requires changes to the structure of global governance and finance, to the design of financial tools (Dafermos et al., 2023) and to the approach taken to catalyzing and directing private finance.

MYTH 5 **“Blended finance—using public funds to ‘de-risk’ private investments—is always cheaper than public investment.”**

Blended finance—where public funds are used to “de-risk” green projects by guaranteeing upfront returns or socializing downside risks—is often seen as a pragmatic solution to mobilizing green finance, given perceived challenges for increasing public budget commitments to climate goals (Gabor, 2021).

Yet such financing arrangements are increasingly recognized—including by the IMF—to be more costly over the long run, especially for low- and middle-income countries (IMF, 2015; European Court of Auditors, 2018). Not only do they typically incur significant legal, technical, and consultancy fees, but blended finance arrangements often require governments to assume potentially significant contingent liabilities which may undermine the health of future public sector budgets (Baloyi & Krinsky, 2022). De-risking partnerships may also crowd out more decisive central bank action to align private finance with climate goals (Kedward et al., 2024). Rather than socializing downside risk to enable the private sector to enjoy privatized returns, governments should share in the upside of de-risked green investments. Governments should also ringfence (green) social infrastructure from blended finance. Mobilizing private investments in social infrastructure can often lead to de-facto privatization, through user fees and private ownership, which in turn threatens to worsen inequalities (Gabor, 2021; Simeoni & Kinoti, 2023).

That said, if well designed, blended finance can be beneficial. This instrument could be much more impactful in mobilizing private capital if it were able to leverage better risk management structures at a wholesale, programmatic level.

3.1 HIGH-INCOME COUNTRIES SHOULD LEAD THE WAY IN FINANCING THE CLIMATE AGENDA

The principle of proportionality must guide global efforts to tackle climate change. Responsibility for the bulk of GHG emissions has ebbed and flowed over time. Germany and the UK were once the world’s top emitters, rapidly outstripped by the U.S. from the late

1880s onwards, and since the 1950s China has rapidly risen to the position of the world's largest CO₂ emitter. The biggest emitters now include China, the U.S., India, Russia and Japan. The U.S. and EU are the largest cumulative (historic) emitters (Vigna et al., 2024). This outsized historic contribution to the crisis creates an outsized responsibility for addressing it, captured by the UNFCCC through the principle of Common but Differentiated Responsibilities and Respective Capabilities.

To achieve the 1.5°C target, forward-looking leadership is needed from all countries, in particular today's big emitters. All G20 countries—who are collectively responsible for about 80% of global GHG emissions—should develop NDCs that align with this target and advance the economic transformation required to achieve it. For instance, India, as a middle-income G20 country, has strengthened its NDC to meet the Paris goals (Climate Action Tracker, 2023). Achieving NDC targets will demand cross-sectoral transformation, which requires large-scale investment by all countries (see financial requirements for G20 middle-income countries in the Annex). However, low- and middle-income countries with steeper challenges to overcome in successfully navigating this transition require high-income countries to take swift action to step up their contributions to securing robust climate finance and technology flows to these economies while simultaneously reducing their own emissions. There can be no individual success in this effort; all countries irrespective of income levels can and must play a role in mitigation, adaptation, nature and biodiversity conservation and the provision of finance and technology.

There is currently a massive imbalance in the global allocation of climate finance. High-income countries and China attracted over 90% of the increase in clean energy investment since 2021 (IEA, 2023b). Meanwhile, low- and middle-income countries received less than 3% of total global climate finance in 2020-2021, and only 14% goes to countries other than China (Butler, 2024). In addition, estimates indicate that the cost of adaptation in low- and middle-income countries is currently about 10 to 18 times greater than international adaptation finance flows (UNEP, 2023a). Funding pledged for loss and damage at COP28 (just over USD 700 million) is less than 0.2% of the estimated needs by 2030 (CISL, 2023). Taking a proportionality approach indicates that at least 20% of climate finance should go to countries outside of the G20. Over USD 2.4 trillion is needed for low- and middle-income countries (minus China) annually between

now and 2030, but less than a fifth of this is available today (Songwe & Stern, 2022).

Moreover, costs are typically much higher in low- and middle-income countries: the cost of capital for renewable energy projects, primarily in the form of debt, is on average seven times higher in low- and middle-income countries compared to high-income ones (Butler, 2024).

The availability and cost of capital represents a massive constraint that has only grown in recent years. Higher costs in low- and middle-income countries stem from both real and perceived risks, diverting capital flows towards more stable high-income countries.

Lack of transparency, clarity on methodology, and poorly regulated sovereign credit ratings have locked low- and middle-income countries out of international capital markets, making capital more expensive or even inaccessible (Songwe et al., 2022; Climate Finance Initiative, 2022). Moreover, climate-vulnerable low- and middle-income nations are burdened with a climate risk premium despite contributing the least to historic emissions (Buhr et al., 2018; Beirne et al., 2021; Kling et al., 2021).

Leadership by the G20 on aligning NDCs and financing for a green industrial strategy as well as designing policies to help increase the flow of capital to emerging and low-income economies is essential to achieve the climate targets.

3.2 CREATING FISCAL SPACE FOR INVESTING IN THE GREEN TRANSITION

The bulk of the cost of the climate transition in many low- and middle-income countries will be borne by governments, with the private sector and MDBs playing a complementary role. Country platforms, transition plans and NDCs should play a critical role in identifying priority financing needs and in coordinating global and domestic climate finance. Governments must use all levers to raise long-term affordable finance and create the fiscal space for investments needed to meet the challenge. Green industrial strategy is the key to translating transition

plans and NDCs into clear investment pathways for public, private and multilateral finance.

One tool for creating the fiscal space needed for effective climate action is taxation. Domestic resource mobilization remains the principal source of revenue for many low- and middle-income countries, but collection levels remain low and must be increased. As of 2020, the unweighted average tax-to-GDP ratio was 15.6% for 33 African countries, 19.8% for Asia and the Pacific, and 21.7% for Latin America and the Caribbean, whereas in the OECD this ratio was 34.1% (OECD, 2023c). Measures to increase revenue, while not straightforward, could include enhancing collection, simplifying payment processes, and expanding the tax base through the use of technology and policy, learning from approaches that are being introduced in countries ranging from India to Burkina Faso (Akitobi et al., 2019; Okunogbe & Santoro, 2023). The G20 should prioritize increased technical capacity building for resource mobilization, using instruments such as the Digital Public Infrastructure program announced under the Indian G20 presidency.

In addition to domestic taxation, countries would benefit from international tax reform. The USD 4 trillion required annually to combat climate change and achieve the SDGs amounts to just 1% of global financial assets, which are valued at over USD 470 trillion (UNCTAD, 2024). Yet the current international tax system favors high-income nations' commercial interests, marginalizing low- and middle-income countries and perpetuating historical power imbalances.

In 2022, the Tax Justice Network reported that countries were losing USD 89 billion annually due to tax opacity among the world's largest corporations (Elliott, 2022), while the use of tax havens results in USD 500-600 billion in lost corporate tax revenue each year (Shaxson, 2019). A significant contributor to these losses is Base Erosion and Profit Shifting (BEPS), where multinational companies take advantage of gaps in tax regulations to move profits to low-tax jurisdictions, depriving countries of essential revenues. These illicit financial flows further weaken the fiscal and institutional capacity of low- and middle-income countries, hindering their ability to invest in climate resilience and sustainable development (Mbeki, 2015; UNECA 2022). Reform of the bilateral treaty regime could reduce opportunities for multinational corporations to engage in BEPS.

Global cooperation is also needed to establish equitable standards for taxing wealth, as well as fossil fuel windfall profits, financial transactions, and emissions from shipping and aviation. For instance,

a global financial transaction tax could generate between USD 237.9 billion and USD 418.8 billion annually (Pekanov & Schratzenstaller, 2019). Brazil's proposed international tax on the super-rich is another example of how global tax reform could contribute to expanding fiscal space for climate action (see Box 5).

Some progress has been made but much more is needed. The recently endorsed global minimum tax (GMT) on corporations is expected to raise up to USD 200 billion in additional revenue annually (OECD, 2023a). The new GMT sets a proposed rate of 15% on profits, under the OECD proposal that has gained support from 137 countries and was approved at the October 2021 G20 Summit in Rome, with implementation scheduled for 2024 (Thomson Reuters, 2024). A Task Force was launched at COP28, co-chaired by Barbados, Kenya, and France, which aims to build political support for progressive climate levies to ensure that all industries and individuals contribute fairly to climate financing. These initiatives could provide a robust basis for the increased progressive resource mobilization that is needed to tackle the climate crisis both nationally and globally.

BOX 5 **Operationalizing Brazil's Proposal for a Global Minimum Tax on the Super-Rich**

A GMT of 2% tax on billionaires, currently under discussion by the G20, could generate about USD 250 billion per year, from less than 3,000 individuals, at the global level (EU Tax Observatory, 2024; Zucman, 2024). Gabriel Zucman, a French economist, crafted this policy for a coordinated minimum global tax on ultra-high-net-worth individuals, with support from Brazilian President Luiz Inácio Lula da Silva, the host of the 2024 G20 Summit. Zucman's proposal is similar to the GMT on multinational corporate profits, as approved by the G20/OECD Inclusive Framework in 2021, and it states that its aim is "to offer a basis for political discussions – to start a conversation, not to end it" (Zucman, 2024). In July 2024, Finance Ministers and Central Bank Governors from G20 countries convened in Rio de Janeiro to approve the Ministerial Declaration on International Tax Cooperation, reaching a consensus to "engage cooperatively to ensure that ultra-high-net-worth individuals are effectively taxed". Despite the absence of a concrete global tax agreement and questions over the feasibility of implementation, the declaration is viewed as a significant step towards fairer and more inclusive tax systems (Hughes, 2024).

Carbon markets provide an additional opportunity for countries to raise revenue to finance the implementation of their transition plans. Well implemented resources from carbon credits could help not only national but also local governments to increase their revenue potential. However, the market for carbon credits is segmented, with the compliance markets doing better than the voluntary markets, which suffer from integrity and distributional issues. High-income economies have established compliance systems that generate an average of USD 50 per ton of carbon, while most low- and middle-income countries operate in the voluntary markets where the average price is less than USD 7 per ton. This disparity in pricing is due to the lack of standardized criteria in the voluntary markets and the fragmentation of measurement and verification processes, which are dominated by independent providers (World Bank, 2023b). The ability of low- and middle-income countries to fully benefit will depend on the adoption of compliance mechanisms based on universally agreed interoperable taxonomies (see Box 6).

BOX 6 **Compliance Mechanisms in Carbon Markets**

The compliance carbon credit market is worth USD 900 billion, while the voluntary market is struggling to get over the USD 100 billion mark. Today, only around a quarter of carbon emissions are subject to a price, and the average price is around USD 20 per ton—far below the required levels. Efforts by the Integrity Council for the Voluntary Carbon Market (ICVCM), the main U.S. government agencies, and the African Carbon Markets Initiative are aiming to enhance integrity in the voluntary market through the development and implementation of core integrity principles for carbon markets. This is a welcome step, but more is needed (Wetterbeg et al., 2024). The ultimate goal should be the global adoption of compliance mechanisms based on universally agreed taxonomies. Adoption of International Sustainability Standards Board (ISSB) standards by the private sector, the development of interoperable taxonomies and agreement to use these taxonomies would help to align emission values with price, providing more predictable revenue streams for countries (World Bank et al., 2023). To support this transition, the G20 could task platforms like the Network for Greening the Financial System (NGFS), the International Platform on Sustainable Finance (IPSF), and Finance in Common (FiCS) to collaborate with the ICVCM on proposing a governance framework for a global compliance system by 2025. A just and equitable carbon market should protect Indigenous rights and ensure that the

benefits from carbon credits also reach local communities. Technical assistance will be essential for countries and communities to understand and integrate national taxonomies with global standards (UNDP, 2023).

Beyond taxation, other measures to create fiscal space include on-lending and/or issuance of new climate Special Drawing Rights (SDRs)—a critical instrument to combat systemic economic risks to the global economy posed by climate shocks. There is collective agreement that the climate crisis at its peak will cause a deeper and more severe downturn than the COVID-19 pandemic. Early access to affordable resources would help countries build resilience. SDRs, if monetized, can provide countries, particularly low-income ones, with liquidity for preparedness, adaptation, mitigation, and transformation, as well as for supporting economies during crises. Alternatively, it can help countries shore up their currencies. SDRs were successfully deployed in the past to address the 2008 financial crisis (USD 250 billion) (IMF, 2009), as well as the COVID-19 pandemic (USD 650 billion) (ECLAC & UNECA, 2022). SDRs can help prevent low-income countries from incurring burdensome debts. By reallocating resources from high-income countries to those most in need, SDRs can help to bridge the financing gap, to achieve climate goals and ensure that all countries have the resources to respond to the climate crisis and to implement their climate commitments (see Box 7).

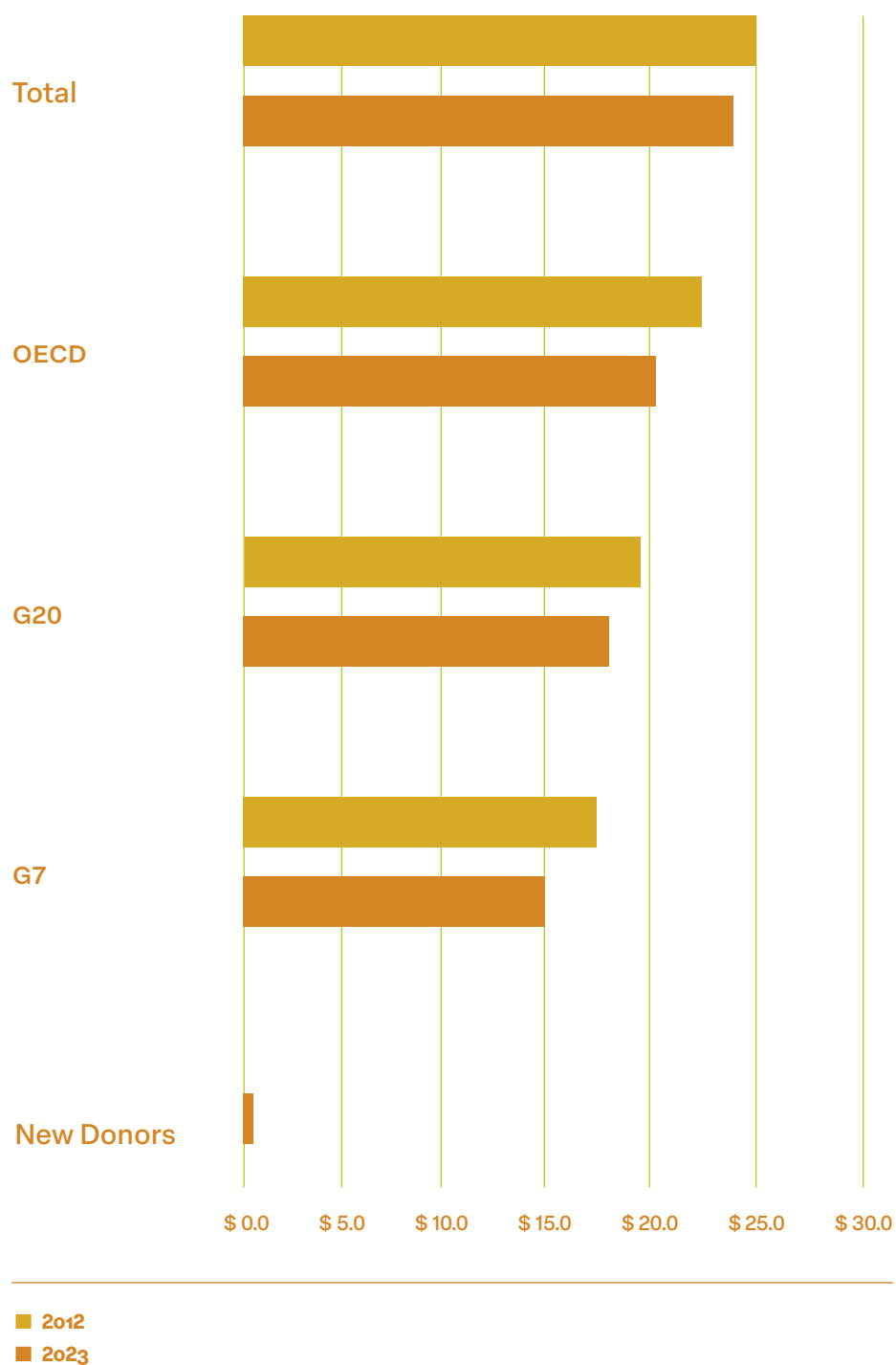
BOX 7 **The IMF and the Use of Special Drawing Rights for Climate Resilience**

The IMF's Resilience and Sustainability Trust (RST) illustrates how SDRs can be effectively leveraged to address climate challenges, with 18 countries having accessed this facility. However, the IMF has faced criticism for the conditionality attached to these funds, which might not be delivering the intended outcome of increasing resilience (Miller et al., 2023). To enhance the effectiveness of SDRs in climate finance, the IMF may need to collaborate more closely with institutions that possess specialized climate expertise. The IMF recently approved the recycling of SDRs to MDBs for use as hybrid capital (Plant, 2024). MDBs can leverage this four-fold, enabling them to increase lending to help countries to achieve both development and climate goals (IMF, 2024).

MDBs and RDBs remain the largest source of affordable, long-term finance—concessional loans and grants—for many low- and middle-income countries. The International Development Association (IDA) remains a vital financing tool, providing grants and highly concessional loans to support development, especially in a challenging macroeconomic environment with rising debt and increasing climate challenges (see Box 8). Unlike most bilateral aid agencies and vertical funds, IDA leverages its equity to provide nearly USD 4 in concessional lending for every USD 1 from donors (Songwe & Aboneaaj, 2023). Its loans are highly concessional, with rates around 1-3% and maturities of 30-40 years, remaining affordable even when global financial conditions tighten, thereby offering critical low-cost liquidity. Nevertheless, IDA's contributions have been consistently dropping since their peak in 2012 (Songwe & Aboneaaj, 2023). While there is increasing agreement that meeting the SDGs and combating climate change are complementary goals to be met without additional resources, many low- and middle-income countries continue to feel they need to choose between climate and development. Adequate resources will allow countries to fund growth-accelerating green industrial strategies at scale, meeting these twin objectives. A robust Poverty Reduction and Growth Trust, IDA and the African Development Fund (ADF) replenishment, adjustments to the MDBs' Capital Adequacy Framework and reforms to the IMF's surcharges and policies on access limits will help these institutions to increase their support to low and middle-income countries.

IDA leverages its equity to provide nearly USD 4 in concessional lending for every USD 1 from donors... Its loans are highly concessional, with rates around 1-3% and maturities of 30-40 years, remaining affordable even when global financial conditions tighten, thereby offering critical low-cost liquidity.

BOX 8 **The Role of the IDA in Preserving and
Enhancing Concessional Financing**

IDA Donor Contributions, by Donor Category (USD billions)

SOURCE: SONGWE & ABONEAAJ, 2023.

African leaders have called for an ambitious USD 120 billion replenishment of the IDA, implying a 15-30% increase in donor contributions, while the World Bank is aiming for USD 100 billion. This means that for the donors an increase between 15-30% will be required. Other sources should be implemented with caution if the aim is to sustain the high level of concessionality; for example, leveraging market borrowing needs care to avoid compromising the concessionality that is essential for the most vulnerable countries. Exploring mechanisms such as shareholder portfolio guarantees could expand IDA's borrowing capacity without undermining its core mission, ensuring that it continues to play a key role in supporting global socioeconomic development.

Given the current economic challenges, sustaining the IDA's critical role in the World Bank's evolving agenda is more important than ever, particularly for climate-resilient infrastructure. While G20 countries are among the top donors, the G7 provides over 50% of contributions. G20 nations should prioritize IDA to ensure finance affordability while advancing MDB reforms.

In addition to providing direct financing, International Financial Institutions (IFIs) can play a role in increasing countries' fiscal space by providing credit enhancement tools which help to crowd in additional resources. A number of innovative instruments exist, including first loss green project development vehicles, debt-for-climate (nature) swaps and Climate Resilient Debt Clauses (CRDCs). These mechanisms offer relief to low- and middle-income countries under the condition that a portion of the funding released supports conservation and adaptation goals (Volz et al., 2020a; Jain et al., 2023). Grenada recently became the first country to trigger a "hurricane clause" in its government bond, allowing it to pause USD 12 million in debt payments following damage from Hurricane Beryl. Integrating climate commitments into sustainable debt offerings should be a key feature of the international financial architecture reform.

BOX 9 **The Bridgetown Initiative and Climate Resilient Debt Clauses**

The Bridgetown Initiative was launched by Prime Minister Mia Mottley of Barbados in July 2022. Its recommendations have gained traction

and hold significant promise for a paradigm shift in the global discourse regarding scaling capital flows and reshaping the financing system to meet the SDGs and spur climate action (Bridgetown Initiative, 2024). This initiative has significantly influenced international discussions, including the UN General Assembly and the UN Climate Change Conferences, as well as the 2023 Paris Summit and the resulting Paris Pact for People and Planet.

CRDCs have emerged as a key element of the Bridgetown Initiative, which seeks to address the urgent financing needs of countries grappling with debt and recurring climate disasters. These clauses provide a vital solution by allowing affected nations to suspend debt payments for up to two years following natural disasters, thereby creating essential fiscal space for recovery efforts. This temporary relief enables governments to allocate resources toward rebuilding without the immediate burden of financial obligations. Unlike traditional insurance, CRDCs remain financially neutral for lenders, ensuring mutual benefits for both parties involved. By integrating these clauses into sovereign debts, countries could unlock substantial liquidity—potentially up to USD 1 trillion—in funding for critical needs, including those arising from the climate crisis.

Finally, increasing the fiscal space available to low- and middle-income countries can be complemented by investments in the state capacity required to direct and deploy green finance. This means developing the capabilities of existing civil servants and attracting talented people to work within government, instead of downsizing government institutions and outsourcing core capacities to big consulting firms—trends that can lead to state capture (Mazzucato & Collington, 2023).

3.3 ALIGNING NATIONAL, REGIONAL AND MULTILATERAL DEVELOPMENT BANKS AROUND CLIMATE GOALS

Public development banks (PDBs) have a vital role to play in enabling economic development aligned with climate goals and the SDGs. NDBs thrive in countries with adequate fiscal space to capitalize them, as well as in countries with the good credit ratings that enable these institutions to access additional capital from

external creditors. When adequately capitalized, NDBs can support governments in the effective implementation of their NDCs, transition plans and green industrial strategies.

Public development banks (PDBs) have a vital role to play in enabling economic development aligned with climate goals and the SDGs.

NDBs hold significant assets, are mandated to finance public goals, and are able to provide the long-term, risk-tolerant finance needed to support economic transformation. However, they have not benefited from the same level of attention as other IFIs. Globally, there are over 500 PDBs. Between 2004 and 2021, they were the second-largest source of finance at the local level (AFD, 2021; CAF, 2023). PDBs manage vast global assets, with NDBs overseeing USD 20.2 trillion and MDBs holding USD 2.2 trillion—in total constituting about 10-12% of global finance (Mazzucato, 2023a).

NDBs are already acting as climate change policy agents. Germany's NDB, KfW, aligns its financing with three "megatrends" including climate change and the environment. This has included, for example, loans to Germany's steel industry that required it to lower the material content of production, thereby helping to catalyze investments in new infrastructure and technologies focused on reuse, repurposing and recycling, helping to give rise to a globally competitive green steel sector (Schreck et al., 2023). Similarly, the Scottish National Investment Bank (SNIB) directs its funding towards three missions, one of which is "[a]chieving a Just Transition to net zero carbon emissions by 2045" (Mazzucato & Macfarlane, 2023; SNIB, 2020). This requires a shift from programmatic approaches, which have dominated the lending of the World Bank and other development banks, towards adopting investment portfolios aligned with key policy priorities that guide all direct and indirect funding mechanisms.

Driving green innovation and stimulating green growth requires patient finance. PDBs specialize in providing such finance, in part because of their ability to take on more risk. Instead of "de-risking" private finance, which has traditionally been seen as the role of public finance, PDBs should *share* both risks and rewards with private actors, benefitting from the upside as well as carrying the losses from the

downside. In this sense, PDBs become lenders of first resort, not only lenders of last resort (Mazzucato, 2023c).

One mechanism that is often relied on, including by PDBs, is blended finance or credit enhancements. If well structured (e.g., to share risk, and to focus on systemic risks through “wholesale” interventions rather than project-by-project “retail” approaches), it can play a valuable role in mobilizing private capital, in particular in low- and middle-income countries burdened by the climate risk premium, and where geopolitical uncertainty and financial instability often hinder investment. Some studies indicate that a USD 1 billion grant could unlock USD 30 billion investment in climate action in medium and low-income economies and have a significant market-making impact (Blended Finance Taskforce, 2023; Climate Policy Initiative, 2023). Others suggest that larger and more effective credit guarantee facilities have the potential to mobilize 6-25 times more financing than loans (Climate Policy Initiative, 2024). Blended finance is a way to leverage risk-tolerant and patient capital to unlock private finance for projects in sectors and geographies that would otherwise struggle to attract funding. There is, however, a risk of overreliance, as blended finance is too often seen as “cheaper” than public investment (see Myth 5).

To direct finance towards green objectives while also prioritizing equity, PDBs should attach conditionalities to public funding agreements with the private sector. This use of conditionality is different from the widely criticized IMF and World Bank conditionalities of the 20th century, which reduced the fiscal space of low- and middle-income countries. For example, reciprocity-based and mission-aligned conditionalities could require businesses accessing public funding to pay workers a living wage, avoid excessive use of stock buybacks and green their supply chains.

NDBs are deeply rooted in the national context, with deep knowledge of and close proximity to local markets, enabling them to effectively expand domestic project pipelines and to engage the private sector directly and continuously at every stage of project development (OECD, 2019). However, in low- and middle-income countries in particular, they face constraints in access to capital and challenges in attracting private investors to key projects that may lack positive cash flows or attractive returns, indicating that there is scope for greater involvement of MDBs.

MDBs can empower and assist NDBs in enhancing their capacity to access low-cost capital (Volz & Lee, 2024). For NDBs to catalyze

the green transition and leverage stakeholder capital effectively, they must secure competitive refinancing rates. However, they face significant challenges. Funding costs for financial institutions in low- and middle-income countries are constrained by a sovereign ceiling effect that directly impacts their cost of capital, hindering the potential contribution of nationally owned NDBs. MDBs could assist NDBs in securing more favorable refinancing terms by providing equity, enhancing governance and building capabilities (where needed), and boosting confidence in capital markets. The World Bank recently partnered with the Development Bank of Rwanda to issue a sustainability-linked bond, and it is supporting the Kenya Development Corporation in setting up green funds to expand equity financing for green business ventures (World Bank, 2023a). Another option that could be considered is MDBs offering callable capital in exchange for seats on an NDB's board, maintaining government ownership while potentially enhancing the NDB's credit rating. Additionally, MDBs can provide guarantees to help NDBs issue local currency debt more affordably and in larger volumes (Volz et al., 2024). All of this aligns with the New Delhi Leaders' Declaration commitment on MDBs, which committed to "[p]ursue reforms for better, bigger, and more effective Multilateral Development Banks (MDBs) to address global challenges and maximize developmental impact" (Indian G20 Presidency, 2023).

Relatedly, credit rating agencies often align the rating of individual projects with the sovereign rating of the country in which they are located, regardless of the project's financial structure or potential risk mitigation measures. This practice contributes to a significant disparity in country risk premiums, which serve as a proxy for the cost of capital for infrastructure projects: the premium is 8.1% in non-OECD countries compared to just 1.5% in OECD countries (Climate Finance Initiative, 2024).

In addition, the 100% capital buffer imposed on development institutions can make it difficult and too costly for MDBs to collaborate with NDBs or extend credit enhancement instruments to these organizations for essential green projects (Inter-American Development Bank, 2023). The G20 should task prudential regulatory bodies with differentiating between de-risking instruments, such as guarantees and other first loss products deployed by commercial organizations, and those deployed by development institutions.

BOX 10 **BNDES—The Brazilian Development Bank**

BNDES is a 100% state-owned company with a mandate to act as “the main instrument of implementation of the investment policies of the Federal Government” with its primary objective being “to support programs, projects, works and services related to social and economic development” (BNDES, 2019).

Since its creation in 1952, BNDES has played a key capital development role by financing the major infrastructure projects, industrial expansion and the mechanization of agriculture in Brazil. In the 1980s, its support expanded into the energy and agribusiness sectors, as well as the integration of social concerns with development policy. In 2008, BNDES established a new mission to “foster sustainable and competitive development in the Brazilian economy, generating employment while reducing social and regional inequalities” (BNDES, 2018). This strategy stipulates that BNDES’s investments should be guided by key challenges, including socio-environmental development. The evolution of BNDES’s programs has closely followed the Brazilian government’s industrial policy strategies.

BNDES’s equity investments have established a strong link between risk-sharing and reward-sharing. The upside gained from successful investments contributes to BNDES’s profits, which translate into dividends to the Brazilian Treasury and returns to the Brazilian Workers’ Social Security Fund (FAT).

Since the late 1990s BNDES has also sought to promote environmental sustainability, and its support for the green economy has dramatically increased. Between 2003 and 2017, BNDES financed more than 90% of the total investment in wind power generation, according to estimates based on data from the Brazilian Energy Agency (ANEEL) (Brasil Innovation Lab for Climate Finance, 2017).

BNDES’ Climate Fund has become the Government of Brazil’s main instrument for fighting climate change, through financing climate change mitigation and adaptation projects. In April 2024, the Brazilian government committed to transfer up to BRL 10.4 billion to the fund, significantly increasing the fund’s financing capacity, and making it one of the largest climate funds in the world. BNDES’ Climate Fund is resourced in part through the issuance of USD 2 billion in sustainable sovereign bonds on the international market by the Ministry of Finance in November 2023. Its focus areas include: resilient and sustainable urban development; green industry; transport logistics,

public transportation and green mobility; energy transition; native forests and hybrid resources; and green services and innovation (Planalto, 2024).

This case draws on Mazzucato & Macfarlane, 2023—reproduced with permission.

Country platforms can be used to pool, structure, and direct finance towards national and regional climate objectives drawn from NDCs and the SDGs, to align MDB and NDB efforts around shared regional climate challenges, and to embed conditionalities that ensure that the efforts of private sector recipients contribute to those priorities. Lessons from the Just Energy Transition Investment Plan (JET-IP) model could inform how this happens (see Box 11).

BOX 11 **South Africa's Just Energy Transition Investment Plan**

Launched in 2021 at COP26, South Africa's JET-IP is a strategic initiative aimed at guiding the country towards a more sustainable and equitable energy future. JET-IP is part of South Africa's broader commitment to addressing climate change, reducing GHG emissions, and transitioning from a heavy reliance on coal to a cleaner, diversified energy mix (Presidency of the Republic of South Africa, 2022). South Africa has been heavily dependent on coal for electricity generation, which has resulted in high levels of carbon emissions, air pollution, and other environmental issues. The country is also facing energy insecurity due to aging infrastructure and frequent power outages.

Partnerships have been established between South Africa and the EU, Germany, France, the UK, the U.S, with investment announcements that amounted to USD 8.5 billion (Vanheukelom, 2023). Partnerships have been established between South Africa and the EU, Germany, France, the UK, the U.S, with investment announcements that amounted to USD 8.5 billion (Vanheukelom, 2023). The plan is centered on the following objectives: decarbonization, economic resilience, social equity and energy security.

Financing for the South African JET-IP is broad-based, with the Government of South Africa and the Development Bank of Southern Africa (DBSA) working with IFIs, bilateral partners and the private sector to meet the needs of the plan.

Komati, the oldest South African coal-fired power station, was the first to undergo a joint project transformation. The plant has been converted to produce solar energy, albeit at a reduced capacity. Additionally, an experimental project has been established to develop containerized mini-grid solar systems, along with a training center. Across more than sixty municipalities, efforts are underway to enhance energy efficiency and promote localized energy generation (Vanheukelom, 2023).

Implementing the JET-IP has been challenging. The Presidential Climate Commission raised concerns with the slow pace of funding availability and the limited scope of the transition (PCC, 2023). Social movements and trade unions have criticized the lack of representation of workers and insufficient protection in an unequal dynamic of foreign investment (Lenferna, 2023; McNamara, 2024). While it has faced challenges, the JET-IP model provides valuable lessons for informing future efforts to mobilize green finance through country platforms.

3.4 DEBT AS A GLOBAL THREAT TO CLIMATE RESPONSE CAPACITY

Subdued growth, tight fiscal conditions and rising debt burdens are compromising the attainment of the 1.5°C and net zero Paris Agreement targets. The succession of crises from 2020-2023—COVID-19, food and price increases, supply chain disruptions, the war on Ukraine, the war in the Middle East and rising inflation—slowed global growth. High and low- and middle-income countries have all been scarred, but the latter are suffering the most.

The external debt of low- and middle-income countries exceeded USD 29 trillion in 2023, with nearly 60% of the world's poorest nations either in or at high risk of debt distress. In 2023, interest payments on debt by low- and middle-income countries reached USD 847 billion, a 26% increase compared to 2021 (UNCTAD, 2024a), reducing net resource transfers and limiting fiscal space for investments. Between January 2022 and March 2023, African currencies depreciated by 8%, resulting in a 10% increase in debt to GDP ratios and raising the cost of imports. Some 80% of external debt in low- and middle-income economies is held in U.S. dollars (Dodd & Rivera, 2023). No IDA-eligible country issued bonds in 2023 (Properzi, 2023) and private capital outflows totaled USD 203 billion, while IFIs failed to offset these losses. Net

resource transfers turned negative, and concessional flows through MDBs were minimal.

Social services and climate programs have borne the brunt of debt crisis. The diversion of limited resources towards debt servicing is contributing to a lack of fiscal space that directly undermines countries' ability to manage climate-related shocks and finance green economic transitions (Volz et al., 2020a; Jain et al., 2023; Diwan & Songwe, 2024). Even when public investments in green infrastructure like sea walls and flood defenses could substantially reduce future loss and damage, low- and middle-income countries often lack the fiscal space needed for these investments. Moreover, a significant portion of climate finance provided to these economies comes in the form of additional debt, which only serves to exacerbate medium-term credit risks.

The diversion of limited resources towards debt servicing is contributing to a lack of fiscal space that directly undermines countries' ability to manage climate-related shocks and finance green economic transitions.

These challenges underscore the urgent need for a revamped global financial architecture that supports climate action without further straining already limited budgets. This entails addressing liquidity and debt constraints and significantly increasing both the volume and quality of financing available to low- and middle-income countries, enabling them to invest in and transition towards resilient, net zero economies in a fiscally sustainable manner. The continuation of a purely incremental approach will not achieve the transformative change necessary for a sustainable global future. Simply keeping countries afloat will only worsen the problem, which risks further eroding trust in the multilateral system.

Debt financing and restructuring need to be viewed as tools for growth and resilience, and not only for stabilization and reduction of indebtedness levels. Resolving the sovereign debt crisis requires comprehensive and coordinated efforts on a global scale. Under India's G20 Presidency in 2023, recommendations were put forward that emphasized the urgent need for additional resources as well as cooperation at the Global Sovereign Debt Roundtable (Summers & Singh,

2023). Improving the speed of implementation of the G20 common framework is central to this process. Low- and middle-income countries that do not need debt relief but do suffer from liquidity constraints require rapid coordinated liquidity solutions that provide ample, affordable and sustained resources to support long term green growth strategies.

COP28 marked a transformational shift in the narrative around climate investments, taking a crucial step in bringing climate and development together. For the first time, key world leaders representing a significant share of global GDP came together in Dubai to launch the Global Climate Finance Framework—an overarching vision that frames investments in climate action as an unprecedented opportunity for economic growth and shared prosperity. A loss and damage grant fund was created to help countries access grant funding rather than debt to build resilience, and a private-sector fund, Alterra, was seeded with over USD 35 billion to support green industrialization.

The G20 can play a critical role in driving this emerging narrative, which focuses on the growth-enhancing opportunity of the green transition as opposed to emphasizing the debt burden and risks of climate investments.

3.5 GOVERNING GREEN FINANCE EQUITABLY ON A GLOBAL SCALE⁵

Countries with healthy finances and macroeconomic balances generally have thriving small and medium-sized enterprises (SMEs). In addition, well-articulated and costed NDCs, transition plans and green industrial strategies allow SMEs to identify areas in the value chain where they can contribute and thrive. Conversely, poorly managed transitions could have a disproportionately negative impact on SMEs.

5. In the report, we address equity in finance holistically, even as we acknowledge the nuances within this debate. For instance, we highlight two interwoven yet distinct dimensions of this issue during the climate crisis: the vulnerability of affected populations and the empowerment of SMEs. The vulnerability dimension relates to the need for support for marginalized communities and social protection, while the SME empowerment dimension focuses on enhancing access to financial resources and growth opportunities. Although distinct, both dimensions can converge in the pursuit of an equitable financial system that benefits all segments of society during the green transition, ensuring that efforts to promote inclusion do not leave anyone behind.

SMEs and lower-income households are often disproportionately exposed to the physical risks and effects of local and global environmental change (Chancel et al., 2023; Hallegatte et al., 2015; Volz et al., 2020b). Climate change and environmental impacts affect firm productivity and the reliability of collateral, resulting in SMEs and vulnerable households being classified as higher-risk customers (Volz & Knaack, 2023). Due to concerns with profitability in terms of risk-adjusted returns, financial institutions may charge higher rates for their services, or not offer them at all (UNEP FI, 2002). Studies indicate that climate vulnerability has already increased financing costs for firms and has made access to finance more difficult (Kling et al., 2021). These issues are particularly concerning for SMEs, which have scarce recourse to capital markets, and often struggle to access financial services.

Transition risk can also adversely impact financial inclusion (Volz & Knaack, 2023). Environmental policies, new technologies, and changes in consumer and investor sentiment may lead the financial sector to withdraw support from “dirty” polluting sectors. Although divesting from environmentally harmful activities is needed, this shift could affect SMEs more than large firms which have better access to private equity and alternative sources of funding to invest in clean technologies.

Moreover, financial-sector and other policies designed to advance the transition to a low-carbon economy may have unintended consequences. For instance, with new regulatory requirements such as the EU’s Corporate Sustainability Reporting Directive and voluntary standards such as the ISSB S2, there is a risk that SMEs with limited capabilities in carbon accounting will not be eligible for contracts as global corporations respond to new Scope 3 disclosure requirements (Haahr & Volz, 2024). Also, without carbon accounting, SMEs are likely to pay a higher risk premium on bank credit and get excluded from cheaper green and transition finance. Moreover, SMEs may struggle to afford green credentials, such as a sustainability assessment by third parties, which could hinder their access to green financing channels even when their activities are environmentally sound. Consequently, despite being well-intentioned, green (finance) policies may exacerbate financial exclusion.

Financial exclusion not only hinders vulnerable groups and sectors from safeguarding themselves against the impacts of environmental change and improving their resilience, but it also limits the scope for effective mitigation strategies. When a substantial share of the population and economy is excluded, unwilling or unable to adapt to and mitigate climate change and environmental degradation, their vulnerability to economic shocks increases, with potentially material

negative repercussions for financial stability. In this “unjust transition” scenario, social inequity and exclusion from economic opportunities may also foster political dissatisfaction and resistance to environmental policies (Volz & Knaack, 2023).

Policymakers must adopt an equity lens to facilitate a just transition, ensuring that those at the economic base have access to adaptation and transition finance (Volz & Knaack, 2023). For instance, policymakers should aim to mitigate certain financial risks involved in adaptation and mitigation finance by providing support to help vulnerable sectors transform, making sustainable finance affordable, and investing in public information systems to evaluate and certify the sustainability of farmers and SMEs.

Policy makers have various tools at their disposal to support inclusive green finance (see policies for promoting inclusive green finance in the Annex). In harnessing the synergies between green finance and financial inclusion, they can enhance the livelihoods of low-income households and boost the business prospects of SMEs that are willing to invest in line with NDCs, while also supporting climate change adaptation and mitigation, minimizing associated risks for the financial sector.

The G20 Global Partnership for Financial Inclusion, the G20 Sustainable Finance Working Group and the NGFS should work together to develop strategies for enhancing inclusive green finance.

3.6 ALIGNING THE ACTIONS OF CENTRAL BANKS, SUPERVISORY AND REGULATORY AUTHORITIES WITH CLIMATE GOALS

Since 2008, central banks, supervisory and regulatory authorities have effectively adopted a broad range of new policies to improve the way they address systemic risks, safeguarding broad macro stability (Songwe et al., 2022). Additionally, they are increasingly recognizing the need to pay attention to climate risks. For instance, the European Central Bank (ECB), in its 2024 climate and nature plan, states “[t]hat climate and nature-related risks are a source of financial risk is established consensus among central banks and supervisors worldwide” (ECB, 2024a). Importantly the Basel Committee on Banking Supervision (BCBS) has acknowledged climate risk, and its two fundamental categories of risk (i.e. physical risk and transition risk), as potential drivers of all traditional categories of financial system risk: credit risk, market risk, operational risk (BIS, 2023).

Central banks also recognize that “market neutrality” approaches in monetary and financial frameworks possess a carbon bias, creating favorable financing conditions for carbon-intensive activities and exacerbating their negative effects on financial stability (Schnabel, 2021).

Within their mandates, central banks can assume a more proactive role in greening the financial system, moving beyond a primarily microprudential risk focus to an approach that recognizes macroprudential risks and aligns with governments’ climate and sustainability goals.

Central banks largely adhere to a “risk-based” approach, relying on enhanced disclosure by the private financial sector of its own risk perceptions via “stress-tests”, scenario analysis and a de-risking role to correct prices (Kedward et al., 2024). This strategy has not shifted financial flows away from carbon-intensive activities toward green investment at scale, and is unlikely to do so at the necessary pace. In part, this is because climate impacts on the financial sector are subject to radical uncertainty, making it difficult to apply meaningful probabilities to future risks (Chenet et al., 2021).

Within their mandates, central banks can assume a more proactive role in greening the financial system, moving beyond a primarily microprudential risk focus to an approach that recognizes macroprudential risks and aligns with governments’ climate and sustainability goals (Volz, 2017; Dikau & Volz, 2021; Robins et al., 2021; Volz et al., 2022; Kriwoluzky & Volz, 2023). A broad range of policy instruments is available, and the appropriate policy mix will reflect mandate- and country-specific constraints. Policies should ensure they do not undermine capital flows to low- and middle-income countries or unintentionally increase the cost of capital.

Within their mandates, central banks and supervisory and regulatory authorities can foster conditions for mobilizing private financing towards green investments. One way of doing this is to endorse and support the implementation of green interoperable taxonomies and disclosure requirements, to allow the financial sector to assess corporate transition plans based on risk and condition lending support accordingly. Similarly, regulators can use these

metrics to establish capital buffers based on the same risk scenarios. Consistent measurement and management of financial risks associated with exposure to climate risks will allow for improved allocation and policy consistency.

The financial sector can help to bridge between national aspirations and investment outcomes. National transition plans based on NDCs can direct public and private sector investment into furthering the green transition. When extending financing to corporations to support their transitions, the finance sector can internalize the green ambitions of governments and of its clients. Financial transition plans will mirror the transition plans of the corporate and government clients they serve. Consequently, due to Scope 3 reporting requirements, the financial sector is well-positioned to lead in assessing transition plans, providing essential support to clients, corporates, and governments.

Therefore, the G20 should also encourage central banks and standard-setting bodies to deepen research into the economic impacts of climate change, which would enhance risk analysis models for sovereigns, corporates, and the financial sector itself. Also, as credit rating agencies look to incorporate climate risks into their analysis, robust risk methodology would further help to ensure increased transparency in their ratings.

A consistent approach to transition plan disclosures, including transition-related risks, can increase transparency for market participants, including financial institutions, providing a critical foundation and source of information to improve the existing prudential framework.

Fit-for-purpose prudential regulation can accompany transition plans and industrial strategies, to support more effective monitoring and financing of these plans. Country and corporate transition plans could act as an additional forward-looking evaluation tool to address micro- and macroprudential concerns about transition-related risks and to safeguard the stability of the financial system (Dikau et al., 2024). Prudential regulation will be all the more effective at ensuring the safety and soundness of the financial system if it is aligned with these plans and strategies.

Building on the efforts of the NGFS and the BCBS, the G20 can explicitly support the ISSB standards and promote adoption by central banks and regulatory authorities for mandatory implementation by banks. Once central banks and banking regulators adopt ISSB standards (see Box 12) and announce a timetable for banks to disclose climate data according to International Financial Reporting Standards (IFRS) S2, significant progress can be made by banks and their borrowers in enhancing the transparency of their asset allocations and risks related to climate change. Such transparency will in turn become an important driver for the reallocation of financial assets towards sustainability. The G20 should support BCBS efforts in implementing this process as well as tasking central banks and regulatory authorities to address the need for data to measure climate risks.

However, the ISSB focuses solely on financial materiality, considering information that impacts investors' decisions. It will be important to enhance ISSB standards where appropriate to incorporate double materiality, which also considers the impact of an entity's activities on the environment and society.

BOX 12 **Equity Markets Move to Adopt New Financial Sustainability-Related Disclosures**

On July 25, 2023, the International Organization of Securities Commissions (IOSCO) decided to endorse the sustainability-related financial disclosure standards issued by the ISSB (IOSCO, 2023a; IOSCO, 2023b). After two years of discussions and engagement, IOSCO concluded that the ISSB's standards offer an effective global framework for investor-focused climate and sustainability disclosures, facilitating accurate risk assessment in financial markets and providing a strong foundation for robust assurance frameworks (IOSCO, 2023a). This is significant not only because it enhances the credibility of these standards but also because IOSCO's 130 member countries regulate over 95% of the world's financial markets (IOSCO, 2023b). Recognizing that jurisdictions have varying domestic arrangements for implementing international standards, IOSCO urged its members to explore methods for integrating or adopting these standards within their frameworks to ensure consistent and comparable climate and sustainability disclosures, recommending both compulsory implementation and voluntary adoption in the absence of existing frameworks (IOSCO, 2023a). Since then, IOSCO has also

directed efforts toward building capacity in these jurisdictions to facilitate the implementation of the ISSB's standards (IOSCO, 2024).

It is both feasible and necessary to include specific climate disclosure elements in Basel II Pillar 3 disclosure requirements, and the BCBS as the standard setter can lead this initiative. Such a convening effort can overcome hurdles to cross-border green capital flows—which are critical to many low- and middle-income countries' sustainability agendas—while helping to address the current lack of international coordination in sustainable finance standards and disclosure requirements.

Disclosure standards based on interoperable taxonomies are a necessary requirement for robust transition strategies. They would provide a common framework for risk measurement across geographies and support the harmonization of relevant prudential standards.

Disclosure also helps to refine risks for the financial sector, investors and countries, allowing for better sequencing of national and corporate transition plans. Once risks are known, it is easier to refine and improve on the risk scenarios needed to meet the capital and solvency requirements of Basel II Pillar 1⁶.

Like in other Basel framework provisions, the principles of proportionality could be applied to allow countries and corporations to phase in different disclosure classes as they develop the appropriate

6. These requirements may represent barriers to finance availability. They include rating agency methodologies that inflate costs and hinder capital deployment, inconsistent treatment of transactions across jurisdictions, and the handling of risk mitigation features associated with blended finance transactions and de-risking instruments within the Basel framework. Prudential regulators should ensure uniform capital treatment across jurisdictions for instruments like A/B loans that offer preferred creditor status and currency control privileges, as well as concessional capital and de-risking instruments from MDBs, DFIs, ECAs, or insurance companies. Furthermore, capital rules should be reformed to adequately reflect the risk mitigation features of these products in the calculations, resulting in reduced capital requirements for investments in low- and middle-income countries.

capacity. With appropriate disclosure standards, capital provision imposed on insurers for infrastructure projects can be solely based on risk and climate-based assessments—and not on geography as is the case currently, where capital buffers for OECD countries are 29% as opposed to 49% for non-OECD countries (Basel III).

Beyond other actions to advance robust global standards and disclosure requirements (see Box 13), the G20's engagement with relevant international organizations, standard-setting bodies and initiatives is also crucial for accelerating the transition to net zero and improving capital allocation for transition plans. For instance, expedited efforts on the part of the BCBS, ISSB, NGFS and IEA could help to integrate climate risk disclosures into the Basel framework, building upon ISSB standards to establish a common, interoperable disclosure framework for transition plans—ensuring that the prudential framework is suited to current needs.

Also, the G20 could support the BCBS in implementing mandatory yet proportional interoperable disclosure requirements in three critical areas of IFRS S2: (i) the exposure of assets to green or sustainable investments versus carbon-intensive assets; (ii) the outcomes of climate risk analyses; and (iii) the transition plans of banks.

Thirdly, the G20 could direct relevant international organizations, standard-setting bodies and initiatives to establish working groups focused on evaluating risks to the resilience of the financial system across short, medium, and long-term transition scenarios. This effort could achieve several outcomes, such as promoting the interoperability of sustainable finance taxonomies by partnering with the IPSF; developing climate risk scenarios that enhance the international comparability of results from climate stress tests and scenario analyses through collaboration with the NGFS and IEA; and fostering greater consistency and comparability in the transition plans formulated by banks and their clients across various jurisdictions by engaging with initiatives like the Science Based Targets Initiative (SBTI) and Transition Plan Taskforce (TPT).

Finally, the G20 should recommend that the BCBS leverage the ongoing revision of the climate risk framework to examine and address other barriers present in the Basel framework, particularly under Pillar 1, Solvency II, and other capital requirements that affect deployment of capital.

BOX 13**Actions to Advance Risk Based Global Climate Standards and Disclosure Requirements**

The G20 should back and build on existing calls for clear and robust climate standards and disclosure requirements. This could include the following measures:

Mandatory Climate Data Disclosure: Central banks and banking regulators should adopt the ISSB standards and establish a clear timeline for banks to disclose climate-related data according to IFRS S2. This transparency will drive the reallocation of financial assets towards sustainability.

Facilitation of Cross-Border Green Capital Flows: The BCBS should convene efforts to overcome hurdles to cross-border green capital flows, particularly by harmonizing international standards in sustainable finance and disclosure requirements.

Development of Interoperable Taxonomies: A global framework of interoperable green taxonomies is essential to provide certainty and consistency in investment and financing, supporting the harmonization of prudential standards and enhancing climate risk management in the financial sector.

Proportionate Implementation for Low- and Middle-income Countries: Low- and middle-income countries should benefit from proportionate implementation of disclosure standards, allowing them to phase in to different disclosure classes as they develop the necessary climate reporting capacity.

Coordination for Enhanced Data Comparability: Task the Bank for International Settlements (BIS), BCBS, and NGFS with creating working groups focused on enhancing the comparability of exposure data, climate risk analysis, and financial sector transition plans across jurisdictions, ensuring consistency and interoperability.

Review of Basel Framework Frictions: Recommend the BCBS to review and address frictions within the Basel framework—particularly under Pillar 1—solvency requirements and other capital regulations, to ensure they are risk based and do not disproportionately impact deployment of capital to some jurisdictions.

Reform of Capital Rules to Account for Special Status of IFIs and MDBs: Prudential regulators should ensure conformity in capital treatment across jurisdictions, particularly for instruments like A/B loans, concessionary capital, and de-risking instruments, to improve alignment of capital requirements with risk; this includes reviewing treatment of IFIs under this framework.

Going further, G20 countries should scale up existing strategies to decarbonize financial and monetary policy (see Boxes 14 to 16)—specifically the collateral framework used by central banks to provide liquidity to the private sector and their unconventional monetary interventions in corporate bond markets (Dafermos et al., 2023). This is essential both to climate-align central banks and to scale up climate finance.

Central banks could—within their mandates—introduce targeted refinancing operations to incentivize climate investments (van't Klooster & van Tilburg, 2020; van't Klooster, 2022; Kriwoluzky & Volz, 2023). In the current high-interest-rate environment, such interventions could directly contribute to achieving central banks' price stability goals. By introducing a special green refinancing instrument, for instance, central banks could, within their mandates, facilitate targeted investments in renewable energies and energy efficiency, reducing the risk of future inflation shocks from fossil fuel price increases (Kriwoluzky & Volz, 2023).

Expanding investment in renewable energy and energy efficiency helps curtail carbon emissions and reduce inflation rates and their volatility. A range of options is available to central banks to adjust their monetary policy frameworks, depending on the specific local context and their mandate (see NGFS recommendations in the Annex).

In addition, central banks and prudential regulators could deploy existing macroprudential policy toolkits to address systemic risks related to climate change with possible adjustments to reflect the distinctive features of these risks—including the long time horizon over which they may materialize, their strong dependency on the pace and direction of the low-carbon transition, and the need for specific data along with forward-looking measurement methodologies required to manage them (Hiebert & Monin, 2023). In particular, they could embrace a longer time horizon in order to account for tail risks and cliff effects.

Given the limitations of measuring, quantifying and disclosing climate-related financial risk, financial authorities should instead adopt a rationale of precaution and prevention in response to potential catastrophic risks posed to macrofinancial systems by climate change, including environmental tipping points such as the melting of polar ice caps or the die-back of the Amazon rainforest (Chenet et al., 2021; Marsden et al., 2024). A precautionary approach towards environment-related risk is a natural extension of macroprudential policy, which acts through elongating risk horizons to allow for pre-emptive measures designed to mitigate systemic financial risks that cannot be estimated by individual financial institutions before they materialize and any self-adjustment by market players.

Building on this, central banks and prudential regulators should also review and assess cliff effects, financial stability risks, and carbon biases induced by short-term time horizons built into key parameters of the first pillar of the global prudential framework. They could also consider the extent to which strong reliance on external corporate credit ratings to determine bank capital requirements could reinforce these biases and risks. Here too, longer time horizons could be considered. The BCBS should also assess the extent to which these shortcomings may be addressed by consistent transition plan disclosure throughout the private sector, and consistent, reliable and transparent incorporation of transition plan-related information into corporate credit ratings (Kammourieh & Vallée, 2021).

Prudential regulation to mitigate climate risks needs to be proportionate to avoid an undue burden on SMEs, to avoid adverse impacts on the access of SMEs to adaptation, mitigation and transition finance (Volz & Knaack, 2023). Disclosure of transition plans and of scope I, II, and III emissions could be used to inform a more nuanced risk assessment and to direct capacity support and design programs geared towards promoting transition plans that will boost resilience. Governments and supervisors need to make sure that disclosure requirements are proportionate, and that SMEs will receive appropriate support in complying with new requirements (see Box 14).

BOX 14 **Bank Negara Malaysia's Low Carbon
Transition Facility**

In 2022, Bank Negara Malaysia (BNM), the central bank of Malaysia, launched a new Low Carbon Transition Facility (LCTF) under its fund for SMEs (BNM, 2024). LCTF is a financing facility to encourage and support SMEs to adopt sustainable practices for business resilience. SMEs in all sectors committed to transforming towards low carbon and sustainable business activities are eligible to access the LCTF. The LCTF offers attractive financing rates and can be used to fund capital expenditure or working capital aimed at starting or facilitating the transition to low carbon and sustainable practices. Such operations include activities such as obtaining sustainability certification; increasing the use of sustainable materials for production; improving energy efficiency of buildings and appliances; and installing on-site generation equipment of renewable energy (BNM, 2022).

Finally, in line with a green financial stability and risk aligned macroprudential policy regime, financial authorities could adopt green credit allocation regimes that direct credit to priority sectors and repress dirty financial flows (Kedward et al., 2024). High-income countries can potentially learn from the experiments in low- and middle-income countries, where “green credit guidance” has shown that central banks can play a strong role, in line with mandates, in fostering green growth and from the post-war period when credit policy was commonly used to support industrial strategy in high income economies (Dikau & Ryan-Collins, 2017).

BOX 15 **The Role of the PBOC in Promoting Green Finance in China**

China has developed the world’s largest green lending market with outstanding green loans at RMB 33.8 trillion (equivalent to about USD 4.7 trillion) and the world’s largest green bond market with outstanding green bonds at RMB 2.2 trillion (equivalent to about USD 300 billion) as of mid-2024 (Zhang et al., 2024). Between 2016 and 2023, China’s green loans grew at an annual average rate of 20.8%, 9.5% faster than the overall loan growth in the country (The State Council of the People’s Republic of China, 2024).

Measures taken by the Chinese central bank—the People’s Bank of China (PBOC)—to drive green finance development have played a significant role in this growth. Since 2015, the PBOC has taken a number of measures to promote green finance, covering taxonomies, disclosure requirements, policy incentives, product innovation, green verification, and guidance on risk analysis (Nedopil & Song, 2023).

First, the PBOC developed a green finance policy framework which included mechanisms for coordination with other ministries. In 2016, under the leadership of the PBOC, seven ministries jointly published China’s green finance guidelines which set out 33 policy measures/incentives from fiscal, monetary, banking, securities, insurance, industrial and environmental regulators and a coordination mechanism.

Second, it developed official green finance taxonomies and made it mandatory for banks and bond issuers to use them. Over 200 green activities were included in official green loan and green bond taxonomies developed by the PBOC, and all banks are required to report the volume, growth, and environmental benefits of green loans/bonds to the PBOC on a regular basis. The mandatory adoption of official

taxonomies helps to prevent greenwashing and provides the basis for product labelling, green performance measurement, and allocation of incentives for greener banks, projects and companies.

Third, it provided a low-cost funding facility—the PBOC carbon emission reduction facility—to incentivize green investments by the private sector. In 2021, building on the green re-lending facility introduced earlier, the PBOC launched this new funding facility with an annual interest rate of only 1.75%—much lower than market rates—to support green projects such as renewables, industrial decarbonization and CCUS. This measure substantially boosted private sector participation in renewable projects.

Fourth, it put in place a green bank evaluation system to incentivize green banking. In 2018, the PBOC introduced a green lending evaluation system, which in 2021 was upgraded to a green bank evaluation system. This system evaluates the “green performance” of commercial banks by measuring the growth rates and percentages of green assets they hold (including green loans, green bonds and other green securities). The results are communicated back to the banks being evaluated and this mechanism has served as another incentive for banks to seek stronger green finance business growth.

Fifth, it organized regional green finance pilots to promote innovative green finance solutions. In 2017, the PBOC launched eight green finance pilot cities to encourage innovation at the local level. In the past six years, some of the pilot cities have established digital green finance platforms that efficiently matched large volumes of green financing and green projects, substantially reduced costs of data collection/verifications and transactions, and launched hundreds of innovative green finance products.

These PBOC policies have played a critical role in defining green activities and preventing greenwashing, enhancing the transparency of green transactions, reducing the funding costs of green projects, providing incentives for greener banks, reducing the costs of data and verifications and encouraging local innovations.

Several high-income economies already implement quantity-based limits on credit allocation for macroprudential purposes. Imposing lending caps or outright exclusions on selected activities incompatible with the climate transition—including coal-fired power generation and the development of new oil and gas reserves—would be the most straightforward approach of managing credit flows to

legacy industries. The extension of existing public taxonomy initiatives to classify activities that are “always significantly harmful” and “where urgent, managed exit/decommissioning is required”—as proposed by the EU Platform on Sustainable Finance (EU Platform on Sustainable Finance, 2022)—would legitimize these targeted, exclusion-based credit policies.

The ECB, for example, recognizing that the market neutrality governing its unconventional bond purchases and collateral operations has generated a carbon bias in its monetary policy operations, designed a decarbonization framework that incentivizes green lending and penalizes dirty lending (see Box 16). This is achieved both via the tilting of corporate bond holdings and via haircuts and limits on dirty bond collateral, supported by a climate scoring framework developed by the ECB to evaluate the climate performance of companies (Schnabel 2021; Dafermos et al., 2022; Dafermos et al., 2023; ECB, 2024b).

BOX 16 **The European Central Bank’s Program to Decarbonize the Corporate Bond Portfolio**

Since 2020, the ECB embarked on a strategy to decarbonize monetary policy, guided by two considerations. It first accepted that the market neutrality governing its unconventional bond purchases and collateral operations had generated a carbon bias (Schnabel, 2021). Since financial markets failed to incorporate climate destruction in pricing, the ECB replication of existing market volumes improved funding conditions for climate laggards (Dafermos et al., 2022; Dafermos et al., 2023).

Second, the ECB stressed that incentives for green lending need to be accompanied by *penalties* for dirty assets it accepts as collateral or purchases in unconventional operations. This would scale up substantively the realignment of credit flows towards green activities, and address funding gaps in clean sectors.

The ECB applied this ‘carrots and sticks’ approach to its corporate bond holdings, seeking to ‘improve the weighted average climate score of its holdings over time so that it is consistent with a decarbonization path in line with the goals of the Paris Agreement’ (ECB, 2024b).

To tilt its corporate bond portfolio towards issuers with stronger climate performance, the ECB introduced a novel climate scoring framework that evaluates the climate performance of companies. The scoring consists of three components: (i) a retrospective

carbon intensity sub-score; (ii) a disclosure sub-score; and (iii) a forward-looking target sub-score. The carbon intensity sub-score is based on a company's Scope 1 and Scope 2 emissions, alongside sector-wide Scope 3 data. The disclosure sub-score reflects the quality of the emissions data provided by issuers, with higher scores for those with third-party verified emissions. The target sub-score is awarded to companies with decarbonization goals aligned with the Paris Agreement. The overall climate score for each issuer is determined by assigning weighted values to these three components.

The application of the tilting approach was responsible for a fifth of the total decline in carbon emissions associated with the ECB's corporate sector portfolios in 2022 and 2023 (ECB, 2024b). The strategy can be fine-tuned to reflect updated regulatory judgments and evolving financing needs for green sectors, including green industrial priorities. It also creates a framework for close monitoring and disciplining of climate laggards (Dafermos et al., 2023).

Section 3 Recommendations

7. Responsibility for the economic transformation required to limit warming to 1.5°C is shared by all countries, and in particular by those with the largest cumulative contributions to global GHG emissions. However, G20 countries—and especially high-income G20 countries—should show leadership by providing and scaling up the financing required for this transformation.
8. The G20 should reinforce existing calls for an equitable global financial architecture that supports countries' ability to create fiscal space and raise capital for green investment. This includes access to cheaper long-term capital, especially for low- and middle-income countries, improvements in domestic resource mobilization, carbon taxes and other international levies, issuance and on-lending of SDRs and adequate funding of MDBs and the IMF. Improvements in the debt management and resolution system are critical for this process.
9. Recognizing that delivering on NDCs needs both a higher quantity and improved quality of climate finance, the G20 should emphasize the role of PDBs, including NDBs, RDBs, and MDBs.

G20 countries should empower NDBs to deliver patient long-term lending that is outcomes-oriented, and directed towards projects that will contribute to achieving NDCs—and the SDGs more widely.

10. The G20 should align the financing strategies of NDBs, RDBs, and MDBs to respond to global and regional climate challenges. Country platforms can be used to pool, structure, and direct finance towards shared climate objectives, and to embed conditionalities that ensure that the efforts of private sector recipients contribute to achieving these objectives. This is not only about “de-risking” but also about sharing risks as well as the resulting rewards.
11. The G20 Sustainable Finance Working Group and the NGFS should work together to develop strategies for enhancing inclusive green finance. The G20 Global Partnership for Financial Inclusion should expand its work to develop explicit strategies for enhancing inclusive green finance, to ensure that economically vulnerable groups across the G20—including low-income households and SMEs—have access to affordable finance to allow them to invest in adaptation and build resilience, contribute to mitigation efforts, and benefit from economic opportunities in the context of a just green transition. To this end, the G20 Global Partnership for Financial Inclusion should work together with the G20 Sustainable Finance Working Group and the NGFS.
12. Central banks, supervisory and regulatory bodies should—within their mandates—implement policies that mitigate climate-related financial risks and foster the conditions for mobilizing private sector finance towards green investments and away from carbon-intensive ones. Appropriate tools for greening the financial system and the economy will vary by country and mandate, ranging from advancing more robust, globally standardized interoperable taxonomies and disclosure requirements, to reforming risk assessment processes by addressing data gaps, to adopting adequate forward looking climate risk models, and taking proactive measures to phase out carbon-intensive financing in collateral frameworks or corporate bond portfolios, and green credit allocation. The G20 should work with regulatory bodies to implement these actions within their mandates.

4

Conclusion

The climate crisis is the direct result of how economic and financial policies have been designed at both the domestic and global levels. Whether the Paris Agreement target of keeping global temperatures to below 1.5°C above pre-industrial levels is achievable will depend on the willingness of governments—within the G20 in particular—to make fundamental reforms to how economic growth policies and financial systems are structured and governed.

This report argues that all G20 states must act with urgency to bring about the economy-wide transformation that is needed to limit warming to 1.5°C. This means, first, that G20 countries should mobilize action around a clear, collective objective. Countries emitted 57.4 GtCO₂e in 2022. To achieve the goal of limiting warming to 1.5°C, global emissions must be reduced to 27 GtCO₂e by 2030 (UNEP, 2023b). Second, it is time to raise our ambition. G20 countries are responsible for 80% of global GHG emissions. They should therefore be responsible for no less than 80% of the required reduction in global emissions. Finally, G20 countries must commit to new development pathways that are compatible with urgent and collective climate action.

This report sets out a framework and specific recommendations for realizing these new development pathways. It emphasizes that sustainable and inclusive growth can be achieved by aligning industrial strategies and financial systems with climate goals, and by strengthening the global governance of both to prioritize global equity.

...sustainable and inclusive growth can be achieved by aligning industrial strategies and financial systems with climate goals, and by strengthening the global governance of both to prioritize global equity.

Specifically, G20 countries should adopt green industrial strategies oriented around NDCs, taking a whole-of-government approach and redesigning key government structures, tools and institutions to support their implementation. They should ensure that collaboration between the public and private sectors is designed to align with the goals of a just green transition, sharing risks and rewards. Vitally, they should lead the way in creating new, equitable global governance structures, in scaling up commitments to equitable green technology

and knowledge transfer, and in building distributed manufacturing capacity to ensure that all countries can realize the potential of green industrial strategy.

Higher-income G20 countries and those with more responsibility for cumulative historic GHG emissions should take a lead role in providing the financing required to advance these strategies. But more finance is not enough. The G20 should seek to empower NDBs to deliver patient, long-term capital that is directed towards achieving NDCs and the SDGs more widely, and in aligning the financing strategies of NDBs, RDBs, and MDBs to support these goals, leveraging country platforms to pool, structure, and direct finance towards shared climate objectives. They should reinforce existing calls for an equitable global financial architecture that provides cheaper long-term capital, especially for low- and middle-income countries, and they should take steps to ensure that the policies of central banks, prudential regulators and supervisors mitigate climate-related financial risks and foster the conditions for mobilizing private sector finance towards green investments and away from carbon-intensive ones. Measures to enhance access to green finance for vulnerable groups must underpin all of these efforts.

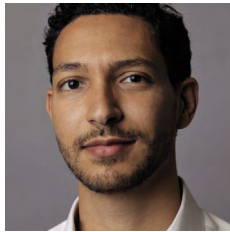
The actions and policies adopted by G20 countries, given their significant influence, economic relevance, and environmental impact, will have a profound impact on global climate outcomes. Without a strong commitment from the G20 to pursuing these goals, the world will continue on an unsustainable trajectory with grave impacts on future generations. This year's G20 process should conclude with a strong commitment to new development pathways grounded in ambitious green industrial strategies, underpinned by measures to enhance the quantity and quality of green finance, and governed to prioritize global equity.



Mariana Mazzucato



Vera Songwe



Amir Lebdioui



Barbara Buchner



Carlos Lopes



Daniela Gabor



Juliano Assunção



Luisa Palacios



Ma Jun



Renu Kohli



Ulrich Volz

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Annex

Overview of Financial Requirements for G20 Middle-Income Countries

Country	Period of study	Sectors Covered	Base Year	Amount in \$ (Cumulative Requirement)
South Africa	2015–30	Energy, Waste and Agriculture IPPU, Forestry and other land use	Not specified; Assuming 2015 values	\$ 697.551 billion
India	2018–30	Energy, Forestry and Adaptation	2011	\$5.25 trillion (Mitigation); \$1.83 trillion (Adaptation); \$161.898 billion (Forestry); Cumulative requirement after accounting for time value of money Rs118.685 trillion
PRC	2016–30	Mitigation and Adaptation	Not specified; assuming 2016 values	\$8.42 trillion
Indonesia	2018–30	Energy and Transport, Forestry, IPPU, Waste and Agriculture	Not specified	\$247 billion
		Mitigation	Not specified	\$322.86 billion
Brazil	till 2030	Mitigation and Adaptation	2017	\$278.88–\$297.68 billion
Mexico	2014–30	Electricity generation, transport, LULUCF, Waste, Oil and Gas, Industry, Agriculture and Livestock and Residential and Commercial	2017	\$126 billion
Turkey	2019–30	Renewable energy and energy efficiency	Not specified	\$63.6–\$84 billion

Policies for Promoting Inclusive Green Finance

		Market-shaping policies [indirect]	Direct interventions
Green finance	Adaptation to environmental change and enhancing resilience	<p>Regulatory enablers for digital retail payments (mobile money)</p> <p>Lower the barriers to market entry for microinsurance and other resilience-supporting (digital) financial services.</p> <p>Environmental and social risk management guidelines that are proportionate to loan size.</p> <p>Consumer protection, awareness-raising and capacity-building measures for vulnerable end-users.</p> <p>Build data infrastructure for sharing open-source data on climate risks.</p> <p>Awareness-raising and capacity-building measures for financial institutions.</p>	<p>Preferential refinancing or guarantees for credit to invest in adaptation/ resilience-enhancing activities or post-disaster reconstruction.</p> <p>Directed credit or sectoral credit targets.</p>
	Mitigation of environmental change	<p>Regulatory enablers for pay-as-you-go solar and water.</p> <p>Prudential rules that incentivise credit to green MSMEs or sustainable agriculture.</p> <p>Guidance and incentives for inclusive green fintech innovation.</p> <p>Build data infrastructure for sharing open-source data on climate impacts.</p> <p>Build information infrastructure that facilitates digital climate disclosure and reporting for MSMEs.</p> <p>Awareness-raising and capacity building measures for financial institutions.</p>	<p>Preferential refinancing or guarantees for credit to invest in new resource-efficient or low-carbon practices and technologies.</p> <p>Directed credit or sectoral credit targets.</p>

NGFS Framework for Options for Adjusting Monetary Policy for the Climate Transition

Credit operations^a

(1)	Adjust pricing to reflect counterparties' climate-related lending	Make the interest rate for central bank lending facilities conditional on the extent to which a counterparty's lending (relative to a relevant benchmark) is contributing to climate change mitigation and/or the extent to which they are decarbonising their business model.
(2)	Adjust pricing to reflect the collateral	Charge a lower (or higher) interest rate to counterparties that pledge a higher proportion of low-carbon (or carbon-intensive) assets as collateral or set up a credit facility (potentially at concessional rates) accessible only against low-carbon assets.
(3)	Adjust counterparties' eligibility	Make access to (some) lending facilities conditional on a counterparty's disclosure of climate-related information or on its carbon-intensive/low-carbon/green investments.

Collateral^b

(4)	Adjust haircuts ^c	Adjust haircuts to better account for climate-related risks. Haircuts could also be calibrated such that they go beyond what might be required from a purely risk mitigation perspective in order to incentivise the market for sustainable assets.
(5)	Negative screening	Exclude otherwise eligible collateral assets, based on their issuer-level climate-related risk profile for debt securities or on the analysis of the carbon performance of underlying assets for pledged pools of loans or securitised products. This could be done in different ways, including adjusting eligibility requirements, tightening risk tolerance, introducing tighter or specific mobilisation rules, etc.
(6)	Positive screening	Accept sustainable collateral so as to incentivise banks to lend or capital markets to fund projects and assets that support environmentally-friendly activities (e.g. green bonds or sustainability linked assets). This could be done in different ways, including adjusting eligibility requirements, increasing risk tolerance on a limited scale, relaxing some mobilisation rules, etc.
(7)	Align collateral pools with a climate-related objective	Require counterparties to pledge collateral such that it complies with a climate-related metric at an aggregate pool level.

Asset purchases^d

(8)	Tilt purchases	Skew asset purchases according to climate-related risks and/or criteria applied at the issuer or asset level.
(9)	Negative screening	Exclude some assets or issuers from purchases if they fail to meet climate-related criteria.

a. Credit operations are widely used to provide aggregate liquidity and usually take the form of collateralised lending. /

b. Collateral policy defines the range of assets that can be pledged to secure central bank credit operations, as well as the risk control measures that apply to them. / **c.** Annex 1 expands upon the different approaches for haircuts and valuation adjustments / **d.** Central banks may buy a variety of assets from both public and private sectors, typically in an effort to exert greater influence on longer-term interest rate levels and spreads while improving market liquidity.

Co-chairs

Mariana Mazzucato, and Vera Songwe

Group of Experts

Mariana Mazzucato, Vera Songwe,
Amir Lebdioui, Barbara Buchner, Carlos Lopes,
Daniela Gabor, Juliano Assunção,
Luisa Palacios, Ma Jun, Renu Kohli,
and Ulrich Volz

Executive Secretariat

Arilson Favareto, Bianca Tavorari,
Arthur Sadami, Giordano Magri, Linnit Pessoa,
and Pedro Lange

Collaborators

Chloe Boehm, Dileimy Orozco,
Francesca Edgerton, Joe Morrisroe,
Luca von Burgsdorff, Sarah Doyle,
and Ulla Heher

Copy-editor

Alex Shankland

Design

Celso Longo + Daniel Trench,
and Gustavo Fragão (assistant)



Executive Secretariat



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