



Financing the climate and ecological transition in emerging economies

The Synthesis Report of the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, published on 20 March 2023, stresses the importance of financing and international cooperation in accelerating climate action. India, a major emerging economy which has held the presidency of the G20 since December 2022, has also placed the environment and financing the transition in middle-income countries among its key priorities. While emerging countries now account for the majority of CO₂ emissions, their emissions are closely linked to those of advanced economies via global trade. Consequently, the international community needs to devote greater financial resources to protecting the climate, which is a global public good. Without this additional funding, financial stability, which central banks are tasked with safeguarding, could be jeopardised by disorderly, delayed or even abrupt climate transitions. The Summit for a New Global Financial Pact, to be held in Paris in June 2023, will attempt to find solutions to these issues.

Fabio Grieco, Henri de la Guéronnière, Clément Marsilli, Quentin Paul, Sophie Rivaud
European and Multilateral Policies Directorate

JEL codes
F33, F34,
H87, Q54

The authors would like to thank Cécile Valadier and Raj Rajesh for their thoughts on this article.

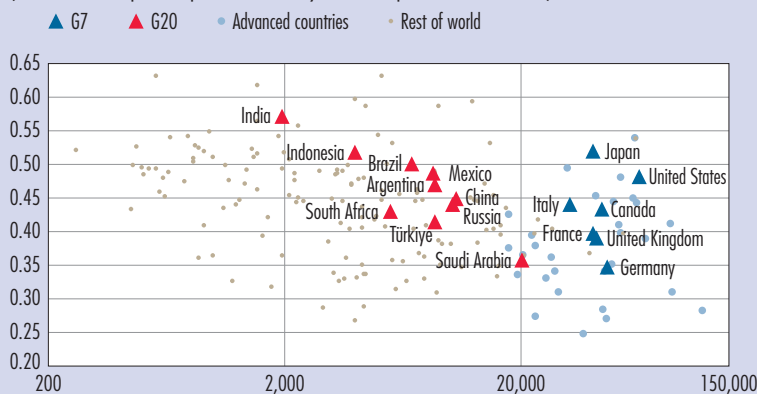
USD **1.0** trillion
annual need for investment in renewable energy to put emerging economies on a pathway consistent with net zero by 2050 (estimate by the International Energy Agency)

USD **100** billion
collective annual target – not yet reached – for financial transfers from advanced countries for climate initiatives in developing countries

USD **45** billion
expected contribution from the IMF's Resilience and Sustainability Trust (RST) for the climate and pandemic preparation

Exposure of G20 member countries to physical climate risks

(x-axis: GDP per capita in USD; y-axis: exposure indicator)



Sources: ND-GAIN (Country Index), IMF (*World Economic Outlook*, October 2022); authors' calculations.

Note: The indicator reflects each country's exposure to climate risks. The higher the indicator (on a scale of 0 to 1), the more exposed the country is to climate change.



This article focuses on those G20 member countries that are not advanced economies, but the issue concerns all countries classified as middle-income economies by the International Monetary Fund (IMF).

1 Emerging countries: key players in the fight against climate change

Cooperation between advanced and emerging countries is necessary and legitimate

The climate is a global public good¹ that requires commitments and cooperation from all countries. However, the pledges made under the Paris Agreement in the form of Nationally Determined Contributions (NDCs)² could prove to be insufficient. Global warming is expected to reach 2.4°C in 2100, even if all the 2030 NDC targets are reached (Climate Action Tracker, 2022).

In light of this, and with climate-related impacts worsening each year, multilateral action is needed to strengthen NDCs. While there is widespread agreement on this, international climate discussions are currently focusing on the issue of “**international burden sharing**”: Which

regions or countries need to bear the cost of reinforcing climate policies? Advanced countries (which are historically responsible for the accumulated stock of CO₂) or emerging countries (which have become the main emitters of CO₂)?

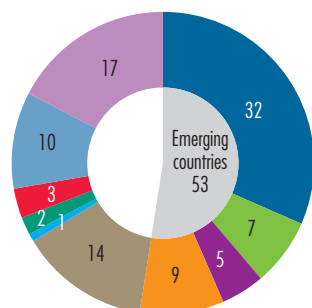
The notion of common but differentiated responsibilities (CBDR), set out in Principle 7 of the 1992 Rio Declaration and reiterated in all international climate treaties since the Kyoto Protocol (1997), was introduced to take account of the historically predominant role played by advanced countries in climate change. The Kyoto Protocol, for example, established a binary distinction between developed countries (known as Annex I countries) on the one hand, which had a responsibility to curb their emissions, and developing countries on the other, for which expectations regarding climate targets were reduced. However, the emergence of new high-emitting countries not included in Annex I over the past 30 years has raised calls for them to be increasingly involved in global efforts to cut emissions. The Paris Agreement attempted to change the binary distinction of the Kyoto Protocol, notably via NDCs, which require all signatory countries to set their own climate targets.

C1 Breakdown of global CO₂ emissions

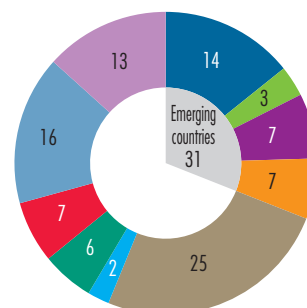
(%)



a) Emissions in 2020



b) Emissions accumulated up to 2020



Sources: Our World in Data, authors' calculations.

1 In economics, a “public” good is a non-rival good, meaning that when it is used by one agent it can also be used simultaneously by another agent. It is also a non-excludable good in that agents cannot be barred from using it. In G20 discussions, climate preservation as well as financial stability are both classified as “global” public goods.

2 An NDC, or Nationally Determined Contribution, is a climate action plan aimed at curbing greenhouse gas emissions and adapting to the effects of climate change. Each party to the Paris Agreement is required to establish an NDC and update it every five years.



However, the national approach on which NDCs are based is not always the most appropriate: for the same volume of emissions avoided, reinforcing NDCs for emerging countries is less costly than for advanced countries (see section 1.2). The latter would therefore benefit from participating directly in the efforts of emerging countries, and from taking these efforts into account in their own NDCs, as permitted under Article 6 of the Paris Agreement. However, the modalities for implementing this article are still being defined (OECD, 2022).

International discussions, notably within the G20, regularly stumble over this issue of burden sharing. Emerging countries fear that the constraints linked to decarbonisation³ will jeopardise their growth prospects. Moreover, emissions in advanced and emerging countries are closely intertwined due to the structure of the world economy: (i) per capita emissions in advanced countries are generally higher than in emerging countries (due to differences in income and despite the reduction in the energy intensity of advanced countries' GDP and in the carbon intensity of their energy mix); and (ii) advanced countries offshore a large share of their highest-emitting production. In global trade, advanced countries are net importers of CO₂ whereas emerging countries or commodity producers are net exporters.⁴

One challenge in international discussions is to avoid the risk that polarisation on financial burden-sharing might slow progress in this field.

Cooperation is vital for emerging countries themselves

Preserving the climate as a global public good is an economic, social and financial challenge for emerging countries:

- **Emerging countries are more exposed to the economic and social consequences of climate transformations and events. This is attributable to purely geographical factors, but also to their lower level of development which limits their ability to adapt.** These major physical risks mean there is a need to invest in adapting to climate change (see section 2 *infra*). As a reminder, adaptation to climate change involves policies to protect against the effects of global warming and differs

from mitigation which aims to curb CO₂ emissions. Consequently, the scale of the physical risks can just as much be an incentive for emerging countries to adopt mitigation policies, as cause them to prioritise adaptation policies at the expense of mitigation (risk of crowding out).

- **The best and cheapest opportunities for reducing CO₂ emissions (abatement)⁵ are concentrated in emerging countries, where coal still accounts for a large share of energy production (France Stratégie, 2019). Moreover, the cost of mitigation policies can be offset by the indirect benefits they bring (even if they are only felt over the long term), in terms of improvements in public health and in the domestic environment.**
- **Last, emerging countries would be penalised economically by uncooperative climate strategies (Chateau et al., 2022).** An ambitious climate action policy restricted solely to advanced countries ("acting countries"), possibly accompanied by a carbon border adjustment mechanism (CBAM),⁶ would penalise GDP in other countries. Emerging countries' exports to advanced countries could fall (owing to lower demand from acting countries) and their terms of trade could deteriorate due to a rise in the price of imports from advanced countries (Fontagné et al. 2022).

³ Reduction in greenhouse gas emissions to limit their effect on the climate.

⁴ According to Cezar and Polge (2020), emerging countries (China, Russia, India and South Africa) have the biggest trade surplus in terms of the CO₂ emissions embodied in their trade exchanges. Countries with a current account deficit in monetary terms can have a trade surplus in CO₂ emissions.

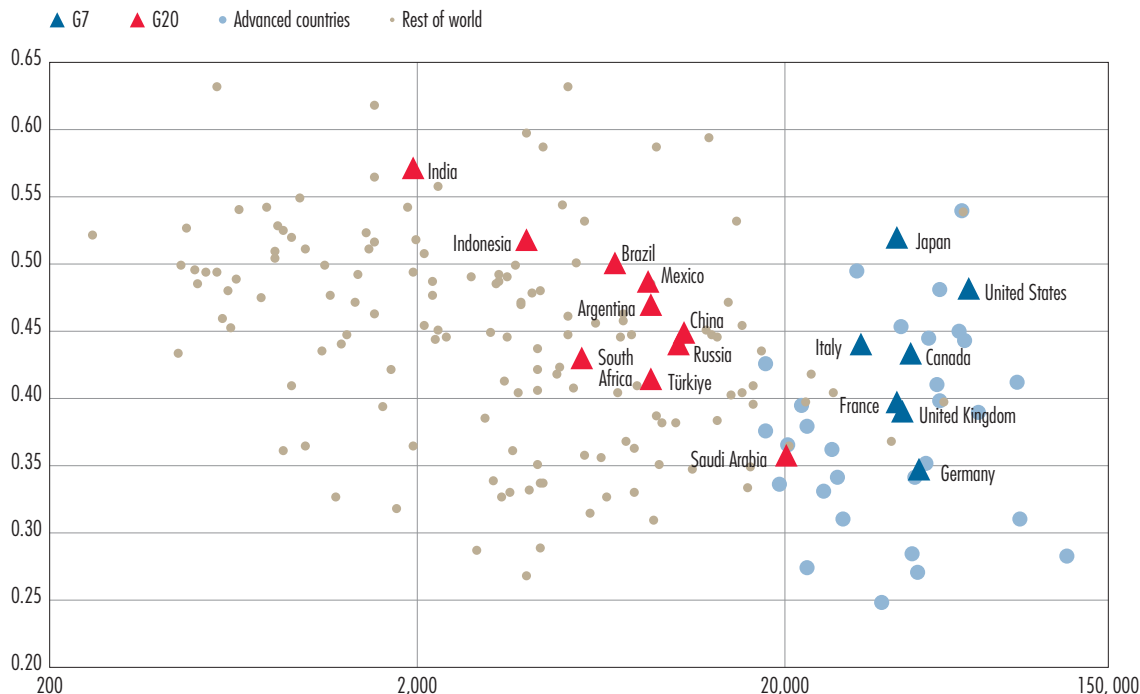
⁵ The abatement cost of a decarbonisation project is its cost relative to the "social cost of the carbon" (value of the emissions avoided). Calculating the abatement cost makes it possible to identify, prioritise (or exclude) and plan projects that deliver the maximum effective reduction in greenhouse gas emissions for a given level of effort by the community.

⁶ On 13 December 2022, the European Union agreed to implement a CBAM designed to set a carbon price for certain products imported by the EU (Bellec et al., 2022).



C2 Exposure of G20 member countries to physical climate risks

(x-axis: GDP per capita in USD; y-axis: exposure indicator)



Sources: ND-GAIN (Country Index), IMF (*World Economic Outlook*, October 2022); authors' calculations.

Note: The indicator reflects the exposure of each country's population, towns, economic sectors, production, resources etc. The higher the indicator (on a scale of 0 to 1), the more exposed the country is to climate change.

2 National commitments are considered too weak, including those of emerging countries

Commitments are considered insufficient to keep global warming below 2°C

Under the Paris Agreement (adopted at COP21 in 2015), signatory countries must submit upwardly revised NDCs every five years, with COP26 in 2021 (in Glasgow) marking the start of the first period of review. On this occasion, the ten emerging countries in the G20, with the exception of India, all updated their NDCs or submitted them for the first time (Türkiye). Their commitments were found to be weak, as half are expected to lead to a rise rather than a fall in emissions by 2030, or generate insufficient emission cuts to be compatible with the warming goal of below 2°C (except for South Africa and Brazil) – see appendix.

Emerging countries have a colossal need for financing

Given the huge amount of financing required, the targets for GHG emission cuts set out in NDCs appear difficult to reach (implementation gap), and will become even more so if the pledges have to be reinforced to follow a pathway consistent with 1.5°C global warming (ambition gap). Emerging or developing countries need at least USD 1 trillion per year between now and 2030 to reach net zero by 2050 (Ehlers et al., 2022), which is more than five times the amount invested in renewable energies in 2020 (approximately USD 200 billion – see Chart 3 *infra*). This estimate relates only to “supply-side” mitigation policies (investment in renewable energy). The total need for financing also includes “demand-side” mitigation policies (measures to reduce energy consumption) and adaptation policies (to tackle physical climate risks). The IMF has put the figure at between USD 3 trillion and



BOX

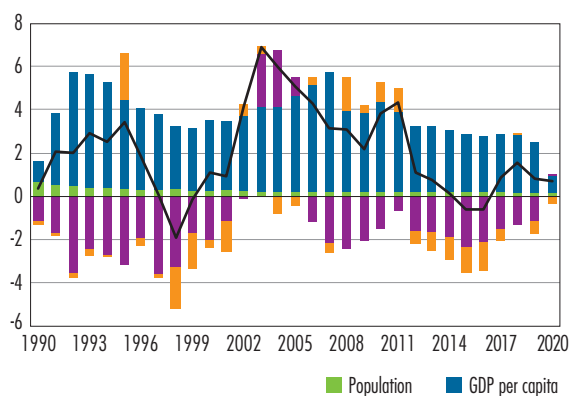
China and India's climate commitments

China and India are respectively the largest and third-largest CO₂ emitters in the world. This is linked more to their economic development than to demographics, as the latter is virtually a residual factor in the variations in their emission levels (see Chart A, "GDP per capita" and "Population").

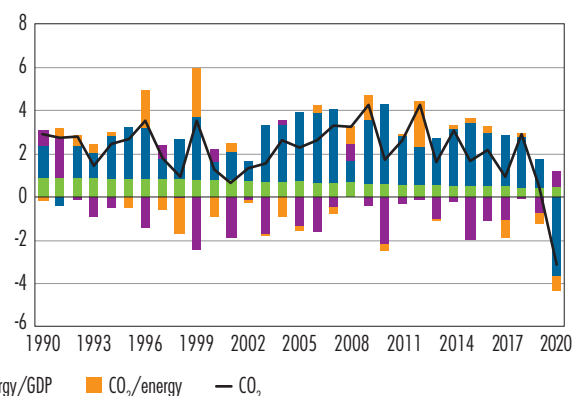
CA Demographics, economic development and CO₂ emissions

(% change compared with the previous year)

a) China



b) India



Source: Global Carbon Project.

Note: The Kaya identity, illustrated here, is sometimes criticised as being an oversimplification. However, it still provides an indication of the most important factors behind annual changes in CO₂ emissions.

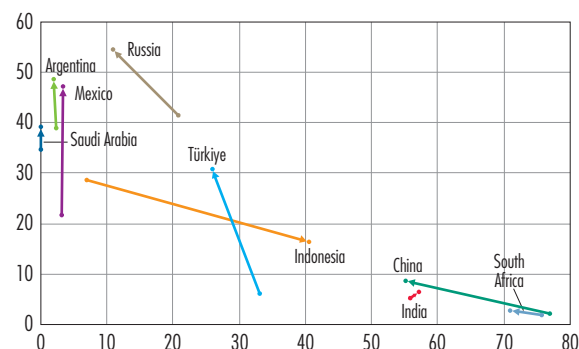
These two countries play a pivotal role in climate talks. COP26 in Glasgow failed to agree on a joint pledge to gradually phase out coal (the energy source with the highest CO₂ emissions), notably owing to pressure from India and China where coal accounted respectively for 57% and 56% of total energy consumption in 2021. India has held the G20 presidency since December 2022 and has singled out the climate as one of its priorities (Ministry of Environment, Forest and Climate Change, 2022), as reflected in the slogan it has adopted "One Earth, One Family, One Future".

However, India and China are at different stages of economic development. The International Monetary Fund identifies China as an upper-middle income emerging country, and India as a lower-middle income country. CO₂ emissions per capita were about 8.2 tonnes in 2020 for China, compared with just 1.7 tonnes for India. This may explain the differences in climate ambitions:

- China is aiming to reach net zero by 2060, India by 2070;

CB Change in the energy mix of emerging countries between 1990 and 2021

(x-axis: % share of coal; y-axis: % share of gas)



Sources: Our World in Data, authors' calculations.

Interpretation: The starting point for each arrow is 1990 and the end point is 2021. In China (as well as in Türkiye, Russia and, to a lesser extent, South Africa and Argentina), the rise in the share of gas in the energy mix has been accompanied by a fall in the share of coal. Conversely, Indonesia has significantly increased its share of coal, while reducing its share of gas.

.../...



- India did not update its Nationally Determined Contribution (NDC) at the first review of the Paris Agreement, but later, in August 2022;
- Climate Action Tracker (a non-governmental organisation) estimates that India's NDC is "critically insufficient" and China's "insufficient" (see also the ratings for their respective emissions targets in the appendix);
- China has announced a gradual phasing down of coal over 2026-30, whereas India has made no commitment regarding coal. Since the 1990s, China has reduced the share of coal in its energy mix, notably in favour of gas, whereas in India the shares of both energies have remained almost unchanged (see Chart B).

USD 6 trillion per year up to 2050 (Ehlers et al., 2022). Yet in 2019-20, total "climate-related" financial flows (i.e. destined for the mitigation of or adaptation to climate change) amounted to just USD 632 billion. In addition, climate finance is still largely dominated by domestic flows (Prasad et al., 2022). Added to this is the investment needed to preserve biodiversity, estimated at between USD 722 billion and USD 967 billion (Deutz et al., 2020). The annual need for investment in nature-based solutions (NbS)⁷ is projected to triple by 2030 and quadruple by 2050 (Pnue, 2021).

In the case of emerging countries, climate financing poses both the "standard" problems associated with emerging market finance (e.g. risk of sudden, massive capital outflows) and climate-specific issues that have been documented more recently (higher need for adaptation financing, lack of data, bias towards advanced countries in "environmental, social and governance" (ESG) flows) (Ehlers et al., 2022, Li et al., 2022)). Moreover, the new geopolitical environment and current risk of fragmentation are not particularly conducive to investing in emerging countries.

These financing needs also need to be viewed in the context of countries' high levels of debt, which have risen even further since the Covid-19 crisis. More than a quarter of emerging countries (and 60% of lower income countries) are on the verge of debt distress (IMF, 2022b; Georgieva, 2022). However, one positive factor is the growing ability of some emerging countries to borrow in their own currency (Onen et al., 2023).

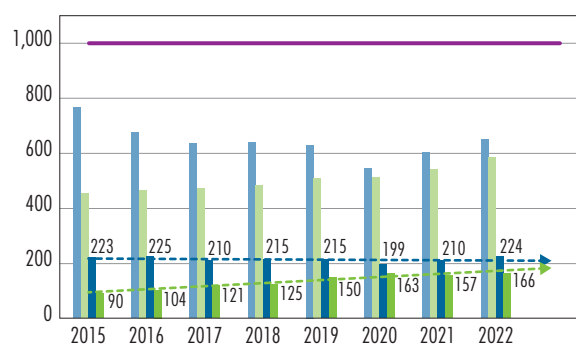
The supply difficulties linked to the Covid-19 crisis and the war in Ukraine are also forcing many countries to choose between energy security and climate measures.

Although the consequences are difficult to measure at present, the war in Ukraine has led in the short run to a rise in the carbon intensity of energy systems. This has increased the risk of a late and disorderly climate transition. Over the longer term, however, it is also an incentive for accelerating the development of renewable energies, for the purposes of energy security, and for gradually phasing out fossil fuels (NGFS, 2022).

C3 Investment in renewable energy and financing needs in emerging countries

(USD billions)

- Cumulative investment in energy^{a)} in EMDE
- Investment in renewable energy in EMDE
- Cumulative investment in energy^{a)} in China
- Investment in renewable energy in China
- Estimated annual investment need in EMDE



Source: International Energy Agency (*World Energy Investment*, 2022).

Note: EMDE, emerging markets and developing economies.

a) Renewable and fossil energies.

⁷ "Nature-based solutions are actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" (International Union for the Conservation of Nature – IUCN).



3 International cooperation: a possible avenue for accelerating and strengthening the implementation of emerging countries' climate pledges

Carbon pricing alone is an insufficient lever

An agreement is needed on a global carbon price to better direct capital flows towards green sectors, activities or projects in those countries with the highest financing need, in line with Article 2.1 c) of the Paris Agreement (on which the "Sharm el-Sheikh Dialogue" was launched at COP27 – UN, 2022b). Currently, carbon pricing initiatives only cover around 30% of global emissions, and the carbon price is still too low: an average of USD 6 per tonne today, whereas the IMF estimates it should be USD 75 in 2030 in order to be effective (Black et al., 2022).

Moreover, **multilateral discussions (G7, G20) need to go further than simply agreeing on a global carbon price** (Fontagné et al., 2022). Even if an international carbon price floor were set that varied according to each country's level of economic development, the IMF has identified two limitations:

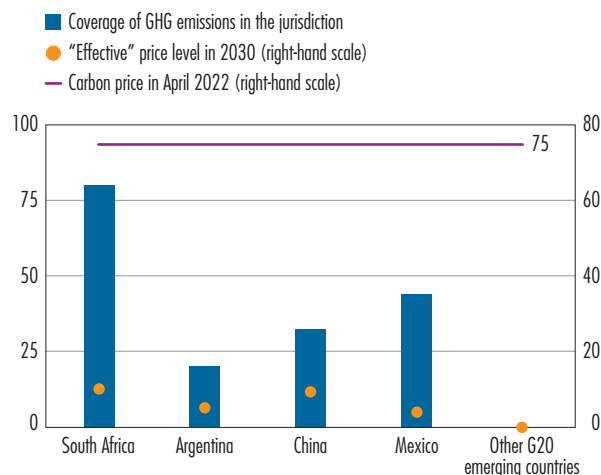
- the burden would still essentially be borne by emerging countries (China, India, Russia, Saudi Arabia, South Africa and Türkiye), whose NDCs incorporate an implicit carbon price well below the envisaged floor, reflecting the weakness of their climate commitments (Chateau et al., 2022);
- the fall in returns on high carbon-intensity investments caused by the pricing would trigger a flight of capital towards advanced, greener countries (IMF, 2022a).

Other avenues need to be explored as a complement.

Initiatives should distinguish between richer emerging countries such as China, with which cooperation is possible on issues such as enhancing regulatory compatibility (green finance), and other middle or low-income emerging countries that are more eligible for concessional multilateral or bilateral financing (i.e. with preferential terms).

C4 Coverage and price of G20 emerging countries' carbon pricing initiatives

(% coverage, price of a tCO₂e in USD)



Sources: World Bank (Carbon Pricing Dashboard), IMF (for "Effective price Level").

Towards an increase in international financial and technological transfers

In 2009, at COP15 in Copenhagen, advanced countries committed to mobilising USD 100 billion per year of public or private, multilateral or bilateral funds, to cover the climate financing needs of developing countries.⁸ According to the OECD (2021), **in 2019, the amount made available remained well below target at USD 79.6 billion** and consisted mainly of public funds.

Based on two forward-looking scenarios, the OECD expects the **USD 100 billion target to be surpassed in 2023.**

Other recent initiatives could help to accelerate global public financial transfers:

- Plurilateral initiatives aimed at providing aid in exchange for specific climate commitments, such as the "just [international] energy transition partnerships" for South Africa (COP26) and Indonesia (COP27).

⁸ Moreover, the biodiversity COP15, held in Montreal in December 2022, pledged to provide USD 20 billion per year of international aid for biodiversity up to 2025.



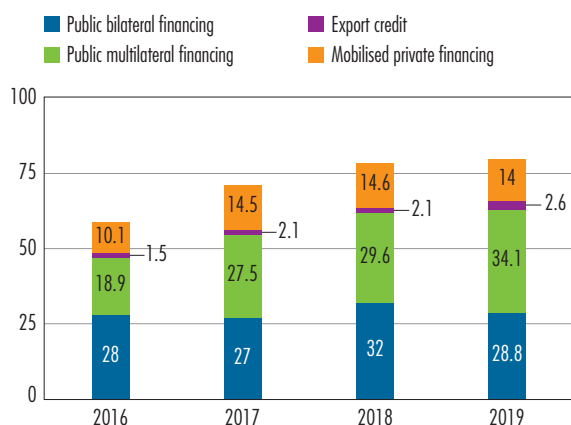
- The creation of the fund to finance the losses and damage from climate change, announced at COP27, the operationalisation of which is to be defined by COP28.⁹ This new fund will provide finance to countries rather than individual projects.

The framework and mechanism for technological transfers included in the Paris Agreement (Article 10) also need to be reinforced. Leaving aside China, the innovation and diffusion of low-carbon technologies remain concentrated in advanced countries (Probst et al., 2021). Moreover, national subsidies for renewable energy (such as the Inflation Reduction Act in the United States) are frequently accompanied by protectionist measures which can be a further obstacle to transfers.

At the G20 summit in Bali in November 2022, French President Emmanuel Macron said Paris would host an international conference in 2023 to seek “a new financial pact with the South” (22 and 23 June 2023), as part of the Bridgetown initiative led by Barbadian Prime Minister Mia Mottley. The conference should address the issue of using IMF special drawing rights (SDRs) for climate finance and, more broadly, the reform of the Bretton Woods Institutions (the IMF and World Bank).

C5 International climate financial transfers by advanced countries

(USD billions)



Source: OECD.

Multilateral supervision and concessional financing

One important lever for increasing climate finance is the greening of the action of multilateral development banks (MDBs). For example, since 2016, the World Bank has been pursuing a Climate Change Action Plan, which it renewed for the period 2021-25. By 2023, all new financing provided by the Bank will be required to be aligned with the Paris Agreement. In addition, the plan has announced the creation of two new *Country Climate and Development Reports* (CCDR) which will look at ways of reaching development and climate change mitigation or adaptation targets, and evaluate the amount of financing required.

As part of its climate strategy published in 2021, the IMF recently added climate considerations to its multilateral and bilateral oversight (Article IV). This means that if, for example, there is risk that climate change could affect a country’s balance of payments, the IMF can attach green conditionalities to its loans. The Resilience and Sustainability Trust (RST) set up by the IMF in October 2022, and which should eventually have USD 45 billion in resources, aims to help low and middle-income countries respond to climate challenges. Countries such as Bangladesh, Barbados, Costa Rica, Jamaica and Rwanda are among the first to have benefited from these RST loan agreements which offer extremely preferential terms (low interest rates, 20-year maturity and a ten year grace period). In 2023, France, via the Banque de France which manages the State’s SDRs, contributed 3 billion SDRs (approximately EUR 3.8 billion) to the RST.

A shared vision of green finance

The development of green finance is an essential lever for mobilising private sector investment, which can be catalysed by bilateral and multilateral public financing initiatives. The main barrier is the lack of common global criteria defining “green” or “sustainable” assets (World Bank, 2020). It is vital to avoid any regulatory fragmentation that might undermine international

⁹ A transition committee will submit recommendations on how to operationalise the fund and set out the details of the new financial arrangements by COP28 in December 2023.



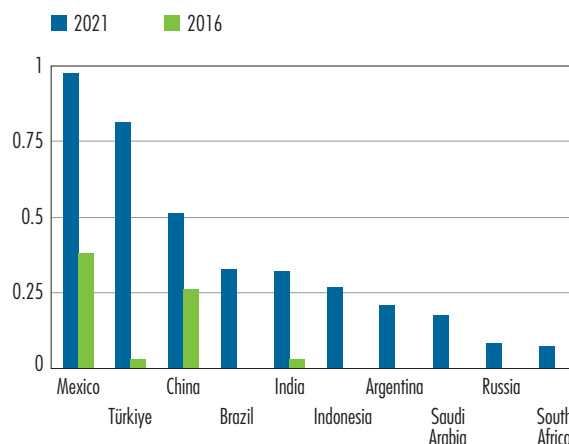
cross-border flows (Ophèle, 2022). Consequently, the core aim of the G20 sustainable finance roadmap, published in October 2021, is to develop a transition framework to ensure the international comparability of sustainable finance standards (notably taxonomies and extra-financial disclosure standards). This is supported by other initiatives, for example the International Platform on Sustainable Finance, launched by the European Union at the IMF annual meetings in October 2019, and which has set up a Green Taxonomy Working Group, co-chaired by China and the European Commission. The aim of this group is to develop a common reference point for the Chinese taxonomy, which focuses on green sectors (additionality principle), and the European taxonomy, which covers the entire economy (substitutability principle).¹⁰ This harmonisation is one possible way to avoid discouraging investors and to correct the current bias towards advanced countries in sustainable finance (see section 2.2 *supra*).

Financial innovation can also play a role, for example debt-for-nature swaps which aim to reduce government debt in exchange for a commitment to spend a fraction of the reduction on protecting the environment (Paul et al., 2023).

Central banks are particularly well-placed to promote green finance, notably by modelling scenarios for the economic and financial consequences of climate change and transition policies (Boirard et al., 2022). As regulators, they also monitor whether financial

C6 Total issuance of "ESG" debt

(% of GDP)



Sources: EPFR, authors' calculations.

Note: ESG stands for environmental, social and governance criteria.

institutions are implementing the regulatory framework of extra-financial standards. The Network for Greening the Financial System (NGFS), a cooperation forum made up exclusively of G20 central banks and regulators, is also testament to their increasingly active involvement. This stems from their mandate, which requires them to take account of climate risks in the transmission of monetary policy, and in their intervention to control inflation and safeguard financial stability (see NGFS annual reports). Central banks also participate in the main international fora (G20, G7, IMF).

¹⁰ Under the European Union taxonomy, all financing that reduces emissions is classified as "green", regardless of the sector in question, as the aim is to green the entire economy. Under the Chinese taxonomy, only financing provided to the sectors listed is classified as "green".



References

- Bellec (Ch.) and Bouthevillain (C.) (2022)
"European instruments aimed at reducing greenhouse gas emissions", *Banque de France Bulletin*, No. 242/1, September-October.
[Download the document](#)
- Black (S.), Parry (I.) and Zhunussova (K.) (2022)
"More countries are pricing carbon, but emissions are still too cheap", *IMF blog*, 21 July.
- Boirard (A.), Payerols (C.), Overton (G.), Soares de Albergaria (S.) and Vernet (L.) (2022)
"Climate scenario analysis to assess financial risks: some encouraging first steps", *Banque de France Bulletin*, No. 241/1, July-August.
[Download the document](#)
- Cezar (R.) and Polge (T.) (2020)
"CO₂ emissions embodied in international trade", *Banque de France Bulletin*, No. 228/1, March-April.
[Download the document](#)
- Chateau (C.), Jaumotte (F.) and Schwerhoff (G.) (2022)
"Economic and environmental benefits from international cooperation on climate policies", *Departmental Paper*, No. DP/2022/007, IMF, March.
- Climate Action Tracker (2022)
Massive gas expansion risks overtaking positive climate policies, coll. "Warming Projections Global Update", November.
- Dees (S.) (2020)
"Assessing the Role of Institutions in Limiting the Environmental Externalities of Economic Growth", *Working paper*, No. 768, Banque de France, June.
[Download the document](#)
- Deutz (A.), Heal (G. M.), Niu (R.), Swanson (E.), Townshend (T.), Zhu (L.), Delmar (A.), Meghji (A.), Sethi (S. A.) and Tobin-de la Puente (J.) (2020)
Financing Nature: Closing the Global Biodiversity Financing Gap, Paulson Institute, The Nature Conservancy and Cronell Atkinson Center for Sustainability, September.
- Ehlers (T.), Gardes-Landolfini (Ch.), Natalucci (F. M.) and Prasad (A.) (2022)
"How to scale up private climate finance in emerging economies", *IMF Blog*, blog post based on Chapter 2 of the IMF's *Global Financial Stability Report*, 7 October.
- Fontagné (L.), Grieco (F.) and Weber (P.-F.) (2022)
"Climate and multilateralism: the carbon floor price option", *Eco Notepad blog*, post No. 287, Banque de France, October.
[View blog post](#)
- France Stratégie, (2019)
La valeur de l'action pour le climat. Une valeur tutélaire du carbone pour évaluer les investissements et les politiques publiques, report by the Commission chaired by Alain Quinet, February.
- Georgieva (K.) (2022)
"Navigating a more fragile world", *IMF podcasts*, 7 October.
- Georgieva (K.) and Pazarbasioglu (C.) (2021)
"The G20 common framework for debt treatments must be stepped up", *IMF Blog*, 2 December.
- IEA, International Energy Agency (2022)
World Energy Investment 2022, June.
- IMF (2022a)
External Sector Reports, August.
- IMF (2022b)
Global Financial Stability Report, October.
- IPCC, Intergovernmental Panel on Climate Change (2023)
Synthesis Report of the IPCC Sixth Assessment Report, March.
- IRENA, International Renewable Energy Agency (2022)
NDCs and renewable energy targets in 2021: Are we on the right path to a climate-safe future?, January.



Kulp (S.) and Strauss (B.H.) (2019)

“New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding”, *Nature Communications*, No. 10, Article No. 4844, December.

Li (Bo), Natalucci (F. M.) and Prasad (A.)

“How blended finance can support climate transition in emerging and developing economies”, *IMF blog*, 15 November.

Ministry of Environment, Forest and Climate Change, India (2022)

“COP27 and ensuring climate justice”, press release, 15 December.

Ministry of Foreign Affairs and Foreign Trade of Barbados (2022)

“The 2022 Bridgetown Agenda for the Reform of the Global Financial Architecture”, press release, 23 September.

NGFS (2021)

“Climate Scenarios”, *Scenarios Portal*.

NGFS (2022)

Not too late – Confronting the growing odds of a late and disorderly transition, September.

OECD, Organisation for Economic Co-operation and Development (2021)

“Forward-looking Scenarios of Climate Finance Provided and Mobilised by Developed Countries in 2021-2025”, *Technical Note*, October.

OECD and IEA (2022)

“The birth of an ITMO: Authorisation under Article 6 of the Paris Agreement”, *OECD/IEA Climate Change Expert Group Papers*, No. 2022(3), November.

Onen (M.), Shin (H.-S.) and von Peter (G.) (2023)

“Overcoming original sin: insights from a new dataset”, *BIS Working Papers*, No. 1075, February.

Ophèle (R.) (2022)

“The ‘nightmare’ facing European regulators”, *Financial Times*, 22 June.

Paul (Q.), Svartzman (R.) and Weber (P.F.) (2023)

“Debt-for-nature swaps: a two-fold solution for environmental and debt sustainability in developing countries?”, *Banque de France Bulletin*, No. 244/2, January-February.

[Download the document](#)

Prasad (A.), Loukoianova (E.), Xiaochen Feng (A.) and Oman (W.) (2022)

“Mobilizing Private Climate Financing in Emerging Market and Developing Economies”, *IMF Staff Climate Notes*, No. 2022/007, July.

Probst (B.), Touboul (S.), Glachant (M.) and Dechezleprêtre (A.) (2021)

“Global trends in the innovation and diffusion of climate change mitigation technologies”, *Nature Energy*, November.

UN, United Nations (2022a)

Finance for climate action: Scaling up investment for climate and development, High-Level Expert Group on Climate Finance (HLEG, COP27), November.

UN (2022b)

“Sharm el-Sheikh Implementation Plan”, *Framework agreement on climate change*, draft decision -/CMA.4, para. IX.68, November.

UNEP, United Nations Environment Programme (2021)

State of Finance for Nature. Tripling investments in nature-based solutions by 2030, May.



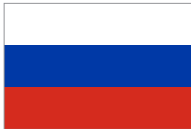


World Bank (2020)

Demystifying Sovereign ESG, coll. “Finance: Equitable Growth, Finance & Institutions Insight”, December.







Appendix

Nationally determined contributions (NDCs) of G20 emerging countries as at March 2023

Country (in descending order of annual CO ₂ emissions, 2020)	Net zero target date	Emissions target	Renewable energy target	Changes versus the previous version in the latest NDC update ^{a)}	Rating of emissions target by Climate Action Tracker and comments if any
China 11,680.416 MtCO ₂ e 8,199 tCO ₂ e /capita/year 	2060	Type: carbon intensity Targets: 65% reduction in CO ₂ emissions per unit of GDP by 2030 compared with 2005 Target for peak emissions "before 2030"	25% share of non-fossil fuel sources in primary energy consumption	Emissions target of 60-65% Renewable energy target of 20-25%	Insufficient
India 2,411.733 1,744 	2070	Type: carbon intensity Target: 45% reduction in CO ₂ emissions per unit of GDP by 2030 compared with 2005	50% renewable share in the energy mix by 2030 (with a rise in low-emission capacity from 450 GW to 500 GW)	NDC update in August 2022 Emissions reduction target of between 33-35% and 45% Renewable share in the energy mix of 40-50%	Critically insufficient
Russia 1,674.228 11,644 	2060	Type: base year Target: 30% reduction in emissions by 2030 compared with 1990	NC	NDC update in November 2020: emissions reduction target of 25-30%	Highly insufficient Not very strong as the base year is 1990 (before the collapse of the USSR and the recession that followed)
Saudi Arabia 588.814 16.964 	2060	Type: baseline scenario (implicit) Target: reduce, avoid and remove greenhouse gas (GHG) emissions by 278 MtCO ₂ e annually by 2030 compared with 2019	NC	Emissions reduction doubled	Highly insufficient The NDC contains no quantifiable information on the two baseline scenarios provided
Indonesia 568.267 2.088 	2060	Type: baseline scenario Target: 32% reduction in GHG emissions by 2030 compared with the business-as-usual scenario or 43% subject to availability of international support	23% in 2025 31% in 2050	NDC update in September 2022 Emissions target of 29-32% Conditional target of 41-43%	Critically insufficient

.../...



Country (in descending order of annual CO ₂ emissions, 2020)	Net zero target date	Emissions target	Renewable energy target	Changes versus the previous version in the latest NDC update ^{a)}	Rating of emissions target by Climate Action Tracker and comments if any
Brazil 451.801 2.113 	2050	Type: base year Target: 50% reduction in emissions by 2030 compared with 2005	NC	NDC update in April 2022 Net zero in 2050 (instead of 2060) Emissions target of 43-50% but 2005 emissions level increased	Almost sufficient
South Africa 435.127 7.410 	2050	Type: absolute target Target: annual emissions in a range of 398- 510 MtCO ₂ e in 2025, and 350-420 Mt in 2030	50% renewable energy share in the energy mix 50% share of natural gas in the electricity mix	The upper end of the target range for 2025 was reduced by 1% The upper end of the target range for 2030 was reduced by 3% and the lower end by 12%	Almost sufficient
Mexico 407.695 3.045 	2050	Type: baseline scenario Target: unconditional reduction of 35% in GHG and pollutants by 2030 compared with business- as-usual scenario; conditional reduction of 40%	NC	NDC update in November 2022 Emissions reduction target of 25-35%	Insufficient
Türkiye 405.203 4.833 	2053	Type: baseline scenario Target: 41% reduction in GHG emissions by 2030 compared with business- as-usual scenario	Increase capacity of production of electricity from solar power to 52.9 GW until 2035 Increase capacity of production of electricity from wind power to 29.6 GW until 2035 Commission a nuclear power plant and tap full hydroelectric potential	NDC update in March 2023	Critically insufficient
Argentina 176.510 3.878 	2050	Type: absolute target Target: emissions cap of 349 MtCO ₂ e in 2030	NC	Emissions target: improvement of 26% (437 MtCO ₂ e)	Insufficient

Sources: International Renewable Energy Agency (*NDCs and Renewable Energy Targets in 2021* – IRENA, 2022); Climate Action Tracker; European Commissions (Edgar database); UN (NDC registry); authors' research.

a) Submitted at COP26, except where otherwise indicated.



Published by
Banque de France

Managing Editor
Claude Piot

Editor-in-Chief
Claude Cornélis

Editor
Didier Névonnic

Translator/English Editor
Vicky Buffery

Technical production
Studio Creation
Press and Communication

ISSN 1952-4382

To subscribe to the Banque de France's publications

<https://publications.banque-france.fr/en>

"Subscription"

