



Sustainability and Climate Policy, Culture, and Governance

4

■ Learning Objectives

After completing this reading you should be able to:

- Discuss the context and issues of international climate policy evolution.
- Understand the relative scale of emissions by country.
- Summarize the history of international climate agreements.
- Assess the achievements and shortcomings of the agreements.
- Analyze countries' obligations after joining various climate agreements.
- Distinguish climate change policies and goals from pre-Paris Agreement to those implemented in the Paris Agreement.
- Evaluate the mechanisms and plans in the Paris Agreement.
- Illustrate the carbon pricing policies of carbon taxes and emissions-trading schemes and their benefits and drawbacks.
- Describes climate policies in the power generation and transportation sectors.
- Compare sector-specific emissions reduction policies.
- Explain how climate policy occurs at the national and subnational levels.
- Differentiate the types of private-sector sustainability and climate investment policies.
- Understand how public policy has been used to promote adoption of green finance.
- Discuss how central banks have incorporated climate change into their supervision practices.

- Explain how climate-related risk is incorporated into policies using the Bank of England case study.
- Compare the types of policy enforcement for sustainable investment and disclosure.
- Describe the trends in private-sector climate frameworks.
- Explain the broader societal and cultural impacts of climate change and policies.

This chapter examines the wider policy and cultural context in which the move toward sustainability and climate risk integration in the private sector has occurred. It starts by describing international sustainability and climate policy frameworks to date and the challenges inherent in attempts to reduce emissions through global agreements. It then describes how sustainability and climate change have become part of various policy frameworks, both public-sector- and private-sector-oriented, ranging from promotion to supervision and regulation. Finally, consideration is given to potential implications, both at the micro and macro level, of how policies and other transition drivers may impact society and corporate culture.

have sharply increased their share of emissions in the past two decades (e.g., China, India) are different from those responsible for accumulated historical emissions (e.g., US, EU, Russia, Japan) and those expected to drive future emissions unless they adopt green growth models (e.g., Saudi Arabia, Indonesia, Brazil), raising "fairness" questions around the potential trade-off between emissions and economic development.

- The first global agreement on climate established the **United Nations Framework Convention on Climate Change (UNFCCC)** in 1992 at the Rio Summit.
- The first global compact on emissions reductions, the **Kyoto Protocol** of 1997, took the form of a legally binding treaty, according to which high-income countries agreed to reduce emissions by 5% from 1990 levels by 2008–2012.
- The subsequent **Paris Agreement** of 2015 took a different tack, agreeing on a 1.5–2°C reduction aspiration and inviting all countries to submit (non-binding) plans to get there, relying on the mechanism of peer pressure.
- At the national level, **carbon pricing** is a widely used policy to reduce emissions; the principal ways to establish a price on carbon emissions are through **carbon taxes or cap-and-trade schemes** (which are not mutually exclusive).
- However, carbon pricing is not the only policy option to achieve emissions reductions; countries have also used **sector-specific policies**, such as priority dispatch, feed-in tariffs, net metering, and quota requirements for renewable power generation, and fuel efficiency and CO₂ emissions standards for automobiles.
- In the investment space, societal and cultural trends and **sustainability and climate investment policies**, led by governments, international financial institutions, and private investor coalitions, are helping to frame the private sector's transition to a sustainable, green economy and promote the growth of green finance and sustainability-oriented products.
- One of the most impactful policy areas where climate change has been integrated is that of **financial supervision**: Many central banks now expect financial institutions to integrate climate into governance, risk management, and disclosure, and to undergo **climate stress tests** to assess the resiliency of the financial system to climate shocks.

Chapter Outline

- 4.1 Introduction to Climate Policy, Culture, and Governance
- 4.2 International Climate Policies
- 4.3 Climate Risk and Investment Policy
- 4.4 Climate Risk and Financial Supervision
- 4.5 Private Sector Climate Frameworks
- 4.6 Broader Societal Implications and Conclusions

Key Learning Points

- There have been various attempts to agree on **international climate policy** globally; these attempts have been complicated by disagreements over the optimal amount of emissions reductions, the inherent difficulties of collective action, and the fact that countries that

- Financial policy also supports the growth of sustainable finance through auditing self-described sustainable products, and in some jurisdictions, through top-down regulatory **taxonomies** defining what products are considered sustainable.

SUSTAINABILITY AND CLIMATE POLICY, CULTURE, AND GOVERNANCE

4.1 Introduction to Climate Policy, Culture, and Governance

To understand the private sector's approaches to sustainability, climate change, and climate risk requires an understanding of the broader policy and cultural framework in which these issues are gaining prominence. This chapter is intended to contextualize and frame the private-sector transition to a sustainable, green economy. First, it describes international climate policy and the considerations that have led it to be relatively slow-moving. Then, it examines the increasing importance of sustainability and climate change-related policy considerations, from investment policies to supervision and regulation of the private sector, notably the private financial sector. The chapter also looks at private-sector-oriented governance and coordination frameworks on sustainability and climate change, building on the coalitions discussed in Chapter 2.

However, just as importantly, policies and private-sector practices are evolving within a greater context of societal and cultural shifts on sustainability and climate, including market expectations. Therefore, the chapter concludes with a look at these.

4.2 International Climate Policies

There have been various attempts since the 1990s to agree on international climate policies, mainly regarding emissions reductions, at a global level. The first global agreement on climate change was the formation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992; the first accord on emissions reductions was the Kyoto Protocol of 1997; and the latest and most

successful, so far, climate change mitigation agreement is the Paris Agreement of 2015. Understanding why global climate policy has proved to be so difficult and slow-moving requires an understanding of the background situation, open questions, and the different ways that agreements have attempted to resolve them (these are reviewed and described in this section). In addition, sustainability and climate-related issues have gained prominence in other areas, including private-sector practices, financial policy, and regulation (these are reviewed in subsequent sections).

4.2.1 Backdrop of Climate Policies

The scientific evidence that human greenhouse gas emissions are warming the planet's climate has roots stretching back decades, and it became the consensus in the 1970s and 1980s. In fact, it was not long after the initial discovery of the greenhouse effect in the mid-nineteenth century—the fact that gases such as carbon dioxide trap heat in the atmosphere—that Svante Arrhenius, a Swedish scientist, proposed in 1896 that fossil-fuel combustion, and the resulting increase in atmospheric CO₂ concentrations, would result in global warming. Scientists such as Gilbert Plass and observers such as Guy Callendar continued to work on collecting evidence that CO₂ was warming the Earth, although at the time, many other scientists thought the oceans' ability to absorb excess CO₂ was vast, or that natural variability mattered more than human influence on climate. Indeed, global average temperatures were not meaningfully rising in the 40s, 50s, or 60s (in fact, the slight cooling trend observed in the 1950s and 1960s can retrospectively be attributed to aerosols, a type of chemical pollution that decreased after clean air legislation in major economies). But in the 1980s, global mean annual temperatures started to rise significantly, and scientific consensus around the strong human influence on climate solidified, leading to the formation of the Intergovernmental Panel on Climate Change (IPCC) in 1988, a UN-convened organization of scientists, and soon thereafter to the United Nations Framework Convention on Climate Change (UNFCCC), a UN body dedicated to climate change.

But the understanding and wide recognition of the fact that human-caused emissions were warming and disrupting the global climate prompted more questions, such as on the optimal level of emissions reductions, over the allocation of

(moral) responsibility and the potential trade-off between emissions and economic development, and questions regarding how to overcome collective action problems.

One important debate played out both within academia and among policymakers over the optimal level of emissions reductions. Economists such as William Nordhaus developed models to assess the costs and benefits of mitigating climate change through emissions reductions versus the physical impacts of climate change. The original formulation of Nordhaus' dynamic integrated climate-economy (DICE) model from the early 1990s suggested that warming of 3.5°C would be optimal in terms of not unduly hampering economic growth while still mitigating the worst climate impacts. Climate scientists have tended to be more conservative, and in any case, more evidence has accumulated that even somewhat lower levels of warming can lead to severe physical impacts and potentially to catastrophic "tipping points," leading to international consensus around a goal of limiting warming to 2°C. A subsequent revisit by academics of the DICE model found that even it suggested an optimum around 2°C once the carbon cycle and energy balance models within it were better calibrated, and climate damage estimates were updated (Hänsel et al., 2020).

Another important open question revolves around the allocation of (moral) responsibility, the relationship between a country's wealth and historical emissions and the potential

trade-off between emissions and economic development. What matters to the warming and disruption of the Earth's climate is the stock of carbon dioxide and other greenhouse gases in the atmosphere—the higher the concentration, the greater the impacts. Obviously, annual emissions keep adding to this stock. One could therefore argue that those responsible for the greatest share of new emissions are the ones who must cut back the most, especially as solutions (both technical and nature-based) to remove CO₂ from the atmosphere are in their infancy and do not yet exist at scale. However, looking backward, one can equally argue that it is the countries responsible for the greatest share of cumulative emissions (i.e., the total stock), that are most responsible for climate change. Countries that have sharply increased their share of emissions in the past two decades (e.g., China, India) are different from those responsible for accumulated historical emissions (e.g., US, EU, Russia, Japan) and those expected to drive future emissions unless they adopt green growth models (e.g., Saudi Arabia, Indonesia, Brazil) (see box). This has set up a tension in international negotiations ever since, and it is complicated by the "fairness" questions around the potential trade-off between emissions and economic development.

A final important issue that forms an indelible part of the backdrop of international climate policy is the inherent difficulties of collective action. Global emissions, and

UNDERSTANDING CUMULATIVE VERSUS CURRENT ANNUAL EMISSIONS

There is quite a contrast in emissions between the countries that are currently the largest emitters and those that have cumulatively contributed most to rising emissions. In terms of current annual emissions, China's by far outpace any other country's, and India's are also growing rapidly. Of current (as of 2017) emissions at regional levels, Asia accounts for over half (53%), with North America at 18%, and Europe at 17%.

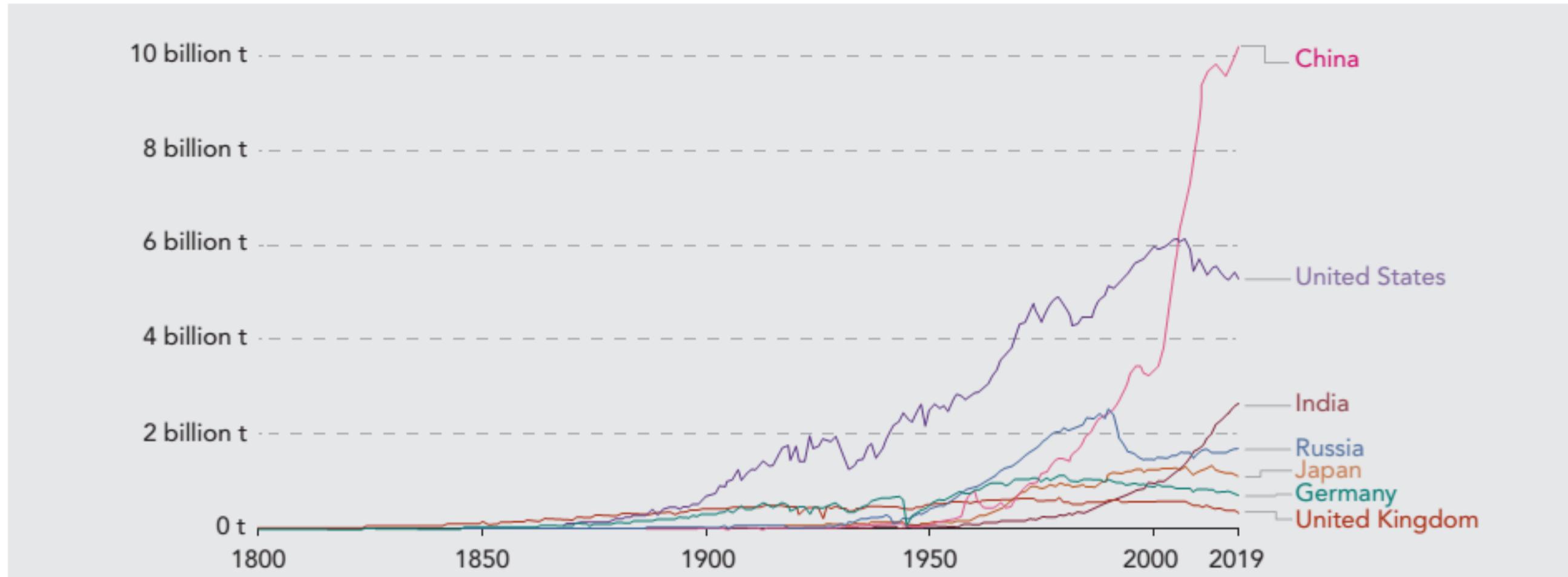
Annual CO₂ Emissions (1800–2019), Select Countries

However, because industrialization driven by coal, oil, and other fossil fuels started far earlier in Europe and in North America than in Asia, these countries account for a far larger share of cumulative emissions. In many ways, cumulative emissions matter more, because cumulative

emissions reflect the stock of CO₂ in the atmosphere—and it is the total stock, not the annual flow, that affects the changes in climate.

Cumulative CO₂ Emissions (1751–2017) by Country

An examination of cumulative emissions finds that, while China does still account for a substantial share—one eighth and growing—Europe and North America come out ahead. The United States alone is responsible for a quarter of global cumulative emissions, and the former 28 countries of the European Union—including the United Kingdom, France, Germany, Italy, and others—for nearly as much, just over a fifth. North America accounts for 29% of global emissions through 2017, the exact same proportion as Asia. Europe accounts for a full third (33%).



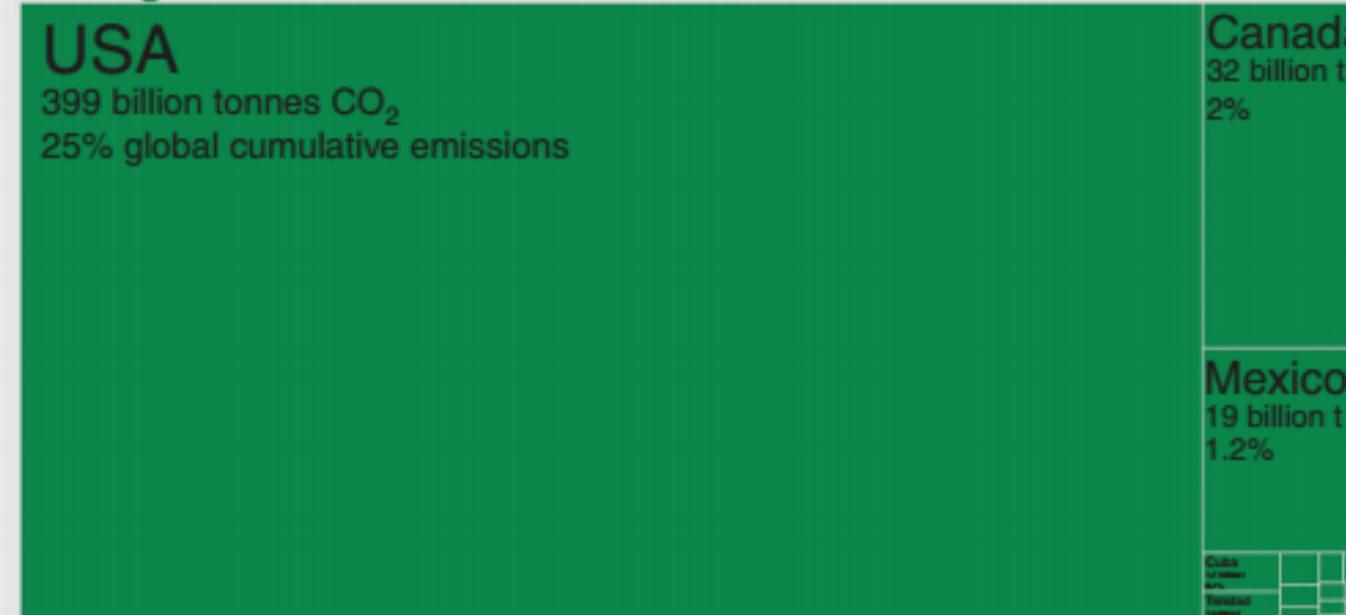
Source: The United States Department of Energy Global Carbon Project / Carbon Dioxide Information Analysis Center 2019.

North America

457 billion tonnes CO₂

29% global cumulative emissions

USA
399 billion tonnes CO₂
25% global cumulative emissions

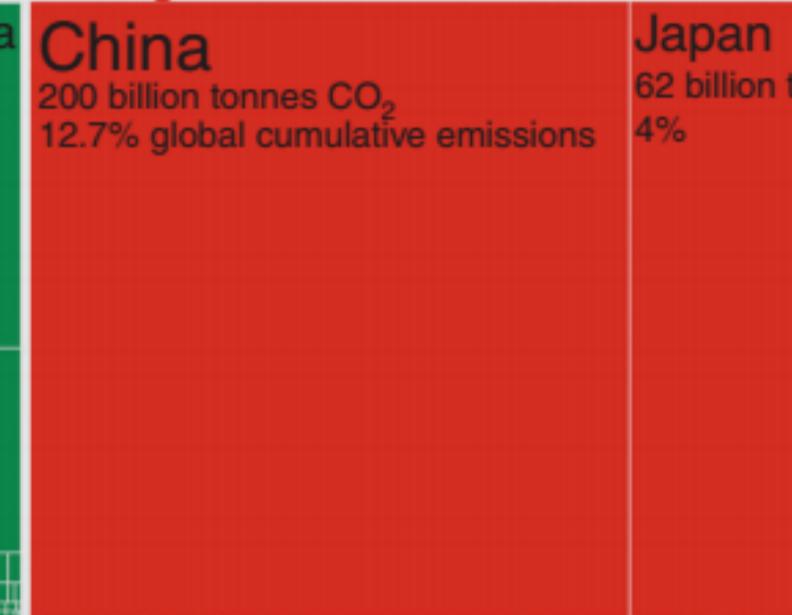


Asia

457 billion tonnes CO₂

29% global cumulative emissions

China
200 billion tonnes CO₂
12.7% global cumulative emissions



EU-28

353 billion tonnes CO₂

22% global cumulative emissions



Russia

101 billion tonnes
6% global emissions

Ukraine
19 billion t
1.2%



Europe

514 billion tonnes CO₂

33% global cumulative emissions

Turkey
9.6 billion t
0.6%



Africa

43 billion tonnes CO₂

3% global emissions

South America

40 billion tonnes CO₂

3% global emissions

South Africa
19.8 billion t
1.3%



Brazil
14.2 billion t
0.9%



Source: Hannah Ritchie and Max Roser (2020) - "CO₂ and Greenhouse Gas Emissions". Published online at OurWorldInData.org.

Figure 1

attempts to reduce them, constitute a classic collective action problem, that is, a problem caused by disincentives that tend to discourage joint action by individual entities (in this case, mainly countries, but also individuals or companies) in pursuit of a common goal, or where the end result is a common good that benefits everyone. The Earth's climate is a common good, and a healthier, less disrupted climate benefits everyone on Earth. However, any country reducing its greenhouse gas emissions is paying the full cost of those emissions cuts in the short term, while only receiving a fraction of the benefits of a better climate, which are only realized over the long term. Thus, countries are easily disincentivized from implementing painful emissions cuts and are free-riding off the emissions cuts of others.

4.2.2 Brief History of International Climate Agreements, from Kyoto to Paris

International climate summits can arguably be traced to 1979, when the first World Climate Summit, organized by the World Meteorological Organization (WMO), framed climate change as an issue to be addressed by global politics. In 1988, the WMO was also the co-creator of the IPCC, the scientific body that was to become ever more influential in subsequent years and decades.

However, the history of concerted global political action on climate starts with United Nations involvement. The 1992 Earth Summit in Rio de Janeiro, Brazil, introduced several new UN initiatives and bodies, including the United Nations Framework Convention on Climate Change (UNFCCC). Subsequent summits of the UNFCCC were called "conferences of parties," or COP for short, with the number of the meeting attached: the first follow-up meeting, COP1, took place in Berlin in 1995.

COP3 in Kyoto in 1997 produced the first major international accord on emissions reductions. The **Kyoto Protocol**, which took the form of a legally binding treaty, required high-income "Annex 1" countries to attain 5% emissions reductions compared to 1990 levels by 2008–2012, with several mechanisms built in that attempted to promote flexibility and technology transfer between countries. The first of these, emissions-trading, was meant to allow Annex 1 countries that had made deeper emissions cuts to sell

surplus emissions allowances to other Annex 1 countries. The second of these, "joint implementation," was also meant to be between Annex 1 countries, where one country could undertake a project involving technology transfer in a fellow Annex 1 country. The third, the "clean development mechanism" (CDM), attempted to provide a way for emissions cuts to also be spread to developing economies. Under the CDM, an Annex 1 country could get credit for conducting an emissions reduction project in a non-Annex 1 country (Napoli, 2012).

Immediately after its adoption, the Protocol was viewed as a resounding success and an optimistic sign for the future. However, in retrospect, the Kyoto Protocol is widely viewed as having been a failure, and it did not achieve even the modest emissions targets it had embedded within it. Some of its failings were technical, such as the fact that the planned emissions-trading scheme was never properly implemented. But many of its failings were deeper and more structural. The fact that, in light of the notion of "common but differentiated responsibilities," developing countries were not subject to any kind of emissions reduction obligations (and indeed many had skyrocketing rates of emissions growth during this time) made even Annex 1 countries less committed. Indeed, the United States ended up never ratifying the Protocol for this reason. Fundamentally, the Protocol provided no good way to overcome the collective action problem, whereby any given country would bear the short-term costs of emissions reduction, but only a fraction of the benefit (Napoli, 2012).

Expectations were high that negotiations at COP15 in Copenhagen in 2009 would produce an improved, binding treaty for the post-Kyoto space, as Kyoto was set to expire in 2012. Inversely to the situation with Kyoto, the Copenhagen summit's acrimonious end, with no agreement on a new binding treaty, was widely seen by commentators and the media as an abject failure. Nonetheless, some of the ideas first introduced at Copenhagen ended up laying the groundwork for subsequent climate policy. For one example, the meeting in Copenhagen was the first COP to establish the aspirational goal that global warming be kept to below 2°C. Another example is that in the absence of a binding treaty, the Copenhagen accord invited countries of

all kinds, high-income and low-income, to submit domestic mitigation strategies to the UNFCCC.

In 2015, COP21 in Paris built on some of these new ideas first tentatively floated in Copenhagen. The **Paris Agreement** is based not on legally binding emissions reductions targets but on a commonly agreed aspiration to keep global temperature rise “well below 2°C above pre-industrial levels” and to “pursuing efforts” to limit the rise to 1.5°C, combined with national efforts by each individual party in this direction (UNFCCC, 2015). These national plans, now called **Nationally Determined Contributions (NDCs)**, are to be submitted to the UNFCCC, and periodically re-evaluated. Specifically, the Paris Agreement establishes a “ratchet” mechanism, where countries are expected to tighten their NDCs every five years, and these are to be evaluated at COP meetings. The first round of NDCs from 2015 were not aligned with a 2°C limit, let alone 1.5°C of warming limit—agencies such as the International Energy Agency (IEA) estimated that these policies would lead to 3°C or more of warming. However, the first round of “ratcheting” seems to be working as intended, as many 2020 NDCs are much more ambitious, with many countries committing to a (domestic) goal of achieving net-zero emissions by 2050, which does align with 2°C limit globally. At the time of writing, the COP26 meeting, where these will be evaluated, has not yet been held, as this was pushed from November 2020 to November 2021 due to the global COVID-19 pandemic.

In any case, it is already possible to say that the success Paris has brought so far is in its different structure, and approach, from Kyoto. Instead of relying on legal obligations (which are difficult to enforce for any international treaty in any case, unlike domestic contracts that can be enforced by judicial systems and appropriate penalties), the Paris Agreement makes use of the powerful tools of inclusion and peer pressure. Everyone has to submit an NDC, and countries can and do ramp up ambitions when others do. As an example, a first version of Japan’s 2020 NDC was not significantly different from its 2015 NDC, but after South Korea adopted a goal of net-zero emissions by 2050, Japan did too.

In addition, the framework around the Paris Agreement explicitly recognized for the first time that many kinds

of stakeholders, ranging from subnational actors such as cities and regions to private-sector businesses and financial institutions, could help to contribute to climate goals. To connect the work of governments with the many voluntary and collaborative actions taken by cities, regions, businesses and investors, nations decided to appoint two “high-level champions.” Under these champions, various initiatives such as the Marrakech Partnership for Global Climate Action, and later, the UN Race to Net Zero, have taken shape (see section 4.2.4 and Section 4.5).

4.2.3 Options of National Climate Policies

Achieving NDCs requires having a domestic climate policy. This section briefly reviews the principal types of climate change mitigation (i.e., greenhouse gas emissions reduction) policies at the national level that countries have in place. Overall, policies can be economy-wide—which tends to be some form of carbon pricing—or sector-specific. This section reviews carbon pricing and then describes climate policies in two of the most emissions-intensive sectors: power generation and transportation.

Carbon pricing refers principally to two types of policies—carbon taxes and emissions-trading schemes, often better known as cap-and-trade schemes. **Carbon taxes**, which impose a price per ton of CO₂ emitted, have typically been favored by economists. They are a classic way of internalizing an externality by forcing emitters to pay for the social cost of their carbon emissions, and a tax in such an instance is the classic prescription from economic theory. Currently, carbon taxes exist in many jurisdictions, though they vary in scope: Japan’s carbon tax is at the lower end, less than USD10 per ton, whereas Sweden’s is currently the world’s highest, at around USD125 per ton. In addition to (or instead of) carbon taxes, many countries have opted for **cap-and-trade schemes**. In these, the total amount of emissions is capped (and the cap gradually lowered), but emissions permits can be traded between participants. While this limit on quantity does end up imposing a price as well, a trading scheme is often considered more flexible.

In general, carbon taxes and emissions-trading schemes both have benefits and drawbacks. Carbon taxes raise

revenue for the government, which can then be spent on further mitigating or adapting to climate change. However, in at least some countries, levels of tax are frequently tweaked, which can be detrimental to investors or businesses that need certainty over multiple years to make investment decisions. Emissions-trading schemes can allow industries or sectors that are more successful in reducing emissions to sell excess permits to those in sectors where emissions reductions are much more expensive, or even technologically infeasible with current technologies. In addition, trading schemes can create credible cash flows that can facilitate larger and longer-term investment decisions, especially if the property rights and market rules of the permits are clear. On the other hand, trading schemes can cause volatile carbon pricing, or an exogenous shock such as a financial crisis can lead to an oversupply of permits, decreasing the incentives to reduce emissions. According to the World Bank, there are currently 64 carbon pricing initiatives (taxes and emissions-trading schemes) in the world, covering 46 countries and 65 subnational jurisdictions. However, in many of these, the price ends up being below the USD100 per ton assumed to be needed to have a significant effect.

Other policies have also had significant effects in reducing emissions in specific sectors. Perhaps the sector where specific policies has had the largest impact so far is in power generation. **Renewable portfolio standards** (RPSs) are an umbrella term for a range of quota-based regulations that aim to increase the supply of renewable electricity by requiring commercial electricity producers to source a specific portion of supply from renewable energy sources, such as wind or solar power. RPSs have been deployed in 173 countries, including the Renewable Obligation in the UK and the Renewable Electricity Standard on the federal level in the United States. **Feed-in tariffs** offer a guaranteed price per unit of electricity generated at which producers can sell their electricity for a fixed period of time (usually between 15 and 25 years). Sometimes these tariffs are simply set by policymakers; in other cases, they are determined through a market-based process, such as the UK's "contract for difference" approach.

The transport sector, notably automobiles, is also an area with ample sector-specific regulation targeted at emissions

reductions. Both the United States and E.U., alongside other jurisdictions, have **fuel efficiency standards** for cars; the E.U. also has **CO₂ emissions standards** both for individual cars and for automobile manufacturers at the fleet level. In the automotive space, electric vehicles (EVs), which are far less emissions-intensive (and produce no tailpipe emissions), are in a similar position to renewable energy in the early to mid-2000s, in that it is a superior technology environmentally but still slightly more expensive. Thus, analogous to feed-in tariffs, which are meant to subsidize and promote the expansion of renewable power generation capacity, a number of countries have implemented **EV purchase subsidies** to encourage uptake of electric vehicles.

Many other policies across many other sectors also contribute to emissions reduction, from home energy-efficiency requirements and fuel taxes to land use regulations (see table for selected sector-specific examples).

4.2.4 Subnational Climate Policies (Cities, Regions)

Although a good portion of climate policy occurs at the national level, an increasing portion takes place at the sub-national level as well, such as in states, regions, and cities. In some cases, this is a product of state or regional political systems where entities can and do have the latitude to make more ambitious policy than the federal government. In Japan, for instance, despite the lack of a national cap-and-trade system, the Tokyo metropolitan area emissions-trading scheme has been running since 2010. Similarly, in the United States, the Regional Greenhouse Gas Initiative, running since 2009, covers all large power plants across ten northeast American states that produce more than 25 MWh of electricity.

Some subnational efforts function more as networks and advocacy efforts. C40, a global coalition of cities dedicated to combating climate change, founded by 18 cities in 2005 and now with 97 members, is a transnational example, and helped contribute to international pressure to bring about the Paris Agreement. In the wake of the decision in 2017 by President Donald Trump's administration to withdraw the United States from the Paris Agreement, an organization called America's Pledge was launched by entities still

Table 1

SELECTED SECTOR-SPECIFIC EMISSIONS REDUCTIONS POLICIES		
Policy	Sector	Description
Carbon tax	Cross-sectoral	A tax per ton of CO ₂ emitted disincentivizes emissions and collects tax revenue that can be used for further climate measures.
Emissions-trading scheme	Cross-sectoral	An emissions-trading scheme reduces emissions but allows sectors to trade with each other, so emissions are reduced where it is easiest and cheapest to do so.
Renewable portfolio standard	Power generation	A requirement of a specific proportion of electricity generation coming from renewable sources
Automobile fuel efficiency requirements	Transport	A requirement that individual cars, or fleets, must satisfy a minimum standard of fuel efficiency to be legally allowed
Fuel tax	Transport, heating	A fuel tax can lower the demand for fuel or be used to disincentivize the use of dirtier fuels.
Building heating / energy-efficiency requirements	Buildings	Building requirements can be used to forbid the use of carbon-emitting heating technologies (e.g., natural gas furnaces, oil heating) in new buildings in favor of renewable alternatives.
Ban on burning peat bogs / wetlands	Agriculture and land use	Generally, peat bogs and wetlands are a huge store of carbon. Some peat bogs have historically been periodically burnt for land management purposes, but banning burning (as in the UK) will reduce emissions.
Green / low-carbon public procurement	Transport, buildings, other	Governments can use their purchasing power to opt for green and sustainable alternatives (e.g., for public-sector buildings, public transport, etc.), helping to spur more general uptake and develop technologies.

committed to Paris. By 2020, this comprised 25 state governors, over 500 cities and counties, 350 institutions of higher education, 30 healthcare systems, and close to 2,300 corporations and investment firms. America's Pledge is also a good example of the increasing collaboration between the public and private sector in these kinds of coalitions (see also Section 4.5 on private sector coalitions).

No matter the exact format of non-state and subnational actor (NSA) climate commitments, these types of commitments are, in aggregate, becoming more and more impactful. One recent comprehensive assessment examined nearly 80 regions, 6000 cities, and 1600 companies across ten large, high-emissions economies. It found that full implementation of NSA commitments would lower emissions by

3.8–5.5% more by 2030 than national pledges in those ten countries would do alone (Kuramochi et al., 2020).

4.3 Climate Risk and Financial Policy

As distinct from the broader context of international climate policy and country-level emissions cuts, issues of climate risk are important in issues relating specifically to the private sector, ranging from investment policies to financial supervision and regulation. Indeed, within the space of a decade or so, climate change has gone from a peripheral issue to a key consideration for corporations and financial institutions. This section discusses private-sector investment policies, and the next covers financial-sector supervision and oversight.

4.3.1 Sustainability and Climate Investment Policies

International financial institutions (IFIs) were some of the earliest to formulate investment policies with regards to sustainability and ESG risks more broadly, and to climate risk specifically. **Multilateral development banks (MDBs)**, including global ones such as the International Bank for Reconstruction and Development (IBRD, commonly known as the World Bank), and regional ones, such as the African Development Bank (AfDB), the Asian Development Bank (ADB), and the European Investment Bank (EIB), are tasked with supporting public-sector investment in physical and human capital projects conducive to socioeconomic development. In addition, MDBs and other **Development Financial Institutions (DFIs)** are also tasked with supporting the development of the private sector. For example, the International Finance Corporation (IFC) is a member of the World Bank Group, and bilateral European DFIs are part of the European Development Finance Institutions (EDFI) association. Because these institutions were created with a double bottom line mission (that is, designed to be financially self-sufficient but with a mandate to support socioeconomic development, as opposed to maximize profits), they became some of the earliest organizations to devise explicit sustainability, ESG, and climate investment policies.

Long before Mark Carney, the governor of the Bank of England, helped popularize the types of climate risk to a broader financial audience in 2015, institutions like the IFC were writing detailed reports about climate risk. For example, back in 2007, the EIB issued the world's first "Climate awareness bond" dedicated to climate-related issues, which helped launch the global market in green bonds (see Chapter 5). And, as early as 2010, IFC was discussing filling the financing gap on climate change, boasting about its USD 1 billion in investments in climate-related projects in 2009 and its ability to leverage greater funding through attracting private co-financing. Similarly, a 2011 IFC report examined in detail the effects of climate on traditional risk categories, such as credit risk, strategy risk, operational risk, and legal risk, covering both physical and transition risk examples (though not yet using terminology) (IFC, 2011). More recently, starting in 2019, IFC has partnered with the private sector to develop the Operating Principles for Impact Management (OPIM), which draw on emerging best practices

to assess the impact of management systems of funds and institutions, including their impact on environmental and climate-related aspects.

And, in a signal of the increasing momentum behind sustainability and climate investment policies, private financial institutions are replicating parts of the multilateral and bilateral DFI model. For example, the USD100 billion J.P. Morgan Development Financial Institution was launched in 2020 to spur additional capital toward financing the UN Sustainable Development Goals (SDGs) in emerging economies.

4.3.2 Public Policy to Promote Adoption of Green Finance

Another strand of public policy relating to finance is that which assumes the role of promoting the presence and activity of the private financial sector. In recent years, as climate change has become a more prominent issue, much financial-sector promotion and policymaking around financial centers has started to incorporate green elements.

Much of this work has involved setting up various sorts of green finance "hubs" or taskforces, in some cases with dedicated institutions. In Japan, the Japan Financial Services Agency and two Japanese ministries have set up the TCFD Consortium of Japan to facilitate dialogue between investors and companies on climate risk disclosure. In Hong Kong, the territory's financial regulator and quasi-central bank, the Hong Kong Monetary Authority, has launched the Centre for Green Finance to spread best practices and help to green Hong Kong's financial services industry. In Singapore, through its Green Finance Action Plan, the Monetary Authority of Singapore has proposed guidelines on environmental risk management for banks, asset managers, and insurers. In 2019, the UK set up a Green Finance Institute, backed by the government but staffed by bankers, to convene and lead sectoral coalitions of experts to broaden and promote the growth of a green finance ecosystem. Luxembourg has a body with a similar mission, the Luxembourg Sustainable Finance Initiative.

Some of these networks are themselves transnational. Financial Centres for Sustainability (FC4S), founded in 2017, is a network to promote sustainability among 30 financial centers, with public entities promoting their respective cities serving as the FC4S members. The FC4S has a

permanent secretariat, which provides research on emerging issues, guidance on best practices, and project development and support services to its members.

4.4 Climate Risk and Financial Supervision

While investment and promotional policies are important, perhaps the most significant way in which climate has become embedded in financial policy is in its role in supervision and oversight, especially by central banks tasked with overseeing the stability of both individual institutions and the financial system.

4.4.1 Climate Integration into Central Bank-led Supervision

In just five years from 2015 to 2020, central banks have, largely, incorporated climate change into their supervision practices. In this, they are following the lead of the Bank of England, the central bank and financial supervisor of the UK, which, in 2014, was widely recognized as the first central bank to begin working on these issues.

An important, subsequent initiative bringing together central banks and regulators to work on climate integration, and helping to spread best practices, has been the **Network for Greening the Financial System (NGFS)**. It promotes collaboration and the sharing of expertise on climate risk among supervisory institutions. It was founded by three European central banks—those of the UK, France, and the Netherlands—but the network now counts 89 members from all continents.

Central banks and financial supervisors have moved to integrate climate change both into **microprudential supervision**, the oversight of specific financial institutions (usually banks and insurers) for financial soundness, and **macroprudential supervision**, which examines the stability of the broader financial system (some have even moved to incorporate climate issues into traditional monetary policy, though this practice is still limited).

In regard to microprudential supervision, or supervision of the soundness of individual financial institutions, various central banks and supervisors have amassed, and continue to build up, internal capacity for climate risk integration. The Bank of

England (BoE) is a forerunner in this space, having laid out its expectations regarding governance, risk management, scenario analysis, and disclosure in 2019 (see Case Study). But similar supervisory expectations have been laid out by the European Central Bank (European Central Bank, 2020), Monetary Authority of Singapore (Monetary Authority of Singapore, 2020), and the Australian Prudential Regulation Authority (Australian Prudential Regulation Authority, 2020), among others.

General trends cut across jurisdictions on climate integration in regard to governance and risk management. In governance, the supervisory expectation is that financial institutions have structures in place to ensure climate-related risks are actively considered and managed at the highest level by senior managers and boards of directors. In risk management, firms are often asked to use some combination of scenario analysis and stress testing. In disclosure, the recommendations of the TCFD are increasingly seen as best practice by regulators and policymakers. In the UK and New Zealand, TCFD-aligned reporting has been made mandatory, and other countries will likely follow suit.

Where the potential impacts of environment-related risks are assessed to be material (for example as a result of scenario analysis), supervisors may then expect or require firms to demonstrate how they will mitigate these financial risks. In general, climate-related prudential policies do differ somewhat across countries due to the different mandate scope of relevant institutions and systematic differences in the use of prudential tools, although bodies like the NGFS are helping to spread best practices.

Among macroprudential measures, one of the most important at central banks' disposal are stress tests. Such tests, which model the reaction of a financial system to a hypothetical shock, were already widely adopted by regulators in the wake of the Global financial crisis of 2008, to avoid a repeat crisis, and they are now being adapted to examine climate change. The Dutch, French, and UK central banks as well as the European Central Bank, are all currently developing climate stress tests with differing degrees of granularity, distinct climate and policy scenarios, time horizons, and feedback loops.

Other macroprudential measures have also been proposed, if not yet widely adopted. One is the idea of a carbon countercyclical capital buffer, a capital requirement that

would require banks to build up a higher equity capital base during periods of carbon-intensive credit. Another is large exposure limits that would limit banks' (over)exposure to carbon-intensive assets that are considered to be at high risk of stranding. Some central banks, while not yet adopting large exposure limits as a requirement for supervised

financial institutions, have done so for the management of their own portfolio (for example, Sweden's Riksbank's exclusion of sub-sovereign issuers with a "large climate footprint" from its capital management, such as the bonds of the Canadian province of Alberta, which produces very emissions-intensive crude oil derived from tar sands).

CASE STUDY: BANK OF ENGLAND

The Bank of England (BoE), the UK's central bank and financial regulator, now integrates climate-related risk in all three of its main policy responsibilities—microprudential policy, macroprudential policy, and monetary policy, which are described in this case study.

Background of Climate Integration

The BoE's shift toward climate started with a 2015 speech called "Tragedy of the Horizon," by its then-governor Mark Carney. The speech recognized and laid out how climate change affects financial stability. Carney argued that while most climate damage is expected far enough in the future to be beyond typical investment horizons, escaping financial scrutiny, climate change would eventually cause systemic risks to the whole financial sector (hence the "tragedy" of the horizon). He specifically discussed physical, transition, and litigation risk.

Once it was accepted that climate change could cause material risks to the financial system and that it therefore belonged within the Bank's supervisory scope, it started to be incorporated into the Bank's expectations and processes. Some time later, in March 2021, the mandate of the Bank was explicitly modified by the UK government to include environmental goals: specifically, that the Bank should support the greening of the country's economy and help the country reach net-zero emissions by 2050.

Microprudential Measures

The BoE has expectations regarding, and monitors firms' progress on, adopting a strategic approach to climate change, which was first laid out in early 2019. While allowing for some flexibility in line with the UK tradition of principles-based regulation, there are four key pillars to the BoE requirements: governance, risk management, scenario analysis, and disclosure.

Regarding governance, the BoE requires firms to allocate responsibility for climate-related risks to a designated

executive under UK rules that allow senior executives to be held responsible. It also expects boards to be involved in assessing climate risk. On risk management, the BoE requires banks and insurers, under their own capital adequacy and solvency assessments, to include "all material exposures" relating to the financial risks from climate change. As for scenario analysis, the Bank expects firms to conduct it to "inform ... strategic planning". Finally, on disclosure, the Bank expects firms to consider implementing disclosures on climate risk beyond mandatory requirements, suggesting TCFD recommendations as a guideline.

Macroprudential Measures

For macroprudential policy, which looks at system-wide risks, stress tests have become one of the most important regulatory tools since the Global Financial Crisis of 2008. From 2021, the Bank is launching a dedicated climate risk stress test, the Biennial Exploratory Scenario (BES). The BES will be based on scenario analysis (see Ch 7 for more details on scenarios) and make use of an early policy action scenario, a late policy action scenario, and a no additional policy scenario. The BES also specifies the variables to be used, and the ways and details in which participating institutions are expected to conduct modeling. The BES follows on from a first successful stress test incorporating climate considerations, namely the BoE's insurance stress test in 2019.

Monetary Measures

Climate has so far been less integrated into monetary policy than into other areas of the Bank's operations. The Bank has previously reported on the climate risk exposures of the assets it owns for monetary policy purposes (e.g., the corporate bond portfolio used for quantitative easing). With the new mandate, the Bank is expected to adjust how it purchases corporate bonds.

Sources: Bank of England 2015; Bank of England 2019; PRA 2019; FT 2021

4.4.2 Policy Enforcement of Sustainable Investment and Disclosure

Another type of policy enforcement of sustainability has to do not with financial stability, but it derives from the regulatory tradition of consumer protection, specifically combating mis-selling or misleadingly advertising products to consumers.

One way in which this is implemented is through audits to determine if funds or products marketing themselves as sustainable are in fact living up to the promise. The Financial Conduct Authority (FCA), the UK financial regulator for conduct and financial consumer protection, found in a 2019 review in that the sustainable label was applied to a “very wide range” of financial products, some of which did not appear to have “materially different exposures” when compared to products not marketed as sustainable. This raised the specter of **greenwashing**, that is, marketing that portrays products or activities as producing positive environmental outcomes when this is not actually the case.

A further step, beyond checks, is to have mandatory disclosure or marketing requirements. The European Union’s securities regulator conducted a consultation in 2020 about the appropriate marketing of sustainable funds, with a view to drawing up guidelines and rules. The FCA, too, has developed a set of principles intended for fund management firms to better realize and implement existing requirements that disclosures must be “fair, clear, and not misleading.”

4.4.3 Policy-led Sustainability Classifications

In an extension of the notion that regulators should verify the sustainability of investment, some jurisdictions have moved to create public policy that clearly defines, from the top down, what counts as a sustainable or climate-friendly investment.

The furthest along in this regard is the European Union. The **E.U. Taxonomy**, first published in draft format in March 2020, sets performance thresholds (referred to as “technical screening criteria”) for economic activities, by sector and subsector. The guidance is very detailed. To count as “green,” activities must a) make a substantive contribution to one of six environmental objectives, b) do no significant harm to the other five, and c) meet minimum safeguards (e.g., the OECD Guidelines on Multinational Enterprises and the UN Guiding Principles on Business and Human Rights).

It is hoped that these criteria will create an international standard to help companies, project promoters, and issuers access green financing to improve their environmental performance as well as help to identify which activities are already environmentally friendly (High-Level Expert Group on Sustainable Finance, 2020). Some doubts remain as to the correct level of specificity and utility of such a taxonomy and whether defining sustainability against a binary threshold stifles innovation and incentives for transition. Political arguments over the inclusion of certain sectors, such as nuclear power, which is carbon-free but opposed by many environmentalists, or natural gas, viewed by some as a “bridge” fuel from coal toward cleaner energy, have plagued the Taxonomy in its slow progression toward being made into law.

However, the struggles of the E.U. Taxonomy have not deterred others from attempting this approach. The UK, Canada, and ASEAN nations of Southeast Asia are all developing taxonomies of their own. Singapore’s proposal for an ASEAN taxonomy, developed by a green finance taskforce convened by the country’s central bank, includes fossil-fuel activities such as natural gas, which the proposal argues will continue to play a “significant role” in the region’s energy supply. These efforts are complemented by other initiatives, such as the Operating Principles for Impact Management (OPIM) discussed in section 4.3.1.

4.5 Private-Sector Climate Frameworks

Regarding climate change, a particularly important role has been played by corporate and investor groupings, which have helped spread best practice. In this regard, the trend has been very similar to what occurred with broader sustainability groupings and frameworks such as the UN Global Compact or the Principles for Responsible Investment, covered in Chapter 2. One of the key early groupings in this space was the Institutional Investors Group on Climate Change (IIGCC), which was launched in 2001 and now encompasses over 300 members (mostly pension funds and asset managers) in 22 countries and represents over USD 40 trillion in assets under management.

With private-sector-led frameworks, there has generally been a trend toward greater size. This manifests not only in groups themselves gaining members and becoming larger, but also in ever larger groups of groups and umbrella

initiatives. The Investor Agenda, for example, consists of the IIGCC and six other groups working with investors. The IIGCC also helped to co-found Climate Action 100+, an investor coalition with 575 members that represents over USD 54 trillion in assets under management that targets the world's 100 most heavily emitting publicly listed companies, pressuring them to reduce emissions and conform to climate targets. Climate Action 100+ has managed to push for substantial change in quite a short amount of time, including getting Glencore, a commodities and mining firm, to agree to cap coal production, and Royal Dutch Shell, an oil & gas firm, to link executive compensation to environmental targets. Other important groupings include the Net Zero Asset Owners' Alliance, and its counterpart for asset managers (see table for more examples).

In some cases (as alluded to in Section 4.2.4) there has been an increasing trend toward combining public and private efforts. The Chilean and UK high-level climate champions founded the Race to Net Zero in 2020. Similar to America's Pledge but on a global scale, the effort is meant to bring together businesses and investors, but also cities and regions, to accelerate the economic transition and help reach Paris Agreement goals. In regard to the financial sector specifically, many of the net-zero and Paris-aligned financial groupings were consolidated under the Glasgow Financial Alliance for Net Zero in advance of COP26, with the idea that a coalition spanning the entire financial system could better help bring broad-reaching change. The Alliance, which sits under the Race to Net Zero umbrella, brings together 160 financial firms representing assets of more than USD 70 trillion, all of whom must use science-based guidelines to reach net-zero emissions covering Scopes 1, 2, and 3, and agree to stringent 2030 criteria.

not other stakeholders that push politicians and policymakers, or each other, to be more ambitious. The mechanism of peer pressure, cleverly built as it was into the Paris Agreement, also operates far beyond its scope.

In the corporate and financial space, remarkable examples of this include Climate Action 100+ and the various net-zero groupings of financial firms. Climate Action 100+ was a private-sector, investor-led initiative to pressure the world's most polluting publicly listed firms to do more on climate change. Even though many of the jurisdictions in which these firms (e.g., large oil & gas majors or steel manufacturers) operate were not seriously restricting these firms' emissions, the firms' investors stepped in to say that they should limit their emissions for reasons of corporate strategy, moral responsibility, and long-term viability and profitability. Asset owners and asset managers in the various net-zero groupings have been able to position themselves as forerunners, placing competitors who have not made such commitments on the back foot. Even back-end, structural aspects of the financial system, such as financial infrastructure, is starting to shift. Many exchanges, for example, require a good measure of sustainability and climate disclosure to be able to list shares or bonds.

These changes are mirrored by changes in broader society. With the rise in popularity of Greta Thunberg, a young Swedish climate activist, millions took to the streets in 2019 to protest slow global progress on combating climate change, and these protests significantly raised the profile of climate change as a political issue. Extinction Rebellion, a climate-focused civil disobedience movement in the UK, sought to disrupt society to highlight the crucial impact of climate change, and many of its targets were banks that were perceived to not be moving quickly enough on climate change or were continuing to fund fossil fuels.

Going forward, it seems clear that the bottom-up popular, societal, and consumer pressure combined with lateral pressure from some stakeholders on others (e.g., by large investors on large corporations) will continue to reinforce the top-down policy frameworks. Indeed, increasing attention on climate will most likely spur ever tighter and more ambitious policy frameworks. At the time of writing, in 2021, this is shaping up to be the case in the lead-up to the Glasgow COP26, with countries such as the UK and the United States, for example, committing to their most ambitious greenhouse gas reduction targets yet.

4.6 Broader Societal Implications and Conclusions

Reviewing policies formulated at international summits, and at the national level by governments and regulators, may make policy sound like a top-down affair. But on the issue of climate change, corporate and financial norms have changed, as have societal and cultural ones. Where previously politicians and policymakers may have been wary of implementing strong climate policies, now it is as often as

Table 2

CLIMATE GROUPINGS		
General/Corporate Groupings		
Name	Members	Description
TCFD	Cross-sectoral	A set of recommendations on disclosing climate-related risks that has been endorsed by hundreds of firms, both financial and non-financial
Science-Based Targets Initiative	Cross-sectoral	An organization with sector-based targets for decarbonization
Financial Sector Groupings		
Name	Members	Description
Institutional Investors Group for Climate Change (IIGCC)	Asset managers and owners	The organization aims to support and enable the investment community in driving significant and real progress by 2030 toward a net-zero and resilient future through capital allocation, stewardship, and successful engagement with companies, policymakers, and fellow investors.
Climate Action 100+	Investors of all kinds	A coalition of 575 investors with over USD 54 trillion in assets under management that targets the world's hundred most carbon emissions-intensive publicly listed companies, seeking through collective shareholder engagement to pressure these companies into alignment with climate goals
Net Zero Asset Owners Alliance	Asset owners	37 investors who have committed to aligning their entire portfolios with the goal of net-zero greenhouse gas emissions by 2050, including full alignment with a 1.5°C scenario
Net Zero Asset Managers Initiative	Asset managers	Similar to, and founded on, the model of, the asset owner alliance, this asset manager initiative is a group of asset managers that support the goal of net-zero greenhouse gas emissions by 2050 and alignment with a 1.5°C scenario.
Net Zero Banking Alliance	Global banks	An initiative of global banks that have signed up to align with net-zero greenhouse gas emissions by 2050 and a 1.5°C scenario, with plans for stringent interim targets for 2030
Glasgow Financial Alliance for Net Zero	All financial players	An umbrella group of the three net-zero groupings listed above, and some others, meant to focus the entire financial sector on the goal of net-zero greenhouse gas emissions by 2050.

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