BTI TRANSFORMATION INDEX

GED Global Economic Dynamics

Shared responsibility for global climate protection

Historical, current and fiduciary liability in industrialized, emerging and developing countries

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Contact

Claudia Härterich
Project Manager
Program Shaping Sustainable Economies
Bertelsmann Stiftung
Phone +49 5241 81-81263
claudia.haerterich@bertelsmann-stiftung.de

Dr. Hauke Hartmann
Senior Expert
Program Shaping Sustainable Economies
Bertelsmann Stiftung
Phone +49 5241 81-81389
hauke.hartmann@bertelsmann-stiftung.de

Dr. Thieß Petersen
Senior Advisor
Program Megatrends
Bertelsmann Stiftung
Phone +49 5241 81-81218
thiess.petersen@bertelsmann-stiftung.de

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*This focus paper draws the expertise of two Bertelsmann Stiftung projects together: The **Global Economic Dynamics** project first examines and explains complex economic dynamics in times of globalization and, here, references previous analyses on the effects of CO_2 pricing. Second, the **BTI Transformation Index** analyzes and compares 137 developing and emerging countries in terms of their democratic quality, economic development and governance performance, and incorporates its qualitative, expert-based analysis of environmental policy and government performance in international cooperation. In addition, the Bertelsmann Stiftung's Sustainable Governance Indicators (SGI) country analyses are also referred to for the climate policy orientation of OECD and EU countries. We would like to thank our colleagues Cora Francisca Jungbluth (Program Europe's Future) and Marcus Wortmann (Program Shaping Sustainable Economies) for their helpful comments and suggestions and Sabrina Gnida and Hannah Kickert for their support in terms of content and editing.*

1 Introduction

Reducing global greenhouse gas emissions, primarily CO_2, is a task that affects all countries – but they have different responsibilities. Developed economies have a special historical and current responsibility resulting from their high share of cumulative global CO_2 emissions. With regard to current CO_2 emissions, the responsibility lies primarily with the OECD countries and China. In addition, some oil and gas producing countries have particularly high per capita emissions. Effectively combating climate change and its consequences also involves protecting natural CO_2 reservoirs. Emerging and developing countries have an essential role to play in emissions prevention and forest protection, and this requires support from industrialized countries. Potential conflicts with development policy goals must be identified and addressed at an early stage.

Climate change is in full swing, and its impacts primarily affect the Global South. In this focus paper, we first outline the effects and name the polluters of thus far completely inadequately contained CO_2 emissions in order to accentuate the discrepancy between the historical and current responsibility of predominant polluters and those parties who are mainly affected. Governments have a number of tools at their disposal that can contribute to significant and necessary reductions in greenhouse gas emissions to ensure climate neutrality, resource conservation, and sustainable development.

When discussing these instruments, we focus primarily on the direct pollutant emissions of carbon dioxide as the most important greenhouse gas and the ways in which this can be contained. For example, the expansion of the circular economy, which will also play a decisive role on the path to climate neutrality and resource conservation, is not addressed (Circle Economy 2021) in this paper. The discussion between the proponents of degrowth (Hickel and Kallis 2019), i.e., a departure from the resource-intensive growth paradigm, and the proponents of green growth, i.e., the attempt to decouple growth from environmental damage, which is the basis of the “Building Back Better World“ approach, for example (Lenaerts et al., 2021), has been postponed for the pragmatic reason that both camps currently have to subordinate their differences in favor of debating with the pure growth protagonists, who adhere to conventional growth garnished with some environmental innovations (Stratford 2020).

In the context of the UN Climate Change Conference in Glasgow in November 2021, this paper concentrates on the consistent application of the ordoliberal liability principle. The focus is on preventing externalization of environmental costs through compensation of cross-border damage by polluters and compensation of cross-border protection by users. Three aspects are addressed here in particular: historical liability, current liability, and fiduciary liability.

- In the wake of the **historical liability**, this paper emphasizes the validity of the polluter-pays principle established in climate protection agreements and sees the developed industrialized countries as having a special responsibility to assume the political will and the main financial burden for resource conservation and climate neutrality through emission reductions, climate protection investments and development policy support.

- In the wake of the **current liability**, this paper discusses the possibility of CO_2 pricing and avoiding the implementation of evasive climate-damaging investments in countries with weak environmental regulation.
- In the wake of the **fiduciary liability**, this paper identifies the need for diplomatic recognition and financial support for governments that are committed to protecting global assets and, in particular, to forests as natural CO_2 reservoirs.

In this discussion of these three liability approaches, it becomes clear – taking into account the historically accumulated as well as current CO_2 emissions and the self-imposed climate protection goals to date – that the various governments have different responsibilities. We discuss the liability and climate policy positions of OECD countries, China, India, Russia and other emerging economies. In addition, we emphasize the need for massive environmental investments in developing countries as well as equitable support between countries and within societies that are currently responsible for only a small portion of global CO_2 emissions but are currently experiencing high growth rates.

2 Consequences of global greenhouse gas emissions

Greenhouse gas emissions are a central cause of the **greenhouse effect** and its associated global warming (Rahmstorf and Schellnhuber 2007: 13, 29–53). In addition to carbon dioxide (CO_2), which accounts for more than three-quarters of greenhouse gases worldwide, other gases such as methane (CH4, 16 percent) and nitrous oxide or laughing gas (N2O, 6 percent) contribute significantly to global warming (Center for Climate and Energy Solutions 2021). Their atmospheric residence time is significantly shorter than that of carbon dioxide, but their greenhouse effect is also significantly higher (US EPA 2020). For example, in May 2021, the UN Environment Program (UNEP) indicated that significant methane reductions of 45 percent in this decade would lead to a 0.3°C reduction in global warming by 2045, and UNEP Director Inger Andersen called a reduction in methane release the strongest current lever for slowing climate change (UNEP 2021). Carbon dioxide, however, is by far the most significant driver of climate change, so the level of CO_2 emissions was introduced as a reference value by the Kyoto Protocol. This focus paper refers only to the reduction of CO_2 emissions to limit global warming.

The concentration of greenhouse gases in the atmosphere has risen very sharply as a result of human activities. This results in a conspicuous amount of **global warming**. It gives rise to numerous consequences. The most important negative effects include the following (Petersen 2008, Rahmstorf and Schellnhuber 2007: 54–81):

- Melting glaciers and Arctic sea ice are causing **sea levels** to **rise** and increasing the **risk of flooding**. The economic consequences include higher costs for coastal protection and for repairing flood damage, cost-intensive relocation of production facilities, and resettlement of the population. The melting of glaciers is also causing a **decrease in water supplies**. This affects agriculture and food production. It also makes it increasingly difficult for people to access **drinking water**.
- Climate change increases the occurrence of **weather extremes** such as heat waves, droughts, storms, floods, etc. Economically relevant consequences include a rising number of heat-related deaths, an increase in heat-related illnesses (e.g., cardiovascular diseases), a heat-related decline in labor productivity, an increase in tropical cyclones with corresponding damage, heavy precipitation events with flooding, and an escalation in droughts with attendant crop losses.
- Climate change also has consequences for **ecosystems**, such as the mass extinction of animal and plant species with corresponding reductions in agricultural harvests and the loss of biodiversity. Other consequences include increased insect infestation and the spread of insect-borne diseases (e.g., malaria or Lyme disease), as well as ocean acidification due to increased CO_2 concentrations, which in turn has negative consequences for fish stocks and depletes fisheries.
- The consequences described above have serious implications for **food** production. Crop losses are a result of water shortages, droughts, storms, floods, and the increase in insect infestations. In addition, rising global average temperatures are expected to reduce crop yields in most regions of the world – especially in the Global South (Nicoll 2016: 342).

- The problems identified lead to serious **obstacles for governance**, especially for developing countries. Over the past ten years, the structural constraints indicator in the Bertelsmann Stiftung's Transformation Index (BTI), which measures political barriers such as poverty, lack of education, geographical and infrastructural disadvantages, and natural disasters, has risen in 31 of 137 countries. This was not universally attributable to increases in weather extremes or food shortages, but these aspects played a significant role.
- Inner-state **conflicts** over increasingly scarce resources such as arable land or available water exacerbate political disputes, especially in fragile states with ethnic or religious divisions (Rüttinger 2020). When livelihoods in climate-sensitive economic sectors are threatened by desiccation or coastal erosion, economically marginalized populations become increasingly radicalized. In addition, there is an increase in the potential for cross-border conflicts due to disputes over water resources or migration flows. Overall, climate change exacerbates fragility risks and thus becomes a key driver of conflict (DGVN 2020).

Even though climate change is a global problem, the negative consequences vary in severity from region to region. The negative consequences of climate change are already hitting the **developing countries** in the **Global South** in particular, and there in turn the **poorest sections** of the population (Deutscher Bundestag 2006: 23). It is mainly there that more frequent droughts with crop failures and famine, more numerous and stronger tropical cyclones, or an increase in forest fires and floods are occurring, while most developing countries have so far contributed the least to global greenhouse gas emissions.

3 Responsibility for climate change

3.1 The historical responsibility

Global greenhouse gas emissions have grown rapidly since the beginning of the Industrial Revolution. With economic progress and rising material prosperity, lifestyles have become increasingly CO_2 intensive, especially in

Figure 1: **Development of annual CO_2 emissions per capita in various world regions between 1900 and 2019,** in metric tons

Source: Ritchie and Roser 2017 (updated 2020).

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the highly developed economies in Europe and North America. Only in recent years has there been a decline in average **CO_2 emissions per capita**. In Asia, as a result of strong economic growth over the past twenty years, per capita CO_2 emissions have risen especially sharply along with the average per capita income (see Figure 1).

In addition to per capita CO_2 emissions, population size is crucial for quantifying the regional contribution to climate change. Europe and North America have been and remain the most pollutant-intensive regions with larger populations. Until the early 1990s, they also had the highest annual emissions. The combination of rapidly growing material wealth per capita and strong population growth has made Asia the region with the world's highest CO_2 emissions volume for two decades (see Figure 2). The emissions in the three remaining regions – Africa, South America and Oceania – are far below this.

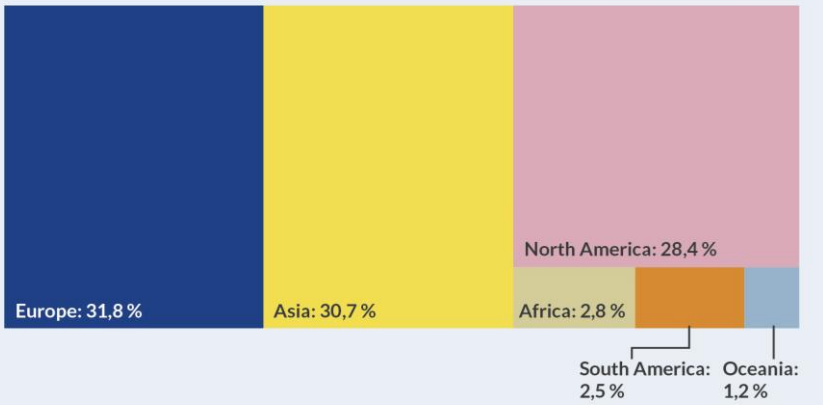
Figure 2: **Development of annual CO_2 emissions in various world regions between 1900 and 2019,** figures in billions of metric tons

Source: Ritchie and Roser 2017 (updated 2020). | BertelsmannStiftung

The historical responsibility of the developed economies of Europe and North America, and secondarily, of some of the emerging economies in Asia, becomes clear when **cumulative CO_2 emissions** are considered. By 2019, an estimated 1,653 billion metric tons of CO_2 were emitted worldwide. Europe is responsible for just under 32 percent of these emissions. Africa and South America together account for around 5 percent (see Figure 3).

With regard to the negative effects of climate change and the greenhouse gas emissions responsible for it, the following statement can be made: The main historical responsibility for the earth-warming level of atmospheric carbon dioxide concentration that has been reached lies with the industrialized nations of Europe and North America. Emerging economies in Asia have also produced significant emissions in recent decades – led by China, which already accounted for 13.3 percent of cumulative global CO_2 emissions to date in 2019 (Ritchie and Roser 2017, updated 2020), although this is still lower than China's current share of the global population, which is just under 18 percent.

Figure 3: **Share of cumulative CO_2 emissions in various world regions up to 2019,** figures in percent



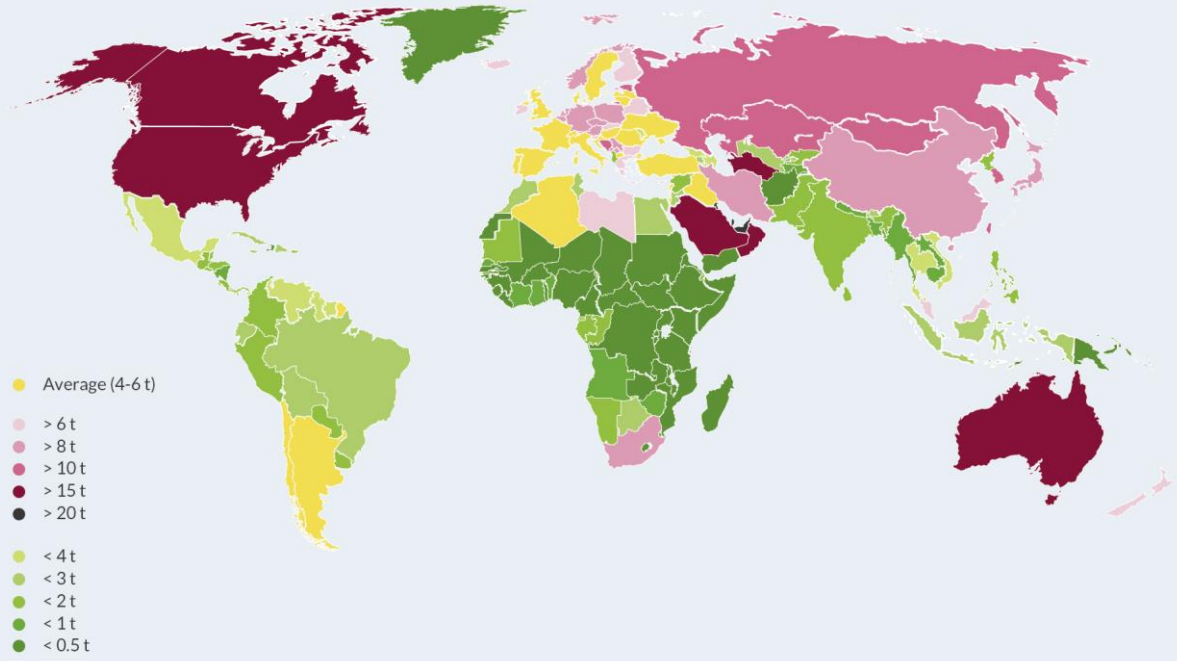
Due to rounding percentages do not add up to 100 percent.
Source: Ritchie and Roser 2017 (updated 2020). | BertelsmannStiftung

3.2 The current responsibility

Together, the 38 OECD countries have a population of almost 1.4 billion, which is comparable to that of China and India. However, according to the European Commission (Emissions Database for Global Atmospheric Research, EDGAR), the OECD's share of annual global CO_2 emissions was over 32 percent in 2019. China's was just over 30 percent, and India's was just under 7 percent. This already points to very different levels of current responsibility. This is accentuated even more when the 42 least polluting developing countries, also with almost 1.4 billion

inhabitants, are contrasted with them. These account for just 1.27 percent of global CO_2 emissions (dark green on the world map below, see Figure 4).

Figure 4: **CO_2 emissions per capita per year in 2019, compared to the global average of 4.9 tons (t)**



Source: Own illustration based on EU Commission, Emissions Database for Global Atmospheric Research (EDGAR). | BertelsmannStiftung

Well over 100 countries' annual per capita CO_2 emissions are below the global average of 4.9 metric tons, while a good 50 countries are above it, in some cases significantly so. The most polluting countries are the Gulf States, followed by Australia, the USA and Canada. Most less developed economies have much lower greenhouse gas emissions per capita. For example, per capita CO_2 emissions in Africa averaged 1.1 metric tons in 2019, a tenth of the amount for North America.

This comparison clearly identifies the current main contributors to CO_2 emissions. Once again, it can be traced to North America, Europe and parts of Asia, as well as the Gulf states. The share of global emissions accounted for by emerging and developing countries outside Asia is negligible.

Three key consequences should be noted:

1. The countries of the Global South are affected earliest, and most severely by the negative consequences of global warming and climate change, and they currently bear the highest adaptation costs.
2. The vast majority of developing countries lack the financial resources to implement climate-friendly technologies and initiate sustainable economic transformation due to their significantly lower economic performance.
3. Over the past decade, poorer countries with less developed economies have shown the highest growth rates in CO_2 emissions by far – indicative of a socially necessary but ecologically questionable catch-up game in terms of economic development.

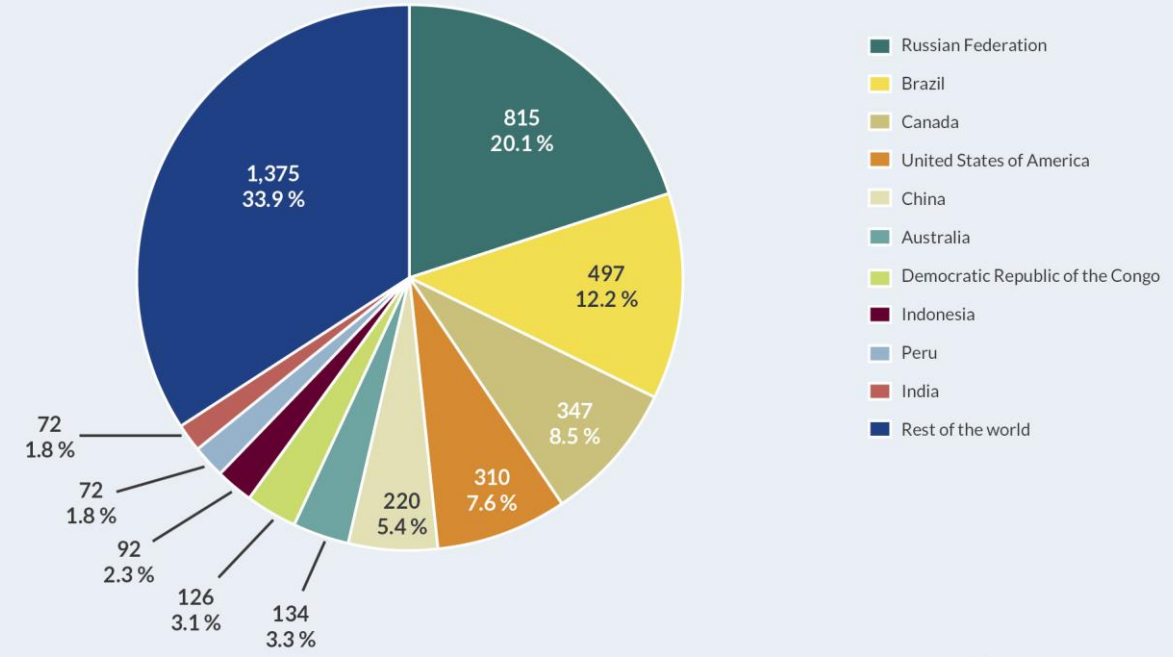
Combining these aspects, the scarcity of funds to finance an ecological transformation in combination with pent-up development needs poses an increasingly central challenge with regard to reducing global greenhouse gas emissions.

3.3 The fiduciary responsibility

In addition to reducing CO_2 emissions, it is crucial to preserve forests as natural CO_2 reservoirs by effectively combating deforestation, slash-and-burn agriculture and forest fires, while at the same time practicing reforestation. The International Union for Conservation of Nature (IUCN 2021) points to the dual role of forests in combating climate change: It estimates that, on the one hand, about a quarter of annual greenhouse gas emissions are attributable to the land sector, about half of which are due to slash-and-burn agriculture and forest degradation. On the other hand, about 2.6 billion tons of carbon dioxide, one-third of the CO_2 released by burning fossil fuels, is absorbed by forests each year. It is also estimated that nearly two billion hectares of degraded land around the world offer opportunities for restoration. This is why increasing and maintaining forests is an essential component of combating climate change. The same applies to the preservation and rewetting of peatlands, which are particularly productive CO_2 reservoirs and, conversely, particularly large emitters when they dry out.

Four billion hectares, or 31 percent of the Earth's surface, are covered by forest (FAO and UNEP 2020). Since 1990, 420 million hectares of forest land have been lost, although the rate of forest destruction has slowed from an average of 16 million hectares per year in the 1990s to 10 million hectares in recent years (12 million hectares last year) (Seymour 2021). Russian (20.1 percent) and Brazilian (12.2 percent) forests already account for one-third of the global forest area; together with Canada, the United States, and China, these five countries account for more than half of the world's forest areas (see Figure 5). Operationally, these states have a special fiduciary responsibility, which they fulfill in varying degrees.

Figure 5: **Global distribution of forests, 2020**
(million hectares and % of world's forest)



Source: FAO 2020.

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At the same time, all people depend on the protection of this global public good to save the world's climate. Therefore, dealing with the **Global Commons** (Petersen 2021: 239–242) poses a particular challenge for international climate policy in terms of responsibilities. Since the use of these resources is not remunerated, a typical market failure can occur: If no one is willing to pay a reasonable price for the protection of a global public good, the willingness of “providers“ to make greater efforts to ensure that good in perpetuity also declines. And conversely, if a

government views a global public good primarily as a resource for its own economic development, the international community is limited in its ability to intervene.

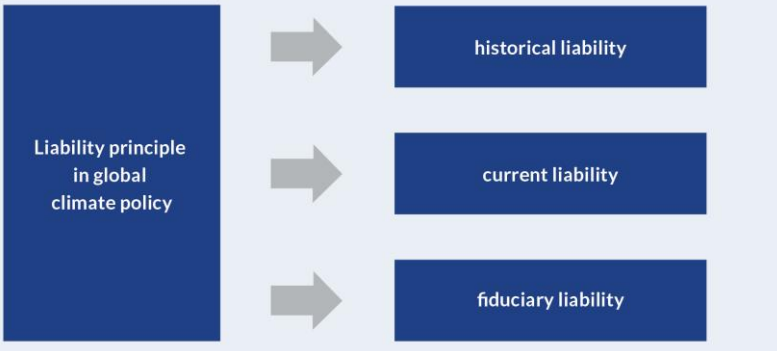
In this respect, the case of forest protection involves shared and interconnected responsibilities. Local accountability rests with the national governments who choose to forgo the economic exploitation of a domestic natural resource and, moreover, raise funds to preserve and protect a global public good. Accordingly, the resulting political and financial costs should not only be explicitly recognized diplomatically but should also be compensated financially. On the one hand by counting forest protection towards a country's carbon footprint, and on the other hand by providing financial and advisory support for forest protection. This is where the historical responsibility borne by the countries in North America and Europe to make a special contribution to forest protection – within the framework of international agreements to limit the consequences of their previous cumulative CO_2 emissions – comes into play once again.

4 The liability principle and its instruments

Greenhouse gas emissions do not stop at national borders. Their reduction therefore requires an internationally coordinated approach. We are convinced that the liability principle plays a decisive role in the concrete design of a global climate protection policy.

One principle of a functioning market economy is that economic actors must bear all the costs of their actions. “He who has the benefit must also bear the damage“ is how Walter Eucken summed up the principle of liability, which he identified as one of four regulating principles of ordoliberalism (Eucken 1952, 2004: 279). If entrepreneurial freedom and entrepreneurial liability are decoupled, negative consequences, such as climate change and environmental damage in this case, can be externalized, i.e., the burden is placed on society rather than on the producer or consumer.

Figure 6: **The three components of the liability principle in global climate policy**



Source: Own illustration. | BertelsmannStiftung

In relation to global climate change, the liability principle at the nation-state level can be interpreted as follows: If the developed industrialized countries owe their social prosperity to a resource-intensive and climate-hostile mode of production as pursued over many decades, and are thus responsible for the majority of the greenhouse gases emitted to date and the resulting damage, they must pay for the elimination of this damage. Moreover, if these historically privileged countries demand that most developing countries that currently still produce relatively low levels of pollutants renunciate their future resource-driven growth, then they need to compensate for this renunciation proportionately. In terms of **historical liability**, it is also these historically privileged economies that are primarily, though not exclusively, responsible for addressing climate change. In terms of **current liability**, it is primarily the countries with the highest CO_2 emissions per capita that have a direct obligation to significantly reduce their pollutant emissions. In terms of **fiduciary liability**, the national sovereigns of global public goods have a political and operational responsibility, but in connection with historical liability, it is once again essentially the developed industrialized countries that must be held financially accountable.

4.1 Historical liability and its instruments

Differences regarding the historical responsibilities of various countries for addressing climate change are a constituent feature of international climate goals. At the **Rio Conference** in 1992, for example, the principle of "common but differentiated responsibilities" of states in protecting the climate was established for the first time. The United Nations Framework Convention on Climate Change (UNFCCC) adopted there stated that industrialization is the central driver of climate change and that industrialized countries therefore bear a particularly large portion of the responsibility for causing, and therefore for managing climate change (Neubäumer 2019: 799). The two major international climate change agreements that followed – the Kyoto Protocol of 1997 and the Paris Agreement of 2015 – sought to substantiate this responsibility.

Under the **Kyoto Protocol**, nearly 40 industrialized countries and Eastern European economies in transition to a market economy, as well as the European Union, pledged to meet quantified emission limits or emission reductions for their respective economies. However, the Kyoto Protocol failed to set an overall global target, i.e., an emissions limit for the world. This was introduced with the **Paris Climate Agreement**. All 190-plus member state signatories of the treaty pledged to work together to achieve emissions levels that limit the rise in average global temperatures to well below 2°C and, if possible, to 1.5°C compared to the preindustrial era. All states must contribute Nationally Determined Contributions (NDCs) for this purpose – however, only as a voluntary commitment (Neubäumer 2019: 802).

It has been repeatedly emphasized, and rightly so, that the global economic disruption triggered by the COVID-19 pandemic also represents a window of opportunity to link national declarations of commitment to a green, resource-efficient, and lower-pollution post-pandemic recovery. For the most part, the strategic goal of "green growth" lies behind these considerations. This is the logic that informs both the EU's Reconstruction Fund in conjunction with the European Green Deal and the "Build Back Better World" approach announced at the G7 Summit in June 2021. Critics of this approach, which is still growth-driven (Barrie and Schröder 2021) rightly emphasize the insufficient consideration of resource conservation in terms of efficiency (circular economy), sufficiency (limiting consumption in developed countries in favor of increasing consumption in developing countries), and fairness (redistributive access to resources). On the other hand, it should be noted that only a few governments in developing and emerging countries even see themselves in a position to integrate green elements centrally into their own reconstruction strategies, so that at present, even "green growth" would already represent considerable progress compared with their status quo.

Even if the political will to conserve resources and reduce pollutants – which is also lacking in many industrialized countries – would be pronounced, governments in numerous developing and emerging countries in particular are confronted with massive planning, social and financial challenges that they are usually unable to solve on their own. In planning terms, resource efficiency, one of 14 governance indicators, is currently the third lowest scoring indicator in the transformation index BTI. 67 of the 137 developing and emerging countries examined in the Transformation Index score a maximum of only 4 out of 10 points here, thus demonstrating wasteful, highly deficient use of their available administrative and financial resources. In socioeconomic terms, as many as 80 of the 137 countries are characterized by massive social marginalization in the form of poverty and inequality (also 1–4 points in the BTI 2022). Understandably, both the mandate of elected democratic governments and the legitimacy of autocratic regimes are based accordingly on societal expectations to improve opportunities for social inclusion and economic participation. In this respect, environmental policy concerns are almost always (in 41 countries with 1–3 points in the BTI environmental policy indicator) or frequently (in 75 countries with 4–6 points) subordinated to growth-oriented economic policy. Finally, in financial terms, many developing countries were on the verge of insolvency, even before the COVID-19 pandemic. Over the past ten years, fiscal stability has deteriorated in more than half of the countries studied in the BTI, in some cases massively, and countries such as Lebanon and Zambia are threatened with national bankruptcy. In this respect, the financial scope for investing in more resource-efficient and less polluting economies is severely limited in many countries.

In all three general concerns – advice in planning terms, poverty reduction in social terms, and stabilization in financial terms – extensive bilateral and multilateral development policy efforts have been assumed for decades by the industrialized countries and the international institutions primarily financed by them, such as the development banks or the United Nations aid organizations. However, in this context it is essential that these concerns in the current situation are in a close enabling relationship with environmental policy objectives as shown, that "climate protection and development policy" are, as the German Ministry for Economic Cooperation and Development (BMZ) states, "inseparably linked" (BMZ 2021). This also means that essential areas of development policy must be thought through in terms of climate policy and, moreover, that they can be derived directly not only because of international solidarity and foreign policy self-interest, but also from historical liability and consequently an obligation to provide such support.

To meet this historic liability, at the 2009 UN Climate Change Conference in Copenhagen the industrialized countries already committed to long-term financing totaling at least $100 billion annually to support developing countries in climate protection and adapting to climate change, starting in 2020. In addition to bilateral and multilateral support mechanisms, numerous instruments have been developed for this purpose in the context of the United Nations Framework Convention on Climate Change (UNFCCC) and the 2015 Paris Agreement. The Climate Funds Update of the Heinrich Böll Foundation and the Overseas Development Institute provides a comprehensive insight into the multitude of established climate funds and supporting institutions, their endowments and funding priorities, as well as the pledges and actual payments of the industrialized countries responsible (see also Watson and Schalatek 2020). The **Global Environment Facility (GEF)** was established 30 years ago and is the longest-running climate fund, with an annual endowment of just over $1 billion. It supports the implementation of several multilateral environmental agreements (e.g., on biodiversity or desertification) and serves as the UNFCCC funding mechanism, including the administration of several funds such as the **Least Developed Countries Fund (LDCF)** and **the Special Climate Change Fund (SCCF)**, which support National Adaptation Plans.

The **Adaptation Fund (AF)** has a much smaller volume, having distributed just over one billion US dollars to address damage and adaptation measures attributable to climate change since 2008. The AF played a pioneering role by allowing developing countries to access funding directly, rather than through multilateral institutions, after its registration as a National Implementing Entity (NIE). AF's other special feature is that it is financed through a two-percent participation in Certified Emission Reductions (CERs) trading under the **Clean Development Mechanism (CDM)**. This mechanism offers industrialized countries that finance climate protection projects in developing countries the opportunity to purchase emission certificates that they can use to achieve their defined emission reduction targets. However, in practice AF financing is largely dependent on donor countries because of the weak dynamics of emissions trading and the current low prices. For example, the German government, as the largest donor, has so far provided US $455 million, more than twice the amount generated by the CDM (World Bank 2021a).

The **Green Climate Fund (GCF)** is currently the largest multilateral climate fund and a key multilateral financing mechanism supporting developing countries in the reduction of their greenhouse gas emissions and improving their capacity to adapt to climate change. Its funding goal is $10 billion per year starting in 2020, with a balanced allocation between pollution reduction and climate adaptation. Like the GEF, it is a financial mechanism of the UNFCCC and the Paris Agreement and has been operational since 2015. Over time, the GCF is expected to become the most important channel for international public climate finance, providing critical support in sustaining the paradigm shift toward climate-resilient and low-carbon development in developing countries.

Outside of the UNFCCC framework, other significant funding instruments are available for climate change adaptation and mitigation. The **Climate Investment Funds (CIFs)**, operated by the World Bank in collaboration with regional development banks, with a funding commitment of $8 billion, include the **Clean Technology Fund (CTF)** and the **Strategic Climate Fund (SCF)**, and, pending the establishment of a global climate finance architecture in selected developing countries, they promote the strategic use of public funds to transform development pathways in a climate-friendly manner. Multilateral development banks also approved more than $60 billion in climate financing in 2019 alone. Other climate-related funds have been set up by the World Bank, the EU, regional development

banks, individual countries such as Germany, the UK or Norway, and in developing countries such as Brazil or Indonesia.

4.2 Current liability and its instruments

With regard to current liability and the attendant responsibility for reducing current pollutant emissions, the need for action and obligations are shifting between countries – but not fundamentally. Despite reductions in per capita CO_2 emissions over the past 15 (in North America) and 30 (in Europe) years, OECD countries still leave the largest proportional and absolute footprint, more than China. For most developing countries, on the other hand, the issue is less about reducing currently released greenhouse gases and more about the triad of:

a) Avoiding future sharp increases in emissions,
b) avoiding the relocation of emissions-intensive production methods from industrialized countries, and
c) protecting their existing CO_2 reservoirs.

In view of this renewed clear responsibility for most CO_2 emissions in North America, Europe and parts of Asia as well as in the Gulf, it is also clear that emissions prevention should take effect particularly intensively here, and that it must entail corresponding disproportionate efforts on the part of these governments. The instruments available should certainly be examined to determine the extent to which they help to prevent a shift of pollutants to countries with weaker environmental legislation and a sharp increase in pollutant intensity in the context of conventional growth-driven, catch-up development in those developing countries.

4.2.1 Climate protection using higher CO_2 prices

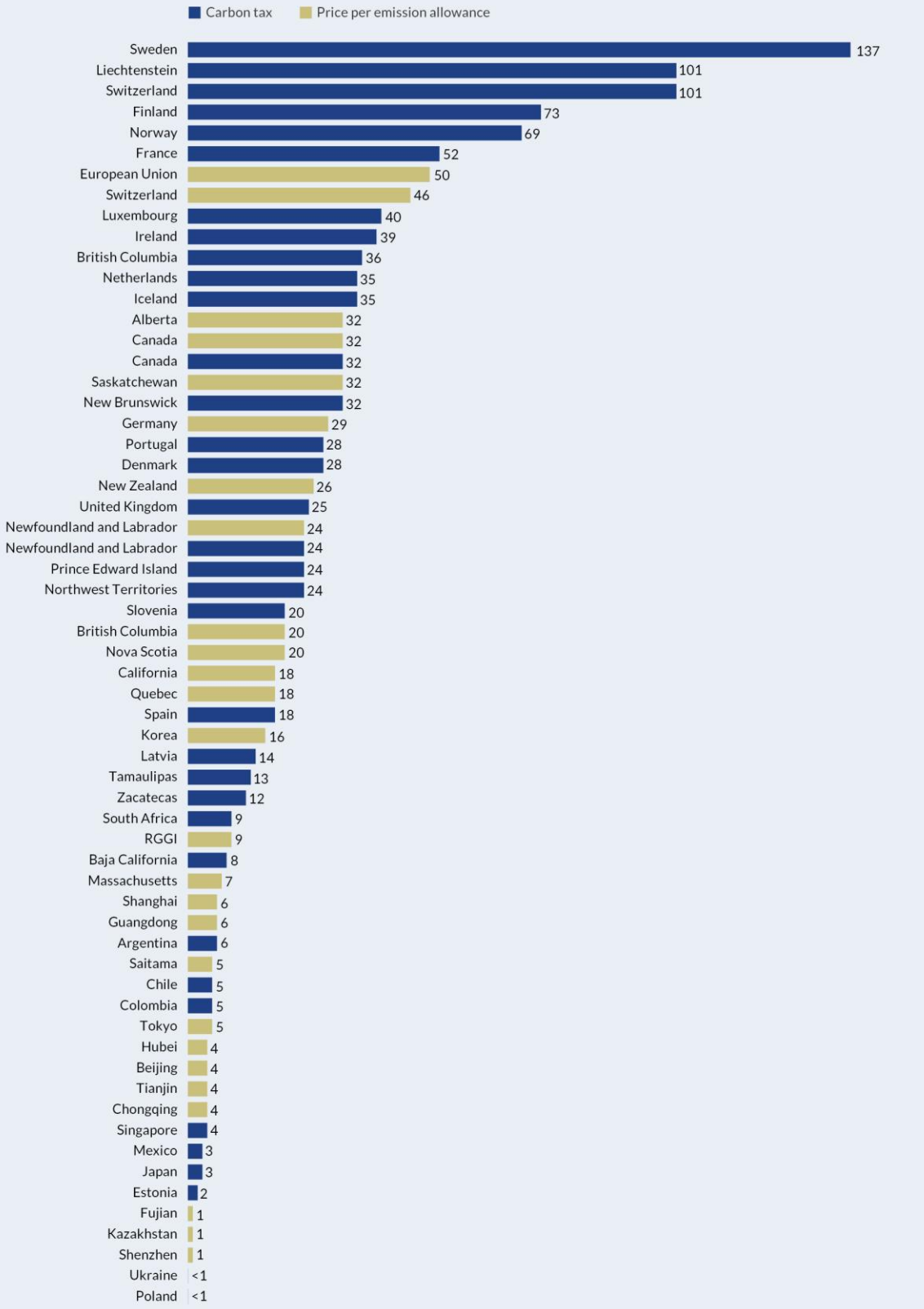
To reduce CO_2 emissions, using market mechanisms such as CO_2 pricing figure particularly prominently in discussions. These build on the idea of internalizing negative externalities. Following the liability principle, they are based on the free-market principle that economic actors must bear all the costs of their actions. If market prices do not include these costs, the government must intervene and can ensure that emissions are subject to pricing. Their amount is based on the damage caused by one ton of CO_2, expressed in monetary units. In concrete terms, this means that a tax is levied on the emission of every ton of CO_2. For Germany, the Federal Environment Agency estimates the damage caused by one ton of CO_2 at €195 for 2020. This is the average cost of a ton of CO_2 emitted in Germany, the damage of which can also spread to the rest of the planet (cf. Bünger and Matthey 2020: 8). Market prices for goods and services do not include these costs.

A corresponding price – in short, a CO_2 price – has two central objectives:

1. **In the short term**, a carbon price lowers a country's CO_2 emissions by reducing activities that cause emissions. A state CO_2 price means a higher price for consumer products and activities that cause CO_2 emissions. This means that the demand for them is declining. The net price that companies receive falls because they can usually only pass part of the CO_2 price on to consumers. When the net price is lower, companies reduce the quantity of goods they offer. The net result is that **production** and real **GDP decline** in the country where the CO_2 price is unilaterally increased. This reduces the volume of production-related emissions.
2. **In the medium term**, CO_2 prices promote **emissions-reducing technological progress**. Companies are responding to higher prices for CO_2 emissions by adapting their production technologies. They use new, energy-saving and lower-emission machines and technologies. Technological advances are occurring that make it possible to produce a given quantity of goods with a lower input of resources – and a correspondingly lower volume of emissions. Given that technological changes take time, this is a medium-term consequence of a higher CO_2 price.

Higher CO_2 prices thus force emission-saving technological progress. Because the development of climate-friendly technologies and products tends to be rather costly, the industrialized countries usually have a major responsibility in this regard that is commensurate with their current level of emissions.

Figure 7: **Global carbon prices on April 1, 2021**
(Figures in US dollars, rounded)



Source: World Bank 2021b.

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4.2.2 Reduction of carbon leakage through a CO_2 boundary adjustment mechanism

If a country unilaterally increases its carbon price, this can lead to a reduction in the international competitiveness of its domestic companies. Therefore, there is an incentive to relocate emissions-intensive economic activities to countries with less stringent climate policies. This relocation reduces domestic production, employment and income. Conversely, for those economies with little or no carbon price or other stricter environmental constraints, this means an increase in their economic activity. The consequence: production, GDP, income and employment are rising, and so are the CO_2 emissions.

This shift in emissions is referred to as **carbon leakage**. This at least partially obviates those emissions savings gained through CO_2 pricing. Theoretically, it is even possible that there will be a net increase in global emissions. This is worrisome if production is carried out abroad using technologies that are more harmful to the environment and the transport of products produced abroad is also associated with higher emissions.

The relocation of emission-intensive production processes can be inhibited with the help of a **Carbon Border Adjustment Mechanism (CBAM)**. It works with two basic tools. On the one hand, products imported from abroad are subject to emissions costs or a CO_2 tariff. The amount of this is tied to the domestic CO_2 price. Second, exports from domestic companies will be exempt from the applicable carbon price. As a result, the products of domestic companies remain competitive on world markets. Consequently, the incentive to relocate emissions-intensive activities to countries with a lower emissions price is negated because the price advantage associated with this relocation is eliminated by the combination of the two measures mentioned above.

Here, derived from the principle of different responsibilities, the development policy dimension and the consequences of such a carbon border adjustment mechanism for developing countries must also be taken into consideration. This is because, for example, if developed economies increase their carbon price and at the same time introduce a fiscal border adjustment, this has a **negative impact** on **less developed economies**. As a rule, emerging and developing countries are unable to meet or demonstrate the high environmental standards of developed economies. If their products are now subject to the high CO_2 price applicable in developed economies, they may lose their price competitiveness there. This raises concerns that they will be hampered in their financial ability to diversify their economies and pursue an inclusive and sustainable economic transformation path. Weko et al. (2021) point out how and to what extent various developing countries would be affected, for example, by the introduction of the European Union's planned CO_2 Carbon Border Adjustment Mechanism.

Excessive burdens, especially on the least developed countries, which are often at the same time the most negatively affected by climate change brought on by a climate action that may be taken primarily in industrialized countries, is not compatible with the principle of liability outlined here. Nor can it be reconciled with the notion of shared but differentiated responsibilities and Goal 10 of the UN Development Agenda to reduce inequality within and between states. In order not to impair the export opportunities of these countries, and to refrain from disconnecting them from global economic development, consideration should be given to offering them an exemption from this emissions levy.

In the concrete design of such an exception, assurances must be in place so this cannot be classified as a discriminatory trade policy measure that would violate international trade regulations. These regulations require, among other things, that a country treat all imports equally and not introduce concessions for selected trading partners. The General Agreement on Tariffs and Trade (GATT), signed in Geneva in 1947, establishes the principle of most-favored-nation treatment in Article 1. This means: If a member country of the World Trade Organization (WTO) grants a trade facilitation to another country, this benefit must be extended to all WTO members. At the same time, Article 20 of the GATT provides for exceptions to this principle, and contains several options that could be introduced to provide a trade-law basis for a special favorable regime model in favor of least developed countries (Dröge 2021 and Dröge et al. 2018). Preferential trade agreements such as the “Everything but Arms” initiative between the European Union and the least developed countries can also serve as a guide here (Brandi 2021). It gives these countries duty-free and quota-free access to the EU market.

Developing countries that do not belong to the group of least developed countries are also potentially negatively affected economically by the introduction of a Carbon Border Adjustment Mechanism in industrialized countries. One way to deal with the revenues from the offset mechanism would be to use them for technology transfer and international climate finance, or to help finance the Green Climate Fund (MCC 2020). Another option would be to allow the border adjustment to be established directly by trading partners. Here, there would have to be a binding agreement that the taxation of exports, for example to the EU, would then also benefit investments in climate protection.

4.2.3 Establishing a climate club

In addition, to increase pressure on major emitters and governments that are averse to establishing and implementing climate policy, the creation of a climate club, as suggested by economist and Nobel laureate William Nordhaus could be introduced.

To do this, a group of countries that have a similar position on the pricing of greenhouse gas emissions form a "coalition of the willing" (Nordhaus 2020 and Frondel 2017: 17). These countries agree on a common emission price, thereby establishing a climate club. Other countries can join this club, provided they are willing to stick to the agreed price.

The climate club offers its members an incentive that non-members do not receive: They can freely exchange goods and services among themselves, i.e., establish a free trade agreement, the conformity of which with GATT and WTO rules must, however, be ensured as outlined above. Countries that do not join the club can trade with members only if they pay a tariff. This is how import tariffs increase the cost of the decision not to subject themselves to emissions pricing to non-members. Therefore, the climate club penalizes noncooperative behavior by reducing the benefits of the international division of labor for a non-member. In order to do this, the climate club applies a general tariff on all goods, but no marginal tax compensation on particularly high-emission products (cf. SVR 2019: 27 f.). The reason for a general duty is that a border adjustment tax does not have a sufficiently punitive effect.

4.2.4 Cost-effective financing of climate protection measures in developing countries

In line with the polluter pays principle, it would be expected that the industrialized countries make the greatest possible political, financial and technological efforts to mitigate climate change by taking measures of their own, since it is largely of their own making. However, when cost efficiency is taken into account, it cannot be denied that developing countries and emerging economies, because of their lower level of economic development, often use less developed technologies, generating higher greenhouse gas emissions than technologies in developed economies. Emissions can often be reduced in these countries through low-cost measures or by adopting technologies from industrialized countries. In this way, adaptation rather than innovation can then reduce research and development spending in developing countries.

As a result of these technological differences, the cost of avoiding one ton of production-related greenhouse gas emissions varies across the aforementioned groups of countries. The technology-related emission costs tend to be higher in industrialized countries than in developing and newly industrializing countries. In this situation, it makes sense from a global perspective to carry out efforts to reduce the global volume of emissions, even where the cost of saving a ton of greenhouse gas (taking into account the additional transport services required to consumers) is lower.

However, many of these countries do not have the financial resources needed to implement lower-emission technologies. As a result, they continue to produce with outdated technologies that have low energy efficiency and use fossil fuels, especially low-cost coal (Frondel 2017: 11). Thus, in order to reduce global emissions, industrialized countries should make the money they plan to spend on emissions reductions available, at least in part, to developing countries and emerging economies. This is viable assuming that the cost of reducing CO_2 emissions by one ton is €30 in industrialized countries and only €15 in an emerging country. In this situation, a given monetary input, transferred from an industrialized country to the emerging country, can achieve twice the reduction in global CO_2 emissions. However, the realization of this measure, which makes sense in terms of climate policy, presupposes

that the industrialized countries will make these financial resources available to the developing and newly industrializing countries and that these resources will then be used there to reduce emissions. The latter could be achieved, for example, by tying the funds provided in **development cooperation** to the purpose of implementing emission-reducing measures.

In addition to funds from the national development policies of individual countries, a multilateral solution should also be considered, in which many countries pool their financial resources and bundle them in a common fund. One instrument for implementing this approach is the **Green Climate Fund (GCF)** described above.

Another option for financing emission-reducing measures in developing countries is the Clean **Development Mechanism**, which has also been described above (Deutscher Bundestag 2006: 3–8, and DEHSt 2008: 4–6). Industrialized countries can finance projects to reduce greenhouse gas emissions in developing countries and earn credit for the resulting reductions in emissions. This market-based instrument allows industrialized countries to reduce greenhouse gas emissions where emission abatement costs are lowest. For example, if Germany invests in building a wind turbine in India that subsequently generates electricity that would have been provided by a coal-fired power plant without this investment, this investment reduces local greenhouse gas emissions. Certificates are issued for the emission reductions achieved in India. These emission credits are transferred to the investor in Germany and can be used by him as an emission right or freely traded, i.e., sold.

This path is open not only to state institutions, but also to private economic actors, above all private companies. In this way, it is possible to mobilize private capital for efficient global climate protection. For companies, this instrument makes good business sense if the current emission costs in their own country are higher than in a developing country. Finally, it should be noted that this mechanism is not only an efficient climate policy instrument, but also contributes to sustainable development in developing countries. This gives them access to climate-friendly, forward-looking technologies and know-how.

4.3 Fiduciary liability and its instruments

Given the shared responsibilities of local protection of forest lands as natural CO_2 reservoirs and the international obligation to finance these protections described here, particularly for industrialized countries, the discussion about the historical responsibility of industrialized countries is linked to those of national sovereignty and self-determination in the case of fiduciary liability (Rayner et al., 2010). For example, attempts (primarily by industrialized countries in the aftermath of the 1992 UN Conference on Environment and Development in Rio) to create an international, binding forest conservation architecture under the **Global Forest Convention** turned out to be unsuccessful (Sotirov et al., 2020). Beyond individual framework agreements – such as the International Tropical Timber Agreement (ITTA), the UN Convention on Biodiversity, or the legally binding obligation for all signatory states to account for, monitor, and report on greenhouse gas emissions from Land Use, Land Use Change, and Forestry (LULUCF) with positive offsets for forest conservation measures - thus far there is no international legal framework for forest conservation.

Instead, non-binding agreements such as the **International Arrangement on Forests (IAF)** have been signed, from which the 26 voluntary targets of the **Global Forest Goals** were developed. Under the **New York Declaration on Forests (NYDF)**, adopted in September 2014 during the UN Climate Summit in New York, more than 200 governments, multinational corporations, indigenous groups, and nongovernmental organizations pledged to address global biodiversity loss, pursue sustainable development goals, and work to halt deforestation.

At the same time, a mostly multilaterally funded support structure for the protection and preservation of forest areas was created. The United Nations **REDD+** (Reducing Emissions from Deforestation and Forest Degradation and the Role of Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks in Developing Countries) program has been in place since 2005 and is a trust fund that allows donors to pool resources and provide funding to significantly reduce global emissions from deforestation and forest degradation in developing

countries. Since the program's launch in 2008, the UN-REDD program has supported 65 partner countries and has been the largest international provider of REDD+ readiness assistance. The **Forest Carbon Partnership Facility (FCPF)** was established in 2007 under the auspices of the World Bank and specializes in programs to capture and reduce greenhouse gas emissions resulting from deforestation, as well as sustainable forest management. On the one hand, the FCPF operates the **Readiness Fund**, which aims to prepare participating developing countries for future REDD+ activities; for example, by preparing national forest conservation plans or climate accounting of any forest conservation activities. In addition, the FCPF's **Carbon Fund** finances the pilot phases of results-based forest conservation activities after the completion of the preparatory phase. The **Forest Investment Program (FIP)** is part of the World Bank-backed Climate Investment Funds (CIFs). The FIP also supports efforts by developing countries to protect as well as sustainably manage their forests.

These multilateral programs have been augmented with other national or regional initiatives. Through the **International Climate Initiative (ICI)**, the German government supports the NYDF Secretariat, promotes sustainable forms of use, especially in agriculture, and identifies the causes of deforestation to support the expansion and strengthening of regional and national infrastructures enforcing forest conservation measures. The Government of Norway's **International Forest Climate Initiative** funds forest conservation activities using bilateral partnerships, multilateral channels, and civil society.

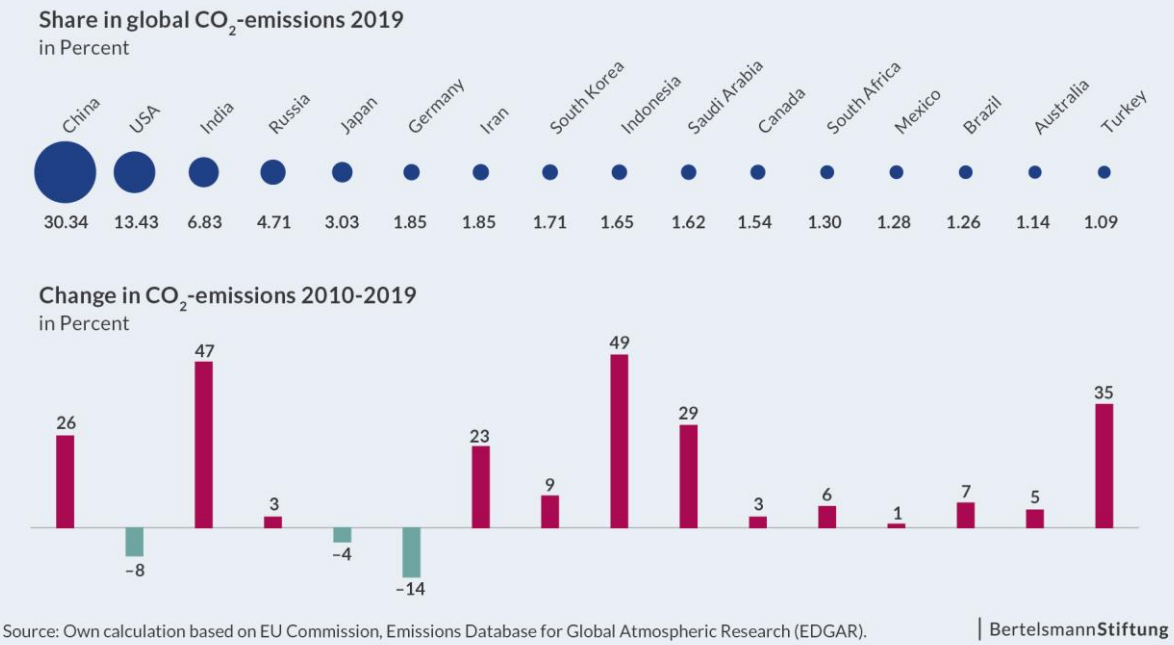
Finally, a number of national and regional funds with multilateral financing have been set up to protect rain forests. Among the most important of these funds are the **Amazon Fund** and the **Central African Forest Initiative** in association with the **Congo Basin Forest Partnership**. Together with international organizations and philanthropic partners, the German government also established the **Legacy Landscapes Fund** in May 2021 to protect biodiversity and valuable natural landscapes. It is expected to have built up a capital stock of one billion US dollars by 2030, making it the world's largest conservation foundation.

The current discussions about the Amazon Fund illustrate the complicated balancing act between sovereign national ownership and international funding responsibility that can also be derived from historical liability. On the one hand, the Brazilian government denounced international support for the protection of the Brazilian rain forest as insufficient in the run-up to the last UN Climate Change Conference in Madrid in 2019; on the other hand, it simultaneously defended itself against diplomatic pressure from, among others, Germany and Norway, the most important donors to the Amazon Fund (Deutsche Welle 2019a). They protested, for example, against the use of this fund for compensation payments to expropriated large-scale landowners (Riedel 2019) and eventually suspended their payments. The example of Brazil illustrates that the conservation of natural CO_2 reservoirs as a goal of fiduciary responsibility is fraught with the difficulties of using global public goods. In addition to the relative willingness of all global users to fund, the policy objectives of the government in whose territory the global public good is located are central.

5 Liability acceptance

While the international community and nation-state governments have a wide-ranging and continuously expanding set of instruments for climate finance, emissions reduction, and forest protection at their disposal, the readiness to accept responsibility and to assume historical, current, and fiduciary liability is extremely uneven. In addition to the country reports of the Transformation Index BTI and the Sustainable Governance Indicators SGI of the Bertelsmann Foundation, the assessments of the Climate Action Tracker have also been consulted in order to document the readiness to assume liability. The Climate Action Tracker, funded by the European Climate Foundation and the German Ministry of the Environment, quantifies the climate change targets, policies and actions of all major emitters, representing about 80 percent of global emissions and about 70 percent of the world's population, and assesses them in terms of their adequacy to achieve the 1.5°C target agreed in the Paris Agreement. Own calculations based on the Emissions Database for Global Atmospheric Research of the EU Commission regarding the extent and change of CO_2 emissions (see Figures 8 and 9) complement the analysis.

Figure 8: **Share in global CO_2-emissions 2019**
(all countries with more than 1% in global share)



Source: Own calculation based on EU Commission, Emissions Database for Global Atmospheric Research (EDGAR). | BertelsmannStiftung

5.1 The OECD countries

CO_2 emissions in the 38 member countries of the OECD have fallen by 9 percent since their peak in 2007 and have recently stabilized, but progress overall has been insufficient. Although most OECD countries have met their emission reduction commitments under the Kyoto Protocol, the Bertelsmann Stiftung's Sustainable Governance Indicators (SGI) score OECD countries 6 out of 10 for the success of their environmental policies and 6.3 for their commitment to binding global environmental regulations. Many OECD countries have mid-century emissions-neutral targets, but these are not currently consistent with most 2030 interim targets. Much stronger policies are needed to implement net-zero emissions targets. These include increasing carbon prices, strengthening sectoral instruments, and supporting public investment and technology programs to drive decarbonization and meet the Paris Agreement goals.

The **US** is the largest CO_2 emitter in the OECD and the second largest globally, accounting for 13.4 percent of global carbon emissions. Although the US has been pursuing ambitious environmental programs for some time, US President Donald Trump’s administration issued a sweeping denial of climate change, significantly stalling

progress. Trump rescinded the Paris climate agreement and promoted coal mining, among other things. As a result, the US ranks last in environmental policy, according to SGI 2020. However, after newly elected President Joe Biden took office in January 2021, climate policy reacquired a higher priority, and ambitious goals and plans for climate action were put in place to offset the backsliding of the past four years. The US rejoined the Paris Agreement and announced plans to cut emissions 50 to 52 percent below 2005 levels by 2030. Biden reaffirmed the goal of achieving climate neutrality by 2050 and signed the **American Rescue Plan Act**, which includes a number of climate-related provisions, in March 2021. Still, the Climate Action Tracker rates the combination of US 2030 climate targets, policies, and climate finance as insufficient to stay below the Paris Agreement's 1.5°C temperature limit.

The **EU** as a whole is responsible for around 8.7 percent of global CO_2 emissions. Germany accounted for the largest share of total EU CO_2 emissions as of 2019, at 21.3 percent, followed by the United Kingdom (11.0 percent), Italy (10.0 percent), Poland (9.6 percent), France (9.5 percent), and Spain (7.8 percent). The EU is committed to accepting its historical as well as current responsibilities and has set more ambitious new climate policy targets. The **European Green Deal** was presented by the European Commission in December 2019 and aims to achieve climate neutrality by 2050. In addition, the EU presented an updated NDC with an emissions reduction target of 55 percent (compared to 1990) by 2030 and has developed corresponding packages of measures. Nevertheless, the Climate Action Tracker rates the EU's climate targets and related policies and funding plans as insufficient to meet the goals of the Paris Agreement. The SGI also gives the EU a score of only 6.1 out of 10 for the success of its environmental policy and 6.7 for its commitment to binding global environmental regulations. One criticism is that many EU member states still do not have a plan in place for the planned coal phase-out by 2030. To meet the Paris Agreement targets, the EU would need to raise its 2030 emissions reduction target to at least 63 percent below 1990 levels and invest more in climate finance.

In general, nearly all OECD countries fall short of the Paris Agreement targets. Measured solely in terms of domestic reduction targets, among the 15 OECD countries examined in the Climate Action Tracker, only the United Kingdom achieves compatibility with the 1.5°C target. However, another eight OECD countries, including Canada, Germany, Japan, the US and the EU as a whole, are rated as “almost sufficient” in their targets and measures to reduce domestic CO_2 emissions.

The situation is clearly different with regard to historical liability. Despite a multitude of initiatives and support institutions, numerous governments of OECD countries are unwilling to meet the payment obligations they have entered into or even to extend them. In September 2021, OECD Secretary-General Mathias Cormann expressed disappointment ahead of the UN Climate Change Conference in Glasgow that developed countries had so far raised one-fifth less than previously pledged for climate finance, leaving a funding gap of about $20 billion towards the $100 billion annual appropriation target (OECD 2021). Without exception, the Climate Action Tracker describes all funding commitments made by the industrialized countries assessed as “insufficient”, albeit in varying degrees. In particular, current climate financing from Australia, Japan, and the US is described as “critically insufficient” because it includes large fossil fuel investments in other countries in addition to too low a proportionate payment commitment to meet the $100 billion per year target for developing countries.

The current funding gap for global climate protection not only represents a pronounced lack of responsibility on the part of industrialized countries with regard to an accepted and incurred historical liability, it also sends a devastating signal with regard to the UN Climate Change Conference, one that could lead to a debate about allocation between historical and current liability. Repeatedly, UN climate conferences have raised precisely this divisive question (Deutsche Welle 2019b) of why a government in a developing country struggling to secure the basic needs of its people should currently take responsibility and accept pollutant-reducing growth reductions that burden both budget and development when the particularly rich and developed states themselves are unwilling to assume a fair share of their historical responsibility.

In general, many OECD countries take their national reduction targets, and thus their current liability, much more seriously than climate finance, and thus their historical liability. Putting these two aspects of liability together, most OECD countries are rated “insufficient” by the Climate Action Tracker, meaning that their overall climate policies –

if they were on a global scale – would contribute to global warming of 2 to 3°C. Australia, Canada, New Zealand and South Korea are even categorized as “highly insufficient”, equivalent to a global warming effect between 3 and 4°C.

5.2 The major emerging markets

In addition to the OECD countries, the emerging economies are mainly responsible for the current CO_2 emissions. Among the eleven countries with the highest emissions from the BTI sample of 137 developing and emerging countries – including the OECD countries Mexico, South Korea and Turkey – there is no country apart from Iran that is not also a member of the G20. Together, at 53.64 percent, these 11 countries emitted more than half of global CO_2 emissions in 2019, according to the EU Commission's Emissions Database for Global Atmospheric Research. However, the disparity is huge even in this small group of countries. For example, Brazil (1.26 percent), Indonesia (1.65 percent), Iran (1.85 percent), Mexico (1.28 percent), Saudi Arabia (1.62 percent), South Africa (1.30 percent), South Korea (1.71 percent), and Turkey (1.09 percent) all remain below 2 percent of global emissions, and below or equal to Germany's share of 1.85 percent. Together, these eight countries emit 11.76 percent of greenhouse gases, nearly the same as India (6.83 percent) and Russia (4.71 percent) combined. Crucially, however, China's share of greenhouse gases, at 30.34 percent of global emissions, is higher than the accumulated contribution of 133 countries, and thus almost all the other developing and emerging economies studied in the BTI combined (except India and Russia).

5.2.1 China

As China is a key player in the fight against climate change due to its high share of emissions, President Xi Jinping's announcement in September 2020 that China's CO_2 emissions would fall before 2030 and that the country would be carbon neutral sooner than 2060 has been greeted with great interest. The initially rather positive perception of this declaration of intent can be explained primarily by contrasting it with the climate policy ignorance of then US President Trump, because the Chinese targets may be ambitious and, according to calculations by Chinese ministries, entail annual investments of up to US $490 billion by 2060 (Cao in ODI 2021), but they are still not enough. First, according to calculations made by the Intergovernmental Panel on Climate Change in 2018, economies must have achieved climate neutrality by 2050 in order to still meet the target of global warming of just 1.5°C (IPCC 2018). China, by far the world's largest emitter of greenhouse gases, is up to ten years behind this time frame. Second, the Chinese government's new five-year plan presented in 2021 includes a massive expansion of coal-fired power generation. Even with efficiency improvements and relative emission reductions, a significant increase in absolute Chinese CO_2 emissions by 2030 is to be feared in view of the targeted growth rates, which would require later, even greater greenhouse gas reductions. This also leaves unclear how a subsequent, necessarily drastic change of course is to be achieved towards the end of the decade in a markedly coal-dependent economy with new power plants that have many years left in their life cycles. Finally, under the New Silk Road Initiative, China is practicing extensive offshoring of pollutant-intensive coal-fired power generation with outdated power plant technology. Princeton University and the Center for American Progress estimate that only 13 percent of Chinese investments in coal-fired power plants in Cambodia, India, Indonesia, Pakistan, and Vietnam meet the latest technological and lower-pollution standards (Lewis and Edwards 2021). In September 2021, however, Xi Jinping declared that China would end its financing of coal-fired power plants abroad and instead support the development of renewable energy. Shortly thereafter the Bank of China announced that it would stop financing coal mining and coal-fired power plants by the end of the year (Sun 2021). However, the extent to which this also applies to the financing and completion of more than 100 coal-fired power plants in 30 countries that are currently already under construction, and the extent to which a reversal of the massive expansion of coal-fired power generation in China under revision of the five-year plan is also possible, are still open questions (Yang 2021).

In addition to China's own ambitions to benefit from a technology-driven shift to a low-carbon economy (Colenbrander in ODI 2021) and to expand its market leadership in environmental technology (Bertelsmann Stiftung 2020b), as well as a general environmental open-mindedness regarding the importance of combating climate change, the Chinese government's involvement in a climate club as described earlier in this paper could also prompt

it to sharpen its climate targets. It is obvious that China should not be classified as a developing country in terms of climate policy, even if a significant proportion of its cumulative CO_2 emissions to date can be attributed to the fact that Western companies had profited massively from the aforementioned carbon leakage by relocating production to the “factory of the world”, which was initially only weakly regulated in terms of environmental policy. Today, on the other hand, the country has a different status, so that China must act proactively on technology development and investment promotion, as well as decelerating in terms of shifting pollutants and their own emissions, working in a supportive and self-responsible manner in concert with the Western industrialized nations.

5.2.2 India

India is the third largest emitter of greenhouse gases at 6.83 percent but emits only about a fifth of the amount of CO_2 emitted by China with roughly the same population size. The US reaches only a quarter of India's population but produces about twice as many emissions. In this respect, it is understandable that Indian governments have vigorously resisted being assigned a special responsibility for containing the climate change caused by Western industrialized countries and additionally fueled by China. Nevertheless, this defensive, rejectionist attitude, traditionally coming from the Congress Party, has undergone a fundamental change under the aegis of the ultra-nationalist President Narendra Modi, of all people. It is true that India's ecological balance sheet is very deficient and the country's environmental policy is rated with only 4 out of 10 points in the BTI. With regard to global responsibilities, however, the Indian government has so far kept its promises. It aims to have reduced CO_2 emissions by one-third by 2030 compared with 2005 levels, while at the same time expanding the share of renewable electricity generation to 40 percent, and is already well advanced in both of these goals, although in terms of reduced greenhouse gas emissions, the economic downturn caused by COVID-19 may have contributed significantly to this. Still, according to the Climate Action Tracker, the Modi government is sending “mixed and inconsistent policy signals in relation to India’s energy transition”, promoting renewable energy and road electrification on the one hand, while pursuing coal-based growth and building new power plants on the other. Environment Minister Prakash Javadekar emphasized that there is a significant need for financing to achieve India's climate goals, so the targeted investment and financing opportunities in India discussed earlier in this paper regarding the Clean Development Mechanism are particularly important (Jaiswal and Joshi 2020). This will not only involve externally funded large-scale projects. Rather, the example of electric-powered rickshaws shows that innovative solutions that can be adapted cost-effectively to the local context are needed to ensure that India's catch-up economic growth does not prove to be as CO_2-intensive as China's (Slater 2020).

5.2.3 Russia

Russia can be expected to take few constructive steps to reduce greenhouse gases beyond the effects of deindustrialization or, for example, to modernize outdated technologies to reduce pollutants, especially in the high-emission energy sector. The Russian Federation ratified the Paris Agreement only in October 2019, after 185 countries had already taken this step. At the same time, Russia's ratification included a reference to the fact that the country is not listed in Annex II of the UNFCCC among the industrialized countries with an obligation to finance climate policy measures in developing countries, but is classified as an “Economy in Transition” (EIT) – Russia thus considers itself exempt from development policy support with regard to climate protection. At the same time, in the ratification document, the Russian government called it “unacceptable” to use the Agreement and its mechanisms “as tools to create barriers to sustainable social and economic development of the Parties to the Convention” (United Nations Treaty Collection 2021).

Despite President Vladimir Putin's announcement in mid-October 2021 that he would strive for climate neutrality by 2060, the country's current climate policy commitments have not changed. A 30 percent reduction in CO_2 emissions by 2030 compared to 1990 emissions levels should be relatively easy to achieve given post-Soviet deindustrialization, without the need for further climate policy measures. The base year 1990 is questionable for the same reason. In the last ten years, contrastingly, Russian carbon dioxide emissions have increased by 3 percent, a low rate of increase but still equivalent to 61 million metric tons of CO_2, which is more than Singapore's annual emissions volume. According to Climate Action Tracker, the influential Russian Union of Industrialists and Entrepreneurs successfully opposed the passage of a bill introduced back in 2018 that would have set emissions quotas and environmental penalties. Instead, a law was passed in July 2021 that, for the first time ever, requires measurement

and reporting of pollutant emissions from the largest emitters (Balmforth and Stolyarov 2021). Russia continues to focus on the high-emission expansion of its power-generating sector. In fact, according to Climate Action Tracker, the Russian Ministry of Energy has explicitly called the promotion of renewable energy a threat to the planned expansion of fossil fuels. In addition, the Russian government had expressed great concern regarding the measures of a Carbon Border Adjustment Mechanism discussed in this article and has announced that it would file a complaint with the World Trade Organization (WTO) against any CO_2 tariffs and other pollutant levies.

5.3 Causes of limited liability

5.3.1 Limited capacities and lack of will to shape climate policy

Looking at the largest emitters makes it clear that, given different baselines and climate policy ambitions, there are also different ways of cooperation, support or confrontation. It is evident that for some countries studied by the BTI, given a high level of development, the primary issue is not the financing difficulties already identified in this focus paper, but the readiness to shape climate policy. At the top end of the governance quality scale are the cases of South Korea and Singapore, whose governments are rated by the BTI 2022 as having generally above-average environmental policies (both 7 points) and a high willingness to cooperate internationally (both 9.0 points), but which, like the German government, do not fully exploit their political potential and financial options when it comes to formulating and setting climate targets. For example, the government of **South Korea** failed to deliver on key elements of its “Green New Deal” announced in July 2020, including climate neutrality by 2050, the introduction of a CO_2 tax, or an end to foreign investment in coal-fired power plants, even though in June 2021 it registered more ambitious reduction targets for greenhouse gas emissions, which are now expected to fall by 40 percent by 2030 compared with 2017 (instead of 24.4 percent previously). In these cases, the pressure triggered by an increase in a CO_2 price could facilitate a rethink.

At the lower end of government performance, this is particularly true of Brazil, Mexico, Saudi Arabia and Turkey, with insufficient environmental policies and limited willingness to cooperate internationally (BTI 2022). This was most pronounced after a record year of deforestation and forest fires in the Amazon in **Brazil**, when in December 2020 the government softened its voluntary commitment by revising the base year emissions level upward (see here and below Climate Action Tracker). The country can now effectively increase its emissions to achieve the maintained 37 percent reduction by 2025 and 43 percent reduction by 2030 compared to the 2005 baseline and still meet these targets. In doing so, the Bolsonaro government made a 27 percent increase in the originally stipulated output possible. The government in **Mexico** responded to reduced electricity demand during the pandemic by suspending renewable energy subsidies to boost the oil sector. Nominally, it has maintained its reduction targets, but similarly to the Brazilian government, it has raised the baseline levels, in this case for Business As Usual (BAU). **Saudi Arabia**, the largest per capita emitter in the G20, has not even adequately formulated its climate policy goals. **Turkey**, like Russia, achieved a removal from Annex II of the UNFCCC despite the country's OECD membership, thus exempting itself from development obligations upon accession in 2004, emphasizing Turkey's “special circumstances” (Timperley 2018). The Turkish government made ratification of the Paris Agreement conditional on access to financing under the Green Climate Fund, even though it is already one of the largest recipients of climate financing. However, this was met with successful opposition from the G77 as well as China, as this fund is explicitly reserved for financing climate change mitigation activities in developing countries (Gundogan 2017). Turkey's voluntary commitment, which has been filed but not ratified, is also so weak that it allows current greenhouse gas emissions to double by 2030. At the same time, Turkey is massively expanding its domestic coal-fired power generation and has not launched any specifically green stimulus programs.

In general, with Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE, all **Gulf states** have an extremely climate-damaging footprint, with per capita CO_2 emissions ranging from 18 tons (Saudi Arabia) to 39 tons (Qatar). In addition, pollutant emissions in the Gulf states have increased by between 15 (Kuwait) and 77 (Oman) percent over the past decade. This illustrates the potential savings that could result from increasing energy efficiency, reducing subsidies, economic diversification, and greater climate policy commitment. To varying degrees, governments have already recognized this as a problem in light of deteriorating climatic conditions due to rising

heat and water scarcity, as well as partially depleted energy reserves and fewer funds for subsidies in the face of sharply rising populations, and have been seeking research and implementation collaborations with companies from industrialized countries and with international organizations that are also suggested in this focus paper (Schubert et al., 2017). Even if there is only limited legal certainty for private investors in the environmental sector and, in view of a dominant state sector, no sufficiently open market and competitive order, guarantees and insurance backed by international organizations could have an enabling effect here.

5.3.2 Influence of domestic fossil industries

In most of the developing and emerging countries studied in the BTI, the financial framework for investments in climate protection is not only tightly limited, but in most cases – as in the Mexican, Russian and Turkish cases – a strong domestic lobby is interested in maintaining conventional carbon-intensive production methods. Although the latter also applies to highly developed industrialized countries such as Germany and the USA or to economies that are essentially geared to energy exports, such as the Gulf states or Russia, it becomes even more difficult to initiate a change in climate policy when the need for catch-up development is entangled with clientelistic structures. In addition to oil- and gas-based power generation, coal-fired power generation is particularly worth mentioning here, since it has a higher CO_2 intensity and a lower energy value than oil and gas. Their usage increase in China and India has slowed in recent years, but they are still expanding massively. In addition, there are countries such as Bangladesh, Cambodia, Indonesia, Turkey and Vietnam where a larger number of coal-fired power plants are planned or under construction. Finally, governments in countries such as Botswana, Mongolia, Serbia, and South Africa, which have long relied on coal-fired power generation, are reluctant to make the investments to initiate an energy transition under financial conditions that are also tighter due to the pandemic.

To be sure, there are positive examples of a planned coal phase-out, as reported in the BTI 2022 country reports. The Polish government plans to invest heavily in wind power, increase the share of renewable energies to 65 percent by the middle of this decade, and has agreed with the trade unions on a coal phase-out that will not be completed until 2049. Chile plans to reduce CO_2 emissions from 2025 and achieve climate neutrality by 2050, has begun phasing out half of its coal-fired power plants by 2025, and aims to complete its coal phase-out by 2040. Pakistan, whose CO_2 emissions have risen by almost 50 percent in the last ten years, has at least announced that it will not build any more coal-fired power plants, contrary to its original plans. Nevertheless, at the current planning stage, it can be expected that if all new coal-fired power plants under construction, planned or merely temporarily postponed worldwide are implemented, half of the global CO_2 residual budget (based on a less ambitious target of limiting global warming by 2°C) will be consumed by new coal emissions alone.

What is needed, first, is an end to coal subsidies and the most far-reaching possible international CO_2 pricing of coal-fired power generation through taxes or an emissions trading system. Second, measures must be taken against the “carbon leakage" already mentioned, which is currently (still) being driven in particular by China through the relocation of production to low-wage countries and investments in coal-fired power plants in the Asian region. Third, due to the high capital requirements for the expansion of renewable energies, favorable and secured credit options must be made available, for example by the development banks, in order to make an energy transition financeable, especially for poorer developing countries.

5.3.3 Socioeconomic challenges

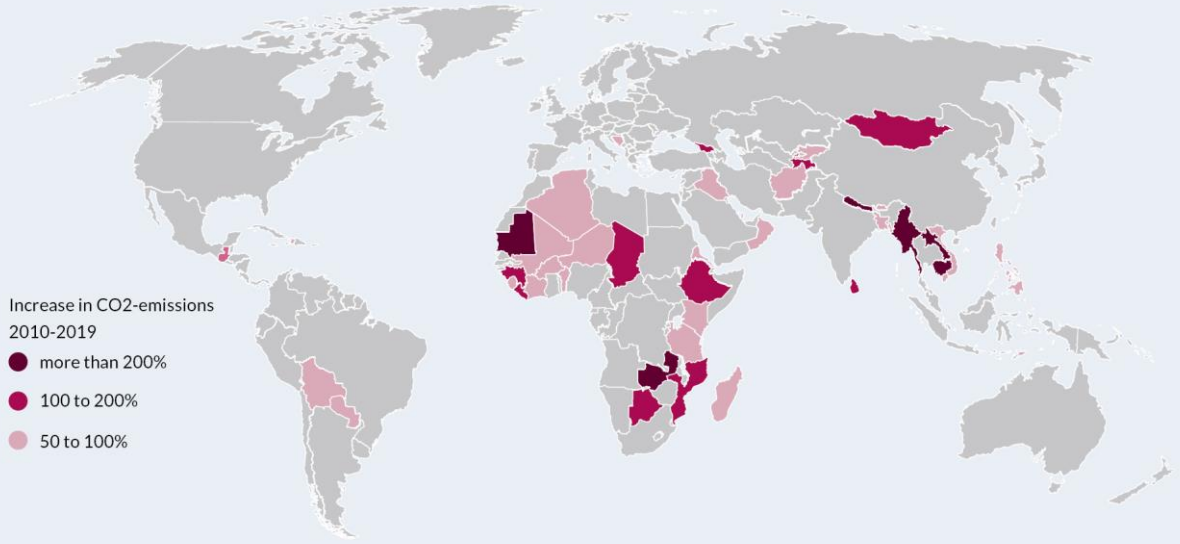
Finally, as the Mercator Research Institute on Global Commons and Climate Change, among others, has emphasized, domestic and intergovernmental mechanisms must be established to compensate for social hardship, especially for poorer people, affected industries and their workforces (MCC 2021). Above all, these mechanisms are necessary to cushion the short-term increase in the price of goods caused by the introduction of CO_2 pricing or the discontinuation of subsidies for fossil fuels, and to offset negative labor market effects. They could be financed by national taxation revenues or also from international funds, to increase the acceptance of the global energy transition.

When designing such compensation mechanisms, it is important that they take effect immediately after the introduction of climate protection measures and do not reach the affected population groups only after a delay,

especially if fossil fuel subsidies are abolished (Kriegler et al., 2020). To this end, numerous domestic mechanisms have already been developed to redistribute revenues from a carbon price in industrialized countries (Klenert et al., 2018). However, their adaptive capacity in developing countries needs to be examined on a context-dependent basis, as special challenges in the development and implementation of social compensation mechanisms come into play there (Malerba 2021). In particular, since a large share of the population is employed in the informal sector, this makes a number of approaches discussed in the context of industrialized countries, which focus on tax relief, impractical and calls for creative alternatives.

Finally, it should be noted that the primary focus on high-emission emerging economies or particularly pollutant-intensive industries and total emission volumes obscures the fact that the most significant growth in emissions is currently taking place in the developing countries classified by the World Bank as “low-income economies” and “lower-middle-income economies” and these represent a major CO_2 driver. With the exception of Bosnia-Herzegovina, Botswana, Georgia, Guatemala, Iraq, Oman, Paraguay and Qatar, the 42 countries with the strongest emissions growth, averaging 115 percent over the past decade – from Kenya at 50 percent to Myanmar at 464 percent – are all among the poorer countries and have now increased their total emissions to 1,556 million metric tons per year, nearly as much as Russia and with a strong upward trend (see Figure 9).

Figure 9: **More than 80% of countries with the largest increase in CO_2-emissions during the previous decade are low-income and lower-middle income economies**



Source: Own calculation based on EU Commission, Emissions Database for Global Atmospheric Research (EDGAR). | BertelsmannStiftung

It is also particularly important here that any CO_2 tax or savings resulting from the elimination of energy subsidies are used for compensation and redistribution, since otherwise – as in Ghana or Senegal – poorer households may switch from diesel or LPG to coal or firewood or, if communication is poor, mass protests may ensue, as happened in Ecuador (Dombrowski 2021). As the head of the United Nations Development Programme (UNDP), Achim Steiner, emphasized, it is essential to advise 118 countries, some of which are heavily indebted, within the framework of the Climate Promise so they can implement their own climate policy goals in a planned, financially and socially balanced manner across all ministries (Steiner and Dembowski 2021).

5.4 Trusteeship versus economic development

The countries with the largest forest areas – Russia, Brazil, Canada, USA and China – are also on the list of countries with the largest forest losses in the last twenty years. However, the reduced forest areas in Russia (-69.5 million hectares) and Canada (-44.1 million hectares) are largely due to forest fires (as well as forest management) and allow for regeneration, while in the US (-42.2 million hectares) and China (-10.3 million hectares), forestry encroachment was primarily responsible for the loss of natural forests, which also need not mean a permanent loss of forest area. This is different in the Brazilian case (-59.8 million hectares, more than 10 percent of forest area), where two-thirds of all forest loss is due to slash-and-burn and deforestation for permanent commercial use for pasture or agricultural products, and another quarter is due to small-scale agricultural use, some of which is temporary, so that 71 percent of this forest area has been lost permanently, according to estimates by the World Resources Institute in the current Global Forest Review (World Resources Institute Research 2021).

The government of right-wing populist President Jair Bolsonaro has systematically undermined rain forest protection and monitoring, including budget cuts of about one-third to environmental protection and firefighting agencies and 600 decrees and ordinances aimed primarily at deregulating environmental provisions (Brazil Country Report, BTI 2022). Brazil's environmental policy (7 points in the 2014 BTI, 4 points in the 2022 BTI), which was still exemplary in the region in significantly reducing deforestation and slash-and-burn rates under the Workers' Party until 2016, is now powerless against the illegal land grabbers encouraged from the top and the one-third increase in forest fires, behind which the agrarian lobby close to the president is also suspected. Of particular concern is the rapidly increasing rate of destruction of carbon-rich and particularly biodiverse virgin forest, which also threatens the livelihoods of indigenous peoples.

Compared to the loss of Brazilian forest cover, deforestation and slash-and-burn in Paraguay, at 6.3 million hectares in the last twenty years, is not so huge, but it does mean the loss of a full quarter of the tree cover that existed in 2000, 91 percent of which is estimated to be permanent. For years, the Paraguayan government has purposefully neglected forest protection and environmental policy (BTI 2022: 4 points) in order to serve an agricultural lobby of cattle ranchers and soybean planters. The country has also lost a third of its virgin forest since 2000 with the clearing of 1.1 million hectares. Large-scale loss of virgin forest can also be observed in Bolivia, Colombia and Peru. Large agrarian farms are responsible for this in Bolivia, with a loss of 3 million hectares (out of a total area of 40.8 million hectares), this represents the fourth largest loss of “primary forest” in the world after Brazil (-26.2 million hectares), Indonesia (-9.7 million hectares) and the Democratic Republic of Congo (-5.3 million hectares) in the last twenty years.

However, the Indonesian government, for example, has responded to the rapid loss of forest cover and virgin forest by expanding forest protection and monitoring, following devastating forest fires in 2015 (Seymour 2021). As suggested earlier in this focus paper, these protections could be done with significant support from the international community to protect the global commons, through World Bank REDD+ financing in East Kalimantan and the conclusion of a Green Growth Compact involving civil society. The portal Global Forest Watch rightly fears that some of the Indonesian achievements of recent years could be undone by pressure from the palm oil industry.

The organization recommends diplomatic recognition as well as international financial support for governments working to protect forests as a global commons. Support and compensation for the protection of the natural CO_2 reservoir, on which the achievement of global climate targets depends, must be regionally adapted to local circumstances. A corrupt government in Myanmar, whose military grants logging licenses for its own profit, must receive different treatment than a reform-minded government in Costa Rica, which has placed a quarter of its territory under protection and successfully pursued reforestation (Costa Rica and Myanmar Country Reports, BTI 2022). Similarly, a distinction must be made between whether clear cutting is a deliberate commercial endeavor by ranchers and agribusiness, as in Brazil or Paraguay, or whether significant shares of forest loss are due to the precarious socio-economic conditions of subsistence farmers, as in the Democratic Republic of Congo or Madagascar, and forest protection must be combined with social aid (all BTI 2022 country reports).

6 Conclusion and outlook

The window of opportunity to limit global warming is closing. The next few years leading up to 2030 will be decisive in determining if it will still be possible to achieve the global climate goals. It is a sad historical fact that the industrialized countries of the North (in both East and West) have been able to build their prosperity and growth on cheap and climate damaging energy production for decades, while now the environmental damage and climate changes are having a particularly detrimental effect on the Global South.

This focus paper has emphasized the importance of the liability principle, which is neglected or ignored to varying degrees by almost all parties who have profited from massive CO_2 emissions. One does not have to look to the complete failure of US climate policy under Donald Trump or the Russian government's denial of responsibility under Vladimir Putin to outline the current failure of the North. One look at Germany is enough to trace the half-heartedness and irresponsibility of supposed northern pioneers in climate policy: The coal phase-out in 2038, which is ten years too late, the unambitious and low CO_2 prices, or the commissioning of a new coal-fired power plant in May 2020 coupled with simultaneous curtailment of the promotion of renewable energies. OECD member countries will have to increase their climate policy efforts tremendously to be able to advocate for limiting CO_2 emissions and protecting forest areas in the Global South with any credibility (Brehmer et al., 2021).

At the same time, Chinese emissions are currently by far the single greatest problem in achieving climate goals. China will have to move dramatically, but understandably will not do so alone, but only in concert with Western industrialized nations. Current plans to reduce emissions and achieve climate neutrality are far from sufficient, especially given the current massive expansion of coal-fired power generation. The Indian government cannot follow the Chinese path without triggering a global climate catastrophe and will need substantial assistance in the form of technological cooperation and financial support. This also applies to a number of emerging countries such as Indonesia or Saudi Arabia, which will surpass Germany in CO_2 emissions in the next few years.

The establishment of a climate club or the introduction of a more ambitious, international, as far-reaching as possible CO_2 price can be a helpful mechanism to make even reform-averse governments like those of the Gulf states think again. At the same time, emission-intensive production methods must be prevented from being relocated to countries with insufficient environmental regulation. A CO_2 border adjustment, which is used for international climate financing possibly within the purview of the Green Climate Fund, could have a corrective effect here, as could taxation in the producing countries themselves, insofar as they use the revenues for climate protection.

Even though the majority of the countries studied by the BTI contribute comparatively minimal CO_2 emissions, their disproportionately rising emissions are cause for concern. Especially in post-pandemic times, there would be an opportunity to use economic stimulus programs for ecological reorientation. In addition, massive investments must be made to preserve the global common goods, not only the forest areas, but in discussion of climate change primarily this natural CO_2 reservoir.

These climate policy goals will require a considerable amount of consulting, technology transfer and financing, which will primarily have to be borne by the industrialized nations. Moreover, they require socially inclusive measures that are differentiated according to local conditions and serve to reduce existing inequalities. Just as a disproportionate burden on the poorer developing countries in particular must be avoided at the international level, taking into account the historical polluter-pays principle and current distributional injustice, climate policy measures in developing countries must be prevented from exhibiting regressive effects and burdening the poorer sections of those populations.

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8 Imprint

Bertelsmann Stiftung
Carl-Bertelsmann-Straße 256
33311 Gütersloh
Telefon +49 5241 81-0
www.bertelsmann-stiftung.de

Responsibilities
Hauke Hartmann
Thieß Petersen

Authors
Claudia Härterich
Hauke Hartmann
Thieß Petersen

Editing
Paul Kaltefleiter

Graphic design
Jürgen Schultheiß

Translation
NATIVES GmbH & Co. KG

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Address | Contact

Bertelsmann Stiftung
Carl-Bertelsmann-Straße 256
33311 Gütersloh
Phone +49 5241 81-0

Claudia Härterich
Project Manager
Program Shaping Sustainable Economies
Phone +49 5241 81-81263
claudia.haerterich@bertelsmann-stiftung.de

Dr. Hauke Hartmann
Senior Expert
Program Shaping Sustainable Economies
Phone +49 5241 81-81389
hauke.hartmann@bertelsmann-stiftung.de

Dr. Thieß Petersen
Senior Advisor
Program Megatrends
Phone +49 5241 81-81218
thiess.petersen@bertelsmann-stiftung.de

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