The Climate Governance Commission, 2021

Interim Report

Governing Our Climate Future

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Table of contents

Foreword

The science is clear. It is telling us that we are already living within an extinction crisis and a climate crisis. Life on Earth as we know it, and even our own survival as a species, is at risk. The circumstances we are confronting are unprecedented. Yet even before the devastating effects of the COVID-19 crisis, the international community was behind on its global goals for climate stabilization, the stewardship of our biodiversity and for sustainable development, despite the hundreds of existing international treaties and declarations on these topics. What we need is a reflection on and reconsideration of our global governance architecture, to ensure it is fit for purpose and adequate to the tasks ahead. Given what is at stake, we must think harder, more swiftly and creatively, and work together to "disrupt" our current trajectory, ensuring that the necessary policies and governance mechanisms are put in place to rise to this occasion. This interim report of the Climate Governance Commission is a powerful contribution to current negotiations and international debate on the climate crisis, setting forth a range of diverse and promising ideas. It is a must-read report as we prepare for COP26 in Glasgow and beyond.

María Fernanda Espinosa, Member, World Future Council, former Ecuadorian Foreign and Defense Ministers, President of the UN General Assembly 2018-2019 and Ambassador for Common Home of Humanity (CHH)

The future of climate governance requires humanity to extend beyond the Paris Climate Agreement and the current system of global governance. More than ever, the ideas, capabilities, and networks of governments and diverse non-governmental actors must be harnessed for climate action, which should strike a balance between mitigation and adaptation initiatives and leverage the creativity, technical know-how, and financial resources of both the private sector and civil society. Besides reinventing the UN Framework Convention on Climate Change and its relationship to non-state actors, attention should be given to rethinking the environmental contributions of global economic institutions, the International Court of Justice, and even the UN Security Council. Indeed, it is the Climate Governance Commission's clarion call for a whole of global system approach to climate action which, if answered collectively and more boldly, will ensure that we slow down and then halt global warming.

Professor Ibrahim Gambari, Chief of Staff to the President of Nigeria and former Nigerian Foreign Minister and UN Under-Secretary-General for Political Affairs

The reality of the climate crisis – unfolding in front of our eyes with each passing day, in multiple parts of the world – by far outpaces the capacity of the current multilateral mechanisms to deliver climate action commensurate with the magnitude of the challenge. In this situation, it is imperative to take stock of what works and what does not within the current institutional setup, and come up with suggestions for creative, surgical interventions to make the international system work in anticipation, and not in the aftermath of, a climate catastrophe. The interim report by the Climate Governance Commission offers policymakers and activists a solid foundation for further discussion and swift implementation of outside-the-box solutions. Urgency, equity and creativity in treating the climate emergency are key youth demands for climate action, and the report is a step ahead in this direction.

Vladislav Kaim, UN Secretary-General's Youth Advisory Group on Climate Change

Our shared global challenges require global cooperation. To handle the climate crisis, with its unprecedented risks to humanity, immediate and coordinated action at the global level is required. The Global Challenges Foundation aims to promote the development of global decision-making models capable of more effectively and equitably mitigating, and preferably eliminating, the major global catastrophic risks threatening humanity. It has thus set up the Climate Governance Commission with its aim of filling a crucial gap in confronting the global climate emergency by proposing, developing and building partnerships that promote feasible, high impact global governance solutions, to limit global temperature rise to 1.5 degrees Celsius or below. It is hoped that this interim report, drawing on the submissions of diverse authors, will generate further discussion and reflection by shining a light on how various enhancements or reforms of global governance approaches and architectures might contribute to better leadership and more effective, purposive climate action.

Anna Lindstedt, Board Member, Global Challenges Foundation, Ambassador and Senior Advisor on Green Transition, Department for Trade Promotion, Nation Branding and Sustainable Business, Ministry for Foreign Affairs, Sweden

Humanity is in a dire fix. We are rapidly running out of global carbon space to have any chance of reaching a safe landing zone for the world on a planet with a climate system holding the "well-below 2 degrees Celsius" global warming line. The IPCC AR6 report shows we have reached the warmest temperature on Earth in the last 100,000 years, and that we are being hit by the consequences harder and more often than was earlier expected. Risks of irreversible changes and tipping points can no longer be excluded. At 1.5 degrees Celsius we are very likely committing all future generations to at least two metres of sea level rise. We must admit that 50 years of global governance efforts for climate and ecological safety have so far not generated the sustainable transformation required. New ideas are urgently needed. This report, from the Climate Governance Commission, convened under the auspices of the Global Challenges Foundation, gathers a wide range of experts across various fields, who contribute novel ideas on how to reform global governance in support of social transformations, for a safe and just climate future for humanity on Earth. I am sure this report will trigger important discussions that will, hopefully, generate real solutions.

Johan Rockström, Professor Earth System Science, University of Potsdam, and Director Potsdam Institute Climate Impact Research (PIK)

Executive Summary

The challenges and the imperative of collective action

- Humanity is facing one of its gravest crises ever, but has so far failed to rise to the challenge. Existing pathways to keep global temperature increase below 1.5 degrees Celsius – a level beyond which, according to science, the risk of disastrous and irreversible consequences of ongoing global warming grows substantially – are rapidly becoming very narrow and will soon be closed.

- To stay within the limited remaining carbon budget, in line with a 1.5 degrees Celsius ambition, global emissions of greenhouse gases must be cut by half every decade, starting immediately. In addition, significant amounts of carbon that have already been emitted must be removed from the atmosphere, for example by protecting and enhancing natural carbon sinks such as forests and peatlands, and potentially also by artificial carbon capture and storage technologies.

- At the same time, global climate mitigation strategies must be compatible with and support social and economic development in parts of the world where it is needed to combat poverty and to achieve the global Sustainable Development Goals (SDGs).

- Viable solutions exist that could keep the world on track to meet this goal, if supported by effective policy, finance, and leadership to enable rapid implementation on a global scale. But so far, responses to the climate emergency have not been characterized by effective policy or strong leadership, and very few countries are close to being on track to meet emission reduction targets aligned with the 1.5 degrees Celsius ambition.

Diagnosing global climate action gaps: moving from challenges to solutions

- Three interrelated global climate action gaps are highlighted in this report:

    - **The climate solution-action gap:** Existing, well-known and viable technological, economic and social solutions that would keep the world on track to meeting Paris Agreement targets and minimizing the risk of disastrous global heating are currently not being applied and executed at the speed and scale required to match the gravity of the climate emergency.

- » **The climate policy gap:** To bridge the climate solution-action gap, there is need for strong leadership and adequate policies to align the incentives of individuals, businesses and nations with global climate goals. Such policies exist and have been on the agenda for many years – for example carbon pricing and the removal of fossil fuel subsidies – but are not put into effect quickly and widely enough, nor are they being sufficiently scaled up and diffused globally in a systematic fashion, to enable the required climate action.

- » **The climate governance gap:** To bridge the climate policy gap, and ensure effective climate policies at a global scale, purposeful and functional governance mechanisms at a global level are urgently needed. Currently, existing governance structures are not up to the task.

- The **Climate Governance Commission**, convened under the auspices of the Global Challenges Foundation, aims to contribute to filling these crucial gaps by proposing, developing and building partnerships to promote innovative models or approaches to governance for achieving known climate solutions. A key aim of this interim report is to highlight how enhancements or major reforms of the global governance architecture can contribute to implementing efficient climate policies on a global scale, thereby enabling more effective climate action through rapid, exponential scaling of known climate solutions.

"Exponential policy" and the diffusion of transformative innovations

- The adoption and diffusion of transformative innovations or behaviors is often a non-linear process, driven by positive and negative feedback loops, creating diffusion tipping points which, once crossed, can lead to accelerating and exponential change.

- This has some important implications for the design of effective policies to increase the speed and scale of the transition to zero-carbon solutions needed to limit global warming in accordance with the Paris Agreement, including:

  - » **Do not underestimate the power of exponential change**. As exponential change is typically perceived as very slow in the early phases, there is a risk that the transformative potential of a new technology is initially not fully understood.

  - » **Identify and enable tipping points**, where positive feedback mechanisms grow strong enough to drive self-generating and accelerating system change; for example, where learning curves for renewable energy technologies push the energy cost of new wind or solar power below that of coal power.

- **Change will not happen by itself.** In the initial phases of a transition process, the new solutions are normally at a disadvantage compared to incumbent technologies due to higher production costs per unit, less well developed infrastructure, poorer access to investment capital, etc. A key policy objective is to remove or compensate for these barriers, to push development of green innovations beyond tipping points to a phase where change becomes self-sustaining.

- **Timing is key to success.** Policies must be adapted to the different phases of the transition process. Supporting zero-carbon solutions so that they become competitive may be more important in the initial phases of the transition, whereas policies aiming directly at suppressing high-carbon products and production models may become more and more important when zero-carbon alternatives are readily available.

- **Assess policy impact from a dynamic system transition perspective.** The impact and cost efficiency of supporting a new zero-carbon technology through the first development and introduction phases cannot be assessed by calculating the amount of CO_2 emissions saved by the first applications of the technology, but must be considered in relation to its role in enabling a larger system change in the longer term.

Identified "vital policies" for climate action

- Based on interviews with progressive business leaders, investors and other stakeholders, the report highlights five policy areas of vital importance for overcoming barriers and bottlenecks and driving a rapid transformation to fossil-free solutions that could keep the world on track to meet the Paris Agreement targets:

  - **Public financing and risk mitigation:** Early stages of green innovation, as well as investments in green infrastructure or renewable energy in fragile economic environments, encounter problems in attracting sufficient private capital to fund climate-progressive projects, as risks are perceived as too high. Policy responses could include public investments as well as risk-sharing instruments, for example, some form of investment guarantees.

  - **Pricing and competitiveness:** A major obstacle to the necessary transition to a fossil-free and circular economy is the low price of fossil fuels, due to massive direct and indirect fossil fuel subsidies and the lack of an adequate price on carbon emissions. Removal of fossil fuel subsidies, carbon pricing and subsidies for low- or zero-carbon alternatives are among the available policy instruments

  - **Regulations:** Clear and long-term legislation and regulation, creating predictability and covering sufficiently large markets to allow for cost-efficient development of zero-carbon technologies and circular business models is important. However, it is crucial not to over-regulate, but rather to set an overall regulatory framework that facilitates, rather than impedes, introduction and acceleration of low- or zero-carbon solutions.

» **Targets, roadmaps and monitoring:** Targets, roadmaps and transparent monitoring and reporting mechanisms provide governance instruments which are "softer" and less interfering than binding regulation and can therefore be easier to implement.

» **Social impact:** The negative social impact of a green transition must be mitigated in a just and effective way, and correlated positive social, health and development impacts amplified, for example, by addressing the loss of jobs and livelihoods in economically vulnerable areas that are heavily dependent on the fossil fuel economy, or increasing rural employment through distributed renewable energy deployment.

Approaching the global climate governance gap

- Part II of this interim report consists of 23 proposals for governance reforms aimed at enabling large scale implementation of effective policies to drive the rapid and pervasive transformation of the global economy that is required to avoid catastrophic climate change. These proposals are submitted by authors from a variety of fields of expertise and cover a range of topics, policy areas and governance instruments.

- While the various proposals do not currently represent a coordinated action plan upon which the authors, the Global Challenges Foundation (GCF) or the Climate Governance Commission have agreed, they do form a rich menu of options to fuel further consideration and discussion among decision-makers and stakeholders. A number of general conclusions can also be drawn from the set of proposals.


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Key conclusions from governance proposals

THE NEED FOR ACTION ACROSS POLICY AREAS

- A range of the proposals focus on the lack of coherence between climate goals and international regimes in other policy areas that are closely linked, and which may present important, even vital, opportunities for effective climate action: international trade, peace and security, finance, development, labour markets and social impact, as well as legal institutions to combat environmental or economic crime and corruption. The common message is that climate change cannot be dealt with in isolation, but must be integrated at the core of nearly all policy fields. Taken together, these proposals speak to an emerging "whole of system" and "whole of societies" approach to climate governance worldwide.

THE TENSION BETWEEN UNIVERSALITY AND AMBITIOUS LEADERSHIP

- Some reform proposals address the delicate trade off and balance between the need for governance mechanisms with global inclusion, and the pressing parallel need for heightened ambition and sharper policy tools, noting that global negotiations under current dominant paradigms, requiring consensus, tend to lead to agreements that are acceptable to the countries with the lowest ambition, undermining the bold action that is required.

- Progressive groups of countries and other stakeholders should continue and/or make substantial new efforts to lead the way with more ambitious programs and policies, aiming for others to follow. However, such initiatives should not be seen as alternatives to the existing global climate regime, with the UNFCCC and the Paris Agreement negotiated under it as the centrepiece, but rather as complementary, and as ways to improve and strengthen existing institutions and shared goals.

TECHNICAL AND ECONOMIC SOLUTIONS ALREADY AVAILABLE IN HARMONY WITH THE SDGs

- Proposals presented in this report also demonstrate that there are options already available for the economic and technological transformation needed for tackling climate change, which would also facilitate achievement of the Sustainable Development Goals. For example, transitioning from fossil fuels and traditional energy grids to distributed renewable energy offers potential to power businesses, livelihoods and have other positive social effects in areas that are today characterized by energy poverty. At the heart of global climate policy should be future-oriented development and justice perspectives.

THE NEED FOR ENHANCED INTERNATIONAL LEGAL PROTECTIONS

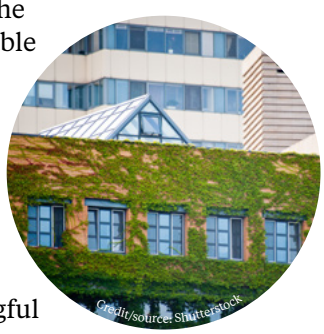
- Several proposals highlight the need for strengthened international legal protection of life-supporting planetary systems that constitute global commons. Such enhancements of the international legal framework could be achieved in different ways: through enhancements of existing legal institutions, such as the International Court of Justice, or the establishment of new specialized institutions such as an International Court for the Environment, or through the establishment of new legal concepts and paradigms.

UPGRADING KEY GLOBAL GOVERNANCE INSTITUTIONS

- Several proposals also explore how key global institutions can be reinforced to better address the existential challenges of climate change and other interrelated environmental problems. The basic architecture of the global governance system could be substantially enhanced in a way that is based on fundamental points of law already agreed to by states worldwide, and upon foundational principles embedded in the current international order. Such efforts need to strike the right balance between proposals that are so ambitious as to have negligible chances of being seriously considered, and those that are seen to be more "politically feasible," but that fail to find meaningful solutions to urgent contemporary problems.

LABOUR MARKET ADJUSTMENTS, CLIMATE ADAPTATION AND A "WELL-BEING" ECONOMY WITHIN PLANETARY BOUNDARIES

- Massive investments in renewable energy and other green solutions will create new jobs and business opportunities that will benefit hundreds of millions of people, in developing as well as developed countries. But millions of jobs will also be lost, and huge assets become worthless in the old, fossil fuel economy. Therefore, it is necessary for the international community to take both a pragmatic and justice-oriented perspective on the transition that must occur, to ensure that funding is available for the retraining of labour and for sufficient investment in green and renewable energy jobs, as well as for climate adaptation in the countries that are most affected and have fewest resources to meet these challenges.



- In addition to a radical, green transformation of technology and production models, there is also need for a major shift in how we think about the economy, away from the current focus on production growth, towards a focus on human well-being and shared prosperity, emphasising indicators such as those relating to good health, meaningful jobs, fair income distribution, healthy ecosystems and a stable climate.

SCALING UP POLICIES AND GOVERNANCE SOLUTIONS

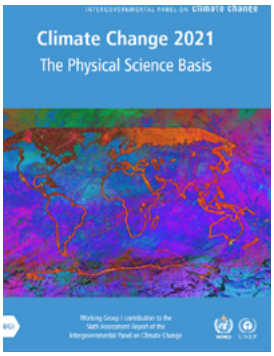
- Policies and governance models that prove effective when adopted by cities, individual countries or groups of countries may themselves have potential to be scaled up and diffused exponentially. Some proposals, such as the idea of Climate Clubs, the increased use of Climate Councils, and/or the establishment of a global climate policy clearinghouse, seek to exploit such opportunities to drive transformative international change.

The climate crisis crossroads: enhancing our capacity to manage global risks

- The climate emergency constitutes an acute existential crisis for humanity. At the same time, it also represents an opportunity to improve the global governance system in a way that makes us better equipped collectively to handle other global catastrophic risks, and to responsibly manage the range of essential global commons in the future.

Introduction

Humanity is facing one of its gravest crises ever, but has so far failed to rise to the challenge. The IPCC's Sixth Assessment Report, Climate Change 2021: The Physical Science Basis, makes clear that the still existing pathways to keep global temperature increase below 1.5 degrees Celsius – a level beyond which, according to science, the risk of disastrous and irreversible consequences of ongoing global warming grows substantially – are rapidly becoming very narrow and will soon be closed.



Immediate and coordinated action at the global level is required, simultaneously aiming for: a) rapid emission cuts on a large scale, halving global greenhouse gas (GHG) emissions every ten years; and, b) a long-term fundamental transformation of the global economy that allows for sustainable development and future prosperity for all, based on technologies, consumption patterns and business models with zero emissions of carbon dioxide (CO_2) and other greenhouse gases.

Achieving such a radical economic and social transition on a global scale in just a few decades is a monumental challenge. But it can be done.

The point of departure for this report is that solutions exist that would keep the world on the narrow but safe path close to the 1.5 degrees Celsius target, with minimal overshoot, including massive investments in renewable energy and increased energy efficiency, increased material and energy efficiency in industrial processes, circular business models, electrification of transportation, more efficient use of building space and increased material and energy efficiency in construction, changes in food consumption, as well as protection, restoration and improved management of natural carbon sinks such as forests, peatlands and pasture. If underpinned by effective policy, finance, and leadership, these known and viable solutions, identified for example in the Exponential Roadmap, could together account for the first halving of GHG emissions this decade.

However, responses so far to the climate emergency have not been characterized by either effective policy or strong leadership. Few countries are on track to honouring their nationally determined contributions (NDCs) under the Paris Agreement, and the NDC commitments themselves are insufficient to meet the 1.5 degree target.

A key aim of this report is to highlight how enhancement or reform of the basic global governance architecture could contribute to better leadership and more effective and purposeful climate action. Despite the success represented by the adoption of the 2015 Paris Agreement and its fundamental importance in enshrining a shared legal framework, there is still a striking deficit in adequate governance architecture or mechanisms at the global level – and in many, or most, parts of the world also at the national and regional levels – that could reliably promote implementation of strong and expedient climate policies for the achievement of the necessary collective climate targets.

The **Climate Governance Commission**, convened under the auspices of the Global Challenges Foundation, aims to contribute to filling crucial climate action gaps in the implementation of known solutions, diffusion of vital policies and adequate governance, and by proposing, developing, and building partnerships to promote governance solutions for urgent and effective climate action. As one step towards this end, a range of authors from various fields of expertise, academics, diplomats, international lawyers, economists, (youth) activists, policymakers, and civil society and business representatives, were invited to contribute ideas for high impact enhancements or reforms of the current global governance system that would facilitate the implementation of effective policies, to drive the economic and social transformations needed to achieve climate and the Sustainable Development Goals.

The result of this call is presented in Part II of this report, and in a number of background reports, published separately by the Global Challenges Foundation. Together, these proposals form a rich, albeit not comprehensive, basis for further discussion of motivations, opportunities, and obstacles for stronger global governance that could make it possible to deal with the current climate emergency, and at the same time better equip humanity to prevent or mitigate other global catastrophic risks in the future.

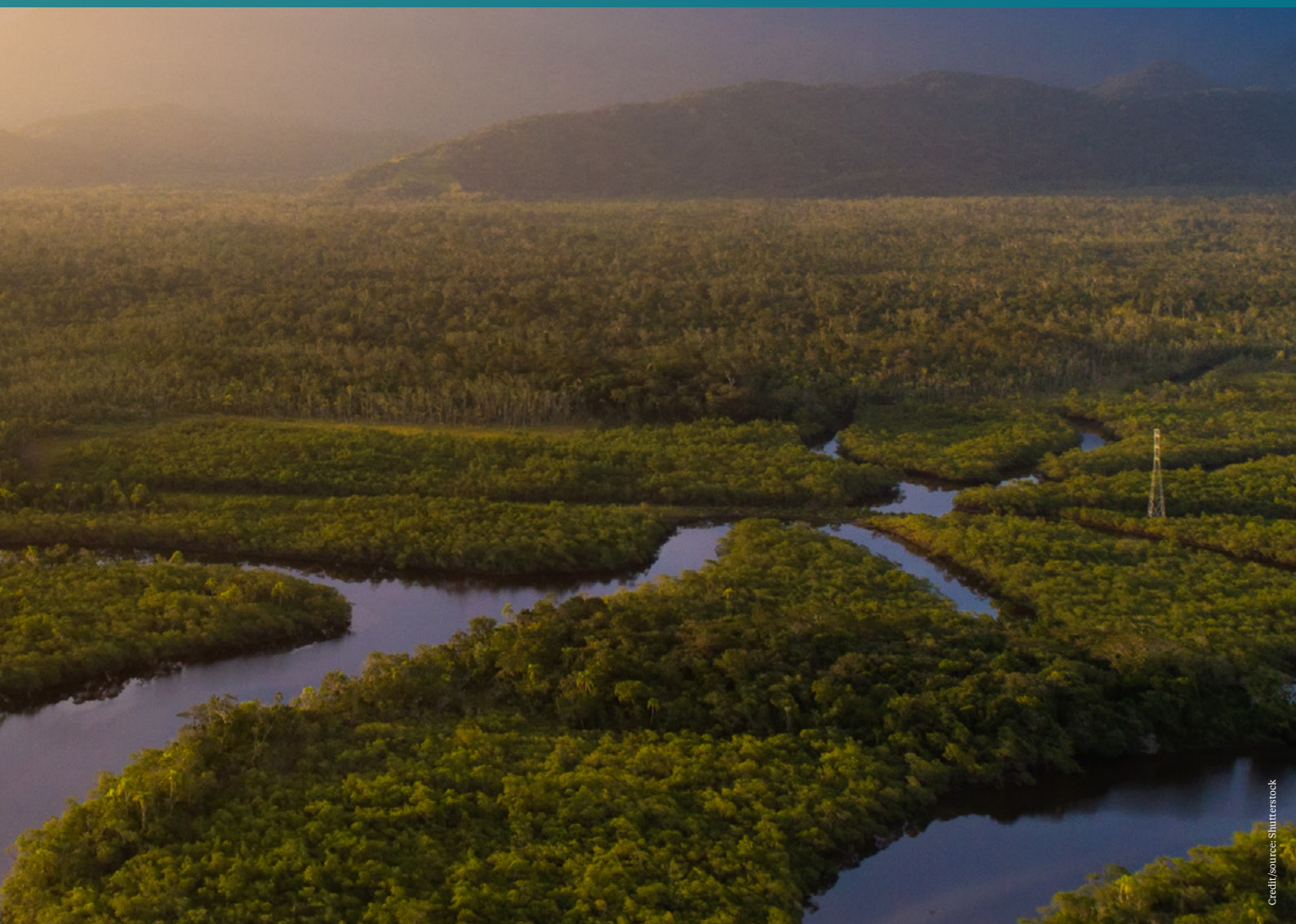
The author submissions presented in Part II, and a previous draft of the discussion paper in Part I, have been reviewed by a number of external experts as well as by other co-authors, giving authors an opportunity to comment on, react to, and critique suggestions. Still, these contributions, and the report, by its limited nature, do not claim to address every crucial issue or dimension relevant to current climate governance debates, which by their nature must be ongoing, and involve multiple and diverse actors. Nor does this report present overall views upon which all the authors – experts contributing to the Climate Governance Commission or the Global Challenges Foundation – have agreed. The authors' submissions not infrequently present diverse and/or overlapping views, which is a natural part of the lively dialogue and exchange that the Commission wishes to foster.

Structure of the report

Part I of this report begins with a brief analysis of the multifaceted challenges posed by the climate emergency, and with an overview of some of the existing solutions that could be implemented in the short term, and that could together, if supported by strong leadership and adequate policies, cut global emissions by 50 percent in the coming 10 years. This overview builds on, and has been compiled in collaboration with, the **Exponential Roadmap Initiative**. It then continues with a discussion of the need for exponential diffusion of innovations, and the corollary implications for policies, aiming to support diffusions and scaling up of zero-carbon solutions to replace and crowd out fossil fuel-based technologies, products and processes, as soon as possible. Finally, it provides a summary of a range of global governance enhancement proposals from a variety of individual authors, that are presented in greater detail in Part II of the report.

As this report provides only very brief, overview information on a wide range of diverse proposals, readers who wish to explore them further are invited to read the in-depth reports on various topics currently published (or forthcoming) on the website of the Climate Governance Commission, or in the other sources cited.

Part I.
Discussion: Moving from challenges to solutions



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1. Challenges

The gravity and urgency of the planetary climate emergency is becoming more widely understood, and increasingly acknowledged. Science is showing that the life-nurturing climatic conditions of our planet – stable for approximately 12,000 years of human history – are threatened, and many changes are occurring more quickly than predicted. For example, a number of the earth's biophysical systems responsible for regulating the global climate, such as the Amazon rainforest, major ocean currents, and ice sheets in the Arctic and Antarctic, are showing signs of instability much earlier than scientists had predicted, and may foreshadow the crossing of dangerous and mutually-reinforcing tipping points. Such developments telegraph the seriousness of current conditions and demonstrate the need for rapid action by national governments and the broader international community to stabilize and protect the earth's climate system. The United Nations (UN) Secretary General has urged all nations to declare a state of climate emergency, and has also called the recent Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) – which notes the worsening, unprecedented, unequivocal, and irreversible (for centuries to millennia) effects of human-induced global heating – a "Code Red for Humanity."

1.1. The imperative of collective action

Unless we rapidly and radically shift course, the world is heading for catastrophic climate change and possible ecological collapse. Some have called our present predicament a survival crisis for humanity – certainly for human society and populations as we currently know them – depending on the course of action that we collectively choose. Paradoxically, even though solutions exist to mitigate the most devastating effects of the climate crisis, they are not being fully adopted or implemented at a pace and scale that mirrors the magnitude and the urgency of the challenge.

In short, our collective system of climate governance, whether in the form of global institutions, laws, policies, operations, and norms, remains woefully inadequate for deliberating upon, adopting, and implementing known solutions at a velocity and competence level equal to our current and intensifying climate calamity.

Catastrophic climate change – with some potentially catastrophic changes already underway according to the 2021 IPCC report – is associated with an increase in global average temperature of more than 3°C, a not-unlikely scenario given current trajectories. But if temperature rise is limited to a maximum of 1.5°C relative to the pre-industrial global average, scientists agree that it may be possible to avoid the worst and most extreme impacts of global heating.

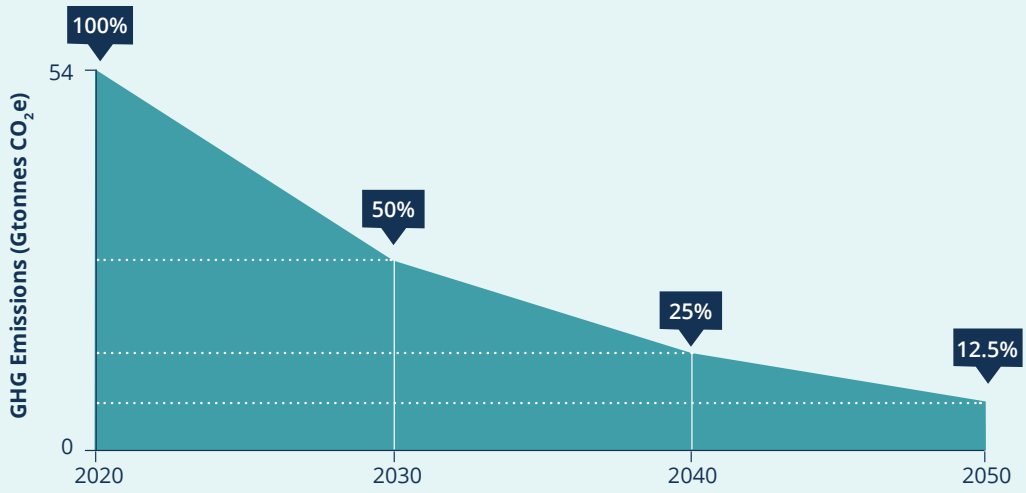
1.2. The global carbon law

A key measure to prevent dangerous temperature rise is to halve worldwide greenhouse gas (GHG) emissions by 2030 and then continue to halve them again every decade. This global rule of thumb – labeled the carbon law to mirror Moore's Law in computer science – was presented in Rockström et al. The principle, albeit not the label, was later confirmed in scenarios with no or low overshoot of the key 1.5 degrees Celsius temperature limitation goal by the IPCC Special Report on the impacts of global warming of 1.5 degrees Celsius.

To keep within the limited remaining carbon budget in line with the 1.5 degrees Celsius ambition, there is also a need for additional strategies to remove carbon from the atmosphere, for example by protecting and enhancing natural carbon sinks such as forests and peatlands, and potentially by artificial carbon capture and storage technologies.

Figure 1.

The global carbon law



Source: Falk, J.; Gaffney, O. et al. 2020.

On the positive side, a growing number of nations, regions, cities and businesses have recently pledged to achieve net zero-carbon emissions by 2050 or earlier. This can be considered an important step forward, even though most of these commitments are not sufficiently robust. Further, emitted CO_2 remains in the atmosphere for hundreds of years, and what matters from a climate management perspective is the total, cumulative volume of emissions released into the atmosphere. Thus the reduction trajectory is as important as the end target; a slow initial decrease will yield much greater cumulative emissions than a steeper one, even if the end year for reaching net zero is the same. Therefore, dramatically cutting global emissions this decade is key.

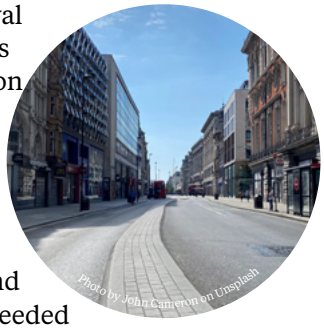
Further, there is also a growing concern in the scientific community over the heavy reliance in many reduction scenarios on future "negative emissions" (i.e., emissions removed from the atmosphere through natural carbon sinks or carbon capture technology) in order to reach net zero targets.

"Net zero" is not absolute zero – in net zero scenarios, some anthropogenic GHG emission sources remain, but are compensated by negative emissions somewhere else – and there is an obvious risk that the prospect of future negative emissions can be used as an excuse not to take difficult decisions to reduce emissions in the short-run, especially if net zero policies rest on yet unproven technologies or business models, or on glossing over difficult political conflicts of interest related to land use that come to the fore in relation to many net zero pathways.

Due to the uncertainties of carbon capture technologies, policymakers should ground their targets and core policies in scenarios with no or limited emissions "overshoot" that would have to be absorbed through highly uncertain carbon capture mechanisms in order to limit the risk of catastrophic scenarios. Removing carbon from the atmosphere by carbon capture based on future technologies may eventually still be necessary. But carbon sinks/capture, relying on unknown or currently non-viable technology, should be considered a last resort for only a very limited share of emissions – in the words of Dyke et al., "to mop up" some of the residual emissions from sectors that are truly difficult to decarbonize rapidly with current technologies.

1.3. A multi-dimensional context: economic and justice dimensions

Rapidly cutting global GHG emissions is an absolute prerequisite to avoiding catastrophic climate change, and represents a huge challenge in itself. But the challenges of the current global climate emergency are even greater and more complex.



The 2007–2008 global financial crisis, as well as the global economic upheaval caused by the ongoing COVID-19 pandemic, have shown that GHG emissions fall when the economy shrinks. But such crisis-induced economic contraction leads to its own set of hardships, and many countries are still in dire need of economic development in order to meet the basic human needs of their populations. While the discussion as to whether continued economic growth, according to current models and metrics, is at all compatible with avoiding global climate disaster is gaining traction and should be taken seriously, any global climate mitigation strategy must be compatible with and support social and economic development in parts of the world where it is needed to combat poverty and achieve the Sustainable Development Goals.

Moreover, the climate emergency is already far beyond the point where reducing consumption alone will suffice. Humans will continue to some extent to need to use energy, live in and build houses, produce and consume, travel and trade; and even if per capita consumption could be significantly reduced in the rich world – and among the middle class and wealthy in every nation – the remaining demand and its increase in developing countries required to satisfy basic human needs must be met without generating GHG emissions. This would be the case even with a strong economic, behavioural and values shift across the world away from high material consumption, accumulation and materially wasteful practices (see section II.1.4). Therefore, a fundamental transformation of technologies, industrial processes and production models, as well as modes of transportation and patterns of consumption, is urgently required.

Historically, today's rich, industrialized countries bear responsibility for the bulk of GHG emissions that have caused the current climate crisis, with China rapidly catching up. Stopping these existing sources of GHG emissions is an absolute imperative. However, to enable the necessary economic and human development in many countries, without taking the same fossil fuelled route that all developed nations have done before them, is an equally large challenge, and will at times require focusing on different types of low-carbon technologies and solutions than the ones at the centre of attention in already-developed economies; for example, applying decentralized renewable energy solutions to power rural livelihoods in the absence of a central power grid (see section II.1.2).

In addition to these challenges, the consequences of global heating are already affecting people and societies around the world, and these consequences will increase in magnitude and have a disproportionate impact on already vulnerable societies through extreme weather events, deteriorated conditions for agriculture, increased disease, water scarcity, reduced access to food and shelter, and climate-induced migration, among others. These effects raise profound human rights issues, as well as issues of apportionment for "loss and damage," which are frequently raised by Global South governments. Ensuring sufficient adaptation to these consequences – and governance of and funding for the same – is a herculean international challenge that must be met in parallel with efforts to cut emissions and with the implementation of low-carbon pathways for economic and social development globally.

1.4. Three climate action gaps

Three major, interrelated global climate action gaps can be highlighted:

1. **The climate solution-action gap:** Technological, economic and social solutions exist that would keep the world on track to meet Paris Agreement targets and minimize the risk of disastrous global heating, but they are not applied and executed at the required speed and scale.

2. **The climate policy gap:** To bridge the climate solution-action gap, there is need for strong leadership and adequate policies, to align the incentives of individuals, businesses and nations with global climate goals. Such policies also exist and are well known – e.g., carbon pricing and the removal of fossil fuel subsidies – but are not put into effect quickly and widely enough, nor are they being sufficiently scaled up and diffused globally, in a systematic fashion, to enable the required climate action.

3. **The climate governance gap:** To bridge the climate policy gap, and impose effective climate policies on a global scale, there is need for purposeful and functional governance mechanisms at a global level. Currently, existing governance structures are not up to the task. It is the aim of this report, and the submitted proposals from a number of authors that make up Part II of the report, to contribute to the discussion on how this climate governance gap can be bridged, and how a better fit-for-purpose global climate governance architecture could enable the response to the climate emergency that the world needs.

2. Solutions

2.1. The exponential roadmap

In addition to protecting, managing and restoring natural carbon sinks, the Global Carbon Law requires us to rapidly phase out fossil fuel-based energy, transportation, and production, as well as other sources of greenhouse gases in agriculture, forestry and industrial processes. These activities and technologies make up a very large share of the current global economy. Thus, without putting alternative solutions in place to serve essential human needs at the same rate as those are phased out, the consequence would be a supply and prosperity deficit which may both generate popular backlash and jeopardize important human ends formulated in the UN Sustainable Development Goals. At the same time, climate change itself substantially reduces chances of reaching the Sustainable Development Goals.

In order to halve emissions by 2030 and every decade thereafter and at the same time raise human prosperity, the most viable strategy is to drive a genuine zero-carbon economy by investing in efforts to accelerate scaling up of carbon-free solutions, renewable energy, electrified transportation, fossil fuel-free steel and cement technologies, circular business models, sustainable food systems and forestry, among others, at an unprecedented pace, to replace fossil fuel-based technologies.


Credit/source: Shutterstock

In certain high-emitting areas such as cement and air travel, viable low- or zero-carbon substitutes might not yet exist and it may therefore be necessary to constrain demand and supply in the near term until solutions are available, in order to keep humanity on a safe climate trajectory. This obviously constitutes a great challenge.

A complementary and necessary building block is digitalization, which has the potential to radically drive energy, material and resource efficiency in all sectors.

Many of these low- or zero-carbon solutions already exist. **The Exponential Climate Action Roadmap** identifies 36 technologically viable and market-ready solutions which, if implemented on a large scale, would jointly enable cutting global emissions by half by 2030, on the path to reaching net zero emissions in 2050.

Solutions exist in all sectors of the economy, and can be organized in six areas, with some examples given below:

1. **Energy:** Massive expansion of affordable renewable energy in combination with increased energy efficiency.

2. **Industry:** Reduced use, recirculation and replacement of high-carbon materials, improved efficiency of production processes (e.g., by digitalization), circular business models and cutting emissions from refrigerants and other chemicals that act as greenhouse gases.

3. **Buildings:** Reduced demand for building space through efficient use of space, reduction of energy use during operation, low-carbon heating and cooling, retrofitting to minimise energy use and improved energy and carbon efficiency in construction and refurbishment.

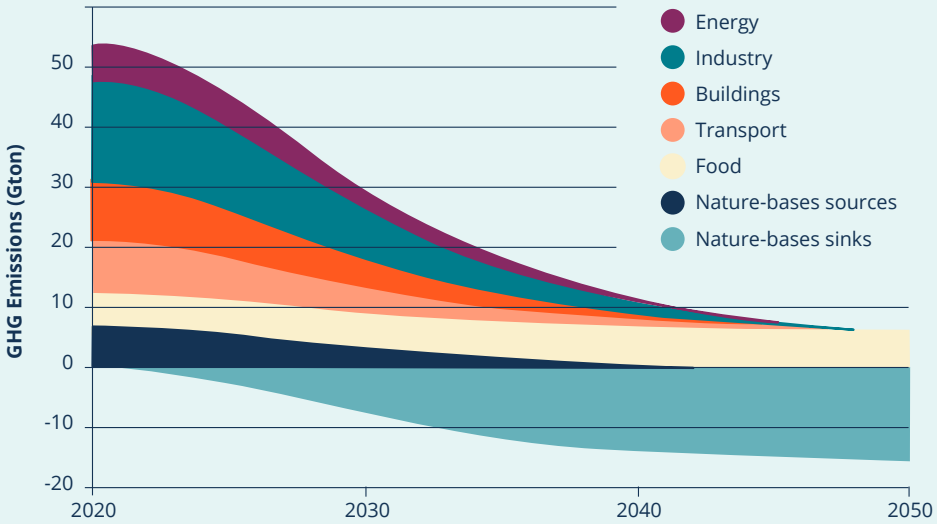
4. **Transport:** Mass transit, cycling and walking to substitute for car use, electric vehicles and a strong move to usership and sharing of cars instead of ownership, development of a green hydrogen economy for long haul and heavy transport.

5. **Food systems:** Reduced meat consumption and food waste, and transformation towards sustainable agriculture. Given the growing world population and the need for improved food supply in many parts of the world, rapidly reducing the GHG intensity of food is essential; but this may mainly compensate for increased demand, and the net emissions reductions could therefore be modest.

6. **Nature-based solutions:** Reduced emissions from nature-based sources, for example by forest and peatland protection, grazing management and reduced use of fertilisers. Expanding nature-based carbon sinks, for example, through reforestation and peatland restoration.

Figure 2.

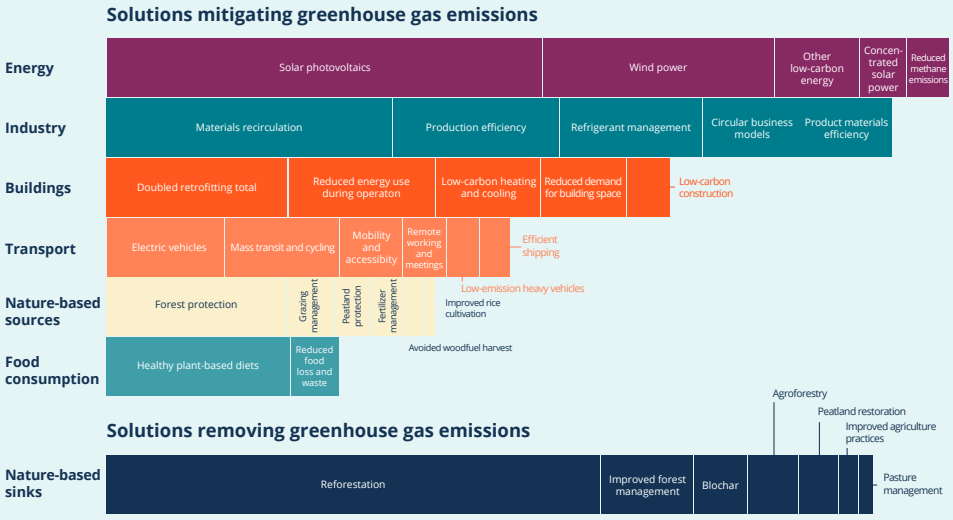
Exponential emission reduction pathways to limit global warming to 1.5°C



Source: Falk, J.; Gaffney, O. et al. 2020.

Figure 3.

36 solutions to halve emissions by 2030



Emission reduction potentials of 36 solutions to halve global emissions by 2030 according to the Exponential Roadmap Initiative. The numbers to the right show the anticipated emissions reduction potential between 2020–2030. Note that Energy (top) represents both the energy sector's own emissions (6.1 Gt) and emissions related to providing electricity and heat to other sectors (e.g., industry and buildings). Note that only the energy sector's own emissions, 6.1 Gt, could be added to the contributions represented by the other bars when deriving an overall reduction potential from this graph to avoid double counting.

2.2. Exponential diffusion of innovations

One fundamental insight behind the Exponential Roadmap is that the adoption and diffusion of transformative innovations or behaviours is often a non-linear process, driven by positive and negative feedback loops creating tipping points which, once crossed, can lead to accelerating and exponential change. This has important implications for the design of effective policies to increase the speed and scale of the transition to zero-carbon solutions needed to limit global warming in accordance with the Paris Agreement.

Exponential increase means that some quantity – for example, the number of new electric cars sold in a month – grows proportionally to the existing quantity; that is, the number of electric cars in traffic (or sold the month before). Such exponential dynamics are also found in many biological processes, for example population growth, where the number of births is proportional to the size of the existing population, or the spread of a new virus, where the number of new cases grows with the number of infected people who can infect others.

In the case of technological or business innovations, or changing consumption patterns, several potential positive feedback mechanisms and forces can drive exponential diffusion:

Economies of scale: larger production volume typically leads to lower cost per unit.

- **Learning curves:** more experience typically leads to improved skills, better quality and more efficient production. Strong and decisive government interventions to drive fast technology deployment, such as Germany's expansion of renewable energy, will push down production costs and may thereby have positive effects that extend far beyond the domestic market.

- **Dependence on infrastructure and complementary technologies:** one example is electric cars which are dependent on charging infrastructure, where lack of infrastructure will be a prohibiting factor.


Credit/Source: Shutterstock

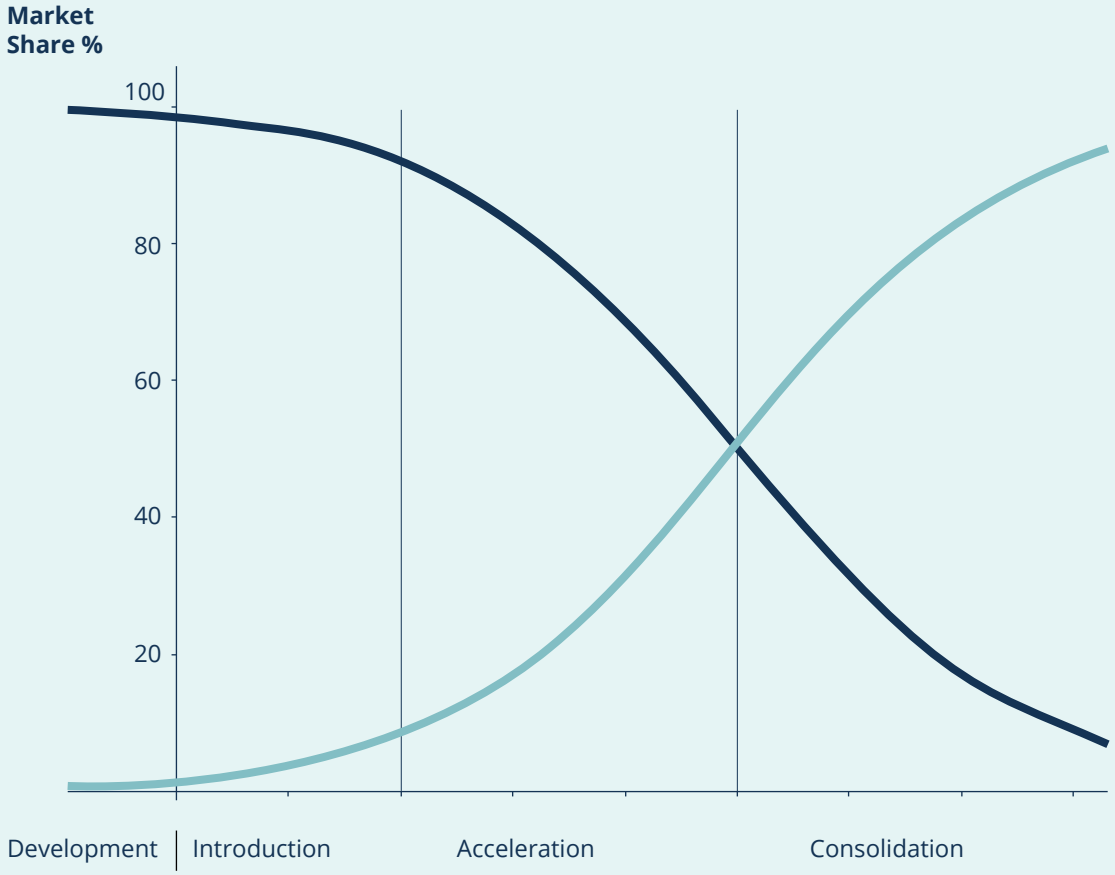
- **Resources available for marketing and lobbying:** companies behind incumbent technologies and products will initially have available larger turnover and stronger balance sheets to fund marketing and lobbying activities. This has clearly been the case with fossil fuel industry lobbying to block or slow down effective climate policies. As the market share of low- or zero-carbon solutions increases, a growing number of companies will have an interest in lobbying for stronger policies, such as when the CEO of Volvo Cars in late 2020 suggested a ban on petrol cars.

- **Access to investment capital:** as new green solutions prove viable, expectations of future performance increase, facilitating access to capital for further growth.

- **Information and imitation dynamics:** the more electric cars I see on the road, the more likely I am to consider buying one myself; the more vegetarians or vegans in my neighborhood, the more likely I am to hear about and contemplate vegetarianism or veganism as an option.

Figure 4.

Four phases to fossil free solutions



The diagram shows four phases in the transformation from fossil fuel-based to fossil fuel-free solutions: development, introduction, acceleration and consolidation.

At some point, however, most innovations run into constraints, where growth slows down and eventually levels off, forming a characteristic S-shaped curve, illustrated in Figure 4. If GHG emission cuts are achieved by simultaneously scaling up zero-carbon solutions, for example by substituting fossil fuels in transportation for electric and hydrogen, coal and gas-fueled power for wind and solar, and extraction of virgin materials for circular business models, the transition can be represented by interrelated S-curves, a black curve representing fossil based technologies and wasteful production models being phased out, and a green curve representing new, fossil free and sustainable alternatives scaling up.

This transition process can be divided into four different phases, illustrated in figure 4 above.

For each of these phases, different policy options will be more or less effective. In the development phase, the aim of policy should be to ensure sufficient financing and to promote research and development of a menu of zero-carbon innovations to be tested on the market. In the introduction phase, policy is of vital importance to enable viable solutions to overcome initial barriers and bottlenecks, pass the first tipping points, and enter into the acceleration phase, where growth becomes self-generating and accelerating.

In the acceleration phase, policy can facilitate and accelerate growth further, and at the same time increase measures designed to suppress fossil fuel-based technologies, products and processes. In the final consolidation phase, policies should aim mainly to speed up the phasing out of fossil fuel-based products and processes in order to reach zero emissions.

This does not mean that all innovations necessarily follow an exponential or S-shaped pathway. Many innovations fail in the early stages because they simply do not have the potential to become competitive, others because they run out of capital before becoming profitable, or because barriers against newcomers in the market are too high. In reality, of course, system transition is a complex process with many different forces interacting to shape development. The perfectly S-shaped innovation diffusion curve is, in this sense, obviously a simplification.

Still, there are good reasons for policy makers to pay special attention to zero-carbon solutions with potential for exponential increase. First, there is strong evidence that feedback mechanisms, tipping points and exponential diffusion of innovations often play a vital role in system transition. Second, such solutions provide opportunities for high impact and cost efficient policy interventions, taking advantage of the leverage provided by positive feedback mechanisms to drive accelerating change.

- Note that when we speak of exponential increase of low- or zero-carbon solutions in this section, what is meant is that the market share of those solutions grows, so that incumbent carbon-intensive products and processes are eventually crowded out. This does not imply growth of the market as such. For example, exponential increase of low-carbon transport solutions, such as mass transit, cycling, walking and electric vehicles, is likely to lead to a smaller market for cars, but the market share of electric cars may still grow exponentially relative to fossil fuel cars.

3. Policy

3.1. Policy implications of the exponential framework

Halving emissions every decade requires sharp and purposeful policies specifically focusing on the rapid growth of green climate solutions and the equally rapid suppression and phasing out of fossil fuel-based technologies and wasteful production models. Current policy generally lacks such ambition, and is to a large extent based on linear thinking and fragmented implementation, delaying the required transformation. A new way of thinking is required.

By "exponential" climate policy and governance, we mean policy and governance mechanisms that are purposely designed to promote exponential increase of low- or zero-carbon solutions to replace incumbent fossil fuel-based models of production and consumption and wasteful resource use, or which aim to directly suppress and enable an exponential decay of the latter.

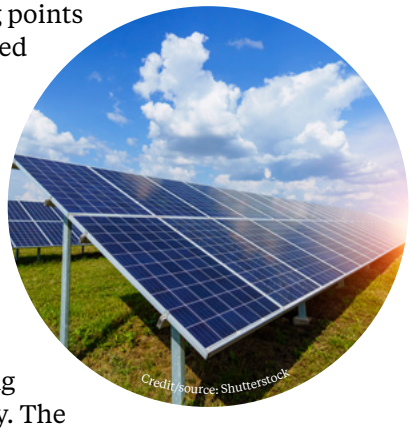
Some of the policy implications of the exponential climate action framework follow directly below.

3.1.1. DO NOT UNDERESTIMATE THE POWER OF EXPONENTIAL CHANGE

Since exponential increase is typically perceived as very slow in the early phases, there is a risk that the transformative potential of a new technology is initially not fully understood. For example, renewable energy technologies such as wind and solar power were initially often seen as small and expensive fringe phenomena, not realistic alternatives to fossil fuel-based or nuclear power. At the same time, however, it is often in the very early stages that policy interventions can have the most impact (see sections I.2.2 and I.3.1.4).

3.1.2. IDENTIFY AND ENABLE TIPPING POINTS

A tipping point occurs when positive feedback mechanisms grow strong enough to outweigh negative, countering forces, and system change becomes a self-generating and accelerating process. For example, important tipping points in the transition from fossil fuel-based to renewable energy are crossed when the levelised cost of energy ($ per kWh) for new wind or solar power first drops below that of new coal and gas power, and then below that of existing fossil fuel power.


Credit source: Shutterstock

Since the development of new technologies and infrastructures are often co-dependent – e.g., electric cars with battery technology and charging infrastructure; fossil fuel-free steel with green hydrogen; intermittent renewable energy with technologies for transmission, storage and load balancing – crossing a tipping point in one area may trigger other tipping points, setting in motion tipping cascades that may together transform large segments of the economy. The possibility of triggering tipping points and tipping cascades provides a powerful opportunity for smart and well targeted climate policy interventions that can drive rapid change.

3.1.3. CHANGE WILL NOT HAPPEN BY ITSELF

It is important to note that in the initial phases, new innovations are normally at a disadvantage compared to existing technologies, regarding all of the mechanisms: smaller volumes mean higher production costs per unit, fewer resources for marketing and lobbying, less well developed infrastructure, poorer access to investment capital, etc. A key objective when designing policies to support a green transition of the economy will therefore be to mitigate or compensate for these barriers and push development of green innovations beyond tipping points, so that positive feedback mechanisms outweigh the barriers and change becomes self-sustaining.

3.1.4. TIMING IS KEY

When we attempt to influence a potentially exponential diffusion, it is not only what we do that matters, but also when we do it. Timing is key to success.

Consider, for example, the impact of a public investment in a new zero-carbon technology that could potentially replace an incumbent high-carbon technology. If this is done early, in the introduction phase when the market share of the new technology is close to zero, it will shift the trajectory substantially to the left, cutting the transition time and thus significantly reducing accumulated emissions during the transition process. Later, when the technology is well into the acceleration phase, the same investment will have little or no effect on the transition time scale or the corresponding accumulated emissions.

On the other hand, policies that aim to suppress fossil fuel-based activities directly – for example, heavy carbon taxes or a prohibition against new fossil fuel cars – may initially be difficult to implement, as the alternatives still seem insignificant and expensive. Such measures may gradually appear more realistic and play an important role to speed up the transition when credible green alternatives have been established.

3.1.5. ASSESS POLICY IMPACT FROM A DYNAMIC SYSTEM TRANSITION PERSPECTIVE

Standard economic assessments of the efficiency of climate policies often take a static allocation efficiency perspective: what counts is emissions saved per dollar spent at a given moment. From this perspective, the efficiency of a policy aiming to promote electric cars, for example, is evaluated based on the cost of the policy, the resulting increase in car owners shifting from fossil to electric cars, and the emissions reduction resulting from each such shift.

From a dynamic system perspective, a much more important aspect of such a policy is the role it plays in enabling larger system change, for example by pushing the system beyond a tipping point where positive feedback mechanisms kick in and accelerate the rate of change, or by rapidly shifting the base level from which a green solution grows upwards.

As Sharpe and Lenton note:

> **Marginal abatement cost curves can be used to rank policies according to the cost per tonne of emissions reduction directly achieved. However, this calculation reflects neither the potential for clean technology costs to come down through learning and economies of scale, nor the possibility of influencing wider changes in the same or other sectors.**

3.1.6. POLICY INNOVATIONS CAN THEMSELVES BE DIFFUSED EXPONENTIALLY

Policies and governance models that prove effective when adopted by cities, individual countries or groups of countries may themselves have potential for exponential diffusion. Policies and governance models that have proven their efficacy should be scaled up, adapted and implemented much more systematically on a global scale. Policies can in some sense also be seen as scalable "products," allowing for experimentation, pilot schemes, iterative development models, open source sharing, etc., which speed up innovation and diffusion of successful models.

Thus, any existing or potential "top down" approaches or structural enhancements to global climate governance, which are likely vital to ensure the safeguarding of key planetary ecological systems (see sections II.3.1–3.8 and II.2.1–2.5) should be connected to and complemented by "bottom up" approaches that can also contribute to the exponential diffusion of effective climate policy and governance (see section II.4.1–4.5). This may include the formation of trend-setting "climate clubs," a novel global climate "policy clearinghouse," as well as significantly strengthened multilateral, multi-stakeholder alliances and initiatives that aim to collect and disseminate information, and promote diffusion of best-practice policies and governance models.

Photo by Antenna on Unsplash

3.2. Key vital policies

In a series of interviews with progressive business leaders, investors, and other stakeholders, barriers and bottlenecks that prevent a transformation to fossil-free business models were mapped out, as well as what policies would help businesses overcome these barriers. Four key policy clusters, described below, were identified through these consultations, and are further developed in a separate report:

1. **Public financing and risk mitigation:** Early stages of green innovation encounter problems in attracting sufficient private capital to fund climate-progressive projects. The same is true for investments in green infrastructure or renewable energy in fragile economic environments, where risks are perceived as being higher. Policy responses could include public investments as well as risk-sharing instruments, such as some form of investment guarantees (see below a proposal addressing risk-sharing in section II.1.3).

2. **Pricing and competitiveness:** A major obstacle to the needed transition to a fossil-free and circular economy is the low price of fossil fuels, due to massive direct and indirect fossil fuel subsidies and the lack of an adequate price on carbon emissions. Removal of fossil fuel subsidies, carbon pricing and subsidies for low- or zero-carbon alternatives are among the available policy instruments.

3. **Regulations:** Clear and long-term legislation and regulation, creating predictability and covering sufficiently large markets to allow for cost efficient development of zero-carbon technologies and circular business models is important. However, it is crucial not to over-regulate, but rather to set an overall regulatory framework that facilitates, rather than impedes, introduction and acceleration of low- or zero-carbon solutions.

4. **Targets, roadmaps and monitoring:** Targets, roadmaps and transparent monitoring and reporting mechanisms provide “softer” and less interfering governance instruments than binding regulation, and can therefore be easier to implement. Still, such instruments can play a vital role in a green transition process, by setting expectations, mobilising key actors, aligning plans across business sectors, and enhancing accountability.

Another important policy area, explored in Dewan (see section II.1.1), is to mitigate negative social impact from a green transition, and to achieve or amplify correlated positive social, health and development impacts, for example, by addressing the loss of jobs and livelihoods in economically vulnerable areas that are heavily dependent on the fossil fuel economy, or increasing rural employment through distributed renewable energy deployment (see section II.1.2). In addition to considerations of justice, failure to address such negative impacts on economies and regions that are heavily dependent on the fossil fuel value chain could result in popular resistance or resistance from key actors, blocking necessary policy changes.

4. Governance

4.1. Approaching the global climate governance gap

Given the gravity of the current climate crisis, and the worsening planetary conditions being mapped in real time by the scientific community, stronger global climate and environmental governance, to meet the challenge of quintessential global problems and to implement vital, "exponential" policies universally and at scale, would seem, logically, to be in order. However, Princeton academic Anne-Marie Slaughter highlighted almost two decades ago what she termed "the globalization paradox," consisting of a pressing need for stronger global governance capabilities, given the current international conditions and shared problems, which is nonetheless inhibited by a generalised or diffuse fear of the same. The Commission on Global Security, Justice and Governance of 2015, co-chaired by Madeleine Albright and Ibrahim Gambari, went further and noted a "crisis in global governance," calling for new impetus behind an international institutional reform agenda, to ensure the "bold, effective, and inclusive global governance" that we so badly need.

Given this global "governance gap," disruptive thinking should be employed to begin to take various global governance enhancement proposals and improvement mechanisms much more seriously, in order to have a chance of effectively managing the climate crisis. In this respect, there is a need to more systematically map out the required vital, exponential policies (such as those described above in sections I.3 and I.3.2), which are needed at the global level to meet collective climate goals, and explore how they may be practically implemented through strengthened governance mechanisms at the global, regional and national levels.

This section gives an introduction to various types of global governance enhancement proposals by diverse authors found in Part II of the report. It explores a range of promising and innovative global governance improvements, on or for which various experts, stakeholder groups, youth or citizen advocates and others may currently be working and advocating. The submitted contributions, advanced by selected contributing authors, take a variety of perspectives (e.g., structural reforms, strengthened international law, "bottom up" approaches, and economic and development perspectives). The proposals are grouped thematically, but listed in no particular order of importance.

4.2. Global economic and development perspectives

Meeting the requirements of the Carbon Law, i.e., cutting global CO_2 emissions by half every decade, to reach net zero emissions by 2050 or earlier, requires a radical and rapid transformation of the global economy, away from fossil fuel-based and material-intensive consumption and production models, towards circular business models, renewable energy and changed consumption patterns.

At the same time, the transition must be done in a way that supports, and ideally facilitates, achieving the Sustainable Development Goals. Meeting this double challenge will require dramatic change in investment patterns away from fossil fuels and unsustainable production and consumption patterns, and huge and coordinated new investments, far beyond what exists at present, in new technologies and infrastructure. This, in turn, will have a pervasive impact on labor markets and livelihoods around the world.

One group of papers in Part II of this report addresses different aspects of these issues, and considers ways to overcome barriers to effective financing of the transition, including mitigation and adaptation, and to improve alignment between climate and development goals.

Sabina Dewan addresses the social impact that a radical transition of the global economy towards fossil fuel-free and sustainable energy, industrial production, transportation, food supply, etc., in just a few decades will inevitably have, affecting labour markets, wealth distribution, well-being and livelihoods across the world. Massive investments in renewable energy and other green solutions will create new jobs and business opportunities that will benefit hundreds of millions of people, in developing as well as developed countries. But millions of jobs will also be lost, and huge assets become worthless in the old, fossil fuel economy. It is not necessarily the case that, for example, coal-dependent workers in India will smoothly transition to new jobs in the emerging green industries.


Credit/source: Shutterstock

Therefore, it is necessary for the international community to take a pragmatic and justice-based perspective on the transition that must occur, to ensure that funding is available for retraining of labour and investments made in renewable energy and green jobs, as well as adequate adaptation to the effects of climate change in the countries that are most affected and have least resources available to meet the challenges to which they are exposed.

Arunabha Ghosh and colleagues at the Council on Energy, Environment and Water (CEEW) present several ideas on how the economic transition necessary to combat climate change can also contribute to powering livelihoods and economic progress, and how obstacles to such a development can be overcome. One proposal focuses on how distributed renewable energy can be used not only to provide access to electricity to homes in rural areas with no central power grid, but also to power businesses and industries that provide income and livelihoods in such areas. Another contribution from Ghosh and the CEEW team presents the idea of a global risk mitigation mechanism to unlock capital for investments in fossil fuel-free pathways to development in countries with fragile economies – investments that are often seen as too risky by many investors. Finally, the CEEW team also proposes a Global Green Hydrogen Alliance to promote development of an inclusive global green hydrogen economy (see section II.4.5), where many countries in the tropics, with optimal resources for renewable energy, have potential to play a central role. In the words of Ghosh et al.:

▼If green hydrogen has the potential to be a foundational fuel for industrial and transport decarbonisation, its development and deployment must be treated as a global public good.▼

Anders Wijkman discusses the need, potential and obstacles to a transition from today's "take-make-dispose" linear economic model, to a circular global economy, where the flow of materials is greatly reduced and products and materials are used and reused for as long as possible.

Wijkman makes the point that such a transition will only be possible if the cost structure of the economy is changed – too often virgin materials are less expensive than reused ones – and if priority is given to product life extension and products are designed for reuse and recycling. Wijkman stresses however, that full circularity cannot be achieved; hence circular production models need to be complemented with a value shift, giving less priority to consumption of resource- and carbon-intensive goods in favor of spending time and money on activities that depend far less on material consumption (see section II.1.4).

Finally, Augusto Lopez-Claros presents a range of ideas on how to raise the massive financial resources needed for the necessary global economic transition, as well as for reducing the negative effects of ongoing global heating that are already felt in many parts of the world. Lopez-Claros discusses various instruments that could be used for this purpose, including carbon taxes, sponsored loan instruments by multilateral development banks, and the idea of seizing corrupt assets that "once discovered and frozen, could be used to finance climate mitigation."

While policy instruments are now most commonly implemented at a national level, the required interventions, in order to be effective in meeting collective climate goals, will often need to cover and be harmonized over markets that go beyond national borders. Moreover, many of the countries with the greatest challenges – for example regarding labour market implications as well as investment risks blocking access to private capital – are also the ones with the fewest resources to tackle those challenges on their own. There is therefore a great need for strongly coordinated efforts and new forms of "radical collaboration" involving multiple nations and stakeholders.

4.3. Strengthened international law

Notwithstanding the remarkable diplomatic and normative achievement of the 2015 Paris Agreement and other flagship global environmental treaties articulating vital shared norms, the current state of international climate and environmental law exhibits many of the systemic weaknesses which apply to international law more generally, in relation to its ability to contribute to reliable governance for crucial global issues.

The lack of consistent implementation and enforcement of international climate and environmental law and related systemic governance deficits have been documented elsewhere – viz., a complex, fragmented system of multiple, weak treaty regimes/compliance mechanisms, without sufficient monitoring and true enforcement capacity. See, for example, The Cartography of Global Catastrophic Governance on the current regime complexes for climate change and ecological collapse.

Legal accountability mechanisms, through mandatory courts or tribunals, and related oversight and enforcement processes to ensure compliance, are considered fundamental to governance at the national level in essentially every nation in the world; yet these are still largely eschewed at the international level. Improving legal accountability at the global level would assist with the implementation of a whole range of policies, principles and obligations that are already widely accepted in a large number of international environmental treaties.

Against this backdrop, several authors contributing to this report focus on ways to strengthen legal regimes relevant to the ongoing climate emergency. A group of authors from the World's Youth for Climate Justice and the World Future Council discuss attempts to bring climate change and its impact on human rights to the International Court of Justice of the United Nations under current procedures, while Andrew Strauss discusses how the International Court of Justice could be further empowered to deal with climate change lawsuits.

Stephen Hockman presents the campaign to establish a new international legal institution, an International Court for the Environment, "*dedicated to the survival of the planet and to achieving the necessary balance between environmental protection and economic development*." Ian Lynch discusses how a new international anti-corruption court could facilitate effective climate action, both by addressing illicit financial flows that originate in and drive environmental crimes, and by making climate mitigation efforts more efficient by targeting costly corruption.

Finally, several authors propose new legal paradigms designed to provide legal protection for essential functions of the "Earth System." To this end, Maud Sarlième, noting that "*(n)o existing international legal mechanism allows for the effective criminal investigation, prosecution, and adjudication of those most responsible for the most serious environmental damage,*" discusses how the inclusion of the concept of "ecocide" in international law could provide one dimension of such a mechanism. Paulo Magalhães proposes granting a new specific legal status to the global ecological commons, defining a healthy and well-functioning Earth System as an "Intangible Common Heritage of Humankind."

4.4. Reformed and new institutions

Despite the generalized resistance to date to strengthened global climate governance, it is now well recognized in international security communities that climate change is a "threat multiplier" with a variety of implications for international peace and stability. National governments may also be incorporating climate into key security policy, for example in a United States (US) Executive Order of January 2021, which establishes "climate considerations" as "an essential element of US foreign policy and national security." This may indicate a growing recognition of the seriousness of the climate crisis, and of its elevation to an urgent, priority issue. However, as some of the authors point out in this section, such trends might also pose risks of "securitization" of climate policy debates or action, and distract attention from the many institutional reforms or enhancements across governance architecture which are necessary, some proposals for which are discussed in this section.

Several authors contributing to this report discuss the connections between climate change and security, highlighting both opportunities and risks, and also how the existing global governance institutions, with the UN system at its core, could be made better fit to deal effectively with the climate emergency.

Maja Groff, Augusto Lopez-Claros and Arthur Dahl discuss possible reforms of the UN Charter in the light of the grave global risks presented by the climate challenge and adjacent ecological and sustainability challenges, which are, in turn, often interconnected with the management of other global risks. Next, Jack Stuart and Halldór Thorgeirsson propose near-term enhancements to the existing processes of the UN Framework Convention on Climate Change (UNFCCC), to make it better equipped for its purpose.

Adriana Abdenur, co-founder and director of Plataforma CIPÓ, discusses how the existing UN system might strike a better balance between military security and human security issues related to climate change. Richard Ponzio proposes ideas on how the UN Peacebuilding Architecture could be enhanced to contribute also to global climate goals; and Karen Smith of Leiden University discusses the viability of the application of the "Responsibility to Protect" doctrine to authorize the international community to prevent or take action against serious environmental threats having global impact.

Georgios Kostakos and Harris Gleckman propose the establishment of a Global Resilience Council, as a new coordinating and rapid response international "Security Council" for non-military global risks, like climate change and pandemics. Such a body could be established by the international community in the nearer-term.

Arthur Dahl and Sylvia Karlsson-Vinkhuyzen propose a new, dedicated Global Environment Agency, with a range of fundamental functions and design features – an institution, in one form or another, that has been suggested previously over many years by multiple authors who envision it as vitally important for the effective management of the global climate and planetary environment.

Finally, Joachim Monkelbaan, International University in Geneva, describes the tight linkages between international trade and climate change, and discusses a range of proposals on how the international trade regime can be better aligned with global climate goals.

4.5. “Bottom-up” pathways

Rather than stronger and more centralized global governance mechanisms, the international community has, to date, chosen a more decentralized approach to global climate and environmental governance, with primary responsibilities falling on the shoulders of individual nations, and a slow-moving consensus model for international norm and policy development, in which the “lowest common denominator” too often prevails.Moreover, this decentralized global climate governance landscape is constantly evolving and has become even more complex and intricate since the adoption of the 2015 Paris Agreement. Although the UNFCCC is a preeminent forum (see section II.3.2), the current global climate governance system contains a much larger web of structures, institutions, states and non-state actors, working in different ways and at different levels of governance. As this system grows in complexity, it is becoming increasingly difficult to analyze and identify the tipping points within the system that can effectively accelerate the required climate action globally, at scale.

In this section, Jimena Leiva Roesch and Julia Almeida Nobre present an overview and mapping of current multi-state or multi-stakeholder climate initiatives, networks and states which have the goal of becoming climate leaders, with a view to diagnosing various weaknesses and positive “pressure points” to strengthen such existing overlapping and decentralized initiatives.

Katia Simeonova’s contribution relates to the idea from the Exponential Roadmap (see section I.3.1.6 of this report), that effective climate action policies can be viewed as a kind of “product,” and policy reforms as innovations, with potential to be diffused exponentially among the population of policy makers. As with other innovations, there are tools that can be consciously designed and used to speed up policy innovation development and diffusion. Simeonova discusses a possible “global climate policy clearinghouse,” which could consolidate or connect existing databases or initiatives, to provide assistance with development, evaluation, adaptation and diffusion of effective and functional climate policies.

Karin Bäckstrand and Matilda Miljand present an analysis of the growing number of national climate policy councils that provide advice and assess governmental policies from a climate perspective. Such councils have the potential to improve, in particular: alignment between national climate goals and policy implementation, and states’ international climate obligations; and, integration of domestic climate policy with other key policy areas at the national level.

Finally, Joachim Monkelbaan discusses the idea of “climate clubs” as a complement to existing climate agreements with extended global coverage, based on broad international consensus. Climate clubs could potentially offer a way for groups of countries to move ahead together to catalyse and mobilise for a more ambitious collective climate agenda than what is possible within current global negotiation patterns.

Part II. Governance proposals: Author submissions

1. Global economic and development dimensions

Summary information is given below on the following proposals:

1.1. Addressing the labour market costs of transition in the global south: a just transition imperative

1.2. Powering livelihoods globally through clean energy

1.3. Coordinating risk mitigation for exponential climate finance

1.4. Governance for a circular economy

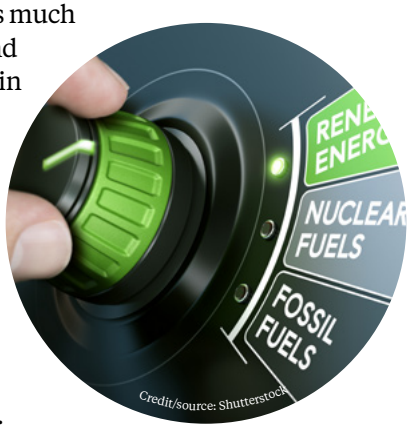
1.5. Financing instruments for climate change mitigation and adaptation

1.1. Addressing the labour market costs of transition in the global south: a just transition imperative

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Sabina Dewan, President and Executive Director, ***JustJobs Network,*** *Senior Visiting Fellow,* ***Centre for Policy Research****.*

Economic growth worldwide feeds on energy, the largest share of which continues to come from fossil fuels. The resulting carbon emissions cause pollution, warm the planet, and induce climate change. Deleterious effects are being felt across the globe, but disproportionately affect the health and livelihoods of populations in the Global South. The urgent imperative to curb carbon emissions, replace dirty fossil fuels with cleaner sources of energy, and move countries to low-carbon growth trajectories could not be more apparent. Yet the transition is painfully slow. It is even slower in countries in the Global South that stand to lose the most. Why?

The reasons are many. First is the ideological argument that some developing and emerging economies resent being denied the same pathways to development that industrialized nations have historically pursued. Low levels of per capita income and development present developing countries with a painful dilemma, as much political as economic and social: should they first grow their economies and worry about the environmental impact later? Or can or should they invest in green growth trajectories for which there is no historical precedent? Short political cycles make it easier for an elected official to defer the problem to the next person in public office. Second, many developing countries, from Venezuela to Nigeria, which rely disproportionately on fossil fuel income and carbon-intensive sectors, have not been able to diversify their economies. Third, a transition would yield stranded assets. Fourth, the long-standing dependence on fossil fuels has bred corruption and elite capture of the gains that constrain the transition away from these sectors (see proposal in II.2.3). Fifth, several developing countries lack the financial, technological, and human resources to undertake the transition.



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Sixth, beyond these well-documented arguments is the basic fact that not only does resource extraction constitute an important part of many economies in the Global South, but fossil fuel sectors continue to employ millions of people. A majority of the global supplies of oil, natural gas, and coal are produced in non-OECD countries. These sectors employ over 24 million workers worldwide. Such extractive sectors are capital intensive, but they are less so in the developing world than in industrialized countries. The challenge of transitioning workers from fossil fuel sectors to alternative sectors exists in both developed and developing countries, but the scale of the challenge is much greater in the Global South, while the capacity to address the issue is greatly reduced. The unique challenges confronting the developing world warrant their own treatment.

1.1.1. TRANSITION CHALLENGES

For the people who directly or indirectly depend on the fossil fuel sector for their livelihoods, a shift to clean energy means losing their current means of earning an income and transitioning to a different livelihood – not easy for workers whose employment is tied to fossil fuel sectors. Nor is it easy for the governments that have to support the transition. The challenge is particularly severe for many countries in the Global South, where ailing labour markets are already struggling to provide enough jobs to large and growing populations, where millions are still employed in fossil fuel or related sectors, and where strapped fiscal budgets constrain the development of appropriate social protection and active labour market policies. The pandemic is exacerbating these challenges even further.


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Several studies examine the viability of cleaner growth trajectories. Yet in seeking to revamp the global economy such that it is in balance with nature, the discourse often fails to acknowledge the fact that the transition itself will be painful. This is perhaps one reason why governments have been slow in taking action to address climate change and transition to clean energy. Policymakers in nations that are seeking to transition away from fossil fuels will have to grapple with and manage the cost of the transition itself. This is true even if the cost of inaction in curbing emissions is higher.

There is an economic and political need to deal with the labour dislocation and relocation of workers as governments seek to transition away from dirty to cleaner sources of energy. How can the global governance system support the transition to clean energy in countries in the Global South and minimize labour market costs? This kind of "just transition" will vary from country to country, based on a number of economic factors, including how diverse the economy is, the role that the fossil fuel sectors play in the economy, and how many people they employ.

1.1.2. RECOMMENDED PATHWAYS FORWARD

To facilitate a just transition and to ensure that the needed labour market transitions take place at the required speed and scale, the following recommendations are suggested:

1. Multilateral institutions, with the International Labour Organization (ILO) leading the charge, should draw greater attention to the plight of workers affected by the clean energy transition, and proceed to practically address the same, at scale. For example, the ILO, collaborating with other international bodies, such as the World Bank and UNDP, should provide technical assistance to developing nations on issues ranging from local economic redevelopment, to building effective social protection systems to facilitate livelihoods for those that will be dislocated by the transition. International fora such as the G20 and G24 should create platforms to share best practices in the above areas, and develop practical mechanisms (including those related to finance, see section II.1.5) to address concretely the necessary labour transitions. These efforts should supplement existing endeavors to create green jobs: that is, "jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency" (see section I.3).

2. Some combination of these is essential in order to minimise the costs of transition, while ensuring that countries establish low-carbon growth trajectories.

3. A number of intergovernmental platforms such as the Green Climate Fund, as well as impact investing funds such as the Green for Growth Fund, seek to stem greenhouse emissions in developing countries while helping vulnerable societies adapt to climate change. But none have set the explicit goal of helping developing countries respond to the labour market disruptions caused by the energy transition. Any such international initiative that establishes a fund should help finance basic social protections in developing countries which will also serve as the basis for a just transition as workers are displaced by the shift to cleaner sources of energy. Such initiatives should also administer relevant financial assistance on a case by case basis, in order to provide other forms of monetary support as outlined above.

4. There is a need for an accurate mapping of direct and indirect employment in fossil fuel sectors across economies. But it is not enough to have only the figures; the mapping should also account for the demographic (age, gender), social (migrant status, caste or other social groupings) and educational/ skill backgrounds of the members of the community. These factors will help foster understanding of the range of policy interventions that will be required. The ILO is well placed to work with national governments to conduct such mapping.

5. The clean energy transition is one among several transformations that are upending labour markets today. Others include the restructuring of economies in the face of technological advancement, urbanization and climate induced change. Moreover, as noted above, in many developing countries, the number of people employed in direct or ancillary sectors is large. Given these two realities, social protection policies must continue to move toward universal coverage, starting at the bottom of the income pyramid first.

6. Policies must ensure that those who have the health, capacity and willingness to transition to a different sector should be skilled or retrained accordingly. Those who are older, ill, or otherwise unable or unwilling to make the transition to a different geography or sector should receive, at a minimum, social security and/or pension benefits.

7. Re-development policies and investment will be essential to shifting local economies away from their dependence on fossil fuel sectors (see proposal in II.4.4). In the interim, policies will also have to examine the viability of incentivising geographic relocation through monetary assistance.

1.2. Powering livelihoods globally through clean energy

Based on a report from Global Challenges Foundation. Summary information contributed by Abhishek Jain, Fellow and Director, Arunabha Ghosh, CEO, and Sanjana Chhabra, Research Analyst, ***Council on Energy, Environment and Water (CEEW)****.*

Some 770 million people around the world still do not have access to electricity. Energy poverty remains one of the key barriers to sustainable development. International efforts on climate action and reducing energy poverty are not strategically aligned. Climate action will not be sustained until the energy-poor see a future in which there is a pathway to meeting their legitimate and rising energy demands.

1.2.1. DISTRIBUTED RENEWABLE ENERGY

In many underserved parts of the world, distributed renewable energy ("DRE") systems – that is, small-scale power generation from local and renewable sources such as solar panels, wind, hydro or biomass, close to where the power is used – can provide energy access at far lower costs than extending the grid. They can also support more local jobs, tap into distributed clean energy resources, and increase the resilience of the electricity system. Decentralised solutions could be the least costly way to provide power to more than half of the global population that is likely to gain access in this decade. However, even if households were electrified, governments will continue to face the challenge of subsidising additional connections; DRE systems could cost less but their high upfront costs are a deterrent.

1.2.2. SYSTEMIC ADVANTAGES

Productive uses of DRE technologies increase livelihood opportunities as well as incomes, and thereby the ability and willingness to pay for clean electricity solutions. They unlock incomes in hitherto energy-starved areas. Due to their resilience, these systems can also help communities in climate-vulnerable areas to continue their livelihood activities. At scale, DRE systems offer a new investment category and a market opportunity for direct selling vendors and indirect enterprises in the supply chain. Finally, these solutions can create many more micro-entrepreneurs in rural and peri-urban areas, making them stakeholders in a rapid transition to clean energy. The market potential is in the tens of billions of dollars.

The potential for DRE for livelihoods remains unfulfilled. First, the productive use of DRE does not mean the mere extension of prevailing energy-access programmes. Rather, it means going beyond energy provision and focusing on the end user: their training, equipment financing, market linkages for the products being produced by end users, and so on. It needs a convergence across multiple actors in the energy and livelihood domain. Second, unless enterprises have access to concessional capital, they are unable to demonstrate that their innovations can cross the commercial "valley of death." Third, most DRE entrepreneurs do not have access to incubators and accelerators to convert a promising lab-based technology into a market-proven commercial product. Fourth, mutually beneficial partnerships that can transform this massive latent opportunity do not exist across geographies to support cross-learning and replication. Out of 36 DRE-focused multi-country/ multilateral initiatives analysed, only three were found to be explicitly focused on promoting livelihoods.


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1.2.3. A PLATFORM FOR DRE SYSTEMS

A multilateral and multi-stakeholder platform focused on DRE system development could drive large-scale adoption of productive uses of clean energy to stimulate jobs and growth in rural economies globally. The platform would catalyse local innovation and entrepreneurship to deploy sustainable technologies for livelihoods, such as green cold storages, agro-processing machinery and textile processing, at scale. The proposed platform is envisioned as one in which the private sector takes the lead with support from civil society, philanthropy and development financial institutions, and with buy-in from the public sector. To illustrate: a US$ 2 billion catalytic facility could affect 10 million lives with a ten-fold return.

Such a platform could be designed with the following features to remove specific barriers, catalysing a DRE-based productive-use market at a global scale:

1. **Demand-centric, not supply-driven, governance:** Resulting in the convergence of skill-creation, financing, market linkage support and catalysing in-country "market accelerators."

2. **Catalyse innovation, from lab to market:** Risk capital from strategic philanthropy, de-risk early-stage technology and business model innovations, and attract more innovators.

3. **Solve for value, not volume:** Attract investors who understand impact and revenue metrics commensurate with livelihood-focused rather than consumer-focused enterprises.

4. **Enable partnership of equals, by design:** The facility and participating national governments would make equal contributions to unlock private investment.

5. **Leverage the power of the collective:** The presence of the facility across geographies would help to facilitate the rapid sharing of knowledge and create global economies of scale to mainstream productive-use DRE.

1.3. Coordinating risk mitigation for exponential climate finance

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Arunabha Ghosh, CEO, and Nandini Harihar, Research Analyst, Council on Energy, Environment and Water (CEEW).

There can be little progress on exponential climate action without a serious conversation about exponential increases in climate finance. In 2009, developed countries promised developing nations US$100 billion a year by 2020 in climate finance. This decade-long promise has been missed or grossly underdelivered, depending on how climate finance is counted. Moreover, discussions on climate finance have not managed to go beyond UNFCCC debates around this US$100 billion. The wider conversation would need attention to a blend of different pools of capital, with innovations in financial governance and new platforms to deliver funds at scale.

1.3.1. SEVERAL MAJOR GAPS

First, definitions of climate and clean energy finance are contested. This is due to ambiguous and non-standardised accounting and lack of transparency. Second, capital flows to developing countries for the clean energy transition are limited. Yet, emerging markets have vast renewable energy resources, 140 times greater than their energy demand. Third, investing in emerging markets is risky but the perceived risks often exceed real ones. Information gaps persist, which make investors unsure about projects in emerging markets. The perception of risk has two consequences: either the investors are unwilling to look favourably at clean energy opportunities in developing countries; or, they demand very high returns, which makes the cost of capital prohibitive in many instances. Fourth, private capital has not been unlocked.

An analysis of 26 initiatives on international clean energy finance, begun between 2011 and 2021, and intended to bridge at least one (or more) of these gaps, found that the current reality is sobering. Only one initiative developed principles to account for clean energy investments. Twelve cater to boosting mitigation efforts in low- to middle-income developing countries, but fund flows have not substantially increased. Whereas 19 initiatives seek to unlock private capital, with ten providing some funds as well, only nine are trying to tackle investment risks, without which it is unlikely that large volumes of private capital will flow to developing countries.

1.3.2. THE PROPOSAL

In order to reduce financing costs in developing countries, two main challenges must be addressed: reduce the costs of non-project risks; and, promote the aggregation of typically small renewable and energy efficiency projects to make them attractive and accessible for direct debt investment by large international money market investors.

A Global Clean Investment Risk Mitigation Mechanism (GCI-RMM) would address both challenges. It is designed to work on the principle of risk pooling, in which risks are pooled across projects and across countries. Additional cost reductions in de-risking services could also accrue:

- The GCI-RMM would facilitate access to non-project risk management tools and reduce transaction costs;
- It would work with financial institutions to optimise currently available de-risking products;
- The GCI-RMM intervention could increase overall volumes in risk markets, thereby increasing liquidity and giving insurance providers the option of more diversified portfolios to reduce de-risking costs;
- Higher volumes could also trigger learning effects and promote future innovation.

Designed originally as a consortium of institutions, the GCI-RMM would need a digital platform as a marketplace to connect financiers, insurers and project developers, a common guarantee to absorb residual risks, and a common regulatory and contractual framework.

The GCI-RMM would be funded through international public money. But the amount required from public funds to mitigate risks would be lower than relying on limited public funds to finance clean energy and climate-related infrastructure when adequate private capital is missing. Its potential could be to leverage public money up to 30 times in the form of private capital.

1.3.3. COORDINATION AT SEVERAL LEVELS

The operative principle is coordination and four sets of actors would be central:

- **The UK COP26 Presidency.** With its pole position in financial services, the United Kingdom is arguably the most important for channelling global institutional capital. It has a central role in coordinating efforts between negotiating parties, key financial institutions, and strategic philanthropy seeking to scale climate finance. The US, having convened the Climate Leaders Summit, would also have an interest in creating such a platform. As one of the world's largest clean energy markets, with high demand for institutional capital, India could also play a role in coordinating efforts on behalf of emerging economies.

- **Multilateral and regional development banks operate through country programmes.** As a result, risk pooling of projects across countries becomes unfeasible within such governance arrangements. Operationally, GCI-RMM would need to be hosted within a particular development bank. Other development financial institutions could coordinate with the GCI-RMM platform to provide de-risking services to their target countries. Bilateral donors could capitalise the GCI-RMM guarantee fund.

- **The financial and reinsurance industry.** The Climate Finance Leadership Initiative could host dialogues on the institutional division of roles between multilateral and bilateral financiers and the private insurance industry. This would give clarity regarding which institutional investors are interested in participating in the GCI-RMM platform and on the residual risk that the GCI-RMM guarantee would have to bear.

- **Role of large sources and destinations of institutional capital.** The US, having convened the 2021 Climate Leaders Summit, would also have an interest in creating such a platform. It is a major source of international institutional investment. On the emerging economy side, India serves as a major destination of clean investment, but is also host to the International Solar Alliance; it could assist in aggregating demand and projects across dozens of member countries.


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1.4. Governance for a circular economy

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Anders Wijkman, Honorary President Club of Rome, Chairman European Institute of Innovation and Technology Knowledge and Innovation Community (EIT).

Establishing a new, circular economy throughout the world should be everyone's business. By moving from linear to circular production models the pressure on natural systems would lessen considerably, and have dramatic effects on the fight against climate change. The International Resource Panel estimates that the extraction and processing of materials, fuels and food make up more than half of global carbon emissions and account for 90 percent of the loss of biodiversity.

Nothing is 100 percent circular, however. All materials degrade and disperse over time and with use. Furthermore, collecting end-of-life products and materials and restoring them to a reusable state itself requires energy inputs and new materials. Obviously, the circular economy is no panacea. Still, many studies confirm that there are huge gains to be made, economically, socially and environmentally, by moving from linear to circular material flows and by keeping products and materials in use as long as possible.

1.4.1. DEFINING CIRCULAR ECONOMY

In order for society to move from a linear to a circular production model, there is need for a robust and generally accepted definition. One positive step was the 2019 initiative by the International Organization for Standardization (ISO), at the urging of many governments, to work on a definition. A proposal is expected in the spring of 2023.

A commonly-used definition from the Ellen MacArthur Foundation is as follows:

> **Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three main principles: i) Design out waste and pollution, ii) Keep products and materials in use, and iii) Regenerate natural systems.**

1.4.2. STRONG RATIONALE

The rationale for enhancing resource efficiency is compelling. It is multidimensional and encompasses economic, ecological as well as social considerations. However, enhanced resource efficiency alone will not result in a sustainable economy. Energy and material use in the Global South will have to grow significantly to make eradication of poverty possible. In industrialized countries, the combination of economic growth and rebound effects are likely to more than balance out the resource savings made over time. Hence, demand for virgin materials is expected to continue to increase globally for several decades to come. The only question is by how much.

Here is where a move to a circular economy could play a crucial role. Moving away from today's hugely wasteful production model, from "take-make-dispose" linear production, toward a circular production model, where goods are designed and produced for extended use, reuse, reconditioning and recycling from the outset, will no doubt help reduce the pressure on natural systems. But the barriers to change are many. The linear production model is dominant today because of massive market failures and because the negative externalities in relation to the extraction, production and use of all kinds of natural resources are not reflected in market prices. Business models are built upon high throughput of energy and materials. There is a strong need for more explicit and focused intergovernmental discussions about governance.

1.4.3. GOVERNANCE

The question of how to overcome the barriers to a circular economy is multifaceted. The role of policy is central on many levels: international, regional, national and municipal. But other stakeholders play a crucial role as well, the most important being business organizations, science and technology, and civil society.

The 2030 Agenda reflects a global consensus that economic, social and environmental aspects of development are interlinked and mutually dependent. Governments all over the world have agreed to work together to meet the SDGs. The circular economy must be discussed and framed within the context of the SDGs and a systemic approach is necessary. The seventeen goals are interconnected and progress towards one target will influence the others.


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Adherence to lofty goals is one thing, but meeting the goals in practice is altogether different. Regrettably, there is as of yet no governance system at the international level that guarantees that the SDGs in general, or the circular economy in particular, are being pursued. Implementation is up to each and every government and varies greatly.

1.4.4. PROMISING INITIATIVES

Most hurdles on the road to a circular economy are closely related to shortcomings and failures in policy frameworks, not least of which are the flawed incentive structures of the economy. This can only be addressed by policy change, ideally at the international level.

Regarding policy change the most important measures ought to be:

- Initiate a tax shift – lowering taxes on labour and increasing taxes on resource use;
- Stop subsidizing fossil fuel production and consumption;
- Products should be designed for reuse, refurbishment, remanufacturing and recycling;
- Remove VAT on all reused materials to boost reuse and recycling;
- Use public procurement proactively in the advancement of the circular economy;
- Make material efficiency a priority in climate mitigation strategies;
- Give cities greater authority in decision-making on circularity;
- Complement today's flow-based metrics, such as GDP, with measures of a country's stock of assets to account for the restoration and regeneration of natural capital.

There are promising initiatives under way. The European Green Deal is meant to transform the Union into "a modern, resource-efficient and competitive economy," and a cross-cutting issue of crucial importance is the Circular Economy Action Plan. It includes a Sustainable Products Initiative and will have particular focus on resource intensive sectors such as textiles, vehicles and batteries, construction, electronics, plastics and packaging. Legislative proposals are prepared to support a "Right to Repair" and Mandatory Sustainability Standards for Public Procurement.

The EU makes clear that it cannot deliver the goals of the Green Deal alone. Global cooperation is indispensable and the European Commission "has confirmed that it will lead the way to a circular economy at the global level and use its influence, expertise and financial resources to implement the 2030 Agenda for Sustainable Development in the EU and beyond." The actions under consideration are wide-ranging, and include:

- Leading efforts at the international level to reach a global agreement on plastics;
- Proposing a Global Alliance on Circular Economy and Resource Efficiency;
- Initiating discussions on an international agreement on the management of natural resources;
- Building a stronger partnership with Africa to maximise the benefits of the green transition and the circular economy;
- Promoting the circular economy in the context of bilateral, regional and multilateral policy dialogues;
- Ensuring that free trade agreements reflect the enhanced objectives of the circular economy (see section II.3.8).

Another promising initiative, with great importance for helping companies prepare for transformation to a circular economy, is the proactive role of the World Economic Forum (WEF) in the promotion of circularity. The WEF´s Circular Economy Initiative brings together private, public, civil society and expert stakeholders to accelerate the circular economy transition by advancing four key pillars of work:

- **The Platform for Accelerating the Circular Economy (PACE)**, launched in 2017 as a platform for public and private sector leaders to make commitments and accelerate collective action towards the Circular Economy.
- **Transforming Material Value Chains -** the WEF hosts a series of major value chain action partnerships that work with partners along global material value chains to advance circular models, from plastics, electronics, batteries, cars, to fashion/textiles.

- **Scaling Innovation and the Fourth Industrial Revolution (4IR):** Scale360° is an emerging initiative which aims to mobilize action among innovators, governments, civil society, and private sector stakeholders to grow the ecosystem for circular 4IR technology innovation, with a focus on plastics, electronics, food and fashion/textiles.

- **The Circular Economy for Net-Zero Industry Transition:** this initiative is designed to raise the decarbonization ambition for harder-to-abate materials (steel, cement, chemicals and aluminum) and help those industries realize a 1.5 degrees Celsius pathway by catalyzing scalable circular economy solutions.

1.4.5. NEEDED: POLICIES AND VALUE SHIFTS

A move from a linear to a circular production model represents an economy-wide transformation. While nothing is fully circular, the benefits of moving from a linear to a circular production model are obvious, from both purely economic and environmental and social points of view. All major stakeholders have to be committed and engaged: national governments, cities, the business community, researchers as well as consumers. International and global governance that facilitates the transition to a circular economy is very much needed. Of crucial importance in the years ahead will be the policies enacted at global, EU, national government and city levels.

What will be needed urgently, as well, is a value shift, replacing, or at least complementing, material consumption as the main objective in life. Quality of life has many components, such as a purposeful life, health care, healthy ecosystems and a stable climate, personal safety, favourable conditions in the workplace, education, access to and participation in cultural activities and enriched family life. It is abundantly clear from research that the priority given in contemporary society to material consumption is exaggerated, both from the point of view of nature protection and of well-being and happiness for the individual.


Photo by Remy Gieling on Unsplash

1.5. Financing instruments for climate change mitigation and adaptation

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Augusto Lopez-Claros, Chair, ***Global Governance Forum (GGF)****.*

One key area of focus for effective climate change mitigation and adaptation is the financing required for investments in various forms of climate-related infrastructure, including investments in energy efficiency and renewable energy. Such needed investments – in the tens of trillions of dollars over the next decade, with two thirds to take place in emerging markets and developing countries – greatly exceed the commitments made by high-income countries in 2009 to deliver US$100 billion in assistance annually to the developing world to ease the transition to a low-carbon economy.


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One aim of climate change mitigation policies is to incentivise businesses and individuals to conserve energy and/or to switch to greener sources by using fiscal tools and regulatory instruments that make it costlier to emit GHGs. Ideally, these tools would also raise revenue that could offset the impact of any undesirable distributional side effects and fund other efforts aimed at mitigation and adaptation. This question has moved to centre-stage in the aftermath of COVID-19, the government responses to which have greatly stretched budget resources virtually everywhere.

Some of the instruments discussed below are aimed at altering incentives to encourage a shift to a low-carbon economy, while others are intended to raise revenues which governments can use to finance climate change mitigation. Financial resources will also be needed to boost resilience in food and water security, agricultural productivity, and disaster risk management. Without improvements in adaptation and resilience, climate change will undermine the attainment of many of the SDGs, including the elimination of extreme poverty. It could also make the world even more vulnerable to the kind of pandemic that is currently devastating the global economy and societies around the world.

1.5.1. CARBON TAXES AND GREEN FINANCIAL INSTRUMENTS

Carbon taxes are a powerful and efficient tool because they generate substantial revenue and, by increasing the cost of carbon, they encourage energy efficiency and provoke a shift away from fossil fuels towards renewable sources. Although more countries have adopted carbon pricing mechanisms in recent years, four-fifths of global emissions remain unpriced, and the majority of those priced are not priced at a level to produce sufficient effect.

While carbon taxes directly generate revenue, green financial instruments channel resources into sustainable projects. Achieving the scale of investment needed to meet the needs of the environment will require significantly increased levels of private and institutional capital. So-called green bonds and equities have emerged as the investment tools most fit for this challenge and now attract a growing contingent of institutional and retail investors as well as sovereign wealth funds. It has been estimated that the value of green bonds traded globally could hit some US$2.5 trillion by 2023.

1.5.2. DEVELOPMENT BANKS

Multilateral development banks can mobilize private sector resources to ensure sustainable economic growth and poverty alleviation. One proposal is a sponsored loans program in which a private sector investor acts as a guarantor for a particular development project. Because the guarantor takes on the risk of the loan, the multilateral development bank has a lower capital reserve, allowing it to further expand its balance sheet. In turn, the guarantor maintains its cash position in the long run while supporting development goals in the short to medium-term. Similarly, blended finance helps induce private investment by leveraging public funds to de-risk and legitimise a given investment project.

1.5.3. OTHER TOOLS

In addition to the more substantial instruments described above, there are other tools that could play a supplemental role. For instance, debt relief can promote green growth in developing countries by allowing nations to allocate their resources toward climate change mitigation projects rather than debt service. Improving the efficiency of tax systems and limiting corruption would harness additional public resources for climate finance (see section II.2.3). Going even further, corrupt assets, once discovered and frozen, could be used to finance climate mitigation or adaptation. Taxing aviation and maritime fuel would capture revenue from two sectors that have historically evaded national tax regimes, despite contributing heavily to global emissions. Finally, taxing mineral resource extraction raises revenue, while preserving geologically scarce resources for future generations.


Photo by Peter Nguyen on Unsplash

Ultimately, the success of the suggested and other possible instruments will require international cooperation, whether it is in the progressive introduction of carbon taxes across jurisdictions or to confirm universally accepted standards for green bonds. With a global system of strengthened tools and policies that hold individual countries accountable for their commitments, the strategies outlined could tangibly alter the financing landscape for climate change mitigation and adaptation.

2. Strengthened international law

Summary information is given below on the following proposals:

Enhanced use of existing institutions and new legal institutions

2.1. The International Court of Justice of the United Nations

2.2. An International Court for the Environment

2.3. An International Anti-Corruption Court

New legal paradigms

2.4. International Criminal Law and "Ecocide"

2.5 A New Legal Status for the Global Ecological Commons

Enhanced use of existing institutions and new legal institutions

2.1. The International Court of Justice of the United Nations

Contributed by Jule Schnakenberg, Aoife Fleming, Solomon Yeo, Vishal Prasad and colleagues, World's Youth for Climate Justice (WYCJ), and Alyn Ware, Rob van Riet, World Future Council (WFC).

In 2011, the climate-vulnerable Pacific Island state of Palau attempted to take climate change to the International Court of Justice (ICJ), the principal judicial body of the UN, and one of its six principal organs. They were seeking clarification of the obligations of states to cut GHG emissions to avoid transboundary harm, across international borders. Unfortunately, Palau's attempts were unsuccessful, in part due to political pressures.

In 2019, 27 law students from the University of the South Pacific were inspired by Palau's initiative and came together to form the Pacific Islands Students Fighting Climate Change (PISFCC). They have built on Palau's campaign and given it a new focus: protecting global human rights from the threat of climate change and clarifying the principle of intergenerational equity. The PISFCC proposal was tabled by the Vanuatu government at the 50th Pacific Island Forum, where the 18 member states noted positively the proposal for a UN General Assembly resolution – one of the very few pathways to receive an opinion from the court – which would request an advisory opinion from the ICJ on climate change and human rights.

2.1.1. GLOBAL CAMPAIGN

For the resolution to be successful, there must be a simple majority vote in the UN General Assembly. Recognizing this reality, the campaign has grown beyond the Pacific, with youth from around the world uniting in this mission under the youth-led umbrella organisation World's Youth for Climate Justice (WYCJ), which empowers and enables young people to raise the visibility of the advisory opinion campaign, and request support from their respective governments. The campaign has received support from civil society organisations, and notable UN officials such as the former High Commissioner for Human Rights Mary Robinson, and the Special Rapporteur on human rights and the environment.

The WYCJ is convinced that an ICJ advisory opinion demanded by citizens on climate change and human rights can clarify crucial legal obligations of all states, thus influencing national policy. It should also contribute to the transformation of the global legal system, as a step towards ensuring that the currently weak UN court system can effectively deliver justice in a process which is inclusive, transparent and accessible to those affected by the judicial opinions and decisions.

2.1.2. EMPOWERING THE INTERNATIONAL COURT OF JUSTICE TO ADJUDICATE CLIMATE CHANGE LAWSUITS

Contributed by Andrew Strauss, Dean of the ***University of Dayton Law School****.*

The ICJ may only assert jurisdiction over states with their consent, and states doing the most to contribute to the climate crisis have little incentive to allow their practices to be reviewed by the global system's highest court. To help correct for this failure, the referral/universal advisory jurisdiction proposal described here provides that the Court be empowered to issue advisory opinions on interstate disputes without the requirement of state consent.

Standing in the way of non-consent-based jurisdiction, the world's most powerful countries, which are best able to lead or block expansion of the Court's jurisdiction, have historically perceived their advantage to lie more with political muscle than expanded judicial process. Today, their power to block is manifest in the ability of each of the permanent five members of the UN Security Council to veto amendments to the UN Charter and the Court's annexed Statute. This proposal, however, provides a way around a UN Charter amendment through a politically feasible legal strategy that would allow the UN General Assembly to itself establish referral or universal advisory jurisdiction, using powers it currently possesses.

This way of expanding the jurisdiction of the ICJ is legal under the Charter of the United Nations, the Statute of the ICJ, and other general principles of international law. If the ICJ's jurisdiction were to be expanded in this way, it could become a significant instrument for enhancing compliance with international environmental legal norms

2.2. An International Court for the Environment

Contributed by Stephen Hockman, Queen's Counsel (QC), Barrister, ***6 Pump Court, Temple, United Kingdom****.*

More than a decade ago a group of lawyers and other professionals and citizens in London decided to come together to propose the creation of a new International Court for the Environment (ICE). To do so, they have formed the ICE Coalition.

There is a gap in legal accountability at the international level, which must be bridged in order to bring about the necessary changes in human behaviour which will keep climate change under control. It is true that in a few highly progressive jurisdictions – see for example recent exceptional cases in the Netherlands – national courts or governments have shown themselves willing to create a suitable regulatory regime or embrace a measure of legal accountability. But in the majority of countries around the world, this has not taken place, and indeed, economic practice, whether on behalf of industrial or rural enterprises or on the part of the government itself, continues to contribute to dangerous levels of emissions.

It is likely that the principal international instruments for bringing about such changes of approach will continue to be political negotiations between governments, leading to further international treaties such as the Paris Agreement of 2015. But events since 2015 have shown that international agreements by themselves, though vital, are insufficient; moreover, current international judicial mechanisms such as the International Court of Justice have managed to play only a small part in achieving necessary progress (see section II.2.1).

2.2.1. THE PROPOSAL

A new legal institution at an international level, dedicated to the survival of the planet and to achieving the necessary balance between environmental protection and economic development, should be set up as soon as possible. This institution, to be called an International Court for the Environment could, like many courts around the world, operate largely, if not entirely, remotely, and would need neither grandiose premises, nor an extensive and expensive administration. Its judicial members could be drawn from distinguished legal figures from around the world, especially those with experience in environmental cases; it could additionally include relevant scientific expert assessors among its members. The court would decide upon the appropriate law to be applied to a dispute, whether public international law, or the domestic law of a particular jurisdiction.

The fundamental purpose of establishing such an international institution would be to enable those affected or likely to be affected by harmful climate change, to bring complaints to the court, whether against their own government, other national governments, international institutions or corporate bodies. Applying what it considers to be the proper law relating to the dispute, the court would rule on the merits and give reasons for its decisions. A respondent to a suit would have every opportunity to put its own case, but would not be able, by its absence or refusal to take part, to prevent the court from reaching and publicising its ruling. As in the case of supreme courts around the world, the reasoning for the decision would very often be the most important element in the process, and such a court could rapidly become a powerful "influencer" in the context of this central, global, socio-political problem.

2.3. An International Anti-Corruption Court

Contributed by Ian J. Lynch, Program Director, Integrity Initiatives International (III).

A substantial proportion of transnational illicit financial flows (IFFs) represent, somewhat counter-intuitively, a global climate challenge. Because transnational IFFs originate in part from environmental crimes, inadequate tracking, knowledge production, prosecution and prevention of such crimes at the international level all create incentives for activities that emit a non-negligible volume of greenhouse gases.

Furthermore, the coronavirus pandemic response has demonstrated the high risk of corruption in large public spending disbursements around the world, at a time of great international crisis and need. Public and private climate finance, vital for adaptation and mitigation projects, faces similar risks. Indeed, most private climate finance, which accounts for the majority of climate investments, at about 56 percent, flows to countries with strong and independent institutions. Mobilizing private and other actors to invest in climate-related initiatives in developing countries, which contribute the least to the climate crisis and yet are the hardest hit by its effects, will require safeguards to ensure that investments are used as intended.

2.3.1. INVESTMENT NEEDS VERSUS CORRUPTION RECORDS

The International Renewable Energy Agency (IRENA) estimates that US$4.4 trillion per year is required between now and 2050 to make the energy transition to a low carbon economy. However, none of the top ten recipient countries of public climate-related development assistance have good records on corruption and six are in the bottom half of Transparency International's Corruption Perceptions Index. Without adequate safeguards and effective anti-corruption enforcement mechanisms, public climate investments will be degraded, as many already are.

2.3.2. WEAK COMPLIANCE MECHANISMS

Looking forward, the Green Climate Fund – the UN's main financial mechanism to distribute the US$100 billion per year pledged to assist developing countries in combating climate change – has limited protections against corruption. Once an entity has been accredited and approved to receive Green Climate Fund funding, there is minimal follow up on compliance. The UN did create the Independent Integrity Unit to investigate corruption related to Green Climate Fund-funded programs. However, it has no enforcement mechanisms and can only call on domestic courts to prosecute individuals for violating Green Climate Fund contracts.

2.3.3. ROLE OF AN INTERNATIONAL ANTI-CORRUPTION COURT

There is growing international momentum to establish an International Anti-Corruption Court to address the anti-corruption enforcement gap that impedes solutions to the climate emergency and other major public challenges. Despite the fact that 187 countries have joined the UN Convention Against Corruption, which calls for national laws to criminalise various forms of corruption, corrupt national leaders (kleptocrats) enjoy impunity, because they control the administration of justice in the countries they rule.

An International Anti-Corruption Court would provide an impartial forum to enforce existing national anti-corruption laws, or a new international counterpart to them, against kleptocrats and enabling transnational networks. Operating on the principle of "complementarity," it would only prosecute if a national government were unwilling or unable to do so. An International Anti-Corruption Court would also have the potential to recover, repurpose and repatriate stolen assets through decisions that include orders of restitution in criminal cases and judgments in civil cases brought by whistleblowers. Due to the transnational nature of kleptocracy, an International Anti-Corruption Court would be effective with as few as 20 to 25 representative countries, if they include several of the financial centers through which the proceeds of corruption are routinely laundered. Such a Court is urgently needed to minimize the loss of climate finance to corruption, thereby improving the efficacy of efforts to combat climate change.

New legal paradigms

2.4. International criminal law and "Ecocide"

Contributed by Maud Sarlième, Legal Officer, the Special Tribunal for Lebanon.

No existing international legal mechanism allows for the effective criminal investigation, prosecution, and adjudication of those most responsible for the most serious environmental damage. The International Criminal Court (ICC), based in The Hague, is competent to try individuals for genocide, aggression, crimes against humanity and war crimes. All these crimes require harm to human life, with the exception of one war crime defined under Article 8(2)(b)(iv) of the Rome Statute, bearing on "widespread, long-term and severe damage to the natural environment," in the context of an armed attack. The restrictive definition of this crime makes it of limited use in prosecuting general ecological harm.

2.4.1. DEFINITION

"Ecocide" generally refers to grave and widespread destruction of the natural environment, with such damage to the environment considered independently from any direct harm caused to human life. A term used prominently for the first time in the 1970s for the extensive environmental harm caused by the conflict in Vietnam, the concept again resurfaced only recently in the international legal community, and is now championed by a growing number of activists and environmental defenders, as well as government representatives, who believe that international criminal law could be one lever to address climate and environmental crises. Two small island states, the Republic of the Maldives and the Republic of Vanuatu, recently expressed this position at the 18th Assembly of States Parties of the ICC in 2019, as the ICC could be the global judicial institution tasked with prosecuting a crime of ecocide.

Following this momentum, the Stop Ecocide Foundation convened a panel of international lawyers to draft an official legal definition of "ecocide" which concluded its work in June 2021. The proposed definition raises a number of significant issues attached to the challenges of the undertaking.

Examples of these include the threshold which should be applied to "damage caused to the environment" or the notion of "environment" itself, which is dynamic and of variable content. The definition of the "intent" element of the crime's alleged perpetrator is another, as many of the worst environmental disasters are not intentional. Conduct that may be considered to be "ecocide" is rarely limited to a single location or a single author, but rather involves various connecting points, leading to a dilution of responsibility. Also, rather than physical individuals, perpetrators are often legal entities over which the ICC currently has no jurisdiction.

2.4.2. SCOPE OF CHALLENGES

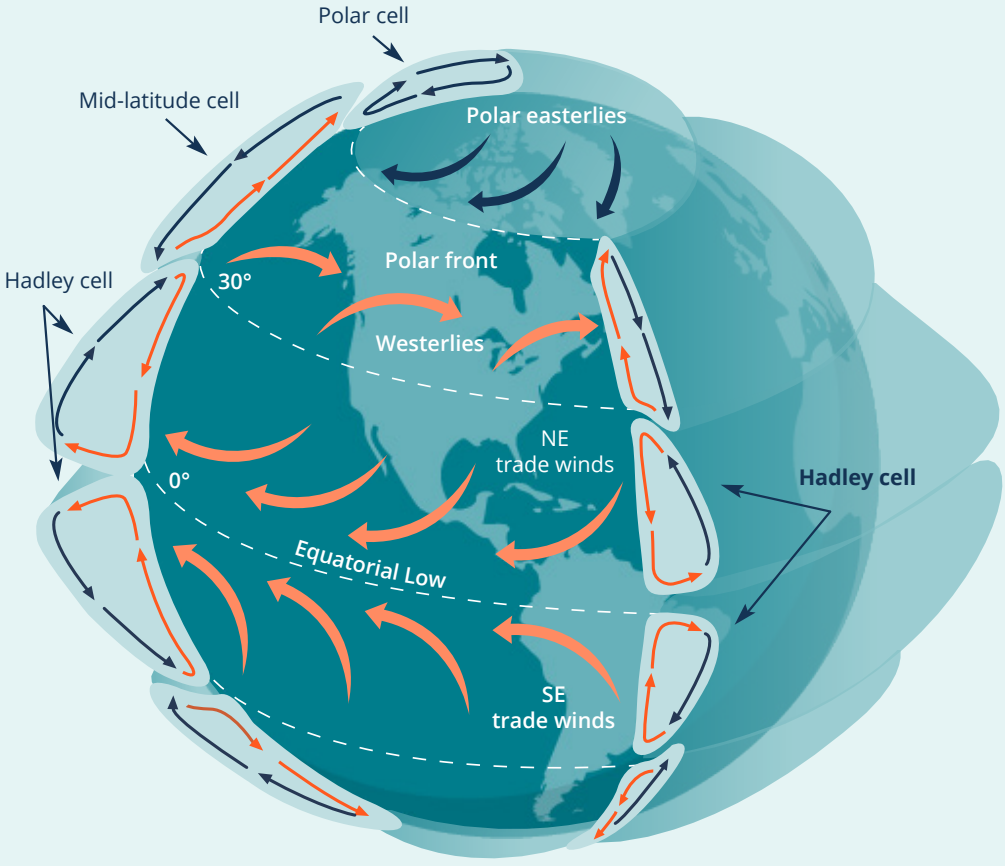
The problem of GHG emissions, which result from our daily individual as well as industrial activities, provides an illustration of these challenges. Most would agree that this is an act that should only be prohibited at an unreasonable scale, presenting difficulties mostly associated with issues of intent or the attribution of responsibility.

Examples of challenging practical situations include cases of unprecedented fossil fuel pollution, such as in the Texaco Chevron case originating in Ecuador, or mass deforestation or mass fossil fuel extraction encouraged by state policies and predatory practices by the private sector.

The main objective of the Stop Ecocide legal expert group initiative was to clarify the scope and nature of the challenges in establishing such a definition, in accordance with the latest environmental science – an essential step in the progress toward criminalising "ecocide." It has also placed the broader issue of the scientifically-delineated planetary boundaries and accountability for large-scale climate/environmental damage at the centre of the public debate. However, given the procedural requirements for an amendment of the Rome Statute of the ICC, and the wide range of political and diplomatic obstacles associated with the inclusion of ecocide as a new international crime, a lengthy process may be foreseen.

Figure 5.

Three distinct wind cells



To date, the atmosphere has transported heat throughout the globe extremely well. There are three distinct wind cells doing this: Hadley Cells, Ferrel Cells (= Mid-latitude cell in the figure) and Polar Cells. Present-day atmospheric characteristics prevent heat from being carried directly from the equator to the poles.

2.5. New legal status for the global ecological commons

Contributed by Paulo Magalhães, Researcher, ***Center for Legal and Economic Research, University of Porto****, Founder and President of* ***Common Home of Humanity (CHH)****.*

A stable climate is a visible manifestation of a well-functioning "Earth System" which, in turn, relies on a resilient and well-functioning biosphere. When we refer to the pattern of stable dynamics of the Earth System that corresponds to a stable climate, we are not referring to "matter" or to the physical planet itself, but rather to how matter and energy move and circulate around the planet. A healthy Earth System, corresponding to a stable planetary climate – due to its fundamental importance to humanity – should thus be granted a new, specific legal status, for the reasons described below.

2.5.1. "NATURE'S SOFTWARE"

Matter is always transforming through chemical reactions and physical processes, and, in the longer term, through biological evolution. But the patterns and rates of these changes, and their interactions to form higher order structures such as ecosystems, follow well-defined pathways for organization and stability. At the global scale, the ways in which matter and energy move around the planet, creating various consistent patterns of atmospheric and oceanic circulation, follow the laws of thermodynamics and result in a stable climate. From an international legal perspective, Common Home of Humanity argues that a stable global climate is something that can only be legally classified as an *intangible natural good*. These circulation patterns and the global climate system are part of "nature's software."

This "natural software" is global and indivisible, and, although intangible as a whole, is measurable and exists in the real world. This software is our most important global commons, existing both inside and outside all political sovereignties. Common Home of Humanity argues that we should implement already known structural conditions for the successful management of common goods, to manage our most vital global commons: the "Earth System." The climate and biosphere emergencies are the logical outcomes of the unregulated use of the Earth System, a "tragedy of the commons" on a global scale. Such a predicament is typically the result of a poorly managed common good, often with uncertainties about to whom it belongs and/or a lack of an adequate legal definition of the good itself.

Credit/source: Shutterstock

2.5.2. A LEGAL VOID

From a current international legal perspective, the planet is merely a territory of 510 million km^2, divided between individual states, where global commons are the territorial "leftovers." However, what distinguishes this planet from all others, as far as we know, is the outstanding existence of a self-regulated and interdependent system able to support life. But this system does not exist yet in the body of international law, mainly because science was not able to define it until very recently, and also because this system spans areas subject to national territorial jurisdiction. Our vital Earth System is at present an intangible "no man's land," operating in a free-for-all scenario, where there are neither restrictions imposed on resource use nor compensation for those who ensure the system's maintenance.

2.5.3. POSSIBLE TO QUANTIFY

Recent advances in scientific understanding have made it possible to identify the key planetary processes dominated by human activities, including climate change, that fundamentally affect the functioning of the Earth System and its overall stability, which has been key for the development of agriculture and complex human societies. A group of Earth System scientists have assigned boundary values to control variables for those processes (including atmospheric CO_2 concentration), the "planetary boundaries," beyond which there is a significant risk of pushing the Earth System into an unstable state, inhospitable to human societies. Keeping aggregated human activities within the "safe operating space" for humankind delineated by the planetary boundaries is vital, and this safe space must be safeguarded.

Therefore, such a pattern of stable and predictable dynamics of the Earth System that corresponds to a stable climate can now be granted a specific legal status as an "intangible object," and be recognized through a new international legal regime, in order to organize its sustainable and fair use. As it is global and indivisible, it should belong to all of humanity, as an "Intangible Common Heritage of Humankind."


Credit/source: Shutterstock

3. Using existing architecture, reformed and new institutions

Summary information is given below on the following proposals:

3.1. Update the UN Charter

*Based on the book **Global Governance and the Emergence of Global Institutions for the 21st Century**, Cambridge University Press. Summary information contributed by Augusto Lopez-Claros, Chair, **Global Governance Forum (GGF)**, Arthur Dahl, President, International Environment Forum (IEF), and Maja Groff, **Global Governance Forum (GGF)**; co-winners of a Global Challenges Foundation 2018 **New Shape Prize**.*

The UN system has evolved in a largely organic fashion over three-quarters of a century to take on many new problems since 1945, and to partially address some of the critical global risks that have emerged. Treaties have been negotiated and signed, specialised agencies created, and programs and structures established within the UN Secretariat. However, this governance architecture remains weak, fragmented and generally voluntary. Moreover, the 1945 UN Charter itself has largely remained frozen in time since its adoption. Indeed, the UN itself and associated specialised agencies/organizations find themselves increasingly unable to respond to current crises, partly due to the lack of appropriate jurisdiction or mandate to act, sometimes because they are inadequately endowed with resources, or because, within the limits of existing conceptual frameworks, they simply do not know what to do.

3.1.1. A NEW CONTEXT

The imperative of global environmental governance did not exist when the UN was founded, and has only emerged in recent decades. There is now a range of proposals on reinforced global institutions to address the existential challenges of climate change and threats to global biodiversity, among other interrelated environmental problems (see proposals in sections II.3.6 and II.3.7). To date, with some exceptions, the prevalent trend of a voluntary approach to environmental governance has proven insufficient. Therefore, more binding measures will likely be needed, as well as capacities to deal effectively with the profound, cross-sectoral impacts of climate change, such as climate-induced displacement risks (predicted to dwarf the present flows of migrants) and global food and water supply issues, among others, which themselves have profound and complex global justice and human rights dimensions (see section II.2.1). The range of problems will require international efforts beyond the capacity of many, if not most, countries.

3.1.2. BALANCED REFORM AND MODERNIZATION

Given the global risk landscape and the worsening outlook for a range of shared global problems, it will be necessary, at some juncture, to strengthen the overall decision-making, legislative and executive action capacities of the international community. This would include its capacity to enforce international law via reformed international legal institutions (see section II.2.2), its collective security capacities and ability to manage other global risks, including those relating to pandemics, nuclear weapons/emergent weapons technology, financial/economic instability and inequality, to name a few – many of which are themselves interrelated with the management of the global ecological commons. The basic architecture of the global governance system could be substantially enhanced in a way that is based on fundamental points of law already agreed by states worldwide, and upon foundational principles embedded in the current international order. Such efforts need to strike the right balance between proposals that are so ambitious as to have negligible chances of being seriously considered, and those that are seen to be more "politically feasible," but that fail to find meaningful solutions to urgent contemporary problems. In order to have a chance of grappling with the complex set of global threats to our future, the world's core global governance architecture, currently underpinned by the 1945 UN Charter, should be updated, sooner rather than later, in order to make it equal to contemporary challenges.

3.2. Making the UNFCCC and its COP more resilient and fit for purpose

Based on a forthcoming paper rom the Global Challenges Foundation. Summary information contributed by Jack Stuart, Research Analyst, ***Environmental Security Program, The Stimson Center****, and Halldór Thorgeirsson, Chair,* ***Iceland's Climate Council.*** *Retired Senior Director at the* ***UN Climate Change Secretariat****.*

The UN Framework Convention on Climate Change (UNFCCC) is the primary international governance vehicle for delivering collective climate action. Through its centrepiece, the Conference of the Parties (COP), the process seeks to bring all countries together to act to mitigate climate change through the reduction of GHG emissions, and to adapt to climate impacts already underway. As the scale of the climate challenge has grown, so too has the importance of the UNFCCC. Given the multidimensional impacts of climate change, virtually every international biodiversity, ocean, environmental, and sustainable development agreement is in some way dependent on the success of the UNFCCC.

3.2.1. ADVANCING EXISTING LEGAL FRAMEWORKS AND ADDRESSING CURRENT WEAKNESSES

Since its creation in 1992, the UNFCCC has led to the negotiation of landmark climate treaties, with the Paris Agreement representing a significant step towards far-reaching climate action. However, these negotiation processes have also highlighted weaknesses in the workings of the UNFCCC. Consensus-based approaches have at times amplified the role of spoilers. Further, an opaque process, coupled with difficulties verifying and tracking commitments, and a lack of financial ambition, have led to a deficit in trust between parties and deepened inequalities between the Global North and the Global South. As the process now shifts from negotiating the treaty to finalising the Paris Rulebook and catalysing action, these weaknesses must be addressed if the UNFCCC is to succeed in its goal of limiting global warming to 2 degrees Celsius (ideally 1.5 degrees Celsius).

3.2.2. COMPREHENSIVENESS AND TRANSPARENCY

Given the multidimensional impacts of climate change, a "whole-of-ecosystem" approach, based on the implementation of the enhanced transparency framework (ETF), is important for the UNFCCC process to incentivise adherence to protocols, highlight non-compliant states, and deal with changes in priorities and scientific evidence. As countries submit updated Nationally Determined Contributions (NDCs) at COP26 for the first global stocktake, it is essential that the UNFCCC look outwards for innovation as it formalizes the Paris Rulebook. For example, it should consider closer coordination with other international agreements and bodies, such as the UN Convention on Biological Diversity, better utilise technical expertise and capacity from other international organizations, such as the Food and Agricultural Organization (FAO) and the WTO (see section II.3.8), and more closely align with regional and other international bodies for broader tracking of climate commitments.

3.2.3. EXPAND TECHNICAL CAPACITY

Improving verification and tracking is essential to maintaining transparency and incentivizing compliance. Finalizing the standardised and enhanced transparency framework as outlined in the Paris Agreement is needed to report and track GHG emission trends, financial commitments, and progress towards NDCs. To do this, the technical capacity of the secretariat could be expanded, and this could be partially achieved through burden-sharing with other international bodies as highlighted above. This work should focus on ensuring that financial commitments from all countries are met, consistently tracked, and continually scaled up. Work should also focus on providing nations with less capacity the support they need to meet reporting requirements. Additional emphasis should also be placed on formalizing the integration of non-state actor contributions, for example cities and the private sector, into NDCs.

3.2.4. ADAPTATION, MITIGATION AND IMPLEMENTATION

Finally, as the impacts of climate change continue to grow more severe, it is essential that the Paris Agreement effectively balances mitigation with adaptation and loss and damage. This is a key demand of the developing nations, and is critical for protecting those most vulnerable to the impacts of climate change. Supporting compliance to meet financial commitments already set, and broadening these mechanisms to support financing from member states, implementation bodies like the Green Climate Fund and the private sector are needed to coordinate climate financing (see sections II.1.3 and II.1.5). Ensuring that nature-based solutions are prioritized is another important aspect and an entry point for further coordinated action and elevating adaptation at the UNFCCC and COP. Given their role in protecting vulnerable communities from the impacts of climate change, storing carbon, and meeting biodiversity targets, appropriate nature-based solutions can be expanded to meet adaptation needs, while also expanding mitigation ambition.

As COP26 approaches, it is clear that transformative and systematic change is needed to tackle the climate crisis, as the Paris Agreement moves into arguably its most difficult phase, sustained action. Improving coordination between the UNFCCC and other international bodies and agreements, fully implementing the enhanced transparency framework and associated verification and tracking capacity, and elevating climate adaptation efforts with a focus on nature-based solutions are all essential to implementing the Paris Rulebook, and helping to build trust among all contracting parties.

3.3. Rebalancing climate and security at the UN

Contributed by Adriana Erthal Abdenur, Co-Founder and Executive Director, ***Plataforma CIPÓ****.*

Over the past five years, policy debates on how to deal with the climate-security nexus have intensified at the UN and other multilateral bodies, as well as within national policy circles and research communities. At the UN, a series of Security Council resolutions have acknowledged that climate can function as a threat multiplier in certain conflict-affected settings.

In order to avoid "securitizing" this debate, there have been calls from civil society to better mainstream the agenda across the UN, including through the UN Climate and Security Mechanism. Some regional organizations, especially in Africa and Europe, have launched discussions on how to incorporate climate into conflict risk assessments and the design of responses, including for conflict prevention. Donor countries are also beginning to consider how to incorporate climate into their international programming, while humanitarian and non-governmental organizations (NGOs) operating in conflict-affected settings are considering how to adopt a more climate-sensitive approach.

3.3.1. EXPANDING NETWORKS

The links between climate and security have been acknowledged by UN leaderships and the creation of a Group of Friends on Climate and Security, focused at the UN Security Council and connected associated networks of independent experts, has expanded the number of regionally-diverse member states acknowledging and engaging with climate-related security risks within the UN system. The group has recently issued a joint statement calling for a biennial country- or region-specific report of the Secretary General on climate-related security risks, "including concrete recommendations for action by UN organs."

The further diversification of this debate away from solely UN Security Council discussions – which focus more narrowly on open conflict areas and are also more directly subject to geopolitical rivalries – is important for two key reasons.

First, while it is inevitable that debates and conflict risk assessments at the UN Security Council incorporate climate variables, the Council may be constrained in addressing climate and security, given interpretations of its current mandate, composition (with P5 rivalries) and orientation towards "hard security" risks. Other parts of the UN system, such as the climate regimes and the development pillar, may be better equipped to deal with vital and practical issues of mitigation, adaptation and resilience, even in conflict-affected parts of the world.

Second, many have raised concern that this emerging agenda may lead to a "securitization" of climate change action or response, leading to resource diversion away from crucial development efforts and from necessary strengthening of the general climate governance architectures. In addition, viewing climate through the lens of security could subsequently lead to broadened justifications for self-interested interventionism.

3.3.2. POSSIBLE APPROACHES

While addressing the links between climate and security is inevitable, the question is how to develop approaches that avoid backfiring and incorporate a broader array of experiences, perspectives and concerns. At the UN, what may be important at this juncture is to establish more clearly the norms and the division of labour for dealing with climate and security. The UN Security Council is already stretched thin and marked by too frequent paralysis; therefore, discussions must differentiate more clearly between existing impacts and potential threats. In addition, the UN Climate and Security Mechanism, which has played an important role in this mainstreaming effort, should promote more inclusive knowledge production around this topic, as it remains dominated by Northern countries, institutions, and researchers, fueling the perception that this emerging agenda may become a conduit for geopolitical interests of rich countries. Finally, an effective approach requires that policy discussions, initiatives, and recommendations remain firmly grounded in evidence and research.

3.4. The UN peacebuilding architecture and climate action

Contributed by Richard Ponzio, Director Global Governance, Justice & Security Program and Senior Fellow, ***The Stimson Center****.*

Established in 2005, the UN Peacebuilding Architecture, comprising the Peacebuilding Commission (PBC), its Fund and Support Office, has recently moved into the climate action space.

First, from (1) the Peacebuilding Commission's diverse 31 UN member states; to (2) its active country-level engagements alongside other global and regional intergovernmental bodies, as well as non-state actors; to (3) its examination of multiple drivers of violent conflict and adoption of an interdisciplinary approach to building resilience in fragile and conflict-affected countries and regions, the Peacebuilding Commission is well placed to tackle climate-related security risks. Recognizing that climate change and other environmental threats are recurring policy concerns on the PBC's agenda, the Commission has identified lessons learned from discussions on the peacebuilding-environment nexus, and the UN Environment Program has seconded experts to and collaborated with the Peacebuilding Support Office on analysis, policy development, and operational tools.

Additionally, the Peacebuilding Fund now offers a steady flow of financial resources, often tied to UN agency technical assistance, helping fragile states better address the root causes of climate-related conflicts. Since 2017, the Peacebuilding Fund has invested $63.4M in 29 projects in 20 countries towards building greater climate security. Several of these environmental peacebuilding initiatives underscore the importance of cross-border and regional approaches, such as in the Sahel and Pacific regions, when seeking, for example, to reduce and end conflicts involving transboundary water management and extreme weather events. In pursuing locally-driven environmentally sustainable solutions for just and durable peace, they have also sought to empower women and youth in the management of natural resources.

3.4.1. RECOMMENDATIONS

Going forward, three key recommendations for strengthening the Peacebuilding Architecture's ability to respond to global ecological risks are:

- First, with both the Peacebuilding Commission and UN Security Council showing growing interest in climate-sensitive risk assessments, the (2010) Monitoring Peace Consolidation: the United Nations Practitioners' Guide to Benchmarking should be updated with new ecological risk indicators, and then applied to the country-level work of the PBC, to field-based, multidimensional peace operations, and also to the country-level programing of some four dozen Peace and Development Advisers, deployed by the UN Development Program and UN Department of Political and Peacebuilding Affairs.

- Second, a newly-proposed Peacebuilding Commission instrument, the "Sustaining Peace and Conflict Prevention Audit" tool, could function similarly to the Human Rights Council's powerful Universal Periodic Review, by having peer review monitoring of early warning indicators of all countries to inform early actions by the UN Security Council and PBC to prevent violent conflict. Incorporationg a "climate lens" and new ecological risks indicators, including those associated with SDGs #13, #14 and #15, would aid the Peacebuilding Commission in addressing climate-related security risks.

- Finally, after 16 years, the Peacebuilding Commission still remains an advisory body to the UN Security Council and General Assembly. Learning from the UN Human Rights Commission, which was transformed into a more authoritative Human Rights Council in 2005–6, it is time for UN member states to back a similar upgrade of the Peacebuilding Commission into an empowered and more capable Peacebuilding Council. This would entail, for instance, an expanded mandate to lead on UN policy oversight and donor coordination support in second and third-order conflicts not on the Security Council's agenda, as well as to address matters of ecological risk before they spill over into deadly violence in fragile states and regions.

3.5. The responsibility to protect

Contributed by Karen Smith, University lecturer in International Relations, Leiden University, former UN Special Adviser on Responsibility to Protect (January 2019 to July 2021) and John Saidi, Ph.D., Legal Intern to the Climate Governance Commission, ***Harvard Law School****.*

Given the recognized "threat multiplier" effect in contributing to armed conflict, the "human security" threat posed by climate change, and the recognition that large scale ecological damage within a nation's borders can have a profoundly negative global impact, it has been argued that the "Responsibility to Protect doctrine" (R2P) may be used to justify collective measures or international security action in certain circumstances. Former Canadian Foreign Minister Lloyd Axworthy and former Canadian UN Ambassador/Justice Minister Allan Rock have suggested consideration of a collective international response under the logic of R2P in relation to nations that adopt environmental policies that produce devastating global impact (see section II.2.4). The idea posed is that the doctrine established by R2P may, in certain circumstances, authorise the international community to take the necessary action, e.g., through "an escalating series of denunciations, embargoes and sanctions," or "multilateral green helmets" assisting in the prevention of destruction of ecosystems that help sustain life on Earth.

3.5.1. CHALLENGES PRESENTED BY THE PRINCIPLE

However, the R2P principle has been narrowly focused on the crimes of genocide, war crimes, ethnic cleansing, and crimes against humanity. The UN Secretary General as well as all special advisers on R2P have cautioned that expanding R2P to include climate change/ecological harm may undermine the international consensus on the doctrine and render it inoperable. Some additional weaknesses of employing R2P in this context include: (a) that it requires UN Security Council authorisation, and the requisite political will for the same; (b) difficulty in ascertaining what actions the international community could practically take to deter the environmental threat, and what threshold must be crossed before any action is taken; and (c) determining which states would sign on to such action, given that very few states, if any, have perfect environmental records. If the five permanent members of the UN Security Council themselves are not viewed as upholding the highest climate policy standards, then any measures imposed by the UN Security Council would likely be perceived as lacking legitimacy (see also concerns raised above, section II.3.3).

3.5.2. A FOCUS ON PREVENTION

An important element of the R2P doctrine focuses on preventing, not just responding to, atrocity crimes. This entails identifying and addressing risk factors, which include structural factors, such as weak state structures and economic instability, and triggering factors such as the outbreak of conflict. The UN's Framework of Analysis for Atrocity Crimes includes a number of risk factors relating to climate change, including humanitarian crises caused by natural disasters and economic instability caused by scarcity of resources or disputes over their use (see section II.3.4). However, in the same way that the relationship between climate change and conflict is not straightforward, neither is the link between climate change and atrocity crimes.

Preliminary studies have shown that climate change is less a direct cause of atrocity crimes than a potential trigger or threat multiplier, where risk factors are already present. In terms of mitigating the risk of atrocity crimes, states should therefore also be developing policies to mitigate the effects of climate change on vulnerable populations and, under Pillars I and II of the R2P, the international community should assist them in doing so. In this way, climate change can be seen as constituting an additional risk or threat multiplier that should primarily be addressed through prevention.

3.6. A Global Resilience Council

Contributed by Georgios Kostakos, Executive Director, and Harris Gleckman, Member of the Executive Board, Foundation for Global Governance and Sustainability (FOGGS).

The world lacks an equivalent body to the UN Security Council with the authority to lead large-scale collective responses to non-military crises that will have an increasing impact on humanity and on our planet. FOGGS has proposed a new "Global Resilience Council," a "Security Council" to deal with non-military global threats.

3.6.1. BACKGROUND

After World War II, the international community reconfigured global governance with the primary goal of preventing the "scourge of war." Today's global crises are challenging the world community to reconfigure global governance once again, to prevent human mega-tragedies and planetary instability (see section II.3.1). What has emerged in recent decades is an awareness that major global threats are multidimensional in character and lead to encompassing "mega-crises" well beyond the capacity, or potential capacity, of any topic-specific multilateral organization. The UNFCCC and its recent Paris Agreement may be showing the way to tackling the climate crisis, but have no direct authority over sectors such as energy production, industry, trade, agriculture, transport, buildings and finance, where the causes of climate change and its solutions lie. Similarly, in the case of the COVID-19 pandemic, we saw dramatic economic and social impacts well beyond the reach of the World Health Organization (WHO).

3.6.2. A "SECURITY COUNCIL" FOR LARGE-SCALE NON-MILITARY THREATS

To correct the fragmented approach to global governance established in 1945 and the inability of any existing body to fill the cross-disciplinary global risk response gap, a new intergovernmental body is needed – one which could both deliberate with urgency and engage all relevant UN system agencies, the Bretton Woods Institutions, Basel-based institutions, and other relevant intergovernmental organizations. The proposed Global Resilience Council would allow the international political response to major multidimensional crises to be elevated from the level of individual specialized agencies to the global community at large. It would enable concerted action across sectors, thus making it possible to address, in a dramatically new fashion, complex environmental, economic, social and health-related crises, also forging linkages to existing international disaster preparedness, early warning and response bodies and mechanisms.

The proposed name, "Global Resilience Council," reflects the primary aim of responding to these crises, and ensuring the capacity of societies to withstand future shocks and "build back better" in the face of intensifying challenges. It would be partly modelled on the UN Security Council – in view of the sweeping powers the latter has under the UN Charter to investigate situations endangering international peace and security – and impose, when necessary, political and economic sanctions.

3.6.3. ESTABLISHING THE COUNCIL AND AN INTERIM BODY

The establishment of a Global Resilience Council, as broadly outlined above, is needed urgently. The basic concept and detailed negotiations to give it concrete shape could be part of the follow-up process to the UN75 Declaration adopted by UN member states in September 2020, on the occasion of the UN's 75th anniversary. Such a Council would go a long way towards delivering on the member states' commitment included in the Declaration "to upgrade the United Nations."

The current global conditions, which include geo-political tensions among major states and a predisposition towards volunteerism in the social, economic, and environmental sector, among others, may make negotiations for a Global Resilience Council protracted and challenging. But even then, such a Council could be in place in the next two to five years. At the same time, it would make sense to create, as soon as possible, an interim body as the Council's precursor, which could later continue as a companion body. This could consist of a common platform (an "Intergovernmental Organizations Leadership Council") for deliberations between UN system bodies and other intergovernmental organizations on any matter pertaining to a major global threat that one of these entities wished to discuss. The goal of such a platform would be to begin to create the dynamics for effective all-of-multilateralism responses to non-military mega-crises. It could also ensure the engagement of diverse communities of non-state actors by institutionalizing links to advisory assemblies, including scientists and scientific associations, labour/trade union and professional associations, business leaders, parliamentarians, local authorities, indigenous peoples, civil society organisations, youth activists and young professionals.

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3.7. A Global Environment Agency

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Arthur Dahl, President, International Environment Forum (IEF), and Sylvia Karlsson-Vinkhuyzen, Associate Professor, Wageningen University, The Netherlands.

The increasingly grave set of global environmental problems are interrelated and closely linked to economic and social issues in a complex, dynamic system. A brief analysis of the present challenging state of the planet from a systems perspective, including its root causes, shows:

- Natural systems as complex global public goods;
- Currently insufficient global governance founded on a too-narrow conception of national sovereignty;
- International laws that cannot be enforced (see section II.2);
- An unregulated and unbalanced global economy, plagued by widespread corruption (see section II.2.3) and;
- Presumptions of wasteful or unlimited natural resource use (see section II.1.4).

Resource exploitation and environmental degradation have reached, if not exceeded, planetary boundaries and the current system of global governance is in no position to respond adequately.

3.7.1. POLYCENTRIC AND SUPRANATIONAL

One way to tackle the crises could be a system of polycentric governance with responsibilities allocated across governance levels (from local to global) based on the principle of subsidiarity, with a global level institution, a Global Environment Agency (GEA), having binding, supranational authority in certain essential areas, in the same way, for example, that the European Union has binding legislative capacity for all member states over a set of determined issues/areas.

Five identified central functions are suggested to be incorporated into a Global Environment Agency, or a similar effective governance process or institution at the global level:

- **The knowledge provision function.** The Global Environment Agency needs to be able to generate knowledge through monitoring and research, collect and assess available knowledge for risk identification and assessment, disseminate knowledge with modern information technologies, make knowledge accessible to decision-makers, and provide evidence-based advice through appropriate science-policy interfaces.

- **The deliberative and legislative function**, corresponding to the role a parliament has at the national level to adopt necessary legislation supported by deliberation on values and priorities among its members and in the public domain and media. Such deliberation should be inclusive and take the form of authentic dialogue, responsive to the needs of all those affected, as well as effective through a proposed introduction of majority voting for the most essential issues.

- **The enabling and implementing function**, strong enough in terms of mandate and financial resources, to adequately support countries in strengthening the implementation of international environmental laws and orchestrating the work of the many other relevant international institutions on cross-cutting issues.

- **The trust and justice building function**, dealing with accountability, mediation and dispute settlement, with the ultimate purpose of creating trust and building justice among states and humanity at large, states need frameworks in which they can trust each other to collaborate and create stronger international laws and organisational functions.

- **The learning and reflexivity function**, a cross cutting function, needed to address the complexity and uncertainty of the future, a viable global environmental governance system must have the ability to reflect on and reconfigure itself to improve its performance, learn from environmental changes and past experience, and adapt to the same.

The creation of a Global Environment Agency could build on the UN Environment Programme (UNEP), but would involve neither simple reform within its present mandate, nor upgrading it to a specialised agency. Such an Agency would have more than a simple catalytic or coordinating function, but could rather establish a central authority, gradually acquiring the mandate to take decisions based on majority voting and carry out tasks that lower levels of governance (e.g., at the national level) are not able or willing to perform – in line with the principle of subsidiarity. The Agency is proposed to have the authority to adopt global rules, norms and values to ensure the safeguarding of the planetary environment for the common good, as well as the right to a clean, safe, productive human environment, and should be endowed with adequate supervisory authority to ensure that necessary rules are followed.

The position of the GEA within the UN system will depend on whether there are wider UN reforms giving, for example, legislative authority to the General Assembly or binding judicial capacity to the International Court of Justice (see section II.3.1). In their absence, granting such authority more narrowly to the GEA to act on the planetary environmental crises may be more politically acceptable. Within a reformed UN, the GEA could be one of several policy-setting and implementing agencies.

3.7.2. START WITH A PILOT STRATEGY

There can be both a long-term strategy and some short-term steps forward toward building such a global institution. A set of specific, near-term measures to strengthen global climate governance could be implemented, for example, by

- Adopting rules of procedure for the UNFCCC to enable majority decision-making (see section II.3.2);
- Setting up an independent global scientific advisory council to support country reflections on their ethical responsibility and highest possible ambition (see section II.4.3);
- Supporting actors to use existing national accountability mechanisms (courts, parliaments, audit agencies) for states' climate obligations.

Such measures could serve as a first pilot strategy for breaking new global governance ground, due to the urgency of the climate challenge and the need for rapid action. It is an issue with widespread support from states and the broader public, with a relatively strong legal foundation in the Paris Agreement. However, while climate change is perhaps the most pressing global environmental crisis, climate governance needs to overlap with the management of many other problems, so that, ultimately, they could be tackled together by a Global Environment Agency evolving out of UNEP.

3.8. The WTO and international trade rules

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Joachim Monkelbaan, Independent Advisor on Trade, Sustainable Development and Climate Change, Adjunct Professor in Sustainability Governance at the International University in Geneva.

International trade and climate change are linked in many ways. International trade flows, for example, affect global emissions through transport, and through their effects on the scale and composition of global production and consumption and on the global distribution of production and diffusion of new technologies.

Trade can undermine effective climate action through what is called "carbon leakage," but also by the belief that distortion of competitiveness and carbon leakage make stringent national climate policies costly and pointless. At the same time, trade can contribute to climate mitigation efforts by promoting carbon efficient distribution of global production, as well as diffusion of climate-friendly technologies.

Trade rules can limit the "policy space" available to countries to tackle climate change. For example, national or regional climate policies with trade implications, such as border taxes on carbon-intensive products, carbon standards, or renewable energy subsidies, could be challenged if they are perceived as distorting or restricting trade. However, international trade rules could also potentially contribute to climate goals, for example, by targeting fossil fuel subsidies – an opportunity that has so far not been much used.

Conversely, a changing climate as well as national climate mitigation and adaptation measures may have a strong impact on international trade, because of changes in agricultural production patterns.

A series of climate-related trade disputes at the WTO indicate potential conflicts between the trade regime and climate action, and underscore the need for stronger coherence between the two policy areas. While international trade rules, in and of themselves, cannot "solve" the climate challenge, they can potentially play a much more constructive role in supporting effective climate policy than is currently the case.

Das et al., for example, identify and assess several concrete policy options available to make WTO and international trade rules more supportive of climate action. These include:

- Legal changes at the WTO;
- Procedural changes in institutions and practices;
- Actions under plurilateral and regional trade agreements;
- Border carbon adjustments;
- Fossil fuel subsidies.

3.8.1. LEGAL CHANGES

Potential legal changes range from amendments of WTO rules to explicitly allow countries to impose certain climate "response measures" in spite of their trade implications, to more temporary or limited interventions, such as a "climate waiver" that would temporarily allow certain climate response measures that would otherwise violate WTO rules, authoritative interpretations of provisions in WTO agreements, or a temporary "peace clause", committing WTO members to wait before challenging trade-related climate measures, or refrain from using countermeasures. By their nature, legal amendments of WTO rules are the more powerful and enduring measures (albeit involving challenging negotiations), whereas waivers and authoritative interpretations may be weaker and more temporary or limited measures.

3.8.2. PROCEDURAL CHANGES

Procedural changes suggested by Das et al. include enhanced coordination between the WTO and UNFCCC and ensuring expertise on climate change in WTO dispute settlement mechanisms, as well as mandatory climate-related impact assessments in the WTO's Trade Policy Review Mechanism (TPRM). There is high potential for improved coordination between the WTO and the UNFCCC through existing channels, such as the WTO's Committee on Trade and Environment, the UNFCCC's Improved Forum on Response Measures and the newly established Trade and Environmental Sustainability Structured Discussions (TESSD). Such joint work could include: the drafting of a definition of "response measure" that could be agreed by the COP, and then incorporated by the WTO; establishing an agreed common international standard for calculating carbon emissions embodied in traded goods; and, simply including climate expertise in WTO dispute settlement panels, a straightforward measure, given that these panels already have the right to consult external expertise.

3.8.3. PLURILATERAL AND REGIONAL TRADE AGREEMENTS

Plurilateral and regional trade agreements also offer opportunities for groups of countries to agree on stronger climate-related trade provisions among themselves, without having to wait for decision processes involving all of the WTO's 164 member states. Significantly stronger climate provisions could be systematically included in regional free trade agreements, and the Environmental Goods Agreement could be employed in this context to help disseminate climate-related technologies.

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3.8.4. BORDER CARBON ADJUSTMENTS AND FOSSIL FUEL SUBSIDIES

An additional two categories of climate and trade policy options listed by Das et al., border carbon adjustments and fossil fuel subsidies, are key climate policy areas where more substantial trade policy reform could play an instrumental role.

Thus the various forms of legal changes suggested, from rule amendments to waivers, authoritative interpretations and a temporary peace clause, could all, in theory at least, be used by WTO member states to facilitate implementation of border carbon adjustments while avoiding trade conflicts.

Several additional procedural changes in the existing international trade regime could meaningfully support the phasing out of fossil fuel subsidies. These include: 1) enhancing transparency and reporting on fossil fuel subsidies under the WTO Agreement on Subsidies and Countervailing Measures; 2) providing greatly enhanced technical assistance on the topic; and, 3) introducing non-binding national pledges, with follow up reporting, to reform fossil fuel subsidies.

Another option worth considering, in order to integrate climate goals in all decision making under the trade regime, is the establishment, within the WTO, of the type of climate policy council that is attracting growing interest at the level of national climate policy. Such councils now exist in 40 countries, and provide advice and assess governmental policies with regard to their impact on national climate goals (see section II.4.3). The EU's recent decision to establish a Scientific Advisory Board on Climate Change is the first application of the concept on a regional/supra-national level.

Another opportunity the trade regime can offer is to remove barriers to trade and foster the dissemination of environmental goods and services (EGS), such as renewable energy technologies. Lowering trade barriers can reduce prices, open up new markets for exporters, and increase access to more innovative and cost-effective suppliers.

The Doha talks held out the promise of such an agreement on EGS and a group of 18 WTO members thereafter negotiated an "Environmental Goods Agreement" (EGA) between 2014 and 2016. Thus, there is space for more innovative ways forward for EGS in the Trade and Environmental Sustainability Structured Discussions (TESSD). TESSD is a diverse group of more than 50 WTO members that take a unique and innovative approach to addressing the trade-related aspects of challenges, such as climate change, circular economy, and fossil fuel subsidies.

4. “Bottom-up” pathways

Summary information is given below on the following proposals:

4.1. Perspectives on strengthening the current climate governance system: mapping leading states and initiatives
4.2. A global climate policy clearinghouse
4.3. Better connecting national climate governance with international obligations
4.4. Climate clubs
4.5. A global green hydrogen alliance

4.1. Perspectives on strengthening the current climate governance system: mapping leading states and initiatives

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Jimena Leiva Roesch, Head of Peace and Sustainable Development, International Peace Institute (IPI), and Julia Almeida Nobre, Independent Research Advisor.

A forthcoming report led by Leiva Roesch investigates the existing decentralized and fragmented global climate governance “system” with the goal of identifying leading states, as key global governance actors, and multi-actor coalitions or initiatives at the forefront of innovation, advancing important climate governance goals. In a series of interviews with policy experts, the study raises a broad, corollary question: is the current, largely ad hoc, voluntary and decentralized climate governance system working to generate the required ambition, and is it incentivizing real progress? While there is no simple answer, all experts interviewed believe that it is not. It is also felt that many of the current ad hoc initiatives and practices, often based on loose “coalitions of the willing,” have weak or no accountability mechanisms for their members. Their impact remains technical at best, and superficial at worst. Further, there is grave concern that global climate finance at the levels actually needed remains blocked (see also sections II.1.3 and II.1.5). Preliminary insights emerging from this research to date are shared below.

The Coalition of Finance Ministers for Climate Action, currently chaired by Finland and Indonesia, provides a platform for Finance Ministers to learn how to mainstream climate in their decisions and budgets at the national level. This initiative provides a useful template on how to bring other Ministries on board, and should be universalized. Member countries represent about 39 percent of global CO_2 emissions (2018 figures).

4.1.1. BEYOND THE POLICY SILO EFFECT AND ENGAGING LEADERSHIP AT THE HIGHEST LEVELS

Climate change is affecting all areas of life and governance. Yet, climate talks take place in a reduced space and within a particular policy silo. They remain largely disconnected from other issues (e.g., biodiversity, SDGs) and from other government ministries or bodies, at both the national and global levels. Climate negotiations should instead take place in a multi-sectoral and inclusive space with the highest levels of leadership at the helm. In recent years, the UNFCCC has started to include sectoral ministries in ad hoc and biennial events. To ensure greater ownership and implementation at the national level, a national government's entire Cabinet should be involved in key decisions and delivery.

The Race to Zero Campaign is a leading example of a multi-actor coalition, linked to the UNFCCC, that includes the participation of national governments, cities, companies and investors. It is also multi-sectoral, encouraging the participation of a vast array of actors. Led by two champions, the UK and Chile, Race to Zero is setting a precedent of inclusive participation by a vast array of diverse actors committed to the net zero goal.

4.1.2. INSTITUTIONALIZING THE ENGAGEMENT OF NON-STATE ACTORS

Beyond expanding the space for the highest levels of national leadership, climate negotiations could also further broaden the space for non-state actors, including municipal authorities, businesses that are committed to net zero, civil society and youth leaders, with better institutionalisation of such participation. These actors should have equal access to information and a consistent, organised process by which they can provide continuous feedback to global climate discussions. This kind of open and inclusive space should also exist at the national level, to ensure that the climate governance system works to incentivise progress and accelerate delivery of the Paris goals. The UN Secretary General, with the support of various states, could start a consultative process on how to broaden the climate negotiation space to regularly include the requisite levels of national leadership, as well as other relevant actors, for example, as has already begun with the Secretary General's Youth Advisory Group on Climate Change.

4.1.3. ENSURING COALITIONS/INITIATIVES HAVE REAL IMPACT

Since the Paris Agreement, a plethora of multi-actor coalitions or initiatives have emerged. The Paris Agreement acknowledges the relevant role of non-state actors in moving the climate agenda forward. Many governments are collaborating more closely than ever with companies, cities, NGOs and philanthropies. However there is now an over-saturation of initiatives that are not sufficiently targeted or systematised, and are thus unable to galvanize real impact and increase delivery at the national level. Currently, there is insufficient collaboration across coalitions or initiatives, and excessive duplication. There is a need to weave connections and increase results-based collaboration across multi-actor action coalitions and initiatives that share a similar purpose, in order to accelerate implementation and reduce duplication. The UN Secretary General's team on climate is well positioned to make these connections and help sustain this growing ecosystem.

4.1.4. GLOBAL FUNDING FLOWS

Experts interviewed identified one of the biggest global governance gaps: how funding flows. International resources are often managed and distributed using outdated mechanisms, dominated by old perceptions, such as entrenched hierarchical relationships between donor and recipient. In order to empower and build capacity and ownership at national and local levels, developing country institutions should have direct access to funding on a much larger scale. This area needs serious consideration and reform (see proposals in sections II.1.5 and II.1.3), as well as proposals for adequate protection from corruption at the national level (see section II.2.3). The UN Special Envoy on Climate Action and Finance should lead a systematic review and provide recommendations on how to break from current dynamics, with particular attention given to the recent global and national fiscal effects of the COVID-19 pandemic. The impact of creating an improved global climate finance system would not only increase trust among actors, but also have an exponential effect on implementation of climate action and Paris Agreement obligations.

4.2. A global climate policy clearinghouse

Contributed by Katia Simeonova, Independent Researcher, Former Co-ordinator of the Subsidiary Body of Implementation and Manager of Transparency, the UNFCCC Secretariat.

Effective climate policies or governance solutions need not always be negotiated or implemented in a "top-down" fashion in order to have global reach. As noted in Part I (section I.3) of this report, key climate legislation and other policy innovations that have proved effective in one jurisdiction can be copied, adapted and implemented by others, creating opportunities for exponential diffusion of policy innovations.

To facilitate and speed up such policy diffusion, a possible near-term solution is to set up a dynamic global climate policy "hub" or Clearinghouse at the international level.

Building on and linking existing high quality but scattered initiatives, data, information and knowledge sources, such a clearinghouse could become a premier tool and a single, authoritative entry point for sharing knowledge and learning about climate policy implementation by governments and other stakeholders. A strong clearinghouse mechanism could inform crucial and time-sensitive policy choices and enable next generation data-driven policymaking across national jurisdictions, helping to alleviate some of the problems stemming from the current fragmentation of global climate governance.

4.2.1. RATIONALE AND NEED

After lengthy negotiations within the UNFCCC, the adoption of the landmark Paris Agreement in 2015, with its established norms and an articulated urgency of taking strong global action, a major shift in focus from negotiations to implementation of global goals on climate is required.

As noted above, key "vital policies," including those which might be termed "exponential policies," in service of the required levels of climate action, need to be implemented swiftly, with skill, at a global scale, and at various levels of governance (see sections I.3 and I.3.2).

Acquiring knowledge and sharing learning on the sound and effective implementation of climate policy, which still happens primarily at the national level, are among the key functions of current decentralized global governance approaches, in addition to other functions, such as guiding and signalling, setting rules and standards, transparency and accountability, and means of implementation. Such implementation should be enabled by enhanced international support for policy implementation, as well as through technology transfer, capacity building, and climate finance.

Numerous databases, clearinghouses, hubs and other similar tools already exist for sharing knowledge and information on climate policies among states that are party to the Paris Agreement and other stakeholders. However, there is much overlap, inconsistency, gaps and a lack of connection between these resources, that make it difficult to capitalise on the more than 20 years of experience with climate policy implementation, to identify novel approaches, to find the most recent information and to engage with other stakeholders.

4.2.2. OPTIONS AND CHALLENGES

A Global Climate Policy Clearinghouse, in addition to building on a range of existing climate policy databases and clearinghouses with proven quality, could be practice-focussed, taking into account, for example, possible synergies with progressive and dynamic multi-stakeholder hubs like Race to Zero. The Clearinghouse should also develop and provide methods and tools to enable: a) the adaptation of key climate policies to diverse national contexts; and, b) ex-post evaluation of various climate policies on a consistent, and scientifically sound basis, also taking into account the great diversity of country conditions and policy environments.

By harnessing the power of artificial intelligence, machine learning and the interdisciplinary collaboration of policy experts, data scientists, visual designers, and interactive programmers, the clearinghouse could provide an intelligent open-access platform that is powered by cutting-edge data analysis, automated collection of policies and dynamic identification and surfacing of top practices in different areas.

One of the main challenges for such a clearinghouse would be to put in place appropriate governance and decision-making structures for the facility, essential to ensure its robustness, credibility and deployment at scale, so that transformational changes can take place. Such governance has the potential to be a complex and expensive undertaking, and would include questions as to where to locate such a facility within the existing climate governance architecture, for maximal effect. Any decision on its positioning and governance should ensure proper, optimal balance between the needs of different stakeholders, ensuring their engagement and collaboration, and the overall goal of effective, swift and high-quality policy implementation globally, at scale.

4.3. Better connecting national climate governance with international obligations through climate councils

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Karin Bäckstrand, Professor in Environmental Social Science, and Matilda Miljand, Ph.D., Department of Political Science, Stockholm University.

There is a growing interest in establishing national climate policy councils to provide advice, assess governmental policies and help further countries' work with the transition to low-carbon or fossil-free societies. Dedicated "Climate Councils" are playing an increasingly important role in connecting national climate governance to vital international climate obligations. Such councils could be more broadly diffused internationally, incorporating optimal design features based on comparative learning to date, for example, by way of a global climate policy clearinghouse (see section II.4.2). Currently, there are about 40 national climate advisory bodies in developed and developing countries with varying mandates, tasks, capacities, scope, resources and focus.

Climate advisory bodies can be divided into: *scientific climate policy councils, stakeholder climate policy forums, inter-ministerial climate policy forums with stakeholders,* and *scientific advisory bodies*. Councils have different functions and share to a varying degree the characteristics of more than one type of advisory council, and some jurisdictions have created national youth climate councils.

To date, councils have been established in all parts of the world. While most are in Europe, there are also councils, representing all the types described above, in Chile, Kenya, Mexico and elsewhere, with scientific climate policy councils being the most common form, and the in-house advisory body the least common.

Scientific climate policy councils consist mainly of scientific experts and their task is to review and monitor whether the climate policy measures taken at the national level are sufficient. They are policy advisors who, with a certain regularity, make recommendations on how national climate policy can be improved or formulated.

A climate policy council can also exist as an *in-house scientific advisory body*. These are formal government bodies that engage or employ scientific experts to provide advice. In order for it to be classified as a climate policy council, these must complement well-established environmental agencies and therefore they either have a narrower thematic focus or are designed with a specific role in mind. The fact that they are internal does not necessarily mean that the results produced have a lower validity, but their work can be seen as being more "in the service of" their government.

Climate policy councils can also fulfil the function of a *stakeholder climate policy forum*. Independent stakeholder engagement and advisory forums, unlike scientific climate policy councils, also include non-scientific actors, such as representatives of business or trade organisations, civil society organizations, local officials, and even members of the general public. The main purpose of these platforms is to open the discussion to relevant actors outside the government, and provide opportunities for exchanges with, and contributions from, civil society, the private sector and municipalities.

A similar type of council is the *inter-ministerial climate policy forums with stakeholders*. These bodies often act as stakeholder platforms, but with the addition of government officials from a wide range of ministries and agencies.

As can be seen from this diversity of climate policy councils, they differ not only in institutional design but also in their purpose. Moreover, they also operate in different governance structures. It is common for climate policy councils to be established within the framework of climate legislation. The broader governance structure for climate issues in a country is crucial for enabling the climate policy council to have an impact. Previous research has shown that the performance of climate policy councils depends on the legal framework within which they operate. There is a need for a strong legislative framework for climate change, in which a climate policy council forms a part, in order to have a greater impact.

Previous research has identified the following success factors: a mandate that ensures political independence and scientific integrity; members that are selected based on their expertise; a robust legislative framework for climate change, for instance in the form of climate laws/act; adequate resources; and, regular interaction between the climate advisory body and the government.

4.3.1. REGIONAL OR INTERNATIONAL CLIMATE COUNCILS

Such councils could also be established at the regional level around the world, and/or within the architecture of existing International Organisations in various subject matter areas (see section II.3.8).

For an example of scaling climate councils to the regional level, on 15 May 2021 members of the European Parliament's Committee on the Environment, Public Health and Food Safety (ENVI Committee) approved a comprehensive climate change law which aims to achieve climate neutrality in the EU. The law creates the European Scientific Advisory Board on Climate Change, to provide the European Commission with independent scientific advice on the plan to become the first climate-neutral continent. The Advisory Board will assess policy coherence and monitor progress, review EU policies and verify compliance with climate objectives, in regular consultation with the European Environmental Agency (EEA) management board. Globally, the IPCC represents a type of scientific climate council at the inter-state level, with limited governance, compliance and policy assessment/monitoring functions, but having government-designated experts from almost 200 countries. The advisory and science-based nature of many of the climate council model could make it a feasible short-term option to integrate climate goals with decision-making in other key policy areas, throughout different levels of governance.

4.4. Climate clubs

Based on a forthcoming report from the Global Challenges Foundation. Summary information contributed by Joachim Monkelbaan, Independent Advisor on Trade, Sustainable Development and Climate Change, Adjunct Professor in Sustainability Governance at the International University in Geneva.

The design of contemporary agreements with global coverage, such as the Paris Agreement, often have to rely on a consensus model. If nations have different objectives and ambitions, such designs will gravitate toward what is acceptable for low-ambition nations, rather than what is most efficient. In political science, this is sometimes referred to as the Law of the Least Ambitious Program, or Underdal's Law.

In view of this tendency, several authors have pointed out a need for what Pihl calls "complementary designs," compensating for the structural weaknesses of such global agreements, allowing groups of countries to move forward with more ambitious climate agendas and accelerate climate action and policy-making beyond the uncertain – and to date inadequate – commitments under the Paris Agreement.

The idea of "climate clubs" has recently been proposed by William Nordhaus, among others, as a solution to the free-rider problem that hampers the provision of public goods and prevents voluntary, global agreements from resulting in strong and effective climate policy. A climate club would be a set of like-minded countries, and possibly non-state actors, that work together on a specific climate policy or action issue (or set of issues) by following determined, agreed guidelines and rules, in exchange for benefits that can be shared among themselves and denied to non-members, unless the latter join the club or match the club's ambition level.

The rules imposed by a climate club could include a minimum price on carbon emissions, removal of fossil fuel subsidies, standards for green procurement or circular production models. Distinct membership benefits could take the form of access to markets without tariffs, access to enhanced technical assistance, or other benefits, conditioned on satisfying the club's rules. By offering members access to significant and exclusive benefits, climate clubs, as Hawkins points out, may "help incentivise participation, ensure compliance, deter free-riding, and scale up ambition."

An important aspect of a climate club is that while it may begin with only a few members – more than two but fewer than all the parties to the UNFCCC – it should be open to include new members, provided they live up to the same standards. In this sense a climate club is a governance mechanism with potential for exponential growth:

The more nations that join the club, the larger the market protected by a carbon tariff and the stronger the incentives for outsiders to join. This would start an escalating process, allowing a global carbon price to emerge.

In terms of their policy-making potential at the global level, climate clubs could be seen as powerful "first movers," pioneering ambitious climate action first among a smaller group which then, in time, sets the new floor/global minimum for all actors at the international level, as the club's example and incentive structures push adoption of its key policies. At COP 25, a group of at least 32 Parties to the UNFCCC adopted the "San Jose Principles for High Ambition and Integrity in International Carbon Markets." These principles are meant to avoid double counting of emissions and to preserve the integrity of carbon markets in reducing GHG emissions. Other promising initiatives that could be preludes to climate clubs are the New Zealand-led Ministerial Declaration on Carbon Markets, the Carbon Market Platform (established in 2015 by the German presidency of the G7), and the Carbon Pricing Leadership Coalition (CPLC).

It is important to note that climate clubs should not be seen as alternatives to global fora such as the UNFCCC, which retains a vital position as "the one platform where global ambition and equity can be discussed and potentially agreed." However, climate clubs could play an important complementary role, as they would enable member countries to collectively take on more ambitious commitments and motivate other countries to join their efforts. Once established in the smaller group, such increased ambitions could then optimally be brought back into the UNFCCC framework.

4.5. A global green hydrogen alliance

Based on a report from the Global Challenges Foundation. Summary information contributed by Arunabha Ghosh, CEO, and Sanjana Chhabra, Research Analyst, Council on Energy, Environment and Water (CEEW).

The use of green hydrogen could be a global game-changer for decarbonisation of heavy industries, such as steel, ammonia and petrochemicals, in addition to transport. Many countries have announced national and regional programmes, but green hydrogen technology is still far from commercialisation at scale. According to an IPCC Special Report, electrification, hydrogen, bio-based feedstocks and substitution would lead to the deep emissions reductions required in energy-intensive industries to limit warming to 1.5 degrees Celsius.

At least 32 countries plus the EU have announced or are developing national-level policies and strategies for hydrogen, and at least 24 countries and regions have targets and pilots for green hydrogen. Recently, the UK government has launched its plan for a world-leading hydrogen economy, which will support over 9,000 jobs in the UK and GBP 900 million of Gross Value Added (GVA) by 2030. In August 2021, the Indian Prime Minister announced the launch of the National Hydrogen Mission, with the aim to make the country a global hub for the production and export of green hydrogen. To add, ACME Group, a renewable energy company, has recently commissioned the world's first integrated commercial-scale pilot plant for green hydrogen production in Rajasthan, India. In order to push towards a hydrogen future, the Government of India is planning to commit an outlay of INR 8,000 million between 2021 to 2024 for pilot projects and research, development and demonstration projects.

There are now more than a dozen bilateral partnerships and at least ten multi-country or multi-firm platforms focused on hydrogen. But they seldom involve developing countries, are not oriented towards joint technology development, and do not focus on deploying technologies in countries that will have the greatest demand for cleaner fuels for industrial development.

4.5.1. CHALLENGES

Three challenges dominate: first, path dependency in national programmes could lead to suboptimal outcomes related to technology choices (continued reliance on fossil fuels for hydrogen production), end uses (lesser focus on abating industrial emissions) and differential standards (for storage, transportation and safety).

Second, there is a gap between the geographical distribution of green hydrogen potential and the primary destination of investment and projects. Many countries in the tropics have optimal renewable resources and other low-carbon resources for producing hydrogen. But the bulk of the hydrogen programmes are concentrated in developed countries. Of the 33 countries and regions analysed, only seven are in Asia, two of which are developed countries and three are major oil and gas producers. Nearly all of the bilateral partnerships are among developed countries.

The biggest obstacle is the absence of leadership. If green hydrogen has the potential to be a foundational fuel for industrial and transport decarbonisation, its development and deployment must be treated as a global public good. There is a need to avoid mercantilist instincts which restrict technology development to a few countries, while trade dependence increases for a clean fuel.

4.5.2. DESIGN AND SCOPE OF AN ALLIANCE

A Global Green Hydrogen Alliance could speed up the development, commercialisation and diffusion of this key technology. Such an alliance should be designed as a multi-country, multi-institutional network to assess, develop and design affordable green hydrogen technologies that can be deployed at scale, both in advanced economies and in developing countries. The work of the Alliance would follow a six-step approach:

1. Global inventory of hydrogen programmes and activities to increase transparency and help connect technology developers and firms across borders, creating conditions for collaboration;

2. Periodic technology assessments (biennially) to help members remain up-to-date about what gaps remain and about new opportunities for joint research;

3. Bilateral/plurilateral partnerships, with the rule being that any initiative would need sponsors from at least two countries to promote collaboration and reduce costs;

4. Pooled funds for enhanced joint R&D, with members allowed to contribute in cash or offer their human resources and laboratory and industry facilities in kind;

5. Rules of intellectual property ownership and licensing, whereby participating institutions retain their original IP, while any new technology developed by a work programme consortium is jointly owned;

6. Alliance-wide standard-setting and inspections for safe storage and transportation via technical supervisory committees, having the mandate to set standards and protocols, build capacity in developing countries, and undertake periodic inspections.

The Alliance's institutional design should prioritise scale, speed and risk. None of the six steps requires a large, bureaucratic secretariat. The Alliance could be designed on a networked governance model, with a governing council overseeing progress made by individual work programmes. Under the Alliance, pilot programmes could be up and running in developing countries by 2025. Given pressing concerns about post-pandemic economic recovery, it is easier to see the value of pooling resources through a networked, but global, platform.

Moreover, the Global Green Hydrogen Alliance should follow a risk-risk approach. These include failures in technological development or in end-use applications, second-order risks associated with the adverse impacts of faulty storage or transportation of green hydrogen, and tertiary risks involving trade or intellectual property disputes. Set against these risks should be the assessment of the failure to combat climate change by not deploying technologies for industrial decarbonisation rapidly and at scale.

The Global Green Hydrogen Alliance, by building on the existing range of initiatives and correcting for their governance failures, can be tactically and operationally more efficient, and would be most critical as a strategic governance innovation for the delivery of results at scale.

Part III. Concluding remarks: Towards a stable climate future

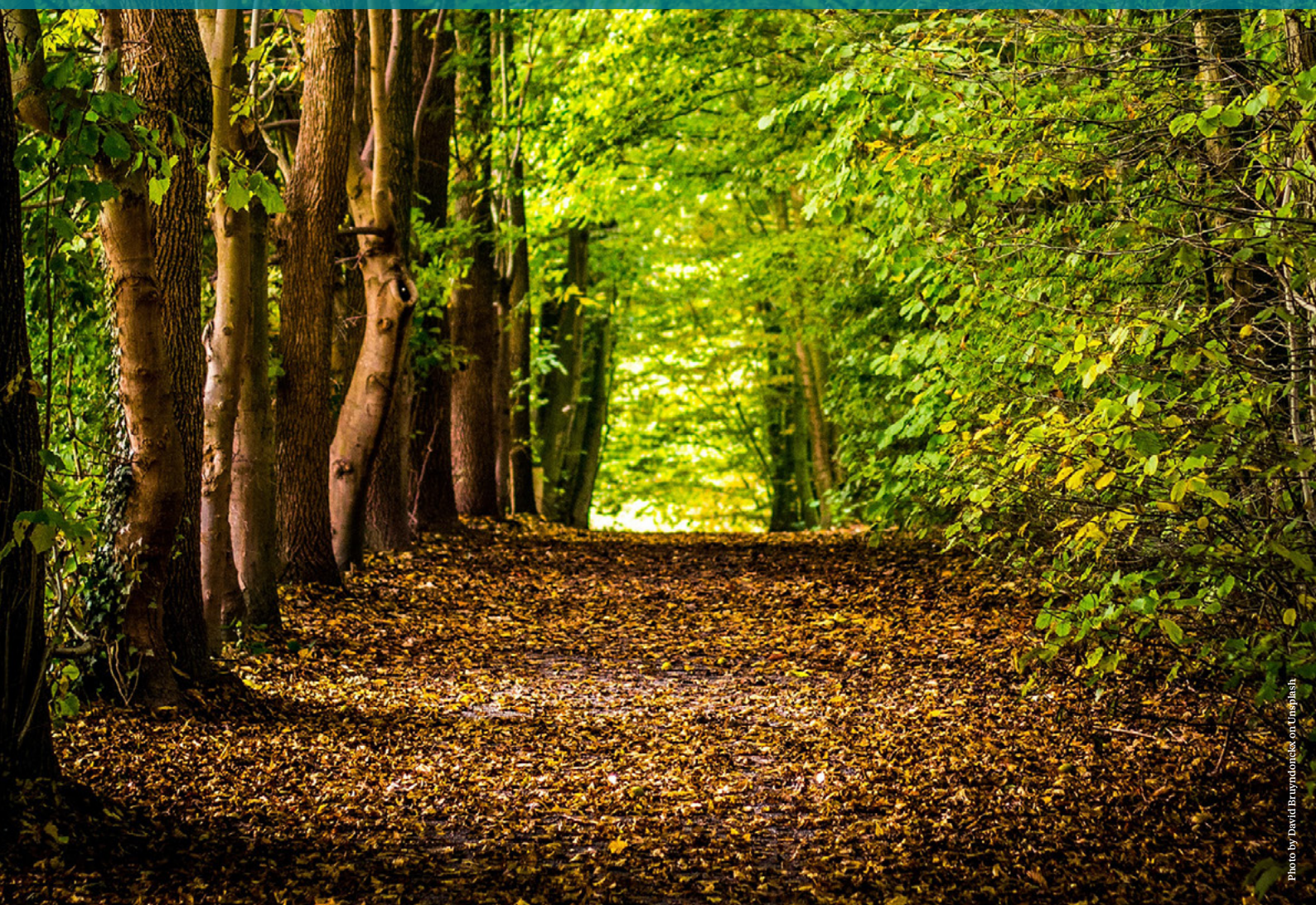

Photo by David Bruyndonckx on Unsplash

Towards a stable climate future

This report began with two very general observations: first, the growing urgency of the threat of disastrous climate change; and second, that solutions exist that would allow the world to stay on a safe path, limiting the global temperature increase to, or near, 1.5 degrees Celsius above pre-industrial levels. The gap between what we know needs to be done and what can be done, and the level of concrete climate action actually being undertaken, is indeed striking. It points to a lack of political leadership and the inadequacy of the existing governance architecture at a global level to take the necessary decisions and implement effective policies to speed up the transition to a zero-carbon global society.

The aim of the Climate Governance Commission, established by the Global Challenges Foundation (in collaboration with the Stimson Center, the Global Governance Forum and the Exponential Roadmap Initiative, among other partners), is to contribute to adressing this deficit in adequate climate governance mechanisms at a global level.

This interim report presents a number of proposals, submitted by authors from various academic and practitioner fields. The wide range of these proposals makes it difficult to summarize with a few concrete recommendations. Still, several observations can be made.

First, a number of the proposals focus on the lack of coherence between climate goals and international regimes in other policy areas that are closely linked, and which may present important, even vital, opportunities for effective climate action: international trade, peace and security, finance, development, labour markets and social impact, as well as legal institutions to combat environmental or economic crime and corruption. The common message is that climate change cannot be dealt with in isolation, but must be integrated at the core of nearly all policy fields. Taken together, these proposals speak to an emerging “whole of system” and “whole of societies” approach to climate governance worldwide.

Second, some proposals in this report address the delicate trade off and balance between the need for governance mechanisms with universal global inclusion, and the parallel pressing need for heightened ambitions and sharper policy tools, noting that global negotiations under current dominant paradigms, based on consensus, tend to lead to agreements that are acceptable to the countries with the lowest ambition, undermining the bold action that is required. Progressive groups of countries and other stakeholders should continue and/or make substantial new efforts to lead the way with more ambitious programs and policies, aiming for others to follow. However, such initiatives should not be seen as alternatives to the existing global climate regime, with the UNFCCC and the Paris Agreement negotiated under it as the centrepiece, but rather as complementary, and as ways to improve and strengthen existing institutions and shared goals.

Third, there are options already available for the economic and technological transformation needed to tackle climate change and these would also facilitate achievement of the Sustainable Development Goals. For example, transitioning from fossil fuels to distributed renewable energy offers potential to power businesses, livelihoods and to have other positive social effects in areas that are today characterized by energy poverty. At the heart of global climate policy should be future-oriented development and justice perspectives.

Fourth, a key observation behind the report is that the diffusion of new technologies and behavioural patterns is often a non-linear process, driven by positive and negative feedback loops, creating tipping points that, once crossed, can lead to accelerating, exponential change. This does not mean that change will happen by itself, but it does mean that targeted and timely policy interventions have the potential to trigger a pervasive transformation that becomes self-sustaining. Governance at all levels should reflect such policy awareness, in the interests of urgent global climate action, at scale.

Moreover, in addition to a radical, green transformation of technology and production models, there is also a need for a major shift in how we think about the economy, away from the current focus on production growth, towards a focus on human well-being and shared prosperity, with an emphasis on indicators such as those related to good health, meaningful jobs, fair income distribution, healthy ecosystems and a stable climate.

This interim report aims to serve as a basis for further discussion, dialogue and action, by showing the richness of available governance options, sometimes overlapping, with some of the governance proposals more desirable or feasible in the near-, medium- or longer terms.

Lack of action cannot be explained or excused by a lack of options. It is quite likely that not all of the proposed governance solutions will need to be implemented in order to tackle climate change effectively. Still, it is clear that the climate crisis presents an unprecedented and multifaceted global challenge, affecting multiple policy areas, and probably requiring the improvement of a range of governance mechanisms and institutions.

The climate emergency constitutes an acute existential crisis for humanity. At the same time, it also represents an opportunity to improve the global governance system in a way that makes us better equipped collectively to handle other global catastrophic risks, and to responsibly manage the range of essential global commons in the future.

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Authors and reviewers have provided highly valuable input to this report. However, authors and reviewers do not necessarily endorse all content and it should be noted that the views expressed by individual authors are their own, and may in some cases represent overlapping proposals and varied opinions and perspectives.

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* A more complete list of experts contributing to the Climate Governance Commission to date can be found on the Commission's website. Global Challenges Foundation. 2021. Climate Governance Commission. **https://globalchallenges.org/initiatives/partnerships/climate-governance-commission/** (Accessed 17 August 2021).

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Endnotes

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interacting physical, chemical and biological global-scale cycles and energy flows that allows, and is regulated by, life on Planet Earth. In essence, it is the integration of the geophysical properties of our planet with the living biosphere that forms an intangible Earth System. These global processes, interacting with the biotic and abiotic infrastructures, function as a set of intangible operational instructions with properties that determine the ways in which the Earth System self-organizes and regulates itself, and can be designated as its "software" or "program." A key process of the Earth System is self-regulation, which consists of feedback loops formed by component parts of the system working synergistically to keep the system within well-defined states. Humans and human activities are an integral part of the Earth System. To know more, see Steffen, W. et al. 2004.

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