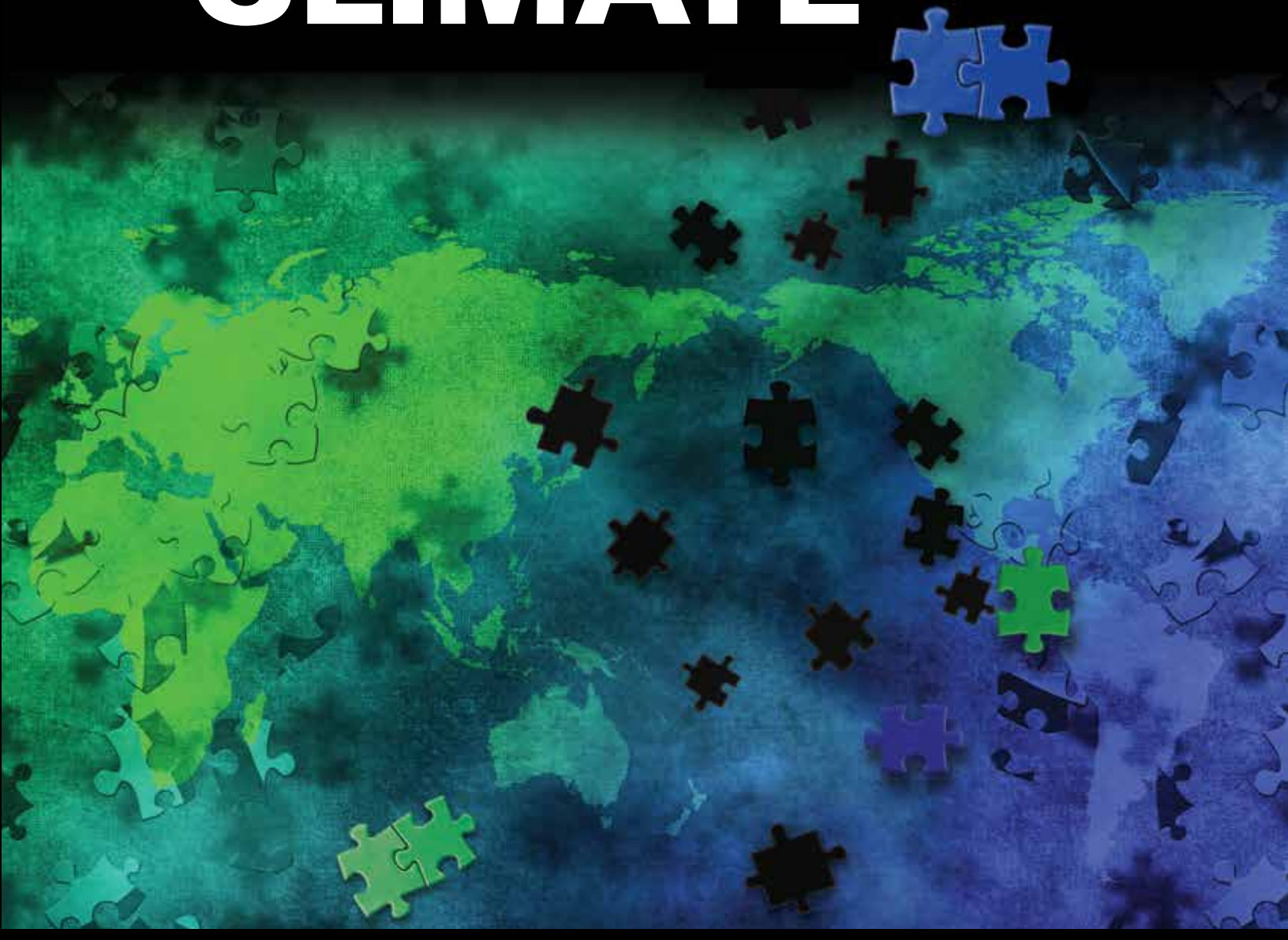
21st Century Diplomacy

FOREIGN policy IS CLIMATE policy



21st Century DIPLOMACY

Wilson Center

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21st Century Diplomacy: Foreign Policy is Climate Policy

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21ST CENTURY DIPLOMACY:

Foreign Policy IS Climate Policy

Climate change will upend the 21st century world order. It will redefine how we live and work, and change the systems of production, trade, economics, and finance. Even now, in the midst of a global pandemic, it is clear that climate change will be the defining issue of this century. In fact, COVID-19 has only underscored the inadequacy of our responses to global crises and heightened the urgency of this call to action. 21st century diplomacy will have to raise climate ambition, shape the transformative systems change needed, and promote and facilitate new modes of multilateral collaboration.

Yet, the world is woefully unprepared for the cascading impacts of climate change. We have not even begun to recalibrate our lives, our economies, or our policies on the scale required. Year after year, we stand in awe of the record-breaking wildfires, hurricanes, droughts, and floods across the globe, as if the previous year hadn't sent up its own warning flares. In many countries, climate change is still largely regarded as primarily an environmental issue. In some key leadership circles and constituencies, even the basic science is questioned. It is far past time for all public diplomacy leaders to join the environment ministries, mayors, conservation groups, forward-thinking private companies, and burgeoning youth movements in taking steps to address climate change.

Climate change is doing more than bleaching coral reefs, stranding polar bears, and causing big storms (all of these things on their own a cause for concern). It is driving change as fundamental as where people can live and where their food comes from, altering the balance of power, stranding assets, changing capital flows, and deepening inequity in the process. These fundamental changes and the associated risks demand leadership and custodians that steer global transformation processes.

This transformative agenda has its global political foundation with the Paris Agreement (decarbonizing the world) and the 2030 Sustainable Development Agenda (managing a just transition and introducing a global circular economy). Leaders of more than 190 nations agreed to these sweeping programs for change only a few years ago. Recent initiatives like the European Union's Green Deal and UN and domestic efforts to build back better in response to COVID-19 promise growing political ambition.

Over the last decade, foreign policy institutions have taken steps to better understand climate risks and inform action. At the UN Security Council (UNSC), the United Kingdom, Germany, and Sweden have elevated climate risks on the UN global security agenda. The German Foreign Office commissioned a global climate risk assessment, and Small Island Developing States continue to urge incoming Security Council Members to address climate change and recognize that it poses an existential threat to their countries. The European Union developed a climate diplomacy strategy to (1) advocate for climate change as a strategic priority in diplomatic dialogues; (2) support implementation of the Paris Agreement in the context of low-emission and climate resilient development; and, (3) increase efforts to address the nexus between climate, natural resources, prosperity, stability, and migration.

But more is needed. For the past decade, the World Economic Forum's Global Risk Report has consistently identified environmental degradation and climate change-related impacts as among the most severe and likely risks facing the globe. The ambition and scale of diplomacy in the 21st century must match the magnitude and likelihood of these risks.

It will not be easy. The worsening climate crisis and efforts towards transformative change are further compounded by the governance crisis we see around the world. Rising populism, increased nationalism, and fear-driven insularity are undermining the very tools required to chip away at the risks posed by climate change. A coordinated, global response is the only effective means to stem the coming crisis. A response that is not dependent on political parties or single ministries or agencies; rather, one that is taken up and addressed across agencies and the full political spectrum. Absorbing the impacts of climate change will require agility on the part of financial institutions, new supply chains and trade partners, alternative migration pathways, the unpacking of decarbonization and its impacts and, perhaps most importantly, new modes of cooperation. Against this background, the foreign policy implications of climate change and climate policy are all encompassing, cutting across portfolios and calling for an all hands on deck response.

Efforts to mitigate climate change must be firmly ensconced in broader governing bodies and regulatory institutions. The world has set course for a future where temperatures are 3-4°C higher by the end of the century. Set against the 1.1°C rise experienced since the industrial revolution, our current trajectory should be setting off alarm bells in every corner of the globe. To limit temperature rise to 1.5°- 2°C above pre-industrial levels by 2100 (the goal set forth by the Paris Agreement), not only will we have to reduce global emissions to net zero, we will need to pursue *negative* emissions. Deploying the technologies required to achieve negative emissions, like carbon dioxide

removal or solar radiation management, brings into the equation a host of questions that, if left unanswered, could further exacerbate the impacts of the very phenomenon they seek to keep at bay and spark their own crisis.

To chart a new course forward, the Wilson Center and adelphi invited a diverse set of foreign policy leaders, analysts, and thematic experts from around the globe to elucidate the connections between climate change and broader foreign policy objectives. What are the challenges ahead? And perhaps more importantly, where are the opportunities for driving transformative change towards a decarbonized world that is both more prosperous and more equitable?

We asked contributors to provide insights on new modes of multilateralism, the steps needed to prevent risky interventions into the earth system, and how to steer a process that will redefine the landscape of global leadership. Our authors have explored how central banks, insurers, and financial regulators need to account for climate risk, and how climate change affects the future of equity and democracy.

Our hope is that these ideas will spark debate and action among foreign policymakers and analysts to expand the diplomatic toolbox and make climate policy an essential tool for 21st century diplomacy. Global stability and prosperity depend on limiting the climate crisis and attenuating its impacts. Our success in meeting this challenge depends on unprecedented global collaboration, the achievements of which must become the North Star of diplomacy. Because Foreign Policy *is* Climate Policy.

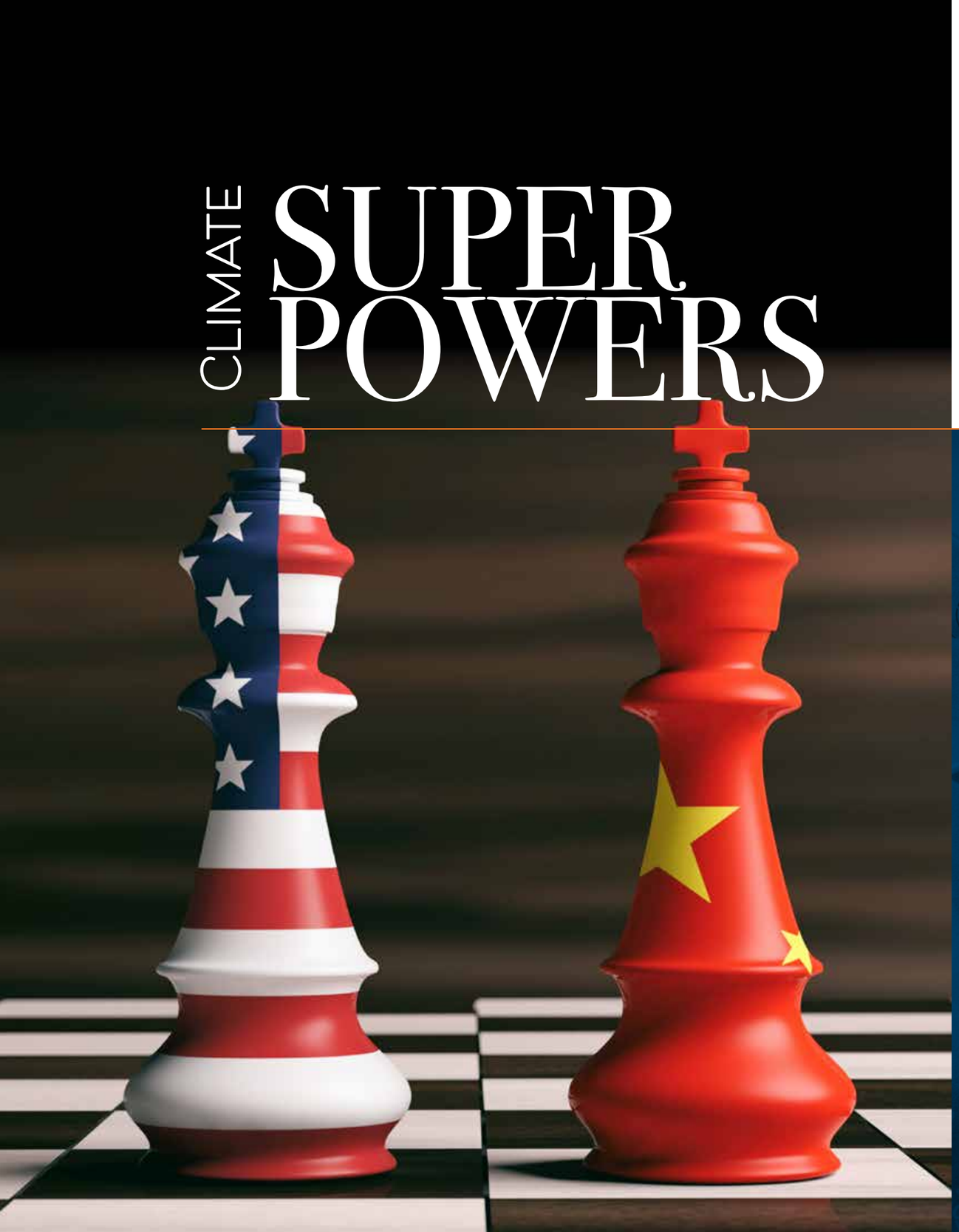


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The ambition and scale of diplomacy in the 21st century must match the magnitude and likelihood of global climate risks.



"Climate Superpowers?" Why the Cold War is the wrong analogy for our heating planet

Huiyao Wang

Great power competition has cast a shadow over our global response to the COVID-19 pandemic. The outbreak should have been a chance for China and the United States to work together for a common cause. Instead, the pressures it has unleashed have inflamed tensions between the two countries.

The looming climate crisis is also a double-edged sword for great power relations. On the one hand, this global challenge that no country can solve alone should be a catalyst for cooperation. On the other hand, climate change can act as a destabilizing "risk multiplier" in geopolitics. It aggravates stressors on societies, economies, and institutions, and opens new areas for competition that can exacerbate friction between states.

Cohesion or conflict? Which of these countervailing forces of climate change prevails may be the most important question of our lifetimes. The answer will be shaped by political will and leadership. It will also depend on the course of China-U.S. relations.

China and the United States are the world's two largest economies, energy consumers, and carbon emitters, jointly accounting for over 40 percent of global emissions.[1] They are leaders in clean tech, industry standards, and represent the developed and developing world respectively. Interplay between these two "climate superpowers" will shape prospects for effective climate governance and the development and deployment of clean technologies.

If they can work together, China and the United States have the critical mass to put us on the road to a sustainable climate future. But if they cannot cooperate, it is difficult to see how we can get there.

Great Power Relations in the Age of Climate Change

Of the many historical analogies applied to China-U.S. relations in the 21st century, it is the Cold War metaphor that has become most pervasive.

Viewed through this lens of bipolar zero-sum competition, the divisive potential of a climate crisis stands out. Environmental flux and the quest for

decarbonization simply open new areas for great power rivalry, whether the prize is control over new waterways and undersea resources in the melting Arctic, dominance in climate-adaptive technologies, or access to the critical minerals that enable these. Decoupling and the emergence of distinct trade blocs, in this view, inhibit growth and lead to suboptimal patterns of clean technology adoption, while discord and strategic competition hinder progress on multilateral climate governance.

This framing does not make for a cheery outlook. But is it the right way to understand China-U.S. relations in an age of climate change?

Each era of great power relations has its own dynamic and characteristics. Two features of 21st century geopolitics make China-U.S. relations quite different to great power relations that came before.

The first is interdependence. Economic globalization and value chains have bound the great powers of our age together in a way quite unlike the Cold War or most other models from history. Some argue that the pressures of decoupling and deglobalization may weaken these linkages. But even so, COVID-19 shows that the effects of "ecological globalization" are only getting stronger. Climate change links our fates together via our shared atmosphere and ecosystems. Indeed, failure to manage climate change could also increase the risk of future pandemics by impacting natural habitats and raising the chance of zoonotic transmission. In the 21st century, the greatest threats we face are not from other states but are transnational in nature, like climate change and epidemics.

The second feature is multipolarity. Long-term structural trends, in particular the rise of Asia and emerging markets, mean that no single power can dictate global norms and rules by itself. The shift of gravity is arguably even more pronounced with respect to climate change. In 2000, Europe and North America made up more than 40 percent of global energy demand and developing Asian economies around 20 percent. This situation will be completely reversed by 2040 according to IEA forecasts. Carbon emissions from India's power sector will overtake that of the United States before 2030.[2] No solution to climate change is possible without the joint efforts of a broad coalition of developed and developing countries.

These realities call for a new understanding of security and power in the 21st century. Cross-cutting non-traditional security issues matter more than ever and cannot be addressed with brute military or economic force. In the face of a common existential threat like climate change, the salient notion is not "power over" but "power with" other countries, to draw on Joseph Nye's distinction.

Foregrounding Climate Response in China-U.S. Relations

One paradox of the Cold War was that deadly nuclear weapons brought a degree of stability to direct interactions between the superpowers. Both sides recognized they had to cooperate to avoid mutually assured destruction.

Compared to the threat of nuclear weapons, climate change is a more complex problem. It involves more actors, greater uncertainty, difficult tradeoffs, and questions of equity between countries and generations. However, in the long-run, there is a certain parallel in logic of nuclear weapons and climate change. Both demand coordination and cooperation to avert an outcome that destroys everyone. Like the Cold War in the last century, great powers in the 21st century must also work together to prevent a potential catastrophe, albeit one that unfolds gradually rather than ends in a bang.

But the cooperative logic of climate change goes far beyond simply avoiding disastrous lose-lose outcomes. The shift to a carbon-neutral world presents many tangible rewards for China and the United States. It would help both countries to protect their environments, create wealth for their citizens, and edge closer to energy security. Reduced dependency on fossil fuels and the shipping lanes that transport them could also reduce tensions in potential flashpoints such as the South China Sea.

Clean tech will be a huge growth sector in years and decades to come—and it will have to be, given that fossil fuels still account for 84 percent of global primary energy consumption.[3] The World Bank estimates that climate change commitments have opened nearly $23 trillion in opportunities for climate-smart investments in emerging markets alone by 2030.[4] Chinese and U.S. companies have complementary strengths in low-carbon sectors. China is a top manufacturer of climate-friendly technologies such as wind and solar PV; the United States is a leader in systems that integrate these products into power grids and cities. By working together, they can tap synergies to develop new solutions and unlock third market opportunities in areas like infrastructure, green buildings, and smart cities. On top of common environmental concerns, these partnerships and shared economic interests would give groups on both sides more incentives to maintain stable bilateral relations, providing a ballast that has been lacking in recent years.

The vision of China and the United States as joint architects of a low-carbon future might seem like a tall order in the current moment, with bilateral tensions frayed and a climate skeptic in the White House. But it is worth remembering that green issues were a bright spot for the relationship until recently. China-U.S. cooperation was instrumental in the 2015 Paris climate agreement. The U.S.-China Climate Change Working Group, created in 2013, saw fruitful collaborations and sharing of expertise between companies from both countries in fields such as smart grids, carbon capture, and vehicle emissions reduction.

In the long-term, China remains optimistic that the United States will again become an active partner in climate management, given the growing global consensus and support for action among younger generations. Clearly, the upcoming presidential election weighs heavily on near-term prospects for climate cooperation at the national level. But regardless of the outcome, there are other ways for the two sides to work together.



China can cooperate more with the United States at the sub-national level. For example, the California-China Climate Institute was launched last September to exchange ideas, bring experts back and forth between the two countries, and promote more ambitious policy. There is scope for more such platforms to facilitate cooperation between policymakers and industry, such as climate summits at the state-provincial or municipal level, though sub-national governments will eventually need more support from their federal or central counterparts.

Like the Pugwash Conferences on science and world affairs served as a channel for dialogue during the Cold War, Track II diplomacy can play an important role in China-U.S. climate cooperation. More exchange between think tanks and nonprofit organizations across the Pacific can help strengthen understanding and explore solutions for mutually beneficial collaboration.

Once the right political window opens in Washington, China and the United States should seize the chance to foreground climate change in the bilateral relationship. In this way, they can nurture its cohesive potential and help proactively manage its destabilizing effects.

It is perhaps inevitable that the China-U.S. relationship will be colored by rivalry and disagreements. But we must not let unbridled competition undermine efforts to overcome the gravest threats to humanity. The Cold War shows it is possible for leading powers to cooperate on existential threats even amidst intense strategic rivalry. Yet in many other ways, it is a flawed analogy to understand a 21st century world that is more multipolar and interconnected than ever, not only through economic and cultural links, but also shared challenges like climate change. Our heating planet needs more imaginative forms of statecraft in great power relations that can ringfence bilateral frictions and spur cooperation to manage our global commons. To lose sight of that bigger picture would be the biggest strategic mistake of all.

Endnotes

1 Ritchie, H., & Roser, M. (2020, August). *CO_2 and Greenhouse Gas Emissions*. Our World in Data. https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions#annual-co2-emissions

2 International Energy Agency. (2019, November). *World Energy Outlook 2019*. IEA. https://www.iea.org/reports/world-energy-outlook-2019

3 BP. (2020). *Statistical Review of World Energy*. https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2020-full-report.pdf

4 The World Bank. (2020, May 7) *Supporting Climate Business Opportunities in Emerging Markets*. https://www.worldbank.org/en/news/feature/2020/05/07/supporting-climate-business-opportunities-in-emerging-markets



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Defanging Great Power Competition

Kori Schake

Climate Superpowers

China's unwillingness to become a 'responsible stakeholder' is the issue of contention in great power competition. The objective of U.S. policy continues to be to compel China to abide by rules. The urgency of climate in Western policy agendas gives China significant leverage to exact technology and financial aid, or asymmetric policy capitulations (for example, averting our eyes from Chinese aggression in the South China Sea in order to keep cooperation on climate). But if handled smartly in Western policies, climate also has the potential to defang great power competition by fostering change within China and better organizing the West with regard to channeling China into rule-abiding behavior.

China is not a superpower in any way except one. It does not have a military that could defeat the United States' (despite the anguished concern of military planners). Its per capita gross domestic product of $16,842, even at purchasing power parity, ranks it 79th in the world, between Iraq and the Maldives.[1] Its GDP growth rate has halved since 2008, its debt has quintupled, and its demographic dividend of working age population is about to reverse into an aged population without an adequate social safety net or working-age population to support it. It lacks self-sufficiency in food, water, and energy.[2] The one metric in which China is a superpower is pollution. China's carbon emissions surpass those of the United States and European Union combined.[3]

Surprising Progress

Strange as it may seem, despite withdrawing from the Paris Climate Accords, despite a regulatory rollback at both the federal and state levels and the overt hostility of the Trump Administration, the United States was in 2018, according to UN Secretary General António Guterres, on track to meet the climate goals in the Paris Accords.[4] The U.S. is achieving its goals through a combination of states like California and cities like Chicago setting rigorous standards,

incentives offered by philanthropists like Michael Bloomberg, corporations like Apple Computers seeking brand association with advancing pro-climate policies, the military's aspiration to reduce reliance on vulnerable or expensive supplies, and growing public awareness driving consumer choices in climate-protecting directions.

This disparity would seem to further aggravate great power competition. China has a weapon—pollution—it can leverage to influence government policies in the West, where vibrant civil societies (absent in China itself) affect policy. China can piously claim to be a poor country in need of Western technology and financial assistance to reduce its carbon footprint, and then use those resources to its advantage in economic competition with Western companies and for military improvements that expand its potential to threaten Western allies and interests. It can confront Western policymakers with trade-offs between threats their public cares about (climate) and systemic corrosion of the rules-based international order (rejecting Tribunal findings) or direct threats that may not seem relevant to many in the West (Hong Kong, Taiwan).

But ruthless and repressive as the Chinese government is toward its own people, it is not wholly insensitive to public concern. The U.S. Embassy in Beijing proved that in 2008, by beginning to monitor and tweet out air quality data, first in the capital and eventually in 70 Chinese cities. That simple and inexpensive action by the United States forced the Chinese government to be more accountable to its own public, to dramatic policy consequence: the Chinese government could no longer successfully falsify data, and concern about public reaction pushed climate way up the government agenda.[5]



We know what the Chinese government is afraid of: its own people. It fears they will demand outcomes the government can't deliver, especially economically. Given Chinese public concern about pollution, the government may not carry the argument with its own public that rich countries' historical responsibility for environmental damage precludes assigning any responsibility for current damage on poorer countries creating it. And that gives the West a second weapon: using economic policies that would penalize China for climate damage as a way to channel the Chinese economy into accepting the practices other countries abide by on climate, and perhaps set an important precedent for wider rule abiding.

A Climate Club

As Jeff Colgan has argued, the urgent needs of addressing climate change offer the opportunity for the United States and its allies to draw China into more cooperative participation with the rules-based order. Colgan proposes the creation of a 'climate club' of countries that meet agreed minimum standards of climate preservation policies and apply trade tariffs to products and services of countries that do not.[6]

Creating a climate club like this would not address the security problems of Chinese state firms' military links or espionage, but it could provide an important area of cooperation to stabilize great power competition and begin building trust that will be essential for progress in other more contentious areas, like arms control or resolving competing territorial claims. It would also give Western powers a positive and publicly popular agenda to organize around, something less fractious than 5G infrastructure decisions. In doing so, it would strengthen the major advantage the U.S. has in great power competition, which is the ability to play team sports.

From Competition to Climate Protection

Current trends both in China and the West risk militarizing the U.S.-China competition. China has accelerated its repression against Hong Kong political activism, Uighur culture, and disputed territorial boundaries in all azimuths from the Himalayas to the East China Sea. The U.S. is structurally biased toward military policy tools because of chronic under-investment in other government agencies, and the erratic belligerence of the Trump administration sends confusing signals that can exacerbate crises.

Developing a climate agenda that advances the U.S. objectives of pulling China into more rule-abiding international behavior would be a major victory in the emergent great power competition, organize Western countries into a sustainable common front pushing China on an issue of great concern to their own publics, prevent China from utilizing climate as a predatory economic policy, and create the basis for greater trust and cooperation on other issues. And, incidentally, provide a way to prevent terrible damage to our planet.

Endnote

1 Worldometer. (2020). *GDP per capita*. https://www.worldometers.info/gdp/gdp-per-capita/

2 Beckley, M. (2018). *Unrivaled: Why America Will Remain the World's Sole Superpower*. Ithaca, N.Y.: Cornell University Press.

3 Hausfather, Z. (2018, May 12). Analysis: Fossil-fuel emissions in 2018 increasing at fastest rate for seven years. *Carbon Brief*. https://www.carbonbrief.org/analysis-fossil-fuel-emissions-in-2018-increasing-at-fastest-rate-for-seven-years

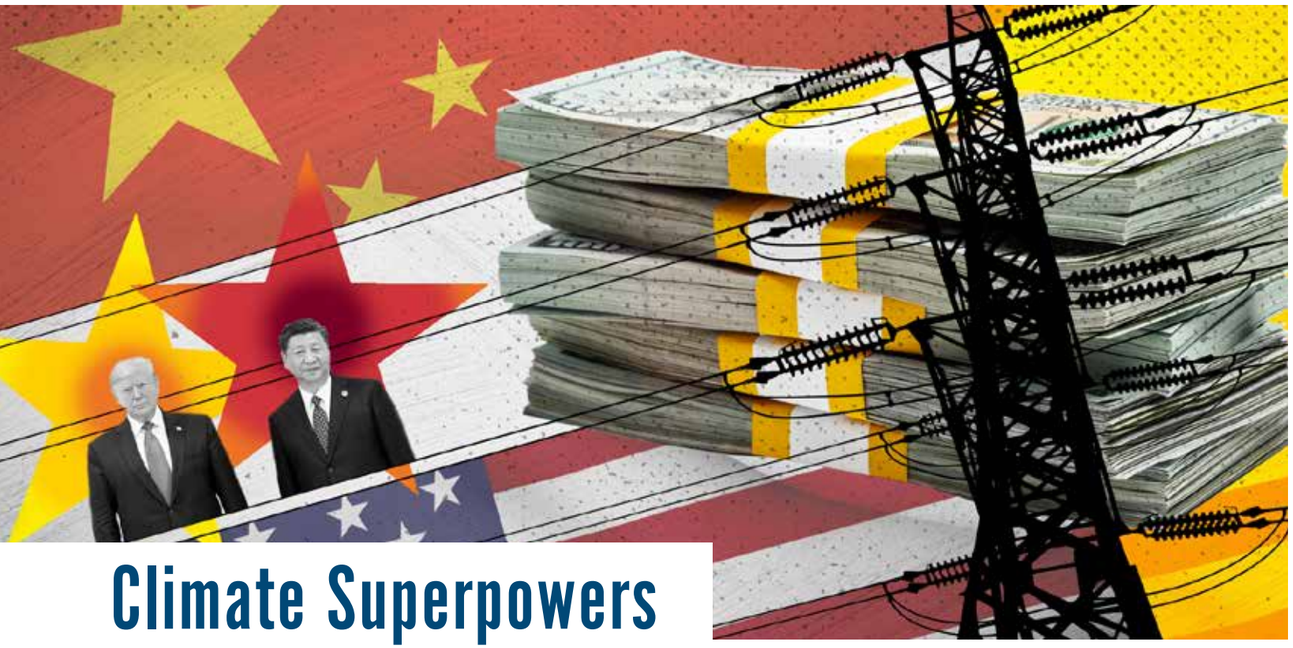
4 France-Presse, A. (2018, March 29). UN: US on track to meet climate accord targets. *Voice of America*. https://www.voanews.com/science-health/un-us-track-meet-climate-accord-targets

5 Roberts, D. (2015, March 6). Opinion: How the US Embassy Tweeted to Clear Beijing's Air. *Wired*. https://www.wired.com/2015/03/opinion-us-embassy-beijing-tweeted-clear-air/

6 Colgan, J. (2020, June 22). *Risks of U.S.-China decoupling in a warming world*. Paper presented for America and the World Consortium Conference.



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Climate Superpowers

Lydia Powell

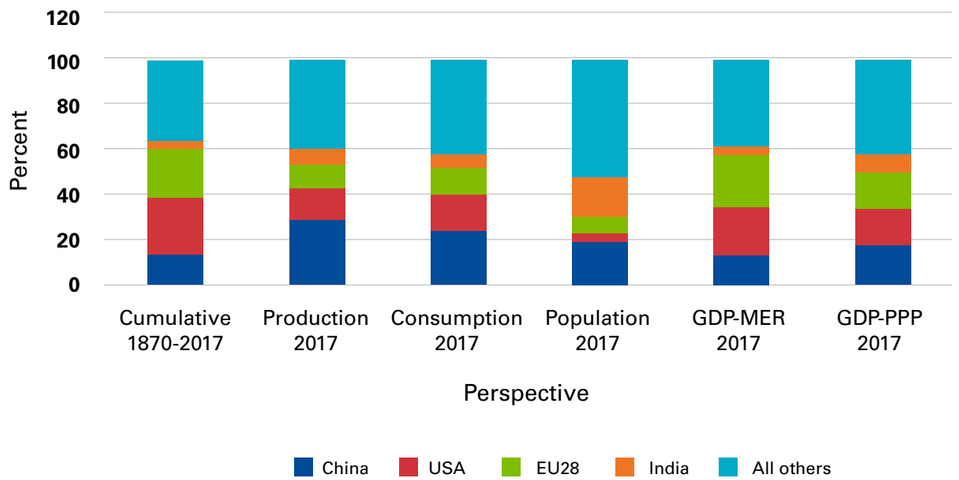
The Climate Scoreboard

In the current environment—where nationalism is on the rise—solidarity is not likely to cross national borders. Even when it comes to addressing the critical challenge of climate change, national interests are likely to dominate responses. This is particularly true of global powers, the United States and China, whose economic and technological interests are competing for dominance. For both superpowers, the nation state is the master discourse that legitimizes the climate discourse.[1]

Being geopolitical superpowers in international affairs has an effect on climate change negotiations, as we have seen in debates where both China and the United States have pursued economic competitiveness, or energy security or "energy dominance," even at the expense of climate action. Superpower rivalry plays a real role in international climate talks, and China and the United States have, thus far, primarily used their power to subordinate climate action to national economic and geopolitical interests.

The sheer size and economic weight of China and the United States also means that they are climate superpowers by dint of their potential to mitigate climate change: China and the United States account for roughly 30 percent of global economic output and are responsible for 43 percent of cumulative carbon emissions (see Chart 1).[2]

Chart 1: Responsibility for Emissions by Perspective



Data Source: Global Carbon Project (Note: MER - Market Exchange Rate, PPP - Purchasing Power Parity)

In 2019, China was the top emitter, accounting for 28 percent of global carbon emissions, with the United States in second place with 15 percent of emissions.[3] Inevitably, the economic and technological competition between China and the United States will strongly influence the effort to climate-proof the world.

This is not necessarily a bad thing. Competition between superpowers can accelerate progress in identifying economic and technological pathways to decarbonization. Climate change provides an opportunity for both the United States and China to increase cooperation and signal their commitment to the rest of the world, even if hostility persists in other spheres of engagement.

The history of the United States and the USSR working together in the area of space research, despite being at the opposite ends of the Cold War, offers hope for cooperation between China and the United States on responses to climate change.[4]

Participation in Multilateral Agreements

In 2017, when the United States announced its withdrawal from the Paris Agreement, China was largely credited with taking over leadership on climate action by virtue of its endorsement of the agreement.[5] This was despite the fact that China's Nationally Determined Contribution (NDC)

to the Paris Agreement was substantially less ambitious than it should have been on the basis of fairness and equity[6], and despite the fact that China, together with India, accounted for more than half of the increase in carbon emissions in 2017.[7]

The 2015 Paris Agreement gave every country in the world the ability to set its own goals to prevent a 2°C increase in global temperature by the end of the century.[8] The agreement is legal in character and contains provisions for reviewing the NDCs every year to move the cumulative contributions closer to the goal of limiting temperature increases.[9] However, the NDCs are often described as vague, aspirational, and unenforceable; the Agreement's provisions for monitoring, reporting, and verification are far from watertight; and the mechanisms to support poor countries are under-developed.[10]

In the elegant framework of Robert Putnam's two-level games theory[11], China's NDCs leveraged the strengths and weaknesses of the Paris Agreement to pursue domestic and international goals while minimizing economic compromises. China's emphasis was on economic costs and international reputation. As a superpower in waiting, the prestige and soft power that comes with being part of a multilateral agreement mattered more to China than to the United States.

As a democracy, the U.S. approach to multilateral agreements has been more fluid, reflecting the ideological changes in the country's leadership. Years of effort to improve bilateral climate cooperation with China under the previous U.S. administration led to a joint statement by China and the United States in 2014 where both announced their 2030 climate targets.[12] This paved the way for China's participation in the Paris Agreement. The current administration chose to upset the Paris table, taking advantage of domestic politics to legitimize its hawkish approach internationally. As the reigning superpower, the United States could afford to shun moral high ground and adopt positions that give primacy to the market over the state.[13] This position may yet be altered when the country's leadership changes in the future. Technically, under Article 28 of the Paris Agreement, the United States will remain under the Paris Agreement until 5 November 2020. Ironically, this date falls two days after the U.S. presidential election, in which commitment to the Paris Agreement may play a role.[14]

Notwithstanding the decision of the current U.S. administration to withdraw from the Paris agreement, 15 U.S. states and territories have taken legislative or executive action to move toward a 100 percent clean energy future.[15] The bipartisan U.S. climate alliance coalition of 24 state governors—representing more than half of the U.S. population and an $11.7 trillion economy that would be the third-largest

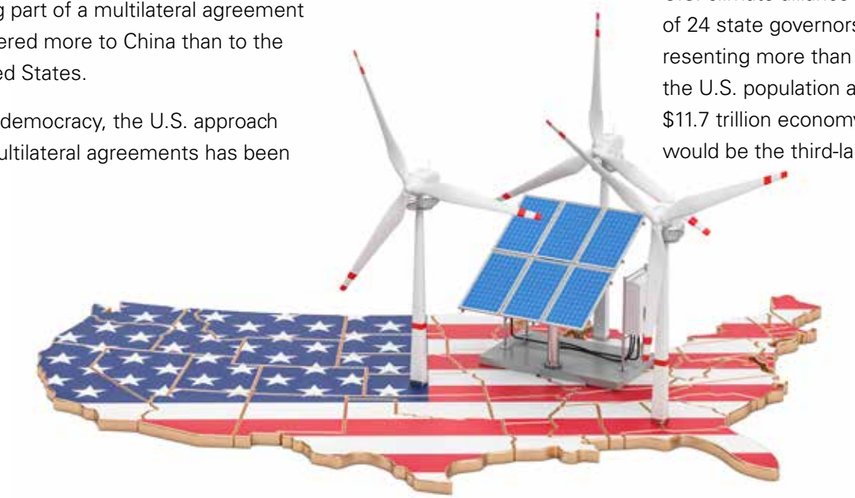
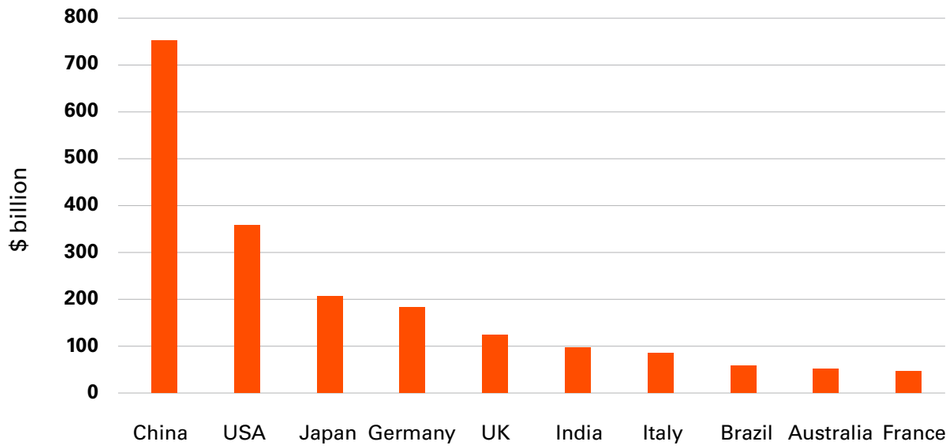


Chart 2: Renewable Energy Capacity Investment 2010 – 2019



Source: Frankfurt School-UNEP Centre/BNEF [17] (Note: 2019, includes only first half of the year)

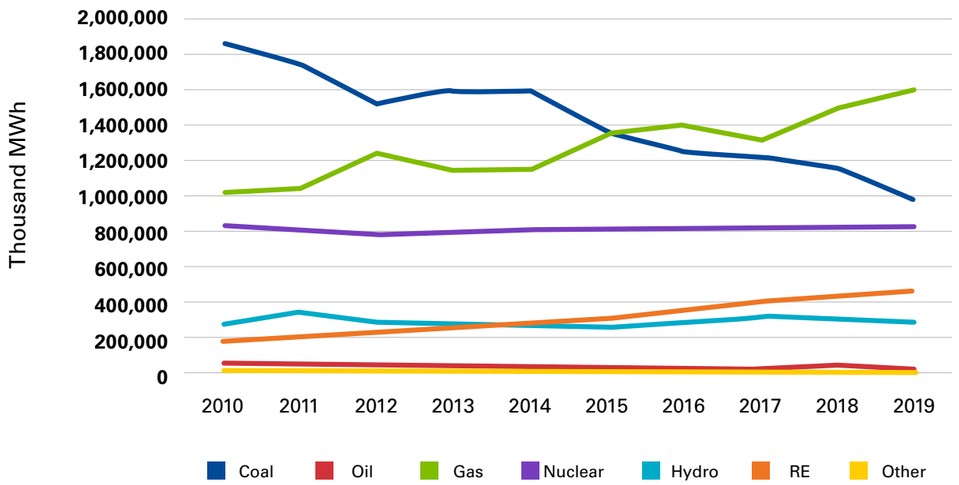
in the world—is committed to reducing carbon emissions by 26-28 percent below 2005 levels by 2025.[16]

Overall, both the United States and China are moving towards a low carbon future, although the motivations and mechanisms for action differ (see Chart 2). As a wealthy liberal democracy, the United States is more dependent on democratic choices of its people and the outcome of market competition between technologies. China, on the other hand, is a middle-income country that depends more on executive mandates on governance and technology to achieve roughly the same goal of decarbonization.

Harnessing Markets

The United States is the largest producer and consumer of oil and gas and the second largest producer and consumer of fossil fuels (oil, gas, and coal) after China.[18] In 2018 the United States produced more than 15.3 mbpd (million barrels per day) of oil, compared to the 12.2 mbpd of oil that Saudi Arabia produced. That same year, Russia—the largest exporter of gas—produced about 670 bcm (billion cubic meters) of natural gas, while America produced over 830 bcm of natural gas (see Chart 3).[19] The ability to harness technology and capital to bring domestic energy resources into production influences the United States' regional development, environmental quality, and national security through energy and climate policies.

Chart 3: U.S. Net Electricity Generation by Fuel



Data Source: Energy Information Administration, United States

Domestic energy production that reduces energy imports has always been a component of U.S. national security. This idea, captured in the slogan "energy independence," has influenced U.S. energy policy for over four decades.[20] Under the energy independence narrative, actors with economic and political interests in the domestic natural resource industries were able to present any commitment to reduce carbon emissions as a threat to national security. The slogan of "energy dominance" adopted by the current government is broader as it includes the idea of the United States emerging not just as a large energy producer, but also as a large exporter of energy, particularly of oil and gas.[21]

Producers of gas from shale plays are highly exposed to swings in oil and gas prices, as the current COVID crisis has demonstrated.[22] With gas demand plunging after the lock-down, taking with it the price, gas production from U.S. shale resources has decreased dramatically[23] and some large companies have filed for bankruptcy.[24] However, shale plays can return to production in a very short time if oil prices rebound, which illustrates the influence of markets over the U.S. oil and gas sector.[25]

Market forces that strongly influence the production and flow of domestic energy resources are driving critical shifts in the United States' fuel basket, with the unintended side benefit of reducing carbon emissions. In the 1980s and 90s, the United States was referred to as the Saudi Arabia of coal as it had a quarter of world coal reserves, the largest in the world.[26] In 2000, when coal accounted for roughly 50 percent of power generation, the U.S. electricity industry believed that the transition away from coal would be very expensive, and potentially impossible.[27] Unlike oil and gas production, which is largely confined to four states, 26 states produced coal and thus there was greater political opposition to a shift away from coal.[28]

Yet in the last two decades, relatively cheap natural gas combined with the higher efficiency of gas-based power plants has substantially displaced coal in power generation. In 2015, the share of coal in power generation fell to 35 percent, with gas increasing its share to 32 percent.[29] Since gas-fired power plants emit half as much carbon as coal plants, in 2015, the U.S. emissions were 21 percent lower than 2005 levels[30]—the lowest emission levels since 1993. In 2019, coal accounted for just 23 percent of power generation.[31]

A similar transition has already begun to displace both coal and gas in favour of solar and wind for power generation, though this shift was not entirely driven by the market. State interventions in the form of tax credits for clean energy at the federal level and mandates to absorb clean energy through portfolio standards, net metering, and feed-in-tariffs at the state level[i] are pushing investment in clean energy that could eventually displace natural gas.[32]

In 2018, the United States generated 10 percent of its electricity from clean energy (not including hydro and nuclear), higher than the 8 percent share in China, though China generates more electricity from clean sources in absolute terms.[33] As of 2018, U.S. carbon emissions were 10 percent below its 2005 levels, which is roughly two-fifths of the way to the Paris Agreement target of 26 percent below 2005 levels by 2025.[34]

Coal-to-gas switching accounted for 33 percent of the reduction while structural changes in demand for energy accounted for another 30 percent. Clean energy was responsible for 20 percent of the reduction; efficiency, along with a fall in transportation demand (surface and air), accounted for 15 percent.[35]

The market cannot take all the credit for displacing coal in favor of gas. Tough environmental regulations on coal plants under the Obama administration assisted the switch to gas. Moreover, the unconventional gas (shale gas) production that is behind the United States' coal-to-gas switching is the result of substantial federal investment in research on fracking and horizontal drilling in the 1970s.[36] Nevertheless, coal-to-gas switching has not arrested growth in carbon emissions. In 2019 carbon emissions from gas use in the United States reached 1.7 GT (giga tonnes) which was a 3.5 percent increase over emissions in 2018, while emissions from coal decreased by 10.5 percent to 1.1 GT.[37]

At the federal level there are no market-oriented instruments for carbon reduction, such as cap-and-trade[ii] or a carbon tax. These instruments could potentially reduce emissions at a lower social cost (the monetary estimate of damages associated with an incremental increase in carbon emissions in a given year) than a more prescriptive regulatory approach due to the greater flexibility that they offer in determining how to reduce emissions. However, it is not easy to accurately determine how the costs of a market-oriented climate policy will be distributed across households with different consumption

i As of October 2019, 39 states and the District of Columbia have state-developed mandatory net metering that facilitates installation solar panels on private properties.

ii Some American states and the European Union have put in place carbon emissions trading schemes. China is also planning to implement a carbon-trading scheme.

patterns and levels of wealth. Because of the large uncertainties in the effects of climate change and the subjectivity of the discount rate, estimates of the social cost of carbon differ widely, from $10.2/ton to $105,213/t.[38] Anecdotal evidence from protests against taxes on fossil fuels in France[39] and Australia highlights the complexity in imposing market-based solutions to address climate change.

U.S. reliance on markets has so far pushed the energy sector towards lower-carbon fuels. Nevertheless, the critical force behind decarbonization was American public investment in the production of knowledge and technologies that were leveraged by capital to produce lower carbon energy.[40] Investment in research and energy by the United States is a public good that makes a huge contribution in shaping technological responses to climate change.

Imposing Mandates

In 2018, China produced more coal than the United States produced oil and gas in energy equivalent terms.[41] Electricity generated from cheap coal supports relatively low cost export-oriented manufacturing in China that is key to its economic success. China's coal demand is expected to plateau by 2022[42], but this is not necessarily because of its Paris pledges.

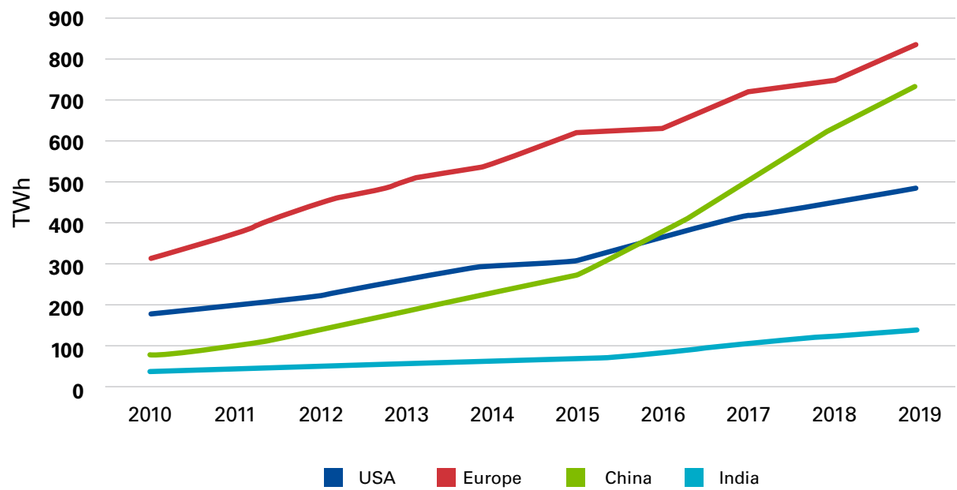
China's solar energy program, the biggest in the world today, was initially designed to meet low-end demand for electricity from rural households. China leveraged this manufacturing capability to respond to high-end demand for solar panels from Western Europe in the 1990s.[43] Provincial and local governments generated skilled and semi-skilled jobs by setting up solar manufacturing facilities, leveraging funding support for "strategic industries" from the central government.[44] Economies of scale from this expansion led to a dramatic reduction of solar panel and module cost for renewable energy consumers initially in Europe and eventually in other parts of the world.[45] From a climate perspective, this cost reduction is a public good because relatively poor countries can now afford large clean energy projects thanks to imports of cheap clean energy equipment from China.

In the early stages of solar manufacturing, China catered to markets in Western Europe, which tended to create excess capacity as European policies to subsidise installations of solar panels kept changing. The need to absorb excess capacity drove domestic installations of solar panels in China.[46]

Following Germany's lead, China introduced attractive feed-in-tariff[iii] to promote the domestic use of solar energy in 2013, and by 2015 China surpassed Germany as the largest market for solar energy in the world.[47] China's wind energy industry traced a similar path, as acquisition of small German companies with cutting-edge wind turbine technology eventually put China in the lead. China's leadership in electricity storage and electric vehicles is now following a similar approach, with rapid acquisition of technology and resources to scale manufacturing to meet state and federal level mandates and targets. China now easily takes all the prizes in the production and consumption of clean energy (see Chart 4).[48]

iii Feed-in-tariff is the price offered to roof-top or equivalent private producers of solar electricity who sell into the grid. This is generally higher than the average electricity tariff which serves as an incentive to install solar panels and generate solar electricity.

Chart 4: Renewable Power Generation



Data source: BP Statistical Review of World Energy 2020

China derives its economic strength more from the size of its population than from the economic efficiency and knowledge-driven productivity that supported U.S. power after the Second World War. At $15,376 (in purchasing power parity in current international dollars), China's per person income was a quarter of the United States' per person income in 2018.[49] China is keen to catch up on this vital economic parameter, irrespective of whether this is fueled by brown or green energy. It was to this end that China built clean energy manufacturing capabilities.[50] Essentially, China leveraged its industrial policy in its climate and clean energy policies—not the other way around.

From China's economic vantage point, the global conversation about climate change has moved from "well-intentioned" environmentalism to the future geopolitical international economic order, and not investing in low carbon energy sources would affect China's economic and trading competitiveness.[51] Trade barriers in clean energy, such as the carbon related border adjustment taxes proposed originally in the American Clean Energy & Security Act 2009[52] and now pursued by the European Union[53], suggests the possibility of "green-marginalization" of China.[54] The heavy investments in clean energy manufacturing by China in the last two decades sought to avoid tariff barriers to its exports manufactured using

fossil fuel based energy.[55] Notwithstanding the motive, the means (clean energy manufacturing) has benefited the world with substantial scaling of low cost clean energy production.

However, China is also facilitating the expansion of fossil fuel use in countries under the Belt & Road Initiative (BRI), which may be counterproductive to addressing climate change.[56] In 25 of the 65 countries under the BRI initiative, China is reportedly involved in 240 coal-fired power projects of about 250 GW capacity[57], roughly equal to current coal-based power generating capacity in the United States.[58] It is important to note here that the key driver of the decision to use coal-based power by relatively poor BRI countries such as Bangladesh, Mongolia, and Vietnam is driven by cost rather than indifference to climate commitments. Though these countries are exposed to climate-related disasters, the concern that the costs of mitigating climate change by reducing emissions could slow down their economic catch-up overrides their climate concerns.[59]

This highlights the critical question of economic inequality between countries and the consequent need for financial assistance from richer to poorer countries to address climate change. Article 4 of the UN Framework Convention on Climate Change (UNFCCC) echoed Article 9 of the Paris Agreement by calling for financial assistance to poor countries to address climate change. Available evidence shows that climate finance grants to poor countries are far lower than the $100 billion promised by developed countries.[60] This could be an opportunity for the United States and other developed countries to offer grants for clean energy to BRI countries under the climate finance mechanism. It is very unlikely that these countries would opt for loan-based coal projects offered by China under BRI if a cheaper clean energy alternative were made available.

Technology Innovation

The most recent report of the IPCC (Intergovernmental Panel on Climate Change) observes that the share of clean energy must increase to 52-62 percent of global primary energy supply by 2050 to limit global average temperature increase to 1.5°C.[61] Industrialised countries have responded by increasing research and development (R&D) spending in clean energy technologies in the past few decades to stay ahead in the race.[62]

The United States, China, Japan, France, and Germany were the five leading countries for public spending on energy R&D in 2018.[63] These five countries accounted for around 70 percent of all such spending worldwide. In 2018, China's energy R&D budget grew most in absolute terms, with spending on clean energy and higher-performing fossil fuel technologies increasing the most. The U.S. budget for energy R&D also increased by more than 12 percent in 2018, with notable increases for solar energy, hydrogen, and alternative vehicle technologies.[64] However, the share of China based start-ups in total venture capital value for early-stage energy technologies overtook the traditionally dominant United States, with Chinese companies receiving over half of the deal value.[65]

According to WIPO (World Intellectual Property Organisation), patents for clean energy technologies account for only 1 percent of overall patent applications, but these applications grew by 546 percent between 2002 and 2012.[66] That growth has continued: in the period 2010 to 2019, Japan led the table for clean energy technologies with 9,374 applications, followed by the U.S. with 6,300 (see Chart 5). China was in fifth place with 1,659 patent applications, with Germany and South Korea taking third and fourth place respectively. However, China's patent applications

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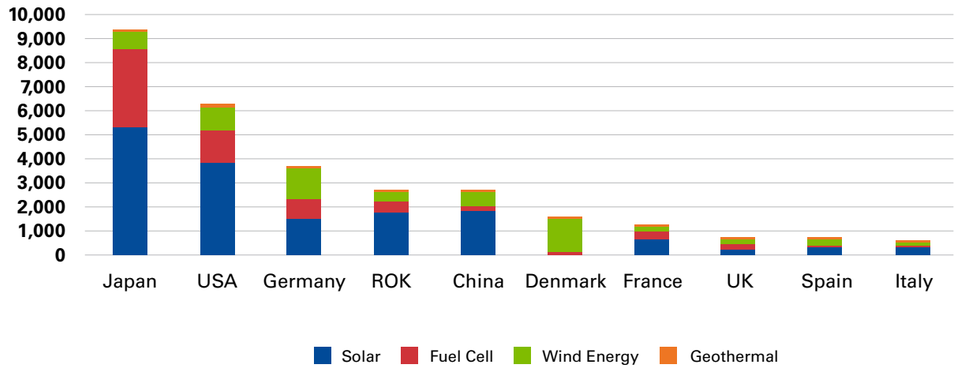
that facilitated its growth as an industrial powerhouse.

increased substantially in the second half of the decade (2015-19) to 1,522 applications, pushing China to third place after Japan (3,114 applications) and the United States (2,247 applications). In the period 2013-17, China was the undisputed leader in applications for clean energy patent families with 45,472 applications (see Chart 6). Patent families offer greater potential for commercialization as patents cover more jurisdictions.

China's emerging dominance in R&D investment in clean energy (and other sectors) need not be interpreted as a threat, especially when seen through the climate change lens. In investing in R&D, China is merely imitating the United States' post-war state-led industrial policy that facilitated its growth as an industrial powerhouse.[68] The state-led development of the United States, based on Hamiltonian economic philosophy, held that a big country needs big organizations to succeed and that the federal government in particular should collaborate with private enterprise to build infrastructure and finance scientific research. The only difference is that China is much larger and its pace of change much faster. However, climate change can benefit from rapid changes, especially when it comes to replacing fossil fuels with low carbon energy from wind and solar plants.

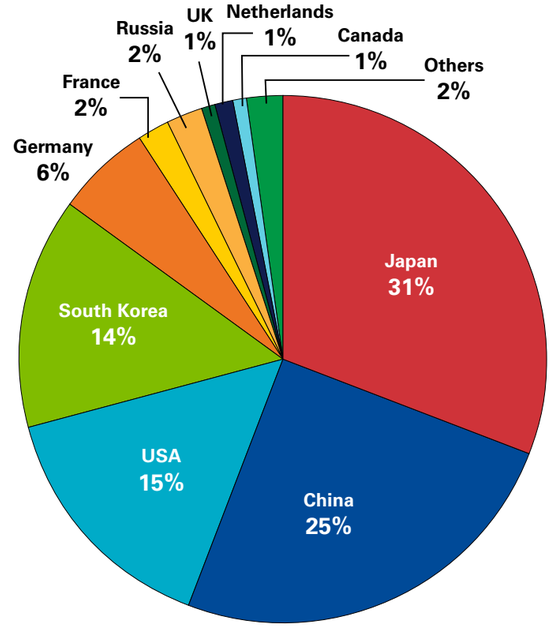
The claim that solar and wind electricity is cheaper than fossil fuel-based electricity and can therefore compete with traditional grid based power without state assistance is only partially true. At the system level, where dependable electricity must be supplied 24 hours of the day, all days of the year, and across all geographies, clean energy is not necessarily cheap as it requires back-up energy sources.[70] For clean energy to realistically compete with traditional grids, battery technologies that store electricity for back-up must become much cheaper and more efficient, or intelligent networks that monitor and displace demand to match supply must be developed.[71]

Chart 5: Patent Applications for Renewables 2010-2019



Source: WIPO News Magazine, March 2020[67]

Chart 6: Patent Families in Green Technologies by Origin 2005-2015



Source: WIPO[69]

The UN Environment Programme (UNEP) calculates in its annual "emissions gap" report that, in the 2020s, the difference between what countries have pledged to the Paris Agreement and what is necessary to limit warming to 2°C degrees is 13 to 15 GT of carbon annually.[72] To bridge the gap, all countries will need to reduce carbon emissions between 5 and 8 percent a year, something no country has ever achieved.[73] No natural rate of technology substitution, even assuming the best possible cost projections, will be fast enough to meet the 2°C target by the end of the century.

The critical need for rapid technological innovation can benefit from the advantages that China has over the United States: its massive domestic market, its centralized power, and its willingness to employ state-sponsored industrial policy and government support.[74] The expansion of scientific and technological capabilities in China has created a more multipolar global scientific landscape. In a multipolar scientific landscape, the big challenge is to institute traffic systems between China and the rest of the world to reduce transaction costs by ensuring that everyone plays by the same rules.

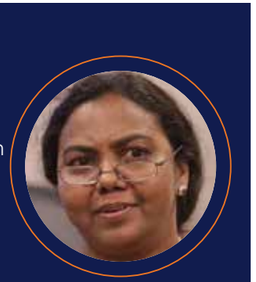
In the future, China and the United States may cooperate, reinforcing their strengths to address climate change much like the technological co-operation between the United States and USSR during the Cold War. While there were of course long periods of mistrust and overt hostility between the United States and the

USSR between 1957 and 1991, there were also periods of accommodation that led to the many cooperative agreements in arms control. It is not rational to rule out similar agreements between China and the United States in the context of climate change.

Conclusion

China and the United States are actively working to retain their leadership in a decarbonizing world. In the near term, competition between the two dominant powers can accelerate progress in finding economic and technological pathways to decarbonization even if economic competitiveness and energy security are the primary goals. U.S. energy markets have harnessed public investment in clean energy technologies and made inroads into traditional energy markets dominated by fossil fuels. China's clean energy manufacturing capabilities, developed to maintain its competitive edge, have lowered the cost of decarbonization for relatively poor countries. Both countries have independently created public goods in the form of clean energy technologies that have helped the whole world to address climate change.

As clearly demonstrated by responses to COVID-19, sovereign efforts, while necessary, are not sufficient to address climate change, a complex planetary problem. Even the most self-interested nation cannot deny that a globally coordinated response to the pandemic led by the superpowers would have substantially reduced public health and economic costs for all nations. Responses to climate change are not likely to be any different if solidarity is forged on a global scale for common and sustainable life.



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Endnotes

1 Paterson, M & Stripple, J (2007), "Singing Climate Change into Existence: On the Territorialisation of Climate Policymaking", in Pattinger M E (ed.), *The Social Construction of Climate Change: Power, Knowledge, Norms, Discourses*, Ashgate, England, https://www.cambridge.org/core/journals/environmental-conservation/article/social-construction-of-climate-change-power-knowledge-norms-discourses-edited-by-mary-e-pettenger-xxi-255-pp-24-16-15-cm-isbn-978-0-7546-4802-4-hardback-us-9995-gb-5500-aldershot-uk-ashgate-publishing-limited-2007/6CCD24E30F1D3942621B511046C341E9

2 Ritchie, Hannah & Max Roser (2019), "CO2 and Greenhouse Gas Emissions", Our World in Data, https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions#annual-co2-emissions

3 BP (2020), *BP Statistical Review of World Energy 2020*, British Petroleum, London, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2020-full-report.pdf

4 Sagdeev, Roald & Susan Eisenhower (2019), "United States-Soviet Space Cooperation during the Cold War", NASA, https://www.nasa.gov/50th/50th_magazine/coldWarCoOp.html

5 Hal, Sam (2017), "The World Doesn't Need the US to Lead Climate Change Action – China will do it Instead", 31 May, https://www.telegraph.co.uk/news/2017/05/31/world-doesnt-need-us-lead-climate-change-action-china-will/

6 du Pont, Yann Robiou et al (2017), "Equitable Mitigation to Achieve the Paris Agreement Goals", http://pure.iiasa.ac.at/id/eprint/14181/1/Equitable_mitigation_to_achieve_the_Paris_Agreement_goals.pdf

7 BP (2018), *Statistical Review of World Energy 2018*, British Petroleum, London, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2018-full-report.pdf

8 Christoff, Peter (2016), "The Promissory Note: COP 21 and the Paris Climate Agreement", E*nvironmental Politics*, 25:5, 765-787, https://www.tandfonline.com/doi/abs/10.1080/09644016.2016.1191818

9 Oran R. Young (2016), "The Paris Agreement: Destined to Succeed or Doomed to Fail?" *Politics and Governance*, 4 (3): 124-132, https://www.cogitatiopress.com/politicsandgovernance/article/view/635

10 Clémencon, Raymond (2016), "The Two Sides of the Paris Climate Agreement: Dismal Failure or Historic Breakthrough?" *Journal of Environment & Development* 25(1) 3–24, https://journals.sagepub.com/doi/pdf/10.1177/1070496516631362

11 Putnam R D (1988), "Diplomacy and Domestic Politics: The Logic of Two-Level Games", *International Organization*, 41 (3):427-460, https://www.jstor.org/stable/2706785

12 Schreurs, Miranda A (2016), "The Paris Climate Agreement and the Three Largest Emitters: China, the United States, and the European Union", *Politics and Governance*, 4(3): 219-223 https://www.cogitatiopress.com/politicsandgovernance/article/download/666/666

13 Agrawala, Shardul & Andresen, S (1999), "Indispensability and Indefensibility: The United States in the climate treaty negotiations", *Global Governance*, 5(4): 457–482, https://journals.sagepub.com/doi/abs/10.1260/0958305011500661

14 Makar, J M (2017), "US withdrawal from Paris Agreement: India should withstand Pulls and Pushes," Observer Research Foundation, New Delhi, https://www.orfonline.org/expert-speak/us-withdrawal-paris-agreement-cop21-india-withstand-pulls-pushes/

15 Ricketts, Sam, Rita Cliffton, Lola Oduyeru, and Bill Holland, "States Are Laying a Road Map for Climate Leadership", American Progress, https://www.americanprogress.org/issues/green/reports/2020/04/30/484163/states-laying-road-map-climate-leadership/

16 US Climate Alliance (2018), States United for Climate Action, https://www.usclimatealliance.org/

17 Frankfurt School-UNEP Centre/BNEF (2019), "Global Trends in Renewable Energy Investment 2019, http://www.fs-unep-centre.org (Frankfurt am Main)

18 BP (2019), *Statistical Review of World Energy 2019*, British Petroleum, London, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf

19 BP (2019), S*tatistical Review of World Energy 2019*, British Petroleum, London, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf

20 Keller, Fred (2020), "America's Energy Independence Has Contributed To The Great American Comeback", https://thehill.com/blogs/congress-blog/energy-environment/481679-americas-energy-independence-has-contributed-to-the

21 Ladislaw, Sarah (2018), "Dissecting the idea of US Energy Dominance", *OIES Forum*, Issue 111, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/01/OEF-111.pdf

22 EIA (2020), "US Natural Gas Prices", US Energy Information & Administration, https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_m.htm

23 EIA (2020), "Monthly Crude Oil & Natural Gas Production", US Energy Information & Administration, https://www.eia.gov/petroleum/production/

24 French, David & Rama Venkat (2020), "Shale pioneer Chesapeake Energy files for Bankruptcy", *Reuters*, June 29, https://www.reuters.com/article/us-chesapeake-enrgy-bankruptcy-idUSKBN23Z0SS

25 Tuttle, Robert (2020), "U.S. Shale's Quick Response to Falling Oil Prices is Paying off", World Oil, 17 May, https://www.worldoil.com/news/2020/5/15/us-shale-s-quick-response-to-falling-oil-prices-is-paying-off

26 James P. (1984), "The USA: Saudi Arabia of Coal?" *In: The Future of Coal*. Palgrave Macmillan, London, https://link.springer.com/chapter/10.1007/978-1-349-17383-9_4

27 Fisher, Dana R (2006), "Bringing the Material Back in: Understanding the U.S. Position on Climate Change", *Sociological Forum*, 21 (3): 467–494. www.jstor.org/stable/4540952

28 National Academies of Sciences, Engineering, and Medicine (2018), *Monitoring and Sampling Approaches to Assess Underground Coal Mine Dust Exposures*, National Academies Press, Washington (DC), https://www.ncbi.nlm.nih.gov/books/NBK531861/

29 EIA (2016), "Carbon dioxide Emissions from Electricity Generation in 2015 were lowest since 1993", *Today in Energy*, Energy Information Administration, https://www.eia.gov/todayinenergy/detail.php?id=26232

30 EIA (2016), "Carbon dioxide Emissions from Electricity Generation in 2015 were lowest since 1993", *Today in Energy*, Energy Information Administration, https://www.eia.gov/todayinenergy/detail.php?id=26232

31 EIA (2019), "Electricity Explained" Electricity in the United States", https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php

32 EIA (2019), "Renewable Energy Explained", https://www.eia.gov/energyexplained/renewable-sources/incentives.php

33 BP (2019), *Statistical Review of World Energy 2019*, British Petroleum, London, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf

34 Stefanik, Elise (2019), "Market-Oriented Solutions to Climate Change", *The Catalyst*, Spring 2010, Issue 14, https://www.bushcenter.org/catalyst/environment/stefanik-market-solutions.html

35 Carbon Brief (2019), "Why US CO2 Emissions have Fallen 14 percent since 2005," August 15, https://www.CO2brief.org/analysis-why-us-CO2-emissions-have-fallen-14-since-2005

36 DOE (2011), "Early Investment in Shale Gas Technology Producing Results Today", Department of Energy, Government of USA, https://www.energy.gov/fe/articles/does-early-investment-shale-gas-technology-producing-results

37 Global Carbon Project (2019), "Natural Gas & Oil push up Global CO2 Emissions in 2019", December 4, https://www.globalcarbonproject.org/carbonbudget/19/files/Norway_CICERO_GCB2019.pdf

38 Snyder, B.F (2020), "Beyond the Social Cost of Carbon: Negative Emission Technologies as a means for Biophysically setting the Price of Carbon", *Ambio* 49, 1567–1580, https://doi.org/10.1007/s13280-019-01301-y

39 O'Sullivan, Feargus (2018), "Why Drivers Are Leading a Protest Movement Across France", *Bloomberg*, November 20, https://www.bloomberg.com/news/articles/2018-11-19/-yellow-vests-why-france-is-protesting-new-gas-taxes

40 Cosbey, Aaron (2011), "Renewable Energy Subsidies and the WTO: The Wrong Law and the Wrong Venue", 11 June, https://www.iisd.org/gsi/subsidy-watch-blog/renewable-energy-subsidies-and-wto-wrong-law-and-wrong-venue

41 BP (2019), *Statistical Review of World Energy 2019*, British Petroleum, London, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf

42 IEA (2019), "Coal 2019: Analysis & Forecasts to 2024", International Energy Agency, https://www.iea.org/reports/coal-2019

43 Fialka, John. 2016. "Why China Is Dominating the Solar Industry", *Scientific Americ*an, 19 December, https://www.scientificamerican.com/article/why-china-is-dominating-the-solar-industry/

44 Wang, Yong-hua, Guo-liang Luo, and Yiwei Guo. 2014, "Why is there Overcapacity in China's PV Industry in its early Growth Stage?" *Renewable Energy*, 72:188–194 December, https://www.researchgate.net/publication/264559375_Why_is_there_overcapacity_in_China's_PV_industry_in_its_early_growth_stage

45 Fialka, John. 2016. "Why China Is Dominating the Solar Industry", *Scientific American*, 19 December, https://www.scientificamerican.com/article/why-china-is-dominating-the-solar-industry/

46 Wang, Yong-hua, Guo-liang Luo, and Yiwei Guo. 2014. "Why is there Overcapacity in China's PV Industry in its early Growth Stage?" *Renewable Energy*, 72:188–194 December, https://www.researchgate.net/publication/264559375_Why_is_there_overcapacity_in_China's_PV_industry_in_its_early_growth_stage

47 Fialka, John. 2016. "Why China Is Dominating the Solar Industry", *Scientific American*, 19 December, https://www.scientificamerican.com/article/why-china-is-dominating-the-solar-industry/

48 The Economist (2018), "China is Rapidly Developing its Clean-Energy Technology", Special Report, The East in Green, *The Economist*, March 15, https://www.economist.com/special-report/2018/03/15/china-is-rapidly-developing-its-clean-energy-technology

49 World Bank (2018), "GDP Per Capita (PPP current international $)", https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

50 Feng, Zhu (2010), "Climate Change, Climate Politics, and the Climate Business: Domestic Variables and China's Emissions Reduction Policy", *In Green Dragons: The Politics of Climate Change in Asia*, by Michael J Green, Charles W Freeman III and Amy E Searight, Centre for Strategic & International Studies, https://www.csis.org/analysis/green-dragons

51 Feng, Zhu (2010), "Climate Change, Climate Politics, and the Climate Business: Domestic Variables and China's Emissions Reduction Policy", *In Green Dragons: The Politics of Climate Change in Asia*, by Michael J Green, Charles W Freeman III and Amy E Searight, Centre for Strategic & International Studies, https://www.csis.org/analysis/green-dragons

52 US Congress (2009), "H.R. 2454 (111th): American Clean Energy and Security Act of 2009", https://www.congress.gov/bill/111th-congress/house-bill/2454

53 McWilliams, Ben & Georg Zachmann (2020), "A European Carbon Border Tax: Much Pain, Little Gain," Brugel, March 5, https://www.bruegel.org/2020/03/a-european-carbon-border-tax-much-pain-little-gain/

54 Bullock, David A.C (2018), "Combating Climate Recalcitrance: CO2-Related Border Tax Adjustments in a New Era of Global Climate Governance", *Washington International Law Journal* 27 (3): 609-644, http://digital.law.washington.edu/dspace-law/bitstream/handle/1773.1/1826/27WILJ609.pdf

55 Wu, Fuzuo (2013), "China's Pragmatic Tactics in International Climate Change Negotiations: Preserving Principles with Compromise", *Asian Survey* (University of California) 53 (4): 778-800, https://online.ucpress.edu/as/article/53/4/778/24611/China-s-Pragmatic-Tactics-in-International-Climate

56 Belt & Road News (2020), "Belt & Road is Not about Going Green", January, https://www.beltandroad.news/2020/01/09/belt-road-is-not-about-going-green/

57 ASEAN Post (2018), "China, Energy and the Belt and Road Initiative", September 2, https://theaseanpost.com/article/china-energy-and-belt-and-road-initiative

58 EIA (2020), "U.S. coal-fired electricity generation in 2019 falls to 42-year low", May 11, https://www.eia.gov/todayinenergy/detail.php?id=43675#:~:text=U.S.%20coal-fired%20capacity%20peaked%20at%20318%20gigawatts%20%28GW%29,rate%20of%20operation%2C%20or%20utilization%2C%20has%20also%20decreased

59 Taconet, N., Méjean, A. & Guivarch, C (2020), "Influence of Climate Change Impacts and Mitigation Costs on Inequality between Countries", *Climatic Change* 160, 15–34, https://doi.org/10.1007/s10584-019-02637-w

60 Ray, Rajasree & Mauskar, J M (2018), "Climate Finance: Myth vs Reality," *Business Standard*, November 17, https://www.ies.gov.in/pdfs/climate-finance-myths.pdf

61 Rogelj, J. et al, (2018), "Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development", in *Global Warming of 1.5°C. An IPCC Special Report* https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf

62 Sharif Naubahar (2015), "Global Technology Leadership: The Case of China", The Hong Kong University of Science and Technology, Working Paper 2015-11, https://iems.ust.hk/assets/publications/working-papers-2015/iemswp2015-11_rev.pdf

63 IEA (2019), *World Energy Investment Report 2020*, International Energy Agency, https://webstore.iea.org/world-energy-investment-2020https://webstore.iea.org/download/direct/2738?fileName=WEI2019.pdf

64 IEA (2019), *World Energy Investment Report 2020*, International Energy Agency, https://webstore.iea.org/world-energy-investment-2020 https://webstore.iea.org/download/direct/2738?fileName=WEI2019.pdf

65 IEA (2019), *World Energy Investment Report 2020*, International Energy Agency, https://webstore.iea.org/world-energy-investment-2020https://webstore.iea.org/download/direct/2738?fileName=WEI2019.pdf

66 Nurton, James (2020), "Patenting Trends in Renewable Energy", March, https://www.wipo.int/wipo_magazine/en/2020/01/article_0008.html

67 Nurton, James (2020), "Patenting Trends in Renewable Energy", March, https://www.wipo.int/wipo_magazine/en/2020/01/article_0008.html

68 Lind, Michael (2012), *Land of Promise: An Economic History of the United States*. Harper: New York, https://www.goodreads.com/book/show/13426019-land-of-promise

69 León , Lorena Rivera, Kyle Bergquist, Sacha Wunsch-Vincent, Ning Xu, Kunihiko Fushimi (2018), "Measuring innovation in energy technologies: green patents as captured by WIPO's International Patent Classification (IPC) Green Inventory, Economic Research Working Paper No. 44, September, WIPO, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_econstat_wp_44.pdf

70 Ziegler, Micah S (2019), "Storage Requirements and Costs of Shaping Renewable Energy Toward Grid Decarbonization", *Joule*, September 3(9): 2134-2153, https://www.cell.com/joule/fulltext/S2542-4351(19)30300-9

71 Bagalini, V et al (2019), "Solar PV-Battery-Electric Grid-Based Energy System for Residential Applications: System Configuration and Viability", *Research*, https://spj.sciencemag.org/research/2019/3838603/

72 UN (2019), "Emissions Gap Report 2019", https://www.unenvironment.org/resources/emissions-gap-report-2019

73 Roberts, David (2019), "The Paris climate agreement is at risk of falling apart in the 2020s", *Vox*, November 5, https://www.vox.com/energy-and-environment/2019/11/5/20947289/paris-climate-agreement-2020s-breakdown-trump

74 Sharif Naubahar (2015), "Global Technology Leadership: The Case of China" The Hong Kong University of Science and Technology, Working Paper 2015-11, https://iems.ust.hk/assets/publications/working-papers-2015/iemswp2015-11_rev.pdf



Harvesting Ill Will:

Can the U.S. and China Turn a Budding Cold War into a Clean Energy Space Race?

Scott Tong

It is no great insight to suggest that the differences between China and the United States are approaching irreconcilable. In July, Beijing slammed Washington's "gangster logic" after President Trump ordered the end of Hong Kong's special economic status with the U.S.—itself a retaliation for the mainland's new national security law. One month prior, China's foreign ministry warned of "consequences"[1] over a new American law to punish Chinese officials over the mass detention of minority Muslim Uighurs in western China. On social media, Chinese citizens have mocked Trump as a "joker" for proclaiming victory against COVID-19. There's anger that the United States is taxing imports from the mainland, denying visas to Chinese researchers, and pursuing criminal prosecution against the vice president of tech titan Huawei, whose smartphone sales last year leapfrogged those of the iPhone. The perceived slights have turbocharged Chinese nationalism. "If you look carefully at the Huawei logo," a cabbie in Shenzhen told me last summer, grinning from his rearview mirror, "it looks like a sliced-up apple."

In the United States, meantime, as I write this there's talk of an entry ban on every single member of the Chinese Communist Party, down to the apolitical, twentysomething opportunists who joined the organization purely for the networking. The president has tweeted of "a complete decoupling"[2] from China, given its alleged theft of U.S. business secrets and market rules nudging aside foreign competition. A newly aggressive Beijing, as the bipartisan narrative goes, is bullying neighbors[3] in the South China Sea, booting out American reporters[4], and spreading misinformation[5] in the States. The United States, in an unusual and risky move, has sent three aircraft carriers to patrol the waters in the South China Sea, prompting threats of "countermeasures."[6] It is hard to keep up.

Antagonism is rising in tandem with the two superpowers' carbon emissions. As the Earth warms, the two largest greenhouse gas emitters are navigating toward a Cold War rather than toward a carbon-free 2050. As the Trump administration prepares to exit the Paris Agreement, U.S. climate collaboration with China at a federal level—diplomatic meetings, ministerial level communications—has largely shut down. Cooperation seems implausible. "What we've seen is a decoupling not just in business and trade but across the board," Orville Schell, director of the Center on U.S.-China Relations at the Asia Society, told me. "Under Nixon and Kissinger, when they went in 1972 of course the common danger was the Soviet Union. Now the common danger is climate. Can we reorganize ourselves to confront that common enemy? I'm not so sure."

A Space Race in the Climate Space

The question is whether this doom and gloom presents an opportunity. Is there a way to harness this ill will to fuel great power competition? To stoke a "race to the top"[7] in cleantech innovation, as a report from the Center for Security and International Studies (CSIS) think tank puts it? Already, U.S.-China relations are being framed as having entered a new era: of competition. "The era of engagement with China has come to an unceremonious close," Kurt Campbell, a top East Asia diplomat in the Obama administration, wrote last fall in an influential essay[8] co-authored with Jake Sullivan in *Foreign Affairs*. "Coexistence means accepting competition as a condition to be managed rather than a problem to be solved."

A new mindset would cast climate friendly solutions less in terms of global benefit and future generations—always a policy challenge—and more in terms of national self-interest. "A space race in the climate space" is how Sarah Ladislaw, energy and environment scholar at CSIS, puts it. "Can China hawks [in Washington] have a climate strategy that's globally relevant?" Adds Kelly Sims Gallagher[9], energy and environment professor at Tufts: "There is plenty of room for healthy competition. I have wondered about the U.S. competitive spirit in the clean energy domain."



A jog back to the actual superpower Space Race of the 1950s and 60s suggests that yes, Cold War enmity did yield technology breakthroughs, not only Lasik[10] eye surgery and the development of memory foam[11], but also step changes in energy including LED lighting[12] and early solar cells.[13] With the right policies and investments, the argument goes, Space Race 2.0 could accelerate the development of essential yet still immature green technologies. The International Energy Agency has declared that several such innovations are not yet on track[14] to displace incumbent fossil solutions: energy from ocean waves, geothermal power, biofuels as alternatives to petroleum, and capturing carbon emissions from fossil fuel plants and sticking the pollution underground forever.

Rhetorically, the idea of country v. country competition syncs up with rising economic nationalism around the world. Tariffs have come back into fashion, including those on solar modules[15] and steel for wind turbines.[16] Economic drawbridges are going up in many corners of the world, blocking the flow of capital[17], business travelers[18], researchers[19], semiconductors[20], and journalists.[21]

Still, in the decarbonization space, fruitful competition is not just about rivalry. It must also be about money. In the 1950s the Soviet launch of Sputnik 1 sent a shock wave through the American body politic and pushed Congress to open its wallet. It helped create NASA and funded what would become a $25 billion[22] (that's $110 billion today) moon project. The federal government put nearly $1 billion into hard sciences.[23] "First in space means first, period," President Lyndon Johnson declared. "Second in space is second in everything." Likewise in Moscow, Soviet Premier Nikita Khrushchev crowed after his country put the first man into space in 1961 that the feat was the "greatest triumph of the immortal Lenin's ideas."

By 1966 NASA's budget accounted for a whopping 4 percent of the federal budget.[24] What would it cost today to green the entire U.S. electricity system? The consultancy Wood Mackenzie projects a price tag of $4.5 trillion[25], spread out over as long as two decades. On a per-year basis, the math over 20 years comes out to … 4 percent of the federal budget. Competition costs money.

To skeptics, turning negative energy from fear and discord into something useful may seem a Hollywood fantasy (recall Pixar's animated tale of an hourly worker named James P. Sullivan, a stinky blue monster who scares the daylights out of boys and girls, harvesting zero-carbon "scream energy" for his employer, Monsters, Incorporated[26]). In the real world, though, several members of Congress, motivated in part by a desire to one-up China, are making a green funding push. One bill would inject more than $20 billion into cutting-edge semiconductor research and domestic manufacturing.[27] A separate bill explicitly referencing the space age, the Endless Frontier Act[28], would feed $110 billion over ten years into advanced energy



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technology, artificial intelligence, and materials science among other areas. One observer tags it Made in America 2025[29], a nod to Beijing's Made in China 2025 tech blueprint.

While he's not a member of Congress, Joe Biden, the Democratic nominee for President, has spoken of the "competition for the future against China."[30] His new climate plan is for the federal government to invest $2 trillion over four years.

Ladislaw adds that the Trump administration already has sought to reduce U.S. dependency on China and pursue homegrown breakthroughs in critical minerals[31], nuclear energy, semiconductors and the power grid. Investments in these areas by federal and state governments and American industry are already framed, to some degree, as "beating China." As far as mobilizing private sector capital, the United States and China rank #1 and 2 as the most attractive countries for renewables investments, according to the consultancy EY.[32]

Clean Energy Dominance Today

A window for these investments is open now as countries, including the United States and China, are spending billions to jump-start their economies and recover from the world's COVID-19-induced economic coma. The International Energy in June proposed that leading nations commit $1 trillion dollars annually in stimulus over three years to spark a "sustainable" recovery[33], bringing strong returns to investors and the environment. A May 2020 working paper from environmental scholars at Oxford University identifies five stimulus areas with high economic and planetary payoff[34]: clean physical infrastructure, building efficiency retrofits, investments in education and training, natural capital investment, and clean energy research & development.

Specific sectors where American industries could "win" include electric vehicles, smart grids, ultra-high voltage electricity transmission, solar cells, wind turbine gearboxes, and advanced battery manufacturing, said Gallagher, who studies global energy supply chains at Tufts. In the last two decades, "we have ceded a lot of those markets to China without a fight. All of those are primarily manufactured in China now." Gallagher offers this cautionary lesson of standing on the sidelines: during the Obama administration the MIT-based battery startup A123 received federal loan support. But as A123 tried to scale up manufacturing domestically, the domestic electric vehicle industry "didn't have the policy support in the U.S.," Gallagher said. In the end, the firm went bankrupt and its assets were acquired by Chinese auto firm Wanxiang.[35]

Today, Gallagher sees encouraging signs, notably in the nascent U.S. offshore wind sector. Up and down the Atlantic seaboard, states from Rhode Island to Virginia have committed to buy whopping amounts of electricity from ocean-based wind farms with towers as tall as the Eiffel Tower. Industry analysts see North America as potentially a next big offshore wind market[36], drawing supplier companies and high-paying jobs to coastal cities.

These programs have skeptics. Critics of large public investments in a single industry—green or not—deride the idea of policymakers rather than market forces "picking winners." Industrial policy can be a risky and expensive bet. Whereas Asian and European economies over the years have plowed billions into targeted low-carbon sectors, industrial policy "has never been fashionable in the U.S.," Gallagher said. Now, though, she suggests the widespread impetus to reshore industrial industries and reduce dependence on China can provide political cover.

As for China, the aspiration to dominate key industries, including cleantech, is well documented. When I first moved to Shanghai in late 2006 to open my news organization's first bureau there, the catch phrase I heard countless times at factories across China was "indigenous innovation," a program of procurement rules and tax breaks to coax domestic science and tech breakthroughs. Its policy descendent, the "Made in China 2025"[37] plan, names new energy vehicles, power equipment, and modern high-speed rail as pillar sectors for which 70 percent of the core content should be domestic. Beijing has declared intentions to become a global technology superpower by 2049.[38] To be sure, this program has helped create the underlying ill will with the United States, fueling accusations[39] that Beijing is freezing out U.S. competition, extracting American technology, and violating free-trade pledges. It is clear, however, that China has joined the green race.

There is one additional way to channel superpower hostilities into planetary good: tariffs on goods with large carbon footprints. Already, trade walls have gone up around the world against Korean washing machines, Chinese solar panels, European commercial plants, and American soybeans. These import barriers have reinvigorated European Union plans for a carbon border tax in its COVID-19 economic recovery plan.[40] The idea is to tax products from climate laggards, including the United States. This levy, a top priority for European Commission head Ursula von der Leyen, is designed to tackle the pernicious problem of "free riding"[41] that has long bedeviled



climate talks: key countries enjoy the benefits of lower emissions and cleaner air, yet don't pull their weight and in the process encourage others to ride without paying, too.

Arguing and Chewing Gum at the Same Time

To most observers, climate competition would likely have to occur in a context of global cooperation. Extreme decoupling, pitting the United States and China on opposite sides of an industrial iron curtain, could backfire, threatening a tried-and-true model of producing green solutions—manufacturing globalization. It's not unlike the production of a Samsung Galaxy S20 phone or the latest crop top from Zara: making world-beating solar panels and wind turbines depends on global supply chains to connect ideas, equipment, money, talent, and scale. This combination is helping solar and wind increasingly undercut fossil energy on price.

Take solar cells. In her book, *The Globalization of Clean Energy Technology*[42], Gallagher documents the product's globe-trotting development story, noting the key role of ideas being shared across borders. To the Tufts professor, it's no accident that two early Chinese executives in the industry, at photovoltaic manufacturers Suntech and Yingli, returned to the mainland after receiving doctorates in Australia, where they acquired equipment and production know-how. This is a familiar pairing of western ideas and Chinese capital. In Suntech's case, founder Shi Zhengrong set up his plant in the eastern city of Wuxi, thanks to $6 million in local government subsidies. When I visited Suntech a decade ago, Shi told me how Chinese manufacturing drove down global prices: "The Chinese market will not support expensive products. Secondly, in the middle of a [global] financial crisis China has much better financial liquidity [due to the Chinese government's economic stimulus], so this will support the realization of these projects."[i]

Finished Chinese panels find customers at home, as well as countries that have made commitments to purchase large amounts of renewable power, including Germany, Spain, Japan, Italy, the United Kingdom, Brazil, and India. Key states in the United States—notably California Nevada, Hawaii, and New Jersey—made similar pledges. By Gallagher's reckoning, global trade in cleantech in the first decade of the 2000s grew by 259 percent, more than double the growth rate of total manufactured goods. "As we look back on the remarkable cost reductions in solar and wind," she said, "we can attribute that largely to the globalization process."

Which means it may be hard to simply extract China from any green supply chain. Jonas Nahm, who researches energy and industrial policy at the Johns Hopkins School of Advanced International Studies, has published research suggesting China's key role in solar and wind talent and supply chains.[44] The sequence to him looks something like this: The United States births large numbers of startups—often from universities. Then European countries, notably Germany, chip in production expertise and advanced factory equipment (visitors to Chinese factories have surely attended plant tours that invariably include a show-the-German-machines moment). Finally, firms in China contribute manufacturing R&D and capital to produce at scale. Beijing's $586 billion stimulus during the 2008-09 financial crisis provided ample green financing. Provocatively, Nahm argues that countries engage in this global distribution of labor *despite domestic policies to bring all the jobs home*. It's hard to compete with these market efficiencies.

"If we want to have an impact on carbon emissions in a short time frame, I don't see a way to replicate China's skills," Nahm told me. To be sure, global trading partners have legitimate reasons to complain about Beijing's industrial rules and contentious home-field economic advantages. "But if we [the United States and China] spend ten years arguing, we will lose Florida."

The upshot: the world's two climate superpowers may have to find ways to compete and yet collaborate at the same time. It would be challenging, for instance, for an American electric vehicle producer to gain market share without access to Chinese middle-class drivers. It's worth noting that in many sectors, despite trade frictions and tariffs, China-centric global supply chains tend to be sticky. Of note: China is home to 90 percent of the world's critical minerals, 50 percent of electric vehicles, and 60 percent of solar panels, by one estimate from by one estimate from New America.[45]

i Suntech went bankrupt in 2013, largely due to Chinese overproduction, which pushed prices down further.[43]

Global Talks: The Essential Role of Climate Superpowers

Superpower collaboration also comes into play with global climate negotiations. Back in 2015, delegations from Beijing and Washington played key roles in sealing the Paris climate accord when they jointly announced emissions targets a year in advance. This laid the groundwork for other nations to follow suit.

The Trump administration, of course, plans to bail on the Paris deal[46], and is loosening domestic rules on power plant and auto emissions. If the United States remains on the sidelines, many analysts argue it could take the pressure off China, providing space for Beijing to underperform as well. In fact, China's COVID-19 stimulus efforts appear more brown than green to many observers; coal plant approvals are said to be on the rise.[47]



Of course, Xi Jinping's government could step into the void and assert global leadership on climate, as it has in global institutions including the World Health Organization. But those signs are less clear. Angel Hsu, an environmental studies researcher at Yale-NUS College in Singapore, has spent years interacting with Chinese climate researchers and negotiators. During the November 2016 UN climate summit in Morocco, Hsu was with the Chinese delegation when word came that Donald Trump, who'd called climate change a "hoax," was elected. Would China step forward to lead, Hsu asked a top Chinese negotiator? "He said 'no,' the typical Chinese stance," Hsu said, adding "'we are still a developing country behind the West, still waiting for the U.S. to show leadership.'"

Elections can change things. For all the global angst about Washington appearing to ignore climate change, Hsu thinks a potential Biden presidency in 2021 could bring a quick pivot. She researches sub-national level climate collaboration between China and the United States and says that even in today's decoupling environment, bilateral connections still exist. Policy dialogue between California and Beijing continues today on emissions reductions, cap-and-trade emissions trading rules, and air quality regulation. At least 24 states in the United States have approved emissions reduction plans.[48] If there's a Biden presidency, Hsu says, those existing building blocks could help reassemble a broader climate relationship.

Is it realistic to imagine great power competition, and collaboration, on climate issues? For proponents, there may be some hope from history: In the 1930s, during the ugliest trade war of the 20th century, which would later drag the world into a Great Depression, the international community nevertheless found ways to work together on several environmental initiatives: to protect fauna and flora, limit fishing nets, and set standards for whaling and wildlife preservation. And even in the Cold War 1950s, the United States and Soviet Union were able to collaborate on the development of a polio vaccine.[49] At least back then, the world's existing and emerging superpowers found ways to argue and chew gum at the same time.



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Endnotes

1 Global Times. (2020, June 18). China vows to take countermeasures over US' Xinjiang bill. *Global Times*. https://www.globaltimes.cn/content/1192024.shtml

2 Lawder, D. (2020, June 23). Trump threat to 'decouple' U.S. and China hits trade, investment reality. *Reuters*. https://www.reuters.com/article/us-usa-trade-china-analysis/trump-threat-to-decouple-us-and-china-hits-trade-investment-reality-idUSKBN23U2WU

3 South China Morning Post. (2018, July 8). *Vietnam airs video of Chinese ship sinking fishing boat in South China Sea*. https://www.scmp.com/news/china/article/1526701/vietnam-airs-video-chinese-ship-sinking-fishing-boat-south-china-sea

4 Xinhua Net. (2020, March 18). *China takes countermeasures against restrictive measures on Chinese media agencies in U.S.* http://www.xinhuanet.com/english/2020-03/18/c_138888830.htm

5 Brandt, J. & Taussig, T. (2020, May 19). *The Kremlin's disinformation playbook goes to Beijing*. Brookings Institution. https://www.brookings.edu/blog/order-from-chaos/2020/05/19/the-kremlins-disinformation-playbook-goes-to-beijing/

6 Xuanzun, L. (2020, June 14). Rare gathering of US aircraft carriers 'to be met with Chinese countermeasures'. *Global Times*. https://www.globaltimes.cn/content/1191544.shtml

7 Ladislaw, S. & Tsafos, N. (2020, July 6). *Race to the top: The case for a new U.S. international energy policy*. Center for Strategic & International Studies. https://www.csis.org/analysis/race-top-case-new-us-international-energy-policy

8 Campbell, K.M. & Sullivan, J. (2019, October). Competition without catastrophe How America can both challenge and coexist with China. *Foreign Affairs*. https://www.foreignaffairs.com/articles/china/competition-with-china-without-catastrophe

9 Gallagher, K.S. (2020). *Biography*. The Fletcher School, Tufts University. https://fletcher.tufts.edu/people/kelly-sims-gallagher

10 NASA Spinoff. (2003). *The right track for vision correction*. The National Aeronautics and Space Administration. https://spinoff.nasa.gov/spinoff2003/hm_1.html

11 Bryan, W. (2017, August 7). *Memory foam*. The National Aeronautics and Space Administration. https://www.nasa.gov/offices/oct/40-years-of-nasa-spinoff/memory-foam

12 NASA Spinoff. (2018). *High-Efficiency LEDs grow crops, stimulate alertness*. The National Aeronautics and Space Administration. https://spinoff.nasa.gov/Spinoff2018/cg_7.html

13 NASA Spinoff. (2002). *Shedding light on solar power*. The National Aeronautics and Space Administration. https://spinoff.nasa.gov/spinoff2002/er_7.html

14 International Energy Agency. (2020). *Tracking Clean Energy Progress: Assessing Critical Energy Technologies for Global Clean Energy Transitions*. https://www.iea.org/topics/tracking-clean-energy-progress

15 Young, N. (2020, March 24). *These are the tariffs still impacting the U.S. solar industry*. Solar Power World. https://www.solarpowerworldonline.com/2020/03/these-are-the-tariffs-still-impacting-the-u-s-solar-industry/

16 Severn, A. & Stern, A. (2020). *Tariffs Put U.S. Jobs and Investments at Risk*. American Wind Energy Association. https://www.awea.org/Awea/media/Resources/Fact%20Sheets/AWEA_Tariffs-Put-Jobs-at-Risk-FINAL.pdf

17 Klein, J.X. (2018, September 13). It's not just the U.S.: Around the world, doors are shutting on Chinese investment. *Politico*. https://www.politico.com/story/2018/09/13/china-us-investment-788834

18 White House. (2020, June 22). *Proclamation Suspending Entry of Aliens Who Present a Risk to the U.S. Labor Market Following the Coronavirus Outbreak*. https://www.whitehouse.gov/presidential-actions/proclamation-suspending-entry-aliens-present-risk-u-s-labor-market-following-coronavirus-outbreak/

19 White House. (2020, May 29). *Proclamation on the Suspension of Entry as Nonimmigrants of Certain Students and Researchers from the People's Republic of China*. https://www.whitehouse.gov/presidential-actions/proclamation-suspension-entry-nonimmigrants-certain-students-researchers-peoples-republic-china/

20 U.S. Department of Commerce. (2020, May 15). *Commerce Addresses Huawei's Efforts to Undermine Entity List, Restricts Products Designed and Produced with U.S. Technologies*. https://www.commerce.gov/news/press-releases/2020/05/commerce-addresses-huaweis-efforts-undermine-entity-list-restricts

21 Ministry of Foreign Affairs of the People's Republic of China. (2020). https://www.mfa.gov.cn/web/fyrbt_673021/t1757128.shtml

22 Wall, M. (2011, April 8). *Space Race: Could the U.S. Have Beaten the Soviets Into Space?* Space. https://www.space.com/11336-space-race-united-states-soviets-space-flight-50years.html

23 Khan Academy. *The start of the Space Race*. https://www.khanacademy.org/humanities/us-history/postwarera/1950s-america/a/the-start-of-the-space-race

24 The National Aeronautics and Space Administration. *Appendix 2 - Apollo Funding History*. https://history.nasa.gov/SP-4214/app2.html

25 Wood Mackenzie. (2019, June 27). *Decarbonising US power grid 'may cost US$4.5 trillion.'* https://www.woodmac.com/press-releases/decarbonising-us-power-grid-may-cost-us$4.5-trillion/

26 Fandom. Monsters, Inc. (company). *Pixar Wiki*. https://pixar.fandom.com/wiki/Monsters,_Inc._(company)

27 Bordelon, B. (2020, June 14). Washington moves to mimic Beijing on tech subsidies. *National Journal*. https://www.nationaljournal.com/s/707521/washington-moves-to-mimic-beijing-on-tech-subsidies

28 Schumer, C.E., Young, T., Peters, G.C., Daines, S., Merkley, J., Collins, S., Hassan, M.W., & McSally, M. (2020, May 21). *S.3832 - Endless Frontier Act. U.S. Senate*. https://www.young.senate.gov/imo/media/doc/EFA%20Summary%2005.26.2020.pdf

29 Bordelon, B. (2020, June 14). Washington moves to mimic Beijing on tech subsidies. *National Journal*. https://www.nationaljournal.com/s/707521/washington-moves-to-mimic-beijing-on-tech-subsidies

30 Williams, K.B. (2020, June 30). Biden's China Policy Starts With Building a Stronger America. *Defense One*. https://www.defenseone.com/policy/2020/06/bidens-china-policy-starts-building-stronger-america/166555/

31 Johnson, K. & Gramer, R. (2020, May 25). U.S. Falters in Bid to Replace Chinese Rare Earths. *Foreign Policy*. https://foreignpolicy.com/2020/05/25/china-trump-trade-supply-chain-rare-earth-minerals-mining-pandemic-tensions/

32 Ernest & Young. (2020). *Renewable Energy Country Attractiveness Index (RECAI)*. https://www.ey.com/en_us/recai

33 International Energy Agency. (2020). *Sustainable Recovery*. https://www.iea.org/reports/sustainable-recovery

34 University of Oxford. (2020, May 5). *Building back better: Green COVID-19 recovery packages will boost economic growth and stop climate change*. https://www.ox.ac.uk/news/2020-05-05-building-back-better-green-covid-19-recovery-packages-will-boost-economic-growth-and

35 Vlasic, B. (2012, December 19). Chinese Firm Wins Bid for Auto Battery Maker. *New York Times*. https://www.nytimes.com/2012/12/10/business/global/auction-for-a123-systems-won-by-wanxiang-group-of-china.html

36 Offshore. (2020, February 21). *US offshore wind energy market could reach $70 billion*. https://www.offshore-mag.com/field-development/article/14168420/us-offshore-wind-energy-market-could-reach-70-billion

37 Kennedy, S. (2015, June 1). *Made in China 2025*. Center for Strategic & International Studies. https://www.csis.org/analysis/made-china-2025

38 Zenglein, M.J. & Holzmann, A. (2019, July 2). *Evolving Made in China 2025: China's Industrial Policy in the Quest for Global Tech Leadership*. MERICS. https://merics.org/en/report/evolving-made-china-2025

39 White House. (2018, June). *How China's Economic Aggression Threatens the Technologies and Intellectual Property of the United States and the World. Office of Trade and Manufacturing Policy*. https://www.whitehouse.gov/briefings-statements/office-trade-manufacturing-policy-report-chinas-economic-aggression-threatens-technologies-intellectual-property-united-states-world/

40 European Commission. (2020, April 1). *EU Green Deal (carbon border adjustment mechanism)*. https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12228-Carbon-Border-Adjustment-Mechanism

41 Tong, S. (2015, October 2). The ultimate climate change challenge: free riders. *Marketplace, Minnesota Public Radio*. https://www.marketplace.org/2015/10/02/ultimate-climate-change-challenge-free-riders/

42 Gallagher, K.S. (2014). *The Globalization of Clean Energy Technology: Lessons from China*. MIT Press. https://mitpress.mit.edu/books/globalization-clean-energy-technology

43 Trabish, H.K. (2013, November 19). Timeline: The Rise, Fall and Unclear Future of Suntech. *Greentech Media*. https://www.greentechmedia.com/articles/read/timeline-the-rise-and-fall-and-unclear-future-of-suntech

44 Helveston, J. & Nahm, J. (2019, November 15). China's key role in scaling low-carbon energy Technologies. *Science*. https://science.sciencemag.org/content/366/6467/794

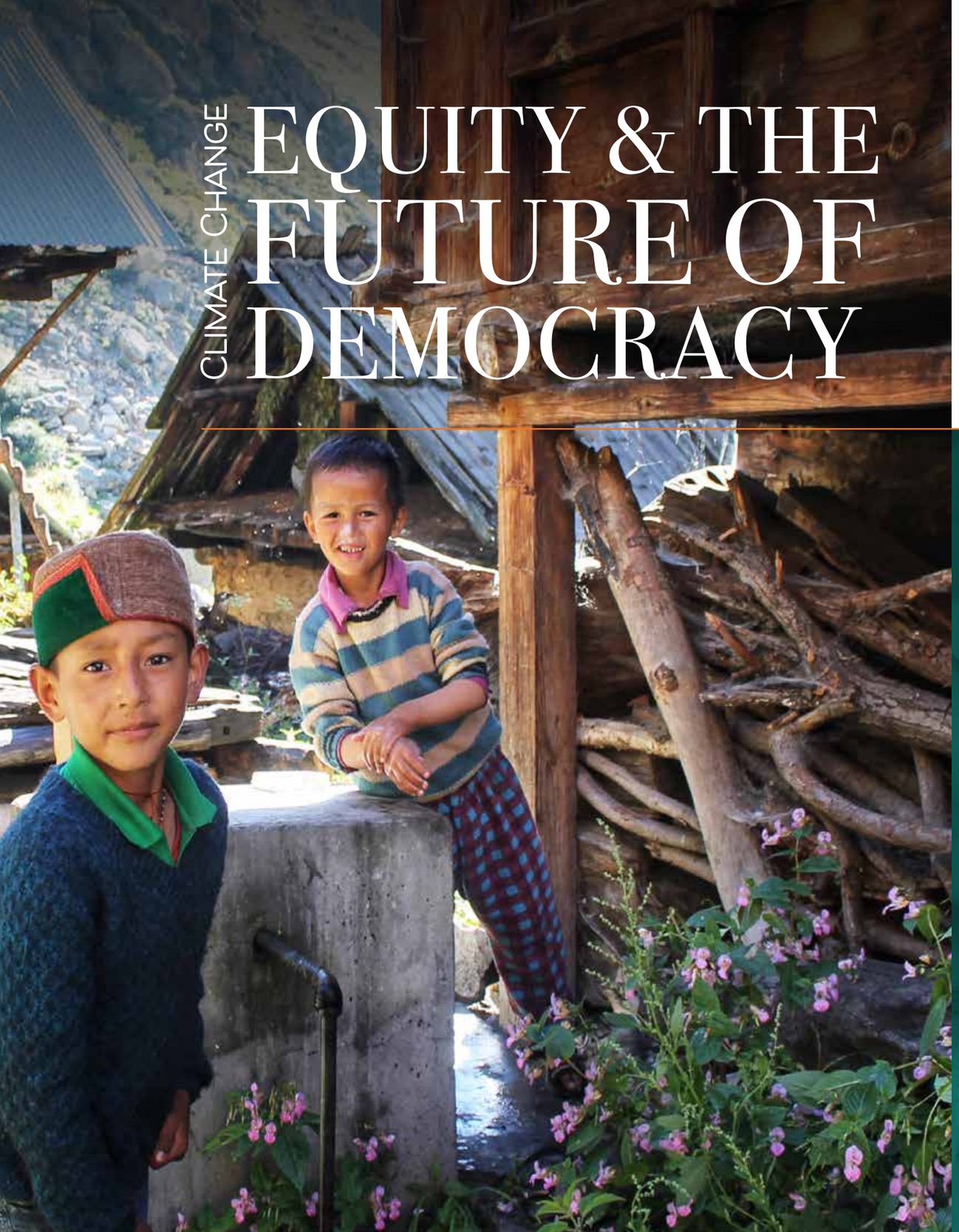
45 Gassert, F. (2020, March 3). China dominates the clean energy supply chain. New America. *Resource Security: Phase Zero Blog*. https://www.newamerica.org/resource-security/phase-zero-blog/china-dominates-clean-energy-supply-chain/

46 White House. (2017, June 1). *Statement by President Trump on the Paris Climate Accord*. https://www.whitehouse.gov/briefings-statements/statement-president-trump-paris-climate-accord/

47 Westrate, R. (2020, June 23). What Does the COVID-19 Pandemic Mean for Climate Change? *Lawfare*. https://www.lawfareblog.com/what-does-covid-19-pandemic-mean-climate-change

48 Center for Climate and Energy Solutions. (2020, August). *U.S. State Greenhouse Gas Emissions Targets*. https://www.c2es.org/document/greenhouse-gas-emissions-targets/

49 Vargha, D. (2014). Between East and West: polio vaccination across the Iron Curtain in Cold War Hungary. *Bulletin of the History of Medicine*. https://pubmed.ncbi.nlm.nih.gov/24976164/



CLIMATE CHANGE

EQUITY & THE FUTURE OF DEMOCRACY

The Solidarity America Needs

Anne-Marie Slaughter & Sharon E. Burke

The same deep tension lies at the heart of the fight against COVID-19 and climate change, particularly in democracies. In each case, the measures necessary to save everyone entail costs that widen existing inequalities. At a time when the United States and other democracies need solidarity, the resulting civic turmoil and division are feeding (and being fed by) populism.

In the United States, the disastrous response to the pandemic has exacerbated class, racial, ethnic, and age divisions. Shutting down 60 percent of the economy for months, and then reopening it in an uneven state-by-state fashion, has pitted those who can work remotely and want to stay safe against those who cannot and thus regard public-health measures as tantamount to economic suicide.

The 40 percent of the economy that has remained open all along is staffed by millions of "essential workers," who disproportionately comprise low-paid black and brown Americans. They are up to five times more likely than whites to be hospitalized for COVID-19[1], and—with more than 37,000 black Americans having now died from the disease—more than twice as likely to die.[2] Intersecting these divides is the coronavirus's differential impact on younger and older Americans, although jokes about COVID-19 being the "boomer remover" have faded as every age group suffers deaths and serious health consequences.

Beyond the health effects, young people are paying a higher social, educational, and economic price for the shutdown than older Americans. The unemployment rate among those aged under 34 is in the double digits[3], while McKinsey & Company estimates that the ongoing disruption to schooling will cost $110 billion in lost annual earnings for today's students.[4] And these are just the consequences that can be measured.

None of this had to happen. America's poor COVID-19 response is a failure of leadership, not governance. Other democracies—including countries as geographically diverse and culturally distinct as South Korea, New Zealand, Germany, and Ghana—have kept infection rates under control so far. And although communist China is widely viewed as having responded better to the pandemic than the United States[5], democratic Taiwan has done an even better job—and without suppressing information about the spread of the virus.

The fault lies with a particular kind of populist leadership that is abysmally evident in President Donald Trump's administration but also plagues other countries, from Poland under the ruling Law and Justice (PiS) party to the Philippines under President Rodrigo Duterte. Such leaders approach problems by blaming others, aiming to strengthen their support within a particular subgroup by fostering division.

That type of leadership undermines trust[6], and makes it less likely that people will have sufficient confidence in authority and expertise to follow public-health guidelines. It also eschews and destroys any idea of shared sacrifice.

Therein lies the similarity between the responses to COVID-19 and climate change: faced with outsize and unexpected burdens and costs, everyone must commit to give up or pay something.

To be sure, solidarity is much harder to sustain when sacrifice is shared unequally. As with the current pandemic, the effects and costs of climate change are unevenly distributed within and across populations. Those who have benefited from the generation of wealth in the industrial age will not be paying anywhere near a proportionate share of the legacy costs in the twenty-first century.

But embracing solidarity offers a potential path forward for all democracies beset with racial and ethnic tensions, either among native populations or between self-described natives and immigrants. In his forthcoming book on "race, solidarity, and the future of America," U.S. Navy veteran and former White House Fellow Theodore Johnson defines national solidarity as "the civic version of the Golden Rule," requiring that each of us "actively champion the right to equality and liberty" for ourselves *and* our fellow citizens.

Johnson further argues that African-Americans and other minority communities have deep experience of solidarity. Michelle Alexander, author of *The New Jim Crow*, has similarly called for a "politics of deep solidarity rooted in love."[7]



Therein lies the similarity between the responses to COVID-19 and climate change: faced with outsize and unexpected burdens and costs, everyone must commit to give up or pay something.



Solidarity is both golden and necessary. The United States, along with Japan, China, Russia, and much of Europe, is struggling with a demographic imbalance, having too few young people to support a tsunami of retirees. But the U.S. has a comparative advantage, because both immigration and a more diverse young population are contributing to economic growth.[8]

Whites are already no longer a majority among Americans under 18. By 2027, they will cease to be a majority among those under 30, and by 2045 they will no longer be a majority at all.[9] If America can make closing the racial equity gap its national mission, such that economic, educational, and social disparities simply track America's demography rather than being disproportionately concentrated in black and brown communities, it will open the door to huge and lasting innovation.

Throughout its history, American democracy has innovated to adjust to technological change, wars, pandemics, and other shocks. Its persistence shows that a society governed by liberal principles, the rule of law, and elected representatives can exist and thrive for centuries. As the U.S. approaches the 250th anniversary of its founding, Americans need to embrace the country's diversity as a source of strength and solidarity that will allow it to meet collective challenges at home and abroad.

The politics of populism is a politics of division, defining "the people" whom populist leaders claim to represent *against* others—foreigners, elitists, cosmopolitans, globalists, urbanites, or people of a different color, race, or creed. By contrast, the politics of solidarity is one of unity, reminding us of the common threat to the planet that imperils us all. By choosing a response that unites equity and existentialism, we can save both democracy and our world.



Endnotes

1 Centers for Disease Control. (2020, August 18). *Hospitalization and Death by Race/Ethnicity*. CDC. Retrieved on September 9, 2020 from https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html.

2 The COVID Tracking Project. (n.d.). COVID-19 is affecting Black, Indigenous, Latinx, and other people of color the most. *The Atlantic*. Retrieved September 9, 2020 from https://covidtracking.com/race

3 U.S. Bureau of Labor Statistics. (n.d.) *Labor Force Statistics from the Current Population Survey*. U.S. Bureau of Labor Statistics. Retrieved September 9, 2020 from https://www.bls.gov/web/empsit/cpseea10.htm

4 Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2020, June 1). *COVID-19 and student learning in the United States: The hurt could last a lifetime*. McKinsey & Company. https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-and-student-learning-in-the-united-states-the-hurt-could-last-a-lifetime#

5 Strauss, M. (2020, June 15). China's response to COVID-19 better than U.S.'s, global poll finds. *Reuters*. https://www.reuters.com/article/us-health-coronavirus-democracy/chinas-response-to-covid-19-better-than-u-s-s-global-poll-finds-idUSKBN23M1LE

6 Fukuyama, F. (2020, March 30). The Thing That Determines a Country's Resistance to the Coronavirus. *The Atlantic*. https://www.theatlantic.com/ideas/archive/2020/03/thing-determines-how-well-countries-respond-coronavirus/609025/

7 Alexander, M. (2020, June 8). America, This Is Your Chance. *New York Times*. https://www.nytimes.com/2020/06/08/opinion/george-floyd-protests-race.html

8 Fontenot, K., Semega, J., Kollar, M. (2018, September). *Income and Poverty in the United States: 2017*. U.S. Census. https://www.census.gov/content/dam/Census/library/publications/2018/demo/p60-263.pdf

9 Rey, W. (2018, March 14). *The US will become 'minority white' in 2045, Census projects*. Brookings Institution. https://www.brookings.edu/blog/the-avenue/2018/03/14/the-us-will-become-minority-white-in-2045-census-projects/



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What Foreign Policy Needs to do to Address Climate Change in the Developing World

Vanessa Nakate

Climate change is the greatest threat facing humanity right now. Though we will all feel its impacts, not all of us will be affected equally, making it not just an important foreign policy issue but also an important issue with regard to equity and democracy. For instance, while some people have yet to experience any climate impacts in their own lives, others have already seen their livelihoods destroyed by climate change-driven floods, hurricanes, and droughts. In my country, Uganda, I have seen people, especially in rural communities, struggle with food and water scarcity—yet we emit less carbon dioxide per capita than nearly every other country. This clearly shows the injustices that come with climate change and demonstrates that the foreign policy community needs to act to protect the developing world and the most vulnerable within it.

There are three key steps to ensuring that climate action is democratic and equitable, and thus more effective. First, the international community needs to provide more democratic development finance to address the needs of communities struggling with air and water pollution and support developing countries with mitigation and adaptation efforts. Second, ecocide needs to be recognized under international law—this is a crucial step towards global environmental justice. Third, we need to bring more voices into the international climate debate, particularly those who suffer the most from climate impacts, namely frontline communities and women.

Encourage More Democratic Development Finance

The objective of development finance is to build more livable and sustainable communities, while the role of democracy is to ensure that the interests and needs of the people are reflected in decision-making.

Democratic development finance needs to support climate-friendly projects for both mitigation and adaptation. Initiatives that are working to build resilience in the most affected communities and countries should be prioritized. Efforts, for instance, that increase food security for the poor, improve water security through water harvesting mechanisms such as boreholes, and bring solar-power installations or eco-friendly stoves to communities.

For so long, activists have tried to drive change in their communities with the resources available to them. For example, I started a project in Uganda—relying on funding from individual internet donors—that involves the installation of solar energy and eco-friendly stoves in schools. These stoves help to reduce the amount of firewood that schools use to prepare food. They also ensure clean cooking for the students and protect the chefs from inhaling smoke as they prepare food. Taking clean cooking a step further, the project includes the installation of solar systems in schools to support a broader transition to renewable energy.

Many other people are working to build resilience in the most affected communities, but they face the basic challenge of a lack of financing. It is estimated that the United Nation's Sustainability Development Goals require $5-7 trillion to ensure the goals are met by 2030[1]—and yet in 2018, Official Development Assistance totaled just $149 billion.[2] Policymakers need to support the policies that enable and encourage financing for young people to build resilience in the most affected communities.

Foreign policymakers should drive green investments globally, such as clean transportation and renewable energy. The developing countries that are the most affected by the climate crisis need assistance in running these investments. Developing investment strategies through a democratic lens helps us recognize who is suffering from climate injustice and carve out a more equitable pathway forward, by allocating financing to increase the resilience of those who are most affected. The people are speaking up and demanding change.

Address Ecocide and Environmental Crimes in International Law

The term "ecocide" refers to human activity that violates the principles of environmental justice, for example causing extensive damage to—or destroying—ecosystems, or harming the health and well-being of a species (including humans). While we have many international agreements and laws meant to protect the environment and



climate, none of them explicitly address ecocide. Ecocide needs to be recognized under international law as a crime.

In fact, justice systems are becoming the new battleground between activists and bad climate actors. The fossil fuel industry is lawyering up. To date, nine U.S. cities and counties have sued the fossil fuel industry for climate damages.[3] California fisherman are going after oil companies for their role in warming the Pacific Ocean, a process that soaks the Dungeness crabs they harvest with a dangerous neurotoxin. The Dutch Supreme Court ruled in the Urgenda climate case that the Dutch government is obligated to reduce emissions in line with its human rights obligations.[4] And in *Juliana vs. U.S.*, a group of young Americans have filed suit against their government, "assert[ing] that, through the government's affirmative actions that cause climate change, it has violated the youngest generation's constitutional rights to life, liberty, and property, as well as failed to protect essential public trust resources."[5]

Governments and corporations need to be held responsible for violating human rights. Foreign policymakers should urge the fulfilment of environmental legal obligations to combat climate change. This will help to reduce potential environmental risks in the most affected communities.

Listen, then Lead

Last but not least, we need to recognize all voices in the international arena, particularly those who most often face the consequences of climate change-driven extreme weather. Women's roles as primary caregivers and providers of fuel and food make them more vulnerable to drought and floods. The authors of a Georgetown Institute for Women, Peace and Security report write, "Around the world, women tend to be marginalized from political and economic power and have limited access to financial and material resources—particularly in conflict-affected, post-conflict, or less economically developed settings—which can exacerbate their vulnerability to the impacts of climate change."[6]

There's a simple illustration of this from Uganda: one of the ways to survive a flood is to climb a tree, and yet women in some areas are strictly not allowed to climb trees, because doing so would taint their dignity according to cultural values.

One way to improve the situation is to include more women in conversations on climate action. This means providing equal space and resources for women and men to participate in climate change decision-making and action at all levels and on all platforms. Decision-making needs to include diverse voices from developing communities and Indigenous communities. These people suffer the most and they deserve platforms to demand justice and inform responses. There is no climate justice without respecting diversity in the climate movement.

We cannot address climate change without democracy and equity. We cannot. We need leaders who will take swift and equitable climate action. We need leaders who will enforce laws to protect people and the planet.



VANESSA NAKATE is a climate activist. She was the first Fridays for Future climate activist in Uganda and founder of the Rise Up Climate Movement—a movement to amplify the voices of activists from Africa. Her work includes raising awareness of climate change causes and impacts. She spearheaded the campaign, Save Congo Rainforest, which has spread to other countries in Africa and Europe. She is currently working on a project that involves the installation of solar and institutional stoves in schools. She was one of a handful of youth activists to speak at COP25 in Spain. Nakate graduated with a degree in Business Administration in Marketing from Makerere University Business School.

Endnotes

1 United Nations. (n.d.) *About the Sustainable Development Goals*. United Nations. Retrieved on August 17, 2020 from https://www.un.org/sustainabledevelopment/sustainable-development-goals/

2 Organization for Economic Co-operation and Development. (n.d.) *Development aid drops in 2018, especially to neediest countries*. OECD. Retrieved on August 17, 2020 from https://www.oecd.org/development/development-aid-drops-in-2018-especially-to-neediest-countries.htm

3 Hasemyer, D. (2020, January 17). Fossil Fuels on Trial: Where the Major Climate Change Lawsuits Stand Today. *Inside Climate News*. https://insideclimatenews.org/news/04042018/climate-change-fossil-fuel-company-lawsuits-timeline-exxon-children-california-cities-attorney-general

4 Urgenda. (2019). *Landmark decision by dutch supreme court*. Urgenda. https://www.urgenda.nl/en/themas/climate-case/

5 Our Children's Trust. (n.d.). *Juliana v. United States Youth Climate Lawsuit*. Our Children's Trust. https://www.ourchildrenstrust.org/juliana-v-us

6 Alam, M., Bhatia, R., & Mawby, B. (2015). *Women and climate change: Impact and agency in human rights, security, and economic development*. Georgetown Institute for Women, Peace, and Security. https://giwps.georgetown.edu/wp-content/uploads/2017/09/Women-and-Climate-Change.pdf



Without Centering Race, Identity, and Indigeneity, Climate Responses Miss the Mark

James Thuo Gathii

Introduction

A press-conference photo from the 2020 World Economic Forum in Davos, Switzerland, excluded Vanessa Nakate, a young Ugandan climate activist who founded the Rise Up Movement. That photo only showed her four White colleagues.[1] Nakate's exclusion from this picture powerfully illustrates the epistemic silencing of non-White and Indigenous peoples and communities in the most eminent discussions of climate change. This example shows how climate discussions are dominated by Western, often White voices and interests.[2]

Take another example. It was only after months of climate change aggravated bushfires raging across Australia[3] that fire services began to consider 50,000-year-old Aboriginal fire-management practices.[4] Those practices involve a close, custodial connection with land, wildlife, and seasons.[5] Furthermore, it was almost three months after those fires had been extinguished when the Australian Government ultimately concluded that it ought to have better incorporated Indigenous knowledge into the country's environmental decision-making.[6]

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While the bushfires in Australia and elsewhere, including in California, received intense media attention, very little attention is paid to the more extreme, long-term, and life-threatening consequences of climate change, such as drought, water scarcity, and food shortages in Africa, South Asia, Latin America, and elsewhere.[7] Like Nakate's excision from the climate activist photo and Australia's initial oversight of Indigenous knowledge[8], climate change issues involving poor countries remain largely underrepresented in both research and global governance.[9]

It is time we put an end to the epistemic silences in predominant climate change discourses, which erase and ignore the agency, knowledge, and experiences of non-Western, non-White peoples, and Indigenous communities. Effectively responding to the immense challenges posed by climate change requires a climate justice approach that centers the voices and experience of those most vulnerable. Foregrounding these voices and experiences, including those relating to traditional ecological knowledge, will serve not only to better understand and address the challenges raised by climate change, but also to end the "cognitive annihilation" of Indigenous heritages and world-views.[10] It is simply not enough to focus only on the economic and scientific issues raised by climate change, without paying attention to those relating to race, identity, and indigeneity.[11]

To make that claim, this essay examines three major approaches to thinking about climate change: sustainable development; social justice cosmopolitanism; and post-development.[12] A comparative analysis reveals significant variation in the ways these approaches exclude the viewpoints of vulnerable communities. Furthermore, these approaches remain largely isolated from one another, which makes coordinating effective climate-change action an even greater challenge.

In contrast, climate justice theorists, practitioners, and activists acknowledge race, gender, identity, and indigeneity;[13] accordingly, they address the limits of development and market orthodoxy in the aforementioned approaches, and also highlight the "issues and concerns that arise from the intersection of climate change with race, poverty, and preexisting environmental risks."[14] These aspects of climate justice are critical because they make visible the most urgent impacts of climate change that have so far been peripheral in policy discussions that are dominated by scientific and economic considerations.

Climate justice is by no means a settled and uncontested concept[15], but more than any of the aforementioned approaches, it opens up climate change discussions to a broader set of considerations and should be embraced alongside the predominant economic and scientific approaches that currently dominate discussions on climate change.

Sustainable Development and its Blind Spots

One lens through which to think about climate change is economics. For example, a recent economic analysis of climate change argues that markets, if left alone, can produce climate-saving innovations, enabling never-ending growth.[16] Sustainable development, by contrast, provides an alternative starting point for a more sustainable and inclusive global economy.

The concept of sustainable development—that high growth rates are a key driver of development[17]—began to take shape after the 1972 U.N. Conference on the Human Environment in Stockholm, which recommended preservation measures to offset environmental degradation caused by resource extraction and economic exploitation. The term "sustainable development"

first appeared in a 1980 report by the International Union for the Conversation of Nature.[18] In 1987, the U.N. World Commission on Development and the Environment presented the Brundtland Report, which imagined sustainable development as balancing economic development with environmental protection.[19] This approach changed when the 1995 Copenhagen Declaration on Social Development described sustainable development as a balance of three pillars: environmental protection, economic development, and social development (which integrates social, economic, and cultural rights, including equality and non-discrimination).[20] Later, the 2012 U.N. Conference on Sustainable Development (i.e., the Rio+20 Conference) proposed a more abstract, pro-growth notion of sustainable development that identified poverty in developing countries as primarily responsible for environmental degradation.[21] The overriding commitment to economic growth that appeared in Rio's "Green Economy" proposals were dubbed as "eco-efficient" approaches to solve environmental issues.[22]

However, very much like the leading scientific studies on climate change, sustainable development alone does not adequately capture the entire breadth of the implications raised by climate change. As a framework, sustainable development comes with significant blind spots. In particular, it pays insufficient attention to historical and structural foundations of poverty. Even with some recognition of both the bio-physical limits to growth and the role of cultural and spiritual heritages in reinforcing economic interests and survival imperatives, sustainable development remains an overtly growth-centric "ruling rationality,"[23] invariably justifying the types of environmental degradation associated with climate change.[24]

The Cracks in Social Justice Cosmopolitanism

Unlike sustainable development, social justice cosmopolitanism evaluates climate change action while weighing the historical and structural foundations of poverty. This includes the impact of the high levels of emissions from developed economies and middle-income emerging market economies that disproportionately impact the lowest carbon dioxide-emitting countries of the Global South. For proponents of social justice cosmopolitanism, who view individuals as the units of moral concern, global institutional arrangements exacerbate socioeconomic inequalities in ways that are both foreseeable and avoidable.[25] As a result, these cosmopolitans believe that developed countries have a moral imperative to stop poverty and ecological harms, including those caused by climate change.

To achieve this goal, cosmopolitans propose measures such as cooperative redistribution. For example, Thomas Pogge has proposed a government sponsored Ecological Impact Fund that would incentivize innovators of ecologically beneficial inventions by paying them on the condition that they agree to give up the underlying intellectual property protection of their innovation so that it can be used in countries that would otherwise be unable to afford such innovation.[26] For cosmopolitans, identity issues, including those based on ethnicity, culture, or race, are irrelevant.[27] Yet, the impact of climate change disproportionately falls on people who have long been marginalized on the basis of their identity. It is insufficient to merely focus on the material resources the poor lack without focusing "on relations and structures of social and political inequality"[28] that reinforce poor communities' powerlessness and subordination.[29]

Beyond Post-Development?

Unlike sustainable development and social justice cosmopolitanism, a post-development approach provides a framework for discussing climate change that emphasizes how contemporary development paradigms are designed by elites and the global institutions they control, "from above," rather than "from below." The claim here is that ideas about development are not designed through bottom-up, grassroots processes that take into account the interest of ordinary people and communities.

A post-development concept argues that development frameworks such as free markets also presuppose a singular "global modernity" rooted in a Eurocentric social order.[30] On the other hand, "coloniality" includes "those subaltern knowledges and cultural practices world-wide that modernity itself [has] shunned, suppressed[,] made invisible and disqualified."[31] Post-development seeks to overcome this modernity/coloniality paradigm that defines contemporary understandings of development by taking seriously local histories and politics, not in a romantic or unrealistic manner[32], but rather as foundations for alternative and dissenting imaginations. Such a view is based on acknowledging the role of social movements to "more directly and simultaneously engage with imperial globality and global coloniality."[33] Post-development therefore provides an approach that counters universalizing solutions to climate justice concerns by foregrounding non-dominant perspectives that cannot be reduced to the modernity/coloniality paradigm, even while acknowledging its overbearing influence.[34]



For example, Balakrishnan Rajagopal reminds us that although human rights discourse is part of this hegemonic modernity/coloniality paradigm, we should not dismiss the value of human rights in our search for radical democratic alternatives, particularly because rights help to envision what he refers to as "counter-hegemonic cognitive frames."[35] Rajagopal's vision of a counter-hegemonic international law includes "coalitions of smaller states and social movements, forming tactical alliances with larger states in particular negotiations, while increasing the prominence of sub-state actors in international law more broadly."[36] In this respect, post-development complements a climate justice framework that also includes attention to issues of identity, including those relating to race, identity, gender, and indigeneity.

Hitting the Mark with Climate Justice

Implementing a climate justice approach to understanding and addressing the impacts of climate change would complement and strengthen the aforementioned predominant approaches. For one, this is because climate justice's inter-disciplinarity avoids the blind spots of economic frameworks oriented towards growth and

redistribution. Additionally, climate justice responds to an urgent global threat by its razor-sharp focus on the disproportionate burden of climate borne by people of color and Indigenous people, as well as related issues such as access to safe, affordable, and nutritional food, access to parks and open space, but also equity in disaster preparation and response.[37] This essay primarily focuses on those elements that directly relate to climate justice.

Climate justice was embraced in the 2002 Bali Principles of Climate Justice, which were formulated by a broad coalition of civil society groups. One of their primary goals was to put a human face to issues related to climate change by borrowing from a human rights and environmental justice perspective.[38]

The many roots of the climate justice movement can be traced to environmental justice movements[39] including those that sought to defeat environmental racism. The goal of environmental justice is to address:

> *the ethical and human rights dimensions of climate change, the disproportionate burden of legacy pollution (chemicals that were used or produced by industry that remain in the environment for a long time after they were used and cause harm), the unsustainable rise in energy costs for low income families, and the impacts of energy extraction, refining, and manufacturing on vulnerable communities.*[40]

For example, in North America, environmental justice actors challenged environmental policies that allowed disproportionate and persistent exposure of environmental harms to people of color.[41]

Environmental justice therefore emphasizes the centrality of grassroots engagement, particularly by people of color, youth, and women, as exemplified in the work of leaders like Nakate, whose combined influence can counter a dismissive culture of inaction on the causes and impacts of climate by governments and other actors.[42] Also referred to as "environmentalism of the poor," environmental justice recognizes those disproportionately impacted by climate change not merely as victims or objects of study, but also as producers of knowledge whose agency in exposing and countering environmental injustices is crucial to understanding the threat that climate change poses.

Indeed, as Maxine Burkett reminds us, the contemporary global climate movement does not simply mirror the concerns of environmental justice.[43] Rather, in Burkett's words, it "seeks to correct a deeper harm that disparately dismantles livelihoods as a result of a changing climate, and to introduce a different kind of political economy that, at the very least, abandons the use of fossil fuels as a driver of our economy."[44] Indigenous peoples and local communities adversely impacted by climate change often seek alliances with sympathetic actors including rich non-governmental organizations based in rich countries as a way of amplifying the voices and concerns.[45]

Recognizing climate change as a problem of global injustice, rather than solely a problem of economics, of science, or merely of inequality, provides clarity on the need "for a fundamental shift in our political and economic systems and thinking."[46] While many of the existing approaches to environmentalism have focused on sustainability, climate justice emphasizes that "nature is more than an economic resource and the natural environment is of more than utilitarian value."[47]

Importantly, climate justice embraces a notion of intergenerational justice, which indicates how "the persistence of greenhouse gases is a past,

It is insufficient to merely focus on the material resources the poor lack without focusing

"on relations and structures of social and political inequality"

that reinforce poor communities' powerlessness and subordination.

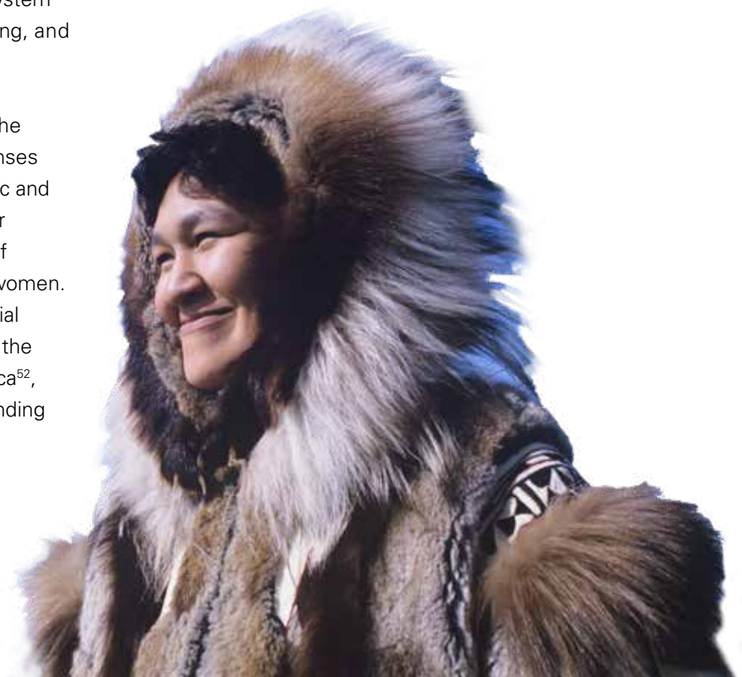


present, and future wrong that must somehow now be addressed."[48] Climate justice proponents consider that climate change will adversely impact not only "the most impoverished nations and peoples in the international community, who will be least able to address it," but the emerging middle-income nations continuing to pursue economic growth in hopes of joining the industrialized world as well.[49]

Solutions to climate change pegged on contemporary notions such as sustainable development are problematic because global capitalism "deploys race and racism as techniques of exclusion and control, creating expendable geographic locations (sacrifice zones) and expendable people."[50] Taking these limits of sustainable development, Carmen Gonzalez argues in favor of a race-conscious approach to create solidarity between diverse social movements and climate-vulnerable states; this approach rejects and counters extractive economic policies, economic inequality, and racism.[51]

Since the dominant approaches to climate change arise from within a State-centric system with a long history of excluding, suppressing, and erasing Indigenous experiences and perspectives, climate justice's inclusivity suggests a more fundamental critique of the exclusionary nature of State-centric responses to climate change that foreground scientific and economic considerations, while ignoring or downplaying the experiences and voices of Indigenous peoples, people of color, and women. This is particularly the case in settler colonial states, including those in the Americas, in the South Pacific, and in places like South Africa[52], where these groups are not merely demanding equality, but self-determination and autonomy for themselves free of the neo-liberal paradigms predicated on coloniality and modernity—both of which are embraced by our contemporary State-centric system.[53] Perhaps most significantly, according to Upendra Baxi, the climate justice approach provides an opportunity and an openness to see and address the suffering of the "others" who are already burdened disproportionately by the impacts of climate change and who are often rendered invisible by State-centric approaches.[54]

Yet, as noted in the introduction, we must recognize that climate justice is a contested idea.[55] For example, as Susannah Fisher notes, the United Nations Framework Convention on Climate Change's concept of common but differentiated responsibility focuses on "the resilience of existing social systems rather than of the transformation to new more equal societies."[56] Further, while the Paris Agreement referred to climate justice for the first time, it "does not involve or provide a basis for any liability or compensation."[57] In fact, one climate justice litigation study that centered this reparation approach and took the Paris Agreement as a



point of departure made no reference to gender or other non-State identities.[58] In addition, unlike post-development, climate justice advocates do not always engage with and/or critique underpinning structural ideologies, such as the neoliberalism or Eurocentric foundations of globalization, including its paradigm of sustainable development.

Conclusion

I still vividly recall the brochures, complete with absolutely horrifying pictures showing environmental destruction, including oil spills and gas flaring from the Movement for the Survival of the Ogoni People (MOSOP), sent to the Washington DC-based International Human Rights Law Group (IHRLG). My job that fateful summer in 1995 was to assist leading international human rights lawyer Gay McDougall, then the Executive Director of the IHRLG, to lobby to save the life of MOSOP's founder and leader, Ken Saro-Wiwa, from Nigerian General Sani Abacha's ruthless repression of MOSOP's protests against fossil fuel corporations like Shell for devastating the region's environment. The struggle for environmental justice of the Indigenous Ogoni community, including the heartbreaking execution of their leader Ken Saro-Wiwa in November 1995 by the military dictatorship of General Abacha, is one of over 3,000 environmental conflicts around the world captured in the Environmental Justice Atlas.[59] This Atlas definitively shows that mining and industrial extraction of fossil fuels are a leading source of mobilizations and protests, especially by Indigenous peoples. Needless to say, these extractive activities are a leading cause of climate change.

From the foregoing perspective, climate justice offers a compelling framework for centering the experiences and perspectives of vulnerable communities upstaged by the often predominantly White voices and concerns in discussions and debates on climate change. Such exclusion is troubling in many respects, but especially so given the growing consensus among policy experts that the brunt of climate change will be shouldered overwhelmingly by people-of-color and Indigenous peoples, especially those within States that are *already* prone to economic insecurity and conflict[60], and which contribute the *least* to global climate change.[61] A devastating instance of this disproportionate exposure is that of small island developing states, like the Maldives, Tuvalu, and Kiribati, many of which will lose *all* of their territory to rising sea levels before the end of the century.[62] Centering a response to climate change in a climate justice approach ensures that issues of race, gender, identity, and indigeneity come to the fore in ways which reflect the most dire needs.[63]

We have unfortunately seen how the United States and many European States pushed back against the adoption of a recent United Nations Human Rights Council Resolution to establish an independent commission of inquiry that would uncover the facts and circumstances related to systemic police violence in the United States and elsewhere following the murder of George Floyd.[64] The United States and European countries have a long history of limiting scrutiny of their record of racial inequality, racial injustice, and ongoing marginalization of women and Indigenous peoples. By spotlighting issues of identity, gender, race, and indigeneity, a climate justice approach can coalesce into a movement that both addresses climate change and pushes back against the insidious denialism of the significance

of these issues, particularly in the United States and in Europe.

Ultimately, while climate justice does have its blind spots, just as other approaches, it opens up attention to the real concerns of Black, Brown, and Indigenous peoples who often have little power in defining the terms through which discussions of climate change are discussed and debated. This attention can only serve to strengthen our collective responses.



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Endnotes

1 Kenya Evelyn, *'Like I wasn't there': climate activist Vanessa Nakate on being erased from a movement*, THE GUARDIAN (Jan. 29, 2020), https://www.theguardian.com/world/2020/jan/29/vanessa-nakate-interview-climate-activism-cropped-photo-davos. *See also Greta Thunberg named Time magazine's person of the year,* THE GUARDIAN (Dec. 11, 2019), https://www.theguardian.com/media/2019/dec/11/greta-thunberg-time-magazine-person-of-the-year-2019; Greta Thunberg: Time's Person of the Year 2019, TIME (accessed on June 30, 2020), https://time.com/person-of-the-year-2019-greta-thunberg/. Nakate challenged this exclusion of her image. See Vanessa Nakate (@vanessa_vash), Twitter (Jan. 24, 2020, 6:30 a.m.), https://twitter.com/vanessa_vash/status/1220685316056588289.

2 *Id.*

3 *See* Tara Law, *Australia's Wildfires and Climate Change Are Making One Another Worse in a Vicious, Devastating Circle*, TIME (Jan. 7, 2020), https://time.com/5759964/australian-bushfires-climate-change/.

4 Aarti Betigeri, *How Australia's Indigenous Experts Could Help Deal With Devastating Wildfires*, TIME (Jan. 14, 2020), https://time.com/5764521/australia-bushfires-indigenous-fire-practices/.

5 Leah Asmelash, *Australia's indigenous people have a solution for the country's bushfires. And it's been around for 50,000 years*, CNN (Jan. 12, 2020), https://www.cnn.com/2020/01/12/world/aboriginal-australia-fire-trnd/index.html.

6 Graeme Samuel AC, Independent Review of the Environment Protection and Biodiversity Conservation Act – Interim Report, Department of Agriculture, Water and the Environment, Canberra, Australia, CC BY 4.0 (June 2020), https://epbcactreview.environment.gov.au/sites/default/files/2020-07/EPBC%20Act%20Review_Interim%20Report_June2020.pdf. See also Christine Eriksen & Don L. Hankins, *The Retention, Revival, and Subjugation of Indigenous Fire Knowledge through Agency Fire Fighting in Eastern Australia and California*, 27 SOC. & ENVTL. RESOURCES 1288-1303 (2014); Garry D. Cook et al., *A revolution in northern Australian fire management: recognition of Indigenous knowledge, practice, and management*, in FLAMMABLE AUSTRALIA: FIRE REGIMES, BIODIVERSITY AND ECOSYSTEMS IN A CHANGING WORLD 346-60 (R.J. Williams et al., eds., 2012) (presenting a history of Indigenous fire management in northern Australia).

7 For more on Africa's underreported humanitarian crises arising from climate change, see Zena Chamas, *Africa has the world's most under-reported humanitarian crises – but why are we turning a blind eye?*, ABC NEWS (Jan. 28, 2020), https://www.abc.net.au/news/2020-01-28/africa-has-the-worlds-most-underreported-humanitarian-crises/11903756. For more on Africa's underreported heat-wave deaths, see Friederike Otto & Luke Harrinngton, *Why Africa's heatwave's are a forgotton impact of climate change*, CARBONBRIEF (July 13, 2020), https://www.carbonbrief.org/guest-post-why-africas-heatwaves-are-a-forgotten-impact-of-climate-change. See generally Ruth Gordon, Panama and the Specter of Climate Change, 41 U. MIAMI INTER-AM. L. REV. 129, 139-48 (2014) [hereinafter *Specter of Climate Change*] (describing the global current and predicted effects of climate change).

8 Gary Nunn, Australia Fires: A*boriginal planners say the bush* "needs to burn," BBC NEWS (Jan. 12, 2020), https://www.bbc.com/news/world-australia-51043828#:~:text=For%20thousands%20of%20years%2C%20the,set%20fire%20to%20the%20land.&text=The%20fires%20burn%20up%20fuel,this%20technique%20have%20grown%20louder.

9 For a significant exception to the underrepresentation of climate issues in poor countries, see generally INTERNATIONAL ENVIRONMENTAL LAW AND THE GLOBAL SOUTH (Carmen G. Gonzalez et al., eds., 2015) (considering environmental issues, including climate change, from the perspective of poor countries and marginalized communities).

10 James Sakej Youngblood Henderson, *Postcolonial Indigenous Legal Consciousness*, 1 INDIGENOUS L.J. 1, 7 (2002).

11 See, e.g., Rebecca Tsosie, *Indigenous Peoples and Epistemic Injustice: Science, Ethic, and Human Rights,* 87 WASH. L. REV. 1133, 1150-64 (2012) (describing structural forms of epistemic injustice as barriers to equal citizenship). See generally BONAVENTURA DE SOUSA SANTOS, THE END OF THE COGNITIVE EMPIRE: THE COMING OF AGE OF EPISTEMOLOGIES OF THE SOUTH (2018).

12 *Id.* Henderson further explains: "The only sustainable category of universality is diversity. Biodiversity in its 'human' manifestation is found in the vast multiplicity of human consciousnesses and forms, the particularity of shared traditions, and the specificity of contexts." *Id.* at 49.

13 Here I rely very much on Mary Robinson, whose principles of climate justice recognize identity, particularly gender. *See Principles of Climate Justic*e, Mary Robinson Foundation (accessed on July 22, 2020), https://www.mrfcj.org/pdf/Principles-of-Climate-Justice.pdf. See also Joyeet Gupta, *The Least Developed Countries and Climate Change Law,* in THE OXFORD HANDBOOK OF INTERNATIONAL CLIMATE CHANGE LAW 741-60 (Cinnamon P. Carlarne et al., eds., 2016) (exploring the evolving historical role and legal challenges faced by the least developed countries in addressing climate change); Maxine Burkett, *The Nation Ex-Situ: on Climate Change, Deterritorialized Nationhood and the Post-Climate Era*, 2 CLIMATE L. 345-74 (2011) (contemplating a "post-climate era" in which loss of land related to climate change, particularly in Small Island Developing States, necessitates a new category of international actors, namely nations ex-situ).

14 Burkett, *Just Solutions to Climate Change: A Climate Justice Proposal for a Domestic Clean Development Mechanism*, 56 BUFF. L. REV. 169, 170 (2008) [hereinafter *Just Solutions*].

15 For a discussion of the contested nature of climate justice, see Karin Mickelson, *Beyond a Politics of the Possible, infra* note 38 (comparing and contrasting the positions of climate justice ethicists and pragmatists). *See also* Patrick Huntjens & Ting Zhang, *Climate Justice: Equitable and Inclusive Governance of Climate Action 2* (Hague Inst. for Global Just., Working Paper 16, 2016), https://www.thehagueinstituteforglobaljustice.org/wp-content/uploads/2016/04/Climate-Justice-April-2016.pdf.

16 BJORN LOMBORG, FALSE ALARM: HOW CLIMATE CHANGE PANIC COSTS US TRILLIONS, HURTS THE POOR, AND FAILS TO FIX THE PLANET (2020)). For a review, see Joseph E. Stiglitz, *Are We Overreacting on Climate Change?*, NEW YORK TIMES (July 16, 2020), https://www.nytimes.com/2020/07/16/books/review/bjorn-lomborg-false-alarm-joseph-stiglitz.html?action=click&module=Editors%20Picks&pgtype=Homepage.

17 Ashish Kothari et al., *Buen Vivir, Degrowth and Ecological Swaraj: Alternatives to Sustainable Development and the Green Economy,* 57 DEV. 362, 362 (2014) (noting sustainable development's previous use in initiatives to reduce ecological harm, poverty, and inequality, but also highlighting sustainable development's failure and fundamental incapacity too meet such objectives).

18 *See generally World Conservation Strategy: Living Resource Conservation for Sustainable Development* (Int'l Union for Conservation of Nature & Nat. Resources, 1980), http://www.a21italy.it/medias/31C2D26FD81B0D40.pdf.

19 Kothari et al., supra note 17, at 363.

20 *See generally UN, Report of the World Summit for Social Development*, Copenhagen, Mar. 6-12, 1995, UN Doc. A/CONF.166/9.

21 Kothari et al., *supra* note 17, at 364.

22 *Id.*

23 *See generally* SUNDHYA PAHUJA, DECOLONISING INTERNATIONAL LAW: DEVELOPMENT, ECONOMIC GROWTH AND THE POLITICS OF UNIVERSALITY (2011) (referring to development as a "ruling rationality").

24 Baxi, *Towards a Climate Change Justice Theory?*, 7 J. HUM. RTS. & ENV'T. 7, 19 (2016) [hereinafter Towards a Theory?]. *See also* Gustavo Esteva & Arturo Escobar, *Post-Development @* 25: on 'being stuck' and moving forward, sideways, backward and otherwise, 38 THIRD WORLD Q. 2559, 2561, 2562 (2017) (describing how early 1970s development practitioners responded to critiques of development's adverse impacts by proposing to satisfy a nebulous package of "basic needs," which carried forward into the U.N. Millennium Goals and the Sustainable Development Goals (SDGs); the authors view the latter as products of a romanticism which holds that lasting improvement will come from "more of the same").

25 Thomas Pogge, *Keynote Address: Poverty, Climate Change, and Overpopulatio*n, 38 GA. J. INT'L & COMP. L. 525, 533-34 (2010) ("Today, the persistence of poverty and the increase of socioeconomic inequality are substantially driven by global institutional arrangements that are designed by the more powerful governments for the benefit of their most powerful industries, corporations, and citizens."). Pogge describes ecological damage and the persistence of poverty as long-term symptoms of

high-stakes adversarial systems which view money as the universal reward; such adversarial systems lead to "self-aggravating regulatory capture," a collective action problem arising "when powerful players find it in their interest to influence the rules and their application in their own favor, in ways that then produce . . . ecological harms and harms to the world's poor." *Id.* at 535-36. See also Pogge, *Are We Violating the Human Rights of the World's Poor?*, 14 YALE HUM. RTS. & DEV. L.J. 1, 1-3, 32 (2011) [hereinafter Are We Violating Human Rights?] (describing developed countries' responsibility in designing and imposing harmful supranational institutional arrangements; "We have a duty not to collaborate in the design or imposition of social institutions that foreseeably cause a human-rights deficit that is reasonably avoidable through better institutions – unless we fully compensate for our fair share of the avoidable human rights deficit.").

26 *Id.* at 540. For Pogge's full proposal for an Ecological Impact Fund (EIF), see id. at 539-42 ("The creation of the EIF would shift the funding model for . . . green products from push funding, where governments and grant-making organizations decide who should receive funds, toward pull funding, where any innovator who believes she can profit has an incentive to pursue and then to promote a new product. . . . By closely aligning private rewards with publicly important outcomes, the EIF would succeed where the uncomplemented patent regime has failed.").

27 *See, e.g.*, Simon Caney, *International Distributive Justice*, 49 POL. STUD. 974, 977 (2001) ("As Pogge . . . points out, on all accounts of justice no reference is made to someone's ethnic identity or their status or their sex. These are all deemed to be irrelevant. But then given this, it is puzzling why these are morally irrelevant but someone's membership of a nation or state is relevant."). *See generally* THOMAS PIKETTY, CAPITAL AND IDEOLOGY (Arthur Goldhammer trans., 2020) (proposing progressive income taxation at the global level to fulfil social and economic rights and eliminate borders, without emphasizing marginalized populations); JOHN LINARELLI ET AL., THE MISERY OF INTERNATIONAL LAW (2018) (arguing that resource redistribution is insufficient to address global poverty without reforming underlying laws and institutions).

28 Monique Deveaux, *Beyond the Redistributive Paradigm: What Philosophers Can Learn from Poor-Led Politics*, in ETHICAL ISSUES IN POVERTY ALLEVIATION 225, 239 (Helmut P. Gaisbauer et al., eds., 2016). *See also* Renante D. Pilapil, *Beyond Redistribution: Honneth, Recognition Theory and Global Justice,* 21 Critical Horizons 34, 35 (2020) (arguing that global justice requires the elimination of "oppressive social, economic, political, and cultural conditions that prevent persons from experiencing the fullness of their existence").

29 Deveaux, *Poor-Led Social Movements and Global Justice,* 46 POL. THEORY 698, 704 (2018).

29 Arturo Escobar, *Beyond the Third World: Imperial Globality, Global Coloniality and Anti-Globalisation Social Movements*, 25 THIRD WORLD Q. 207, 212 (2004) [hereinafter *Beyond the Third World*]. See also Escobar & Wendy Harcourt, *Post-Development Possibilities: A Conversation*, 64 DEV. 6, 7 (2018) [hereinafter Post-Development Possibilities] (describing "how indigenous and popular communities are creating their own forms of modernity" at a time when the world faces "modern problems for which there are no modern solutions").

31 *Id.* at 210.

32 *Post-Development Possibilities, supra* note 30, at 7.

33 Beyond the Third World, supra note 30, at 220.

34 *Post-Development Possibilities*, supra note 30, at 7. See also Escobar, *Sustainability: Design for the Pluriverse*, 54 DEV. 137, 139 (2011) ("Rather than in terms of globalization, the evolving pluriverse might be described as a process of planetarization articulated around a vision of the Earth as a living whole that is always emerging out of the manifold biophysical, human, and spiritual elements and relations that make it up."); *Degrowth, Postdevelopment, and Transitions: A Preliminary Conversation*, 10 SUSTAINABILITY SCI. 451, 460 (2015) ("An important dimension of any transition discourse . . . should thus be moving from a view of globalization as the universalization of modernity to a view of globality as the struggle to preserve and foster the pluriverse.").

35 Rajagopal, *Counter-Hegemonic International Law: Rethinking Human Rights and Development as a Third World Strategy*, 27 THIRD WORLD Q. 767, 768 (2006) [hereinafter *Counter-Hegemonic International Law*]. *See also* Gonzalez, *Environmental Justice, Human Rights, and the Global South*, 13 SANTA CLARA J. INT'L L. 151, 190-95 (2015) (exploring competing theories of human rights law and differentiating between human rights discourse and its incorporation into elite-dominated global-governance institutions).

36 *Id.* at 781 (noting that "the course available for counter-hegemonic international law is not entirely outside the hegemonic framework that already exists").

37 Although environmental justice discourse has historical links to the United States, one finds that the underlying environmental justice issues have long existed in the Global South. See generally Joan Martinez-Alier et al., *Is there a Global Environmental Justice Movement?*, 43 J. PEASANT STUD. 731-55 (2016) (comparing *global environmental justice movements*).

38 Karin Mickelson, *Beyond a Politics of the Possible: South-North Relations and Climate Justice*, 10 MELB. J. INT'L L. 411, 412 (2009) [hereinafter *Beyond a Politics of the Possible*].

39 Burkett, Just Solutions, supra note 14, at 192 (describing climate justice as the next generation of environmental justice theory and action). See also Burkett, Climate Disobedience, 27 DUKE ENVTL. L. & POL'Y F. 1, 38 (2016) [hereinafter Climate Disobedience] ("The environmental justice movement emerged in the late 1970s and early 1980s in response to the disproportionate toxic burden of underrepresented communities."); Rebecca Tsosie, Indigenous People and Environmental Justice: The Impact of Climate Change, 78 U. COLO. L. REV. 1625, 1629 (2007) (tracing the origins of EJ and exploring EJ initiatives within Native American communities).

40 *Id.*

41 Jalonne Lynay White-Newsome, *A Policy Approach Toward Climate Justice*, 46 BLACK SCHOLAR 12, 12 (2016). *See also* Burkett, *Just Solutions, supra* note 14, at 179 (describing the disproportionate impact of negative effects of climate change and economic hardship on vulnerable communities). However, environmental justice has gone beyond its initial focus on disproportionate pollution burdens to encompass additional issues, like food and disaster justice. Gonzalez, *supra* note 35, at 154-56.

42 Shireen K. Lewis, *An Interview with Dr. Robert D. Bullard*, 46 BLACK SCHOLAR 4, 10 (2016).

43 *Climate Disobedience, supra* note 39, at 17.

44 *Id.*.

45 Martinez-Alier et al. *supra* note 37, at 736-37.

46 Mickelson, *Beyond a Politics of the Possible, supra* note 38, at 413.

47 Kishan Khoday et al., *Locating Nature: Making and Unmaking International Law: Introduction*, 27 LEIDEN J. INT'L L. 571, 572 (2014).

48 Baxi, *Towards a Theory?, supra* note 24, at 19.

49 Gordon, Climate Changes and the Poorest Nations: Further Reflections on Global Inequality, Presentation at the University of Colorado Law School's Conference: The Climate of Environmental Justice: Taking Stock (Mar. 17, 2007). See also Gordon, *Specter of Climate Change, supra* note 7, at 135; Gupta, supra note 13; Burkett, *A Justice Paradox: On Climate Change, Small Island Developing States, and the Quest for an Effective Legal Remedy*, 35 U. HAW. L. REV. 633, 634 (2013) [hereinafter A Justice Paradox] (identifying a "justice paradox" insofar as "the current international legal regime forecloses any reasonable attempts at a just remedy for the victims of climate change who are the most vulnerable and the least responsible").

50 Gonzalez, *Racial Capitalism, Climate Justice, and Climate Displacement*, OÑATI SOCIO-LEGAL SERIES 1, 7 (forthcoming 2020-21) ("Racism is thus not simply a form of bias or discrimination, but an integral part of a world system that subjects growing segments of the world's population to precarity and premature death.").

51 *Id.* at 26-7. See also Usha Natarajan, *Environmental Justice in the Global South*, in THE CAMBRIDGE HANDBOOK OF ENVIRONMENTAL JUSTICE AND SUSTAINABLE DEVELOPMENT (Carmen G. Gonzalez et al., eds., forthcoming Oct. 2020) (manuscript at 16-17) (on file with editors) (arguing from a Third World Approaches to International Law (TWAIL) perspective that the "environmental justice framework highlights commonalities and historic connections between disempowered communities within rich and poor states," and also "allows for a reconfigured understanding of where the Global South really is: a transnational and evolving place where solidarity can be built between lower class and caste communities in poor and rich states, Indigenous communities, and poor peoples of color"). This essay presents a TWAIL perspective on climate change.

52 For an analysis of the tension between the status tribes of as sovereign nations and racialized groups, see Gloria Valencia-Weber, *Racial Equality: Old and New Strains and American Indians*, 80 NOTRE DAME L. REV. 333 (2004); Carole Goldberg, *Descent into Race*, 49 UCLA L. Rev. 1371 (2002). *See also* James Thuo Gathii, *The Promise of International Law: A Third World View, Grotius Lecture Presented at the Virtual Meeting of the American Society of International Law* (June 25, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3635509 (arguing that international law scholarship has had an epistemic silence with regard to the voices of indigenous scholars of international law).

53 *See generally* PEDRO A. MALAVET, AMERICA'S COLONY: THE POLITICAL AND CULTURAL CONFLICT BETWEEN THE U.S. AND PUERTO RICO (2007).

54 Baxi, *Some Newly Emergent Geographies of Injustice: Boundaries and Borders in International Law*, 23 IND. J. GLOBAL LEGAL STUD. 15, 17 (2016). *See also* Baxi, *Towards a Theory?, supra* note 24, at 12.

55 Indeed as Ikeme argues, there is a "lack of coherence among the various environmental justice constructs… [which in turn] perpetuate the atmosphere of endless chaotic theorisation with no positive effect on the evolution of a consensus." Jekwu Ikeme, *Equity, environmental justice, and sustainability: incomplete approaches in climate change politics*, 13 GLOB. ENVTL. CHANGE 195, 203 (2003).

56 *See generally* Susannah Fisher, *The emerging geographies of climate justice* (Cent. for Climate Change Econ. & Pol'y, Working Paper No. 94, & Grantham Res. Inst. on Climate Change and the Env't, Working Paper No. 83, 2012). *See also* Gonzalez, *supra* note 50, at 14-15 (describing the UNFCCC's implicit recognition of the Global North's climate debt and responsibilities to the Global South).

57 Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015 art. 8 ¶ 52, T.I.A.S. No. 16-1104.

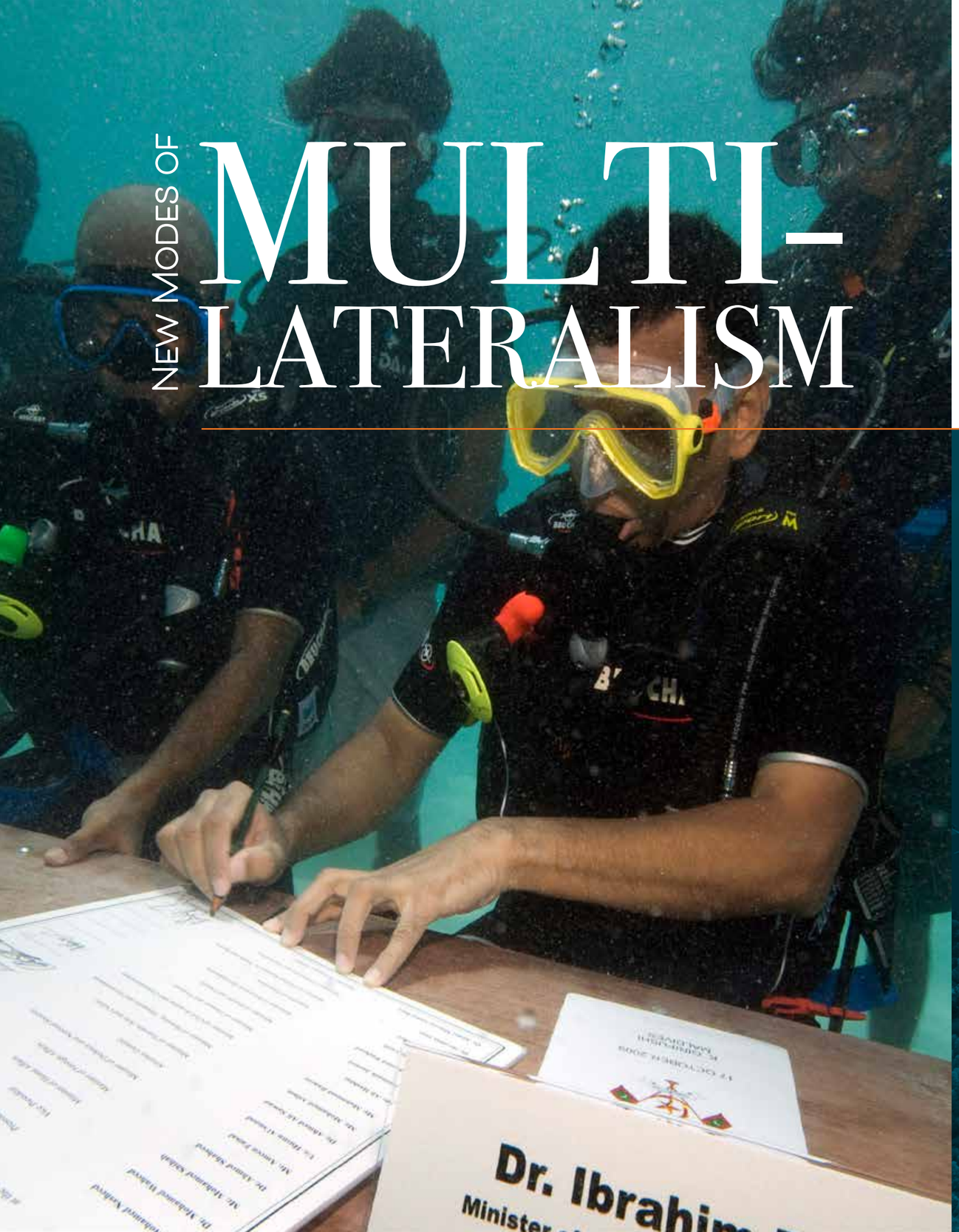
58 *See generally* Keely Boom et al., *Climate Justice: The international momentum Towards climate litigation*, (Heinrich Boell Found., 2016), https://www.boell.de/sites/default/files/report-climate-justice-2016.pdf.

59 *See Mapping Environmental Justice*, EJ ATLAS (accessed on Aug. 21, 2020), https://ejatlas.org/.

60 *See*, e.g., Lukas Rüttinger, *Climate Change in the United Nations Peacebuilding Commission and Fund* 1, 6-9, (Climate Sec. Expert Network, 2020), https://climate-security-expert-network.org/sites/climate-security-expert-network.com/files/documents/csen_climate_fragility_policy_paper_-_climate_change_in_the_un_peacebuilding_commission_and_fund.pdf.

61 *See* Burkett, *A Justice Paradox, supra* note 49.

62 *Id.* at 659.



Building Back a Better EU Foreign Policy:

Climate and Security after COVID-19

Wolfgang Ischinger

In February 2017, Bill Gates alerted world leaders at the Munich Security Conference (MSC) that "we ignore the link between health security and international security at our peril."[1]

It did not take long for this warning to become a terrible reality—as of this writing (August 2020), 750,000 people have perished from COVID-19, and that number continues to rise. That is roughly ten times the number of people that died in armed conflicts in 2019.[2]

The European Union (EU) was among the regions hit hardest in the early stages of the pandemic. More than 90,000 people have died in Italy, France, and Spain alone.[3] For decades we were under the illusion that our island of relative bliss could isolate itself from global turmoil. We chose to ignore dangers in plain view, instead of taking precautions that could have saved lives. We are advised to not repeat this mistake with regard to another global security threat: climate change. The EU needs a true climate foreign policy, and Germany should help to lead this effort.

After Us, the Floods

Last year's apocalyptic wildfires in Australia and this January's devastating floods in Jakarta gave us a glimpse of what is to come if we don't act now. In fact, for many, the changing climate already poses a massive security threat. In 2019, 24.9 million people were internally displaced as a result of weather-related disasters.[4] Absent drastic measures, such events will become even more frequent and destructive in the future. The World Bank estimates that by 2050, as a result of climate change, more than 140 million people could become internally displaced in Sub-Saharan Africa, South Asia, and Latin America alone.[5]

These climate impacts can also undermine peace, particularly in fragile states.[6] While the effect of climate change on armed conflict within states has only been modest so far, it is expected to rise with global temperatures.[7] The same holds true for interstate conflicts, as climate change may exacerbate resource scarcity or create new and contested abundance, like in the Arctic.[8] If

we continue on the current path, climate change will become one of the most serious—if not the dominant threat—to individual and global security.

The COVID-19 crisis underscores that a 21st century understanding of security needs to include non-traditional threats like climate change and points to the importance of reflecting and integrating this broader concept of security in our domestic and foreign policies. Adapting our definition of national and international security is so important because it decisively influences the way we allocate our resources. Our collective lack of pandemic preparedness—despite ample warnings—has highlighted this fact in the most painful manner.

It is good that the strategic community increasingly embraces the link between security and climate change. Eight years ago, when we started to debate the issue in Munich on a regular basis, many were skeptical as to whether climate change was a relevant agenda item for a conference on security. That is certainly no longer the case, but political action has failed to match the rhetoric. This is particularly evident with regard to the weak implementation of the agreements reached at the UN Climate Change Conferences: rather than limiting global warming to 1.5°C, as governments agreed to in Paris in 2015, the world is currently heading for 3.2°C global warming by 2100.[9] Reducing greenhouse gas emissions is the single most effective action we can take to limit climate-related security risks. Yet it is only due to the massive economic shock of a pandemic that 2020 may be the first year in which annual global emissions actually fall by the amount necessary to meet the Paris objectives.[10]

Today, most people understand that no state can address global challenges like pandemics or climate change on its own. However, international efforts are being undermined as multilateral fora and instruments lose support and nationalism gains ground. The United States' withdrawal from the Paris Agreement—and now possibly the World Health Organization—is a stark illustration of this trend. With governments understandably focused on addressing the public health emergency and economic downturn, the COVID-19 crisis has further contributed to the inward turn of many countries and diverted attention from more long-term policy objectives.



In order to offset these developments it is paramount to both strengthen the capacities of international and regional organizations and establish coalitions-of-the-willing that are able and willing to lead the way through the multilateral deadlock. Given their economic and political weight in the world, it is the European Union (EU) and its member states that have a particularly important role to play in this regard.

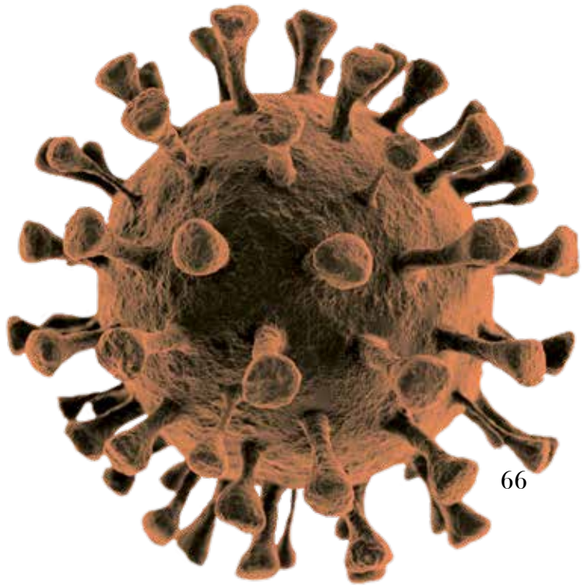
The EU and Multilateral Climate Action

To its credit, in the wake of the COVID-19 pandemic, the EU has made significant strides to boost climate action. Underlining that "for climate change, […] there is no vaccine,"[11] President of the European Commission, Ursula von der Leyen, has placed the European Green Deal at the heart of the EU recovery plan. Unfortunately, both in the Commission's initial proposals, in the subsequent deal agreed by EU leaders, and in the current budget discussions in the European Parliament, the foreign policy dimension of EU action on COVID-19 and climate change has been largely absent.

The imperative of "building back better" should not be limited to our continent. For one, the EU should seek additional ways to support international climate institutions and mechanisms to offset waning support from others during the COVID-19 crisis. The world has very little time left to limit climate change before its effects become irreversible. We simply cannot afford further delays.

But a true climate foreign policy must be about more than reducing emissions. Climate security has to be embedded strategically and operationally in EU foreign policies, such as development aid, global health security, conflict prevention, climate diplomacy, as well as global economic and trade policies.

Many countries in Europe's southern neighborhood and the Sahel are both highly fragile and particularly vulnerable to the effects of climate change.[12] In the COVID-19 crisis, these same countries face not only the immediate public health implications of the virus, but also potentially deadlier secondary and tertiary effects, such as rapid economic deterioration and food insecurity. Supporting our neighbors during these difficult times is a humanitarian imperative, but it is also a strategic imperative, as further destabilization of these regions will have direct effects on Europe's security.



Wherever feasible, policies designed to address the manifold threats posed by the pandemic in these regions should also seek to mitigate the threat of climate change, following a green do no harm principle much like EU-internal policies. For example, EU-led investment programs should prioritize climate-friendly industries. Particular attention should also be paid to democracy promotion and governance support as both the COVID-19 pandemic and climate change threaten to increase social tensions in these regions.

More Than an Afterthought

Although climate change has been part of the EU's security agenda since 2008, including in the 2016 EU Global Strategy, in practice it is still all too often only a foreign policy afterthought. The COVID-19 pandemic is both a reminder and an opportunity to change that. To that end, Germany should use its forthcoming EU Council Presidency to move the climate-security nexus up on the EU agenda und build a better and more comprehensive EU foreign policy.

Endnotes

1 Gates, B. (2017, February 17). Panel Discussion on "*Health Security: Small Bugs, Big Bombs*" [Introduction AS PREPARED]. Munich Security Conference, Munich, Germany. https://www.gatesfoundation.org/Media-Center/Speeches/2017/05/Bill-Gates-Munich-Security-Conference

2 Uppsala Conflict Data Program & Uppsala Universitet. (n.d.). *Fatalities by Type of Violence (Including Rwanda 1994), 1989-2019 [Graph].* https://ucdp.uu.se/downloads/charts/graphs/pdf_20/fat_by_tov_incrw.pdf

3 Johns Hopkins University. (2020). *COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University.* https://coronavirus.jhu.edu/map.html

4 Internal Displacement Monitoring Centre. (2020). *Global Report on Internal Displacement 2020.* https://www.internal-displacement.org/global-report/grid2020/

5 World Bank. (2018, March 19). *Groundswell: Preparing for Internal Climate Migration.* https://www.worldbank.org/en/news/infographic/2018/03/19/groundswell—preparing-for-internal-climate-migration

6 Rüttinger, L., Smith, D., Stang, G., Tänzler, D., Vivekananda, J., Brown, O. Carius, A., Dabelko, G. De Souza, R.M., Mitra, S., Nett, K., Parker, M., & Pohl, B. (2015). *A New Climate for Peace: Taking Action on Climate and Fragility Risks.* adelphi, International Alert, Woodrow Wilson International Center for Scholars, European Union Institute for Security Studies. https://www.newclimateforpeace.org/#report-top

7 Mach, K.J., Kraan, C.M., Adger, W.N., Buhaug, H. Burke, M., Fearon, J.D., Field, C.B., Hendrix, C.S., Maystadt, J.F., O'Loughlin, J., Roessler, P., Sheffran, J., Schultz, K.A., & Uexkull, N.V. (2019). Climate as a risk factor for armed conflict. *Nature*, 571, 193–197. https://doi.org/10.1038/s41586-019-1300-6

8 Johnson, B. (2020, May 14). Cruising the "7Cs" of the Arctic: A Wilson Center NOW Interview with Mike Sfraga. *New Security Beat.* https://www.newsecuritybeat.org/2020/05/cruising-7cs-arctic-wilson-center-interview-mike-sfraga/

9 United Nations Environment Programme. (2019). *Emissions Gap Report 2019.* UNEP, Nairobi. https://www.unenvironment.org/resources/emissions-gap-report-2019

10 Tollefson, J. (2020, May 20). How the coronavirus pandemic slashed carbon emissions — in five graphs. *Nature.* https://www.nature.com/articles/d41586-020-01497-0

11 European Commission. (2020, May 14). *Speech by President von der Leyen at the European Parliament Plenary on the new MFF, own resources and the Recovery Plan* [Check against delivery]. https://ec.europa.eu/cyprus/news/20200514_2_en

12 Moran, A., Busby, J.W., Raleigh, C., Smith, T.G., Kishi, R., Krishnan, N., Wight, C. & Management Systems International, a Tetra Tech Company. (2018, September). *The Intersection of Global Fragility and Climate Risks.* Produced for review by the United States Agency for International Development. https://pdf.usaid.gov/pdf_docs/PA00TBFH.pdf

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To Build Back Better, We Must Cooperate on Climate Change

Helga Maria Schmid



The havoc caused by COVID-19 is yet another wake-up call that demonstrates nature's ultimate power over our lives and societies, and the urgent need for us to better respect and protect the environment upon which we depend. As we seek to recover from the crisis, we must learn from our past mistakes and not become entrenched in them. Building back better means mending our economies and our planet at the same time. It also calls for a stronger integration of the most profound underlying environmental challenge we face—climate change—in the process of building back. This is a tall order, but, as our increasingly vocal youth remind us, we cannot afford to fail.

International cooperation is critical to the success of overcoming this pandemic and addressing climate change. Just as the virus ignores all borders and unleashes its devastation without regard for the responsibility or resilience of nations, so do the emissions from industry or melting permafrost. To win, we must demonstrate cooperation and solidarity, as individual nations, as partners, and as a single global community.

The negotiation and signature of the Paris Agreement on Climate Change by 196 states demonstrated that such an approach—and a more sustainable and resilient future—is possible. Together with another landmark global agreement—the 2030 Agenda for Sustainable Development—it charts a clear path to deliver the economic and societal transformation needed to preserve our planet and shared future.

The EU has always been at the forefront of this multilateral climate diplomacy and is strongly committed to implementing the Paris Agreement and to sustaining and nurturing the global momentum behind its goals. COP-26, due now to take place in November 2021, will be a moment of reckoning. At the meeting in Glasgow, the international community will have to set new, ambitious, emissions-reduction targets for 2030, and map the way towards climate neutrality by mid-century.

The Urgency of Now

But even this may not be enough. Science tells us that the climate crisis is accelerating. We must adapt faster. In December of last year, the EU set a target of being climate neutral by 2050 and adopted an ambitious new growth strategy to this end. The European Green Deal, together with our budget for the next seven years and the EU Recovery Plan, are designed to transform Europe into a greener, resource-efficient and competitive economy, and to help our partners to do likewise. We are determined to succeed in this ambition, and to inspire others to follow suit.

Such ambitious and integrated approaches are important for all, but particularly for the world's largest economies. G20 countries account for almost 80 percent of global CO_2 emissions. The G7 and G20 are thus important multilateral fora to drive and coordinate our climate efforts, particularly as both will play critical roles in the multilateral coordination of the post-COVID economic recovery. Global solidarity and multilateralism will be crucial to avoid any lapse into a fossil fuel and resource-intensive recovery. As we rebuild our economies, we must accelerate the transition to a low-carbon future. Our investments now must secure our future, not lock us into an unsustainable past.

The EU devotes considerable energy and resources to its climate diplomacy efforts, with a tailor-made approach promoting constructive engagement with our partners around the world; large-scale and visible activities such as "Climate Diplomacy Weeks;" dedicated programmes for partnership actions with, for example, G20 partners; and new initiatives to engage least developed countries and small island developing states. The EU also leads international cooperation on sustainable finance and works with the international financial institutions to increase green financing.

Mobilizing partnerships at all levels—bilateral and multilateral—to deliver on our climate goals is a core tenet of EU foreign policy. Another is to work to prevent and mitigate the negative consequences of climate change, including related security risks. Climate change is a serious threat multiplier, acting as a catalyst to destabilization and conflict, in particular in the most fragile states. The UN estimates that 40 percent of conflicts are exacerbated by environmental factors. Climate degradation worsens already fragile situations. The most vulnerable pay the heaviest price from natural disasters, increased pressure on natural resources, loss of livelihood, forced displacement or rising social and political unrest. Global warming is not a 'soft threat' if you live near Lake Chad and have seen your livelihood disappear along with the



The European Green Deal, together with our budget for the next seven years and the EU Recovery Plan, are designed to transform Europe into a greener, resource-efficient and competitive economy, and to help our partners to do likewise…

water you need. The current pandemic will further amplify climate-related security challenges as more people find their livelihoods destabilized.

The EU's Impact

In 2008, I was involved in the drafting of a ground-breaking paper on "Climate Change and International Security." Since then, the EU has led the way, designing its support for the most vulnerable countries to combine adaptation to global warming with conflict prevention. Additionally, Germany has done important work to push the issue up the agenda of the United Nations Security Council.

We work in North Darfur to improve the management of scarce fresh water, so that communities can share what they need to grow food. We work in Vanuatu, to help the country adapt to better handle more frequent extreme weather events. Our satellites track the impacts of climate change, feeding into our conflict early warning system and long-term planning, and helping with disaster relief. Our security Missions and Operations engage to promote security in fragile regions, such as in the Sahel and Horn of Africa where tensions are increasing as the climate deteriorates. And we will do more. Already the world's biggest climate donor, the EU will continue to increase its financial footprint, with at least 22 billion Euros dedicated to EU international cooperation on climate over the next 7 years.

As a result of our efforts and those of many like-minded partners, multi-level and multilateral governance is stepping up to the challenge of climate change, in all its complexity. Governments certainly bear the lion's share of the burden in setting ambitious targets, developing the right regulatory frameworks, and ensuring all actors deliver on their responsibilities. They are increasingly engaged and cooperating at all levels, including for example with the Global Covenant of Mayors for Climate and Energy. But societies and economies are not shaped by governments alone. One of the major innovations in multilateral diplomacy of the Paris Agreement was the engagement of non-state actors, and the recognition of their role in the fight against climate change. Its implementation will need even more active public-private partnerships and even wider and deeper community engagement.

Climate diplomacy, like so many aspects of our lives, will be forever marked by the impact of COVID-19. It is up to us to ensure this crisis does not hamper but rather accelerates the pace of multilateralism and climate action. Just like the virus, addressing global warming requires a massive global effort. The EU will stick firmly to its commitments and seize this opportunity for further reform, but we need all our partners to do the same. Together, we have a once-in-a-generation opportunity to "build back better."



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THE ROLE OF MULTILATERALISM AND MULTI-LEVEL GOVERNANCE:

An Interview with OSCE Secretary General Thomas Greminger*

** This interview was conducted in early July 2020, when Ambassador Greminger still held the post of OSCE Secretary-General.*



We are here with OSCE Secretary General Thomas Greminger. Thanks for joining us, Mr. Secretary General...

Q: The OSCE takes what it calls a "comprehensive approach to security." What does that entail? What role does climate change play in the organization's work?

Thank you, I am delighted for this opportunity to discuss climate change and security with you, a topic close to my heart.

The OSCE's concept of security is multi-dimensional. We are interested in politico-military matters, the economic and environmental aspects of security, as well as human rights issues and their relationship with security at the individual, national, and regional levels. All of these different dimensions are viewed as complementary, interconnected, and of equal importance. We also work on the premise that insecurity in one OSCE participating State is a concern for everyone else. Dialogue and cooperation between our 57 participating States serve to address challenges to our common security.

The 1975 Helsinki Final Act, the founding document of the OSCE, was innovative not only for pioneering our organization's comprehensive and co-operative concept of security; it was also among the first internationally agreed documents that recognized climate phenomena as a common challenge. The Helsinki Final Act called on OSCE participating States to cooperate for research on "adaptation to climatic extremes," even before the first World Climate Conference in 1979 framed climate change as a global political issue.

A number of OSCE documents have since made reference to climate change and global warming. In 2007, the Madrid Declaration on Environment and Security defined a "complementary role" for the OSCE in the field of climate change. Subsequently, a number of OSCE Ministerial Decisions have addressed climate change through the lens of issues like migration, energy, and disaster risk reduction.

Q: Do you and the OSCE consider climate protection part of security?

Climate change is a defining challenge of our time that affects our lives in profound ways. Scientists from more than 150 countries recently declared a climate emergency. They warn us that we will face more frequent and more powerful floods, droughts, storms, and heatwaves as well as accelerated rising sea levels. This again brings along increased scarcity and competition for vital resources like water.

Climate change and its impacts are no longer an imagined future scenario—its effects are already upon us, affecting the lives and livelihoods of millions of people worldwide. Not one of our 57 OSCE participating States is immune to these adverse impacts, which affect our security and stability both within and across borders. That is why I believe climate change warrants more attention in the OSCE.

The climate-security nexus is not yet a mainstream feature of the OSCE's security agenda. OSCE participating States so far lack a common approach, but I believe this could change in the years to come.

Early warning and prevention are among the cornerstones of the OSCE's comprehensive approach to security. In my mind, the OSCE could play a stronger role in supporting OSCE participating States to assess climate-related security risks. We have already started doing this in some subregions. Our network of field operations could be a strong asset in fostering regional and transboundary cooperation.

We also need to develop climate-sensitive conflict prevention approaches and ensure that climate action is conflict-sensitive. Even without establishing a direct causal link between climate change and conflict, it makes sense to factor in all elements that might help participating States deal with possible repercussions of climate change on their security.

Q: How will climate change influence how we govern? And what steps can the foreign policy community take to improve our response to climate change? Are there lessons from the OSCE's work that you think apply to how multilateralism and multi-governance can help mitigate climate change?

Today we are facing an unprecedented confluence of transnational threats and global challenges. Most of these complex and interconnected challenges—including climate change—are not confined within borders, and no single country or organization can tackle them alone.

At the same time, multilateral mechanisms have come under greater pressure over recent years, making genuine multilateral dialogue more difficult. The adoption of the Paris Agreement in 2015 and its ratification shortly after, is one of the greatest successes of multilateralism. Unfortunately, implementation is lagging behind and the slow pace of action is at odds with the urgency of the problem.

Similar to the COVID-19 pandemic, climate change is a systemic risk that calls for extensive cooperation across multiple sectors, borders, and regions. Partnerships and cooperation among foreign policy stakeholders, including the humanitarian, development, and security communities are essential to enhancing synergies and revitalizing multilateral approaches to climate action and the handling of climate-related security risks.

The climate security dialogue that takes place on OSCE platforms contributes to climate diplomacy by raising political awareness and allowing for discussion of diverging views in the search of a common approach. That said, we still have a ways to go to demonstrate the benefits of co-operation and to reveal the costs of not cooperating.

Consensus-based decision-making is challenging, especially on issues where OSCE participating States have diverse priorities. But consensus is a powerful tool because it ensures that decisions reached are truly co-owned. We try to pursue a unifying approach rather than a divisive one, focusing on finding areas of common interest or concern.

Given the growing recognition of the role of climate change in exacerbating risks to security and stability globally, and in the OSCE region, we must continue to search for viable opportunities to revitalize multilateral approaches to tackle these challenges. The current COVID-19 crisis has highlighted how interconnected and interdependent our economies and social systems are, and how such complex crises can magnify existing vulnerabilities and create new ones across multiple sectors, levels, and timelines.

Learning from this experience, we should invest more in speeding up the transition to green, low-carbon, and climate-resilient growth. We should enable climate-informed policy and decision-making by generating accurate data and evidence on climate change impacts. And we should retain enough flexibility in our approach so that we are able to tackle the uncertainties surrounding the climate risk landscape and its cascading consequences.

Q: **For the last three years you have been serving as the Secretary General and in 2014 during Switzerland's OSCE Chairmanship, you served as the Chair of the OSCE Permanent Council. Is there a particular OSCE climate-related project that is close to your heart?**

The OSCE has been implementing projects related to climate change for more than a decade, in close partnership with other regional and international partners, including the European Union, UNDP, UNEP, UNECE, and others.

Allow me to highlight one project that we recently launched together with adelphi: "Strengthening Responses to Security Risks from Climate Change in South-Eastern Europe, Eastern Europe, the South Caucasus and Central Asia."

With this project, we are bringing a regional approach to climate action that bridges national and global-level initiatives. The project aims to raise political awareness on security implications of climate change in the four regions where it is implemented. The project further aims to support a regional-level dialogue on climate-related security risks and to identify joint measures that would allow neighboring countries to manage such risks together.

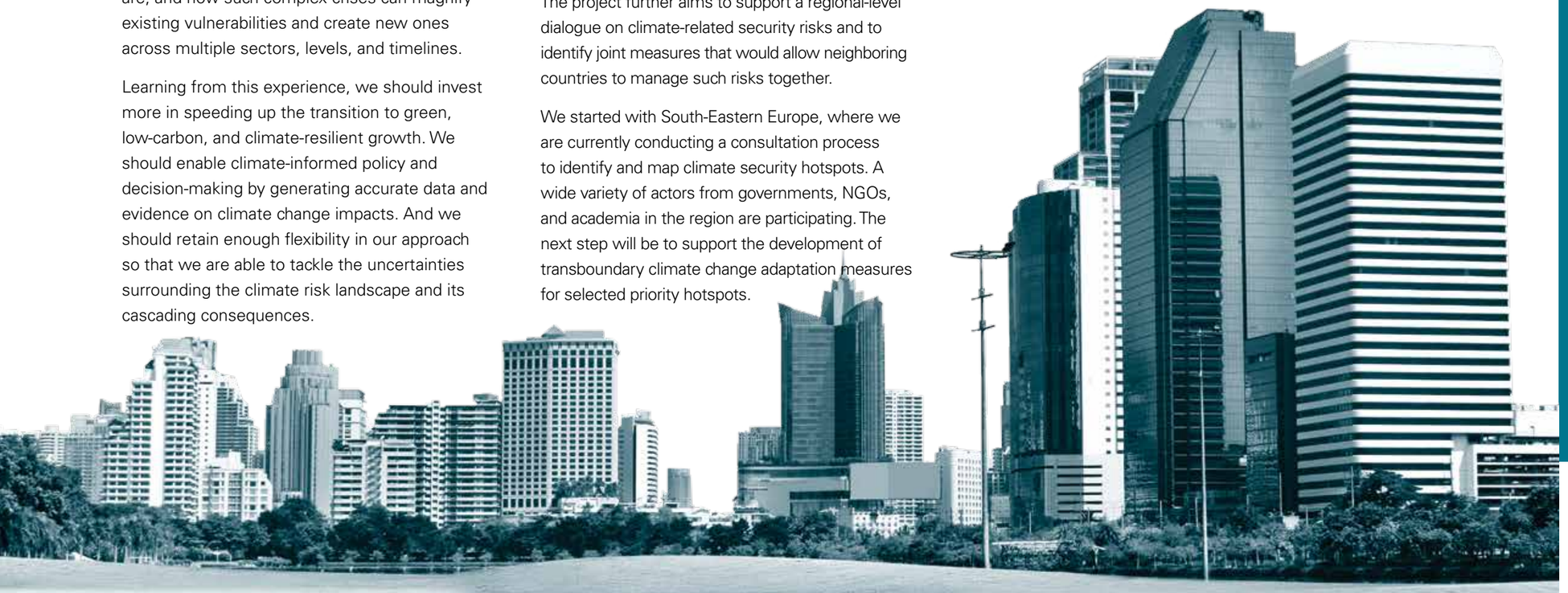
We started with South-Eastern Europe, where we are currently conducting a consultation process to identify and map climate security hotspots. A wide variety of actors from governments, NGOs, and academia in the region are participating. The next step will be to support the development of transboundary climate change adaptation measures for selected priority hotspots.

I highlight this project because it will not only support OSCE participating States in implementing their commitments for climate action but will also foster regional cooperation, contributing to broader efforts for conflict prevention and confidence-building.

Together with the Union for the Mediterranean, we are also currently developing a similar program, primarily for the OSCE's Mediterranean Partners.

All these initiatives have one common goal: to transform climate risks into opportunities for cooperation that would enhance security and stability in the OSCE region and beyond.

In conclusion, let me underline that five years after the adoption of the 2030 Agenda, the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction, it is the responsibility of the entire international community, including the OSCE, to revitalize the spirit of solidarity, trust, confidence, and collective action at all levels for a better and climate secure future.



AMBASSADOR THOMAS GREMINGER



served as Secretary General of the OSCE from July 2017 to July 2020. Ambassador Greminger joined the diplomatic service of the Federal Department of Foreign Affairs (FDFA) in 1990 and has held numerous senior management positions during his career. Prior to his appointment as OSCE Secretary General, he was Deputy Director General of the Swiss Agency for Development and Cooperation, overseeing an annual budget of USD 730 million and 900 staff in Bern and abroad. From 2010 to 2015, Greminger was the Permanent Representative of Switzerland to the OSCE, serving as Chair of the Permanent Council during Switzerland's 2014 OSCE Chairmanship. Prior to his assignment at the Permanent Delegation of Switzerland to the OSCE, Greminger was Head of the Federal Department of Foreign Affair's Human Security Division, Switzerland's competence centre for peace, human rights, and humanitarian and migration policy. Greminger holds a PhD in history from the University of Zurich and the rank of Lieutenant Colonel (General Staff) in the Swiss Armed Forces. He has authored a number of publications on military history, conflict management, peacekeeping, development and human rights. His mother tongue is German; he speaks fluent English and French, and has a working knowledge of Portuguese. In 2012, he was awarded the OSCE white ribbon for his long-standing support for gender equality.



"Multilateralism," the Climate Challenge, and the (Greater Metropolitan) Paris Agreement

Susan Biniaz

Before turning to the Paris Agreement in particular, let me start with an admission. As a lawyer for the U.S. State Department for over thirty years (and the lead climate lawyer for over twenty-five), I was involved in negotiating many of the most significant multilateral environment agreements of the past few decades. But I have never been wild about the term "multilateralism."

For one thing, I have found a lack of clarity when it comes to its meaning:

- To a lawyer, it's confusing. When people talk about a "multilateral" approach, they might mean it in its literal sense (i.e., involving three or more parties), in its fullest sense (i.e., a global regime), or in a sense that is more political than legal (i.e., in contrast to "unilateralism" or "nationalism").

- It is often not possible to motivate States to agree on a "multilateral" approach unless one State (or a small group of States) catalyzes such a solution by first acting unilaterally. When an international body reaches agreement, but was only able to do so because of a unilateral action, is that an example of multilateralism?

- An agreement might be "multilateral" in one respect but not necessarily in another. For example, a multilateral agreement might set an environmental standard but be silent on enforcement; if a State opts to enforce the standard through a trade measure, such as an import restriction, is that trade measure "multilateral" or "unilateral?" If a multilateral environmental agreement requires Parties to restrict trade with non-Parties, is the trade measure "multilateral" vis-à-vis the State that did not join?

- Even within the context of a global regime, there can be gradations of "multilateralism." The international climate change regime is arguably at the extreme end of the spectrum; not only is there near-universal participation, but decisions are taken by consensus. However, a global agreement could operate in a different way. The Montreal Protocol, for example, is global in terms of its membership but can take decisions by less-than-global super-majority voting, in some cases binding all Parties.

Not only do I find the concept of "multilateralism" to lack clarity, but my experience leads me to believe that there is nothing magical or superior about a multilateral approach *per se*. Such an approach might have its advantages, serving the purposes of, for example:

- promoting environmental effectiveness, where action in many countries is necessary to address the environmental problem in question;

- reducing competitiveness concerns, which might have otherwise impeded action;

- addressing the interests of States affected by the environmental problem; and/or,

- enhancing the legitimacy of the regime.

However, those benefits might come at a cost. A multilateral approach might impede action—by slowing things down, by making it more difficult (or even impossible) to reach agreement, or by empowering reluctant participants. In some situations, unilateral, bilateral, or "mini-lateral" approaches might be more effective. In the case of addressing CO_2 emissions from international aviation, for example, it took a unilateral act on the part of the European Union to prompt the development of an international approach. It is therefore hard to say, in a vacuum, whether "multilateralism" is the appropriate path and, even if so, exactly which form it should take.

For these reasons, I think it is useful to sidestep labels and focus instead on pragmatic



problem-solving, i.e., identifying specific problems to be addressed and potential solutions to be considered. Below I consider problems and potential approaches to addressing them in the context of the international climate regime.

The Paris Agreement – A Good Foundation

I start from the premise that the 2015 Paris Agreement is a good foundation for international action and cooperation on climate change.

In part, I rest that premise on the history of the international climate change regime. It can be debated whether the international community's initial choice, back in 1990, to take a UN-based global approach to climate change was a wise one or not. Securing agreement among nearly all countries in the world is always difficult; in the case of climate change, the challenges are compounded by the complexity of the issue, countries' wildly different interests, and North-South politics. The UN Framework Convention on Climate Change (UNFCCC) was dogged by all of these challenges; moreover, the Parties were never able to agree to move away from consensus decision-making, essentially giving any one country the ability to block a decision.



It is no wonder that it took years of trial and error to elaborate the regime. The Parties needed to strike the right balance between stringency and participation, among other factors. Kyoto veered in the direction of stringency but sacrificed participation; it included emissions cuts that were legally binding and internationally negotiated but they did not apply to developing countries (even those with rapidly growing emissions), and the United States never joined. On the other hand, the Copenhagen Accord (as filled out by the Cancun agreements) achieved widespread participation, including both the United States and China, but was thoroughly non-binding and lacked rigor in terms of rules and guidelines. Against all odds, the Paris Agreement secured stringency in terms of both form and content, as well as global participation.

However, the Paris Agreement was not just a surprisingly good outcome in light of the climate regime's difficult history; it is also a positive agreement on the merits, with the potential to deliver necessary ambition. Among other things:

- The Paris Agreement clearly sets forth the key climate objectives—limiting global temperature increase, enhancing resilience/adaptation to climate impacts, and making financial flows consistent with the other two objectives.
- Its architecture, which is both long-term and reliant on nationally determined contributions, allows Parties to focus their energies on implementation and increasing ambition, rather than continually having to negotiate new agreements/amendments/targets/etc.
- It creates an ambition cycle, with regular global assessments and updates of national action.
- It provides for robust reporting and review of both emissions and implementation.
- It finds the sweet spot between national discretion and international rules, accommodating a wide array of different national circumstances within the context of various global goals and requirements.
- The goals of the Paris Agreement are floors, not ceilings. Nothing in the Agreement prevents the Parties, or groups of Parties, from aiming higher (such as for a temperature goal of 1.5°C, rather than "well below 2," or for net zero emissions by 2050, as opposed to the second half of the century). That is already happening.
- Finally, it breaks new ground in recognizing and encouraging the contributions of non-State actors.

As the ad for Prego spaghetti sauce used to say, "it's in there."

Criticisms of the Paris Agreement

Some of the criticisms of Paris are based on misimpressions. For example, it is sometimes said that the Agreement is a failure because the NDCs put the world on track to warm by three or more degrees Celsius. That would be a valid criticism if the Agreement stopped with one set of NDCs. But the initial NDCs were never designed to fully achieve the Agreement's temperature goal. Rather, they were intended to guide the early years and then be replaced by more ambitious NDCs in subsequent years. The Agreement has an indefinite time-frame, with regular global assessments and NDC updates along the way.

Other critiques, for example, that countries have not been doing enough under the Agreement to tackle climate change, say more about the nature of the climate beast—and the insufficient political will to address it—than about the Agreement itself. Moreover, two unanticipated events since Paris have further affected enthusiasm for climate action: the U.S. withdrawal from Paris has likely eroded political will, at least in some countries, and the arrival of a pandemic in 2020 has, at a minimum, diverted political attention.

Criticisms that the Agreement would be stronger if the targets were negotiated, legally binding, and enforceable, do not address whether a "stronger" agreement, at least on paper, would have been more effective in real life. Even assuming for the sake of argument that such a design could have been agreed to, would it have had a positive or negative effect on participation (including that of the United States and China), the level of ambition, and actual implementation?

But More Needs to Be Done…

That said, much more needs to be done to effectively grapple with the enormity of the climate challenge. The international community is currently not doing enough to address climate change, whether by reducing greenhouse gas emissions, adapting to impacts, or otherwise. Per the IPCC and other sources, we are not nearly on track to

keep the world at a safe temperature—one that does not involve devastating impacts and upend life as we know it; even at a "safe" temperature, there would be significant negative impacts.

If we are to avoid the worst consequences of climate change, we need to act with sufficient vigor and speed to effectuate a massive transition from fossil to non-fossil energy and the large-scale removal of carbon from the atmosphere.

Five Steps Towards Achieving the Paris Objectives

I would suggest five things that need to happen to move us closer toward achievement of the Paris objectives—some inside Paris proper and some outside, in the "greater metropolitan" area. COVID-19 injects huge "known unknowns" into the mix, and others might equally pick five different items for their agenda, but here is my multi-forum, multi-actor list.

1. NDCs – It Takes a Village

The "nationally determined contribution" (NDC) is the backbone of the Paris Agreement. This design feature of the Agreement, which relies on the Parties to set and update their emissions contributions rather than specifically directing them to do X or not do Y, depends upon the Parties' political will to deliver adequate reductions over time. There is nothing automatic about it.

For the NDCs to be successful, help will need to take many forms, from many sources:

- High-level political attention (such as that provided by the UN Secretary General, the G7, and the G20) is needed to help keep Parties focused on the importance of NDC implementation and enhancement.
- Financial and technical assistance (such as through the Green Climate Fund and the NDC Partnership) is needed to help some developing countries with the implementation of their NDCs.
- Pressure from civil society is needed to help keep climate action on the front burner, as well as push for stronger commitments.
- Action by sub-national governments and other non-State actors is needed to contribute to NDC implementation, as well as provide confidence to Parties to raise their ambition.
- Should the United States return to Paris in the short term, its leadership and other tools will be needed to promote global NDC implementation and improvement. Admittedly, the atmosphere doesn't care whether emissions are reduced pursuant to an NDC or otherwise. However, NDCs are the currency of the Paris Agreement, and it is important for the viability of the regime to ensure that a significant amount of climate action is captured in this form.

2. Specific Initiatives – Getting to Net Zero

In the few years since 2015, when the Paris Agreement was adopted, conventional wisdom has shifted in the direction of the need for both a stronger limit on global temperature increase (1.5°C., rather than well below 2) and a nearer-term goal for net zero emissions (2050, rather than the second half of the century). As such, there needs to be greater emphasis on initiatives focusing on specific decarbonization objectives (whether related to reducing emissions, increasing removals, or both) among smaller sets of actors.

- In terms of "who," there could be a role for sub-sets of Parties (i.e., national governments) and/or multi-stakeholder initiatives involving sub-national governments, companies, etc.
- In terms of "what," efforts could involve, for example, sectoral cooperation (e.g., cement) and/or a specific objective (e.g., related to the internal combustion engine).
- In terms of "where," efforts could take place in a forum outside the UNFCCC/Paris Agreement, such as in a revived U.S.-led process involving the world's major economies, or the G20. Instead or in addition, they could be rooted somehow in the UNFCCC/Paris; at a minimum, outside cooperative arrangements could potentially be fed back into the Paris regime, e.g., as part of the regular global stocktake.
- In terms of "how," to the extent that "agreement" is reached on any particular subject, initiatives might result in a non-binding outcome, a binding agreement, or other arrangements; in some cases, there may just be cooperation without a particular written outcome.

3. The Conference of the Parties (COP) – In Need of Reimagining

Even before COVID-19, it was a good time to review and rethink the "COP," the annual UNFCCC climate change conference.

The COP has historically revolved around intergovernmental negotiations, with success measured (rightly or wrongly) by the extent to which the Parties to the UN Framework Convention or the Paris Agreement are able to reach agreement. However, things are changing:

- With the Paris Agreement in force, the Paris design based on non-negotiated mitigation contributions, and the "rulebook" nearly completed, future COPs will involve much less negotiation.
- There is a growing disconnect between the demand for climate action and what the official COP has been able to deliver.
- Non-State entities have become more significant as climate actors, not just in the United States (where they work to uphold the Paris goals in the face of withdrawal) but all over the world. They are not only taking extensive action but also discussing and debating emerging issues and approaches (such as carbon dioxide removal) in ways that the COP is not. At the recent Madrid COP, there were times when the so-called "side events" seemed like the main event, and the official proceedings seemed like the side event.

The COP's role as an action-forcing event is too important to alter its annual frequency. But it is time for the COP to adapt. As just two examples:

- A more effective COP would put greater emphasis on, and energy into, practical implementation than on agreed COP pronouncements. For example, a session on unpacking the issues involved in developing a national strategy to decarbonize the economy by the middle of the century could be more useful than chasing a consensus sentence on such strategies (which is likely

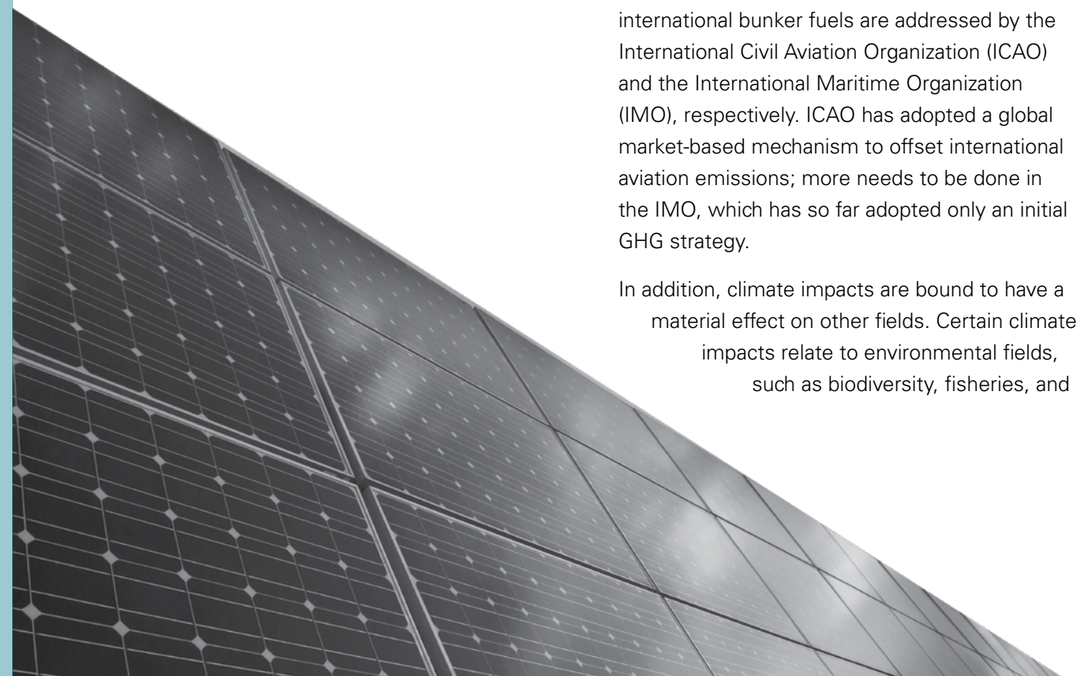
> If we are to avoid the worst consequences of climate change, we need to act with sufficient vigor and speed to effectuate a massive transition from fossil to non-fossil energy and the large-scale removal of carbon from the atmosphere.



to be least-common-denominator and without real-life impact).

» A COP should aim to reduce the gap between the official universe (the Parties) and the unofficial universe (the non-State actors). The UNFCCC regime is already far ahead of others in terms of supporting and engaging so-called "non-Party stakeholders." More could be done, however, to combine the worlds, such as through platforms for multi-stakeholder initiatives, greater ease of access for states, cities, etc.

Of course, COPs cannot be expected to evolve effectively unless there is also an evolution in the metrics used to judge them. For example, if COP watchers treat implementation as dull and focus unduly on the presence or absence of particular words in an official outcome, reform will be more difficult. At the same time, unless COPs can change to fit the new realities (and COVID-19 has added extra challenges to staging a large conference, to be sure), they risk losing force and relevance.



4. The Importance of Other Fora – It's Your Problem Too

The Paris Agreement cannot fully advance its objectives without the help of other international agreements and institutions. As noted above, certain fora will need to lend political, technical, and/or financial support to the implementation and enhancement of NDCs. But others also need to step up, as the Montreal Protocol on Substances that Deplete the Ozone Layer did when it adopted the 2016 Kigali Amendment to regulate the production and consumption of hydrofluorocarbons (HFCs).

In some cases, other fora may be appropriate because an issue demands specialized expertise. For example, the Paris Agreement calls for strengthened cooperative action on technology development and transfer. However, no one would expect an agreement to reduce or eliminate tariffs on climate-friendly goods to be negotiated under Paris auspices.

In other cases, the UNFCCC regime has designated particular fora to address greenhouse gas emissions. In this regard, emissions from international bunker fuels are addressed by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), respectively. ICAO has adopted a global market-based mechanism to offset international aviation emissions; more needs to be done in the IMO, which has so far adopted only an initial GHG strategy.

In addition, climate impacts are bound to have a material effect on other fields. Certain climate impacts relate to environmental fields, such as biodiversity, fisheries, and

protection of the marine environment, and should be taken up by fora addressing those issues. Other impacts, such as sea level rise, have implications for, e.g., the law of the sea and migration.

Finally, in some cases, the issue is less about *taking* climate action than about *not impeding* climate action. If the Paris Agreement works as intended, Parties will be assuming increasingly ambitious targets over time. At least some of the national measures taken to achieve them are likely to be challenged under other regimes that regulate trade and/or investment (such as the WTO). There may be ways for such fora to make an affirmative contribution to the climate effort, such as through fossil fuel subsidy reform. However, at a minimum, they should consider how best to ensure that their regimes do not stand in the way of *bona fide* climate action.

5. Climate = Foreign Policy

To date, climate change has been largely addressed alongside foreign policy, rather than as part of it. In the United States, even under the climate-friendly Obama Administration, and with international climate negotiations embedded in the State Department rather than another agency, climate issues were not mainstreamed into the day-to-day business of the department.

However, to the extent that efforts in the above realms are to be successful, many will depend, at least in part, on convincing officials and other actors in "traditional" foreign policy spaces of the need to integrate climate change into their worlds. There needs to be a broad national commitment to the issue. Climate change has too many sources, on the one hand, and implications, on the other, to be either ignored or treated as a niche issue with little or no bearing on other fields.

This needs to change. Steps such as these could help:

- **Lead by example:** Those in leadership positions should make clear to policymakers that the days of giving short shrift to climate considerations are over. There needs to be institutional recognition of the many ways in which actions taken in certain fields (e.g., trade, aviation, shipping, agriculture) can help reduce climate change and how certain other fields (e.g., migration, law of the sea, food security, conflict) are potentially affected by climate impacts.
- **Educate:** Governments should explore ways to integrate climate literacy into standard diplomatic training and continuing education.
- **Cut the jargon:** Climate specialists, especially those involved in the international negotiations/regime, need to do a better job of speaking in a language that non-specialists can understand. Partly because the regime is complicated, and partly because particular words have taken on outsized significance in the negotiating process, climate negotiators (myself included) tend to speak in code. We need to make the climate regime more accessible.
- **Institutionalize through structure and personnel:** Governments should organize themselves so as to better integrate climate change with traditional foreign policy issues. This could involve not only how they set up their bureaucratic structures (e.g., including international climate issues within the ministry of foreign affairs) but how they select and assign personnel.

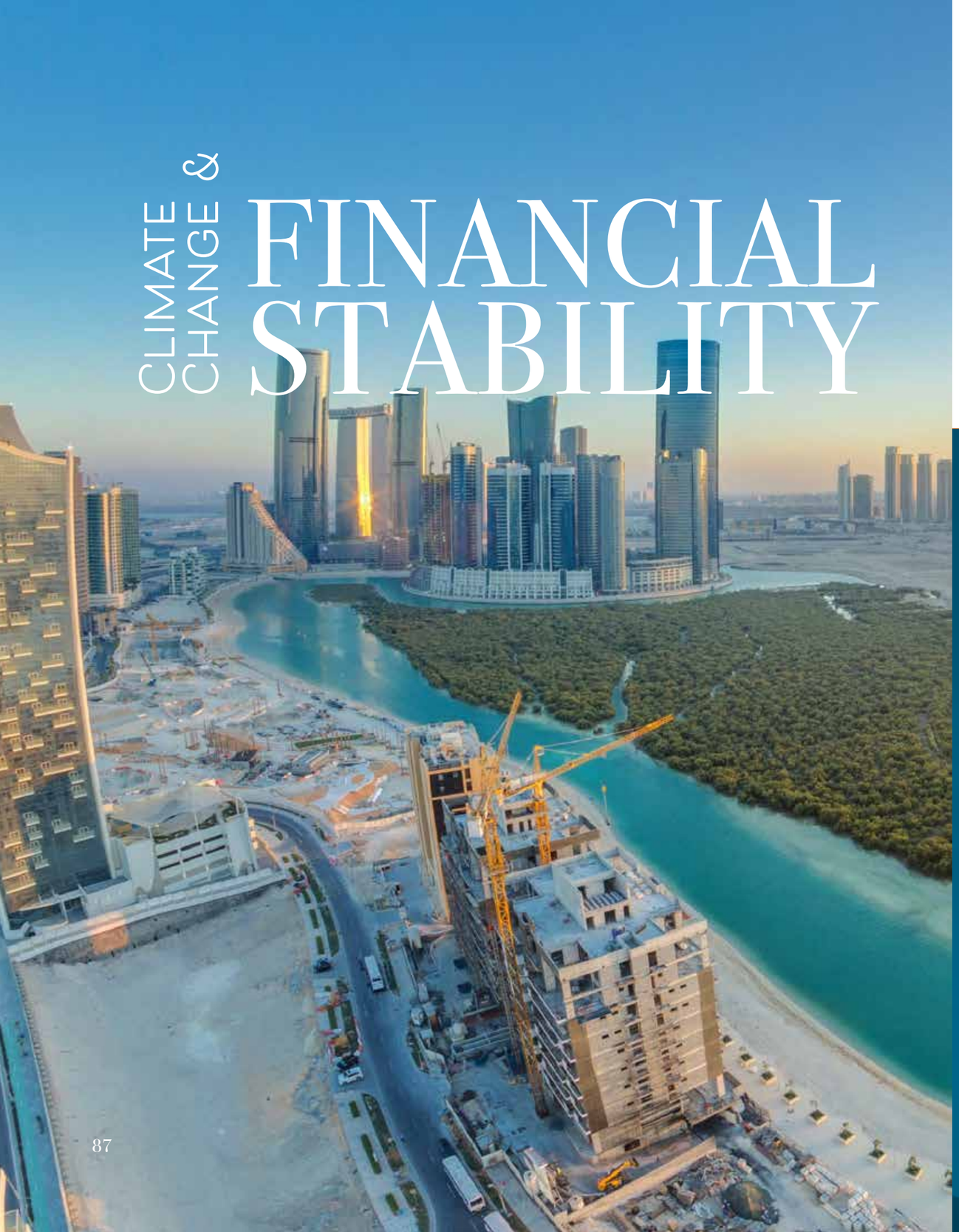
Conclusion

In sum, we have the right foundation—it's the Paris Agreement. Like any foundation, it needs additional layers or, to pick up the city metaphor, additional structures both within Paris proper and within its surrounding areas. These need to include ever-improving NDCs from Parties, heightened commitments from smaller coalitions, ambitious action from non-State actors, help from other international agreements, and integration of climate issues across the foreign policy landscape. The international community may or may not succeed in avoiding the worst climate impacts; if it fails to do so, however, it will not be a function of the Paris Agreement but rather of a lack of political will that no agreement alone, whatever its design, could overcome.



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To Protect Financial Stability, Confront Climate Change

Determined policy action can help meet an existential challenge.

Tobias Adrian

Climate change confronts humanity with an existential challenge. Climate-related disasters already cause immense human suffering as well as large economic, financial, and ecological damages. Direct damages from Thailand's 2011 floods, for example, cost around 10 percent of the country's GDP. Over the past decade, direct damages of climate-related disasters added up to $1.3 trillion (or around 0.2 percent of world GDP on average per year). Indirect damages were even higher: although precise estimates currently do not exist, some have calculated that indirect costs may be five to ten times the direct costs, or $6.5–$13 trillion. For instance, the total estimated cost of California's 2018 wildfires is about eleven percent of California's GDP, versus only 1 percent for the direct damage. Moreover, climate science is sending us a clear warning: Unless we change our ineffective current policies, extreme weather events are destined to become more destructive and more frequent, and global warming will have increasingly disruptive socio-economic impacts.

Climate change puts global financial stability at risk. Destructive hurricanes and droughts not only increasingly chip away at the global economy, but they also weaken financial stability. Our recent *Global Financial Stability Report* examined the impact of climate change's physical risk (the loss of life and property as well as disruptions to economic activity) on financial stability: it found that stock market investors are not paying enough attention to this risk, and they should.[1]

The increasingly destructive impacts of hurricanes and wildfires illustrate that even seemingly well-known types of risks can take us by surprise. Addressing the climate challenge fundamentally requires that the global economy move away from a dependence on resources that produce high carbon dioxide emissions, like coal. To do so will require planning for a necessary and complex transition to a low-carbon economy. Firms with business models dependent on carbon emissions could see their earnings decline and their funding costs increase, while other industries may benefit from new opportunities. Global investments to address climate change are estimated in trillions of U.S. dollars, and most are likely to be intermediated through the financial system. Financial

inaction—the low-carbon transition becomes uncoordinated or abrupt, triggering rapid shifts in investor and consumer behavior. If the financial system is weak, for example, due to excessive leverage, it will exacerbate these shocks, hurting the real economy.

Policymakers are starting to recognize the dramatic implications of climate change for financial stability, and the urgency of speeding the low-carbon transition. Incorporating climate-related risks into policymaking requires assessing financial stability over longer horizons, using new methodologies. A growing number of central banks and financial regulators—including those in the Network for the Greening of the Financial System (NGFS)—are realizing the importance of these issues and are aiming to integrate climate-related risks into financial stability oversight.



The International Monetary Fund (IMF) is helping countries better understand the macro-financial transmission of climate risks. Analyzing risks and vulnerabilities is at the core of what we do at the Fund. The IMF pioneered the use of stress test for financial stability analysis 20 years ago when, along with the World Bank, it began the Financial Sector Assessment Program (FSAP). Over the past decade, one in five FSAP assessments considered climate-related risks, and IMF staff have been working to increase coverage of those risks in ongoing and planned FSAPs. Earlier tests focused on physical risks, such as insurance losses and nonperforming loans associated with natural disasters. Recently, our stress tests—such as the 2019 assessment for the Bahamas[2]—have included scenarios that analyze the combined macro-financial impact of a severe hurricane and an economic downturn. More comprehensive assessments are planned in other countries, and IMF staff have started examining the financial system's exposures to the low-carbon transition. Next steps include capturing second-round effects, in which asset price declines lead to "fire sales," generating vicious cycles that amplify the initial shock. IMF staff collaborate with World Bank colleagues, NGFS members, and others to further upgrade the framework for assessing climate-related risks.

Only with accurate and standardized reporting of climate risks in financial statements can investors discern companies' exposures to climate-related risks. The Fund supports efforts to strengthen the quality and consistency of climate disclosures. Efforts such as those of the Task Force on Climate-related Financial Disclosures are

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welcome, but IMF research has found disclosures to be uneven across countries and asset classes. Partly as a result, investors have been reluctant to invest at the scale necessary to mitigate climate change, especially since policy action to address climate change has been lagging.

The standardization of climate risk disclosures would improve the comparability of information in financial statements across markets and jurisdictions. Granular, firm-specific information on exposures and vulnerabilities would help lenders, insurers, and investors to better grasp climate risk. It would also help improve climate stress testing by central banks, supervisors, and other oversight bodies. Developing a global climate risk disclosure framework requires stepping up global cooperation and global leadership. Such a framework is essential for preserving financial stability.

More broadly, the IMF can help by providing advice to policymakers on climate-related macro-financial policies. Addressing climate change in a sustainable way requires strong global policy action across many policy fronts. Macro-financial policies have a key role to play due to the magnitude and global nature of the risks and the strong complementarities of climate protection with macroeconomic performance and financial stability. For example, expanding the availability of insurance and increasing the sovereign's financial strength can reduce the impact of climatic disasters, thus decreasing financial stability risks. Fiscal policies (such as carbon pricing) and structural policies (such as emission standards) have key roles to play in reducing emissions and mobilizing revenues, but the financial sector is also critical. Financial institutions and markets already provide financial protection through insurance and other risk-sharing mechanisms, such as catastrophe bonds. The financial system can help mobilize resources for investments in climate mitigation (reducing emissions) and adaptation (building resilience) in response to price signals such as carbon prices. If policymakers implement policies to price externalities and to incentivize the low-carbon transition, the financial system can help achieve these goals efficiently. The IMF has thus been integrating climate change into its financial sector policy advice.

The COVID-19 pandemic reminds us that crisis preparedness and resilience are essential to manage risks from uncertain, complex events that can have extreme economic and human costs. The pandemic highlights the fragility of our natural world, underscoring the fact that climate change remains an urgent and existential issue. Like the pandemic, the climate crisis may seem remote, but its impact can manifest itself abruptly. Like the pandemic, the climate crisis is linked to the degradation of the natural environment. Like the pandemic, poor and vulnerable populations suffer most from climate shocks. Like the pandemic, ignoring the climate crisis involves massive financial risks. Like the pandemic, the climate crisis has no borders, and mitigation is less costly than containing the crisis once it has materialized. And like the pandemic, the climate crisis requires a forceful and globally coordinated response.

The pandemic-induced economic crisis does not change the fundamental climate challenge, or the proper response to it. Even a prolonged global recession would have only a modest impact on the stock of atmospheric greenhouse gas emissions. Therefore, raising the cost of emissions remains central to addressing the externality problem at the heart of climate change. And the policy action required also remains ambitious: For example, containing global warming to 2°C or less would require rapidly phasing in measures equivalent to a global tax of at least $75 per ton by 2030, whereas the current global average carbon price is $2 per ton.

Taking action to address climate change demands the mobilization of both public and private finance. In that context, it is critical to ensure that financial instability does not undermine the low-carbon transition. Financial firms and infrastructures, central banks, and financial regulators have essential roles to play: with determined action, the financial community can help society increase its chances of survival as it confronts the looming climate crisis.

Endnotes

1 Deghi, A. Feng, A., Gan, Z.K., Khadarina, O., Suntheim, F., & Xu, Y. (2020, April). *Chapter 5: Climate change: Physical risk and equity prices. Global financial stability report: Markets in the time of COVID-19.* International Monetary Fund. https://www.imf.org/en/Publications/GFSR/Issues/2020/04/14/global-financial-stability-report-april-2020#Chapter5

2 International Monetary Fund. (2019, July 1). *The Bahamas: Financial sector assessment program – Technical note on financial stability and stress testing.* https://www.imf.org/en/Publications/CR/Issues/2019/07/02/The-Bahamas-Financial-Sector-Assessment-Program-Technical-Note-on-Financial-Stability-and-47071

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How to Defuse the "Double Jeopardy" of Climate and Financial Risks in Developing Countries

Ceyla Pazarbasioglu

As the COVID-19 pandemic was destroying lives and livelihoods across the world, Pacific Island nations faced a catastrophe of a more familiar kind. In April, Cyclone Harold cut a deadly swath through these nations, destroying homes, schools, and hospitals and dealing an additional blow to their efforts to manage the health, social, and economic effects of the pandemic.[1]

These nations, in economic terms, were already some of the world's most vulnerable[2]—many of them heavily dependent on commodity exports and tourism and short on the fiscal buffers necessary to cope with setbacks. The combined effects of COVID-19 and Cyclone Harold are expected to result in a massive decline in national income in these countries. Disasters on this scale, moreover, tend to leave lasting scars[3], reducing human capital and lowering productivity for years.

Pacific Island nations are hardly alone in confronting this "double jeopardy"—where climate risks and financial risks amplify one another and create a vicious circle of instability. About a third of countries in East Asia and the Pacific, Latin America and the Caribbean, South Asia, and sub-Saharan Africa face elevated risks from extreme weather—such as floods, storms, and droughts—and from macroeconomic, debt, and banking-sector risks.[4] These cascading risks will further compound existing vulnerabilities, further weakening countries' abilities to confront climate impacts.

Countries facing this double jeopardy typically have limited means to recover from the physical damage caused by extreme weather events. It is hard for them to promptly mobilize the necessary financial resources because their borrowing costs tend to be relatively high. Economic problems can spill over quickly to the financial system when physical damage reduces property and asset values for businesses and consumers. At the same time, governments attempting to build low-carbon economies must contend with the financial risks associated with changing investor risk assessments and valuations.

Yet there is a way forward for these countries. Governments can build financial resilience and capacity to deal with climate-related risks. In our

experience working with developing economies, policies should strive to achieve four goals:

1. **Strengthen macro-financial resilience.** As the public and financial sector play central roles in climate mitigation and adaptation efforts, measures to strengthen macro-financial systems are key for tackling the consequences of climate change. These include macro-economic, fiscal, monetary, and financial sector measures, such as adequate pricing of carbon emissions and well-designed disaster-risk financing strategies.

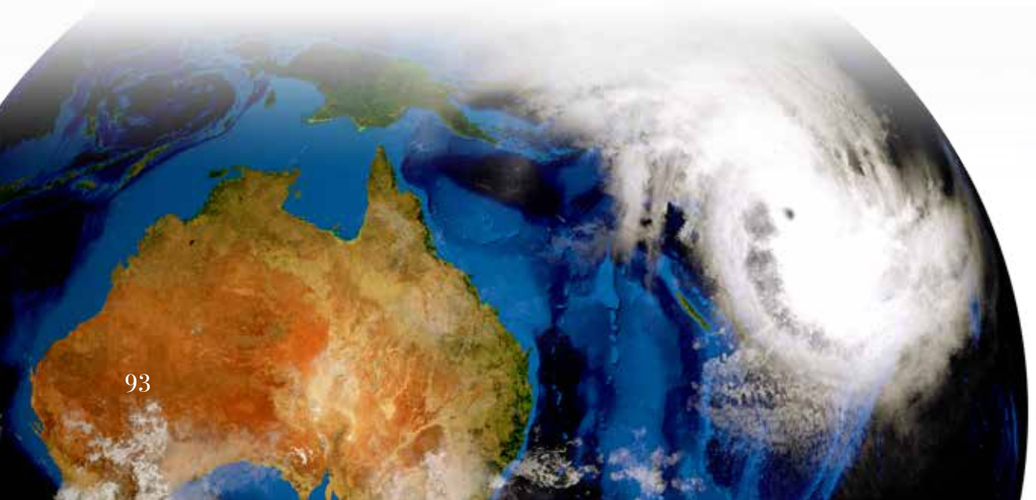
2. **Assess and disclose climate-related risks.** Climate change poses significant physical and transition risks, but efforts to assess these risks are in their infancy. Data gaps should be addressed, and risks should be transparently disclosed and incorporated into monitoring exercises, including macro-economic and financial stress tests.

3. **Incorporate impacts of climate change in growth diagnostics.** Climate-related risks to economic growth are significantly under-estimated. Well-designed adaptation and mitigation efforts can have positive impacts on growth. This points to the importance of reflecting climate-related risks and mitigation and adaptation impacts in the assessment of countries' growth prospects and the design of growth strategies.

4. **Promote green finance.** Green finance encompasses financial investments that have environmental objectives.[5] Besides enhanced disclosure, green finance requires the development of widely recognized taxonomies, regulatory frameworks, and national strategies. This will create incentives for stakeholders to incorporate climate issues into their risk management and investment approaches, and it can encourage the creation of new financing instruments.

Support from the international community is crucial. The World Bank, together with partners, is working closely with vulnerable countries to address financial risks emanating from natural disasters and climate change. We are also helping clients leverage the power of the financial system to be a force for climate adaptation and mitigation.

Better financial risk management is at the heart of these efforts. The Financial Sector Assessment Program (FSAP), a joint effort of the World Bank and IMF, helps regulators and financial-sector supervisors integrate climate risk into their over-sight. These pilot assessments include identifying vulnerabilities with respect to financial-sector soundness and stability; evaluating the supervisory responses of banking, insurance, and capital market regulators; and identifying opportunities for green finance. We have also helped regulators set up stress testing for typhoon risk, and enabled some governments to adopt a similar approach to flood risk.





In developing countries, a lack of well-functioning insurance markets often exacerbates climate risks. Better developed insurance markets can contribute significantly to the resilience of the economy at large and may reduce the government's fiscal burden in rebuilding from a disaster.

Longer-term technical assistance is also important. With the World Bank Group's private sector arm, IFC, we have started a comprehensive program to help banks and institutional investors in Colombia offer more green financing. The program consists of four components: assessing climate risks in the banking sector; integrating sustainability factors into investment decisions; developing a taxonomy of economic activities; and stakeholder engagement and capacity building.

Dialogue among financial-sector stakeholders can also make a key difference. Central banks and supervisors have joined forces across the globe to address climate related financial risks, as part of the Network for Greening the Financial System (NGFS).[6] We also work closely with the IFC-led Sustainable Banking Network (SBN)[7] and support the Coalition of Finance Ministers for Climate Action.[8]

Over the past decade, the World Bank has provided financing and advisory services to promote financial resilience against natural disasters and crisis risks to over 60 countries, including over US$2.5 billion in contingent lines of credit and US$3.9 billion in market-based catastrophe-risk transactions. Our technical assistance has supported ministries of finance as well as helped financial and insurance regulators develop reliable risk models, and advanced financial analytics and market-based risk financing products needed to better understand, anticipate, and respond to natural disasters, climate change, and other complex crises in a timely and cost-efficient manner.

This work fits within a broader agenda for climate change. We believe fiscal-policy measures such as carbon taxation or phasing out fossil-fuel subsidies standards have a key role to play—as do regulatory measures to increase energy efficiency.

These can be politically difficult reforms—requiring citizens to accept short-term pains in return for long-term gains. Yet we must tackle them head on. COVID-19 illustrates the steep costs of complacency. All countries should act now to defuse the double jeopardy of climate and financial risks. It is within our means to shift to a low-carbon economy without creating financial risks.

Endnotes

1 Gunia, Amy. (2020, April 17). This Tiny Nation Has Zero Coronavirus Cases. After a Devastating Cyclone, It's Refusing Foreign Aid Workers to Keep It That Way. *Time*. https://time.com/5820382/coronavirus-cyclone-harold-vanuatu/

2 World Bank. (2020, June). East Asia and Pacific. *Global Economic Prospects*. http://pubdocs.worldbank.org/en/667991588788067485/Global-Economic-Prospects-June-2020-Analysis-EAP.pdf

3 World Bank. (2020, June). Chapter 3: Lasting Scars of the COVID-19 Pandemic. *Global Economic Prospects*. http://pubdocs.worldbank.org/en/112641588788257004/Global-Economic-Prospects-June-2020-Topical-Issue-1.pdf

4 Feyen, E., Utz, R., Huertas, I.Z., Bogdan, O., Moon, J. (2020, January). *Macro-Financial Aspects of Climate Change*. Policy Research Working Paper 9109. World Bank Group. https://openknowledge.worldbank.org/bitstream/handle/10986/33193/Macro-Financial-Aspects-of-Climate-Change.pdf?sequence=1&isAllowed=y

5 G20 Green Finance Study Group. (2016). *G20 Green Finance Synthesis Report*. http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf

6 *Network for Greening the Financial System*. (2020). https://www.ngfs.net/en

7 International Finance Corporation. (2020). *Sustainable Banking Network*. https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/company-resources/sustainable-finance/sbn

8 *The Coalition of Finance Ministers for Climate Action*. (2020). https://www.financeministersforclimate.org/

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Financial Stability in the Age of Global and Systemic Ecological Risks ("Green Swans")

Patrick Bolton, Morgan Després, Luiz Awazu Pereira da Silva, Frédéric Samama & Romain Svartzman

Central banks' mandates of price and financial stability will increasingly face the risks posed by climate change and other global ecological challenges such as biodiversity loss. This suggests that central banks have a role to play in managing these risks. However, climate-related risks are characterized by radical uncertainty and the need to engage in a system-wide transition, which requires both independent action from multiple stakeholders and an unprecedented level of international coordination. Central banks' interventions are therefore constrained by both the nature of our ecological predicament and by the need for structural change. The question regarding their role must then be reframed as follows: Given that structural transformation of the global economy is a prerequisite for financial and price stability, how can central banks contribute to the coordination needed to preserve the resilience of our Earth's ecosystems?

Climate Change Adaptation and Mitigation as Global Challenges

The unprecedented challenges posed by climate change are well documented. Climate-related impacts, such as rising sea levels, droughts, floods, extreme weather events, and soil erosion, are projected to increase over time.[1] They could lead to unbearable stresses on ecosystems and "untold suffering" for human beings, according to more than 11,000 scientists.[2]

Through these impacts, climate change can generate geopolitical tensions and pose significant financial and economic stability problems. What is more, the worst consequences of climate change will likely be concentrated in low-income countries[3], potentially leading to the displacement of hundreds of millions of people[4] and increasing global inequality, reversing the trends[5] of income growth made over the past decades, and triggering new conflicts.[6]

The authors of this essay are co-authors of "The green swan: central banking and financial stability in the age of climate change." The views expressed are those of the authors and do not necessarily reflect those of their respective institutions.

While avoiding these impacts seems a no-brainer, the hard reality is that a low-carbon transition also raises significant geopolitical issues[7] (unless one puts all one's faith in technologies[8] such as geoengineering that would solve the problem). For instance, a move towards renewable energy could shift the balance of power between countries, reorder trade flows and global value chains (e.g., because of climate clubs among countries willing to implement adequate carbon prices), and even generate new conflicts related to access to minerals needed for renewables.[9] Moreover, some countries (for instance those involved in the extraction of shale oil and tar sands) would need to rapidly discontinue some key carbon-intensive activities[10], which could generate important losses of revenue (although those could ultimately be compensated by employment and revenues in other sectors).

These patterns may partially explain why the principle of "common but differentiated responsibilities"[11] enshrined in international climate negotiations remains largely ineffective. While many of the wealthiest countries committed to mobilize US$100 billion per year[12] in climate financing to accelerate mitigation in developing countries, current pledges remain unfulfilled and this amount will in any case fall far short of what is necessary. In the meantime, the wealthiest 10 percent of individuals on the planet are responsible for about half of total CO_2 emissions[13], while the bottom half of the population in terms of income emits just 10 percent.

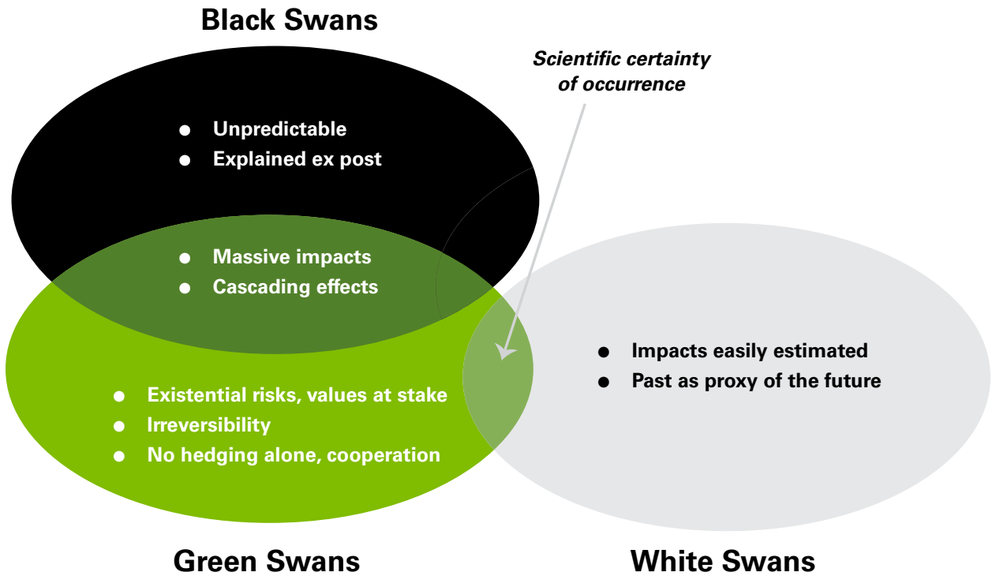


What Role for Central Banks in Managing "Green Swans?"

Central banks and financial regulators now recognize that these patterns are a source of financial instability.[14] The physical impacts of climate change could lead to much more disastrous and irreversible outcomes[15] than the COVID-19 pandemic, while the transition to a low-carbon economy also raises significant risks. For instance, limiting global warming to less than 1.5°C or 2°C requires keeping a large proportion of existing fossil fuel reserves in the ground. These stranded assets[16] could suddenly be written down and trigger a "climate Minsky moment"[17]—a systemic crisis triggered by an abrupt change of sentiment regarding the ability to repay climate liabilities.

Climate-related risks taken together are best understood as "Green Swans"[18] (see figure on page 98). Green Swans have similar features to Black Swans[19], in that they are *ex ante* largely unexpected rare events with severe consequences that are all too readily rationalized *ex post*.

Black, White, and Green Swans



But Green Swans have two additional features: (i) scientific evidence suggests that climate-related shocks are almost sure to occur (though the exact timing and impacts of these events remains highly uncertain); and (ii) they involve irreversible losses (financial, material, and the loss of human lives) that can pose an existential threat to humanity.

Importantly, Green Swans involve other ecological risks, such as those tied to the accelerating decline of the Earth's biodiversity.[20] For instance, the crisis caused by the pandemic of COVID-19 has been linked to the destruction of our natural habitats, which in turn is likely to facilitate the emergence of other pandemics in the future.[21] Viewed from this perspective, the current crisis is the manifestation of a particular Green Swan event.[22]

Given that climate change and other ecological challenges are a source of financial risks, it is within the mandate of central banks[23] to safeguard the financial system against these risks. The central bank response cannot rely on traditional risk assessment models, which merely extrapolate historical trends and do not include the risks related to natural disasters (of rising magnitude and incidence) and to a system-wide transition (which has not yet occurred). Therefore, in order to better understand Green Swans, a methodological shift in macroeconomic and financial modeling is needed. For instance, focusing more on forward-looking scenario analysis[24] and on non-equilibrium modeling[25] can better represent uncertain transition dynamics.

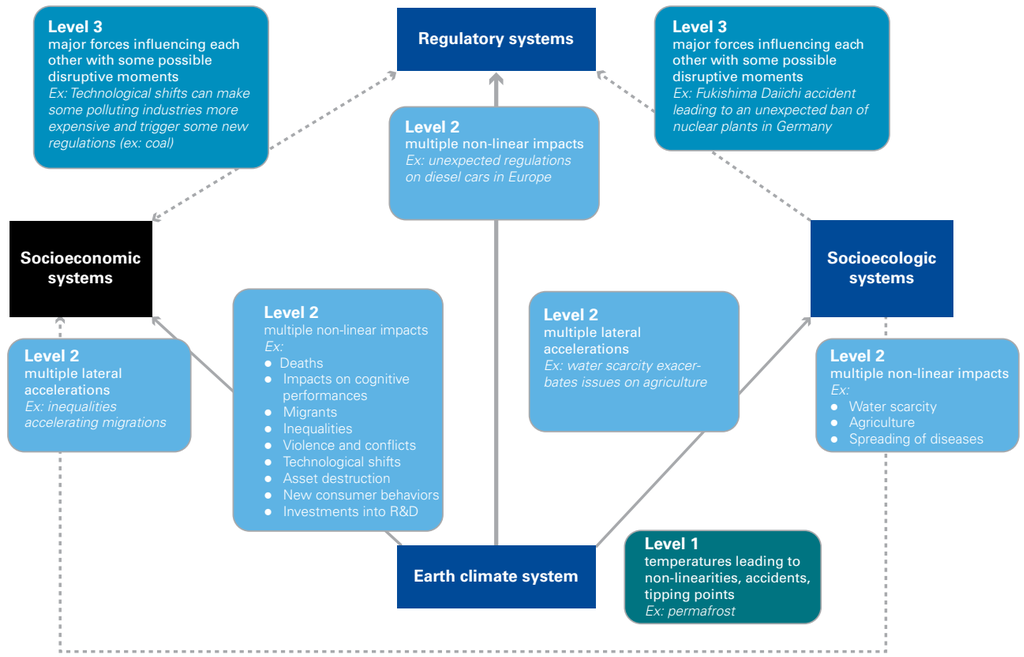
But no single model will be able to account for the uncertainty and complexity of Green Swan

> The central bank response cannot rely on traditional risk assessment models, which merely extrapolate historical trends and do not include the risks related to natural disasters (of rising magnitude and incidence) and to a system-wide transition (which has not yet occurred).

events, which involve physical and transition risks that propagate non-linearly, with multiple feedback loops and chain reactions that cascade across sectors, countries, and systems (see figure below). With regard to physical risks, when climate tipping points are crossed[26], there may be catastrophic and irreversible impacts that are simply impossible to quantify[27] with any reasonable degree of accuracy. Staying below these tipping points requires multiple immediate and ambitious measures towards an economic structural change[28] and an even deeper socio-technical transition[29], which also generates significant complexity and uncertainty.

This means that central banks cannot address climate change on their own. They must join forces with other institutions. In "The Green Swan"[31] we outline four areas in which they could do this: (i) the quest for new policy mixes between fiscal, regulatory, monetary, and prudential

Chain reactions stemming from climate-related physical and transition risks



Source: Bolton et al. (2020)[30]

policies; (ii) the promotion of long-termism and environmental values in the financial sector; (iii) the integration of sustainability accounting in national and corporate accounting frameworks; and (iv) the reform of the international monetary and financial system.

What Global Monetary and Financial Architecture to Preserve Climate and Financial Stability?

With regard to the fourth area, it is important to emphasize that climate stability is a global public good and that an equitable transition to a low-carbon economy will require an unprecedented level of international cooperation. As a first step, and especially in light of the COVID-19 pandemic, massive public investments will be needed. Multilateral development banks will have a critical role to play in this area.[32] They can help coordinate national governments' crisis mitigation public policies, prioritize emergency funding for the poorest countries, and ensure debt sustainability following the crisis.

But more is needed. Tackling the new global challenges posed by climate change demands a global joint governance of climate and financial stability, possibly including the creation of a new international agency that would: (i) provide financial and logistical support to countries facing a climate or ecological shock; and (ii) supervise and coordinate climate mitigation policies among member countries. Some analysts have also proposed adding a climate change mitigation mandate to existing international institutions such as the International Monetary Fund (IMF), as part of their responsibilities to manage the international monetary and financial system. In particular, proposals have been made to issue "green" Special Drawing Rights (SDRs)[33] through the IMF to finance green funds. SDRs could be allocated to national and multilateral development banks and be pledged to finance the national commitments to reduce carbon emissions under the Paris Agreement.

As bold as they seem, these initiatives are essential to build a multilateral governance system capable of channeling savings from all parts of the world to finance the low-carbon transition. This new governance architecture would then facilitate the task of central banks, but the reverse may also be true. For instance, by joining forces among themselves with the creation of the NGFS (Network for Greening the Financial System)[34], central banks have shown that international cooperation on climate change, in the spirit of the Bretton Woods order[35], is possible. This is what we need to address today's global challenges.



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Endnotes

1 Intergovernmental Panel on Climate Change. (2018, October 8). *Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments*. https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

2 Ripple, W.J., Wolf, C., Newsome, T.M., Barnard, P., & Moomwa, W.R. (2020, January 1). World Scientists' Warning of a Climate Emergency. *BioScience*, Volume 70, Issue 1. https://academic.oup.com/bioscience/article/70/1/8/5610806

3 Diffendaugh, N.S., & Burke, M. (2019, May 14). Global warming has increased global economic inequality. *PNAS* 116 (20) 9808-9813. https://doi.org/10.1073/pnas.1816020116

4 Rigaud, K.K., de Sherbinin, A., Jones, B., Bermann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., & Midgley, A. (2018, March 19). *Groundswell: Preparing for Internal Climate Migration. World Bank Group*. https://openknowledge.worldbank.org/handle/10986/29461

5 United Nations Human Rights Office of the High Commissioner. (2019, June 25). *UN expert condemns failure to address impact of climate change on poverty*. https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=24735&LangID=E

6 Werrell, C.E., & Femia, F. (2018). Climate change raises conflict concerns. *The UNESCO Courier ISSN 2220-2269*. https://en.unesco.org/courier/2018-2/climate-change-raises-conflict-concerns

7 Global Commission on the Geopolitics of Energy Transformation. (2019, January). *A New World: The Geopolitics of the Energy Transformation*. https://www.irena.org/publications/2019/Jan/A-New-World-The-Geopolitics-of-the-Energy-Transformation

8 Thornhill, J. (2019, September 30). Technology can help save the planet, but it is not enough. *Financial Times*. https://www.ft.com/content/bde19efc-e35a-11e9-9743-db5a370481bc

9 Pitron, G. (2018, September 27). Dirty Rare Metals: Digging Deeper into the Energy Transition. *Green European Journal*. https://www.greeneuropeanjournal.eu/dirty-rare-metals-digging-deeper-into-the-energy-transition/

10 Mercure, J.F., Pollitt, H., Viñuales, J.E., Edwards, N.R., Holden, P.B., Chewpreecha, U., Salas, P., Sognnaes, I., Lam, A., & F. Knobloch. (2018, June 4). Macroeconomic impact of stranded fossil fuel assets. *Nature Climate Change*, 8, 588-593. https://www.nature.com/articles/s41558-018-0182-1

11 Climate Nexus. (2020). *Common But Differentiated Responsibilities and Respective Capabilities* (CBDR-RC). https://climatenexus.org/climate-change-news/common-but-differentiated-responsibilities-and-respective-capabilities-cbdr-rc/

12 Green Climate Fund. (2020). *Resource mobilisation*. https://www.greenclimate.fund/about/resource-mobilisation

13 Beuret, N. (2019, March 28). Emissions inequality: there is a gulf between global rich and poor. *The Conversation*. https://theconversation.com/emissions-inequality-there-is-a-gulf-between-global-rich-and-poor-113804

14 Network for Greening the Financial System. (2018, October 11). *First Progress Report*. https://www.ngfs.net/en/first-progress-report

15 Glikson, A. (2020, April 2). While we fixate on coronavirus, Earth is hurtling towards a catastrophe worse than the dinosaur extinction. *The Conversation*. https://theconversation.com/while-we-fixate-on-coronavirus-earth-is-hurtling-towards-a-catastrophe-worse-than-the-dinosaur-extinction-130869

16 Matikainen, S. (2018, January 23). *What are stranded assets?* The London School of Economics and Political Science. https://www.lse.ac.uk/granthaminstitute/explainers/what-are-stranded-assets/

17 Partington, R. (2018, April 6). Mark Carney warns of climate change threat to financial system. *The Guardian*. https://www.theguardian.com/business/2018/apr/06/mark-carney-warns-climate-change-threat-financial-system

18 Bolton, P., Despres, M., Pereira da Silva, L.A., Samama, F., & Swartzman, R. (2020, January). The green swan: Central banking and financial stability in the age of climate change. Bank for International Settlements. https://www.bis.org/publ/othp31.pdf

19 Taleb, N.N. (2007, April 22). The Black Swan: The Impact of the Highly Improbable. *The New York Times*. https://www.nytimes.com/2007/04/22/books/chapters/0422-1st-tale.html

20 IPBES. (2019): *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES secretariat. https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf

21 Vidal, J. (2020, March 17). Destruction of Habitat and Loss of Biodiversity are Creating the Perfect Conditions for Diseases Like COVID-19 to Emerge. *Ensia*. https://ensia.com/features/covid-19-coronavirus-biodiversity-planetary-health-zoonoses/

22 Bolton, P., Despres, M., Pereira da Silva, L.A., Samama, F., & Swartzman, R. (2020, June 29). The "Green Swan": central banks in the era of climate risks. *Banque de France Bulletin* 229. https://publications.banque-france.fr/le-cygne-vert-les-banques-centrales-lere-des-risques-climatiques

23 Network for Greening the Financial System. (2019, April 17). First comprehensive report: A call for action. *NGFS Publications*. https://www.ngfs.net/en/first-comprehensive-report-call-action

24 Pereira da Silva, L.A. (2019, April 17). *Research on climate-related risks and financial stability: An "epistemological break"?* Bank for International Settlements speech at the Conference of the Central Banks and Supervisors for Greening the Financial System. https://www.bis.org/speeches/sp190523.htm

25 Mercure, JF., Knobloch, F., Pollitt, H., Paroussos, L., Serban Scrieciu, S., & Lewney, R. (2019, June 7). Modelling innovation and the macroeconomics of low-carbon transitions: theory, perspectives and practical use. *Climate Policy Volume 19* (Issue 8). https://doi.org/10.1080/14693062.2019.1617665

26 Steffen, W., Rockström, J., Richardson, K., Lenton, T.M., Folke, C., Liverman, D., Summerhayes, C.P., Barnosky, A.D., Cornell, S.E., Crucifix, M., Donges, J.F., Fetzer, I., Lade, S.J., Scheffer, M., Winkelmann, R., Schellnhuber, H.J. (2018, August 14). Trajectories of the Earth System in the Anthropocene. *PNAS 115 (33) 8252-8259*. https://doi.org/10.1073/pnas.1810141115

27 Weitzman, M.L. (2009, February). On Modeling and Interpreting the Economics of Catastrophic Climate Change. *The Review of Economics and Statistics Vol. XCI (1).* https://scholar.harvard.edu/weitzman/publications/modeling-and-interpreting-economics-catastrophic-climate-change

28 The London School of Economics and Political Science. (2020, May 5). *Building back better: A net-zero emissions recovery.* https://www.lse.ac.uk/GranthamInstitute/news/building-back-better-a-net-zero-emissions-recovery/

29 Geels, F.W. (2019, August). Socio-technical transitions to sustainability: a review of criticisms and elaborations of the Multi-Level Perspective. Current Opinion in Environmental Sustainability Vol. 39, Pgs. 187-201. *Science Direct.* https://doi.org/10.1016/j.cosust.2019.06.009

30 Bolton, P., Despres, M., Pereira da Silva, L.A., Samama, F., & Swartzman, R. (2020, January). *The green swan: Central banking and financial stability in the age of climate change.* Bank for International Settlements. https://www.bis.org/publ/othp31.pdf

31 Bolton, P., Despres, M., Pereira da Silva, L.A., Samama, F., & Swartzman, R. (2020, January). *The green swan: Central banking and financial stability in the age of climate change.* Bank for International Settlements. https://www.bis.org/publ/othp31.pdf

32 Pereira da Silva, L.A. (2020, May 14). *Green Swan 2 – Climate change and Covid-19: reflections on efficiency versus resilience.* Bank for International Settlements speech based on remarks at the OECD Chief Economist Talk Series. https://www.bis.org/speeches/sp200514.htm

33 Aglietta, M., & Coudert, V. (2019, May). The Dollar and the Transition to Sustainable Development: From Key Currency to Multilateralism. *CEPII Policy Brief No. 26.* http://www.cepii.fr/CEPII/en/publications/pb/abstract.asp?NoDoc=12245

34 Network for Greening the Financial System. (2020). *Origin and Purpose.* https://www.ngfs.net/en

35 Villeroy de Galhau, F. (2019, July 16). *Bretton Woods: 75 years later – Thinking about the next 75.* Welcome address by François Villeroy de Galhau, Governor of the Banque de France. Banque de France. https://www.banque-france.fr/en/intervention/bretton-woods-75-years-later-thinking-about-next-75-paris

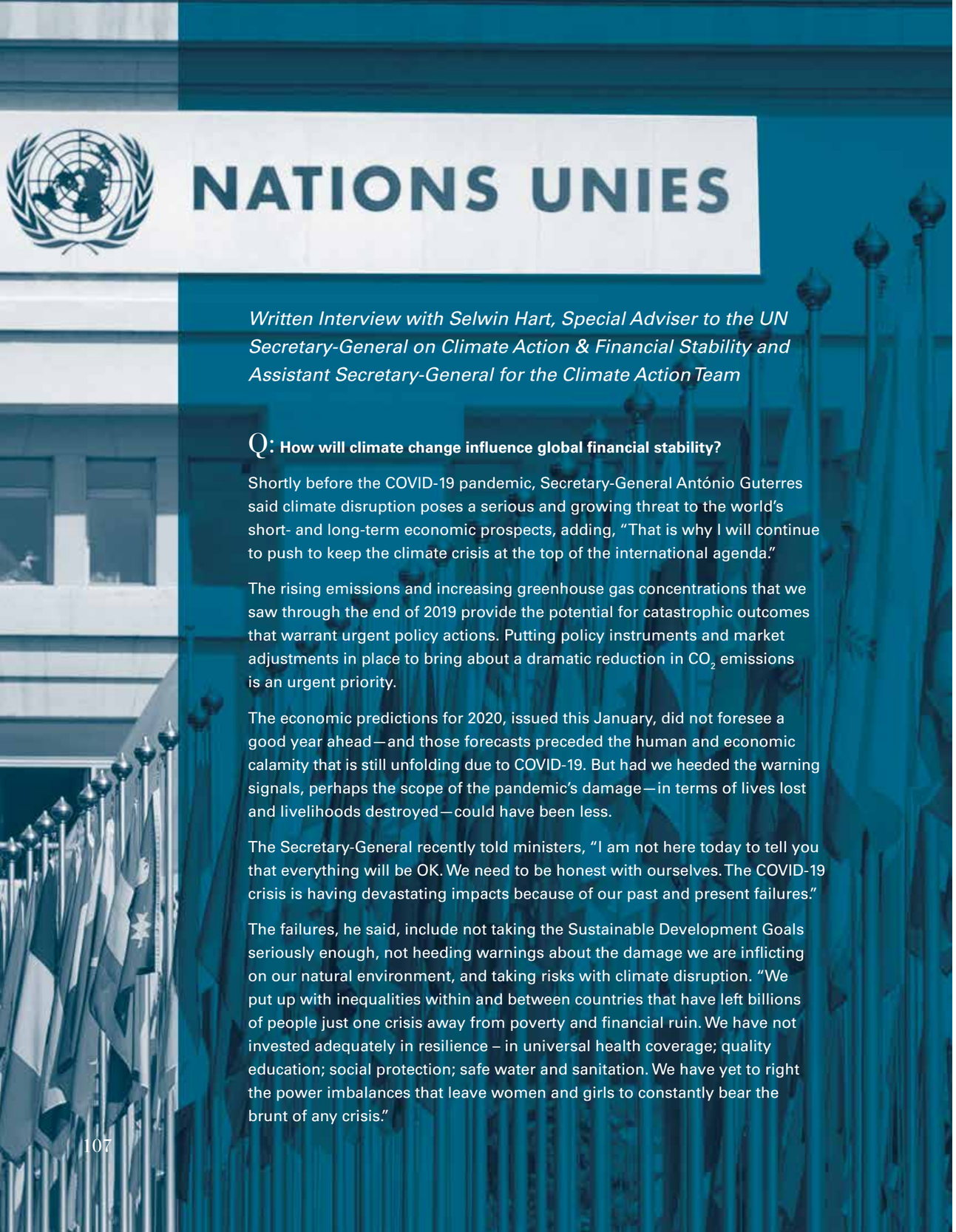




Climate Change and Financial Stability

An Interview with Selwin Hart,

Special Adviser to the UN Secretary-General on Climate Action & Financial Stability



Written Interview with Selwin Hart, Special Adviser to the UN Secretary-General on Climate Action & Financial Stability and Assistant Secretary-General for the Climate Action Team

Q: How will climate change influence global financial stability?

Shortly before the COVID-19 pandemic, Secretary-General António Guterres said climate disruption poses a serious and growing threat to the world's short- and long-term economic prospects, adding, "That is why I will continue to push to keep the climate crisis at the top of the international agenda."

The rising emissions and increasing greenhouse gas concentrations that we saw through the end of 2019 provide the potential for catastrophic outcomes that warrant urgent policy actions. Putting policy instruments and market adjustments in place to bring about a dramatic reduction in CO_2 emissions is an urgent priority.

The economic predictions for 2020, issued this January, did not foresee a good year ahead—and those forecasts preceded the human and economic calamity that is still unfolding due to COVID-19. But had we heeded the warning signals, perhaps the scope of the pandemic's damage—in terms of lives lost and livelihoods destroyed—could have been less.

The Secretary-General recently told ministers, "I am not here today to tell you that everything will be OK. We need to be honest with ourselves. The COVID-19 crisis is having devastating impacts because of our past and present failures."

The failures, he said, include not taking the Sustainable Development Goals seriously enough, not heeding warnings about the damage we are inflicting on our natural environment, and taking risks with climate disruption. "We put up with inequalities within and between countries that have left billions of people just one crisis away from poverty and financial ruin. We have not invested adequately in resilience – in universal health coverage; quality education; social protection; safe water and sanitation. We have yet to right the power imbalances that leave women and girls to constantly bear the brunt of any crisis."

There has been a surge in interest from companies in adopting sustainable business plans that are compatible with a 1.5°C future, yet with a few notable exceptions, markets and major financial institutions have yet to take climate change seriously. Major pensions funds and investments firms acknowledge that their portfolios are more aligned with a 3.5°C future.

Many investors continue to underestimate the risks of climate change and are still making short-sighted decisions to expand investment into carbon-intensive assets. One of the primary ways to [break the link between greenhouse gas emissions and economic activity is to change the energy supply mix, transitioning from fossil fuels to renewable sources of energy.

This transition will require policies that steer nations towards carbon neutrality well before 2050. The Secretary-General has set six priority areas for climate action during the COVID-19 recovery phase including: investing in decent jobs; no bail-outs for polluting companies; abandoning perverse fossil fuel subsidies; ending investment in and construction of coal-fired power plants by 2020; taking climate risks and opportunities into account in all financial and policy decisions; increasing international cooperation; and ensuring a just transition that leaves nobody behind.

And if we don't? We ignore these risks at our peril. Rising sea level and energy consumption will require major infrastructure investments in cities, but will cities continue to be able to raise money from municipal bonds? Will home mortgages still be available if lenders can't estimate the impact of climate risk over such a long timeline, and if there is no viable market for flood or fire insurance in impacted areas? What happens to inflation, and in turn interest rates, if the cost of food climbs from drought and flooding? How can we model economic growth if emerging markets see their productivity decline due to extreme heat and other climate impacts?

Q: What steps can the foreign policy community take to address climate-related risks in this area?

In 2015 the world came together to adopt the Paris Agreement on climate change and the Sustainable Development Goals. We are not on track to achieve the goals of either.

International cooperation is fundamental to addressing climate change as it is truly a challenge that affects all countries—and no country can solve it on its own. Progress in one place can easily be offset by increased emissions in another.

But while some countries and companies have gotten the message that climate concerns must be part of their COVID-19 recovery plans, many have not. Recent reports show that in major emitting countries, recovery stimulus packages are spending twice as much on fossil fuels than on clean energy sources.

Implementation of the Paris Agreement requires full transparency and international cooperation. Developing countries require assistance to enable them to decarbonize their economies with clean, renewable energy, and to help build adaptation and resilience against a problem that is not of their making.

National action needs to be mirrored by actions abroad. Phasing out coal domestically is necessary and essential, but countries can't stop there—they must also stop funding of coal abroad and actively offer funding for renewables instead.

Governments need to show that they are serious about honoring their national contributions under the Paris Agreement; they need to substantially increase their ambitions under their Nationally Determined Contributions. They also need to show that they are ready to meet their obligations under the Paris Agreement to ramp up financial support to developing countries.

Q: What role should central banks play in combating the climate crisis, and is there a need to adjust their mandate or the powers they possess?

For the role of central banks, I look to UN Special Envoy on Climate Finance Mark Carney, who, until recently, was the Governor of the Bank of England. According to Mr. Carney, a new and sustainable financial system is slowly, yet surely, being built that will provide funding for the initiatives and innovations of the private sector, which in turn has the potential to amplify the effectiveness of the climate policies of governments.[i]

"But the task is large, the window of opportunity is short, and the risks are existential," he said, adding that "like virtually everything else in the response to climate change, the development of this new sustainable finance is not moving fast enough for the world to reach net zero."

There are several key points that Mr. Carney makes about changing the financial landscape to fully bring climate risks and resilience into the heart of financial decision-making.

First, climate disclosure must become comprehensive, climate risk management must be transformed, and sustainable investing must go mainstream, using the framework provided by the Task Force on Climate-related Financial Disclosures—a comprehensive, practical and flexible framework for corporate disclosure of climate-related risks and opportunities.

Second, make these disclosures mandatory everywhere. "It's time for every country to get involved because the world won't get to net zero if the financial sector doesn't know how our companies are responding," said Mr. Carney. "In order to watch we must be able to see."

In addition, the providers of capital—banks, insurers, asset managers—and those who supervise them all need to improve their understanding and management of climate-related financial risks. The changes in climate policies, new technologies, and growing physical risks will prompt reassessments of the values of virtually every financial asset, and firms that align their business models to the transition to a net zero world will be rewarded handsomely—while that those that fail to adapt will cease to exist.

Finally, financial markets increasingly recognize that sustainable investment is the new horizon that can bring enormous opportunities. To go mainstream, Mr. Carney said that sustainable investing must cover, catalyze, and support "all companies that are working to transition from brown to green."

Q: How prepared is the financial system for regulatory shock and large investments becoming stranded assets—and what do regulators need to do to shore up the system?

It is increasingly clear that the world cannot afford to burn all of its fossil fuel reserves if we are to succeed in limiting climate change to sustainable, livable, levels. This raises the question of assets that will be abandoned well before their intended date of retirement and will not produce the expected returns. Already, coal mines are being closed as the price of coal becomes increasingly more expensive compared with renewable energy sources.

Losses due to stranded assets can imperil financial stability. According to Mr. Carney, a stress test is needed, and it is necessary to build a large coalition of central banks and supervisors to conduct these tests. "The Bank of England will become the first regulator to stress test its major banks and insurers against different climate pathways, including the catastrophic business–as-usual scenario," said Mr. Carney. "Our stress test of the world's leading international financial centre will show how major financial firms expect to adjust their business models, and what the collective impact of these responses could be on the wider economy."

If estimates are even approximately correct, he said, "it would render the vast majority of reserves 'stranded' – oil, gas and coal that will be literally unburnable without expensive carbon capture technology, which itself alters fossil fuel economics."

Q: What is the role of insurance providers and regulators for setting price signals and helping to advance the transition to a more sustainable economy?

The insurance sector can supply expertise, money, and perspective that are crucial in helping society adjust to the reality of a transition to a sustainable economy. The sector, with assets over US$30 trillion, can help make decisive contributions to reduce the protection gap, financing resilient infrastructure or improving reporting, risk management, and return optimization across the financial sector.

Insurers understand the physical risks of climate change that are being felt across the globe; insured losses in 2018 were US$80 billion, double the inflation-adjusted average for the past 30 years.

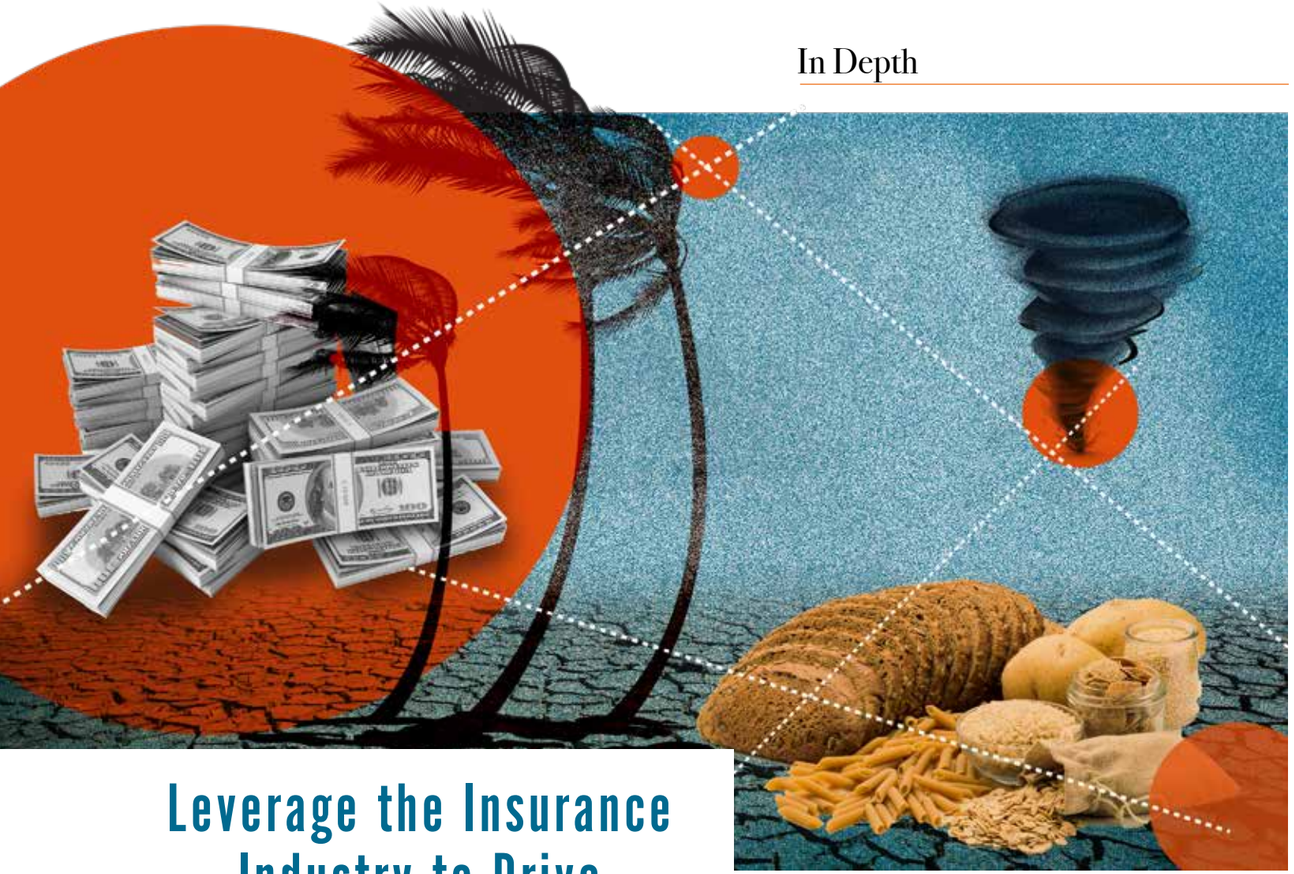
In low and middle income countries, a lack of protection means that even greater costs are being borne by the uninsured. In 2017, the record US$140 billion of insured losses was eclipsed by an additional US$200 billion of uninsured losses.

According to Mr. Carney, both sides of insurers' balance sheets need to respond. On the liability side, the focus must be reducing the protection gap and supporting the resilience of households and companies to growing climate risks. And on the asset side, infrastructure investments will be essential. To transition to net zero, all countries need to step up their investments in sustainable energy. The reality of climate change also means that all countries, but particularly developing and emerging economies, will need to invest in new climate-resilient infrastructure in order to adapt to the new realities of a hotter and more volatile climate.



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i Carney, M. (2020, April 16). Mark Carney on how the economy must yield to human values. *The Economist*. https://www.economist.com/by-invitation/2020/04/16/mark-carney-on-how-the-economy-must-yield-to-human-values



Leverage the Insurance Industry to Drive Climate-Proof Development

Les Williams &
Andres Franzetti

As the global economy becomes increasingly interconnected, so too have the risks. A single disaster or event in one region can have severe implications felt halfway around the globe. No single risk illustrates this interconnectedness better than climate change. The increased frequency of extreme weather events and their growing intensity is affecting every facet of the world and humanity. Extreme weather events have created added strain on global food production, caused supply chain disruptions, and are constantly testing the endurance of global infrastructure as well as financial resiliency. Addressing climate change is a complex and daunting task that requires an international coordinated response from policymakers. To enact effective change, however, policymakers must do more than simply implement policies in a unilateral fashion; they must formulate public-private partnerships that can execute such actions. One key player that can help facilitate this, and has yet to be fully utilized, is the insurance industry.

The insurance industry is uniquely positioned to drive a fundamental improvement of sustainability practices across the global economy through its vast financial assets, expertise, and influence. It touches virtually every sphere of human endeavor, and insurers' ability to effectively grant or revoke permission for companies to operate affords them singular leverage in relation to curbing high-risk behaviors and encouraging financial resiliency. In 2019, 820 natural disasters around the globe caused overall losses of US$150 billion[1], of which only US$52 billion were insured. This widening protection gap, and the indiscriminate nature with which extreme weather events occur, could lead to a dramatic rise in global poverty levels unless addressed. Creating more access to insurance solutions can expedite recovery efforts to restore livelihoods and rebuild critical infrastructure so that people, communities, and economies can rebound.

Traditionally, policymakers have addressed climate change via regulatory means, like carbon taxes, cap-and-trade programs, and stricter emissions standards. From an insurance perspective, policymakers have worked with insurers in the promotion of premium rate relief for companies who practice responsible behavior, like utilizing eco-friendly manufacturing processes. This approach has proven effective and will be part of the solution to combat climate change for the foreseeable future. The next evolution in the utilization of insurance to combat climate change involves policies that encourage companies and insurers to participate in innovative insurance solutions. Future-proofing food supplies, rethinking insurance's role in energy and infrastructure, and designing resilient infrastructure solutions that are affordable for multiple stakeholders are three key areas of innovation that policymakers should pursue alongside the insurance industry.

Future-proofing Food Supplies

Policymakers understand that a critical aspect of climate change is its impact on global food supplies and agriculture. Climate change has undercut the reliability of the years of data and weather patterns farmers have traditionally depended on to plant and harvest their crops. Extreme weather events, dramatic fluctuations in precipitation, and heat patterns are having a detrimental impact on crop growth, livestock health, fisheries, and other related resources. The United Nations' International Panel on Climate Change (IPCC)[2] is forecasting a 2 to 6 percent decrease in global crop production every decade for the foreseeable future. While policymakers have implemented various types of crop insurance initiatives designed to help abate some of these risks for farmers, these programs utilize an outdated, retroactive risk modeling that does not contemplate climate change impacts, and provides funds for losses only once they have occurred. Such programs do nothing to meet the



dynamic nature of climate risks, nor do they help smaller, less financially stable farmers salvage their crops and livestock in real time.

When losses can be anticipated, such as during extended droughts, existing parametric insurance programs play a pivotal role for farming communities. Parametric insurance policies utilize pre-determined triggers to determine whether a loss is likely to occur, such as insufficient rainfall. This allows insurers to pay insurance claims proactively and allows farmers to replant crops within the same harvest. Some smaller innovative companies, like AcreFrica, are deploying these types of solutions in Kenya. By embedding a mobile-activated code in the bags of seeds, farmers obtain immediate drought insurance. If insufficient rainfall occurs, measured via satellites and sensors, funds are sent automatically to farmers. While countries like the United States have made crop insurance programs available and affordable to farmers, often via premium subsidies and tax incentives, this is not a widely utilized concept. Emerging countries do not have these types of advanced insurance programs in place that would provide farmers access to risk transfer products, like crop insurance. Policymakers in developing economies could work with insurers to provide more proactive and innovative parametric program structures to encourage participation by private insurers in these markets. Parametric policies, especially those leveraging innovative technology and dynamic data modeling like that found in AcreFrica's solution, help reduce the overall severity of losses over time, create a more resilient food production supply chain, and build the necessary financial resiliency and economic stability for emerging markets.

A select number of countries have leveraged these types of programs to help establish insurance funds. Sovereign parametric insurance programs—where national governments are the buyer and the insurance relies on satellite and data modeling rather than on-the-ground damage assessments to estimate the cost of disasters—help countries manage climate disasters and enable expedited recovery efforts. Surprisingly, developing country governments have been quick to adopt these programs at the national level to offset catastrophic losses. But they have not been successful in encouraging the insurance industry to invest in creating the primary insurance markets (such as business interruption insurance vehicles) so their citizens and businesses can also benefit from these types of financial risk transfer tools.

Building for the New Normal: Impact on Energy and Infrastructure

Working towards cleaner, more efficient energy standards has long been an objective in the fight against climate change. In an interesting twist of fate, the fallout from COVID-19 has aided this task by raising the profile of clean energy projects and increasing their importance for large energy producers. For instance, in the aftermath of the pandemic, the French oil behemoth Total[3] cut capital spending by more than 20 percent and eliminated share buybacks. However, the unit dubbed "new energies," which included investments in alternative energy infrastructure such as wind and solar, was spared from budget cuts.

The pandemic lockdowns knocked the price of oil from above US$60 a barrel down towards $0[4], an unprecedented benchmark. Although negative oil prices were an anomaly related to futures contracts, and prices are slowly recovering as lockdowns end and OPEC cuts production until significant demand returns, the future of oil assets remains uncertain. Policymakers had been pressuring oil companies to diversify from these stranded assets to alternative sources well before the pandemic, but the unique slump in oil demand is a rare opportunity to accelerate these efforts.

As cheap oil dominates the headlines, policymakers must work even harder to ensure that clean energy investments like those undertaken by Total continue to proliferate. They can do this by:

- Increasing the number of new commercial and residential real estate developments required to have energy efficient systems installed, such as solar panels.
- Working with insurers to encourage insurance premium rebates to companies and residences that adopt energy efficient infrastructure improvements, such as the installation of solar panels and other alternative energy solutions.
- Working with insurers to expand their investments in renewable and clean energy vehicles via financial incentives (such as tax breaks). Examples of investments include MetLife's ownership in a solar PV power plant in Texas, and Allianz having investments in wind farms and solar parks throughout Europe.
- Increasing the adoption of Feed-in tariffs, where homeowners are compensated for any unused solar energy that is returned to the power grid.



» Easing restrictions placed on offshore wind farms.

While it is difficult to determine the lasting impacts of the pandemic on global travel, early indicators show some changes may be permanent, with lasting impacts on infrastructure maintenance at critical transportation hubs. As firms around the world have shifted to teleworking policies, travel has declined drastically, with air travel down more than 90 percent from this time last year. The International Air Transport Association (IATA) estimated that demand for air travel in 2021 will be 24 percent less than what it was in 2019, and not return to pre-pandemic levels until 2023. IATA's most pessimistic recovery scenario projected a 41 percent decrease in demand by 2021, with a five to seven-year timeframe before returning to 2019 levels. This is fueled both by consumer fears and shifting corporate views on "essential business travel" needs, especially with increased video conferencing capabilities.

This reduced travel has helped to curb greenhouse emissions in the short term, but it has also halted key infrastructure improvements at airports and other transportation hubs. To keep infrastructure improvement projects on the agenda post-pandemic, policymakers can work with insurers to establish the types of incentives that encourage energy-efficient improvements to critical infrastructure like airports and ports, such as discounts on insurance premiums.

Policymakers need look no further than California as an example. The insurance commissioner for the state recently introduced the Climate Smart Insurance Products Database[5], a groundbreaking list of green insurance policies. Individuals and businesses alike can choose from hundreds of insurance policies that address climate risks, such as policies that factor green energy use in the discounting of insurance premiums.

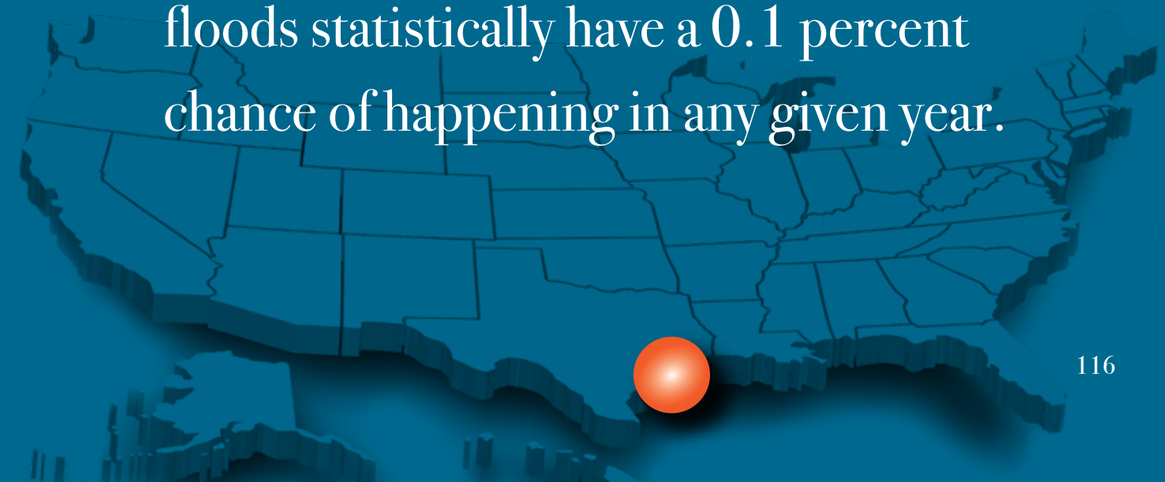
Designing Affordable Resiliency

As the world's population creeps towards 8.5 billion over the next decade, urbanization and development of megacities around the world is accelerating. This rapid urban development, however, has not fully accounted for the new risks introduced by climate change. The past few years has shown the impact of these new weather patterns—causing devastating floods across the United Kingdom and Indonesia, igniting powerful wildfires throughout Australia and the Amazon rainforest, and bringing record-breaking high temperatures to Siberia. Houston, the fourth largest city in the United States, has now seen three consecutive 1,000-year floods in the past two years. To put this in perspective, 1,000-year floods statistically have a 0.1 percent chance of happening in any given year. These types of floods not only cost billions in damages, but also displace thousands of people. Current city planning and construction has further exacerbated these weather events by limiting natural mitigation systems such as root systems, forestry, and other barriers that reduce flooding.

By working with policymakers, insurers could help guide a more resilient approach to the development of major cities. Policymakers must enact stronger guidelines for building codes, aligning with insurers' risk models to limit losses. Encouraging developers to consider the new threat landscape that extreme weather events are creating, via measures like reduced insurance premiums, can drastically reduce the overall damage and loss of economic activity.

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There is a school of thought, now backed by a growing body of evidence, that suggests that protecting nature's boundaries is critical.[6] This is particularly important in post-disaster reconstruction cases where questions of *build back, build back better,* or *build back at all* require consideration of nature's lines of defense. Barrier reefs, for example, offer clear advantages in abating storm surges and coastal flooding, as do mangroves. Groups like Conservation International are exploring ways to leverage these natural defensive systems to reduce risks of flooding and property damage in collaboration with insurers. Their objective is to not only limit potential damage, but also work to establish greater access to insurance solutions in developing countries. By reducing the risk profile of property projects in developing countries, insurers can expand their risk appetite into regions they might have otherwise deemed too risky. This can be encouraged with the support of policymakers enforcing these types of "natural defense" building codes.

Integrating these natural defenses into man-made projects is not the only way to leverage the protection they provide. In many places around the world, natural assets act as the primary barrier against natural disasters and extreme weather events. Coral reefs, mangroves, wetlands, and forests can often minimize the damage caused by these events near metropolitan areas. It is equally important to protect these natural assets, much like property developments are protected.

The effects of human development and natural degradation (such as wind, rain, and erosion) takes its toll on these natural barriers, rendering them less effective over time. Fortunately, a select number of pioneering insurers have developed highly bespoke products to insure nature's assets. One of the first, and most notable projects, was an insurance policy designed to protect the Mesoamerican Reef in the Caribbean Sea.[7] By quantifying the economic impact of potential damages and lost GDP that would be incurred should the reef cease to exist, insurers were able to develop an insurance policy protecting this asset. The policy would pay for the maintenance, revitalization, and repair efforts needed if the reef sustained any damage.

While these types of customized insurance solutions are uncommon, it is imperative for policymakers to encourage more of these solutions into their broader strategy for fighting climate change. Working in collaboration with policymakers and the private sector, insurers can help establish added layers of financial resources that will not just maintain natural assets, but also help reduce damages and protect economic interests while building more resilient communities.

This approach allows for both proactive regulatory measures and revitalization efforts to work in unison. Multilateral organizations like the World Bank have also developed and promoted sovereign insurance funds[8] to address these types of complex, large scale risks with insurance funds, working directly with sovereign governments. However, there is greater scope to promote this approach, e.g. by involving the participation of private sector insurers and working closer with policymakers to establish subsidiaries. Doing so would both encourage governments to offset potential losses from their balance sheets and enable private sector participation in these types of innovative risk transfer solutions.

Aligning insurance underwriting requirements and regulations, via policies that allow insurers to influence buying behaviors, further encourages the proliferation of these innovative solutions. The requirement to not only keep natural protective barriers intact as regions become developed, but also mandating the ongoing maintenance of such natural barriers as part of the insurance policy, will have a lasting impact in terms of limiting potential economic losses and damages from extreme weather events.

This is akin to the practices employed by insurers and regulators during periods of urbanization in the late 19th century. When large cities, using wood as the dominant construction material, expanded along with the adoption of electricity, stricter building codes were required as a public safety measure. This served a dual purpose from insurers' perspective: stricter building codes and fire prevention measures enabled insurers to both reduce damages and contain losses in highly urbanized environments.

Regulation and Public-Private Partnerships

Public-private partnerships are key to supporting initiatives that combat climate change. Last summer, the Bank of England's Prudential Regulation Authority (PRA) stated that it would work with United Kingdom insurers to determine how climate change will affect their finances.[9] Given the impact climate change is having on insurance claims globally, the PRA is wise to investigate how climate change will affect insurers' balance sheets as it will have a direct impact on the bank's financial health. California's insurance regulator has followed a similar posture, asking insurers operating in the state to conduct veritable climate stress tests on their balance sheets to not only identify stranded assets exposed to climate change, but also recalibrate their liabilities.

Policymakers must work with insurers globally to include climate change impacts into insurance underwriting models, compelling more businesses to make climate-sensitive changes to their operations in order to secure favorable premiums or coverage in the first place. Some insurers have taken steps in this direction. The insurance giant Chubb says it will no longer underwrite risks related to the construction and operation of new coal-fired plants.[10] (Exceptions to the policy will be considered until 2022 in regions that do not have practical near-term alternative energy sources and taking into account the insured's commitment to reduce coal dependence.)

However, while some carriers like Chubb are making strides to limit their carbon footprints



and wield their investment dollars to fight climate change, it is not the industry standard. Encouraging more insurance carriers to adopt this mindset and aligning shared interests would not only drive effective climate risk reduction, but also propel insurers to expand the access of their products to more emerging markets, creating broader global resiliency. The Sustainable Insurance Forum (SIF) is one such group that is gaining momentum with this effort. SIF is a global network of insurance regulators working on the sustainability issues confronting the insurance industry, and it is influencing regulation aimed at reducing the impact of climate change.[11]

The International Chamber of Commerce (ICC) is an important element of the public-private partnership needed on a global scale. The ICC has launched its Climate Coalition, a global network of over 45 million businesses that convene on a regional level to devise solutions aimed at reducing climate change's impact—it is a type of marketplace, just as Lloyd's is the marketplace through which insurance buyers and sellers meet. The word "public-private partnership" is used casually, but the ICC's Climate Coalition is a global resource where this partnership has the chance to create public-private partnership models that can be scalable globally.

Climate change poses a global threat that requires a multi-faceted, international coalition to help change its trajectory. As governments seek to implement new guidelines and goals for how to fight its impact, they would do well to recognize that insurers can play an important role—through data sharing and financial tools that equip countries with additional funds and resources needed to rebound quickly from disasters linked to climate change. Policymakers must encourage insurers to expand their market access, bringing sophisticated risk transfer solutions to both advanced economies and those throughout the developing world. With an aligned agenda, this type of public-private partnership can affect material change and build greater financial resiliency while navigating the new risk landscape shaped by climate change.



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Endnotes

1 Löw, P. (2020, January 9). *Tropical cyclones cause highest losses: Natural disasters of 2019 in figures*. Munich Re Group. https://www.munichre.com/topics-online/en/climate-change-and-natural-disasters/natural-disasters/natural-disasters-of-2019-in-figures-tropical-cyclones-cause-highest-losses.html#:~:text=Number%20of%20natural%20disasters,heatwaves%2C%20cold%20spells%20and%20wildfires

2 Mbow, C., C. Rosenzweig, L.G. Barioni, T.G. Benton, M. Herrero, M. Krishnapillai, E. Liwenga, P. Pradhan, M.G. Rivera-Ferre, T. Sapkota, F.N. Tubiello, Y. Xu, 2019: Food Security. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes interrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D.C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press. https://www.ipcc.ch/srccl/chapter/chapter-5/

3 Ball, J. (2020, April 20). Why the coronavirus crisis could make Big Oil greener. *Fortune*. https://fortune.com/2020/04/20/big-oil-price-war-investments-green-renewable-energy-climate-change/

4 Ramkumar, A. (2020, June 30). Coronavirus Sends Oil Prices on Wild, Six-Month Ride. *The Wall Street Journal*. https://www.wsj.com/articles/coronavirus-sends-oil-prices-on-wild-six-month-ride-11593463541

5 California Department of Insurance. (n.d.). Climate Smart Insurance Products Search. https://interactive.web.insurance.ca.gov/apex_extprd/f?p=142:1

6 *The UN environment programme and nature-based solutions.* (n.d.). UNEP - UN Environment Programme. https://www.unenvironment.org/unga/our-position/unep-and-nature-based-solutions

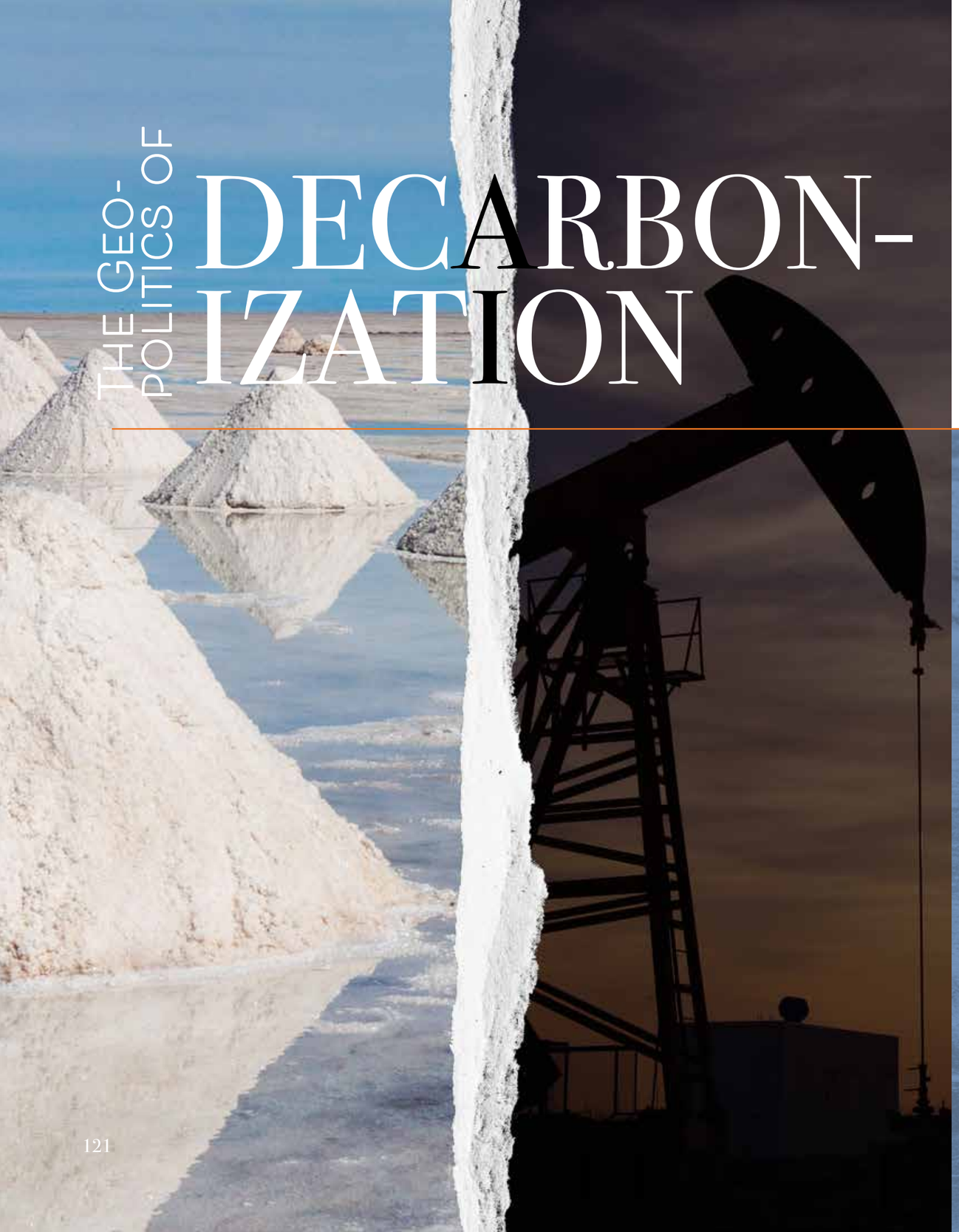
7 Gonzalez, G. (2019, June 7). Parametric insurance policy to cover Mexico coral reef. *Business Insurance*. https://www.businessinsurance.com/article/20190607/NEWS06/912328933/Parametric-insurance-policy-to-cover-Mexico-coral-reef#

8 World Bank. (2018, February 7). *World Bank Affirms Position as Largest Sovereign Risk Insurance Provider with Multi-Country Earthquake Bond*. https://www.worldbank.org/en/news/press-release/2018/02/07/world-bank-affirms-position-as-largest-sovereign-risk-insurance-provider-with-multi-country-earthquake-bond

9 Bank of England Prudential Regulation Authority. (2019, April). *Enhancing banks' and insurers' approaches to managing the financial risks from climate change* (Supervisory Statement | SS3/19). Bank of England. https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/supervisory-statement/2019/ss319.pdf?la=en&hash=7BA9824BAC5FB313F42C00889D4E3A6104881C44

10 Chubb Limited. (2019, July 1). *Chubb Announces New Policy on Coal Underwriting and Investment*. https://news.chubb.com/2019-07-01-Chubb-Announces-New-Policy-on-Coal-Underwriting-and-Investment#:~:text=Chubb%20will%20not%20underwrite%20risks,commitments%20to%20reduce%20coal%20dependence

11 Sustainable Insurance Forum. (n.d.). *About*. https://www.sustainableinsuranceforum.org/about



THE GEO-POLITICS OF DECARBON-IZATION

How Curbing Reliance on Fossil Fuels Will Change the World

Strategists rightly focus on the geopolitical consequences of climate change. The consequences of action to stop it could be just as profound.

Philip H. Gordon

The world's reliance on fossil fuels for energy has had geopolitical implications of one sort or another since humans first started burning coal several thousand years ago. In modern times, major powers' need for oil and gas to fuel their economies and armies contributed to the spread of colonialism in the 19th and early 20th centuries, Japan's 1941 attack on Pearl Harbor, the 1967 and 1974 OPEC oil embargos (and subsequent global recessions), the 1990 Iraqi invasion of Kuwait, and the U.S. invasions of Iraq in 1991 and 2003, to name just a few of the major world developments that resulted at least in part from the world's growing thirst for energy. Today, scholars and practitioners argue that the changes to the climate that result from this energy use is accelerating rising sea levels and the frequency and severity of droughts, fires, and mega storms—trends they predict[1] could undermine governments, generate destabilizing refugee flows, and ultimately lead to tensions or even resource conflicts among states.

Less attention has been paid, however, to the potential geopolitical consequences of the opposite scenario—a *decrease* in reliance on fossil fuels. But that could prove shortsighted, because the policy changes required to avoid climate catastrophe—the elimination of oil, coal, and gas as primary energy sources and their replacement with renewables—could have as much an impact on geopolitics as the need for those sources had in the first place. The reduction in global energy use and emissions associated with the coronavirus pandemic may make this seem like a hypothetical or long-term problem[2], but rather than solving the climate crisis, the pandemic has actually underscored its depth. The fact that it took an almost unprecedented global economic shutdown to reduce emissions to levels barely consistent with the 2015 Paris climate commitments underscores the need for far more dramatic policy action[3] than was previously underway.

If countries do reduce their reliance on fossil fuels, how could that transform the world? At least three likely trends are worth considering:

Political instability in oil-dependent states. The shift to a decarbonized world—in which global reliance on fossil fuels for energy production is dramatically reduced and virtually all remaining carbon dioxide emissions are captured, stored, utilized, or compensated—will have a major impact on the political systems of oil and gas producing states. According to the International Energy Agency[4], those states could lose US$7 trillion in revenues by 2040. Countries that rely on oil revenues for large shares of government revenue[5] include Libya (96%), Iraq (89%), Kuwait (70%), Nigeria[6] (65%), Saudi Arabia[7] (61%), Venezuela[8] (50%), Russia[9] (40%), UAE[10] (46%), and Iran[11] (29%). Declining oil revenues[12] will oblige these countries to cut subsidies (including for utilities such as electricity and water), raise taxes, and in many cases diminish their reliance on expatriate workers, forcing citizens to take menial jobs they are not used to doing. The world's leading oil exporter, Saudi Arabia[13], is particularly vulnerable: a booming youth population and the need to create millions of jobs will require deficit spending of up to US$100 billion per year, eroding reserves that could be exhausted within just a few years. Russia, too, would lose considerable income in a decarbonized world, which could lead its government to become even more repressive to hold its grip on power. The potential upside of such changes is that these states will be compelled to reform their economies and invest in education, industry, human capital, and other non-energy sectors, as Riyadh is seeking to do in its Vision 2030[14] plan. But such transitions are difficult and disruptive, and could also be a source of domestic instability, as citizens used to an implicit social contract with their government —security and prosperity in exchange for loyalty— find governments unable to uphold their end of the bargain.

U.S. disengagement from the Middle East. Declining U.S.—and global—dependence on oil from the Middle East will likely accelerate U.S. disengagement from the region. After the failure of President George W. Bush's efforts to "transform" the Middle East in part through the invasion of Iraq, President Barack Obama sought gradually to "pivot" away from the region, in part due to the diminishing U.S. need for energy imports from the region.[15] President Donald Trump has taken that view to an extreme, boasting about American energy "independence"[16] and claiming previous presidents had wasted US$7 trillion[17] trying to stabilize a region allegedly no longer a vital interest of the United States. A growing number of Americans agree with former top official Martin Indyk, who recently asserted in the *Wall Street Journal* that the Middle East just "isn't worth it anymore,"[18] in large part because "the United States no longer relies on imported petroleum." The strategic importance of American energy "independence," of course, can be exaggerated[19], because even if the United



What is certain, however, is that decarbonization—whenever it happens—

will have a profound impact on world politics, in predictable and unpredictable ways.

States doesn't import oil directly from the Persian Gulf, it has a stake in the free flow of oil from the region so long as other countries—including many close U.S. partners and allies—do. And the United States will continue to have other national interests in the region, including containing Iran, supporting Israel, counter-terrorism and nonproliferation. Still, the perception that securing imports from the region might no longer be worth American blood and treasure makes future U.S. engagement in the region less likely, increasing the prospects of a security vacuum, conflict among states, and competition among outside actors such as Russia, China, and Turkey.

A U.S.-China "Cold War." Decarbonization will require significant and binding emissions reductions by all major industrial powers, in particular by the two largest emitters, the United States and China. But getting such an agreement will be exceedingly difficult, as China argues that developed countries (such as the United States) who have contributed the most to the current problem should bear a disproportionate share of that burden[20], while the United States wants China to play a role commensurate with its current contribution to emissions. With the two countries already at loggerheads over trade[21], Taiwan, the South China Sea, intellectual property, human rights, responsibility for the COVID-19 crisis and much more[22], disputes over climate could poison this critical relationship further, especially as the costs and consequences of climate change become increasingly apparent in both countries. Imagine the debates that will result if large numbers of deaths are caused by climate developments in either country that its citizens' attribute to irresponsible policies pursued by the other. U.S.-China disputes over climate burden-sharing could contribute to a new Cold War that will affect all aspects of international relations in the decades to come.

It is easy to imagine plenty of other geopolitical developments beyond the three listed above, from strains in the transatlantic relationship to global competition for clean-energy jobs. What is certain, however, is that decarbonization—whenever it happens—will have a profound impact on world politics, in predictable and unpredictable ways. To adapt, governments around the world will have to take into account the geopolitical consequences of their climate policies. This will mean incorporating geopolitical impact assessments into intelligence assessments[23], bureaucratic adjustments that elevate climate change to the same level as more traditional national security concerns[24], and developing diplomatic approaches designed to mitigate the negative impact of decarbonization on other states and the relations between them. The world's gradual addiction to fossil fuels transformed international relations over the past century and more. Leaders in all countries must start thinking now about the political consequences of withdrawing from that addiction.



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Endnotes

1 Busby, J. (2018, October 31). How to Understand the Geopolitics of Climate Change. *Foreign Affairs*. https://www.foreignaffairs.com/lists/how-to-understand-the-geopolitics-of-climate-change

2 International Energy Agency. (2020, April 30). *Global energy demand to plunge this year as a result of the biggest shock since the Second World War*. https://www.iea.org/news/global-energy-demand-to-plunge-this-year-as-a-result-of-the-biggest-shock-since-the-second-world-war

3 Raval, A. (2019, November 12). Drastic changes needed to alleviate climate crisis, says IEA. *Financial Times*. https://www.ft.com/content/7a5b5f8c-056b-11ea-a984-fbbacad9e7dd

4 Robertson, H. (2018, October 24). Petro-States Have Got a Problem With Their Economies. *Bloomberg*. https://www.bloomberg.com/news/articles/2018-10-24/petro-states-have-got-a-problem-with-their-economies

5 U.S. Energy Information Agency. (2020). *International overview*. Retrieved August 27, 2020 from https://www.eia.gov/international/overview/world

6 Extractive Industries Transparency Initiative. (2020). *Revenue Collection*. Nigeria Extractive Industries Transparency Initiative. https://eiti.org/es/implementing_country/32#:~:text=Nigeria%27s%20oil%20and%20gas%20sector,-to%20USD%2032.6%20billion%202018.

7 Grand, S., & Wolff, K. (2020, June). *Assessing Saudi Vision 2030: A 2020 Review*. Atlantic Council. https://www.atlanticcouncil.org/wp-content/uploads/2020/06/Assessing-Saudi-Vision-2030-A-2020-review.pdf

8 Central Intelligence Agency. (2020). *Venezuela*. The World Factbook. Retrieved August 27, 2020 from https://www.cia.gov/library/publications/the-world-factbook/geos/ve.html

9 Paraskova, T. (2018, May 14). Russia's oil revenue is about to soar. *Business Insider*. https://www.businessinsider.com/russia-oil-revenue-about-to-soar-2018-5

10 Fahy, M. (2020, June 10). UAE well-placed to handle lower oil revenue, Moody's says. *The National*. https://www.thenational.ae/business/economy/uae-well-placed-to-handle-lower-oil-revenue-moody-s-says-1.1031731

11 Rome, H. (2020, April 2). Iran's Crisis Budget. The Iran Primer. U.S. Institute for Peace. https://iranprimer.usip.org/blog/2019/dec/16/irans-crisis-budget

12 The Economist. (2020, July 18). *The end of the Arab world's oil age is nigh*. https://www.economist.com/middle-east-and-africa/2020/07/18/the-end-of-the-arab-worlds-oil-age-is-nigh

13 Jones, R., & Chilkoti, A. (2020, April 15). Saudi Arabia Set to Raise $7 Billion in Bond Sale to Plug Spending Gap. *The Wall Street Journal*. https://www.wsj.com/articles/saudi-arabia-markets-dollar-bond-to-plug-spending-gap-11586959815

14 Hubbard, B., & Kelly, K. (2017, October 25). *Saudi Arabia's* Grand Plan to Move Beyond Oil: Big Goals, Bigger Hurdles. *The New York Times*. https://www.nytimes.com/2017/10/25/world/middleeast/saudi-arabias-grand-plan-to-move-beyond-oil-big-goals-bigger-hurdles.html

15 Indyk, M. (2016, March 15). *The end of the U.S.-dominated order in the Middle East*. Brookings. https://www.brookings.edu/blog/order-from-chaos/2016/03/15/the-end-of-the-u-s-dominated-order-in-the-middle-east/

16 The White House. (2020, January 8). *Remarks by President Trump on Iran*. https://www.whitehouse.gov/briefings-statements/remarks-president-trump-iran/

17 Greenberg, J. (2018, May 1). Donald Trump says US spent $7 trillion on Middle East wars. A lot of that money has not been spent. *Politifact*. https://www.politifact.com/factchecks/2018/may/01/donald-trump/donald-trump-and-7-trillion-dollar-cost-war/

18 Indyk, M. (2020, January 17). The Middle East Isn't Worth It Anymore. *The Wall Street Journal*. https://www.wsj.com/articles/the-middle-east-isnt-worth-it-anymore-11579277317

19 Bordoff, J. (2020, January 10). No, President Trump, the U.S. isn't energy-independent. Middle East oil still matters. *The Washington Post*. https://www.washingtonpost.com/outlook/2020/01/10/no-president-trump-us-isnt-energy-independent-middle-east-oil-still-matters/

20 Harvey, F., & Doherty, B. (2018, December 13). China demands developed countries 'pay their debts' on climate change. *The Guardian*. https://www.theguardian.com/science/2018/dec/13/china-demands-developed-countries-pay-their-debts-on-climate-change

21 Edel, C., & Rapp-Hooper, M. (2020, May 18). The 5 Ways U.S.-China Competition is Hardening. *Foreign Policy*. https://foreignpolicy.com/2020/05/18/united-states-competition-coronavirus-pandemic-tensions/

22 Campbell, K., & Rapp-Hpper, M. (2020, July 15). China Is Done Biding Its Time. *Foreign Affairs*. https://www.foreignaffairs.com/articles/china/2020-07-15/china-done-biding-its-time

23 Irfan, U., & Roberts, D. (2020, February 19). How 2020 Democrats will address climate change through foreign policy. *Vox*. https://www.vox.com/energy-and-environment/2019/10/14/20908345/2020-democratic-debates-climate-change-foreign-policy

24 Podesta, J., & Stern, T. (2020, May/June). A Foreign Policy for the Climate. *Foreign Affairs*. https://www.foreignaffairs.com/articles/united-states/2020-04-13/foreign-policy-climate

Small States and Climate Change: The Case of Qatar

H.E. Lolwah R Al-Khater



Climate change is posing increasingly formidable challenges to all humankind and has been identified as the most pressing global environmental problem, with potentially catastrophic consequences for human development. Today, the focus is on strategies for mitigation and adaptation, involving national action and international cooperation.

It's a problem with unique characteristics. It is a global challenge that necessitates collective solutions. Further, it is a long-term problem with cumulative outcomes. Addressing it is a cross-generational, cross-border exercise. The current generation cannot solve the problem alone, but it has the responsibility to take urgent action on behalf of posterity.

The Challenge of Decarbonization

Interestingly, the key pillar of the response to climate change—decarbonization—will also be a major force that will change the power and influence of regions and states.

Some nations may require support as the global decarbonization effort accelerates. The decline in the use of fossil fuels may profoundly destabilize countries that have not prepared their economies for the transition. In countries with weak governance, reduced revenue could create political instability, and increased fragility in fossil-exporting countries can have strong effects beyond the respective regions.

The development of clean energy technology, meanwhile, could also result in the technological dominance of a handful of nations. If a small number of countries and companies dominate clean energy technology, concentration could stifle innovation and suppress competition. Countries that do not develop domestic clean energy sources and technologies will remain vulnerable to foreign suppliers.

Further, decarbonization is by no means resource-neutral. Scaling-up low-carbon technologies creates greater demand for certain metals, for example. This may give rise to geopolitical dynamics similar to those experienced in the modern economy.

Just as fossil fuels have shaped the geopolitical map over for the past 200 years—altering international relations, affecting political alliances, and informing national defense strategies—decarbonization and the global transition to renewable energy sources will have profound consequences and alter the international geopolitical landscape. It is therefore important for the world's superpowers to play an essential role when it comes to leading the initiative against climate change. In order to accelerate the healing, the biggest contributors to the problem to start must be the biggest contributors to the healing.

The Qatari Approach

As a small nation, our contribution is limited. However, as both a producer of fossil fuels and a country especially threatened by sea-level rise, we are very attuned to the challenges and potential benefits of decarbonization.

At the UN Climate Action Summit 2019, His Highness the Amir of Qatar stated, "The phenomenon of climate change is undoubtedly one of the serious challenges of our time. It is a problem that is continuously exacerbating and causing many problems which intertwine in their economic, environmental and social dimensions and have very serious negative repercussions on all forms of life including human life and on both developed and developing countries alike, especially on the tracks of the sustainable development which all peoples aspire to."

To ensure commitment across government agencies and overcome institutional rivalry and inertia, there must be high-level political engagement to address climate change. In some countries, the responsibility for sustainable development issues is given to environmental ministries and departments—which tend to be under-resourced and insufficiently influential in government—thus hindering the necessary process of cross-sector policy integration. In Qatar, the Qatar National Vision 2030 names Environmental Development as one of its four main pillars, aiming to manage rapid domestic expansion to ensure harmony among the priorities of economic growth, social development, and environmental protection. Although climate change is a global problem, its impacts will vary. Small states and less developed states often stand on the frontline of climate change and bear its burden. Qatar lacks arable land and water resources for the development of carbon sinks, forests, and green areas and is therefore especially vulnerable to global warming's impacts. If sea levels rise, coastlines and marine life will be affected, land degradation will occur, and freshwater levels will fall. If temperatures rise, rising underground water salinity and falling freshwater levels will threaten water security and reduce the efficiency of the region's vital desalination plants. Qatar is among the 10 countries that would be most impacted by sea level rise in terms of percentage of land area and wetlands affected.

In addressing the challenge, all countries, including Qatar, need to reconcile multiple priorities, from economic growth to environmental management to human and social development. For Qatar, as a consumer and key producer of fossil fuels, these priorities can at times be conflicting, especially against a backdrop of increasing local and global demand for energy.

A holistic and integrated approach is essential to address the range of environmental, economic, social, educational, and behavioral issues involved.

Qatar is actively working toward the management of risks associated with climate change. There are a number of significant and positive developments:

- Qatar, as the host nation for FIFA World Cup 2022, is committed to organizing an environmental-friendly tournament and the first carbon-neutral tournament through the use of solar-powered stadiums and the use of cooling and lighting technology that is water- and energy-saving.
- In October 2019, Qatar announced the commissioning of a carbon storage plant, the largest of its kind in the region. It aims to capture over five million tons of CO_2 per year from Qatar's LNG industry by 2025.
- In March 2019, during the seventh International Agricultural Exhibition and the first Qatar International Environmental Exhibition, Qatar announced an initiative to plant one million trees by 2021 in order to enhance biological diversity, improve air quality, and reduce the country's carbon footprint.
- The Qatar Investment Authority is a founding member of the "One Planet" Global Sovereign Wealth Fund, which has been established to promote green investments and accelerate efforts to consider environmental issues in the investment sector and management of sovereign wealth funds. Zero-emission investments represent 44 percent of the fund's infrastructure projects.

Education and Adaptation

Qatar also recognizes education as a key element in addressing climate change. A highly skilled workforce is required to plan, manage, and execute the transition to a diversified and competitive economy away from oil and gas, and to plan and implement adaptation measures, as well as the corresponding transitions of infrastructure. Qatar's educational system is focused on preparing students to collaboratively address the complexity of our pressing environmental challenges.

Changes in global markets will create new opportunities for Qatar in emerging fields, such as emission reduction approaches, energy efficient technologies, green buildings, agricultural management in arid regions, innovative education, and financing of low carbon activities. Qatar is motivated by good global citizenship to support adaptation in developing countries through increased support for low-carbon power generation.



Qatar is involved in several initiatives to this end:

- In 2012, Qatar joined a consortium of founding member countries to establish the Global Green Growth Institute (GGGI). The Institute provides developing countries with the tools to build institutional capacity and develop green growth policy, strengthen peer learning and knowledge sharing, and engage private investors and public donors. Qatar's disbursement of $10 million toward the GGGI has enabled direct work to be conducted on sustainable energy, water and sanitation, sustainable landscapes, and green cities.
- One-third of the world's population lives in drylands, which make up approximately 40 percent of the Earth's land surface. Drylands face many environmental challenges, including water scarcity, temperature extremes, droughts, and floods. At the UN General Assembly in 2013, His Highness the Amir of Qatar described the newly created Global Dryland Alliance (GDA), an organization of dryland countries now headquartered in Doha, as "an initiative created to establish an international organization to face food insecurity consequences and negative environmental and economic impacts associated with climate change." GDA also offers its members mutual assistance in times of extraordinary need such as national or manmade disasters.
- In 2019, Qatar made a $20 million contribution to the UNDP Accelerator Labs network in 60 developing countries to tackle the world's most pressing sustainable development challenges.
- Also in 2019, His Highness the Amir of Qatar announced a contribution of $100 million to support small island developing states and the least developed countries in dealing with climate change, natural hazards, and environmental challenges. This support is consistent with the UN priority of "preserving tangible and intangible cultural heritage and promoting culture for island sustainable development."

The State of Qatar will continue to promote international cooperation and action to achieve inclusive and sustainable development in order to meet the challenges of climate change.



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The Geopolitics of Decarbonization: The Russian Case

Tatiana Mitrova



Global efforts to combat climate change and to decarbonize the world economy will have a tremendous impact on geopolitics and foreign policy. Climate discussion itself creates leaders and outsiders: countries that resist this global transition away from carbon are losing credibility, whereas those leaders promoting a climate agenda are gaining stronger positions in the international arena and using carbon restrictions to help reshape the rules of international trade and relations between different economies (like with EU ambition to introduce cost-benefit analysis and other restrictions on carbon-intensive imports). This dynamic will be at work despite the economic decline caused by COVID-19. There are also some strong sector-specific implications related primarily to the energy sector, the biggest carbon emitter.

According to the UN's *Emissions Gap Report 2019*[1], fossil CO_2 emissions from energy use and industry dominate total greenhouse gas (GHG) emissions, making fossil fuels use the primary target for reduction. Many approaches have already been developed to move towards zero-carbon development pathways: energy efficiency; massive deployment of renewable energy for electrification; coal phase-out for rapid decarbonization of the energy system; decarbonizing transport with electric vehicles; hydrogen and other alternative fuels; decarbonizing energy-intensive industries through recycling; materials substitution and dematerialization; deployment of carbon capture, utilization, and storage; and fundamental transitions in the industrial process itself. Implementing these measures will affect the geopolitical positions of the hydrocarbon producing and importing countries, as well as the positions of countries which are not reserve holders but technological leaders in new energy. Energy superpowers' leverage in this world of energy transition will be decreasing dramatically, together with their resource rent. Their comparative negotiating power is already changing, resulting in a profound reconfiguration of the global energy market landscape.

More Inventory than Customers

Russia is one of the more glaring examples of the potential losers in this geopolitical transformation. Indeed, countries like Russia, heavily dependent on hydrocarbon export revenues, will need to adapt their foreign policy to a world economy less reliant on their supplies. Hydrocarbon exports will no longer be a bargaining chip in international negotiations, and "geopolitical" energy projects (like many gas pipelines) will not be able to provide additional geopolitical arguments and power to the reserve holders.

The recent turmoil on the global oil and gas markets—which began when a production agreement between Russia and Saudi Arabia collapsed and became much more serious due to the COVID-19 lockdowns—was a sort of stress-test for all hydrocarbon exporting economies. The shrinking demand and fierce competition has led to an unprecedented drop in the oil and gas revenues for producing nations and significantly destabilized their economies. Given the inevitable path of the energy transition, this episode has illustrated in a couple of months what will happen to the oil and gas exporters over the next decade or so as the world approaches peak oil demand. The Russian Federation, for instance, faces the equivalent of a 50 percent loss in expected energy export revenues (as gas prices are halving and oil prices reducing by one third, while volumes of Russian exports of oil, gas, and coal are decreasing by 20–25 percent). For the national budget, this decline means a sharp fall in income of about 25 percent, just as the public and business are in most need of state support.

This is a real wake up call for the resource-rich countries. Fossil-fuel exporters that refuse to accept the energy transition are most exposed to decarbonization and least resilient to its economic effects.

So far Russia, which ranks fourth in the world for primary energy consumption and carbon dioxide emissions and third in global primary energy production, has adhered to a strategy of "business as usual." Huge new investments were made during the last decade in new expensive infrastructure for hydrocarbon exports—not only to the traditional European markets ("Turk Stream", NS, and NS-2) but also to the North-East Asia (ESPO, "Power of Siberia"), which Russian leadership regards as the most promising market for Russian oil and gas. Energy exports are critical for the state budget, for the key energy companies, and for many regions in the country that rely strongly on hydrocarbon revenues. But the changing global environment and the decarbonization agenda pose an existential threat to all key Russian stakeholders, challenging the very sustainability of the economic (and political) system in the country. In 2016, according to the OECD, oil and gas revenues accounted for 36 percent of the country's federal budget, and Russia's main export market, the EU, is working fast to reduce its imports.

Although Russia joined the Paris Agreement in September 2019, domestic decarbonization of the energy sector is not yet on the agenda—a skeptical attitude about the problem of global climate change prevails among stakeholders. GDP energy intensity remains high, constrained by relatively low energy prices and high capital costs. The share of solar and wind energy in the Russian energy balance is insignificant and,

according to the official forecasts, is not expected to exceed 1 percent by 2035. The challenge for Russia in the coming years will be to develop a new strategy for developing the energy sector (at least for energy exports) in the absence of a significant domestic climate change agenda—and in response to increasing global competition, growing technological isolation, and financial constraints.[2]

The Green Recovery

The coronavirus crisis will create new momentum for energy transitions, especially in the countries that are Russia`s major energy trading partners: the European Union, Japan, South Korea, and to a certain extent China. National governments in these countries are increasingly vocal in their calls for low carbon economic recovery. The EU has confirmed its commitment to a green path of 100 percent climate neutrality by 2050, which will require colossal funds—between €175 and €290 billion of investments annually. In addition to €1 trillion of public funding for the next 10 years, the EU envisages a number of initiatives to develop green private financing. Such investment projects will get privileged access to money.



Against the background of excessive and extremely cheap hydrocarbon supply, importing country governments are now moving to introduce the long-discussed Carbon Border Adjustment Mechanism—the European Commission will put forward its proposal for one in 2021. This duty would mean additional costs for some carbon-intensive imported goods. It is intended to eliminate the competitive advantage currently enjoyed by countries that export to regions with tough eco-standards, where local industry faces higher costs. This is another disruption for hydrocarbons, metallurgy, and chemical industries. At the same time, oil market volatility has aggravated skepticism among investors, who even before the crisis had shifted massively from fossil fuel assets to low carbon and energy efficient projects.

Demand for energy will gradually recover in the wake of the COVID-19 lockdowns. But there are two trajectories for this recovery: the traditional one and that of an accelerated energy transition. In the first scenario, spurred by low oil prices, hydrocarbon demand will recover quickly and markets will inevitably be exposed to a deep investment gap, which will result in a new price hike. Rising hydrocarbon prices, in their turn, will once again stimulate interest in alternative energy sources and energy efficiency.

In the accelerated energy transition scenario, massive state support will be channeled into a green recovery. The EU has taken a step in this direction with a pledge to spend 30 percent of its €1.8 trillion budget from 2021-2027 on climate action. Such state support will advantage the industries competing with the oil and gas sector, creating pressure for those dependent on demand for fossil fuels. In short, importing countries have every opportunity to emerge from the crisis with transformed energy systems, strict carbon footprint limitations on imported raw materials, and irreversibly curtailed demand for hydrocarbons.

Going Down with the Ship?

An energy transition appears unavoidable; the only question is the speed of the process. Despite this, Russian regulations assiduously ignore the trend towards decarbonization. Combatting climate change is not mentioned in the Goals and Strategic Objectives of the Russian Federation to 2024. The Energy Security Doctrine defines "increasing international efforts to implement climate policies and accelerate transition to a green economy" as an external political challenge to Russia's energy security. The term 'energy transition' and related external market changes are not mentioned in the text of the new "Energy Strategy for the Period to 2035," which envisages a significant scaling-up of coal, oil, and gas exports.

Strategically, however, the Russian economy currently has an opportunity to make fundamental reforms that could provide the country with a long-term trajectory to a different, more innovative development track. In Russia, energy is utilized very inefficiently, particularly in heating. This problem has been discussed for several decades. Today might be the ideal time for measures that have long been urgent, namely support for energy efficiency projects. A breakthrough in this sphere would not only strengthen global competitiveness dramatically and reduce the global carbon footprint but also create a significant number of new localized production facilities and jobs.

The promotion of high-tech sectors could focus on a program of overall energy efficiency enhancement, localization of services and equipment production, promotion of renewable energy systems, establishment of a state fund for targeted investments in technology with low greenhouse gas emissions (hydrogen, etc.), and provide an opportunity to exit the crisis with a better, more modern structure for the economy. This means new highly qualified jobs, development of high value-added production, and faster growth, instead of catching-up. And it does not require eliminating hydrocarbons. A transformed oil and gas sector could continue to play the role of the national economic driver, while aligning with the green agenda perfectly well. However, this requires new solutions (e.g., carbon capture, storage, and utilization technologies, methane emission control, hydrogen, use of the whole spectrum of offsetting mechanisms) and, importantly, a strategic choice.

It is a complex, expensive process that requires new technologies and skills that Russia and the Gulf countries currently do not have. For now, however, there are no other options in sight for securing the long-term stability of its export-focused resource-based economy.

What the International Community can do

In this respect, the international community could take some steps to encourage a smooth energy transition for fossil fuel resource rich economies like Russia's.

First of all, a clear and transparent communication of the long-term decarbonization strategies and schedules of the importing countries is an important signal for producers, so that they can adjust their strategies and investments accordingly. This would require high-level coordination and synchronization, which would be quite a challenging exercise. But without understanding it, producers inspired by calls for additional investments and exports in the short-term will find themselves with enormous stranded assets and shrinking revenues.

The second important component is technological cooperation and joint development of the new supply chains and of the appropriate regulation and certification mechanisms—for decarbonized oil and gas supplies, as well as for blue and green hydrogen and renewable electricity exports. This will be achieved and tested only with bilateral pilot projects, which are lacking at the moment.

And, of course, the interests of the producer economies should not be ignored during the global discussion: the rapid destabilization of any of these hydrocarbon producing countries could have extremely dramatic consequences for their regions and, potentially, for the whole world.



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Endnotes

1 United Nations Environment Programme. (2019, November). *Emissions Gap Report 2019*. UNEP. https://wedocs.unep.org/bitstream/handle/20.500.11822/30797/EGR2019.pdf?sequence=1&isAllowed=y

2 Henderson J., & Mitrova T. (2020) Chapter: Implications of the Global Energy Transition on Russia. In: Hafner M., & Tagliapietra S. (eds). The Geopolitics of the Global Energy Transition. *Lecture Notes in Energy 73*. https://link.springer.com/chapter/10.1007/978-3-030-39066-2_5



The New Geopolitics of a Decarbonizing World

Dennis Tänzler & Noah Gordon

The world has transitioned to new energy sources before, from wood to coal to oil to natural gas. And each transition has reshaped the geopolitical map in countless ways, creating hard-to-imagine realities. British colonialists from the bygone Empire would be shocked to discover that not only is Newcastle receiving instead of exporting coal in the 21st century, but that the descendants of their former subjects on the Arabian Peninsula would use oil revenue to bid for the Newcastle football team.

The current transition to low-carbon energy sources —known broadly as decarbonization—will affect geopolitics and foreign policy at least as much as did its predecessors, and it will require a response from the foreign policy community. This essay examines those effects and the needed response.

First we note how this transition is different from previous ones, in speed and scope. We then summarize the role of energy in various areas of current foreign policy: in modern geopolitics, fossil fuels are a strategic resource that affect money, power, and diplomatic relationships. Finally, we examine the impacts that decarbonization is having on these policy areas, using a diverse group of countries as illustrative cases and offer recommendations for how the foreign policy community can ensure a smooth transition to new energy sources.

A New Type of Transition

Our current transition differs from previous ones in two main ways. First, decarbonization must be an energy replacement, not merely an energy addition. In past global energy transitions, the new energy source has tended to surpass rather than replace the existing one[1]: for instance, while oil displaced coal in the 1960s as the dominant resource in the global energy supply, the world consumes more than twice as much coal today as it did then.[2] Decarbonization, on the other hand, requires reducing fossil fuel consumption to an absolute minimum in order for the world to hit stated climate targets. Indeed, the majority of known, valuable fossil fuel reserves must stay in the ground to avoid dangerous climate change.[3]

Second, this climate protection-driven transition needs to occur significantly faster than previous transitions, which primarily occurred because the rising energy resource was cheaper or much more useful to its end-users. In previous transitions, as the energy historian Vaclav Smil has pointed out, it took over 50 years for a new energy resource to reach "a large penetration,"[4] let alone market dominance. Today, low-carbon energy—including both renewable energy and nuclear energy—accounts for only 15 percent of the global energy mix.[5]

By signing the Paris Agreement on climate change, the nations of the world have implicitly pledged to achieve this more comprehensive transition in record speed. According to the UN Intergovernmental Panel on Climate Change, in order to have a better than 66 percent chance of limiting warming to 1.5°C or less, the world must achieve net-zero greenhouse gas emissions by 2050, i.e. in 30 years.[6] Even pathways based on slower emissions reductions entail net-zero emissions



by around 2070 or 2080 to limit warming to 2°C, and thus rapid declines in oil and gas consumption by the middle of the century. In historical terms, stakeholders will not have long to adjust.

This is not to say that decarbonization on this ambitious timeframe is unachievable. Certain countries and sectors have transitioned more quickly, from Kuwait shifting its economy to run on oil in the late 1940s, to the French electricity sector going nuclear in the 1970s, to Brazilian automakers switching to flex-fuels cars (that can run on either gasoline or ethanol) in the 2000s.[7] Moreover, the expansion of renewable energies has also already made significant progress in recent years in countries such as Costa Rica, Iceland, Denmark, and Uruguay. Policymakers hope to use the lessons of previous efforts to accelerate the spread of clean energy. They must also be aware of the political effects of such transitions.

Geopolitics of Fossil Fuels in the Modern World: What Role Does Energy Play Today?

Money: Energy is big business. It is not just a commodity but a basic resource required to exploit all other resources. Energy expenditures account for over 3 percent of global GDP, even without taking into account energy subsidies, energy transport costs, and energy efficiency measures.[8] Fossil fuel imports alone make up over 10 percent of global merchandise import costs.[9]

Accordingly, energy is a key revenue source for governments who tax energy transactions, sell drilling rights, or own shares in energy companies. Fossil fuels are in fact the most important source of revenue for the governments of Nigeria, Russia, Iran, Venezuela, and Saudi Arabia. They are also a vital source of income and jobs in certain regions and sectors, whether oil and gas extraction in the Canadian province of Alberta, freight transport in India, or coal mining in Southern Poland.

Power: National control over or access to fossil fuels has long been key to international power. The availability of domestic coal was essential to Britain's industrial revolution and imperial strength, and great powers have gone to great lengths to secure energy resources ever since. The oil-exporting nations of OPEC discovered in the 1970s that their energy resources gave them the ability to put major pressure on larger, richer energy importers.

Although securing resources has seldom been the primary cause for a war, it has been a factor in many military conflicts and diplomatic spats, from the Nigerian Civil War of 1967-70, to the 1991 Gulf War, to the current tensions over drilling rights between Greece, Turkey, and Cyprus. Interestingly, research suggests that petrostates—those where oil exports constitute more than 10 percent of GDP—have been more likely to engage in military conflict than non-petrostates.[10]

Governments can use fossil fuel revenues to develop and diversify their economies, expanding their influence on foreign affairs, and they can funnel them into social spending to improve lives and maintain stability. Yet the presence of substantial fossil fuel reserves can also lead to negative outcomes if the "resource curse" strikes. In fact, because trade in fossil fuels is so important to both importers and exporters, merely being located along key trade routes can give a country more geopolitical weight. A good example is Ukraine's role as a transit country for sales of Russian gas to Europe.

Relationships: Fossil fuels can be a key determinant of diplomatic relationships. Saudi Arabia's position as the top oil exporter on the planet, as well as its location near the world's most important oil transit chokepoint, the Strait of Hormuz, is largely responsible for its close security relationship with the United States. Venezuela has sold refined oil products at a discount to Caribbean allies, while most Azerbaijani exports to the EU are fossil fuels, which informs that diplomatic relationship. This dimension of diplomacy has long been linked to the question of energy security, understood as assured access to reliable energy supplies. Exporters of fossil fuels have often been able to ensure a favourable negotiation position vis-à-vis importing countries, even compensating for deficits in other areas such as good governance and the rule of law.

Relatedly, the fact that fossil fuels are important in so many areas makes them a favored *strategic resource* of politicians seeking to achieve other ends. Countries can enforce embargos (as the UN did against apartheid South Africa in 1987), impose sanctions (the P5+1 against Iran in the late 2010s), or seek to prevent the construction of fossil fuel infrastructure, as the United States did with the Brotherhood pipeline built in the 1980s to connect Soviet gas fields with European consumers.

What Impacts Will Decarbonization Have in These Areas?

Decarbonization will change the landscape of money, power, relationships, and strategic resources in a way that offers new pathways to peace and stability. Yet it also requires managing energy transitions to avoid the sudden destabilization of existing relationships.

Some countries will likely enjoy geopolitical benefits. Those countries that currently import large quantities of fossil fuels will become less dependent on exporters, improve their balance of trade—and perhaps enjoy new economic opportunities if they can seize the initiative and dominate the technologies required for a decarbonized energy system. Firms from China to California are racing to file clean energy patents.

The flip side is that decarbonization represents a real challenge for oil- and gas-producing states. The International Energy Agency has argued that economies that produce oil and gas could lose US$7 trillion by 2040 in a low oil price environment.[11] States that have failed to diversify their economies are particularly exposed and may slide into instability. Meanwhile, states that face high production costs in the oil sector or rely on high oil prices to balance their budget will suffer more immediate negative impacts—especially if the oil-richest nations decide to "panic and pump," i.e., to sell their buried treasure while they still have customers. Fossil fuel exporters may also have to contend with trade restrictions imposed by customers should these customers move to tax imported products based on their embedded carbon emissions. The EU already plans to implement such a carbon tax at its borders.

Just as decarbonization transforms geopolitics, geopolitical considerations can in turn influence decarbonization—think of China's Belt and Road Initiative, which is financing high-carbon infrastructure (coal-fired power plants, oil pipelines) in part for geopolitical reasons and in the process may lock in a high-carbon economy.[12]

Decarbonized geopolitics will, however, resemble current geopolitics in certain ways. There will still be cross-border trade in electricity and hydrogen in a decarbonizing world, which means there will still be security and transit risks. There will still be energy technologies that require certain natural resources: the EU estimates that it will need up to 16 times more lithium and five times more cobalt—both are used for batteries—by 2030 to meet its climate neutrality goal.[13]

Like fossil fuels, these resources are distributed unevenly, which raises concerns about access. China, for instance, has the largest deposits of rare earth metals (used for magnets for e.g., wind turbines) and, alongside Chile, it is the main producer of lithium. It already reduced exports of rare earth metals in 2010 amid rising tensions with Japan.[14]

The leading producer of cobalt, meanwhile, is the unstable Democratic Republic of the Congo.[15] A race to exploit clean energy resources in poorly governed countries could have negative environmental and human rights impacts if not guided by appropriate resource governance. Careful planning, e.g., supporting recycling systems and the efficient use of resources, can help avoid future scarcities, though technological breakthroughs may be also key to reducing future dependencies on all these materials. Finally, the decarbonized world map will still have some countries whose natural energy resources boost their geopolitical position: Algeria, Australia, and others could use solar and wind power to produce energy carriers such as hydrogen.[16]

Fragile Decarbonization

What does this mean on the national level? It is useful to focus here on fossil-fuel exporting states[17] who potentially have a lot to lose from the energy transition. Here we break them down into three categories: the "Relatively Prepared," the "Facing Risks and Opportunities," and the "Fragile."



- **Relatively prepared**
  Wealthier, politically stable exporters are relatively prepared to deal with the repercussions of a global decarbonization process. Canada, for example, is a stable, highly developed democracy with a diversified economy and a well-educated workforce, although the oil industry remains economically important. The country has already started to establish institutions, such as a Task Force on Just Transition for Canadian Coal Power Workers and Communities, that are responsible for providing knowledge, options, and recommendations to guide a just transition process in the country. Qatar, as another example, is a rich petrostate with stable governance structures and one of the highest per capita incomes in the world. It has used the wealth generated by its oil industry to develop its gas sector, as well as other areas of the economy and its external relations.

- **Facing Risks and Opportunities**
  A second set of countries faces both major risks and opportunities. In Colombia, revenues from coal and oil exports are economically significant, but the economy increasingly aims at diversifying into low-emission areas—for example by expanding the creative industry and other service-oriented sectors. However, the country is still in the process of emerging from decades of internal conflict. Indonesia, as another example, is a rapidly developing economy that is experiencing huge growth in the demand for goods and energy. This growth is highly dependent on the exploitation of its abundant hydrocarbons, primarily coal and oil, as well as other carbon-intensive assets, such as palm oil. A global shift away from fossil fuels, like a ban on unsustainable palm oil, would have major repercussions for its economy.

- **Fragile**
  Finally, some countries are highly vulnerable to deep decarbonisation processes—especially where their main trade partners are already working towards achieving climate-neutral economies. In Nigeria, the economy is highly dependent on gas and particularly oil. These two commodities account for almost all the country's export revenues. The country also scores poorly on indexes assessing state fragility, human development, strength of governance, and preparedness for climate change impacts, weaknesses that the COVID-19 pandemic and ensuing recession have only made more acute in fragile countries around the world. Another example of a fragile country is Azerbaijan, which faces an ongoing conflict with Armenia over disputed territory and whose economy is highly dependent on oil and gas trade with the decarbonizing EU.

Foreign policy actors know how problems in a distant, fragile state can quickly land on their desks, whether the trigger is a coup, migration flows, or a virus. Unlike pandemics that strike suddenly, though, with decarbonization it is relatively easy to predict which exposed sectors in which fragile countries will fall into disarray.

The sooner the international community acts to manage the fallout, the better.

How Can We Make the Transition Less Bumpy?

In order to manage the effects of this energy transition, which is already in progress, foreign policy actors must ensure that decarbonization goes hand in hand with the further development of robust bilateral relations. This approach requires a climate-informed foreign policy that acknowledges the shifting flows of money and of power, as well as the changing landscape of diplomatic relations and strategic resources. Different policy areas can contribute to a stable and peaceful transition process.[18]

- **Climate and energy policies**
  Low-carbon development, including renewable and clean energy technologies, is a particularly promising field for developing future cooperation, transforming existing relations, and promoting enhanced action worldwide through the increased use of diplomatic resources. Many fossil fuel-exporting countries have great potential to enhance cooperation around expanding sustainable energy. Renewable energy enjoys increasing price advantages, is becoming an internationally recognized prime energy resource, and can be linked to established programs and strategies for economic diversification. Renewable energy also yields co-benefits, like good jobs, increased energy access via decentralized energy systems, and improved livelihood security and living standards in rural areas. These advantages are especially clear in developing countries like Nigeria, where only around 60 percent of the population are connected to the electricity grid, and 80 percent of those with grid access rely on generators running on expensive imported diesel fuel to cope with frequent outages.

- **Trade and investment**
  Foreign policymakers need to consider a wider variety of potential entry points to move countries beyond fossil fuels and



other carbon-intensive products. Trade, investment, and more generally, economic cooperation with countries facing risks from global decarbonization, such as Nigeria or Colombia, can play an important role. As seen in the EU, partnership and cooperation agreements or free-trade agreements can provide a strong basis for such economic cooperation. A starting point could be cooperation between countries that have strategies or plans for economic diversification; these could build more strongly on and connect to priority sectors and industries independent of the fossil fuel business. Such activities should also help enhance these countries' resilience against stability risks arising from their dependence on oil and gas in a world that is beginning to move beyond fossil fuels.

- **Science and education**
  Poorer fossil fuel exporters in particular face significant challenges in developing a knowledge-based economy, which is itself closely linked to aspirations of economic diversification. Countries with established educational and research programs should recognize that these capacities are a strategic resource with which to encourage and shape diplomatic relations and international cooperation. By cooperating with fossil-fuel exporters, they can help to enhance their education and skills development as well as their research capacities. Such cooperation on education, research, and training can be intensified both bilaterally and in interregional frameworks. Renewable energy and other aspects of a low-carbon economy have particular potential in this respect (e.g., university partnerships or joint university degrees).

- **Finance and development**
  Diplomatic relations can put a focus on realigning finance and development cooperation to support decarbonization. Ongoing debates in Europe and beyond center on designing external finance and development cooperation so that a significant share of overall finance is reserved for climate and low-carbon development purposes. In addition, governments need to work to phase out or prohibit finance that is not aligned with low-carbon development objectives. China's Belt and Road program fails to do this.[19] On the other hand, Japan has announced it will slash its support for coal power in Asia[20], the UK government's overseas development bank is cutting support for fossil fuel projects[21], and the European Investment Bank pledges more than 25 percent of its financing to climate action. An important element of such reformed policies on external finance and cooperation is financial support for a just transition.[22] Incorporating strategies for a just transition would heed the lessons from internal debates, like those in Europe or Canada, on the importance of supporting regions particularly reliant on high-carbon industries and activities.

- **Security and peace**
  The geopolitics of decarbonization are also closely related to issues of peace and security. Many fossil fuel exporters face serious internal and/or external security challenges. This dynamic is as true

Unlike pandemics that strike suddenly, though, **with decarbonization it is relatively easy to predict** which exposed sectors in which fragile countries **will fall into disarray.**



for relatively prepared countries as it is for fragile ones. For example, Nigeria faces both serious internal and regional security threats, whereas the main security challenges are primarily domestic for Colombia and Indonesia. Qatar and Azerbaijan in particular are embedded in precarious regional security contexts. In addition, these countries are—to varying extents—challenged by weaknesses of their governance systems. Partners such as the EU can build on and intensify cooperation with fossil-fuel exporters on these security matters.

Conclusion

This vital energy transition is not just a matter of concern for climate and energy policymakers. Nor should the foreign policy community expect the decline of fossil fuels to cause energy issues to recede into the background. On the contrary, it will create new geopolitical dynamics around low-carbon energy. In order for the transition to go relatively smoothly, it is essential that policymakers consider decarbonization in every aspect of their work, whether trade relations or education policy or development aid. Decarbonization will redraw the geopolitical landscape; diplomacy must be leveraged to ensure a smooth transition.



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Endnotes

1 York, R., & Bell, S. E. (2019). Energy transitions or additions?: Why a transition from fossil fuels requires more than the growth of renewable energy. *Energy Research & Social Science*, 51, 40-43. https://doi.org/10.1016/j.erss.2019.01.008

2 *World coal consumption, 1978-2019*. (2020, July 29). IEA. https://www.iea.org/data-and-statistics/charts/world-coal-consumption-1978-2019

3 Which fossil fuels must remain in the ground to limit global warming? (2015, January 7). *UCL News*. https://www.ucl.ac.uk/news/2015/jan/which-fossil-fuels-must-remain-ground-limit-global-warming#:~:text=A%20third%20of%20oil%20reserves,UCL%20Institute%20for%20Sustainable%20Resources.

4 *Why the Energy Transition is Longer Than We Admit*. (2010, April 22). Renewable Energy World. https://www.renewableenergyworld.com/2010/04/22/why-the-energy-transition-is-longer-than-we-admit/#gref

5 *Statistical Review of World Energy*. (2020). bp. https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

6 Hafner, M. & Tagliapietra, S. (2020). *The Geopolitics of the Global Energy Transition*. Springer International Publishing. https://www.springer.com/gp/book/9783030390655#aboutBook

7 Sovacool, B.K. (2016, March). How long will it take? Conceptualizing the temporal dynamics of energy transitions, *Energy Research & Social Science, Volume 13, 2016*, Pages 202-215, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2015.12.020

8 *Energy Transition Outlook 2019*. (2019). DNV GL. https://eto.dnvgl.com/2019/index.html

9 *Data*. (2020). World Trade Organization. https://data.wto.org/

10 Colgan, J.D. (2013). *Petro-Aggression: When Oil Causes War*. University of Cambridge Press. https://books.google.de/books?hl=en&lr=&id=GDchAwAAQBAJ&oi=fnd&pg=PR12&dq=info:M4QPjaHGFgEJ:scholar.google.com&ots=uwAGbR7qg6&sig=5bVvge9JGQ5KRvLx-Vu0Z2gAt3tE&redir_esc=y#v=onepage&q&f=false

11 *Outlook for Producer Economies*. (2018, October). International Energy Agency. https://www.iea.org/reports/outlook-for-producer-economies

12 Ivleva, D. (2019). *Geopolitics of Decarbonisation: Towards an analytical framework*. adelphi. https://www.adelphi.de/en/publication/geopolitics-decarbonisation-towards-analytical-framework

13 Peel, M. & Sanderson, H. (2020, August 31). EU sounds alarm on critical raw materials shortage. *Financial Times*. https://www.ft.com/content/8f153358-810e-42b3-a529-a5a6d0f2077f

14 King, A. (2013, August 19). *Digging into the rare earth embargo*. Crawford School of Public Policy at Australian National University. https://crawford.anu.edu.au/news-events/news/2432/digging-rare-earth-embargo

15 Oberthür, S., Tänzler, D., Wright, E., Kuzemko, C., & Vanheukelen, M. (2020, July 3). *The Geopolitics of Decarbonisation: Re-Shaping European Foreign Relations. Institute for European Studies*. https://www.ies.be/conference/geopolitics-decarbonisation-re-shaping-european-foreign-relations

16 Van de Graaf, T., Overland, I., Scholten, D., & Westphal, K. (2020, December). The new oil? The geopolitics and international governance of hydrogen. *Energy Research & Social Science*. https://www.sciencedirect.com/science/article/pii/S2214629620302425

17 Ivleva, D. (2019). *Geopolitics of Decarbonisation: Towards an analytical framework*. adelphi. https://www.adelphi.de/en/publication/geopolitics-decarbonisation-towards-analytical-framework

18 Tänzler, D., Oberthür, S., & Wright, E. (2020). *The geopolitics of decarbonisation. Reshaping European foreign politics*. Berlin: adelphi. https://www.adelphi.de/en/publication/geopolitics-decarbonisation

19 Harding, R. (2020, July 12). Japan vows to slash financing of coal power in developing world. *Financial Times*. https://www.ft.com/content/482fa9e4-5eb5-4c61-a777-998993febae0

20 Harding, R. (2020, July 12). Japan vows to slash financing of coal power in developing world. *Financial Times*. https://www.ft.com/content/482fa9e4-5eb5-4c61-a777-998993febae0

21 Ambrose, J. (2020, July 2). UK government development bank to end fossil fuel financing. *The Guardian*. https://www.theguardian.com/environment/2020/jul/02/uk-governments-development-bank-to-end-fossil-fuel-financing

22 *What is a just transition?* European Bank for Reconstruction Development. https://www.ebrd.com/what-we-do/just-transition

CLIMATE CHANGE

MIGRATION & DISPLACEMENT

Displacement and Out-Migration: The Marshall Islands Experience

Hilda Heine and Kathy Jetñil-Kijiner

Many Marshallese have their own migration story. Our migration story began when we moved from the capital city of Majuro to Hawai'i for work and educational opportunities. These opportunities included working with the nonprofit Pacific Resources for Education and Learning (PREL) while pursuing postgraduate studies (Hilda), and elementary and secondary education in the downtown area of Honolulu (Kathy). For twelve years, life revolved around school, work, family barbeques, and picnics at Ala Moana, and we welcomed a continuous tide of relatives from the Marshalls who came through the Honolulu airport with coolers and suitcases in tow to live with us in our 3-bedroom apartment on Makiki Street.

We always understood that our future was not in the United States. There were no plans to stay permanently—we had moved for a purpose and when we reached our goals, we returned home. Yet the years we lived as a family in Honolulu would set the foundation for understanding the nuanced difficulties of living and migrating as a Marshallese. And as we each entered the realm of climate change work, those experiences have continued to inform and shape the dialogue we pursue at local, national, and international levels.

Our perspective has always been that migration, while a necessary option and important response to climate change, is not meant to be—nor should it be—the only option for our citizens. Forced migration is not the way forward. Our family willingly chose to relocate—and our fellow citizens and future generations must be able to retain that right of choice as well.

The science tells us that climate change impacts will continue to worsen and that we can no longer just focus on mitigation. The Republic of the Marshall Islands (RMI) is currently developing its National Adaptation plan, a strategic plan that considers various responses to climate change, including the elevation of land, internal migration, or even the extreme option of building new islands. At only 2 meters above sea level, we have no higher ground to run to—we must, instead, build that higher ground ourselves.

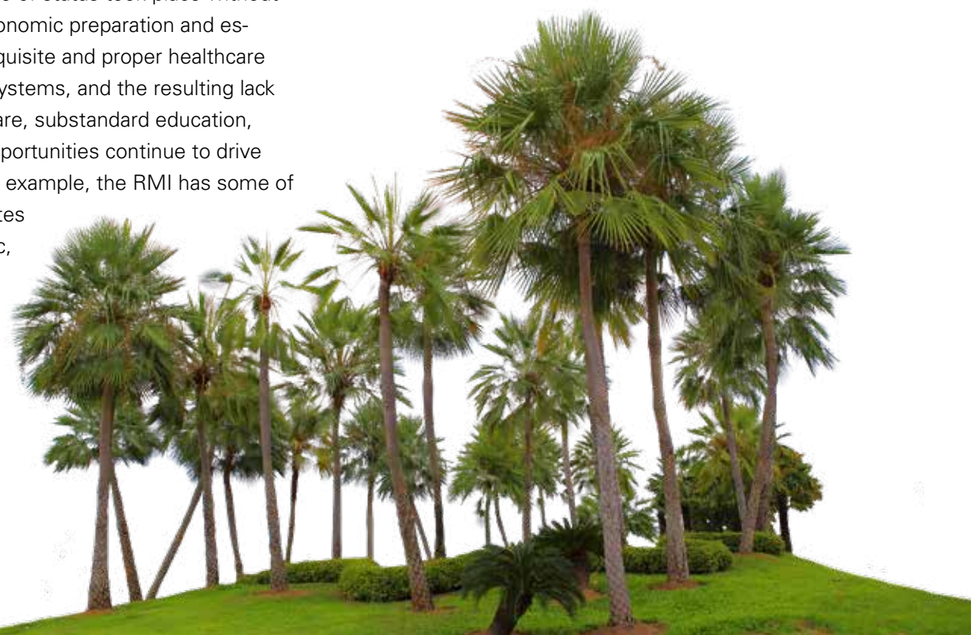
This is why policies to address climate change must not only continue to support mitigation efforts and create systems that enable a just transition into U.S. communities, but also continue to provide support for adaptation—especially for atoll nations, which are uniquely vulnerable. These policies must include funding mechanisms that enable atoll countries to access funds for adaptation sooner rather than later, resources to enable meaningful dialogues with stakeholders in our communities, and studies for understanding and supporting land reclamation or land elevation.

Our Giant, Distant Neighbor

The issues that the RMI is now planning for and considering do not exist in a vacuum. Our country has a long and complicated history with the United States, the country that most of our citizens have and will likely continue to migrate to as climate impacts worsen.

To properly understand our current and future migration patterns, one must also understand the history of the RMI's relationship with the United States, starting with the RMI's transition from a Trust Territory of the U.S. to an independent nation. This change of status took place without the necessary economic preparation and establishment of requisite and proper healthcare and educational systems, and the resulting lack of proper healthcare, substandard education, and limited job opportunities continue to drive out-migration. For example, the RMI has some of the highest diabetes rates in the Pacific, but the hospital system lacks proper dialysis equipment, forcing many Marshallese abroad.

The legacy of nuclear testing conducted by the United States continues to influence migration across the islands and the health of our people. After World War II and before the Compact of Free Association was enacted, the United States tested 67 nuclear weapons on Bikini and Enewetak atolls. Those tests destroyed our islands and ecosystems and had disastrous impacts on the health of our people. Marshallese from these nuclear affected islands were displaced within the Marshall Islands, and are still displaced 70 years later due to high levels of radiation on those islands. Understanding that their islands will never be restored to pre-nuclear testing conditions, many members from those islands in particular have emigrated to seek better lives. For example, a community of Enewetak islanders—the islands that house the Runit nuclear waste known for its cracked dome—currently reside on Big Island in Hawai'i. While our family does not come from the four islands the U.S. deems nuclear-affected, the elders in our family passed away from nuclear-related cancers long ago. No Marshallese citizen, regardless of where they reside in the RMI, is untouched by this legacy.





This nuclear legacy is only one example of the complicated relationship that the Marshallese have with the United States. COVID-19 has also exposed the cracks in the U.S. system, and the many ways vulnerable populations fall through these cracks. Marshallese people in particular have had a higher percentage of deaths in Arkansas, where many are working low-wage jobs with little to no access to the health care that was promised by the Compact of Free Association treaty. We hear from our family members working in the Consulates and as healthcare professionals how they struggle to support Marshallese community members in navigating the complicated systems to gain access to unemployment benefits and health insurance.

This systemic marginalization, combined with the current atmosphere of hostility and outright racism towards immigrants in the United States, puts into stark reality the struggles Marshallese and other Pacific Island people will face as climate impacts drive increased migration. In our work through PREL as well as the time we spent living and growing up in the U.S., we have experienced this discrimination ourselves in our daily interactions with acquaintances and friends, teachers, and in institutional policies such as the eligibility for Medicaid.

A Framework for Mobility

The Compact of Free Association Treaty, a treaty between the Marshall Islands and the United States that first went into effect in 1986, originally extended education and health benefits such as student loans and Medicaid insurance. The Federated States of Micronesia and the Republic of Palau have also signed similar Compact agreements with the United States. The first Compact between the RMI and the U.S. was a fifteen-year treaty that was renewed in 2003 for another fifteen-year period, and is currently up for renewal again in 2023.

Migration out of the RMI increased after the Compact went into effect because of visa-free provisions that allowed easy mobility between the RMI and the United States. In 2011, 25 years after the Compact came into force, 22,343 Marshallese were living in the U.S. That number has since risen to an estimated 30,000. This means nearly half of all Marshallese have migrated to the States, with significant numbers in its territory of Guam as well.

While the Compact has enabled easier mobility, there are significant gaps in the agreement that must be addressed in the face of both COVID-19 and climate change. First, the status of Freely

Associated States (FAS) residents living in the United States must be made clearer. As it stands, confusion over our status means that some states allow certain critical benefits, like health insurance, while others deny them.

The discontinuation of Section 177 funds—a $150 million Nuclear Claims Fund for the four most affected the RMI atolls—also needs to be addressed. Without the funds, the Nuclear Claims Tribunal is no longer able to operate, despite the fact that numerous land compensation and personal injury claims have gone unresolved. The elders in our family—both of whom had nuclear-related cancers—were awarded personal injury claims by the Nuclear Claims Tribunal, yet they only received half of the payment because the funds ran out. How many other nuclear victims have experienced this?

We are currently in the process of renegotiating the Compact and working to ensure that climate change and its impacts are considered in the talks. The current U.S. administration's position on the issue, however, will create barriers to that discussion, despite the strategic importance of the Marshall Islands generally, and of Kwajalein missile test site, specifically.

Climate, Health, and Safety

The Compact of Free Association has provided important opportunities for the RMI citizens to access healthcare and education opportunities in the United States. But the gaps in the agreement, paired with the heightened risks posed by climate change and COVID-10 and the current administration's reluctance to address these risks, signal a need for broader foreign policy initiatives that support the Marshall Islands and other frontline nations and communities.

Opportunities lie in the United Nations Framework Convention on Climate Change as well as with the Human Rights Council, where Marshall Islands currently has a seat.

Our country is one of just 5 atoll nations that are severely threatened by climate change. King tides, intrusion of salt water into freshwater resources, and the difficulties of growing food have exacerbated the challenges of the harsh atoll environment. We are also facing increased health challenges as a result of climate change. Scientists have determined that dengue fever and other mosquito-borne illnesses are increasing as climate change worsens, and our country has been experiencing this first hand. From this past October to January 2020, our hospitals and staff were overwhelmed with patients sick with dengue fever.

This experience with dengue, however, helped inform our government's decision to close down borders early on in an effort to prevent COVID-19 from entering our country. Hospital administrators advised the National Disaster Committee to take swift action, learning from lessons months earlier that our system and staff lacked the capacity to deal with the pandemic sweeping the world.

COVID-19 has exposed the ways in which countries are capable of transitioning to low-carbon means of transportation, but at high costs. Climate change advocates, including representatives from our own country, have long been pushing for these transitions, but through processes that would provide the breathing room needed for systemic change, and without the high economic impacts and death tolls seen from the pandemic.

Ultimately, foreign policies need to provide the proper infrastructure for migrating—infrastructure that affords our citizens the access to essential services like health care that we desperately need. At the same time, policies must also address and support adaptation so that migration is a choice, and those that decide to stay are able to maintain our land, our identity, and our culture.

Living as a Marshallese family in Hawai'i for all those years gave us many opportunities—but it also taught us the many difficulties of living away from our homeland. We want to ensure that all Marshallese families have the choice to migrate, but can also continue to live in our islands for generations to come.





SENATOR HILDA C. HEINE, former President of the Republic of the Marshall Islands (RMI), is serving her third term as Member of Parliament (Nitijela) from the constituency of Aur Atoll Electoral District, RMI. She is the first female President of RMI and one of two women elected to the Nitijela following the 2019 election. Previously, Senator Heine was Minister of Education and served the Marshallese government in various capacities, including as President of the College of the Marshall Islands. She worked for the Pacific Resources for Education and Learning in Honolulu, Hawaii for ten years. A crusader for women's rights, Senator Heine is a co-founder and advisor to Women United Together Marshall Islands. Under her leadership, the Pacific Women Leaders Coalition was formed in 2019. Senator Heine holds a BA from the University of Oregon, MA from the University of Hawaii, and EdD from the University of Southern California.



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A Climate Crisis and a World on the Move: Implications for Migration Management

Mariam Traore Chazalnoël & Dina Ionesco

Climate migration is increasingly visible worldwide, from Pacific Islanders moving inland, to migrants in African countries whose livelihoods have been destroyed by desertification and land degradation.[1] And we have seen in the past few years—whether at the United States' southern border or in the Mediterranean—that migration can quickly become a pressing issue for foreign policymakers, who are often unprepared to handle the aftermath of migration crises.

The linkages between migration and climate change are drawing more attention in international policy forums. For many United Nations member states, discussing the adverse impacts of climate change on migration is no longer an option but a necessity. Indeed, even if we do not know exactly how many people migrate as a result of the slow and sudden onset impacts of climate change, we do know that policymakers in all regions of the world are—or will be—confronted by challenges linked to the increased mobility of people because of climate impacts on their livelihoods, physical safety, and health.

In 2019, 25 million of people were displaced within their own countries by weather-related disasters[2], including over 900,000 people in the United States. The World Bank estimates that by 2050, 140 million people could be compelled to move within their home country borders because of climate impacts.[3]

We are not prepared for this anticipated surge in mobility. Existing migration management policies and practices are often inadequate to address the challenges associated with the movement of people in the context of climate change, environmental degradation, and natural disasters. Even where there has been progress in national policies, it is insufficient.

The pace at which the climate is changing combined with other economic or social shocks should prompt governments to urgently consider how to anticipate and respond to evolving migration patterns.

Better Climate Migration Management Will Help States Weather the Storm

COVID-19 is an extreme shock that currently is at the forefront of our thoughts.[4] But there will be more shocks to come—some that we can predict and others that will disrupt our societies with little or no warning. These crises all have the potential to affect the individual fate of millions of migrants, including climate migrants and those left behind. While there is no one-size-fits-all blueprint applicable to crises, better migration management is always going to be an essential component of crisis response.

The Global Compact for Safe, Orderly and Regular Migration[5] (GCM) and the Task Force on Displacement under the United Nations Framework Convention on Climate Change[6] (UNFCCC) have produced solid recommendations and principles that can guide states in the development of forward-looking policies on climate migration. As has been the case for many years, the emphasis is on privileging climate change adaptation[7] and resilience strategies *in situ* so that people aren't forced to move because of circumstances beyond their control.

More recently, however, the discussion has evolved to acknowledge, importantly, that migration policies need to be expanded by states to facilitate safe migration for those who cannot remain in, or return to, their areas of origin due to climate and environmental conditions.

The political acceptance of this concept is relatively new—therefore, these ideas are mostly still at the level of principles in international policy texts. However, there is hope that the increased political awareness at the global level can trigger a review of existing national and regional migration and climate change policy frameworks to align them with agreed upon global principles. This is the case for example in Tajikistan where the United Nations Migration Agency (IOM) is currently undertaking a policy review to analyze how national policies and planning processes can better integrate migration and climate dimensions.

New mobility policy frameworks could also be developed on the basis of the GCM, opening the possibility to further mainstream climate and environmental dimensions. For instance, in the 3 year implementation plan of action for the GCM of the African Union[8], one priority centers on addressing drivers of migration in the context of climate change. For most countries and regions, however, translating these principles into national and regional policies is both a political and a technical challenge. Many national policymakers are hamstrung by the negative connotations of migration and sensitive nature of discussions focused on helping people to migrate to cope with the impacts of climate change. They also need better information and guidance on how to analyze their national policy frameworks and propose relevant changes.

The language adopted in these global policy documents is constructive, but words will not mean much unless governments actively develop and implement migration management policies that provide comprehensive legal migration options to climate migrants. In a world where the mere mention of migration is politically loaded, having a frank conversation on this topic will not be easy. Yet the pace of the climate crisis leaves no other choices than to tackle this question head on.



Moving Beyond a Fear of More Migration

Some states are already implementing migration management policies that can be applied to disaster contexts[9], such as visas granted on humanitarian grounds in the Dominican Republic, Argentina, and Panama. However, these measures do not usually apply to people migrating because of the slow impacts of environmental degradation.

A recent mapping of human mobility and climate change in relevant national policies and institutional frameworks produced by IOM found that out of 66 countries and territories reviewed, 53 percent referenced climate change and environmental factors in their national migration and displacement frameworks.[10] Notably, this includes several African countries such as Ghana, Kenya, Nigeria, Botswana, and Uganda. Some countries—like Nepal, Georgia, and Vanuatu—have even developed specialized policies on climate and human migration. But these discussions are often ad hoc and not systematized.

As we enter an uncertain post-COVID-19 period, there is an opportunity to rethink climate action and climate migration management in the context of building back better.[11] It is time for states to engage in a systematic and comprehensive analysis of their migration policies and practices with dual ambition: to understand how their different migration management tools can be repurposed to fit new environmental realities, and determine what new practices and policies might be needed.

The goal is not only to provide protection and assistance to climate migrants, but to also enhance and elevate the benefits that these migrants bring to their host societies. The United Nations system and civil society actors can support states by extracting lessons learned from existing initiatives and providing general guidance and recommendations across the whole spectrum of migration management policies.

To this end, many migration management approaches can be rethought and stepped up. One of the clearest approaches is for states to provide exceptional or special migration measures (including visas and residency permits) to those affected by the impacts of climate change. Another approach is to leverage more common migration categories—for instance permanent residency and citizenship applications—in cases where migrants are affected by severe climate impacts and returning is not an option.

Existing labor, educational, and training bilateral agreements can better target communities particularly vulnerable to climate impacts, quotas can be expanded, and new options created to serve those most vulnerable to climate change. Regional free movement protocols can explicitly include climate migrants and persons displaced by disasters.[12] Migrant voluntary return and reintegration policies and programs can be tweaked to systematically be environmentally sustainable and create opportunities in the green economy.[13] Measures to prevent and combat trafficking and smuggling of migrants should systematically consider how disasters and climate impacts increase risks of trafficking and smuggling.[14] Formulating economic measures to reduce the cost of transferring remittances and incentivize diaspora investments[15] in climate action is also a promising avenue that remains underexplored.

Health dimensions should be taken into account across the board, including—as noted repeatedly by the UN Secretary General[16]—through the integration of climate action and COVID-19.

Climate migrants have their specific vulnerabilities, but they are also a genuine asset to their host communities and societies. A comprehensive migration management approach can help to offer dignified and legal opportunities that are beneficial to all. Such measures will come as a *complement* to climate mitigation and adaptation efforts that seek to prevent forced migration and allow people to remain in their communities of origin. As the world face the dual impacts of the COVID-19 and climate crises, it is time to create better systems to provide dignified options to migrants and support the states they leave and enter in a warming world.

The opinions expressed in this article are those of the authors and do not necessarily reflect the views of the International Organization for Migration (IOM).





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Endnotes

1 International Organization for Migration, & United Nations Convention to Combat Desertification. (2019). *Addressing the Land Degradation – Migration Nexus: The Role of the United States Convention to Combat Desertification*. IOM. https://www.uncclearn.org/sites/default/files/inventory/iom_unccd_desertification_2019_final.pdf

2 Internal Displacement Monitoring Centre. (2020). *Global Report on Internal Displacement 2020*. https://www.internal-displacement.org/global-report/grid2020/

3 Rigaud, K.K., de Sherbinin, A., Jones, B., Bermann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., & Midgley, A. (2018, March 19). *Groundswell: Preparing for Internal Climate Migration*. World Bank Group. https://openknowledge.worldbank.org/handle/10986/29461

4 Ionesco, D., & Chazalnoël, M.T. (2020). *More than a health crisis? Assessing the impacts of COVID-19 on climate migration*. Environmental Migration Portal. https://environmentalmigration.iom.int/blogs/more-health-crisis-assessing-impacts-covid-19-climate-migration

5 Ionesco, D., & Chazalnoël, M.T. (N.D.) *10 Key Takeaways from the GCM on Environmental Migration*. Environmental Migration Portal. https://environmentalmigration.iom.int/10-key-takeaways-gcm-environmental-migration

6 Chazalnoël, M.T., & Ionesco, D. (N.D.) *10 Key Takeaways from the COP24 Recommendations on Integrated Approaches to Address Displacement and Climate Change. Environmental Migration Portal*. https://environmentalmigration.iom.int/es/node/1470

7 Wright, E., Tänzler, D., Rüttinger, L. (2019, November). *Migration, environment and climate change: Responding via climate change adaptation policy*. German Environment Agency. https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2020-03-04_texte_44-2020_migration-response_3.pdf

8 Africa Union. (N.D.) *3 Year Implementation Plan of Action for The Global Compact on Safe, Orderly and Regular Migration (GCM) in Africa* (2020 – 2022). https://au.int/sites/default/files/newsevents/workingdocuments/37472-wd-3_year_implementation_plan_of_action-english.pdf

9 The Nansen Initiative. (2015, December). *Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change*. https://nanseninitiative.org/wp-content/uploads/2015/02/PROTECTION-AGENDA-VOLUME-2.pdf

10 International Organization for Migration. (2018, August). *Mapping Human Mobility and Climate Change in Relevant National Policies and Institutional Frameworks*. The Warsaw International Mechanism for Loss and Damage Associated with Climate Change Impacts. https://unfccc.int/sites/default/files/resource/WIM%20TFD%20I.1%20Output.pdf

11 Gemenne, F., & Depoux, A. (2020, March 18). From the coronavirus crisis, we can learn lessons to fight against climate change. *Le Monde*. https://www.lemonde.fr/idees/article/2020/03/18/de-la-crise-du-coronavirus-on-peut-tirer-des-lecons-pour-lutter-contre-le-changement-climatique_6033464_3232.html

12 Wood, T. (2020, February 28). OPINION: New pact paves way for innovative solutions to disaster and climate change displacement in Africa. T*homson Reuters Foundation*. https://news.trust.org/item/20200228175003-4k8dq/

13 International Organization for Migation. (2019). *Reintegration Handbook: Practical guidance on the design, implementation and monitoring of reintegration assistance*. https://publications.iom.int/system/files/pdf/iom_reintegration_handbook.pdf

14 International Organization for Migration. (2016). *The Climate Change-Human Trafficking Nexus*. https://publications.iom.int/system/files/pdf/mecc_infosheet_climate_change_nexus.pdf

15 Environmental Migration Portal. (N.D). *West Africa: Promoting sustainable land management in migration-prone areas through innovative financing mechanisms*. Knowledge Platform on People on the Move in a Changing Climate. https://environmentalmigration.iom.int/projects/west-africa-promoting-sustainable-land-management-migration-prone-areas-through-innovative

16 The United Nations Department of Global Communications. (2020). *Climate Change and COVID-19: UN urges nations to 'recover better.'* https://www.un.org/en/un-coronavirus-communications-team/un-urges-countries-%E2%80%98build-back-better%E2%80%99



Reorienting Perceptions of Climate Change, Migration & Displacement

Maxine Burkett & Lauren Risi

The role of environmental conditions in triggering migration has long been hotly contested. Climate change as the definitive condition is no exception. How exactly climate change impacts forced or voluntary migration is difficult to decipher and riddled with complexity, yet the essence of climate change is a dramatic and decisive departure from the past. Despite the inconclusive and sometimes contradictory historical record for the environment-migration nexus, it is clear that climate change will increasingly influence migration patterns around the world. Estimates for how many people will move as a result of climate change are wide-ranging and fraught with uncertainty. What we do know is that migration is an important factor in climate adaptation, for both sending and receiving countries.

The actions that have led to climate change and its impacts (migration chief among them), and the geographically lopsided nature of them, make "climate change" as much a geopolitical term as a scientific one. To date, however, diplomacy related to climate change has been generally relegated to environment ministers, climate negotiators, and scientists who are tasked with managing a phenomenon with geopolitical implications. Those engaged in other areas of diplomacy have not seen its relevance to their portfolios. Many within the diplomatic class, such as trade envoys, actively disregard or oppose climate change curbing goals, despite the consequences for the globe and their very remit.

The effect of this positioning is that climate and environment negotiators, armed with the limited capacity and resources to "manage the trees," are now burdened with saving each and every forest, as well as the peoples and political economies that depend upon them (i.e., the global population).[1] Consistent with the intent of the "21st Century Diplomacy" project, Sue Biniaz persuasively argues the same in her article, reminding fellow diplomats that "it's your problem too" and "climate is foreign policy," both militating in favor of intentional and intensive streamlining of climate change in diplomatic work.

Climate migration touches on innumerable areas across international law, and down to domestic and sub-national decision-making. Notably, climate-induced migration breaks through the typical silos more so than the impacts of climate on other sectors, like agricultural productivity, transportation, and energy. This is in part because climate-induced migration is commonly used to illustrate how climate change can act as a "threat multiplier." Without additional context, however, the (unintended) consequence of this framing is that it presents climate-induced migration first and foremost as a security risk. It obscures the very practical role that migration plays in climate adaptation, and the need and potential for interventions that prevent *forced* displacement—that is, interventions that allow people to *decide* whether or not to move.

This piece surveys relevant evidence and current policy proposals related to climate change and migration, explores the shortcomings of the predominant security framing, and seeks to inspire and advance diplomatic responses that provide meaningful choices for those at the crossroads of climate change and human mobility.

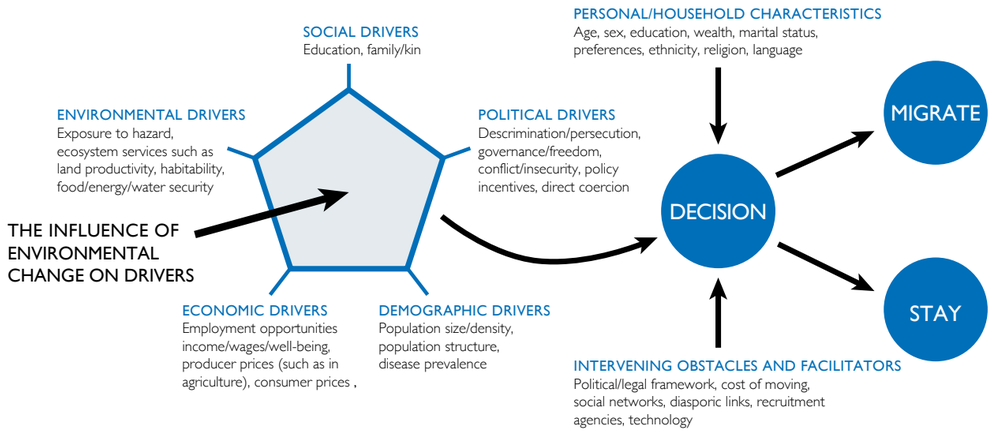


Climate Migration - Evidence and Projects

Although experts are quick to maintain that migration has always been a feature of human behavior and the product of multiple drivers, climate change is increasingly a factor in the decision to move. Perhaps the clearest indication of this is the growing number of people displaced by weather-related impacts. In fact, weather related displacement now represents a significantly larger number of internally displaced people (IDPs) than those displaced by conflict and violence. In 2017, there were 18.8 million new IDPs associated with disasters, compared with 11.8 million new IDPs as a result of conflict and violence.[2]

Climate change will also impact migration through its effects on the five broadly recognized drivers of migration: economic, political, demographic, social, and environmental.[3] Together these drivers comprise a conceptual framework for deciphering the range of factors that might affect the volume, direction, and frequency of migratory movements. Climate will redistribute economic activity and shift trade routes[4], impact agricultural productivity, expose weak governance in fragile states, and deepen inequities. As climate change impacts the primary drivers of migration, its influence on migration decisions and pathways will grow.

Fig 1: A conceptual framework showing the influence of environmental change on drivers of human migration.



Source: Black et al. (2011). Migration and Global Environmental Change.[5]

Climate change will also influence mobility patterns more directly, however, as global change increases sea level and the number and intensity of droughts, floods, heatwaves, and other extreme weather events. There are, of course, variations in the responses to these triggers. Sea level rise, for example, is more likely to influence the timing and volume of ongoing migration rather than produce novel patterns of migration.[6] Migration responses and displacement as a result of extreme, sudden onset events vary widely across socioeconomic groups, as seen in the United States following Hurricane Katrina.[7] Droughts and extended extreme heat events suggest wholly different patterns. Where livelihoods and food security are undermined, but homes left intact, these events do not generally lead to "immediate, large-scale displacement or migration."[8] However, if the conditions persist and there is insufficient adaptive capacity, internal rural to urban migration may increase.[9] These divergent responses, under varying scenarios, make a precise prediction of the scope and scale of climate-induced migration a fundamental challenge.

Evidence of Climate-Migration Linkages Around the World

The interplay of climate migration drivers is born out in the results of studies on migration in West Africa. One review examined 15 empirical case studies that concentrate directly on the links between climate and human mobility in West African drylands.[10] The authors found that the studies were consistent on three points: 1) environmental conditions and changes tend to result in temporary migration; 2) migration is commonly leveraged to diversify income; and 3) migration is caused by multiple factors. They also determined that environmental factors are often *not* the main driver but can trigger movement in regions where there are other drivers at play. Again, however, whether the future stays consistent with current and former studies is unclear in light of accelerating climatic changes.

Increased temperature may have a more significant impact on migration as it can more directly, and more permanently, impact those whose livelihoods are dependent on the environment (e.g., declines in agricultural productivity). A 21-year longitudinal survey conducted by Mueller et al. in rural Pakistan that measured the relationship between weather and long-term migration found that while flooding—a climate shock commonly associated with large relief efforts—has "modest to insignificant impacts on migration," heat stress "consistently increases the long-term migration of men, driven by a negative effect on farm and non-farm income."[11] Interestingly, they explain that flooding's more modest impact on migration may be because flooding increases demand for local labor and hence reduces migration.

Similarly, Bohra-Mishra et al. demonstrate that increased temperatures have had a much stronger effect on inter-provincial migration within the Philippines than disasters by using a detailed longitudinal dataset, combined with data on temperature and precipitation.[12] Another study by Feng, Krueger, and Oppenheimer found that climate-driven changes in crop yields in Mexico had a significant effect on Mexican emigration to the United States.[13]

Three broad, possible shifts in mobility due to climate change can be deduced[14], however:

1. Larger flows of people along established migration routes as the destinations become safer or more attractive, sending areas become less safe or less viable, and migration network effects continue to facilitate movement.

2. Unchanged or even decreased flows of people along established migration routes, either because destinations become less attractive or less viable relative to the sending area, or because migrant networks are not able to facilitate greater levels of migration.

3. New flows of migrants between sending and destination areas that have not historically been connected, leading to the creation of new migration networks.

Given the way in which recent migration crises have unfolded, countries—including those in the Global North—are woefully ill-prepared. In an assessment of "distress-driven migration," researchers found that climate change could drive a huge increase in the number of migrants seeking asylum in Europe if current trends continue.[15] They forecast the number of migrants attempting to settle in Europe each year to triple by the end of the century based on current climate trends alone, independent of other political and economic factors.[16] Warming of 2.6 degrees Celsius to 4.8 degrees Celsius (which climate experts deem likely unless stringent measures are taken to bring down greenhouse gas emissions) would result in as many as 660,000 additional asylum seekers coming to Europe each year by 2100, based on their proposed model.[17]

Numbers like these dominate the climate migration discourse, with estimates of global climate migration ranging from as few as 25 million to as many as 1 billion climate migrants. These numbers can tell a compelling story but are hampered by the limitations of crude population estimates and fail to consider the countering effects of climate adaptation, particularly to facilitate potential migrants' preferences to stay in place.[18] They also leave out the stories of those unwilling or unable to relocate, sometimes referred to as "trapped populations." Of equally great concern is the absence of broadly recognized and formal legal infrastructures and clearly articulated and enforceable rights of migrants, much less a spirit of readiness and welcome for receiving countries.

The focus on the projected number of potential migrants obscures another important fact: Migration is a critical and long-practiced resilience strategy with benefits for both sending and receiving communities. In fact, as a response to climate change, it may serve as "the most effective way to allow people to diversify income and build resilience where environmental change threatens livelihoods."[19] Temporary migration can be a necessary and pragmatic response to disasters, and is capable of strengthening the resilience of affected communities.[20] Migrants often provide significant remittances to their places of origin, increasing the resilience and adaptability of those who remain. In 2019, for the first time, remittances exceeded foreign direct investment and official development assistance flows to low- and middle-income countries.[21]

These potential benefits of migration, however, are dependent on policies that facilitate safe, affordable, and legal migration, ensure equal rights for both migrants and host communities, and avoid real or perceived disparities in opportunity or access to services between migrants and host communities.[22] Decision-makers should institute these migration policies in concert with broader climate strategies such as aggressive decarbonization, sustainable urbanization, climate-smart development, conflict resolution and prevention, and emergency preparedness.[23]

Relevant Laws & Governance Gaps

The instruments and regimes related to migration that are currently in place fail to respond effectively to current migration flows, and increased and potentially erratic movement will likely further stress and strain them. In short, the mobility options for those on the move are circumscribed by increasingly antiquated 20th century parameters. They include: a move to (the rare) neighboring country that allows unrestricted entry; formal international migration programs that facilitate entry to high-income countries, such as a skilled worker visa programs; and the extralegal, clandestine, and often life-threatening journey to another country to seek asylum.[24]

Most climate change and mobility scenarios fall outside of almost all legal frameworks, prompting numerous and sustained calls[25] for a global governance regime to manage international migration.[26] Some have called for a new legal instrument, such as a standalone treaty to address cross-border climate-induced migration[27], while others remain skeptical that migration spurred by climate change differs substantially from other kinds of survival migration to warrant a new instrument—never mind the difficulty of drafting and passing a new one or amending the Refugee Convention.[28]

Certain migration scenarios may meet the elements of the oft-invoked Refugee Convention's definition of "refugee." If authorities were to deny assistance and protection following a slow or sudden-onset event to "certain people because of their race, religion, nationality, membership of a particular social group or political opinion and as a consequence expose them to treatment amounting to persecution," protections might be available.[29] The overwhelming consensus, however, is that climate-induced migration, particularly triggered by relatively slow-moving sea level rise, for example, falls outside of the Convention's scope and protections.

More recent international attempts to manage movement related to climate change include three United Nations initiatives relevant to migra-



tion: The Global Compact for Safe, Orderly and Regular Migration (GCM), the Global Compact on Refugees, and the United Nations Framework Convention on Climate Change (UNFCCC) Task Force on Displacement (Task Force). The Task Force seeks to enhance the capacity of governments and regional and international organizations to address climate-related drivers and impacts of displacement by developing recommendations for integrated approaches in response. Some believe that a combination of extant approaches, if fully taken up, would be effective. The GCM, the Sustainable Development Goals, and the UNFCCC displacement efforts "collectively provide all of the policy-making tools necessary for responding successfully to the risks posed by climate change."[30] Yet the United States, Australia, and a number of European states did not vote to approve the GCM, despite the fact that it doesn't create any legal obligations. Meanwhile the current U.S. administration has initiated withdrawal from the UNFCCC's Paris Agreement and appears thoroughly unmotivated by the goals and content of the SDGs.

International agreements related to the protection of human rights may be increasingly relevant. In 2013, an i-Kiribati man was denied asylum in New Zealand after claiming that, if deported, he faced irreparable harm to his right to life because climate change is rendering Kirabti uninhabitable. In a subsequent appeal, the UN Human Rights Committee found that New Zealand did not violate the man's right to life when they deported him. In their ruling, however, they recognized that "without robust national and international efforts, the effects of climate change in receiving states may expose individuals to a violation of their rights,"[31] suggesting that future claims based on violation of human rights might be available. There are also relevant principles and soft law provisions, such as the Peninsula Principles on Climate Displacement within States and the Sendai Framework for Disaster Risk Reduction, that while pertinent are not binding on any nation state, providing very limited protection for migrants. Some individual nation-states also provide temporary or subsidiary protection for disaster-induced cross-border displaced persons that, while promising, remain ad hoc.[32]

Informing More Effective Diplomatic Reponses

Explore State to State Engagement

The diplomatic community might explore avenues adjacent to the multilateral initiatives described above. While there are no legally binding regional conventions or treaties that prescribe obligation for developed countries, existing or newly crafted regional, bilateral, and multilateral agreements may be relevant.[33] And, countries with strong transnational communities can develop bilateral arrangements.[34]

The Compacts of Free Association between the United States, and the "Freely Associated States" of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau, for example, allow for visa free entry to work and live in the United States. These agreements were negotiated before climate related threats to habitability emerged but may, nonetheless, provide an avenue for migration in response to climate impacts. Even so, there are gaps in the existing agreements that, if addressed, would strengthen them. While the agreements do allow for indefinite stay, they do not provide a pathway to citizenship for migrants. The lack of financial assistance restricts eligibility to those with existing resources or family networks.[35] Finally, the Compacts may not serve as an adequate solution to permanent or large-scale population displacement in large part because they are unilaterally terminable by any party.[36]

Regional governance of migration, effectively exemplified by the free movement agreements (FMAs), may offer a more facile, practical response to climate migration and displacement. Such 'bottom-up' approaches acknowledge that regions experience climate displacement differently and have differing capacities for protecting those who are displaced.[37] FMAs—provisions within broader regional economic agreements that liberalize mobility restrictions between participating states—have the potential to offer comprehensive protection to climate migrants.[38] They exist across all continents and have already proven effective in facilitating migration in the disaster context. For instance, the Caribbean Community (CARICOM) and Organization of Eastern Caribbean States (OECS) FMAs were both used during the 2017 Atlantic Hurricane season to provide displaced persons a right of entry into neighboring island nation-states, waivers of travel document requirements, indefinite stays in some circumstances, and access to foreign labor markets by waiving work permit requirements. For instance, after Hurricane Maria in 2017, displaced Dominicans were able to migrate to Trinidad and Tobago using the CARICOM FMA's six-month visa-free stay program, and others were able to migrate to Antigua, St. Vincent, Grenada, and St. Lucia under the OECS FMA.[39] Expansion of FMAs may provide effective protection in the climate change context.[40]

FMAs may also resonate in the Pacific, as free movement harkens back to pre-colonial Oceania in which islanders' freedom of movement was not hindered by national borders. Historically, interconnections among islands were inherent to the Pacific experience, "but active travel and resettlement activities were stifled by the migration and mobility restrictions of the colonial powers."[41] Indeed, current South Pacific negotiations processes seem shaped by these earlier conceptions of mobility when facing contemporary discussion of climate migration.[42] Similarly creative, collaborative, and humane proposals can emerge if the security frame is right-sized to address the multidisciplinary nature of climate change generally, and climate and human mobility specifically.

Loosen the Security Frame and Expand the Toolbox

In the academic literature there is a consistent concern regarding the exceptionalism used to describe climate-induced mobility (as if mobility has not been a defining feature of human history) and the subsequent securitization of climate migration. The larger numbers of potential migrants estimated and disseminated in policy reports are often used to fuel the negative perceptions of migrants themselves, strengthening the "threatened borders" narratives and anti-immigrant sentiment prevalent around the world today. As noted by Boas et al.'s review and reflected in the migration agendas of the European Union, United States, and Australia, among others, the effect of this narrative is that "'climate-induced migration' is now a common rationale for measures to strengthen and protect national and regional borders in the Global North."[43] These countries are implementing migration policies that include

restricted entry, discouragement of asylum claimants, and criminalization of undocumented migration—and, in some instances, are pressuring other countries to do the same. This is suboptimal from the perspective of the migrant as well as host countries and communities.

The growth of anti-immigration sentiment and border tightening is also happening within the Global South, where South-South migration is empirically more prevalent and is projected to grow. In Johannesburg last September, a dozen people were killed in a spate of xenophobia-fueled violence against migrant shop owners.[44] Also of note are the stricter border controls Venezuela has erected with its neighbors, the Dominican Republic's deportation of Dominican-born descendants of Haiti, and Kenya's border fence with Somalia.[45]

In addition to military grade weapons, vehicles, and even uniforms, high-tech surveillance tools are being deployed by the U.S. Border Patrol. We see increased border surveillance as well in the European Union with the use of biometric visas for third-country nationals. Robert McLeman underscores the stark consequences of this turn:

> *…turning these technologies with military origins against civilians … securitizes the act of migration. It blurs the distinction between surveillance actions to detect and deter the approach of armed enemy agents — something that every state has a sovereign right to do — and monitoring borders to prevent the approach of unarmed civilians seeking entry: something every person has a right to do under the Universal Declaration of Human Rights and the UN Refugee Convention. In this collision, the rights of the individual are lost.*[46]

These trends carry their own security risks. Migration can act as an important "release valve." Restrictions on mobility—including hardened borders and the criminalization of asylum-seekers—force migrants into "expensive and physically dangerous attempts to reach their destinations."[47]

Severely impeding mobility can have knock-on effects on livelihood security more broadly, and not just in regard to remittances. For example, in the Lake Chad Basin, where more than 2.5 million people have been displaced by conflict and 10.7 million are in need of humanitarian assistance, an assessment of the region's climate and fragility linkages found that "restrictions on the places that people can live and travel [compound] the impacts of displacement and population growth on livelihoods and natural resources."[48]

A reorientation that does not reinforce decontextualized narratives about climate-fueled mass migration is sorely needed at this time. A narrative that is focused on both the risks faced by affected populations' and their rights, and is as attentive to the need to migrate as it is to efforts



to "stay in place," will be the most effective. It is only through this reorientation that policymakers and practitioners will be able to identify an expanded set of entry points for interventions that bolster the resilience of both sending and receiving communities.

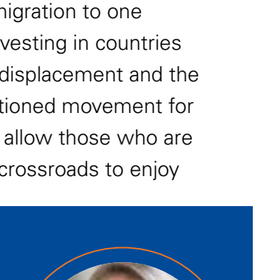
Conclusion

The single defining global policy decision regarding human mobility and climate change is the rate of greenhouse gas emissions and their rapid drawdown. But the fact remains that even if greenhouse gas emissions were reduced to zero tomorrow, the world would continue to warm for several more decades.

The rhetoric needs to shift from a fear of migrants and unregulated migration to one focused on the impact of investing in countries experiencing high levels of displacement and the facilitation of safe and sanctioned movement for those who need it most. To allow those who are at the climate and mobility crossroads to enjoy meaningful choices, the diplomatic community will need to facilitate the protection of life and dignity, whether individuals and communities are on the move or choosing to stay in place. Key to this is the recognition of the role played by domestic and international institutions, agencies, and international regimes that are tasked with addressing and responding to the increased movement of people across and within borders.[49]

We must address the magnitude of 21st century human migration, which has no historical analogue, by crafting solutions that are not shaped by, nor perpetuate, fear and othering. Instead, mediated approaches that are inclusive and rights-driven should be the only non-negotiable.

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Endnotes

1 For further exploration of this quite useful analogy, see Bosselman K. (2010). Losing the Forest for the Trees: Environmental Reductionism in the Law. *Sustainability* 2(8), 2424-2448. https://doi.org/10.3390/su2082424

2 Norwegian Refugee Council. (2018). *Global Report on Internal Displacement 2018*. Internal Displacement Monitoring Centre. https://www.internal-displacement.org/global-report/grid2018/

3 Black, R., Adger, N., Arnell, N., Dercon, S., Geddes, A., & Thomas, D. (2011). M*igration and Global Environmental Change: Final Project Report*. The Government Office for Science, London. https://sustainabledevelopment.un.org/content/documents/867migrationscience.pdf

4 Schlenker, W., & Auffhammer, M. (2018, May 23). The cost of a warming climate. *Nature*. https://www.nature.com/articles/d41586-018-05198-7?proof=true

5 Black, R., Adger, N., Arnell, N., Dercon, S., Geddes, A., & Thomas, D. (2011). *Migration and Global Environmental Change: Final Project Report*. The Government Office for Science, London. https://sustainabledevelopment.un.org/content/documents/867migrationscience.pdf

6 Wrathall, D. J., Mueller, V., Clark, P. U., Bell, A., Oppenheimer, M., Hauer, M., & Abel., K. (2019, December). Meeting the looming policy challenge of sea-level change and human migration. *Nature Climate Change*, 9(12), 898-901. https://doi.org/10.1038/s41558-019-0640-4

7 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

8 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

9 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

10 De Longueville, F., Ozer, P., Gemenne, F., Henry, S., Mertz, O., & Nielsen, J. Ø. (2020, April 17). Comparing climate change perceptions and meteorological data in rural West Africa to improve the understanding of household decisions to migrate. *Climatic Change*, 160, 123-141. https://doi.org/10.1007/s10584-020-02704-7

11 V. Mueller, C. Gray, and K. Kosec. (2014, January 26). "Heat Stress Increases Long-Term Human Migration in Rural Pakistan." *Nature Climate Change*, 4(3), 182-185. https://doi.org/10.1038/nclimate2103

12 Bohra-Mishra, P., Oppenheimer, M., Cai, R., Feng, S., & Licker, R. (2016, October 8). Climate variability and migration in the Philippines. *Population and Environment*, 38(3), 286-308. https://doi.org/10.1007/s11111-016-0263-x

13 Feng, S., Krueger, A. B., & Oppenheimer, M. (2010). Linkages among climate change, crop yields and Mexico–US cross-border migration. *Proceedings of the National Academy of Sciences*, 107(32), 14257-14262. https://doi.org/10.1073/pnas.1002632107

14 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

15 Missirian, A., & Schlenker, W. (2017, December 22). Asylum applications respond to temperature fluctuations. *Science*, 358(6370), 1610-1614. http://dx.doi.org/10.1126/science.aao0432

16 Missirian, A., & Schlenker, W. (2017, December 22). Asylum applications respond to temperature fluctuations. *Science*, 358(6370), 1610-1614. http://dx.doi.org/10.1126/science.aao0432

17 Missirian, A., & Schlenker, W. (2017, December 22). Asylum applications respond to temperature fluctuations. *Science*, 358(6370), 1610-1614. http://dx.doi.org/10.1126/science.aao0432

18 Barnett, J., & Webber, M. (2009, March). *Accommodating Migration to Promote Adaptation to Climate Change*. Commission on Climate Change and Development. https://www.preventionweb.net/files/11872_AccommodatingMigration1.pdf

19 Black, R., Bennett, S. R., Thomas, S. M., & Beddington, J. R. (2011, October 20). Migration as adaptation. *Nature*, 478(7370), 447-449. https://doi.org/10.1038/478477a

20 Black, R., Bennett, S. R., Thomas, S. M., & Beddington, J. R. (2011, October 20). Migration as adaptation. *Nature*, 478(7370), 447-449. https://doi.org/10.1038/478477a

21 Plaza, S., Ratha, D., De, S., Kim, E. J., Seshan, G., Yameogo, N. D. (2019, April 30). *Migration and remittances: Recent developments and outlook*. KNOMAD Migration and Development Brief 31. World Bank Group. https://www.knomad.org/sites/default/files/2019-04/Migrationanddevelopmentbrief31.pdf

22 Webber, M., & Barnett, J. (2010, April). *Background Paper to the 2010 World Development Report: Accommodating Migration to Promote Adaptation to Climate Change*. Policy Research Working Paper 5270. The World Bank. http://documents1.worldbank.org/curated/en/765111468326385012/pdf/WPS5270.pdf

23 Black, R., Bennett, S. R., Thomas, S. M., & Beddington, J. R. (2011, October 20). Migration as adaptation. *Nature*, 478(7370), 447-449. https://doi.org/10.1038/478477a

24 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

25 Feijen, L. (2012, June 29). Jane McAdam-Climate Change, Forced Migration, and International Law. *Utrecht Journal of International and European Law*, 28(75), 61-64. http://doi.org/10.5334/ujiel.bh

26 Koser, K. (2010). Introduction: International Migration and Global Governance. *Global Governance*, 16(3), 301-315. http://www.jstor.org/stable/29764947

27 Docherty, B., & Giannini, T. (2009). Confronting a Rising Tide: A Proposal for a Convention on Climate Change Refugees. *Harvard Environmental Law Review*, 33, 349-403. https://climate.law.columbia.edu/sites/default/files/content/5c3e836f23a774ba2e115c36a8f72fd3e218.pdf

28 McAdam, J. (2012). *Climate Change, Forced Migration, and International Law*. Oxford University Press. https://oxford.universitypressscholarship.com/view/10.1093/acprof:oso/9780199587087.001.0001/acprof-9780199587087

29 Kälin, W., & Schrepfer, N. (2012, February). *Protecting People Crossing Borders in the Context of Climate Change-Normative Gaps and Possible Approaches*. UNHCR. https://www.refworld.org/pdfid/4f38a9422.pdf

30 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

31 Ioane Teitiota v. New Zealand. (Human Rights Committee Sept. 15, 2015). International Covenant on Civil and Political Rights. CCPR/C/127/D/2728/2016. https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=CCPR%2FC%2F127%2FD%2F2728%2F2016&Lang=en

32 Kälin, W., & Schrepfer, N. (2012, February). *Protecting People Crossing Borders in the Context of Climate Change-Normative Gaps and Possible Approaches*. UNHCR. https://www.refworld.org/pdfid/4f38a9422.pdf

33 Hauer, M. E., Fussell, E., Mueller, V., Burkett, M., Call, M., Abel, K., McLeman, R., & Wrathall, D. (2019, December 9). Sea-level rise and human migration. *Nature Reviews Earth & Environment*, 1, 28-39. https://doi.org/10.1038/s43017-019-0002-9

34 McLeman, R. A. (2014). *Climate and Human Migration: Past Experiences, Future Challenges*. Cambridge University Press.

35 Constable, A. (2016, July 9). Climate change and migration in the Pacific: options for Tuvalu and the Marshall Islands. *Regional Environmental Change*, 17, 1029-1038. https://link.springer.com/article/10.1007/s10113-016-1004-5

36 Dema, B. (2012). Sea Level Rise and the Freely Associated States: Addressing Environmental Migration Under the Compacts of Free Association. *Columbia Journal of Environmental Law*, 1(37), 177- 204. https://journals.library.columbia.edu/index.php/cjel/article/view/3570/1419

37 See generally Amaratunga, O. (2019, September). Climate Displaced Peoples: Utilizing Regional Approaches to Combat Climate Induced Displacement in the 21st Century. *Pace Environmental Law Review*, Vol. 36(2). https://digitalcommons.pace.edu/cgi/viewcontent.cgi?article=1829&context=pelr

38 See generally Francis, A. (2019, September). *Free movement agreement & climate-induced migration: A Caribbean case study*. Sabin Center for Climate Change Law, Columbia Law School. https://climate.law.columbia.edu/sites/default/files/content/Francis%202019-09-20%20FMAs%20%26%20Climate%20Migration.pdf

39 Francis, A. (2019, September). *Free movement agreement & climate-induced migration: A Caribbean case study*. Sabin Center for Climate Change Law, Columbia Law School. https://climate.law.columbia.edu/sites/default/files/content/Francis%202019-09-20%20FMAs%20%26%20Climate%20Migration.pdf

40 Francis, A. (2019, September). *Free movement agreement & climate-induced migration: A Caribbean case study*. Sabin Center for Climate Change Law, Columbia Law School. https://climate.law.columbia.edu/sites/default/files/content/Francis%202019-09-20%20FMAs%20%26%20Climate%20Migration.pdf

41 Klepp, S., & Herbeck, J. (2016, March). The Politics of Environmental Migration and Climate Justice in the Pacific Region. *Journal of Human Rights and the Environment*, 7(1), 54-73. http://dx.doi.org/10.4337/jhre.2016.01.03

42 Klepp, S., & Herbeck, J. (2016, March). The Politics of Environmental Migration and Climate Justice in the Pacific Region. *Journal of Human Rights and the Environment*, 7(1), 54-73. http://dx.doi.org/10.4337/jhre.2016.01.03

43 Boas, I., Farbotko, C., Adams, H., Sterly, H., Bush, S., van der Geest, K., ... & Blondin, S. (2019, November 26). Climate Migration Myths. *Nature Climate Change*, 9(12), 901-903. https://doi.org/10.1038/s41558-019-0633-3

44 Chutel, L. (2019, September 10). What's driving anti-immigrant violence in South Africa? It's not just economic anxiety. *Washington Post*. https://www.washingtonpost.com/world/africa/whats-driving-anti-immigrant-violence-in-south-africa-its-not-just-economic-anxiety/2019/09/10/ba4c1fb2-d0d9-11e9-a620-0a91656d7db6_story.html

45 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

46 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

47 McLeman, R. (2019, December). International migration and climate adaptation in an era of hardening borders. *Nature Climate Change*, 9(12), 911-918. https://doi.org/10.1038/s41558-019-0634-2

48 Vivekananda, J., Wall, M., Sylvestre, F., Nagarajan, C., & Brown, O. (2019). *Shoring Up Stability: Addressing Climate and Fragility Risks in the Lake Chad Region*. Adelphi Report. https://shoring-up-stability.org/wp-content/uploads/2019/06/Shoring-up-Stability.pdf

49 *Internally Displaced People*. (n.d.). UNHCR. https://www.unhcr.org/en-us/internally-displaced-people.html



Climate-Induced Displacement:

South Asia's Clear and Present Danger

Michael Kugelman

In May 2020, Cyclone Amphan slammed into Bangladesh and India. It was one of the strongest storms to hit the region in decades, resulting in three million evacuees and nearly two million destroyed or damaged homes.[1] People were displaced and lost their homes in three different countries—Bangladesh, India, and Sri Lanka. Many of the lost homes were mud huts and dilapidated shacks, and therefore not at all disaster-proof.

Cyclone Amphan is just the latest reminder that climate change effects and climate-induced migration are clear and present dangers in South Asia. Governments in the region have crafted policies that aim to mitigate these threats. However, capacity, governance, and financial constraints encumber such efforts. They are in great need of international support, which to this point has been present but insufficient.

Acute Climate Change Vulnerability

Many observers, when thinking about climate vulnerability in South Asia, reflexively fixate on Bangladesh—a low-lying, lower riparian nation often convulsed by destructive floods. In reality, the entire region is dangerously vulnerable. Rising sea levels and flooding threaten the coastal states of India, Pakistan, and Sri Lanka—as well as Bangladesh. These nations' large and dense urban coastal populations compound the threat that climate change effects pose to their residents. Meanwhile, landlocked Afghanistan, Bhutan, and Nepal face rising temperatures, drought, and glacial melt. And the tiny yet densely populated island of Maldives—the lowest-lying country in the world—faces the real prospect of complete submersion in the not-too-distant future.

Not surprisingly, over the last decade, nearly half the region's people—almost 700 million in all—have been impacted by at least one climate-related disaster.[2]

In recent years, the Germanwatch think tank's Global Climate Risk Index has ranked India and Pakistan among the top ten countries vulnerable to climate change.[3] Additionally, a troubling new study by India's Ministry of Earth Sciences, released in June 2020 and based on extensive climate modeling, predicts that in the coming decades India—South Asia's most populous country by far—will become far dryer and hotter, with average temperatures poised to increase by nearly 4 degrees celcius by century's end.[4] It will also experience longer monsoon periods and more glacial melt, along with warming temperatures in the Indian Ocean and predicted sea level rises of up to nearly a foot.

On the Indian Subcontinent, climate vulnerability is exacerbated by problematic public policy. In ndia[5] and Pakistan[6], water shortages are intensified by the government's subsidization of wasteful flood irrigation and water-guzzling crops, such as sugar. Developers and industrialists are given free rein to deplete precious water bodies. In India, communities in vulnerable neighborhoods have accused officials of ignoring flood risks—except during election campaign seasons.[7]

Manifestations of Climate-Induced Migration

In recent years, millions of South Asians have been displaced by the effects of climate change.

Destructive weather events like Cyclone Amphan are frequent displacement triggers. Back in 2009, Cyclone Aila displaced 2.3 million in India and nearly a million in Bangladesh.[8] Pakistan's 2010 floods damaged or destroyed 1.1 million homes[9] and displaced about 11 million people[10]—and large numbers settled in major cities instead of returning home.[11] In 2012, floods displaced 1.5 million in the Indian state of Assam.[12] More gradual impacts can also cause displacement. In dry, rural regions, acute water shortages have caused farmers, fisher people, and others with water-dependent livelihoods to migrate to cities. This climate-induced mass displacement is compounded by two enabling factors: the large number of people who work in the agricultural sector, and densely populated coastal areas.

Most of South Asia's climate-induced migration is domestic, from rural to urban areas. Asian Development Bank research finds that floods and agricultural land losses are increasingly contributing to decisions to migrate to major Indian cities.[13] But cross-border migration is possible as well. Recent scholarship predicts that in Bangladesh, climate refugees from rural areas are increasingly likely to migrate internationally as Bangladeshi cities become less desirable destinations for the displaced due to population pressures and a lack of jobs.[14]

South Asia's high risk of climate-induced migration is particularly vivid in the Sunderbans, a UNESCO World Heritage Site that houses the world's largest mangrove forest. Located along the Bay of Bengal and straddling areas of Bangladesh and India, it is highly susceptible to sea level rise, destructive storms, land erosion, and water salinity. Recent years have seen human flight from the Sunderbans Islands due to storms. More flight could be on the horizon given that major sectors of employment—farming, fishing, betel-leaf growing, and tourism—have been severely damaged by destructive weather events.[15]

A 2018 World Bank study projects nearly 40 million climate migrants in South Asia by 2050 in a worst-case scenario—one in which the region suffers from a dearth of climate-friendly policies.[16] The Bank predicts, under this scenario, that nearly a quarter of all internal migrants in South Asia—and nearly 2 percent of the overall regional population—would be classifiable as climate migrants. And even in the best-case scenario, where climate-friendly policies abound, the Bank projects nearly 20 million climate migrants by 2050. According to the Bank's predictions, out-migration "hotspots" will range from eastern and northern Bangladesh and coastal cities in India and Bangladesh to the Delhi-Lahore corridor spanning India and Pakistan. In-migration activity will be strongest in the southern Indian highlands and areas in Nepal. Bangladesh is projected to be a regional ground zero for climate migration. Under the worst-case scenario, the country could have more than 13 million climate migrants by 2050—more than any other type of internal migrant.

Intensifying climate migration in South Asia is not only a looming humanitarian crisis—it is also a regional stability risk. Growing rural-to-urban migration will place added burdens on already-overcrowded cities to provide food, shelter, and jobs. Their inability to provide these resources could raise the risks of radicalization in a region where terrorist groups often recruit in major cities in Bangladesh, India, and Pakistan. Additionally, the mass movement of vulnerable, persecuted groups—ethnic Pashtuns fleeing floods in northern Pakistan, Muslims displaced from drought-ridden rural India, Rohingya refugees leaving flooded cities in Bangladesh—could stoke communal tensions and violence in their new communities. Furthermore, a wall that India built in the 2000s to prevent influxes of refugees from Bangladesh has led to violence, with border police gunning down several migrants trying to cross it.[17] Surges of future climate migrants from Bangladesh could intensify this violence and deepen societal tensions in the Indian border state of Assam, where many have resented the arrival of these migrants in previous decades.

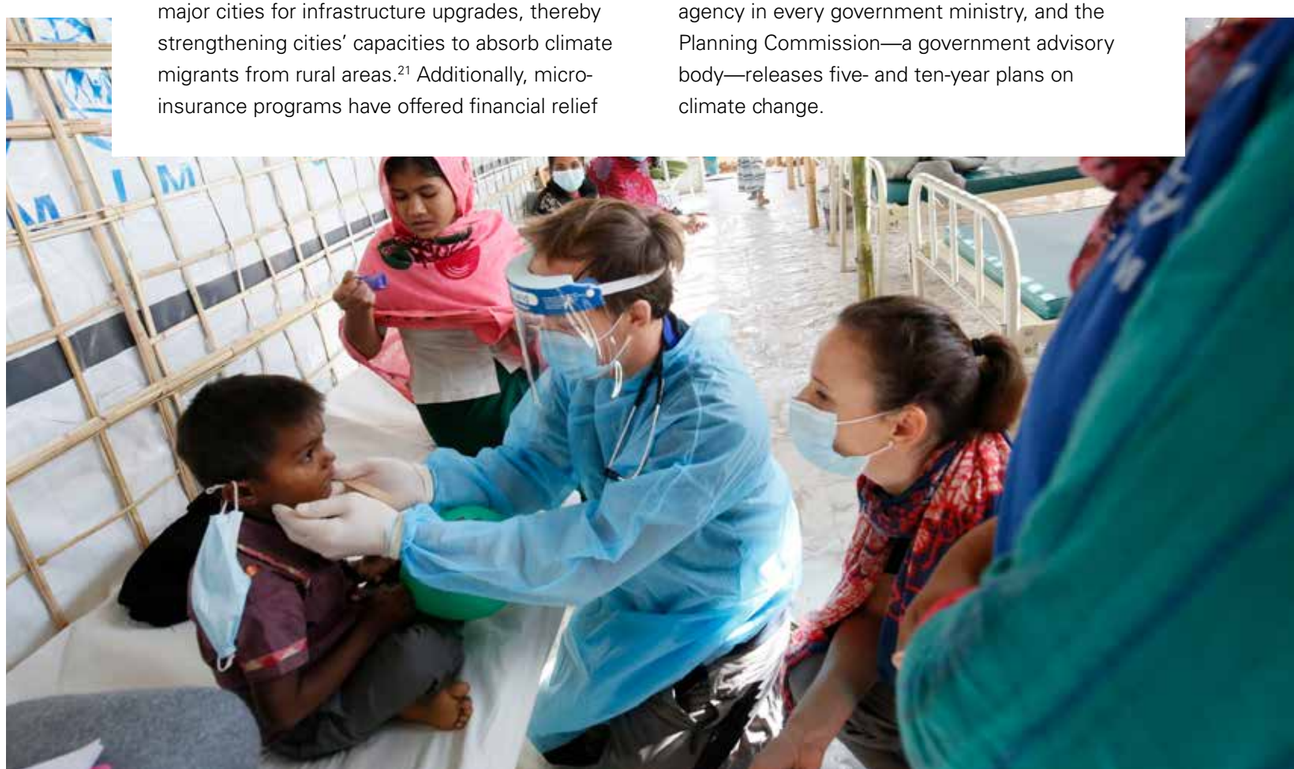
National Responses

Governments across South Asia have crafted laws and policies to mitigate climate change and climate-induced migration. And they have done so for quite some time: Back in 2005, after the catastrophic Indian Ocean tsunami, the Maldives developed a plan that envisioned relocating the population to higher ground. In more recent years, the plan has expanded to building new islands altogether.[18]

However, these policies are hobbled by factors that range from problems with enforcement to poor infrastructure, corruption, and insufficient funding. While South Asian authorities are highly aware of climate migration risks, and they have taken initial steps to curb these risks, the magnitude of the climate change and displacement threat amplifies the region's unpreparedness. In this regard, international support—at higher levels than at present—is essential.

Existing national responses range from the punitive (fines for those that cut down trees) to the proactive (the construction of shelters, mud and concrete walls, and embankments to protect against cyclones). There is also an impressive array of policies in place. India's climate change national action plan promotes renewable energy, energy efficiency, sustainable agriculture (including the development of climate-resilient crops), and water management.[19] The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) ensures 100 days of paid employment per financial year to manual laborers, in order to reduce migration risks stemming from climate-driven livelihood losses.[20] And on the urban side, the Jawharlal Nehru National Urban Renewal Mission (JNNURM) has provided $10 billion to 60 major cities for infrastructure upgrades, thereby strengthening cities' capacities to absorb climate migrants from rural areas.[21] Additionally, micro-insurance programs have offered financial relief to disaster-affected communities in return for a modest annual premium. One of the main such programs, AfatVimo, covers damage or losses for earthquakes, floods, cyclones, and landslides.[22]

Meanwhile, Pakistan has a climate change policy with action plans to address rural-urban migration, and a national food security policy that aims to make agriculture more resilient in the face of climate change.[23] Bangladesh has several major initiatives expressly focused on climate migration: a National Strategy on the Management of Disaster and Climate-Inducted International Displacement[24], and a framework within the Ministry of Disaster Management and Relief that tackles climate-induced internal displacement. The country has also made major headway in developing the sustainable production of forest, fruit, and fish resources in coastal areas. More broadly, Bangladesh has been a pioneer in the region for its efforts to integrate climate change into the government's interagency structure. Plans are afoot to establish a climate change agency in every government ministry, and the Planning Commission—a government advisory body—releases five- and ten-year plans on climate change.



Right: Emergency Medical Team examine a boy who is showing symptoms of diphtheria in the Kutupalong refugee camp, Bangladesh picture courtesy of - Russell Watkins/Department for International Development

However, the balance sheet on these signature policies is far from stellar. India's climate change national action plan has been criticized for a lack of clear strategies and specificity. An academic assessment of NREGA finds that a lack of public awareness about the program contributes to low enrollment among rural adults.[25] Another asserts that NREGA has strengthened economic security much more in wealthy states than rural ones.[26] The most recent study of NREGA, released by the International Food Policy Research Institute in 2019, concludes that while it has helped boost incomes for vulnerable residents, recipients haven't used the new income to make their farms more climate-resilient.[27] Meanwhile, the JNNURM failed to complete many initiatives, including housing projects.[28] It was terminated in 2014.[29] Furthermore, government assessments of water supplies are undermined by unreliable data and poor communication between states.[30]

Meanwhile, Pakistan's national climate change policy boasts an implementation framework[31], but many climate adaptation plans haven't been implemented. The implementing framework is also singled out for its lack of monitoring and evaluation measures.[32] Pakistani environmentalists fault Islamabad for passing new climate-related laws instead of focusing on implementing and enforcing earlier ones.[33] Making matters worse is that provincial officials, who have the main responsibility for implementation, often lack the technical and financial capacity to carry out climate change policy—a challenge that has afflicted Pakistani policy making more broadly ever since 2010, when a constitutional amendment[34] devolved responsibility for many policy matters to ill-prepared provinces.

Additionally, Bangladesh, for all its success stories, still doesn't have a national climate change policy. And its closest analogue—a climate change strategy and action plan[35]—has struggled with budgetary and implementation challenges.[36]

Efforts to build climate resilience in the Sunderbans—and by extension to mitigate the risk of climate-induced migration—have lagged because of problematic infrastructure. This includes water aquifers that are too deep to access, homes made of material (such as tin or asbestos) that don't allow for rainwater harvesting, and fragile embankment structures. Other problems include poorly coordinated and communicated disaster responses and relief efforts, as well as insufficient funding for concrete installments and mangrove bio shields that would ensure more robust climate-proofing.[37]



International Responses

There are no specific international legal frameworks related to climate-induced displacement, and there is no consensus within the international system on a definition for an "environmental refugee."[38] However, while there may be no legal justifications for international interventions to address "climate refugee" threats, there are compelling normative ones—and especially in South Asia, where climate vulnerability is acute and climate-induced migration is already taking place.

Fortunately, global players have already stepped in. The International Organization for Migration supported a research project between Bangladesh, Nepal, and Sri Lanka on climate and migration that resulted in a framework product[39] on combating climate-induced migration. On more operational levels, the World Bank and the Red Cross have offered technological and scientific support for national disaster risk management programs. The Bank's South Asia Water Initiative provides technical and analytical assistance to states to operationalize flood forecasting in the Ganges Basin.[40] A new Bank initiative, the Climate Adaptation and Resilience for South Asia project, funds the development of climate-resilience policies and investments.[41] Bilateral donors are involved as well; the Asia Regional Resilience to a Changing Climate program, a project of the United Kingdom's National Weather Service and aid agency DFID, helps develop early-warning systems for climate-vulnerable communities in South Asia.[42]

Policy Recommendations

These international efforts are encouraging, but insufficient. There is much more the global community can and should do to help reduce the risk of climate-induced migration in South Asia.

- **Promote more livelihood opportunities in non-agricultural sectors.** Agriculture is a top source of employment in many South Asian nations, but it is also arguably the region's most climate-vulnerable sector. Consequently, its workers are highly susceptible to climate-driven displacement. Even while national governments aim to reduce climate threats to agriculture, the international community should help promote the growth of alternative, less climate-vulnerable employment options. Donors can fund vocational training and other skills-development programs to make the region's millions of young people more marketable for urban-centered jobs in telecommunications, electronics, and retail, among others—all critical, high-growth-potential fields in a rapidly urbanizing region.

- **Empower non-federal authorities to better tackle climate-induced displacement risks.** In much of South Asia, domestic policy is a non-federal matter. However, state/provincial authorities often lack the requisite expertise and resources for this work. International donors can provide or sponsor training or other educational programs to bolster the ability of non-federal policymakers to tackle the admittedly overwhelming challenge posed by climate change and, by extension, displacement. Support for local-level authorities is particularly essential. In some South Asian nations, decentralization reforms have brought

more technical and financial resources to state/provincial authorities, but these reforms often don't extend down to local levels, where much of the on-the-ground policy implementation—including service delivery—takes place.[43]

- **Host and sponsor dialogues and other exchanges to generate greater regional cooperation, so that South Asian states can jointly combat the shared—and transnational—threats of climate change and climate-induced displacement.** South Asia is rife with diplomatic tensions, thanks to longstanding strains between India and Pakistan, Pakistan and Afghanistan, and India and several smaller states. These divides are exacerbated by an absence of regional integration, thanks in great part to South Asia's shoddy infrastructure—especially bad roads and poorly functioning electricity grids. Not surprisingly, intraregional trade is low[44] relative to other regions, and this lack of commercial cooperation deprives the region of a potential pathway toward more trust and goodwill. Furthermore, deliberations within South Asia's main regional organization, SAARC, are effectively paralyzed because of the tension-filled India-Pakistan relationship.

  Foreign diplomats and other external actors—ideally from countries perceived as neutral by all South Asian states—should convene Track II dialogues and multilateral forums to help build a region-wide consensus around a joint plan to address climate change and displacement. Some frameworks are already in place, thanks to two initiatives that have languished within SAARC for years: the Dhaka Declaration on Climate Change, which promotes capacity building and regional cooperation[45], and a SAARC food security reserve, which creates a food grains reserve for vulnerable communities during humanitarian disasters.[46]

- **Washington should integrate climate change mitigation assistance into its Indo-Pacific strategy, the administration's main Asia policy.** White House officials now view South Asia as a part of the Indo-Pacific region[47], and recent policy documents call for strengthening ties with the region under this policy[48]—though to this point, areas of cooperation are limited to security-focused spheres such as counterterrorism and maritime collaboration. Washington should leverage the U.S. International Development Finance Corporation (DFC), a recently established American development bank that partners with the private sector, to make new investments in sustainable agriculture, disaster-resistant infrastructure, and other initiatives that can reduce the risks of climate-induced displacement. The DFC should look for corporate partners in South Asia—entities that often boast more resources and capacity than public sector interlocutors.

The Stakes of Inaction

Discussions of climate-induced migration in South Asia should not be divorced from the broader challenge of displacement. Here, the recent travails of Rohingya refugees are instructive—and a sobering reminder of the complex and tragic nexus between conflict, displacement, and climate change.

In 2017, military forces in Myanmar staged a brutal crackdown on the Rohingya, a heartbreakingly marginalized religious minority. Hundreds of thousands were displaced, and they fled next door to Bangladesh. Since then, they have toiled in overcrowded refugee camps. However, in 2019, Dhaka announced its intention to relocate up to 100,000 of them to Bhashan Char—an isolated island that is a three-hour boat ride from Bangladesh's mainland, and that is prone to sea-level rise, storm surges, and floods.[49] Officials initially held back, following an outcry from human rights activists, but in May 2020 nearly 300 Rohingya attempting to enter Bangladesh by sea were taken to the island. Officials cited the need to reduce the risks of COVID-19 infections within the Rohingya camps on the mainland.[50]



First the Rohingya were displaced by conflict. Now they are at risk of being displaced by climate. And yet, if the nearly 300 souls stranded on Bhashan Char—and the thousands more that could join them—are displaced again, they will have nowhere to go.

This ongoing tragedy illustrates the seriousness of the twin threats of climate change and climate-induced migration in South Asia. It also highlights the urgency with which governments in the region, with stepped-up international support, must act to help curb these threats. And it underscores the terrible and potentially deadly costs of failing to do so.

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Endnotes

1 *Cyclone Amphan*. (2020, May 20). Center for Disaster Philanthropy. https://disasterphilanthropy.org/disaster/cyclone-amphan/

2 Fallesen, D., Khan, H., Tehsin, A., & Abbhi, A. (2019, November 11). South Asia needs to act as one to fight climate change. *World Bank Blogs*. https://blogs.worldbank.org/endpovertyinsouthasia/south-asia-needs-act-one-fight-climate-change

3 Eckstein, D., Künzel, V., Schäfer, L., & Winges, M. (2019, December). *Global Climate Risk Index 2020*. Germanwatch. https://germanwatch.org/sites/germanwatch.org/files/20-2-01e%20Global%20Climate%20Risk%20Index%202020_14.pdf

4 Krishnan, R., Sanjay, J., Gnanaseelan, C., Mujumdar, M., Kulkarni, A., & Chakraborty, S. (2020). *Assessment of Climate Change over the Indian Region: A Report of the Ministry of Earth Sciences (MoES), Government of India*. Springer Open. https://www.springer.com/gp/book/9789811543265

5 Denton, B., & Sengupta, S. (2019, November 25). India's Ominous Future: Too Little Water, or Far Too Much. *New York Times*. https://www.nytimes.com/interactive/2019/11/25/climate/india-monsoon-drought.html#:~:text=The%20monsoon%20is%20central%20to,poetry%20and%20in%20Bollywood%20films.&text=Monsoon%20rainwater%20and%20the%20swollen,parts%20of%20Mumbai%20in%20August.

6 Kugelman, M., & Hathaway, R. M. (Eds.). (2009). *Running on Empty: Pakistan's Water Crisis*. Woodrow Wilson International Center for Scholars. https://www.wilsoncenter.org/sites/default/files/media/documents/publication/ASIA_090422_Running%20on%20Empty_web.pdf

7 Denton, B., & Sengupta, S. (2019, November 25). India's Ominous Future: Too Little Water, or Far Too Much. *New York Times*. https://www.nytimes.com/interactive/2019/11/25/climate/india-monsoon-drought.html#:~:text=The%20monsoon%20is%20central%20to,poetry%20and%20in%20Bollywood%20films.&text=Monsoon%20rainwater%20and%20the%20swollen,parts%20of%20Mumbai%20in%20August.

8 Bhattacharyya, A., & Werz, M. (2012, December 3). *Climate Change, Migration and Conflict in South Asia*. Center for American Progress. https://www.americanprogress.org/issues/security/reports/2012/12/03/46382/climate-change-migration-and-conflict-in-south-asia/

9 Kirsch, T. D., Wadhwani, C., Sauer, L., Doocy, S., & Catlett, C. (2012). Impact of the 2010 Pakistan Floods on Rural and Urban Populations at Six Months. *PLoS Currents*, 4. https://doi.org/10.1371/4fdfb212d2432

10 Shabir, O. (2013, April 11). A Summary Case Report on the Health Impacts and Response to the Pakistan Floods of 2010. *PLoS Currents*, 5. https://dx.doi.org/10.1371%2Fcurrents.dis.cc7bd532ce252c1b740c39a2a827993f

11 Latif, A. (2019, August 12). Climate change triggers widespread Pakistan migration. *Anadolu Agency*. https://www.aa.com.tr/en/environment/climate-change-triggers-widespread-pakistan-migration/1667231#:~:text=Extreme%20weather%20patterns%2C%20shrinking%20agriculture,spells%20forced%20millions%20to%20migrate&text=Extreme%20weather%20patterns%2C%20shrinking%20agriculture%2C%20sea%20erosion%2C%20and%20lingering,to%20officials%20and%20local%20experts.

12 Bhattacharyya, A., & Werz, M. (2012, December 3). *Climate Change, Migration and Conflict in South Asia*. Center for American Progress. https://www.americanprogress.org/issues/security/reports/2012/12/03/46382/climate-change-migration-and-conflict-in-south-asia/

13 Asian Development Bank. (2012). *Addressing Climate Change and Migration in Asia and the Pacific*. Asian Development Bank. https://www.adb.org/sites/default/files/publication/29662/addressing-climate-change-migration.pdf

14 Chen, J., & Mueller, V. (2019). Climate-induced cross-border migration and change in demographic structure. *Population and Environment*, 41(2), 98-125. https://doi.org/10.1007/s11111-019-00328-3

15 Nagchoudhury, S. (2020, June 9). *No water or work: Climate stress pushes Indian delta-dwellers to the edge*. Thomson Reuters Foundation. https://news.trust.org/item/20200609051637-sy2ry

16 Kumari, R. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., & Midgley, Amelia. (2018). *Groundswell: Preparing for Internal Climate Migration*. World Bank. https://openknowledge.worldbank.org/handle/10986/29461

17 Ramachandran, S. (2017, February 15). The India-Bangladesh Wall: Lessons for Trump. *The Diplomat*. https://thediplomat.com/2017/02/the-india-bangladesh-wall-lessons-for-trump/

18 Dauenhauer, N. J. (2017, March 20). *On front line of climate change as Maldives fights rising seas*. NewScientist. https://www.newscientist.com/article/2125198-on-front-line-of-climate-change-as-maldives-fights-rising-seas/

19 Prime Minister's Council on Climate Change. (2008). *National Action Plan on Climate Change*. https://www.indiawaterportal.org/sites/indiawaterportal.org/files/National%20Action%20Plan%20on%20Climate%20Change%20(NAPCC)_Prime%20Ministers%20Council%20on%20Climate%20Change_Government%20of%20India_%202008.pdf

20 *The Mahatma Gandhi National Rural Employment Guarantee Act 2005*. Ministry of Rural Development, Government of India. https://www.nrega.nic.in/netnrega/mgnrega_new/Nrega_home.aspx

21 Choudhary, B. K. (2019). Jawaharlal Nehru National Urban Renewal Mission (JNNURM). *The Wiley Blackwell Encyclopedia of Urban and Regional Studies*, 1-5. http://mohua.gov.in/upload/uploadfiles/files/1Mission%20Overview%20English(1).pdf

22 Bhatt, M. (2012, March 01). Investing in insurance: reducing vulnerability and risk. *Alliance Magazine*. https://www.alliancemagazine.org/feature/investing-in-insurance-reducing-vulnerability-and-risk/

23 Government of Pakistan Ministry of Climate Change. (2012). *National Climate Change Policy*. http://www.gcisc.org.pk/National_Climate_Change_Policy_2012.pdf

24 Siddiqui, T., Islam, M. T., & Akhter, Z. (2015). *National Strategy on the Management of Disaster and Climate Induced Internal Displacement* (NSMDCIID). Comprehensive Disaster Management Programme and Ministry of Disaster Management and Relief. https://www.preventionweb.net/files/46732_nsmdciidfinalversion-21sept2015withc.pdf

25 Bhatia, R., Chinoy, S. L., Kaushish, B., Puri, J., Chahar, V. S., & Waddington, H. (2016). Examining the evidence on the effectiveness of India's rural employment guarantee act. *International Initiative for Impact Evaluation, 3ie Working Paper*, 27. https://www.3ieimpact.org/evidence-hub/publications/working-papers/examining-evidence-effectiveness-indias-rural-employment

26 Godfrey-Wood, R., & Flower, B. C. (2018). Does Guaranteed employment promote resilience to climate change? The case of India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). *Development Policy Review*, 36, O586-O604. https://doi.org/10.1111/dpr.12309

27 Anisimova, E. (2019, May 21). *Study: India's National Rural Employment Guarantee Scheme has positive impact on participants' welfare*. International Food Policy Research Institute. https://www.ifpri.org/blog/study-indias-national-rural-employment-guarantee-scheme-has-positive-impact-participants%E2%80%99#:~:text=Research%20Post-,Study%3A%20India's%20National%20Rural%20Employment%20Guarantee%20Scheme,positive%20impact%20on%20participants'%20welfare&text=To%20ensure%20transparency%2C%20NREGS%20makes,and%20conducts%20regular%20social%20audits.

28 Pallavi. (2012, December 7). Status of Jawaharlal Nehru National Urban Renewal Mission. *PRS Legislative Research*. https://www.prsindia.org/theprsblog/status-jawaharlal-nehru-national-urban-renewal-mission

29 Sadoway, D., Gopakumar, G., Baindur, V., & Badami, M. G. (2018, January 13). JNNURM as a Window on Urban Governance. *Economic & Political Weekly*, 53(2), 71. https://smartnet.niua.org/sites/default/files/resources/sa_liii_2_130118_rua_david_sadoway.pdf

30 Committee on Estimates. (2018, December 10). Performance of National Action Plan on Climate Change. *PRS Legislative Research*. https://www.prsindia.org/content/performance-national-action-plan-climate-change#:~:text=Performance%20of%20National%20Action%20Plan%20on%20Climate%20Change,-Open%20PDF&text=The%20Committee%20on%20Estimates%20(Chair,issues%20related%20to%20climate%20change.

31 Government of Pakistan Climate Change Division. (2013, November). *Framework for Implementation of Climate Change Policy* (2014 – 2030). http://www.gcisc.org.pk/Framework%20for%20Implementation%20of%20CC%20Policy.pdf

32 Parry, J. E. (2016). Review of Current and Planned Adaptation Action in Pakistan. *CARIAA, Working Paper*, 15. https://www.iisd.org/sites/default/files/publications/idl-55959-pakistan.pdf

33 Khan, R. S. (2017, March 24). Pakistan passes climate change act, reviving hopes - and skepticism. *Reuters*. https://www.reuters.com/article/us-pakistan-climatechange-lawmaking/pakistan-passes-climate-change-act-reviving-hopes-and-skepticism-idUSKBN16V19N#:~:text=Pakistan%20passes%20climate%20change%20act%2C%20reviving%20hopes%20%2D%20and%20skepticism,-Rina%20Saeed%20Khan&text=The%20new%20law%20establishes%20a,line%20on%20climate%2Dchanging%20emissions.

34 Constitution (Eighteenth Amendment) Act, 2010. (Apr. 19, 2010). The Constitution of Pakistan. http://www.pakistani.org/pakistan/constitution/amendments/18amendment.html

35 Ministry of Environment, Forest and Climate Change. (2009). *Bangladesh Climate Change Strategy and Action Plan* (BCCSAP) 2009. http://nda.erd.gov.bd/en/c/publication/bangladesh-climate-change-strategy-action-plan-bccsap-2009

36 Zamudio, A. N., & Parry, J. E. (2016). Review of Current and Planned Adaptation Action in Bangladesh. *CARIAA, Working Paper*, 6. https://www.iisd.org/sites/default/files/publications/idl-55862-bangladesh.pdf

37 Sánchez-Triana, E., Paul, T., & Leonard, O. (2014). *Building Resilience for Sustainable Development of the Sundarbans through Estuary Management, Poverty Reduction, and Biodiversity Conservation.* The International Bank for Reconstruction and Development and World Bank. http://documents1.worldbank.org/curated/en/879351468259748207/pdf/880610REVISED00ns-000Strategy0Report.pdf

38 Ali, A. (2015). *Climate-Induced Migrants, International Law, and Human Rights: An Assessment.* University of Ottawa. https://environmentalmigration.iom.int/climate-induced-migrants-international-law-and-human-rights-assessment

39 Rabbani, G., Shafeeqa, F., & Sharma, S. (2016). Assessing the Climate Change Environmental Degradation and Migration Nexus in South Asia. *International Organisation for Migration Bangladesh: Dhaka, Bangladesh*. https://publications.iom.int/books/assessing-climate-change-environmental-degradation-and-migration-nexus-south-asia

40 World Bank. (n.d.). *South Asia Water Initiative* (SAWI). https://www.worldbank.org/en/programs/sawi

41 *South Asia - Climate Adaptation and Resilience for South Asia (CARE) Project.* (2020, May 12). World Bank. https://www.worldbank.org/en/news/loans-credits/2020/05/12/south-asia-climate-adaptation-and-resilience-for-south-asia-care-project

42 *Asia Regional Resilience to a Changing Climate* (ARRCC). (2018). Met Office. https://www.metoffice.gov.uk/services/government/international-development/arrcc

43 Kugelman, M. & Husain, I. (Eds.). (2018). *Pakistan's Institutions: We Know They Matter, But How Can They Work Better?* Fellowship Fund for Pakistan and Woodrow Wilson International Center for Scholars, Asia Program. https://www.wilsoncenter.org/sites/default/files/media/documents/publication/2018-06-pakistansinstitutions.pdf

44 Dossani, R. (n.d.). *South Asia Regional Trade and Investment Policy.* RAND Corporation. https://www.rand.org/international/research/projects/south-asia-trade-and-investments.html#:~:text=South%20Asia%20remains%20one%20of,21%20percent%20for%20South%20America.

45 *SAARC Environment Ministers Dhaka Declaration on Climate Change.* (2008, July 3). https://thimaaveshi.files.wordpress.com/2009/10/saarc-declaration_dhaka.pdf

46 SAARC. (1987, November 3). Agreement On Establishing The SAARC Food Security Reserve (1987). https://www.iatp.org/documents/agreement-on-establishing-the-saarc-food-security-reserve-1987

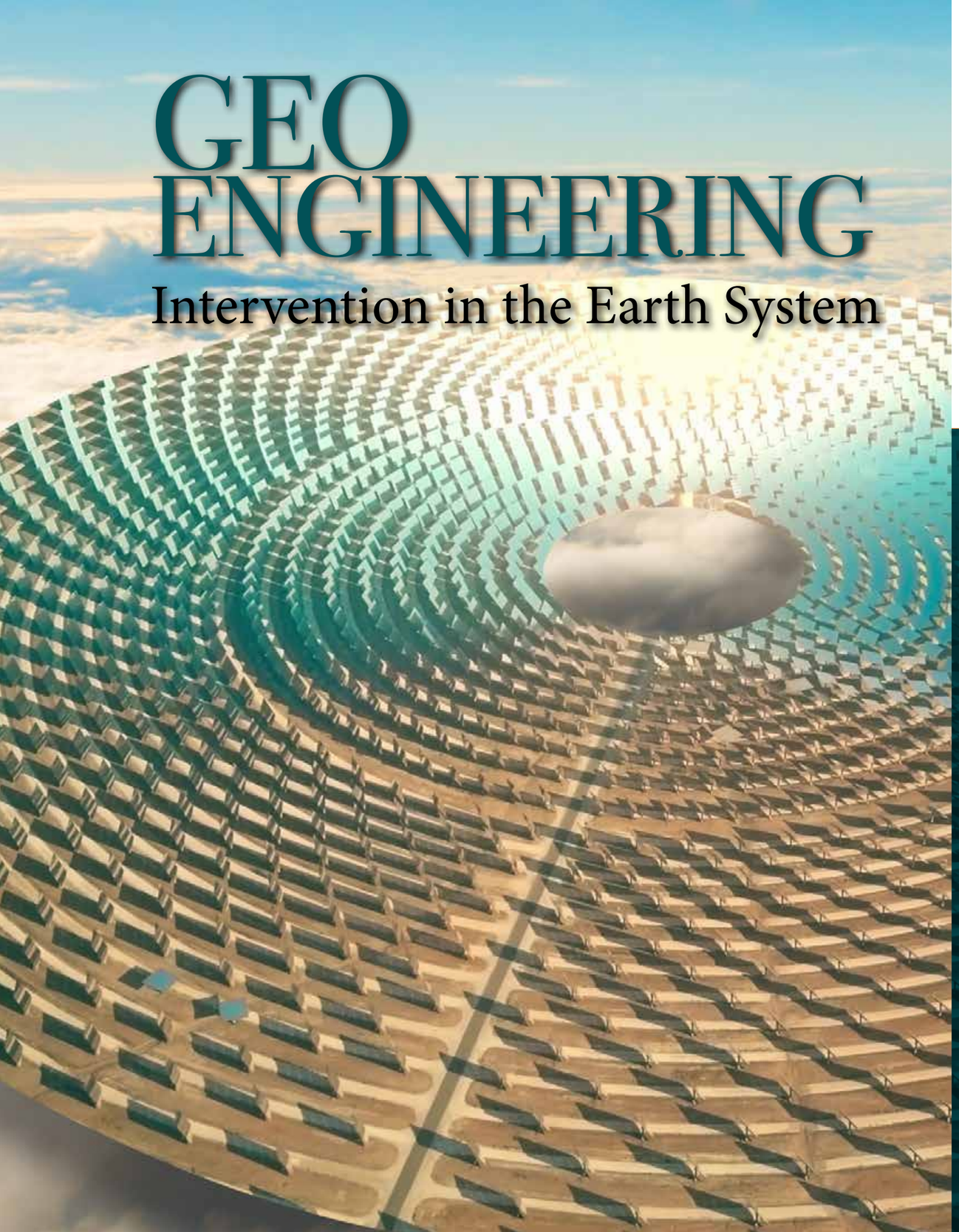
47 Parpiani, K., & Das, A. (2020, February 19). *US-India defence trade and India's underwater domain awareness.* Observer Research Foundation. https://www.orfonline.org/expert-speak/us-india-defence-trade-and-indias-underwater-domain-awareness-61571/

48 *The Department of Defense Indo-Pacific Strategy Report: Preparedness, Partnerships, and Promoting a Networked Region.* (2019, June 1). Department of Defense. https://media.defense.gov/2019/Jul/01/2002152311/-1/-1/1/DEPARTMENT-OF-DEFENSE-INDO-PACIFIC-STRATEGY-REPORT-2019.PDF

49 Ratcliffe, R. (2020, May 8). Rohingya refugees arrive at 'de facto detention island' in Bangladesh. *The Guardian*. https://www.theguardian.com/world/2020/may/08/bangladesh-takes-rohingya-refugees-to-de-facto-detention-island

50 Ratcliffe, R. (2020, May 8). Rohingya refugees arrive at 'de facto detention island' in Bangladesh. *The Guardian*. https://www.theguardian.com/world/2020/may/08/bangladesh-takes-rohingya-refugees-to-de-facto-detention-island

A 2018 World Bank study projects nearly 40 million climate migrants in South Asia by 2050 in a worst-case scenario—one in which the region suffers from a dearth of climate-friendly policies.



The Geopolitical Challenges of Geoengineering

and Geoengineering's Challenge to Geopolitics

Oliver Morton

In 2006 the atmospheric chemist Paul Crutzen, one of the world's most respected atmospheric scientists, published "A contribution to resolve a policy dilemma" in the journal *Climatic Change*.[1] The policy dilemma was this: the burden of respiratory disease associated with particulate emissions from coal-fired power stations was apallingly high, killing perhaps 500,000 people a year. Regulators planned to reduce this significantly by cleaning up power stations. As a result, anthropogenic sulphur emissions, then around 55m tonnes a year, would decline significantly over the coming decades.

As well as damaging people's lungs, though, the aerosol particles which sulphur emissions produce in the atmosphere also reflect sunlight back into space before it can warm the Earth's surface. The cooling due to such pollution, Crutzen estimated, was depressing the global temperature by up to one degree celsius, offsetting a significant fraction of the damage being done by anthropogenic greenhouse gas emissions. Remove those sulphur emissions, and the world would heat up more quickly than if you kept them in place. The policy dilemma: actions to reduce harm in the short term by curtailing respiratory disease would increase harm in the medium term by unleashing the full impact of greenhouse gas warming.

Crutzen suggested that the loss in cooling when sulphur emissions into the lower atmosphere were reduced could be made up for by releasing sulphur into the stratosphere. Because sulphate particles last much longer in the rainless, snowless stratosphere than in the weather-riled lower atmosphere, the amount of sulphur needed would be small compared to existing emissions: just a million tonnes or so a year, well within the technical capacity of a small fleet of aircraft.

Crutzen's paper paved the way for a growing interest in solar geoengineering: the use of technology to reduce the amount of sunlight that the earth absorbs. And in the years since its release, researchers have used computer models to produce hundreds of papers modeling solar geoengineering's climatic effects, technological

implementation, adverse impacts, and compatability with notions of justice and democracy.

This climate model-based research shows that solar geoengineering could never simply cancel out anthropogenic temperature increases, let alone other climate change impacts. If carried out with stratospheric sulphur, for example, it would slow down the ozone layer's recovery from the damage caused by industry in the second half of the 20th century. It would also have a potentially profound effect on the hydrological cycle. A world in which all greenhouse warming after a certain date was offset by solar geoengineering would experience significantly less precipitation than one in which there was neither greenhouse warming nor geoengineered cooling.

However, all in all, the results of this research have increasingly come to suggest that in a world where greenhouse gas emissions peak some time between now and mid-century and then dwindle—which is to say, our current world—a solar geoengineering program that offset a signicant fraction of the resultant warming could greatly reduce overall harm. The benefits of that moderating effect would vary from region to region, but models suggest that there may well be levels and patterns of intervention where even the regions in which the benefits were found to be lowest and/or the harmful side effects highest would see little or no net harm. "Showstoppers" that cast doubt on the whole idea have, from the point of view of natural science, failed to appear.

A (Political) Science Experiment

It has thus become commonplace within the geoengineering research community to hold the opinion that the most substantial risks posed by solar geoengineering are not biogeophysical, but matters of international relations. These risks can be divided into systemic risks, which are geopolitical in the broad sense, in that they bear on international processes of decision-making, and scenario risks, which are geopolitical in the more specific sense of depending immediately on matters of territory and military capability.

The major systemic risk is the erosion of mitigation efforts. This does not depend on anyone actually doing solar geoengineering, just on people being willing to talk about and research the possibility. The insidious nature of the risk is illustrated by the role in recent climate negotiations of solar geoengineering's speculative sibling, carbon geoengineering—the active removal of carbon dioxide from the atmosphere.

It was by tacitly invoking carbon geoengineering that the Paris Agreement of 2015 was able to succeed where previous climate diplomacy had failed. Previous climate negotiations had been based, implicitly or explicitly, on the idea that the eventual level of global warming would depend on the total amount of long-lived greenhouse gas emitted into the atmosphere. A given temperature limit would imply a specific total amount of



emissions reductions required and the rate at which emissions should be cut. Major emitters, however, were not able, or willing, to promise cuts on the scale needed for the then widely accepted limit of a two degree temperature increase.

Paris squared this circle in two ways. The more obvious was that it set up a "ratcheting mechanism" whereby policies to cut emissions would get more and more ambitious over time. The second and subtler method was to open up the possibility of "negative emissions." The stable level of long-lived greenhouse gases that it imagined for the second half of the 21st centuy would not be brought about solely by an absence of anthropogenic emissions, but by the advent of technologies or policies that remove already-emitted carbon dioxide from the atmosphere. If positive and negative emissions are in balance, you have the world of "net-zero" emissions that the agreement talks about. If negative emissions come to predominate, you have a world of reducing greenhouse gas levels in which temperature will, after a certain degree of lag, actually come down. Invoking this sort of carbon geoengineering allows one to draw lines on graphs that connect today's modest emission cuts with stable and acceptable temperatures at the end of the century.

There are various plausible carbon-geoengineering technologies by means of which this might be done.[2] But at present they do not exist at any real scale, and efforts aimed at their creation and widespread acceptance are, on a global scale, nugatory. The Paris Agreement's squaring of modest emission-reduction pledges with ambitious future-temperature targets thus rests on what is in effect a fantasy (abeit one that could, in principle, be actualized). To make matters worse, the fantasy is fungible. Once you have allowed the idea of negative emissions into your thinking it is always possible, at the margin, to trade a little less emissions-reduction today for a little more negative emission tomorrow. Over time, there is nothing to stop a little from becoming a lot. The promise of geoengineering becomes a license for procrastination.

This is true regardless of whether that promise is made sincerely or cynically, or whether the geoengineering in question is carbon or solar. Indeed, the fact that both solar geoengineering and carbon geoengineering decouple climate outcomes from cumulative emissions is one of the reasons why I choose to see them as similar enough to carry the same name, despite the deep differences in the way they act and the effects they can produce. Treating either solar or carbon geoengineering as a medium-term possibility reduces the incentives for near-term emissions reduction.

This problem has been much discussed in the solar-geoengineering literature, often under the rubric of "moral hazard." The way in which the negative-emissions discussion has evolved before and after Paris strongly suggests that the risk is real: building the assumption of solar geoengineering into the policy framework really can be used to legitimize and valorize levels of effort not otherwise remotely sufficient to meet stated climate goals.

In demonstrating this, though, Paris may also have shown that the risk no longer matters. We already live in a world in which people do too little about climate change, in part because they are relying on notional future geoengineering to bail them out; it is just that the non-existent safety net is being provided by carbon geoengineering

rather than solar geoengineering. It is not obvious that more serious discussion of solar geoengineering would further undermine current action on climate change.

Invidious Intervention?

Actual solar geoengineering, though, undoubtedly would. This is in part because the biogeophysical effects of solar geoengineering are strongly scenario dependent. Imagine a deployed solar-geoengineering strategy aimed at limiting warming to two degrees while ensuring that no country or region faces unacceptable hydrological distress. The amount of cooling required will depend on the emissions pathway the world follows. If the act of starting the intervention changes the way nations act with respect to emissions, that pathway changes in turn—and thus so does the amount of solar geoengineering required. It is easy to imagine such a strategy soon finding itself in a world where its purported aim—capping temperatures but not causing hydrological distress—is no longer achievable. At this point the interests of nations in different regions, once plausibly aligned, diverge.

This is a special case of a general geopolitical problem: strategic stability. As solar geoengineering research quickened post-Crutzen, it was widely assumed that even if a strategy's net benefits were large, the workings of the climate system would ensure that they were sufficiently heterogeneous that some regions would end up worse off even if most others benefitted—in other words, that there would be winners and losers. Yet one of the most striking results to come out of solar geoengineering research has been the discovery that, in models, there seem to be strategies in which a moderate amount of solar geoengineering leaves no nation worse off than it is today.

There is a catch. A strategy in which no region loses will also be one in which some regions do less well than they would under some other strategy. Some nations will thus always have an interest in strategy change. This builds an asymmetric instability into the system that will tend to increase the amount of solar geoengineering beyond that originally seen as optimal.

Imagine a world in which a consortium of nations is injecting aerosols into the stratosphere in order to provide an optimized effect acceptable to all. Now imagine that one of those nations decides, in the light of how things play out on the ground, it wants less cooling. Unless it can convince all the other nations to agree, it is stuck; if it stops emitting aerosols unilaterally, the other nations can easily make up the deficit, keeping to the originally specified strategy. Reducing cooling (i.e., increasing warming) will always require consensus.

More cooling, though, does not. If Nation A wants more cooling, it merely needs to inject more aerosols. If the other nations reduce their contributions to try and keep things on an even keel, Nation A can decide to inject even more. If all the other nations stop injecting, Nation A can take on the whole task. This is what Marty Weitzmann and Gernot Wagner have called the "free driver" problem.[3] The amount of solar geoengineering carried out will be a function of the level of intervention preferred by the nation with the greatest desire for cooling and the willingness of other nations to impose a price for that cooling that the first nation finds unacceptable.

A New Geopolitical Phenomenon

Thus solar geoengineering depending on stratospheric aerosols offers a clear possibility of international conflict even among nations that, in principle, are all open to its deployment. This is because solar geoengineering is a global geophysical phenomenon subject to some level of national political influence—a class of phenomenon hard to embrace within current conceptions of geopolitics. The "geo" of geopolitics is, after all, fundamentally that of the geographer's map; a heterogeneous two-dimensional surface divided up among players whose interactions are encouraged or constrained by their relative sizes and positions. The "geo" of geoengineering is the geo of geophysics and biogeochemistry; an earth system in constant flux. This Earth system is in some ways deeply non-local; carbon dioxide emitted from any given source is like that from every other, for example. In other ways it is defiantly local; the climatic state, and direction of change, differ from place to place.

A geopolitics, and system of international relations, conceived on the basis of nations that hold territories, is a poor fit to the political demands of a unified planetary system defined by the flows of energy and material through unending climatic and biogeochemical cycles. Many of the problems that have dogged the development of climate diplomacy can be seen as direct or indirect consequences of that poor fit. But they are not necessarily perceived as such, because the concepts through which the problems are discussed—the natural climate, the economy—do not feel fundamentally new.

Solar geoengineering, on the other hand, is new: a global geophysical phenomenon subject to some level of national political influence that does not exist in any form today, but could tomorrow. It thus sheds a unique light on the degree to which a geopolitics that grew up in a world of great powers can be reconciled with an Earth system of planet-spanning flows, and on the challenges that such a reconciliation will entail. Solar geoengineering raises problems within geopolitics. It also brings into focus problems with the whole idea of geopolitics.



Endnotes

1 Crutzen, P. (2006, July 25). Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma?. *Climatic Change*, 77(211). https://link.springer.com/article/10.1007/s10584-006-9101-y

2 Carbon Brief. (2016, November 4). *Explainer: 10 ways 'negative emissions' could slow climate change*. https://www.carbonbrief.org/explainer-10-ways-negative-emissions-could-slow-climate-change

3 Weitzman, ML. (2015, July 14). A Voting Architecture for the Governance of Free-Driver Externalities, with Application to Geoengineering. *Scandinavian Journal of Economics*, 117 (4): 1049-1068. https://scholar.harvard.edu/weitzman/publications/voting-architecture-governance-free-driver-externalities-application

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Without Attention, Geoengineering Could Upend Foreign Policy

Dhanasree Jayaram

In the summer of 2020, border tensions between India and China and the future of their bilateral relations came to dominate the news cycle in the subcontinent—or at least the space left over by the coronavirus pandemic. Although foreign policy experts are right to discuss the boundary dispute at the core of India-China tensions, they must not ignore the many other potential sources of tensions. One of the most significant is the probable implementation of large-scale geoengineering projects.

As emissions reductions prove elusive, major emitters are increasingly looking for other solutions to reduce global warming. Both China[1] and India[2] are exploring carbon dioxide removal or negative emission technologies. More controversially, they are also studying solar radiation management, a technological domain in which China is far ahead of India and the risk of bilateral disagreement is extremely high. The foreign policy community needs to incorporate climate change issues—especially geoengineering—into foreign policy.

Geoengineering's Potential to Heighten Tension

The emergence of ambitious geoengineering technologies could exacerbate tensions and even hostility between nations such as India and China. Without regulation, one country's efforts could affect other countries. While China has not yet shown signs of "unilaterally"[3] deploying geoengineering projects on the ground, the scale of its weather modification and other massive engineering projects, including mega-dam projects (such as the Three Gorges), suggests China is willing to deploy large-scale geoengineering schemes[4] to tackle the impacts of climate change and achieve its Paris targets.

Take, for example, China's large-scale weather modification project, *Tianhe*, or Sky River—a cloud seeding geoengineering project. The project has potential security implications for neighboring countries, including India, and other South and Southeast Asian countries.

Tianhe's climate geoengineering venture aims to manage drought-like conditions in the northern parts of the county that receive less rainfall and are seeing declining water levels in its rivers. With the project, China seeks to blast silver iodide particles[5] into the atmosphere using fuel-burning chambers in order to transfer more water from the Yangtze River basin to the Yellow River basin via water vapor that becomes rainfall.[6]

If past patterns repeat, conflicts may arise. India has accused China of creating floods in its northeast through suspicious dam-building activities.[7] The *Tianhe* project could further heighten concerns in the South and Southeast Asian regions, as the Tibetan Plateau is the source of major rivers such as the Indus, and Brahmaputra. Some Chinese scientists regard the project, led by researchers from Tsinghua University and Qinghai University, as technically "unfeasible," and scientifically "delusional."[8] But if it is to go through, it could unpredictably affect local and transboundary ecosystems[9], precipitation patterns, and even the long-term regional climate. These variables could raise the importance of information and data sharing (transparency) that is at times held hostage by geopolitical dynamics, as was the case during the 2017 Doklam military standoff between India and China, when owing to "technical" reasons, the latter did not share water flow data with the former.[10]

Just how solar geoengineering may affect regional climate and weather patterns is unclear, but the impacts are potentially significant. Climate change already seems to be affecting the Indian Summer Monsoon Rainfall (ISMR) that is the lifeline of all the South Asian economies. Studies have attributed a decline in the total rainfall and a concurrent rise in the magnitude and frequency of extreme rainfall events to climate change in many parts of India and other South Asian countries.[11] A few scientific studies have also pointed out that using techniques such as injection of stratospheric aerosols to cool the planet (the effect is comparable to that of a volcanic eruption) may reduce rainfall in India and China and may affect the ozone layer too, by thinning it.[12] The deployment of such initiatives in the region could therefore unleash far-reaching repercussions for ecological, livelihood, economic, social, and human security.

The Geopolitical Divide Between the Haves and Have-Nots

The consequences of a lack of safeguards on unregulated geoengineering could be disastrous, particularly for developing countries that do not possess enough resources to undertake research and development (R&D) in the field, deploy such schemes on a large-scale, or deal with their unintended outcomes. Geoengineering research, especially solar geoengineering, both in terms of technological innovation and futuristic governance frameworks, continues to be dominated by the Global North (primarily North America and Western Europe).[13]

These dynamics could exacerbate the geopolitical divide between the haves and have-nots or winners and losers, an asymmetry in the international system that developing countries have long contested. Yet, scientists have spoken about the need to implement geoengineering not just to prevent a future climate emergency, but also to create "equity" in connection with the possibility of reducing surface temperature faster than mitigation, in a way that will be comparatively cheaper than adaptation, and as a moral obligation to save the global poor.[14]

The Military Factor

Wherever militaries are involved, we should proceed with caution. In some countries, the military may already be playing a role in developing these technologies.[15] If and when the technologies are deployed on a wide scale, militaries may be involved in various aspects of the process[16], including the protection of project sites, R&D, and potential militarization/weaponization (to have an upper hand in times of crises).

Tianhe, in fact, is being aided by the state-owned China Aerospace Science and Technology Corporation, a "major space and defense contractor," using "cutting-edge military rocket engine technology" and "satellite network."[17] The involvement of the militaries in an already geopolitically tense region without appropriate safeguards could lead to further opaqueness, mistrust, disagreements, and conflict over the use of such technologies.

Some argue that geoengineering governance research should be free of regulations that may politicize the debate, delay effective means of arresting the effects of climate change[18], and even lead to a potential moratorium on the use of these technologies. Others argue that there is not enough scientific evidence to prove the risks associated with geoengineering.[19] This is precisely why we cannot wait for perfect information to act, and we may have to adopt a cautious approach that looks to diplomatic efforts to deal with the effects of these technologies, if not impose a ban on them.

Designing Geoengineering Governance Frameworks

Concerned foreign policy and security stakeholders in the Global South will need to step up efforts to address the political, security, and governance-related implications of geoengineering schemes. The focus of geoengineering should shift from mere preoccupation with the global context to regional climate change, as the impacts of these technologies on a regional scale (including precipitation and hydrologic cycle) are still under-studied. In a region such as South Asia,



countries should cooperate. First, they should reach a common understanding on the role of climate geoengineering as a "plan B"[20] solution for tackling climate change, and help advance the discussion on and implementation of national regulatory frameworks (which are non-existent in most cases). Then they should design rules and norms that draw upon these frameworks and that can be used at the international level for developing a global governance, or regulatory, framework.

Accountability and transparency are the key to future global, regional, and national climate governance. Although most countries, including China, the United States, and India have ratified the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD), establishing "compliance" and liability[21] can be tricky in the event of perceived (or claimed) benign use of climate geoengineering, coupled with the existence of longstanding militarized border zones. According to ENMOD[22], states must "undertake not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to another State party." This is perhaps the most relevant legal framework that could cater to the security implications of climate geoengineering, albeit only in "hostile" scenarios. It is outdated and does not address "peaceful" modification techniques.[23]

In the present situation the uncertainties have multiplied, with the COVID-19 pandemic, geopolitical tensions, and climate change complicating existing challenges. With the pandemic, although there are never-ending calls for a "green recovery"[24]—"to build back better"—some speculate that many renewable energy projects are likely to be delayed.[25] In such a scenario, countries will be more ambitious about pushing ahead with geoengineering projects to achieve their climate objectives. Richer countries may set aside ethical concerns with regard to developing countries and pursue a technocratic solution to climate change. In this context, the need for better governance mechanisms and tools, and the role of foreign policy stakeholders, especially those who engage in climate diplomacy, will be paramount, including in regions such as South Asia.



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Endnotes

1 Wan, L. (2019, July 30). *Carbon capture and storage in China*. CRU. https://www.crugroup.com/knowledge-and-insights/insights/2019/carbon-capture-and-storage-in-china/?utm_medium=Press_release&utm_source=PR%20Newswire&utm_campaign=CRU%20Insight%20LW%20Jul%2019

2 Gupta, A., & Paul, A. (2019, February). Carbon capture and sequestration potential in India: A comprehensive review. *Energy Procedia*, 160, 848-855. https://doi.org/10.1016/j.egypro.2019.02.148

3 The National Academies. *Committee on Developing a Research Agenda and Research Governance Approaches for Climate Intervention Strategies that Reflect Sunlight to Cool Earth – International Briefing to U.S. NAS Study Committee*. Vimeo. https://vimeo.com/384026949

4 Bluemling, B., Kim, R.K., & Biermann, F. (2019, May 18). Seeding the clouds to reach the sky: Will China's weather modification practices support the legitimization of climate engineering? *Ambio, 49, 365-373*. https://link.springer.com/article/10.1007/s13280-019-01180-3

5 Dockrill, P. (2018, April 28). China's 'Sky River' Will Be The Biggest Artificial Rain Experiment Ever. *Science Alert*. https://www.sciencealert.com/how-china-s-sky-river-will-be-the-biggest-artificial-rain-experiment-ever-cloud-seeding

6 Zheng, J. (2016, May 14). Project aims to divert water through the sky. *China Daily*. https://www.chinadaily.com.cn/china/2016-09/14/content_26793165.htm

7 The Economic Times. (2016, October 5). *Why India is worried about China's dam projects on the Brahmaputra River*. https://economictimes.indiatimes.com/news/politics-and-nation/why-india-is-worried-about-chinas-dam-projects-on-the-brahmaputra-river/articleshow/54691589.cms?from=mdr

8 Xuan, T.J., & Wang, J. (2018, November 27). *Qinghai-Tibet Artificial Rainfall Project 'Delusional,' Experts Say*. Caixin Global. https://www.caixinglobal.com/2018-11-27/qinghai-tibet-artificial-rainfall-project-delusional-experts-say-101352671.html

9 Pike, L. (2018, December 19). China's Scientific Community Confronts 'Rogue Science.' *Science - The Wire*. https://science.thewire.in/external-affairs/world/chinas-scientific-community-confronts-rogue-science/

10 Jayaram, D. (2018, March 14). Mutual Mistrust should Give Way to Water Cooperation between India and China. *Climate Diplomacy*. https://www.climate-diplomacy.org/news/mutual-mistrust-should-give-way-water-cooperation-between-india-and-china-0

11 Roxy, M.K., Ghosh, S., Pathak, A., Athulya, R., Mujumdar, M., Murtugudde, R., Terray, P., & Rajeevan, M. (2017, October 3). A threefold rise in widespread extreme rain events over central India. *Nature Communications*, 8(708). https://www.nature.com/articles/s41467-017-00744-9

12 Robock, A., Oman, L., & Stenchikov, G.L. (2008, August 16). Regional climate responses to geoengineering with tropical and Arctic SO2 injections. *Journal of Geophysical Research*: Atmospheres, 113(D16). https://doi.org/10.1029/2008JD010050

13 Rahman, A.A., Artaxo, P., Asrat, A., & Parker, A. (2018, April 3). Developing countries must lead on solar geoengineering research. *Nature*. https://www.nature.com/articles/d41586-018-03917-8

14 Flegal, J.A., & Gupta, A. (2017, September 19). Evoking equity as a rationale for solar geoengineering research? Scrutinizing emerging expert visions of equity. *International Environmental Agreements: Politics, Law and Economics*, 18, 45-61. https://link.springer.com/article/10.1007/s10784-017-9377-6

15 Kintisch, E. (2009, March 14). *DARPA to Explore Geoengineering*. American Association for the Advancement of Science. https://www.sciencemag.org/news/2009/03/darpa-explore-geoengineering#

16 Muniruzzaman, A. (2018, January 11). *Climate Geo-engineering: Uncertainties and Implications*. RSIS Commentary. https://www.rsis.edu.sg/rsis-publication/rsis/co18005-climate-geo-engineering-uncertainties-and-implications/#.X0gMcshKhPZ

17 Chen, S. (2018, March 26). China needs more water. So it's building a rain-making network three times the size of Spain. *South China Morning Post*. https://www.scmp.com/news/china/society/article/2138866/china-needs-more-water-so-its-building-rain-making-network-three

18 Hamilton, C. (2010, September 13). The powerful coalition that wants to engineer the world's climate. *The Guardian*. https://www.theguardian.com/environment/2010/sep/13/geoengineering-coalition-world-climate

19 Frumhoff, P.C., & Stephens, J.C. (2018, April 2). Towards legitimacy of the solar geoengineering research enterprise. Philosophical transactions. *Series A, Mathematical, physical, and engineering sciences*, 376(2119). https://doi.org/10.1098/rsta.2016.0459

20 Hood, M. (2019, August 23). *Geoengineering: 'Plan B' for the planet*. Phys.org. https://phys.org/news/2019-08-geo-engineering-planet.html

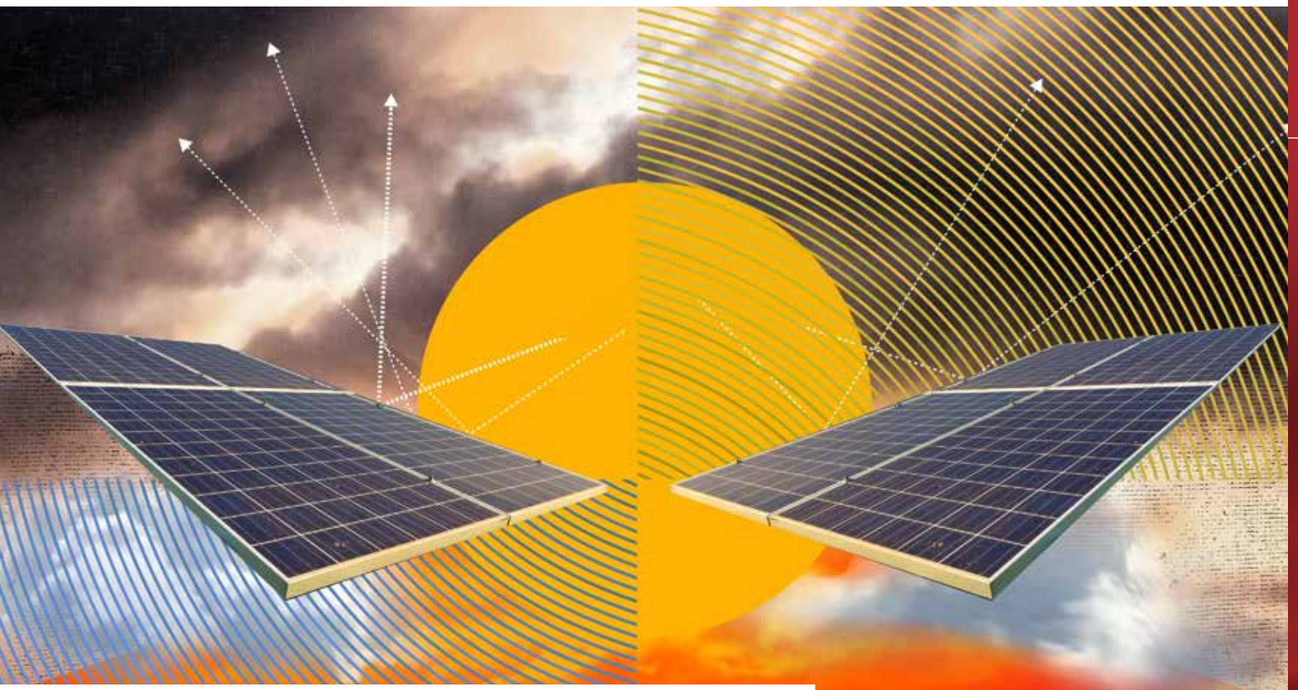
21 Smit, E. (2015, Spring). Geoengineering: Issues of Accountability in International Law. *Nevada Law Journal*, 15:1060-1089. https://scholars.law.unlv.edu/cgi/viewcontent.cgi?article=1604&context=nlj

22 United Nations Geneva. (2020). Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD). Retrieved August 27, 2020 from https://www.unog.ch/enmod

23 Kolpak, G. (2020, April 7). *From ENMOD to geoengineering: the environment as a weapon of war*. Conflict and Environment Observatory. https://ceobs.org/from-enmod-to-geoengineering-the-environment-as-a-weapon-of-war/

24 Harrabin, R. (2020, May 6). Climate change: Could the coronavirus crisis spur a green recovery? *BBC*. https://www.bbc.com/news/science-environment-52488134

25 Mulchandani, P. (2020, May 8). COVID-19 Crisis: Economic Stimulus Packages and Environmental Sustainability. *Economic & Political Weekly* 55(19). https://www.epw.in/engage/article/covid-19-crisis-economic-stimulus-packages-and-environmental-sustainability?0=ip_login_no_cache%3Dc204c90b45ddb949092e94a8d22885a3



Solar Radiation Management

Simon Nicholson

Solar radiation management (SRM) is an idea born of desperation. It is also an idea that demands consideration as the global community grapples with an ongoing and accelerating climate crisis. This briefing note defines and describes SRM, discusses why SRM is under consideration by the scientific community, policy actors, and representatives of civil society, and looks at what effective governance of SRM requires. SRM raises big questions for the foreign policy community: Should SRM technologies be developed? Should they ever be used? Who decides based on what kinds of imperatives or criteria? Who would have control of operation and intended outcomes? This note makes the case that even though SRM approaches are still at the discussion stage, the building of a governance architecture around SRM should begin now.

SRM is a speculative form of climate change response. SRM schemes, should they ever be developed and used, would operate by reflecting some amount of incoming solar energy back into space before that energy can be trapped by the gases that produce the greenhouse effect. Think of SRM like a reflective shield, artificially providing regional or global cooling.

BOX 1:

The Language of Geoengineering, Carbon Removal, and Solar Radiation Management

The term **geoengineering** (or **climate engineering**) has long been used as a catch-all for any potential large-scale technological intervention in earth systems to tackle or address climate change. The term has, though, largely fallen out of favor. Instead, scientific and policy discussions tend now to distinguish more carefully between two distinct types of potential large-scale climate intervention:

1. **Carbon removal** (or **carbon dioxide removal** or **negative emissions technologies**) approaches could draw carbon dioxide from the atmosphere and direct the carbon dioxide to long-term storage or to beneficial use. Climate models now suggest large-scale carbon removal will be a necessary component of the global climate change response.[1] Biological pathways for carbon removal include the planting of trees[2], the managing of farmlands[3] for carbon uptake and storage, or, perhaps, depositing iron filings in the ocean[4] to promote blooms of carbon-inhaling phytoplankton. More speculative chemical and technological methods include direct air capture[5] (capturing carbon dioxide directly from the open air and then injecting it underground) and enhanced weathering[6] (speeding up the natural processes that turn atmospheric carbon into rock formations).

2. **Solar radiation management** (or **solar geoengineering** or **solar radiation modification** or **albedo modification**) could cool the planet by reflecting or refracting a small amount of incoming solar energy. Proposals include stratospheric aerosol injection, marine cloud brightening, or ground-level albedo enhancement. This briefing note focuses on the science and governance requirements of solar radiation management approaches.

Carbon removal and solar radiation management offer different and perhaps complementary ways to tackle climate change, in conjunction with reducing greenhouse gas emissions and adapting to a changing climate.

Setting aside for the moment potential negative or unintended consequences, increasing the reflectivity of planetary features at any altitude could achieve the cooling goal of SRM. At ground and sea level, SRM proposals have included using gigantic pumps to introduce microbubbles into reservoirs or other bodies of still water, the genetic engineering of crops to make leaves shinier, and the spreading of reflective films on the ocean's surface or on vulnerable ice flows. The two most-discussed proposals for SRM, outlined in the next section, are both options that would operate up in the atmosphere. Any of these options would increase what is known as the Earth's "albedo"—the reflectiveness of the planet—sending more solar radiation back into space before it can interact with greenhouse gases.[i]



FIGURE 1: Illustration of Sample Solar Radiation Management Proposals

Source: Graphic prepared by Isabelle Rodas for Nicholson, S. (2013). "The Promises and Perils of Geoengineering," in Erik Assadourian et al., Worldwatch Institute: State of the World 2013.

The emerging science and technology of SRM is complicated enough. SRM is not, though, just a technical enterprise. It's a big complex entanglement of technological and scientific ideas, promises, and understandings interacting with social forces and actions. Some see technological developments as a way to bypass messy political processes. That's not really the case. SRM is not a way to get around climate politics; SRM is *part* of climate and broader politics. Consideration of SRM will necessarily take place in the context of the rest of the global effort to understand and respond to climate change. With this in mind, the world will be better placed in 2040 and beyond to take action if investment in how to govern SRM is well underway in 2020. SRM has world-altering potential. Its governance needs to be early, anticipatory, and flexibly attentive to the range of different possibilities that lie just over the horizon.

Current SRM Proposals

Ground-level SRM options such as more reflective crops or white roofs on buildings could provide some localized cooling and, if implemented at a large enough scale across multiple locations, could even have a modest impact on global heating. Higher-leverage proposals that could more readily produce regional or global cooling would operate in the atmosphere. **Marine cloud brightening** would involve introducing saltwater particles from the ocean up into the cloud layer, with the hope that this would lead to the short-term appearance of new and whiter clouds. These artificial or newly whitened marine clouds would mimic the "ship tracks"[7] that appear above ocean-traveling ships. In Australia, marine cloud brightening is one of more than 40 proposals being looked at as part of an AU$150 million government-backed research enterprise aimed at reducing heat impacts on the Great Barrier Reef.[8] A trial in early 2020 used a modified turbine with hundreds of nozzles to spray salt crystals skyward as a proof of a potential particle delivery system.[9] Future tests are planned to test atmospheric and ocean surface impacts. A project based in Washington state has set out its own research plan and is seeking US$40-50 million over five years.[10]

A second proposal, stratospheric aerosol injection, would involve throwing reflective particles into the upper atmosphere. The particle might be sulfur dioxide, or, in some formulations, calcium carbonate or perhaps an engineered nanoparticle, with delivery most likely by a fleet of high-flying aircraft. This activity would replicate the cooling effect of a volcanic event. The eruption of Mount Pinatubo in the Philippines in 1991 produced a plume of gas containing some 20 million tons of sulfur dioxide, some of which was forced to high altitudes. The Earth's average temperature fell by around 0.5 degrees Celsius for the 18 months that the sulfur dioxide particles remained aloft.[ii] A team at Harvard University has begun early-stage investigations that could, in time, inform whether humans could replicate such a feat.[11]

One paper[12] has suggested that a program that would ramp up to a cooling impact of around 0.3 degrees Celsius could be achieved for about US$2.25 billion per year over an imagined 15 year lifespan.[iii] This kind of price tag makes stratospheric aerosol injection look a good bet in brute economic terms. Such cost estimates are scrambled, though, when one tries to take account of unintended or potential downside consequences. Working out whether any SRM proposal is a good idea is dependent not just on feasibility and direct cost estimates, but also on questions about whether and how any deployment can be governed, how costs and benefits are likely to be distributed, and what SRM development would mean for other needed efforts to respond to climate change.

Stratospheric aerosol injection would, if utilized, have a global cooling effect, though computer modeling suggests it would not impact all places in the same way. Optimistic forecasts[13] based on limited and carefully controlled deployment of stratospheric aerosols suggest that every region of the world would see some climate benefit, with some regions seeing more benefit than



i The fact that increasing albedo or planetary brightness at any altitude would cool the planet has to do with the manner in which solar energy interacts with greenhouse gases in the atmosphere. Incoming solar radiation enters the Earth's atmosphere in short wavelengths. Some incoming shortwave radiation is reflected back into space by the cloud layer or particles in the atmosphere. Some makes it through to the Earth's surface, where it is absorbed and then re-radiated spaceward as longwave radiation. It is this outgoing longwave radiation that is trapped by greenhouse gases in the lower atmosphere, with increasing concentrations of greenhouse gases then leading to more planetary warming. Solar radiation management (SRM) has the potential to offset some human-induced warming by reflecting solar energy back into space before that energy becomes the longwave infrared radiation that can be captured by greenhouse gases.

ii This figure of 0.5 degrees Celsius is notable, given that the atmosphere has warmed a little more than 1 degree since the beginning of the Industrial Revolution and the goal of the Paris Agreement is to limit warming to no more than 2 degrees of warming above pre-industrial averages, aiming to limit warming to 1.5 degrees.

iii These cost estimates include aircraft development and production expenses spread across the fifteen-year life of the imagined program.

others. Other forecasts, however, suggest that this kind of SRM could upset rainfall patterns[14], amplify or change seasonal cycle[15], deplete stratospheric ozone[16], and potentially harm biodiversity.[17] Much would depend on the particular kind of aerosols deployed, what quantities are used, where they're deposited, and over what timeframe. Marine cloud brightening, by contrast, could have regional application[18] to slow Arctic sea ice melt or protect against coral bleaching. Small-scale ground level SRM efforts could be deployed entirely within one country, while atmospheric approaches would depend upon—or would spill over to—the atmospheric commons. This is all to say that while SRM approaches have in common that they would reflect solar radiation, there are some big and important differences in terms of what various SRM approaches entail and require in governance terms.

Why is Solar Radiation Management on the Table?

SRM could offer, by one well-known formulation, a "fast, cheap, and imperfect"[19] approach to slowing or offsetting temperature rise caused by greenhouse gas emissions. SRM is *fast* in the sense that deployment of an SRM approach would begin working immediately to reduce temperatures and it is *cheap* by the measure of anticipated direct costs.[iv] SRM is also imperfect, though, in that it does very little to address the underlying problem of the buildup of greenhouse gases in the atmosphere (or in the oceans, where atmospheric CO_2 is driving ocean acidification) and comes with a range of attendant risks.

Said differently, SRM is under consideration by scientists and policymakers because there is very little scientific doubt that using SRM approaches would cool particular regions or the planet. Climate change is about far more than temperature increase, however, and the cooling would come with a range of challenges and downside risks.

If SRM is to be used, it must be utilized alongside traditional emissions abatement (mitigation), adaptation to climate change effects, and, perhaps, carbon removal (see Box 1 and Figure 2). This is a key punchline when it comes to SRM: **SRM should only be considered a supplement to emissions abatement, never a substitute**. In the formulation in the left-hand portion of Figure 2[20], SRM is used in a "peak shaving" fashion, to remove the peak from a climate damage curve for a period of time. This could buy time for emissions abatement and then the removal of CO_2 from the atmosphere using large-scale carbon removal schemes (also a speculative notion) to stabilize and ultimately reduce atmospheric greenhouse gas concentrations. SRM in this scenario would be gradually ramped up through time and then gradually phased out, with the length of time and maximum scale of deployment depending on a range of different factors. In the right-hand portion of the figure, by contrast, SRM is used all by itself in an effort to keep climate impacts under control. In such a scenario SRM would need to be ramped up to keep pace with rising concentrations of greenhouse gases in the atmosphere, with the downside that higher concentrations of SRM entail more risk.

SRM has made it onto the international climate policy agenda, though it remains contentious. In 2019, a proposed resolution on "Geoengineering and its governance" was advanced for consideration at the 4th United Nations Environment Assembly (UNEA-4) in Nairobi. The proposal called

iv Note that this is an estimate of direct costs, and does not take account of potential indirect costs such as foreseeable or unforeseeable environmental disruption.

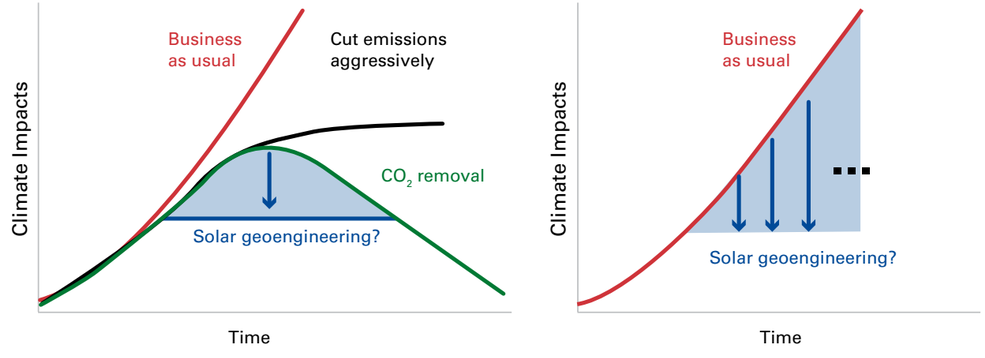


Figure 2: (Left) A limited role for SRM (solar geoengineering) as part of a broad portfolio of climate change response options; (Right) An unrealistic scenario shows SRM used alone, without emissions abatement or removal of carbon from the atmosphere, leads to more and more SRM needed each year for an indefinite period of time. From "Mission-driven research for stratospheric aerosol geoengineering," by D. MacMartin and B. Kravitz.[21] Copyright 2019 by Clearance Center, Inc. Reprinted with permission.

for a report or series of reports to be prepared by the United Nations Environment Programme (UNEP), assessing criteria to define SRM and carbon removal approaches, the state of existing science, and governance considerations. The proposal was ultimately withdrawn, in part because the U.S. delegation wanted to forestall any opportunity for international processes to impose restrictions on the kinds of research that might be pursued in the United States.[22] The formal governance of SRM will likely be back on the agenda at UNEA-5 and in other upcoming fora.

Governing Solar Radiation Management

What, then, does governing SRM require? Governing SRM means steering between the good that could come from developing and utilizing SRM options and the potential hazards and harms that SRM options present. Governance in a case like this one is not just about trying to protect against risks. Focusing just on the worst-case scenarios for SRM gone awry or terrible uses of SRM approaches by the worst imaginable actors leads one immediately to demands for a moratorium or strict restrictions on even SRM research efforts. An evaluation of SRM governance needs to start with comparing the potential risks and benefits of SRM approaches with the risks associated with climate change trajectories absent the availability of SRM. That is, could SRM provide a good and manageable way to offset some climate change risks? The truth is that we, collectively, don't yet know enough about SRM either in scientific or societal terms. We haven't yet sorted through whether SRM approaches could work, as models and early

tests suggest they might; nor is it clear that people would accept SRM options and that governments and others could establish the rules and institutions needed to manage them. This means that, in addition to managing for risks and potential harms, effective governance of SRM is also about creating an appropriate enabling environment for critical, quality research; opening up space for the kinds of societal deliberations that need to be undertaken; and establishing transparency and information sharing mechanisms.

BOX 2:

Limited and Fragmented Formal Governance of SRM

At present, there is no single present or planned international regime that has taken up the governance of SRM. There exists, instead, a patchwork of relevant rules and a range of different proposals.

There have been, to date, three international environmental regimes that have given explicit attention to SRM. These are:

1. The Convention on Biological Diversity (CBD): The parties to the CBD adopted decisions in 2010 and 2012[23] motivated by concern about potential negative impacts on biodiversity from climate-related geoengineering activities. Some have argued that the CBD decisions represent a de facto moratorium[24] against SRM investigation or deployment. The decisions, though, are guidance rather than binding law, and they also explicitly call for and allow for various kinds of research activities attentive to and designed to help assess environmental risks associated with SRM.

2. The London Convention and London Protocol (LC/LP): The LC/LP establishes a regime covering the dumping of materials into the oceans. In 2010, parties to the LC/LP adopted a resolution on an "Assessment Framework for Scientific Research Involving Ocean Fertilization."[25] The assessment framework is designed to provide guidance on the monitoring of ocean iron fertilization experiments, which could remove carbon dioxide from the atmosphere. Ocean iron fertilization and SRM have often been brought together under the "geoengineering" umbrella, such that many read the LC/LP guidance as also applying to SRM approaches that involve putting materials into the oceans. In 2013, amendments were adopted designed to regulate marine geoengineering activities, where marine geoengineering was defined as "a deliberate intervention in the marine environment to manipulate natural processes, including to counteract anthropogenic climate change and/or its impacts, and that has the potential to result in deleterious effects, especially where those effects may be widespread, long-lasting or severe."[26] These amendments have not entered into force.

3. The Vienna Convention and Montreal Protocol: The parties to this regime to address human harms to the stratospheric ozone layer have taken some interest in SRM. This is because there is some concern that stratospheric aerosol injection, a type of SRM, could harm the ozone layer. Over recent meetings there has been a growing push to include consideration of SRM in an upcoming scientific assessment.[27] It is unclear at this juncture whether this scientific interest might lead to an interest in rulemaking.

In addition, there are a number of other environmental regimes that could have bearing on SRM based on existing treaty language or mandate. Among these regimes is the Convention on Long-range Transboundary Air Pollution (perhaps relevant in the case of the spread of sulfate aerosols or some other particle in the atmosphere), the UN Convention on the Law of the Sea (perhaps pertinent in the case of positive or negative marine impacts from SRM testing or deployment), and the Environmental Modification Treaty (ENMOD – perhaps relevant if some particular use of SRM were deemed or seen as hostile).[28]

A study published in 2020 by Susan Biniaz and Daniel Bodansky concluded that there is no obvious "one-stop shop" for SRM governance.[29] The international climate change regime, with the UN Framework Convention on Climate Change at its heart, is an obvious place to site formal governance of SRM, but the authors contend that the agenda for parties to that convention is already packed and contentious. Nor is there another obvious international forum with sufficient scope and mandate. Biniaz and Bodansky instead weigh a range of potential existing institutions or regimes that could pick up important *pieces* of the SRM governance agenda: the Intergovernmental Panel on Climate Change, World Meteorological Organization, or similar for scientific assessment, and the UN Security Council or G7/G20 or a regional forum for policy decisions. Others have endorsed this polycentric or multi-nodal governance notion.[30] SRM governance is needed. SRM governance does not, though, all need to be handled in one place, and for the foreseeable future fragmented governance of SRM is likely to remain the norm.

Right now, SRM is still an idea. There is some computer modeling and a handful of plans for early-stage scientific investigation into the efficacy of certain aspects of some SRM proposals, but there are no readily deployable SRM options. This means that in the near-term, governance of SRM means governance of SRM research. But even the mere mention of SRM research has garnered objections. Among the concerns (see also box 3 in *Governing Solar Radiation Management*[31]):

- SRM could be sold by fossil fuel interests and others as a kind of get-out-of-jail-free card;
- SRM might distract elites or society from the essential work of emissions abatement;
- SRM could experience a kind of technological lock-in or elite capture, where early stage research efforts would drive inexorably towards use even if it proved a bad idea; and,
- Even medium to large-scale testing of some forms of SRM would amount to messing with ecosystems, with very limited knowledge and ability to control and account for the impacts of such interventions.

Yet, quashing research denies us the opportunity to better understand a potentially beneficial tool and prevents informed decision-making—including baseline knowledge about potential risks—which is an especially important consideration should a group ever decide to rush to SRM deployment.

When it comes to potential deployment of SRM approaches, much depends on the particular kinds of SRM under consideration. A stratospheric aerosol injection program, for instance, would have global climatological impacts but could be launched by a single country or even a sub-state actor. This could not be a covert undertaking. Other countries would certainly notice if, say, China or Russia or the United States launched (in a deployment scenario) thousands of flights each year into the stratosphere, and satellite-based LIDAR could detect major engineered changes in planetary reflectivity. Still, the fact that one country could go it alone suggests the need for coordinated action, even if only to ward off the potential for rogue actions.

Another much-discussed challenge with a global stratospheric aerosol injection deployment is the so-called "termination shock" that could accompany a sudden cessation of activities. If a global SRM scheme were implemented while greenhouse gas concentrations continued to rise, then all that SRM would be doing is masking and suppressing potential warming. A sudden halt of the SRM scheme would result in a sudden, and potentially severe, pulse of warming. All of this suggests that SRM with global impacts would need to be managed effectively and without interruption for a potentially very long time.

A regional or local SRM approach, such as marine cloud brightening or the spreading of ocean films, has different implications. Such programs would infiltrate the global commons and have spillover impacts on neighboring states, but risks would likely be more geographically constrained than with global approaches.

A further consideration, of particular importance for foreign policy discussions, concerns security or securitization dimensions of SRM. While some have speculated that stratospheric aerosol injection might be weaponized, this is likely an overblown concern. More pressing is that costs and benefits of SRM deployment would be unevenly distributed. Even models that suggest that nearly everyone would benefit from SRM indicate that benefits would be spread unevenly. These kinds of equity concerns could have implications for vulnerability to climatic pressures, including pressure points for migration, and public acceptance of SRM developments.

Another security implication has to do with how SRM could shape public and elite understandings of climate change. Climate change is now a diffuse challenge, in the sense that every person on the planet contributes to climate change through their actions (recognizing that some contribute significantly more than others and focusing individuals as the producers of climate change lets corporations and flawed systems off the hook). SRM could potentially provide a touchpoint by which a particular actor is identified (correctly or not) as the source of climatological effects. Suppose that Pakistan were to experience a major flooding event the year after India announced field tests of an SRM approach.[32] Pakistan could blame India for the flooding *whether or not* a direct causal impact could be uncovered. In this way SRM would exacerbate and feed into existing interstate tensions. Some have gone so far as to suggest that SRM feeds a militarization of climate politics, intensifying a logic of surveillance and control, in ways that could undermine cooperative climate response efforts.[33]

Looking Ahead - Prospects for Solar Radiation Management and its Governance

Imagine the world in 2040. The ice sheets covering Greenland are sliding more rapidly into the ocean even as much of the world is experiencing massive fires. Climate-induced migration and global food system disruptions are increasing. Decision-makers and communities all over the world are finally aligned to do something about climate change. Climate change is acutely felt and the need to address it, urgent. Where does SRM fit in?

- **Scenario 1:** There has been limited research on SRM to this point, but things are getting so drastic that every tool needs to be used. *Fly the planes.*
- **Scenario 2:** Research has shown SRM to be good in certain respects but bad in others. Keep SRM local and avoid risks associated with global options. *Brighten the clouds.*
- **Scenario 3:** The world has taken a back-to-nature swing and there's widespread antipathy towards technological responses. *Shelve the plans.*
- **Scenario 4:** Jeff Bezos decides he's going to sidestep all the talk and get the SRM job done himself. *Anoint the savior.*



- **Scenario 5:** Governments have directed a multi-year coordinated research effort around stratospheric aerosol injection and have agreed upon rules to guide large-scale outdoor experimentation. *Proceed with caution.*

These scenarios begin just to hint at the array of possible futures into which SRM will fit and that consideration of SRM will help to create. Bottom line: though potential use of SRM is some way off in the future, SRM demands consideration now. How decision-makers answer the "where does SRM fit" question today will go a long way towards producing which of the paths outlined above, or others, we find ourselves on in 15-20 years.



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Endnotes

1 Morrow, D.R., Buck, H.J., Burns, W.C.G., Nicholson, S., & Turkaly, C. (2018). W*hy talk about carbon removal?* Washington, D.C.: Institute for Carbon Removal Law and Policy, American University. https://doi.org/10.17606/M6H66H

2 *Fact sheet: Forestation*. (2020, June 24). American University. https://www.american.edu/sis/centers/carbon-removal/fact-sheet-forestation.cfm

3 *Fact sheet: Soil carbon sequestration.* (2020, June 24). American University. https://www.american.edu/sis/centers/carbon-removal/fact-sheet-soil-carbon-sequestration.cfm

4 *Ocean iron fertilization*. (n.d.). Woods Hole Oceanographic Institution. https://www.whoi.edu/oceanus/special-series/ocean-iron-fertilization/

5 *Fact sheet: Direct air capture*. (2020, June 24). American University. https://www.american.edu/sis/centers/carbon-removal/fact-sheet-direct-air-capture.cfm

6 *Fact sheet: Enhanced mineralization.* (2020, June 24). American University. https://www.american.edu/sis/centers/carbon-removal/fact-sheet-enhanced-mineralization.cfm

7 *Ship tracks south of Alaska.* (n.d.). NASA Earth Observatory. https://earthobservatory.nasa.gov/images/37455/ship-tracks-south-of-alaska

8 *Marine Cloud Brightening for the Great Barrier Reef.* (n.d.). Marine Cloud Brightening for the Great Barrier Reef. https://www.savingthegreatbarrierreef.org/

9 Readfearn, G. (2020, April 16). Scientists trial cloud brightening equipment to shade and cool Great Barrier Reef. *The Guardian*. https://www.theguardian.com/environment/2020/apr/17/scientists-trial-cloud-brightening-equipment-to-shade-and-cool-great-barrier-reef

10 *Index - Marine Cloud*. (n.d.). The Marine Cloud Brightening Project. http://www.mcbproject.org/index.html

11 *SCoPEx Science*. (2014). Keutsch Research Group, Harvard University. https://projects.iq.harvard.edu/keutschgroup/scopex

12 Smith, W., & Wagner, G. (2018). Stratospheric aerosol injection tactics and costs in the first 15 years of deployment. *Environmental Research Letters*, 13(12), 124001. https://doi.org/10.1088/1748-9326/aae98d

13 Irvine, P., Emanuel, K., He, J., Horowitz, L. W., Vecchi, G., & Keith, D. (2019). Halving warming with idealized solar geoengineering moderates key climate hazards. *Nature Climate Change,* 9(4), 295–299. https://doi.org/10.1038/s41558-019-0398-8

14 Ferraro, A. J., Highwood, E. J., & Charlton-Perez, A. J. (2014). Weakened tropical circulation and reduced precipitation in response to geoengineering. *Environmental Research Letters*, 9(1), 014001. https://doi.org/10.1088/1748-9326/9/1/014001

15 Jiang, J., Cao, L., MacMartin, D. G., Simpson, I. R., Kravitz, B., Cheng, W., Visioni, D., Tilmes, S., Richter, J. H., & Mills, M. J. (2019). Stratospheric sulfate aerosol geoengineering could alter the high-latitude seasonal cycle. *Geophysical Research Letters*, 46(23), 14153–14163. https://doi.org/10.1029/2019gl085758

16 Tilmes, S., Muller, R., & Salawitch, R. (2008). The sensitivity of polar ozone depletion to proposed geoengineering schemes. *Science*, 320(5880), 1201–1204. https://doi.org/10.1126/science.1153966

17 Trisos, C. H., Amatulli, G., Gurevitch, J., Robock, A., Xia, L., & Zambri, B. (2018). Potentially dangerous consequences for biodiversity of solar geoengineering implementation and termination. *Nature Ecology & Evolution*, 2(3), 475–482. https://doi.org/10.1038/s41559-017-0431-0

18 Latham, J., Gadian, A., Fournier, J., Parkes, B., Wadhams, P., & Chen, J. (2014). Marine cloud brightening: regional applications. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 372(2031), 20140053. https://doi.org/10.1098/rsta.2014.0053

19 Mahajan, A., Tingley, D., & Wagner, G. (2018). Fast, cheap, and imperfect? US public opinion about solar geoengineering. *Environmental Politics*, 28(3), 523–543. https://doi.org/10.1080/09644016.2018.1479101

20 MacMartin, D. G., & Kravitz, B. (2019). Mission-driven research for stratospheric aerosol geoengineering. *Proceedings of the National Academy of Sciences*, 116(4), 1089–1094. https://doi.org/10.1073/pnas.1811022116

21 MacMartin, D. G., & Kravitz, B. (2019). Mission-driven research for stratospheric aerosol geoengineering. *Proceedings of the National Academy of Sciences,* 116(4), 1089–1094. https://doi.org/10.1073/pnas.1811022116

22 Jinnah, S., & Nicholson, S. (2019). The hidden politics of climate engineering. *Nature Geoscience*, 12(11), 876–879. https://doi.org/10.1038/s41561-019-0483-7

23 Williamson, P., & Bodle, R. (2016). *Update on Climate Geoengineering in Relation to the Convention on Biological Diversity: Potential Impacts and Regulatory Framework*. Technical Series No.84. Secretariat of the Convention on Biological Diversity, Montreal, 158 pages. https://www.cbd.int/doc/publications/cbd-ts-84-en.pdf

24 *UN Convention still says "No" to manipulating the climate*. (2016, December 16). ETC Group. https://www.etcgroup.org/content/un-convention-still-says-no-manipulating-climate

25 International Maritime Organization, document LC 32/15 Annex 6, resolution LC-LP.2, *On the assessment framework for scientific research involving ocean fertilization* (2010, October 14), available from http://www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/geoengineering/Documents/OFassessmentResolution.pdf

26 International Maritime Organization resolution LP.4(8), *On the amendment to the London Protocol to regulate the placement of matter for ocean fertilization and other marine geoengineering activities* (2013, October 18), available from http://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/London-Convention-London-Protocol-(LDC-LC-LP)/Documents/LP.4(8).pdf

27 Institute for Governance & Sustainable Development. (2018, November 12). *Montreal Protocol aims high in Quito to avoid 1°C of future warming.* Climate & Clean Air Coalition. https://ccacoalition.org/en/news/montreal-protocol-aims-high-quito-avoid-1%C2%BAc-future-warming

28 Reynolds, J. L. (2019). Solar geoengineering to reduce climate change: a review of governance proposals. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences,* 475(2229), 20190255. https://doi.org/10.1098/rspa.2019.0255

29 Biniaz, S. & Bodansky, D. (2020). S*olar climate intervention: Options for international assessment and decision-making.* Center for Climate and Energy Solutions & SilverLining. https://www.c2es.org/site/assets/uploads/2020/07/solar-climate-intervention-options-for-international-assessment-and-decision-making.pdf

30 Nicholson, S., Jinnah, S., & Gillespie, A. (2017). Solar radiation management: a proposal for immediate polycentric governance. *Climate Policy,* 18(3), 322–334. https://doi.org/10.1080/14693062.2017.1400944

31 Chhetri, N., Chong, D., Conca, K., Falk, R., Gillespie, A., Gupta, A., Jinnah, S., Kashwan, P., Lahsen, M., Light, A., McKinnon, C., Thiele, L.P., Valdivia, W., Wapner, P., Morrow, D., Turkaly C., & Nicholson, S. (2018). *Governing solar radiation management*. Washington, D.C.: Forum for Climate Engineering Assessment, American University. https://doi.org/10.17606/M6SM17

32 Rayner, S., Heyward, C., Kruger, T., Pidgeon, N., Redgwell, C., & Savulescu, J. (2013). The Oxford Principles. *Climatic Change*, 121(3), 499–512. https://doi.org/10.1007/s10584-012-0675-2

33 Surprise, K. (2020). Geopolitical ecology of solar geoengineering: from a "logic of multilateralism" to logics of militarization. *Journal of Political Ecology*, 27(1), 213–235. https://doi.org/10.2458/v27i1.23583



Governance is Essential to Manage the Risks of Solar Radiation Modification

Cynthia Scharf

Senior policymakers everywhere tend to react to the idea of new climate-altering technologies in a similar way: with a mix of curiosity, potential hope, and palpable anxiety.

It's a natural reaction, especially in these deeply challenging times.

For the past three years, my colleagues and I from the Carnegie Climate Governance Initiative (C2G)[1] have been meeting with senior interlocutors around the world, both in and out of government, and alerting them to the critical need for multilateral governance of powerful but risky new ideas to reduce the impacts of climate change.

These include proposals to remove billions of tonnes of CO_2 already in the atmosphere[2], and technologies to reflect back sunlight to lower the global temperature, known as solar radiation modification.[3]

All pose profound governance challenges, which need to be addressed. The latter, if deployed at a global scale, would affect every country on Earth.

In response, we are regularly asked the same questions. What are the risks and possible benefits? Are they a substitute—or a dangerous diversion—from the urgent need to reduce CO_2 emissions? Are there any existing international laws or bodies to govern them?

And last but not least, why are we drawing attention to this issue now, when agendas are packed and there are other competing priorities?

Having worked for eight years in former UN Secretary-General Ban Ki-moon's climate change team, I am familiar with these kinds of concerns.

For many senior policymakers, this is the first time they've had a conversation about emerging climate technologies, a topic that raises profoundly difficult questions about risk management, ethics, international security, and sustainable development.

But the consequences of our present course are also extremely serious. Despite a temporary drop in CO_2 emissions during the pandemic, scientists say we must reduce global emissions to net zero and then net negative if the world is to meet the Paris goal of limiting temperature rise to 1.5°- 2°C above pre-industrial levels by 2100.

How can the world reduce climate risks in a way that is safe, inclusive, and fair? And what role can governance play in reducing the specific risks posed by solar radiation modification, were it ever to be used? This is a new type of challenge, and it's not clear we are ready to meet it.

What Are Emerging Climate-Altering Technologies?

Any discussion of technologies that would intentionally alter the climate must begin with a recognition that our "business as usual" emissions pathway leads to disaster. National pledges made thus far under the Paris Agreement fall significantly short of what is needed.

While the long-term consequences of COVID-19 are unclear, the world appears to be hurtling toward a catastrophic 3-4°C temperature rise by 2100—twice the level set by the Paris Agreement. This would mark the end of civilization as we know it within eighty years, easily the lifespan of someone born today. Seen from any angle—environmental, economic, geopolitical—climate change could have destructive global impacts far greater than the current pandemic.



It is in this context that some scientists, business, and policymakers have begun exploring a range of new approaches and technologies to supplement existing climate response tools. These include nature-based approaches[4],such as enhancing soil carbon content or restoring forest ecosystems to remove excess CO_2 from the atmosphere and store it, as well as technical methods that would directly capture CO_2 from

ambient air. Removal approaches vary considerably in their potential, readiness, permanence, cost, and risks of negative side-effects. Their specific governance challenges vary as well.

Solar radiation modification[i] is perhaps the most controversial of these emerging technologies.[5] It has the potential to provide quick, tangible benefits, but it also poses potentially serious risks. It includes ideas that would intentionally alter the climate by creating brighter clouds at sea or spraying reflective particles into the stratosphere.

These technologies would not address the anthropogenic causes of climate change, but rather address a key symptom of climate change—temperature rise—by reflecting sunlight into space to rapidly cool the planet.

One particular technology—stratospheric aerosol injection[6]—could potentially reduce global temperatures very quickly (within months), according to computer models, potentially providing significant human health benefits and other indirect gains, at a limited operational cost.

No other approach or technology we know of can do this. This makes it potentially very attractive to politicians seeking to buy more time to reduce emissions or show quick results to their constituents.

However, solar radiation modification would not be a substitute for traditional mitigation or large-scale removals, only a potential supplement. And the risks of stratospheric aerosol injection could be very high, not only for the environment, but for geopolitical stability, equity, and attainment of the Sustainable Development Goals.[7]

Why Governance and Why Now?

Perhaps the greatest risk concerns governance—or rather, the present lack thereof.

Governance is about far more than governments, rules, and regulations.[8] It requires interlocutors from across all sectors of society, both the powerful and the marginalized, coming together to discuss, learn, share knowledge, and take decisions at multiple levels. And it must include those most affected by climate change—including those who would be most impacted by any potential use of solar radiation modification. Governance also embraces deep ethical issues regarding legitimacy, decision-making authority, and inter-generational equity, among others.

There are currently no comprehensive international governance frameworks for solar radiation modification. Until recently, discussions about these emerging technologies have been limited to a small community of scientists.

In fact, the vast majority of policymakers, and their advisors, around the world do not know enough about these technologies to be aware of their challenges, including why they need to be governed. This poses unacceptable risks to current and future generations.

Some believe that talking about these technologies may reduce incentive for the urgent and essential task of reducing global emissions, thus creating a "moral hazard." While this is a valid concern, C2G believes the greater risk is in ignoring or postponing a discussion about technologies such as solar radiation modification. We do not have the luxury of time.

The COVID-19 crisis has made it abundantly clear that when it comes to global challenges, there is a very high cost to waiting—waiting to prepare, to mobilize key actors, and to develop governance at multiple levels to mitigate risks.

In short, the longer the world delays sorting out how to govern technologies that would intentionally alter our climate, the more we will all pay in terms of increased risks.

The time to anticipate risks and develop governance is now, before some actor—state or non-state—unilaterally decides to deploy solar radiation modification technologies that have global impacts. By any measure, this is a timely investment in a safer future.

Laying a Foundation for Governance

C2G, a foundation-funded initiative, was created in 2017 to help minimize these risks by catalyzing governance conversations with global policymakers and their advisors, as well as with non-state actors.[9] This mission—to catalyze the creation of effective governance for climate altering technologies—is unique.

Over the past few years, C2G has broadened the conversation on climate-altering technologies from the academic and research community to the policy world. It does not aim to determine the outcome of these discussions or provide answers. Rather, C2G takes a broad, risk management approach.[10] In a rapidly warming world, C2G encourages policymakers to consider both the risks of action—and inaction—with respect to any potential climate intervention.

Its role is to ask critical questions, and to catalyze inclusive and well-informed discussions in order to fill governance gaps, both nationally and globally. C2G is impartial regarding the potential use of any proposed climate-altering technologies or interventions[11]. These are choices for society to make.

But make them they must—and soon.

In March 2020, Australian scientists, funded by the government, conducted an outdoor experiment aimed at protecting the Great Barrier Reef using marine cloud brightening—a form of solar radiation modification—governed under existing domestic laws.

A different outdoor experiment in the United States is under discussion, potentially paving the way for further development of stratospheric aerosol injection.

As climate impacts continue to worsen, there will be increased pressure on governments in both developed and developing countries to use additional tools beyond traditional mitigation.



i C2G does not use the word "geoengineering" as it encompasses a wide variety of technologies and approaches that pose very different challenges. This can confuse, instead of contribute, to their effective governance and impede constructive discussions with policymakers. "Geoengineering" also contains an implicit assumption that it is possible to engineer the climate, which may underplay the complexity of the earth system. Please see our blog on "what's in a name." (Pasztor, J. (2019, June 10). *What's in a name? Why we became C2G.* C2G. https://www.c2g2.net/whats-in-a-name-why-we-became-c2g/)

Three Common Concerns from Policymakers

Since its inception, C2G has met with senior policymakers in scores of governments around the world. It has also met with senior officials across the UN system, and dozens of civil society organizations and faith groups. Much more learning is needed about the risks and potential benefits of these technologies—known and unknown—as weighed against the dangers of a warming world.

Overall, C2G's message is clear: Difficult choices lie ahead. There are no risk-free options[12] to address the climate crisis; every course of action has costs and trade-offs as well as potential benefits.

The risk of the world's present course is simple: Society-wide transformational changes to decarbonize the global economy are urgently needed. But the speed and scale of action we see thus far falls far short. And the current leadership of the world's largest emitting countries does not invite optimism.

At the same time, new ideas to tackle our crisis bring major risks of their own. To that end, governance for solar radiation modification should be developed as soon as possible and set within the context of an overall climate response.

In our conversations with global policymakers, we sense a growing recognition of the need for a robust science-society-policy dialogue, starting now. We also hear three common concerns:

1. **Decision-making authority:** Whose finger is on the global thermostat? Who decides to use—or not use—technologies with planetary impacts? On what basis, and under what process?

This goes to the heart of legitimacy and decision-making authority in a multilateral system already under great strain.

At present, there is no clear answer to these questions under existing international law. There is no existing institution uniquely equipped to address all the governance challenges raised by stratospheric aerosol injection. Nor is there currently an appetite for creating new institutions. Some have argued that a polycentric approach might serve best under present circumstances.

2. **Linkages with other issues:** How would solar radiation modification affect the Sustainable Development Goals (SDGs)?[13] Much more research is needed, but clearly there could be significant impacts—both positive and negative—on health, food, water security, and biodiversity.

Another concern is solar radiation modification and its implications for global security. Some of the impacts of stratospheric aerosol injection could create global winners and losers (or be *perceived* to do so), thus potentially triggering conflicts. Ungoverned deployment of this technology could cause serious geopolitical instability without a multilateral mechanism for deciding if and when the technology were ever to be used. Regional use of marine cloud brightening could also provoke regional and/or international tensions.

3. **The public's response:** As with other controversial technologies (GMOs, stem cell research, cloning), solar radiation modification raises profound questions about humanity's relationship to nature, to the divine, and to future generations.

With more than 80 percent of the global population professing adherence to a religion, faith communities[14] and ethical leaders could have a major influence on the public's response to emerging climate technologies—and hence their governance. To be seen as legitimate, the governance of solar radiation modification will

> There are no risk-free options to address the climate crisis; every course of action has costs and trade-offs as well as potential benefits.

need to address deeply rooted values and beliefs about justice, equity, and inclusivity, among others.

Are we foolishly "playing God," as some have said? Do we have the right to deliberately alter the one atmosphere we all share? How can young people have a say in these matters? After all, their generation—and future generations—will live with the consequences.

Others argue that solar radiation modification could rapidly reduce temperatures, thus benefitting some of the world's poorest and most vulnerable communities who are located in areas already suffering from extreme heat under today's 1.1°C rise in global temperatures. Imagine the grave consequences of a "business as usual" emissions pathway, where temperatures are anticipated to rise to an estimated 3°C or 4°C by century's end. Significant swathes of the Earth might simply be uninhabitable for hundreds of millions of people.

Why Act Now?

Society will need to make difficult decisions in the next decade on how to respond to the climate crisis. This includes weighing the possible risks and benefits (known and unknown) of any potential use of solar radiation modification against those of a rapidly heating planet, whose environmental degradation is accelerating due to human influence.

Policymakers still have a window of opportunity to proactively lead a global conversation about these technologies, and to build multilateral frameworks to govern them, before one or more countries or non-state actors act unilaterally.

Given its global nature, governance of solar radiation modification will require global arrangements in the United Nations, building on actions and agreements in regional and global intergovernmental processes, including, inter alia, the European Union, the African Union, the G7, and the G20.

As COVID-19 has reminded us, governance that anticipates a crisis, instead of merely reacting to one, can save lives.[15] A second lesson is also true: We ignore science at our own peril. Humanity's oversized imprint on the climate and ecosystems will continue to have serious consequences, affecting not only sustainable development, but also global peace and security.

And yet, while science must be the evidence base for decision-making, ethics and values are at the heart of how these emerging technologies will be viewed by the public. Credible, impartial information and open dialogue are essential for building trust.[16]

There remains a great deal of learning and outreach ahead. Nonetheless, the doors to serious global conversations about the governance of these powerful technologies have been opened.

The issues C2G is raising are difficult and uncomfortable. But we have found that by the end of our conversations, despite any initial hesitation, our interlocutors tend to agree: The greatest risk lies not in broaching contentious topics, but in not being prepared to face them, openly, honestly, and with humility.

Endnotes

1 *C2G Mission*. (n.d.). C2G. Retrieved August 31, 2020, from https://www.c2g2.net/c2g-mission/

2 *Carbon dioxide removal*. (2020, August 18). C2G. https://www.c2g2.net/carbon-dioxide-removal/

3 Carnegie Climate Governance Initiative. (2018, November 29). *Governing Solar Radiation Modification*. [Infographic]. https://www.c2g2.net/wp-content/uploads/20181129-SRM-Infographic.pdf

4 *Nature-based approaches to large-scale carbon dioxide removal*. (2020, August 18). C2G. https://www.c2g2.net/nature-based-solutions/

5 Carnegie Climate Governance Initiative. (2019, November 26). *Governing Solar Radiation Modification [Policy brief]*. https://www.c2g2.net/wp-content/uploads/C2G2_Solar-Brief-hyperlink.pdf

6 Carnegie Climate Governance Initiative. (2019, November 26). *What is stratospheric aerosol injection and why do we need to govern it?* [Infographic]. https://www.c2g2.net/project/infographic-what-is-stratospheric-aerosol-injection-and-why-do-we-need-to-govern-it/

7 Honegger, M., Derwent, H., Harrison, N., Michaelowa, A., & Schäfer, S. (2018). *Carbon removal and solar geoengineering: Potential implications for delivery of the Sustainable Development Goals*. Carnegie Climate Geoengineering Governance Initiative, May 2018, New York, U.S. https://www.c2g2.net/wp-content/uploads/C2G2-Geoeng-SDGs_20180521.pdf

8 C2G2 (2019). *Geoengineering: the need for governance*. Carnegie Climate Geoengineering Governance Initiative (C2G2), February 2019, New York, USA. https://www.c2g2.net/wp-content/uploads/Geoengineering-Need-for-Governance.pdf

9 C2G Carnegie Climate Governance Initiative. (2020, May 22). *What is the Carnegie Climate Governance Initiative (C2G)? – Janos Pasztor*. [Video]. C2G. https://www.c2g2.net/what-is-c2g-janos-pasztor/

10 Carnegie Climate Governance Initiative. (2019, October 1). *The need to govern climate-altering technologies: C2G and its approach*. Carnegie Climate Governance Initiative Geneva-New York. https://www.c2g2.net/wp-content/uploads/20191001-C2G-Approach.pdf

11 C2G Carnegie Climate Governance Initiative. (2020, May 27). *What does C2G mean when it says it is impartial?* – Janos Pasztor [Video]. C2G. https://www.c2g2.net/what-does-c2g-mean-when-it-says-it-is-impartial-janos-pasztor/

12 Carnegie Council for Ethics in International Affairs. (2020, February 17). Cynthia Scharf: We're now in the era of no risk-free options [Video]. C2G. https://www.c2g2.net/were-now-in-the-era-of-no-risk-free-options-cynthia-scharf/

13 Honegger, M., Derwent, H., Harrison, N., Michaelowa, A., & Schäfer, S. (2018). *Carbon removal and solar geoengineering: Potential implications for delivery of the Sustainable Development Goals*. Carnegie Climate Geoengineering Governance Initiative, May 2018, New York, U.S. https://www.c2g2.net/wp-content/uploads/C2G2-Geoeng-SDGs_20180521.pdf

14 Scharf, C., Suarez, P., & Vinciguerra, T. (2018, June 1). *Vatican Seminar on the Governance of Geoengineering*. C2G. https://www.c2g2.net/vatican-seminar-on-governance-ethical-dimensions-of-geoengineering/

15 Pasztor, J. (2020, March 20). *C2G in the age of COVID-19*. C2G. https://www.c2g2.net/c2g-in-the-age-of-covid-19/

16 *Video/Audio: Communicating climate-altering technologies*. (2020, March 11). C2G. https://www.c2g2.net/video-audio-communicating-geoengineering/



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The Wilson Center, chartered by Congress in 1968 as the official memorial to President Woodrow Wilson, is the nation's key non-partisan policy forum for tackling global issues through independent research and open dialogue to inform actionable ideas for the policy community.

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adelphi is an independent Berlin-based think tank for applied research, policy analysis, and public policy consultancy on global environmental change. We inform policy processes and facilitate dialogue to foster transformative change towards a sustainable future.

The Climate Diplomacy initiative is a collaborative effort of adelphi and the German Federal Foreign Office. It aims at advocating climate change as a strategic priority in public diplomacy and addressing the nexus between climate change, conflict and peace.

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