Article

Do G20 Leaders need to put on their Own Emergency Oxygen Masks First? A Look at Germany's G20 Presidency and Climate Policy

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This article examines climate policy commitments under the German G20 presidency. It concludes that the fracturing of the G20 consensus on climate change resulted in two course changes—one positive and one negative. A 'near-consensus' was expressed in the Hamburg Climate and Energy Action Plan for Growth (CEAG). There the G19 maintained climate commitments, including a recognition of the role of sustainable infrastructure for inclusive low-carbon growth. On the negative side of the ledger, the absence of an ongoing mandate for the Financial Stability Board (FSB) to address the impact of climate change on the global financial system is cause for grave concern. To guard against a further fracturing of the consensus needed for structural reforms—such as carbon pricing—G19 leaders and finance ministers must engage citizens, particularly young citizens, on how best to integrate economic, social, and climate policy.

Introduction

It could be said that the German G20 Presidency was characterized by a disquieting realization that the G20's focus on economic policy and economic opportunities through jobs must be reconsidered in light of the need to assure social cohesion. Since its formalization in the wake of the global financial crisis, the G20's focus has been on growth and structural reform to deliver the investment needed to underpin job creation. But this focus on economic progress as the primary means of assuring social cohesion, international cooperation, and strong democratic institutions is now in question.

In the words of Dennis Snower, the co-chair of the Think Tank 20 (T20), and the President of the Kiel Institute for the World Economy, "the world is economically integrated but socially fragmented . . . when economic and social progress becomes decoupled—as we commonly observe through growing income disparities, growing disempowerment and disintegrating social affiliations—then an exclusive preoccupation with economic policy issues is unlikely to quell the widespread public discontent" (Snower 2017, 1). In this sense, the German G20 presidency was accompanied by a crisis of confidence in the rules-based global order, which in turn is impacting how international and G20-specific climate matters will progress in G20 and treaty-based forums, including the United Nations Framework Convention on Climate Change (UNFCCC).

G20 countries are responsible for eighty per cent of global GDP and eighty per cent of greenhouse gas (GHG) emissions: these countries' adherence to their climate and energy commitments are therefore crucially important

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(Light and Steer 2017). This article focuses on climate policy commitments under the German G20 presidency.

As a result of the US decision to leave the Paris Agreement, climate change became a point of contention under the German G20 presidency. This was resolved through a G19 consensus under the Climate Action and Energy Plan for Growth (CEAG).

While the CEAG maintained the previous G20 commitment to aligning financial flows with the 2°C emissions target outlined in the Paris Agreement, German G20 declarations were silent on the FSB mandate to assess the potential risk posed by climate change to the global financial system. As important as it was to maintain progress in the Sherpa track climate-related matters in the CEAG and the Hamburg Leaders' Declaration, this step back from a commitment to the FSB's mandate on climate-related financial risk will make globally coordinated policies less likely. What this means is that there is a G20 coordination question at a time when global and national supervisory authorities for banking, insurance and equity markets begin to consider the impact of climate change on the stability of financial systems.

Similarly, the absence of a commitment to pricing carbon externalities, whether by G20 Finance Ministers', in the Hamburg Leaders' Declaration or the CEAG, suggest that G20 leaders and their finance ministers are only beginning to translate Paris Agreement commitments into national economic policies. Greater citizen engagement on climate budgets and the 2°C scenarios could provide G20 leaders with insights into how to implement fiscal and climate-related policies. Policies to be considered include: carbon prices and economic stimulus policies such as investing in infrastructure, while maintaining social cohesion for example through infrastructure that stimulates investment, fosters inclusion and enables progress against climate goals. The work of existing G20 stakeholder engagement groups such as the Youth 20, Women 20, Labour 20, Think Tank 20, Civil Society 20, and Business 20 can provide some of the foundation for such engagement.

In order to set the context for the G20 climate agenda, this article begins with an overview of past G20 climate milestones leading to the German G20 presidency. The next section analyses the extent to which climate and energy commitments on matters such fossil fuel subsidies, the alignment of long-term energy-infrastructure investment criteria with carbon budgets, and carbon pricing were included among commitments made at the Hamburg Summit. This is followed with addressing the absence of the FSB's ongoing mandate in the G20 discussions in 2017. The last section discusses the potential of more citizen engagement to support the G20 in addressing the global climate challenge.

Overview of past G20 Climate Milestones Leading to the German G20 Presidency

The G20 offers its members a mechanism for exploring and coordinating macro-economic, structural and financial policy reforms. With respect to climate change, until 2015, G20 leaders' declarations marked the progress that was made on translating climate change policy into the international treaty-based agreements that culminated in the Paris Agreement.

For example, at the September 2009 G20 leaders' meeting in Pittsburgh—a meeting at which the G20 was declared to be the premier forum for international economic cooperation—a commitment was made to successfully implementing the Copenhagen Agreement, the precursor to the Paris Agreement. Commitments were also made to support the creation of efficient global energy markets through the medium-term phase-out of inefficient fossil fuel subsidies and the extension of climate finance to poor countries through the World Bank. In addition, openness to sustainable and green growth was declared (G20 2009).

With these commitments, climate change was viewed not so much as a matter requiring structural change in all G20 economies but rather as an area in which advanced economies had a duty to support poorer countries as they adapted to climate change and established low-carbon energy systems. The concept of leveraging the long-term investments needed to address climate change as one of the growth drivers required to support productivity in advanced and emerging economies alike had yet to appear, nor had the view of climate policies as akin to structural economic reforms for both developed and developing countries.

Commitments to multilateral, treaty-based climate processes continued at the G20 meetings in Toronto (G20 2010a) and Seoul in 2010 (G20 2010 b), and in Cannes in 2011 (G20 2011). At these three Leaders meetings, G20 leaders pledged their support for the UNFCCC, as well as the meetings convened under the Conference of the Parties (COP) to the UNFCCC.

A change occurred in 2012 in Los Cabos, Mexico. There, for the first time, the economic impacts of climate change were described in the leaders' declaration: "Climate change will continue to have a significant impact on the world economy, and costs will be higher to the extent we delay additional action" (G20 2012). Also, in 2012 the G20 Leaders' Declaration recognized the need to build climate-related institutional capacity: "We welcome the creation of the G20 study group on climate finance, in order to consider ways to effectively mobilize resources taking into account the objectives, provisions and principles of the UNFCCC in line with the Cancun Agreement."

In 2013, at St Petersburg Russia, G20 leaders again recognized the work of treaty-based organizations, this time with regards to the climate-related impacts of hydrofluorocarbons: "We also support complementary initiatives, through multilateral approaches that include using the expertise and the institutions of the Montreal Protocol to phase down the production and consumption of hydrofluorocarbons (HFCs), based on the examination of economically viable and technically feasible alternatives" (G20 2013). The products of these working groups—including that of the G20 Climate Finance Working Group, struck at Los Cabos—were acknowledged by the G20. The fossil fuel subsidy file continued to move forward with a focus on peer review, and responsibility was placed on finance ministers to report on the progress of these reviews. Also at St Petersburg, momentum gathered on the importance of improving the investment environment for infrastructure as a strategy to heighten economic growth potential.

The goal of increasing investment in infrastructure was a major emphasis of the 2014 Brisbane Summit. The leaders' declaration recognized the work of the Secretary General of the United Nations to mobilize political will, but hedged in terms of the targeted outcome from COP21 (Paris) with a reference to "the successful adoption of a protocol, another legal instrument, or an agreed outcome with legal force under the convention applicable to all Parties" (G20 2014).

With its potential to stimulate growth, the emphasis was placed on transparency of infrastructure project pipelines to enable private-sector investment. However, there was still no explicit commitment to build new financial markets in both developed and developing countries in order to enable long-term investments in infrastructure. Neither was there a clear commitment to making infrastructure investment consistent with climate change goals, given the sizeable investments needed to underpin Paris Agreement GHG emissions targets. However, in the realm of international development, climate and finance were connected in references to operationalizing the commitments made in the Cancun Agreement (UNFCCC 2011) through the Green Climate Fund (G20 2014).

Under Turkey's G20 presidency, a qualitative shift occurred regarding the integration of climate change matters into economic policy. At their meeting on September 5, 2015, G20 finance ministers and central bankers asked the FSB to consider the risks posed to the financial system by climate change (Bak 2017 p1). The FSB's role, as recommended by finance ministers and central bank leaders, was reflected in the Antalya Leaders' Declaration with this pivotal statement: "We ask the FSB to continue to engage with public- and private-sector participants on how the financial sector can take account of climate change risks" (G20 2015). Infrastructure investments, on the other hand, continued to be viewed through the lens of growth and without criteria to assess their suitability to climate change mitigation or adaptation, or indeed, their potential to improve social inclusion.

Following the agreement to ratify the treaty-based Paris Agreement, in December 2015, significant progress was made on climate change under China's G20 presidency through qualitatively new observations and commitments. In the Hangzhou Leaders' Declaration, climate-related global progress and challenges were called out: "Climate change is one of the greatest challenges facing the world today. We welcomed the adoption of the Paris Agreement at the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change ... and were satisfied that G20 members had played a key role in facilitating this progress" (G20 2016).

The Hangzhou Leaders' Declaration also reflected the fruitful initiatives to define how elements of the financial system should be aligned with Paris Agreement commitments. For example, the declaration included the following: "We believe efforts could be made to provide clear strategic policy signals and frameworks, promote voluntary principles for green finance, expand learning networks for capacity building, support the development of local green bond markets, promote international collaboration to facilitate cross-border investment in green bonds, encourage and facilitate knowledge sharing on environmental and financial risks, and improve the measurement of green finance activities and their impacts." (G20 2016)

China's G20 presidency also produced more specific language on the evaluation characteristics that "quality" infrastructure could possess, which included references to the environment and life-cycle cost assessments which laid the ground-work for shadow carbon pricing in the evaluation of infrastructure: "We stress the importance of quality infrastructure investment, which aims to ensure economic efficiency in view of life-cycle cost, safety, resilience against natural disaster, job creation, capacity building, and transfer of expertise and know-how on mutually agreed terms and conditions, while addressing social and environmental impacts and aligning with economic and development strategies." (G20 2016)

The Hangzhou Leaders' Declaration was silent on unwinding fossil fuel subsidies. Rather it made reference to natural gas: "given that natural gas is a less emission-intensive fossil fuel, we will enhance collaboration on solutions that promote natural gas extraction, transportation, and processing in a manner that minimizes environmental impacts. We stress the importance of diversification of energy sources and routes."(G20 2016)

In summary, China's G20 presidency marked important progress on: connecting economic policy and climate policy through agreement on the alignment of financial flows with climate commitments, criteria for infrastructure investment that addresses both environmental and economic goals, and the development of natural gas markets and infrastructure to provide greater access to less carbon-intensive fossil fuels than coal. Climate change commitments were being integrated into structural economic commitments on financial and energy systems as well as macro-economic policies for investment including infrastructure.

As a result of a crisis of confidence, along with an acknowledgement of the decoupling of economic and social progress, the German G20 presidency coincided with a levelling among G20 governments: leaders of advanced economies faced political pressures not dissimilar to those faced by the leaders of emerging economies with still-developing institutional capacities. The tone changed in Hamburg.

The pressures faced by these advanced economies now include: extra-sovereign interference in elections, identity politics, nativism, and nationalism. These pressures are in addition to those brought on by health epidemics such as the opioid crisis, and more broadly, social polarization, including on issues around climate change and energy. The challenges faced by G20 leaders, and the threat of polarization, will likely require much deeper engagement with citizens at multiple levels, including on how climate change policies can be put to the service of providing a better life for all.

The German G20 Presidency and the Climate Agenda

The U.S.'s stance dominated Germany's G20 climate agenda—a fact noted in the Hamburg G20 Leaders' Declaration, which recognized the U.S. position on the Paris Agreement and energy policy:

> We take note of the decision of the United States of America to withdraw from the Paris Agreement. The United States of America announced it will immediately cease the implementation of its current nationally-determined contribution and affirms its strong commitment to an approach that lowers emissions while supporting economic growth and improving energy security needs.
>
> The United States of America states it will endeavour to work closely with other countries to help them access and use fossil fuels more cleanly and efficiently and help deploy renewable and other clean energy sources, given the importance of energy access and security in their nationally-determined contributions. (German G20 Presidency 2017f)

Despite these significant headwinds, the German G20 presidency produced the CEAG, which reiterated unmet commitments on the phasing-out of fossil fuel subsidies, and more recent commitments to align financial flow with Paris Agreement commitments. This declaration which represented a G19 rather than a G20 consensus, was the first of its kind. The CEAG laid foundations for both emerging and advanced economies to: recognize the necessity of leveraging investment in energy generation, energy distribution, transportation, and energy efficiency infrastructure for a reinforcing system of enhanced investment; and achievement of climate change commitments. In this regard, the OECD's "Investing in Climate, Investing in Growth" was welcomed (OECD 2017).

The pressures faced by G20 leaders, coupled with US policies, may have led to an increase in engagement by civil-society representatives from G20 countries under the German G20 presidency. The result is an array of texts, including the Annual Progress Report on G20 Development Commitments (German G20 Presidency 2017c), as well as the statements on the G20 Resource Efficiency Dialogue, and the G20 Africa Partnership (German G20 Presidency 2017a, 2017b). Though not part of the G20 Leaders' Declaration, this breadth of work products suggests a recognition on the part of some G20 countries that, because of climate change, the challenges faced by advanced and emerging G20 economies are more connected than was previously expressed.

For instance, the changing climate is now recognized as a root cause of geopolitical conflict that has led millions of people to flee their homes in the Middle East and Africa and seek refuge in Europe (Mobjörk et al. 2016). Also, climate change is now known to lead to the "apocalyptic" atmospheric conditions in China resulting from electricity and the heat generated from coal, conditions that citizens have demand be addressed and that Chinese leaders have made a nation-wide priority (Needham 2017). In the second part of the U.S. National Climate Assessment, which is due out in 2018, the impacts of climate change on local communities and citizens will be explained including the sharp rise in tidal flooding (Plumer 2017).

Under the German G20 presidency, the recognition of even greater global interdependence was also reflected by, among other signs, the number of ministerial meetings[1], and the depth and breadth of stakeholder dialogues and meetings.[2] In the face of this broad and deep engagement, there were six Sherpa track ministerial meetings.

Within G20 international development commitments, there was progress on recognizing the need both to bring infrastructure investments in line with climate commitments and guarantee their resilience to climate change. As such, a commitment to sustainable infrastructure was included in the German G20 presidency's international development commitments. Sustainable infrastructure would exclude coal-powered electricity plants. Other climate-related development references were made in the "The Hamburg Update: Taking Forward the G20 Action Plan on the 2030 Agenda" (G20 2030 Agenda), as well as the Progress Report of the Development Working Group (DWG) (Germany G20 presidency 2017g).

The U.S. departure from climate-related international agreements coincided with a recognition among EU member states of the need to create a sustainable finance "union" (European Commission 2016). Such a union is now

[1]*Under the German G20 Presidency, ministerial meetings were held for agriculture, foreign affairs, finance, digitalization, labour, and health, but not for climate change and energy (See German G20 Presidency 2017h).*

[2]*Civil-society dialogues were held for science, women, labour, think tanks, youth, and civil society. In addition, formal meetings were held for the business engagement group (B20) (German G20 Presidency 2017d).*

viewed as a Pan-European vehicle that could stimulate both the investment needed for growth and economic integration through shared infrastructure. Finance for sustainable long-term investments, including in infrastructure, would aim to deliver the triple benefit of stimulating growth, improving citizens' daily lives, and supporting the attainment of national climate commitments via energy, transportation, water, and digital infrastructure.

Where broad citizen support for climate action may ebb and flow, sustainable and inclusive infrastructure investment could provide a path for the attainment of Paris Agreement commitments at a politically acceptable price, particularly if long-term investors and public financial institutions are bound by a commitment to make their investments consistent with the Paris Agreement (Bhattacharya et al. 2016). Such investments by Germany would also address EU pressures to invest in mechanisms that stimulate European growth and integration.

The CEAG makes reference both to sustainable and unsustainable infrastructure investments, such as those in coal power plants:

> We recognise that long-term low greenhouse gas emission development strategies may inform our investments, inter alia in infrastructure.
>
> Significant investments will be required in the upcoming 15 years for establishing and modernising infrastructure. In light of different national circumstances, this can constitute significant opportunities for stimulating employment, poverty eradication and growth through the transformation towards sustainable, low greenhouse gas emission and climate resilient infrastructure. (CEAG 2017)

Whereas efforts to put sustainable infrastructure onto the G20 agenda were successful, the push to include a reference to market mechanisms to price carbon was not. This was the case despite policy input from the T20, including through publications addressed to Finance Ministers that proposed an integrated approach to carbon pricing, sustainable infrastructure and green finance, which started with the following call to action:

> There is no longer a choice between climate policy and no climate policy. G20 finance ministers have to play a key role in implementing smart climate policies like carbon pricing. Yet they remain reluctant to take advantage of the merits of carbon pricing for sound fiscal policy. (Edenhoffer et al. 2017, 1)

Support for carbon pricing was also front and centre in the Statement on the Withdrawal of the United States from the Paris Climate Agreement by the Business 20, Civil Society 20, Labour 20, T20, Women 20, and Foundations 20: "The G20 should collectively drive towards effective and globally converging carbon pricing mechanisms . . . and report progress on an annual basis. These factors are essential to direct infrastructure investments towards low-carbon and energy-efficient technologies. The G20 should share best practices for the use of the revenues from carbon pricing and the redistribution of savings from fossil fuel subsidies reforms to ensure a just transition that benefits all." (B20 et al. 2017)

Despite unanimous support from all parts of civil society, mechanisms to price carbon were not included in the G19 CEAG. Why is this? Recent research on G20 climate commitments points to greater compliance when a climate and energy ministerial ministers meeting is held (Kirton et al. 2017). The fact that carbon pricing was not included as a G20 commitment in 2017 may reflect the decision not to seek out ministerial input on climate under the German G20 presidency. This in turn may reflect the fact that the United States only announced its departure from the Paris Agreement a few weeks before the Hamburg leaders' meeting and the lack of time for the G19 to coalesce around the climate agenda, including via a ministerial climate and energy meeting. When considering the G19 leaders' reticence to make a commitment to carbon pricing, it is instructive to consider the arc of statements made on fossil fuel subsidies.

The elimination of fossil fuel subsidies has been a G20 "commitment" for nearly a decade. In the Pittsburgh leaders' declaration, for example, the text reads as follows:

> The Organization for Economic Cooperation and Development (OECD) and the IEA have found that eliminating fossil fuel subsidies by 2020 would reduce global greenhouse gas emissions in 2050 by ten percent. Many countries are reducing fossil fuel subsidies while preventing adverse impact on the poorest. (G20 2009, para. 28)

In 2017, the phase-out of fossil fuel subsidies was included not in the text of the G20 Leaders' Declaration, but rather in the CEAG. Eight years later, it amounts to a more detailed version of the 2009 text:

> Inefficient fossil fuel subsidies (IFFS) that encourage wasteful consumption distort energy markets, impede investment in clean energy sources, place a strain on public budgets, and incentivise unsustainable infrastructure investments. Providing those in need with essential energy services, including the use of targeted cash transfers and other appropriate mechanisms, however, is still important. The US-Chinese peer review on IFFS was concluded, the German-Mexican peer review is ongoing and Indonesia and Italy have announced the continuation of their respective voluntary processes. (German G20 Presidency 2017f)

In reference to the CEAG text on fossil fuel subsidies, we note that all but six G20 countries have not undertaken peer review of fossil fuel subsidies, and looking back, we also note that there is no mention of fossil fuel subsidies in the G20 Leaders Declaration from Toronto (G20 2010a). Canada's Auditor General and its Environment Commissioner have each called upon the Minister of Finance to report on national fossil fuel subsidies as a precursor of a joint review (Office of the Auditor General 2017).

In the joint B20-C20-L20-T20-W20-Y20-F20 statement, these stakeholder groups directly addressed the phase-out of fossil fuel subsidies, stating that G20 leaders should "agree on a concrete and ambitious timeline for phasing-out (inefficient) fossil fuel subsidies."(B20 et al. 2017) The C20 and T20 called for a phase-out of fossil fuel subsidies by 2020 and 2022, respectively, while the B20 called for governments to agree to a timeline (B20 et al. 2017). This approach calling for specific timelines is aligned with the findings on the fulfilment of G20 climate policy commitments (Kirton et al. 2017).

Over the past eight years, within fourteen G20 Finance Ministries, there has been insufficient time and will to build capacity to identify and address fiscal measures such as fossil fuel subsidies. This suggests that a different approach will be needed to integrate carbon pricing into G20 governments' fiscal planning processes.

Addressing Climate-Related Financial Risk

At their meeting on September 5, 2015, in Antalya, Turkey, G20 finance ministers, and central bankers requested that the FSB—which was formally constituted at the Pittsburgh G20 Leaders' meeting in 2009—examine the risks to the global financial system posed by climate change. In response, the private-sector-led Taskforce on Climate-related Financial Risk Disclosure (TCFD) was formed, with Michael Bloomberg as chair.

The TCFD is comprised of 32 members, chosen by the FSB, covering a range of financial sectors and markets. Its first mandate was to develop guidelines for climate-related financial risk disclosures for companies to provide continuous disclosure on material business risks caused by climate change; it was aimed primarily at capital markets, including asset owners and managers, lenders, insurers, and other stakeholders.

The G20 finance ministers and central bankers met on March 18, 2017, in Baden-Baden, Germany, but—unlike their meeting in 2016, in Chengdu, China—there was no mention in their final communiqué of climate change and the material risks it poses to the planet, and therefore to the stability of the global financial system. In noteworthy timing, the TCFD's report was released on March 31, 2017, after the Baden-Baden meeting (G20 2017). More worrisome still, the work of the FSB's TCFD, commissioned through the FSB by the G20, was not referred to in the G19's CEAG.

To improve transparency in financial markets, in its report, the TCFD made recommendations for enhanced and consistent disclosure by financial entities. The phase 1 report established three levels of climate-related financial disclosure based on the following benchmarks: how business models contribute to climate change, including the emissions from corporations and their supply chains and the positive impact of practices that reduce carbon emissions on the risk associated with transitioning to low-carbon business models and strategies; how climate change will affect the resilience of investments, including physical risks associated with fires and extreme weather events; and what climate scenarios (and inherent global carbon budgets) are used to assess the climate resilience and impact of business models.

Lack of disclosure around climate risk information creates challenges for investors trying to determine the physical, transition/regulatory, and reputational risks associated with climate change. Reporting by the companies, which are among the assets pension funds hold, is currently done on a voluntary basis, and it differs across industries and regions. Capital market regulators may decide that under their mandate to ensure investor protection, mandatory disclosure of climate-related financial risk would protect investors against stranded assets. Financial system regulators may consider that enhanced accounting norms and standards on climate-related disclosure would guard against the dangers of tipping points and support financial stability. Legal bodies may consider that climate-related risk be included in fiduciary duties. Today, only five per cent of the world's 500 largest institutional investors have implemented policies with their investment managers that monitor stranded-asset risk (Bouvet, Kirjanas and Sheppard 2016).

The G19's lack of endorsement of the TCFD recommendations jeopardizes, it would seem, the FSB's future climate-related mandates. To take one example, the lack of consensus on climate-related financial risk among G20 finance ministers and central bankers has meant that the FSB was not mandated, and may not receive future mandates, to establish harmonized mechanisms. This could include such things as definitions of materiality for continuous disclosure of climate-related financial risk, the use of shadow carbon pricing[3] to assess infrastructure investments, the impact of carbon pricing on the rules that govern global trade, the creation of standards for green bonds, and the use of green finance to offset climate-related financial risk in the financial system, or the implications for prudential policy.

FSB chair Mark Carney's remarks, included in "Breaking the Tragedy of the Horizon – climate change and financial stability," bear repeating: "The horizon for monetary policy extends out to 2–3 years. For financial stability, it is a bit longer, but typically only to the outer boundaries of the credit cycle—about a decade. In other words, once climate change becomes a defining issue for financial stability, it may already be too late." (Carney 2015)

If the G20—or G19—does not stand behind the FSB's mandate to address long-term climate-related financial risk, other international fora should be sought out if the FSB cannot—through a breakdown in G20 consensus on climate change—fulfil this role.

The Global Carbon Budget, Citizens, and Sustainable Infrastructure

As discussed above, no progress was made during the German G20 presidency on building a consensus on the need to internalize the cost of GHG pollution into the economy through carbon pricing. This structural agenda item has been the subject of mobilization initiatives, such as the Carbon Pricing Leadership Coalition (CPLC), which was launched by the World Bank in Paris at the start of the negotiations that led to the Paris Agreement, and which brings together leaders from across government, the private sector, academia, and civil society to expand the use of carbon pricing policies.

For market mechanisms that address climate change to be translated into future G20 commitments, a number of possible criteria for successful global cooperation should be considered. Mike Callaghan, a former director of Australia's Lowy Institute, and Executive Director, International, in the Australian Treasury from 2008 until 2012 and also Australia's G20 Finance Deputy, has listed a number of conditions for achieving international economic cooperation (Callaghan 2015). These are: broad agreement on the underlying problem, a clear idea of the course of action each country should take, a mechanism to monitor performance, international bodies to advance this work, and, finally, the ramping up of public pressure so that governments act.

In regards to climate change, there is broad agreement on the underlying problem and on the need to act to stem the problem: the Paris Agreement is proof. However, the way in which the agreement is being translated into economic and political commitments may be hampering G20 leaders' ability to act. Could building a consensus around global carbon and eventually local budgets provide the foundation for a consensus on the necessity of international cooperation on carbon pricing, as a foundation for implementation

[3] *Shadow pricing is defined as a way to evaluate potential investments: "This approach attaches a hypothetical or assumed cost for carbon emissions—for example US \$30 per metric tonne of CO_2-equivalent (MTCO2e)—to better understand the potential impact of external carbon pricing on the profitability of a project. Companies also create a range of shadow prices to test sensitivities or build them into financial models with various assumptions, probabilities, and discount rates" (United Nations Global Compact, United Nations Environment Programme and the secretariat of the United Nations Framework Convention on Climate Change 2015).*

of the Paris Agreement, and, eventually, the required strong structural reform agenda?

There is already a scientific consensus on the global carbon budget. To keep the global temperature increase to less than 2°C with a 66 per cent chance,[4] the emission of carbon into the atmosphere needs to be limited to roughly 800 gigatons of carbon dioxide ($GtCO_2$) from 2015. However, the nationally determined contributions (NDCs) pledged under the Paris Agreement would consume 600 $GtCO_2$ by 2030, whereas the 800 gigatons budget is the total for all CO_2 emissions for all time (Intergovernmental Panel on Climate Change [IPCC] 2014) with a two-thirds probability of success. See figure 1. NDCs pledged under the Paris Agreement, plus the planned coal power plants in the developing world, would take us over the 800 gigaton limit—and yet international financial institutions continue to finance the construction of coal power plants with public funds (Edenhofer, Flachsland, and Kornek 2016).

Strengthening society's, including the private sector's, understanding of the global carbon budget at different levels of likelihood, the impact of climate change on communities, and eventually translating these to the lives of citizens, is one way to establish the transparency and civic engagement needed for a deeper level of agreement on the underlying problem. It would also represent progress on two additional conditions for successful international cooperation—namely a clear idea of the course of action each country should take and a ramping up of public pressure so that governments act on the structural reforms needed to achieve economic growth within the planet's carrying capacity. Some countries may wish to undertake the translation of global and national carbon budgets to the community level via their use of the UN's 2030 Sustainable Development Goals.

Foundations to engage citizens in the process of translating climate goals to the community level, can be seen in the Hamburg Leaders Declaration. References to climate change were included in its preamble – where it was enumerated after job creation but before gender equality – as part of the many challenges facing the global community:

> We are resolved to tackle common challenges to the global community, including terrorism, displacement, poverty, hunger and health threats, job creation, climate change, energy security, and inequality including gender inequality, as a basis for sustainable development and stability. We will continue to work together with others, including developing countries, to address these challenges, building on the rules-based international order. (German G20 Presidency 2017f)

In keeping with a broader narrative on climate change, the Hamburg Leaders' Declaration included references to Energy and Climate under the heading "Improving Sustainable Livelihoods". In so doing, it presents a new narrative focus on the opportunities for economic growth presented by the investments required to address climate change. The Hamburg Leaders' Declaration also reiterated the dual multilateral frameworks of the Paris Agreement and the UN 2030 Sustainable Development Goals (German G20 Presidency 2017f).

[4]*For an estimate of the Earth's carbon budget with a greater degree of certainty than 66 per cent, see the Mercator Research Institute on Global Commons and Climate Change Carbon Clock. The Lower Estimate, associated with greater certainty, has a carbon budget of 350 $GtCO_2$. https://www.mcc-berlin.net/en/research/co2-budget.html (accessed November 5, 2017).*

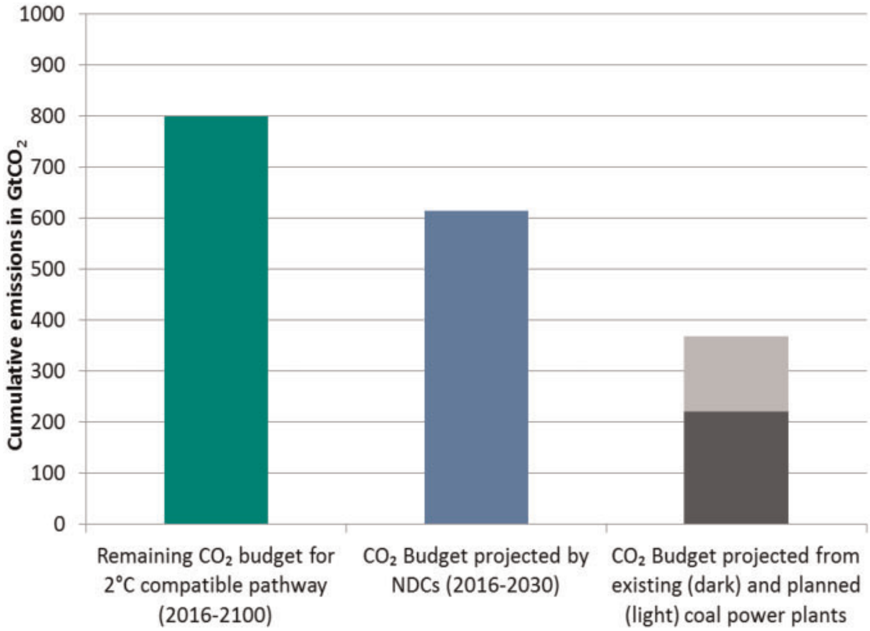

Figure 1 CO_2 budget (Bak et al. 2017). Towards a comprehensive approach to climate policy, sustainable infrastructure and finance.

Sustainable infrastructure contributing a better life for all was subsequently taken up as part of the Hamburg Leaders' Declaration on the Africa Partnership:

> We welcome the outcomes of the G20 Africa Partnership Conference in Berlin, which highlighted the need for joint measures to enhance sustainable infrastructure, improve investment frameworks as well as support education and capacity building. Individual priorities for "Investment Compacts" were put forward by Côte d'Ivoire, Ethiopia, Ghana, Morocco, Rwanda, Senegal and Tunisia. Led by the respective African countries, the African Development Bank, IMF and WBG as well as the G20 and other partners, these Compacts aim to mobilise private investment as well as promote efficient use of public funding. (German G20 Presidency 2017a)

These proposals aim to support developing countries as they seek to provide their citizens with energy security and energy access that is not locked into GHG-intensive long-term investments in new coal-fired power plants and related logistics infrastructure. All coal exporters, be it Poland, Indonesia, Australia, the United States, or China, will seek markets for coal, as G20 members—including China—substitute coal for renewable energy and natural gas electricity plants within their energy mixes.

The Hamburg Leader's Declaration also included a broader reference to infrastructure as part of the mutual reinforcement of a strong economy and a healthy planet. This is part of an emerging consensus on the need to contribute to the betterment of society by promoting long-term investment for growth and embracing the opportunity presented by infrastructure projects that reduce GHG emissions. This alignment of goals is being realized in emerging and advanced economies alike.

Developing countries are under pressure to provide first access to citizens of electricity. This makes remarkable, the progress report on development commitments, which referred to sustainable infrastructure as part of the

Cross-Cutting Infrastructure Dialogue. Recognition is due to the leadership of this forum which aims to "promote a policy dialogue with Low Income Countries, Multilateral Development Banks, regional institutions, investors and relevant stakeholders on cross-cutting infrastructure issues requiring joint inputs from both groups" (Germany G20 Presidency 2017h). This forum's progress report included a reference to sustainable and resilient infrastructure:

> A first joint report using the agreed terms and methodology was published ahead of the 2017 Global Infrastructure Forum (GIF). The 2017 GIF focused on jointly supporting the effectiveness of resources to plan, execute, supervise, and evaluate sustainable and resilient infrastructure. It was hosted by the Inter-American Development Bank (IADB) and is expected to expand the participation to include additional regional development banks and national development finance institutions (DFIs).(Global Infrastructure Forum 2017)

This sustainable infrastructure policy agenda would require that infrastructure investments be subjected to lifecycle cost assessments and to ensure that they meet a double climate test while at the same time meeting society's goals. The first test would require that infrastructure function to advance GHG-reduction commitments under the Paris Agreement, while the second would require that infrastructure be resilient to weather, fire, and other adverse events resulting from climate change. Lifecycle cost assessments would be a mechanism to apply a shadow carbon price on the returns of a given infrastructure project.

As an example, budgets for investments in public buildings would accommodate energy specifications consistent with national GHG-reduction plans and criteria to ensure resilience to climate-related weather events. Similarly, investments in public transportation infrastructure would be subject to an internalized price on carbon, and this public transportation would also have to demonstrate a resilience to climate change. At the same time, the implementation of lifecycle-assessment criteria for long-term investments would create new opportunities for long-term investments that are consistent with Paris Agreement commitments and recommendations by the TCFD. The criteria would support the reforms to financial markets needed to meet climate goals.

While the policy proposal by developing countries make the case for long-term infrastructure investments that are consistent with Paris Agreement commitments, the G20 has not yet reached this consensus. Within the G19's CEAG, references were made to infrastructure investments as part of the energy and climate text, although the qualifier "sustainable" did not appear and with a statement that advocated "balance", a far weaker statement than one committing to progress.

> In facilitating well-balanced and economically viable long-term strategies and signals for investments in order to continually transform and enhance our economies and energy systems, G20 members will collaborate closely and balance a number of important factors, including inter alia energy security, energy access, infrastructure, environmental protection, poverty reduction, good health, quality education and quality job creation.

> Welcoming the progress made under prior G20 Presidencies, in particular our Leaders' commitment from Hangzhou to identify new and sustainable drivers of growth, we take note of the OECD's report "Investing in Climate, Investing in Growth" (OECD 2017), the IEA/IRENA report "Perspectives for the Energy Transition: Investment Needs for a Low Carbon Energy System" (IEA 2017) as

well as the World Bank report "Sovereign Climate and Disaster Risk Pooling – Joining Forces to Manage Climate and Disaster Risks". (World Bank Group 2017)

Citizens and the Integration of Climate, Social, and Economic Policy—New G20 Climate Change Policy Agenda in 2017

It would seem that until there is a deeper understanding of climate change within societies, G20 leaders and their finance ministers will act as a break on progress, even if the remaining conditions for international cooperation are fulfilled. These conditions are a mechanism to monitor performance—namely Paris Agreement commitments and NDCs, and international bodies to advance this work, such as the UN Framework on Climate Change and the UN Environment Program's Intergovernmental Panel on Climate Change, which is now in its sixth assessment report.

The shared aspirations that made the Paris Agreement possible, coupled with the enhanced country-level commitment to climate action expressed in individual nations' NDCs, mean that governments must now turn their attention to implementing robust climate measures, including the alignment of policies with strategies to keep the global temperature increase to under 2°C with ambition to restrict warming to 1.5°C. Resilient and sustainable infrastructure investments represent one such opportunity. Citizens are more likely to act on preparing for the risks brought on by climate change, such as the risk of floods, when efforts are made to increase public awareness. (Thieken et al. 2016).

Going forward, an approach that combines a societal understanding of global and national carbon budgets, the risks associated with each, and engagement of citizens in infrastructure planning as a vehicle for sustainable growth and the improvement of citizens' quality of life, could offer fruitful pathways. Jurisdictions such as the EU have identified €180 billion in additional yearly capital investments needed to keep the increase in global temperatures to well below 2°C. In addition to delivering the transition to a low-carbon, more resource efficient, and more circular economy, this investment is seen as vital to sustainable and inclusive growth, including to support inclusion provided by infrastructure, which over time, will result in greater economic inclusion. (European Commission 2016) Carbon prices can be a source of public capital in a blended finance approach that funds sustainable infrastructure. (Edenhoffer 2017).

Citizens will be more likely to take action and responsibility for climate change if they have access to local context and experts to frame choices. Greater engagement of citizens to shape their own destiny may provide the legitimacy needed to make progress on commitments in a carbon constrained world. This approach requires G20 leaders and their finance ministers to "put their own emergency oxygen masks on first", as it were, so that, having engaged their own citizens directly, they may be better able to cooperate internationally in the attainment of global climate and economic goals.

It could be said that the German G20 presidency was characterized by a disquieting realization that the G20's focus on economic policy and economic opportunities through jobs must be reconsidered in light of the need to assure social cohesion. Since its formalization in the wake of the global financial crisis, the G20's focus has been on structural reform and on regulating financial activity to deliver the investment needed to underpin job creation, productivity, and growth. It also dutifully recognized efforts to make progress on treaty-based multilateral initiatives. However, this focus on globalization and economic progress as primary means to assure social cohesion, international cooperation, and strong democratic institutions has come into question. Engaging with citizens on how to reconcile carbon budgets within our communities and our homes would provide the impetus for action needed to make progress on the commitments made under the Paris Agreement by translating these lofty ideals into citizen daily lives.

Works Cited

Bak, C. 2017. Can Canada step into the breach? Addressing climate-related financial risk and growing green finance. CIGI Policy Brief No. 110. Waterloo: Centre for International Governance Innovation. Retrieved from https://www.cigionline.org/sites/default/files/documents/PB%20no110web_1.pdf (accessed November 5, 2017).

Bak, C., A. Bhattacharya, O. Edenhofer and B. Knopf. 2017. Towards a comprehensive approach to climate policy, sustainable infrastructure, and finance. *G20 Insights* 16 May. Retrieved from www.g20-insights.org/policy_briefs/towards-comprehensive-approach-climate-policy-sustainable-infrastructure-finance/ (accessed November 5, 2017).

Bhattacharya, A., J. P. Meltzer, J. Oppenheim, Z. Qureshi, and N. Stern. 2016. *Delivering on sustainable infrastructure for better development and better climate.* The Brookings Institution, the Global Commission on the Economy and Climate and the Grantham Research Institute on Climate Change and the Environment. Retrieved from www.brookings.edu/wp-content/uploads/2016/12/global_122316_delivering-on-sustainable-infrastructure.pdf (accessed November 5, 2017).

Bouvet, L., P. Kirjanas, and J Sheppard. 2016. *Global Asset 500 Index 2016: Rating the world's investors on climate related financial risk.* London: Asset Owners Disclosure Project. Retrieved from http://aodproject.net/wp-content/uploads/2016/05/AODP-GLOBAL-CLIMATE-INDEX-2016-view.pdf (accessed November 5, 2017).

B20, C20, L20, T20, W20, Y20 and F20. 2017. Statement on the withdrawal of the United States from the Paris climate agreement. Retrieved from https://www.b20germany.org/fileadmin/user_upload/News/joint_statement-B20_C20_L20_T20_W20_F20-paris_agreement.pdf (accessed November 5, 2017).

Callaghan, M. 2015. The Brisbane G20 Summit: Was it more than just a talkfest? In *The G20 and the Future of International Economic Governance, ed.* M. Callaghan and T. Sainsbury, 21–38. Sydney: University of New South Wales Press.

Carney, M. 2015. Breaking the tragedy of the horizon – climate change and financial stability. Speech given at Lloyd's of London, London, England, 29 September. Retrieved from www.bankofengland.co.uk/publications/Documents/speeches/2015/speech844.pdf (accessed November 5, 2017).

Edenhofer, O., B. Knopf, C. Bak, and A. Bhattacharya 2017. Aligning climate policy with finance ministers' G20 agenda. *Nature Climate Change* 4:Retrieved from https://www.nature.com/articles/nclimate3331 (accessed November 5, 2017).

Edenhofer, O., C. Flachsland, and U. Kornek. 2016. Der Grundriss für ein neues Klimaregime. *Ifo Schnelldienst* 3:Retreived from https://www.cesifo-group.de/DocDL/sd-2016-03-2016-2-11.pdf (accessed November 5, 2017).

European Commission. 2016. Commission decision of 28.10.2016 on the creation of a High-Level Expert Group on Sustainable Finance in the context of the Capital Markets Union. Brussels, 28 October. Retrieved from https://ec.europa.eu/info/system/files/161028-decision_en.pdf (accessed November 5, 2017).

German G20 Presidency 2017a. Annex to G20 Leaders Declaration: G20 Africa Partnership. Hamburg, 28 July. Retrieved from http://www.g20.utoronto.ca/2017/2017-g20-annex-partnership-africa.html (accessed November 5, 2017).

German G20 Presidency 2017b. Annex to G20 Leaderś Declaration: G20 Resource Efficiency Dialogue. Hamburg, 8 July. Retrieved from https://www.g20.org/Content/DE/_Anlagen/G7_G20/2017-g20-resource-efficiency-dialogue-en.pdf?__blob=publicationFile&v=4 (accessed November 5, 2017).

German G20 Presidency 2017c, June. Annex to G20 leaderś declaration: Hamburg Annual Progress Report on G20 Development Commitments. Hamburg, n.d. Retrieved from https://www.g20.org/Content/DE/_Anlagen/G7_G20/2017-g20-hamburg-annual-progress-report-en.pdf; jsessionid=5CBEB7CF33AF1B6EEB983EC09D8CA7BF.s1t1?__blob=publicationFile&v=5 (accessed November 5, 2017).

German G20 Presidency 2017d. Dialogue with civil society. Hamburg, n.d. Retrieved from https://www.g20.org/Webs/G20/EN/G20/Civil_society/civil_society_node.html; jsessionid=8E107D0291C93CE98FFC50DC5653CB14.s4t1 (accessed November 5, 2017).

German G20 Presidency. 2017e, July. G20 Hamburg climate and energy action plan for growth. Hamburg, n.d. Retrieved from http://www.g20.utoronto.ca/2017/2017-g20-climate-and-energy-en.pdf (accessed November 5, 2017).

German G20 Presidency. 2017f. G20 Leaderś declaration: Shaping an interconnected world. Hamburg, 7–8 July. Retrieved from http://www.g20.utoronto.ca/2017/2017-G20-leaders-declaration.pdf (accessed November 5, 2017).

German G20 Presidency. 2017g. Hamburg update: Taking forward the G20 Action Plan on the 2030 agenda for sustainable development. Hamburg, 8 July. Retrieved from http://www.g20.utoronto.ca/2017/2017-g20-hamburg-update.html (accessed November 5, 2017).

German G20 Presidency. 2017h. Ministers meetings and workings groups. Hamburg, n.d. Retrieved from https://www.g20.org/Webs/G20/EN/G20/meeting_ministers/meetings_ministers_node.html; jsessionid=8E107D0291C93CE98FFC50DC5653CB14.s4t1 (accessed November 5, 2017).

Global Infrastructure Forum. 2017. Outcome statement. New York, 22 April. Retrieved from http://www.un.org/esa/ffd/wp-content/uploads/2017/01/2017_gi_forum_outcome_statement_final.pdf (accessed November 5, 2017).

G20 Development Working Group. 2017. Hamburg Annual Progress Report on G20 Developments Commitments. Hamburg, n.d. Retrieved from http://www.g20.utoronto.ca/2017/2017-g20-hamburg-annual-progress-report-en.pdf (accessed November 5, 2017).

G20 Finance Ministers and Central Bank Governors. 2016. Communiqué: G20 Finance Ministers and Central Bank Governors Meeting. Chengdu, 24 July. Retrieved from www.g20.utoronto.ca/2016/160723-finance.html. (accessed November 5, 2017).

G20. 2009. The G20 Pittsburgh Summit Commitments. Pittsburgh, 24–25 September. Retrieved from http://www.g20.utoronto.ca/analysis/commitments-09-pittsburgh.html (accessed November 5, 2017).

G20. 2010a. The G-20 Toronto Summit Declaration. Toronto, 27 June. Retrieved from http://www.g20.utoronto.ca/2010/to-communique.html (accessed November 5, 2017).

G20. 2010b. The Seoul Summit Document. Seoul, n.d. Retrieved from http://www.g20.utoronto.ca/2010/g20seoul-doc.pdf (accessed November 5, 2017).

G20. 2011. Cannes Summit Final Declaration – building our common future: Renewed collective action for the benefit of all. Cannes, 4 November. Retrieved from http://www.g20.utoronto.ca/2011/2011-cannes-declaration-111104-en.html.

G20. 2012. G20 leaders declaration. Los Cabos, 19 June. Retrieved from http://www.g20.utoronto.ca/2012/2012-0619-loscabos.pdf (accessed November 5, 2017).

G20. 2013. G20 leaders' declaration. St Petersburg, n.d. Retrieved from http://www.g20.utoronto.ca/2013/Saint_Petersburg_Declaration_ENG.pdf (accessed November 5, 2017).

G20. 2014. G20 leaders' declaration. Brisbane, 16 November. Retrieved from http://www.g20.utoronto.ca/2014/2014-1116-communique.html (accessed November 5, 2017).

G20. 2015. G20 leaders' communiqué. Antalya, 15–16 November. Retrieved from http://www.g20.utoronto.ca/2015/151116-communique.pdf (accessed November 5, 2017).

G20. 2016. G20 leaders' Communiqué. Hangzhou, 5 September. Retrieved from http://www.g20.utoronto.ca/2016/160905-communique.html (accessed November 5, 2017).

G20. 2017. G20 Finance Ministers and Central Bank Governors Meeting. Baden-Baden, 18 March. Retrieved from http://www.g20.utoronto.ca/2017/170318-finance-en.html (accessed November 5, 2017).

International Energy Agency [IEA] 2017. *Perspectives for the energy transition.* Paris: IEA. Retrieved from https://www.iea.org/publications/insights/insightpublications/perspectives-for-the-energy-transition.html (accessed November 5, 2017).

Intergovernmental Panel on Climate Change [IPCC]. 2014. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Core Writing Team, Pachauri R. and L Meyer. Geneva: IPCC.

Kirton, J., B. Warren, and M. Koch. 2017. *Improving G20 compliance to control climate change.* Toronto: G20 Research Group, University of Toronto.

Light, A., and A. Steer. 2017. *G20 economies must lead on climate despite U.S. position on Paris Agreement.* Washington, DC: World Resources Institute. Retrieved from http://www.wri.org/blog/2017/07/g20-economies-must-lead-climate-despite-us-position-paris-agreement (accessed November 5, 2017).

Mobjörk, M., M. Gustafsson, H. Sonnsjö, S. van Baalen, L. Dellmuth, and N. Bremberg. 2016. *Climate-related security risks: Towards an integrated approach.* Solna: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/Climate-related-security-risks.pdf (accessed November 5, 2017).

Needham, K. 2017. In China, the war on coal just got serious. *Sydney Morning Herald* 13 October. Retrieved from http://www.smh.com.au/world/in-china-the-war-on-coal-just-got-serious-20171011-gyyvi6.html (accessed November 5, 2017).

Office of the Auditor General of Canada. 2017. Opening Statement to the Standing Committee on Environment and Sustainable Development. Ottawa, 14 June. Retrieved from http://www.oag-bvg.gc.ca/internet/English/osh_20170619_e_42330.html (accessed November 5, 2017).

Plumer, B. 2017. A climate report that changes minds? Don't bet on it. *New York Times*, 4 November. Retrieved from https://www.nytimes.com/2017/11/04/climate/trump-climate-change-report.html (accessed November 5, 2017).

Snower, D. 2017. Beyond capital and wealth: Challenges of the G20. *G20 Insights* 24 May. Retrieved from http://www.g20-insights.org/wp-content/uploads/2017/07/D.J.Snower_Beyond-Capital-and-Wealth-1.pdf (accessed November 5, 2017).

Thieken, A.H., S. Kienzler, H. Kreibich, C. Kuhlicke, M. Kunz, B. Mühr, M. Müller, A. Otto, T. Petrow, S. Pisi, and K. Schröter. 2016. Review of the flood risk management system in Germany after the major flood in 2013. *Ecology and Society* 21(2):Retrieved from https://www.ecologyandsociety.org/vol21/iss2/art51/ (accessed November 5, 2017).

United Nations Framework Convention on Climate Change [UNFCCC]. 2011. The Cancun Agreements. Bonn: UNFCCC. Retrieved from http://unfccc.int/cancun/ (accessed November 5, 2017).

United Nations Global Compact, United Nations Environment Programme and the secretariat of the United Nations Framework Convention on Climate Change. 2015. *Executive guide to carbon pricing leadership: A caring for climate report.* United Nations Global Compact. Retrieved from http://newsroom.unfccc.int/media/544105/carbon-pricing-executive-guide.pdf (accessed November 5, 2017).

World Bank Group 2017. *Sovereign climate and disaster risk pooling.* Washington, DC: World Bank. Retrieved from http://www.bmz.de/de/zentrales_downloadarchiv/themen_und_schwerpunkte/klimaschutz/DFRI_G20.pdf (accessed November 5, 2017).