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Advancing Climate-Compatible Infrastructure Through the G-20

Opportunities for Progress Under the German Presidency

By Gwynne Taraska, Pete Ogden, Nancy Alexander, and Howard Marano December 2016

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Introduction

To date, 17 G-20 countries—which account for 67 percent of global greenhouse gas pollution—have officially joined the Paris Agreement, bringing the pact into effect sooner than anyone expected.[1] If they follow through with their commitments to reduce emissions, it will represent unprecedented progress in the global effort to curb climate change.

U.S. President-elect Donald Trump, meanwhile, has suggested a number of actions, including dismantling the Clean Power Plan and pledging to "cancel" the Paris Agreement, that would drive the United States—and potentially other countries—in the opposite direction.[2] In light of this, the G-20 summit in July 2017 provides an important opportunity for committed major powers to resist backsliding by any and all G-20 countries—and even to make some progress in meeting the climate challenge.

To its credit, the German government, which officially assumed the G-20 presidency in December 2016, has taken steps that position the summit well for just such an effort. When German Chancellor Angela Merkel announced her three "pillar" objectives for the summit, she explicitly identified climate change as a priority. These pillars include fostering global economic stability; making the global economy viable for the future, including through the Paris Agreement and the 2030 Agenda for Sustainable Development; and establishing the G-20 as a "community of responsibility," including by promoting a compact with Africa that would address infrastructure investment, among other topics.[4]

TABLE 1
G-20 priorities in 2017

Building resilience	Improving sustainability	Assuming responsibility
World economy	Climate and energy	Tackling the causes of displacement
Trade and investment	2030 Agenda	Partnership with Africa
Employment	Digitalization	Fighting terrorism
Financial markets/international financial architecture	Global health	Anti-corruption
International tax cooperation	Empowering women	Agriculture/food security

Source: Die Bundesregierung, "Priorities of the 2017 G20 Summit" (2016), available at https://www.g20.org/Content/DE/_Anlagen/G7_G20/2016-g20-praesidentschaftspapier-en.pdf.

Making progress on climate—and economic stability—through climate-compatible infrastructure

The G-20 has expanded its infrastructure initiatives in recent years. These initiatives, however, have insufficiently considered the reality of climate change.[5] Despite the fact that three of the four infrastructure sectors in which the G-20 is promoting investment—energy, transport, and water—are inextricably linked with climate issues, climate change has remained a topic that the forum has addressed only in parallel and, for the most part, has avoided.[6]

Developing a focus on making infrastructure low-carbon and climate-resilient, however, would allow the G-20 and the German presidency to make progress across the objectives of the summit, including economic stability. Infrastructure projects that are vulnerable to the physical effects of climate change can cause profound economic damage, while infrastructure projects that are high-carbon can face early obsolescence as global markets pivot to clean energy. High-carbon projects also drive further climate change—infrastructure already accounts for some 60 percent of global greenhouse gas pollution—and further economic risk.[7]

The G-20 is uniquely positioned to become a leader on climate-compatible infrastructure. First, the founding purpose of the forum is to promote global economic resilience: Divorcing its climate and infrastructure conversations runs counter to this core objective. Second, G-20 countries account for more than 75 percent of greenhouse gas pollution and more than 85 percent of global gross

domestic product. They therefore have both the responsibility and the capacity to drive the necessary investments. (see Figures 1 and 2 in text and Figures A1 and A2 in appendix) Third, G-20 leadership on this issue would have effects beyond its member nations, given that they play a dominant role in development and climate finance through their leadership and support of multilateral development banks, national development banks, project preparation facilities, and other channels of investment in less developed countries.[8]

This report proposes that the German presidency and the G-20 adopt an integrated climate and infrastructure agenda. It first analyzes the G-20's traditional approach to infrastructure, which undermines sustainable development and economic stability. It then presents a menu of options—on topics including climate risk disclosure, fossil fuel subsidy reform, national growth plans, climate-related risk insurance, and proxy carbon pricing—that would allow the German presidency and the G-20 to promote climate-compatible infrastructure in order to help fulfill the goals of the forum and the 2017 summit.

Key dates

1 December 2016: Start of German presidency

12-13 December 2016: Sherpa meeting

22 January 2017: Meeting of agriculture ministers

16-17 February 2017: Meeting of foreign ministers

17-18 March 2017: Meeting of finance ministers and central bank governors

22 March 2017: S20 Dialogue with the Science and Research Community

23-24 March 2017: Sherpa meeting

26 April 2017: W20 Dialogue with Women in Business, Science and Society

3 May 2017: B20 Dialogue with Business Associations

17 May 2017: L20 Dialogue with Trade Union Representatives

18-19 May 2017: Sherpa meeting

18-19 May 2017: Meeting of labor ministers

19-20 May 2017: Meeting of health ministers

30 May 2017: T20 Dialogue with Think Tanks

7 June 2017: Y20 Youth Summit

19 June 2017: C20 Dialogue with Civil Society

5-6 July 2017: Sherpa meeting

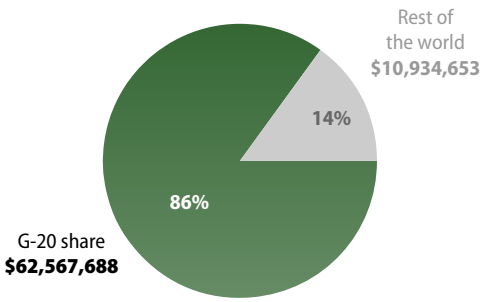
7-8 July 2017: 2017 G-20 summit in Hamburg

1 December 2017: Start of Argentinian presidency[9]

FIGURE 1

Share of global GDP of the G-20

GDP, in millions of U.S. dollars, 2015



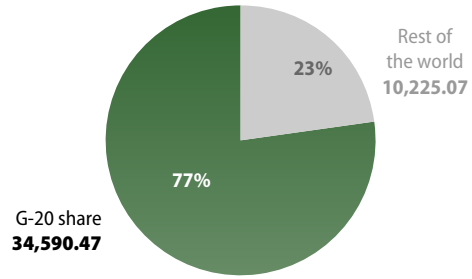
Economy	GDP, in millions of dollars
United States	$17,946,996
China	$10,866,444
Other European Union	$5,789,433
Japan	$4,123,258
Germany	$3,355,772
United Kingdom	$2,848,755
France	$2,421,682
India	$2,073,543
Italy	$1,814,763
Brazil	$1,774,725
Canada	$1,550,537
Korea	$1,377,873
Australia	$1,339,539
Russia	$1,326,015
Mexico	$1,144,331
Indonesia	$861,934
Turkey	$718,221
Saudi Arabia	$646,002
Argentina	$583,169
South Africa	$312,798
Total world	**$73,502,341**

Source: World Bank Group, "GDP ranking," available at http://data.worldbank.org/data-catalog/GDP-ranking-table (last accessed November 2016).

FIGURE 2

Share of global greenhouse gas emissions of the G-20

GHG emissions, in MtCO2e, excluding land-use change and forestry in 2012



Economy	Total GHG emissions, in MtCO2e
China	10,975.50
United States	6,235.10
India	3,013.77
Russia	2,322.22
Other European Union	2,035.96
Japan	1,344.58
Brazil	1,012.55
Germany	887.22
Indonesia	760.81
Mexico	723.85
Canada	714.12
Korea	693.33
Australia	648.23
United Kingdom	553.43
Saudi Arabia	526.97
Italy	465.20
South Africa	462.60
France	457.34
Turkey	419.70
Argentina	338.00
Total world	**44,815.54**

Source: World Resources Institute, "CAIT Climate Data Explorer," available at http://cait.wri.org/historical (last accessed November 2016).

The infrastructure investment gap and the global response

There is a global shortfall in infrastructure investment. In developed countries, chronic underinvestment is resulting in a growing amount of decaying and outdated infrastructure.[10] In developing countries, infrastructure investment often fails to keep up with increased industrialization and urbanization.[11] At the same time, billions of people still lack access to basic infrastructure: Globally, 1.3 billion people lack access to electricity, 768 million people lack access to clean water, and 2.5 billion people lack access to adequate sanitation.[12]

Unmet demand for infrastructure development is currently estimated to be $1 trillion per year: Global demand is approximately $3.7 trillion, while $2.7 trillion is invested.[13] Looking to the future, an estimated $90 trillion in infrastructure investments will be required by 2030 to accommodate global growth.[14] Indeed, it is hoped that the trillions in investment will provide a major stimulus to the global economy.[15]

Impediments in both the public and private sectors contribute to the infrastructure investment gap. In the aftermath of the global financial crisis, fiscal constraints and banking rules have cut the capacity for investment in general and the capacity of European banks to prepare infrastructure projects in particular.[16] In addition, advanced and developing countries with weak institutions can lack the policy and regulatory capacity to support beneficial projects.[17] In the private sector, investors can be reluctant to commit capital to long-term and potentially risky projects.[18]

The expansion of infrastructure initiatives

In recognition of the infrastructure investment gap, there has been an expansion of infrastructure initiatives in the G-20. At the 2016 summit in Hangzhou, for example, the G-20 launched a Global Infrastructure Connectivity Alliance to strengthen and link the infrastructure master plans in the regions and continents of the world, particularly in four sectors: energy, transport, water, and information and communications technology.[19] Each regional master plan has its own funds,

such as the European Fund for Strategic Investments or the Silk Road Fund. To achieve its goals, the Alliance promotes billion- or trillion-dollar projects that are financed, built, and operated especially through public-private partnerships. At the Summit, multilateral development banks issued a declaration to support infrastructure investment with a minimum of $350 billion in 2016-2018.[20]

There has been an expansion of infrastructure initiatives by individual G-20 member countries over the past few years as well. Recent ventures include the China-led Asian Infrastructure Investment Bank, which became operational in 2015, and the New Development Bank, which was established by the so-called BRICS countries in 2014 and has authorized $100 billion to mobilize resources for infrastructure and development projects.[21]

More established institutions are also placing increased emphasis on infrastructure. The World Bank, for example, launched the Global Infrastructure Facility in order to provide a platform to coordinate the development of public-private partnerships on infrastructure.[22] Private-sector partners and financial institutions involved in the Facility represent approximately $10 trillion in assets. Meanwhile, the African Development Bank has established the Africa50 Infrastructure Fund—which has a target capitalization of $3 billion—in order to support infrastructure development across the continent.[23] Some national development banks—including those in China, Brazil, South Africa, Algeria, and Germany—are also focusing on infrastructure by adopting investment targets.[24]

The new model of infrastructure financing

Governments are increasingly turning to private finance—including from long-term institutional investors, such as pension funds and insurance companies—in order to narrow the infrastructure investment gap. This trend, sometimes referred to as the financialization of infrastructure, is partly due to the fiscal constraints facing governments and partly due to the appetite of institutional investors to pursue profitable investment opportunities, among other factors.[25] These investors are experiencing a crisis in their income model, since they cannot rely on healthy returns from products such as government bonds.[26]

In order to attract long-term institutional investors, governments are presenting infrastructure as an asset class with the potential to yield moderately high returns. In such arrangements, investors do not own infrastructure assets, but rather the claim to a revenue stream from users of infrastructure services—for example, tolls or water fees—and the government.

To reduce the financial risks borne by investors, governments are pursuing measures such as the use of guarantees and the creation of infrastructure bonds, which provide the higher investment ratings sought by institutional investors.[27]

To further promote private infrastructure investment, an effort is underway to standardize the procedures and contract clauses of public-private partnerships. The World Bank and the Public-Private Infrastructure Advisory Facility, for example, presented recommended standard contract clauses to the G-20 Meeting of Finance Ministers and Central Bank Governors in 2015.[28] The World Bank also supports a number of knowledge-sharing tools: These include the PPP Knowledge Lab; Private Participation in Infrastructure Project Database; Public-Private Partnership in Infrastructure Resource Center for Contracts, Laws and Regulations; and the Body of Knowledge on Infrastructure Regulation.[29]

Climate-compatible infrastructure: A necessary condition for economic stability

The G-20 has developed a focus on infrastructure since 2010, but it has yet to effectively incorporate the reality of climate change in its plans. For example, the Global Infrastructure Hub, launched by the G-20 in 2014, does not consider the infrastructure investment gap in the context of climate change—or explicitly grapple with climate implications at all. In addition, the G20 Investment and Infrastructure Working Group, which operated from 2014 to 2016, launched several major infrastructure initiatives that did not tackle the climate dimension of their work.[30]

Failure to integrate the topics of infrastructure and climate change, however, invites economic instability. It is fiscally unwise to attempt to narrow the infrastructure investment gap by funding projects that are vulnerable to the physical effects of climate change. Likewise, it is fiscally unwise to narrow the infrastructure investment gap by funding projects that are high-carbon, incompatible with the global pivot toward clean energy, and at risk of early obsolescence.

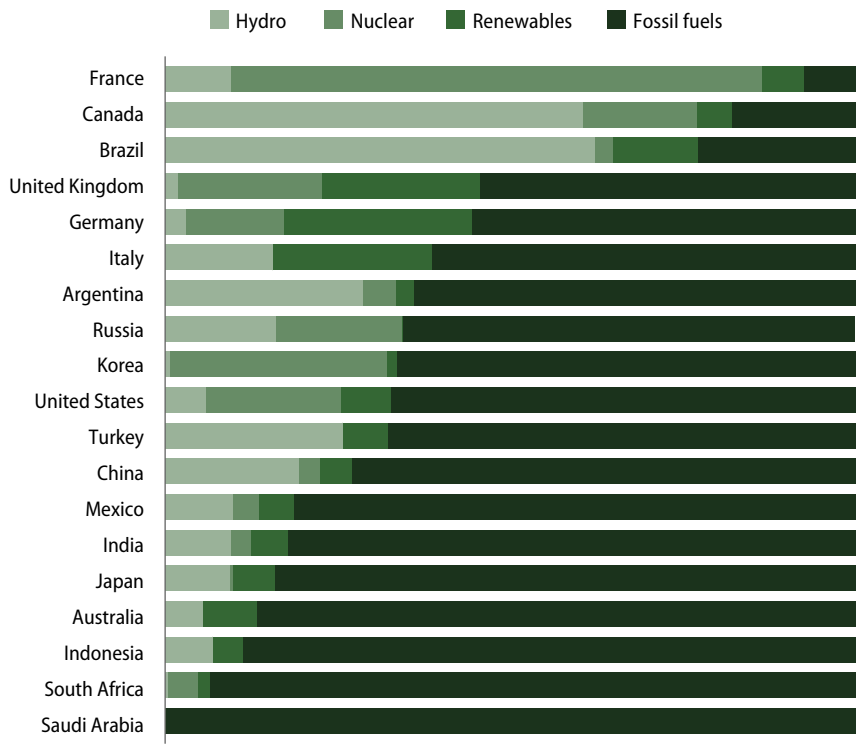
Of course, high-carbon projects not only face the prospect of devaluation but also drive climate change and the associated economic damage. There were more than 1,000 natural disasters inflicting some $100 billion worth of economic damage in 2015 alone.[31] These natural disasters were spread across the globe, affecting both developed and developing countries. A growing body of research has shown that the recurrence of these events is increasing, even when controlling for changes in exposed values caused by population growth and development.[32] Going forward, climate change has the capacity to put trillions of dollars in global financial assets at risk—it also has the capacity to push more than 100 million additional people into extreme poverty.[33] Experts in the World Economic Forum now identify climate change as the greatest global threat due to its ability to cause a cascade of risks, including migration and conflict.[34]

To date, the G-20 has largely avoided climate issues at the leaders' level, leaving them to the U.N. Framework Convention on Climate Change. At the 2016 summit, for example, the forum avoided key climate priorities, such as a deadline for phasing out fossil fuel subsidies and the integration of long-term emissions reduction plans into each G-20 country's Growth Strategy. The forum has also been agnostic on energy sources, as demonstrated by the 2016 Energy Ministers' Statement and the Leaders' Communique.[35] Indeed, the Communique promotes diversification of energy sources, especially natural gas. G-20 countries themselves exhibit a wide range of renewable energy adoption. (see Figures 3 and 4)

FIGURE 3

Electricity generation by source as percent of total electricity generation

G-20 members, 2015



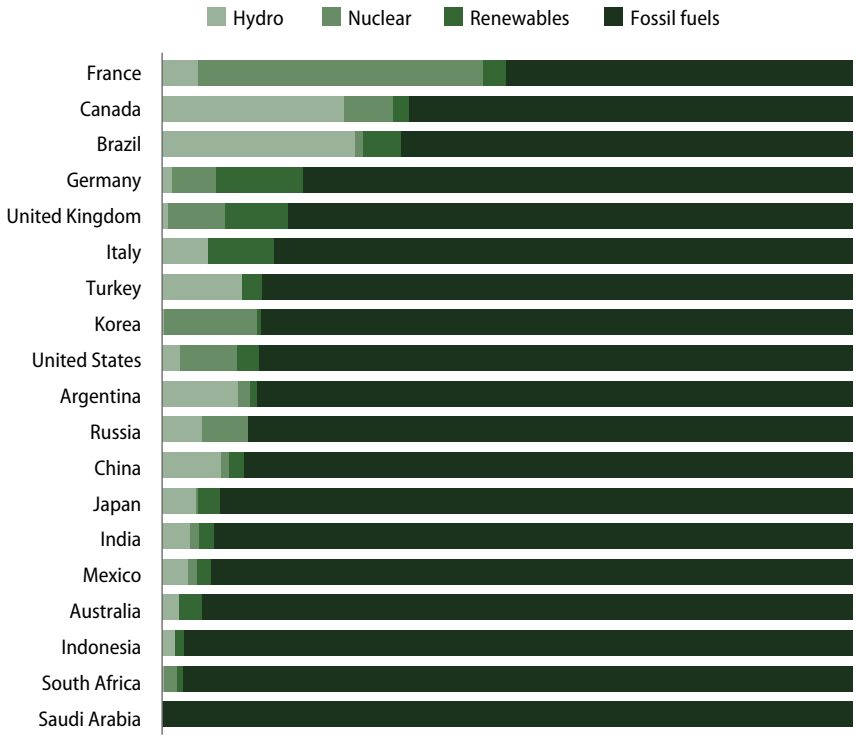
Note: Renewable energy sources include wind, geothermal, solar, biomass, and waste.

Source: British Petroleum Global, "Statistical Review of World Energy," available at http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html (last accessed November 2016). See also, Roger Andrews, "Electricity and energy in the G20," Energy Matters blog, September 8, 2016, available at http://euanmearns.com/electricity-and-energy-in-the-g20/.

FIGURE 4

Electricity generation by source as percent of total energy consumption

G-20 members, 2015



Note: Renewable energy sources include wind, geothermal, solar, biomass, and waste.

Source: British Petroleum Global, "Statistical Review of World Energy," available at http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html (last accessed November 2016). See also, Roger Andrews, "Electricity and energy in the G20," Energy Matters blog, September 8, 2016, available at http://euanmearns.com/electricity-and-energy-in-the-g20/.

But while climate change has not been a primary focus of the forum, it certainly has proven itself willing and capable of taking up the issue both directly and indirectly, providing a foundation for more substantive work. In 2009, for instance, G-20 countries committed to eliminate fossil fuel subsidies—and this remains an item on its agenda. Over the years, the G-20 has also launched several climate and energy initiatives, including the G20 Energy Access Plan, the Voluntary Action Plan on Renewable Energy, and the Energy Efficiency Leading Programme.[36] It has an established Climate Finance Study Group and, in 2016, also created a new Green Finance Study Group.[37] In 2015, the Turkish presidency launched the GreenInvest Platform to facilitate green growth investments, a commitment first made during the 2012 Mexican presidency.[38]

TABLE 2

Change in renewable electricty generation as a percentage of total energy consumption

G-20 members, 2005—2015

Economy	
Turkey	3867%
China	2144%
Korea	1389%
South Africa	1204%
Brazil	810%
France	686%
United Kingdom	667%
Italy	473%
Germany	327%
India	283%
United States	258%
Australia	252%
Canada	198%
Japan	161%
Argentina	141%
Mexico	73%
Russia	19%
Indonesia	-1%

Note: Renewable energy sources include wind, geothermal, solar, biomass, and waste. Saudi Arabia did not have any renewable energy generation in 2005 therefore it is excluded from this figure.

Source: British Petroleum Global, "Statistical Review of World Energy," available at http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html (last accessed November 2016).

Options and opportunities for the G-20 and the German presidency

Developing a focus on climate-compatible infrastructure that spans the forum would be a natural—and constructive—step for the G-20 to take in 2017. It would allow the forum to protect global progress on climate change and to pursue the "pillar" objective of supporting sustainability, including sustainable energy. It would also allow the forum to pursue its overarching goal of promoting global economic stability and would build on several of its existing strands of work.

1. Identify and disclose transition risk

Discussion of climate risk typically focuses on the disruptive and costly physical effects of climate change, but there is another category of risk that threatens the global economy: transition risk.

Transition risk arises from the global pivot toward nonpolluting energy. The recent surge of international support for climate action—even in the face of the 2016 U.S. presidential outcome—is just one indication that this pivot is well underway.[39] More than 100 countries representing more than 75 percent of global greenhouse gas pollution have now officially joined the Paris Agreement within just a year of its finalization.[40] Moreover, the entry into force of the Agreement in November 2016 follows on the heels of other multilateral climate successes, including the amendment to the Montreal Protocol to phase down hydrofluorocarbons, or HCFs, and the agreement in the International Civil Aviation Organization, or ICAO, to limit greenhouse gas pollution from air travel.

It is not only governments that are turning toward nonpolluting energy—the marketplace is as well. In 2015, global investment in renewables reached a record $286 billion, with developing countries accounting for more than half of this amount.[41] Renewables also made up the majority of global installed capacity for the first time in 2015, with investment in renewable energy capacity equal to more than

twice the amount allocated to new coal and gas generation.[42] In the same year, global employment in the renewable energy sector was more than 8 million.[43] This growth is being driven by the continued reduction in renewable energy costs, a trend that is expected to continue as wind and solar become the cheapest way to produce electricity in most of the world in the 2030s.[44]

As investors and civil society increasingly turn away from greenhouse gas pollution—and as many governments pursue policies to implement their national and collective climate goals—the value of assets will shift. High-carbon assets will decline in value or even become stranded: The fossil fuel industry, for example, could lose more than $30 trillion over 25 years.[45] The flipside of transition risk, of course, is transition opportunity: low-carbon alternatives will increase in value. An abrupt reassessment of asset values, however, could have a destabilizing effect on the global economy.[46]

The first step in mitigating transition risk is identifying it. This is not only a green issue. It is in the economic self-interest of companies, investors, and nations to have a clear view of the financial risks and opportunities presented by climate change. This is particularly important in the context of infrastructure projects, which can lock in greenhouse gas pollution through lifespans that measure in the decades.

Currently, too few companies accurately and thoroughly report their exposure to the physical and transition risks posed by climate change. In the United States, for example, the Sustainability Accounting Standards Board analyzed the disclosures of more than 600 companies and found that more than 60 percent of the entries contained either no acknowledgment of climate risk or only boilerplate statements.[47] In addition, there is a vast diversity of reporting regimes.[48]

To counter this irregularity, the Financial Stability Board—an international body that aims to promote global financial resilience—created the Task Force on Climate-related Financial Disclosures at the request of the G-20. This has been among the foremost positive developments in the G-20 on climate change. The current objective of the task force is to develop guidelines for companies to publicly disclose climate risks to investors. The task force delivered its initial recommendations and launched a 60-day public consultation in December 2016.[49] The final report will be released in June 2017, in advance of the G-20 summit.[50]

With the disclosure guidelines in hand, the G-20 and the German presidency should turn to the task of promoting implementation. To this end, it would be helpful for G-20 members to adopt a leadership role in climate risk disclosure. There are a number of steps that they could take. For example, G-20 countries could commit to considering and publicly disclosing physical risks and transition risks in major federal projects and actions in order to protect their national economies over the long term.[51] Given the influence they have in international development finance, they also could work to institute responsible climate-disclosure practices among the development banks of which they are members. And, in order to promote adequate climate risk disclosure practices in the private sector, they could implement policies to contract only with companies that adhere to the task force's disclosure guidelines.[52]

2. Strengthen fossil fuel subsidy reform

In order to improve investment in climate-compatible infrastructure, countries will need to increase public expenditures and foster the market conditions necessary to attract an influx of private finance.

Fortunately, G-20 countries committed in 2009 to take a step that would drive progress on both of these fronts: eliminating inefficient fossil fuel subsidies.[53] Such subsidies drain national budgets—diverting public dollars away from infrastructure spending—and tilt the investment playing field against renewable energy and energy efficiency.[54] Moreover, they are generally extremely regressive: In developing countries, the richest 20 percent of the population captures on average six times more of the value of fuel subsidies than the poorest 20 percent.[55] Phasing out these subsidies alone could reduce global greenhouse gas pollution by between 6 and 13 percent by 2050. The economic and climate benefits would be even greater if the savings are put to good use.[56]

There has been some progress—albeit insufficient progress—toward fulfilling the 2009 commitment. Globally, countries provided $325 billion worth of fossil-fuel consumption subsidies in 2015 alone.[57] To help build momentum for the elimination of fossil fuel subsidies, the G-20 finance ministers announced in 2013 a new peer review program in which countries could voluntarily engage in an information-sharing and consultation exercise designed to clarify the level of their subsidies and how to reduce them.[58] The first peer reviews—completed by the United States and China—were publicly released during the 2016 summit.[59]

The G-20 under the German presidency could build on this successful first peer review by improving and expanding participation in the process.[60] For example, the United States and China could establish a precedent whereby countries that undergo peer review participate as advisors in subsequent rounds. This would allow countries to share the lessons learned from their own experiences and to guide the process for new participants. G-20 countries could also provide support for the peer review process by contributing additional funds to The World Bank's Energy Sector Management Assistance Program.[61] These funds could be used to provide further technical assistance to countries with limited experience assessing their own subsidy programs.

In addition, Germany could establish a channel for non-G-20 countries, civil society, and academic institutions to provide input into the peer review process and the phase-out of fossil fuel subsidies generally. This could take the form of a public comment period in which the G-20 formally solicits technical expertise and insights. Such a comment period would expand and diversify the pool of expertise and resources available to countries pursuing reform.

Germany could also create a public platform for G-20 countries to track and share their progress in meeting a timeline for fossil fuel phase-out. This would improve public understanding of the benefits that accrue from reform, which is critical to getting such reforms enacted and making them durable.[62] Indonesia, for example, has linked subsidy reforms to economic and social development goals. It has used part of the savings from reduced subsidies to fund public transportation infrastructure investments in Jakarta, a city suffering from chronic congestion.[63] It has also invested in poverty reduction, education, and health care for low income populations.[64] In 2015, savings from reduced subsidies contributed to an increase of an estimated $12.6 billion in expenditures on programs to reduce poverty and transfer funds for regions and villages.[65]

Importantly, the G-20 should also build on its 2009 commitment and establish 2025 as the deadline for phasing out all inefficient fossil fuel subsidies. This would be consistent with the G-7 commitment made in 2016 and would create a focal point for efforts in the G-20 to promote low-carbon, climate-resilient development.[66]

3. Include Paris goals in growth strategies

Within the G-20, the growth strategy of each country, which includes infrastructure plans, has been a crucial contribution to the collective effort to foster economic recovery and prosperity.[67] Countries should include their goals to reduce greenhouse gas pollution and build resilience to the effects of climate change—including any Paris goals—in their growth strategies. This would promote accountability and would allow countries to plan, in an integrated way, how to achieve a stable and low-carbon economy.

The Paris Agreement calls on countries not only to submit near-term climate goals but also to formulate national mid-century strategies to decarbonize their economies.[68] Four G-20 countries—Germany, the United States, Canada, and Mexico—have already created their mid-term strategies.[69] All G-20 countries should create them by 2020 and include them in their plans for growth.

The G-20 could also implement peer reviews of national progress in adopting renewable energy technologies, which could be done in the context of each country's national mid-century decarbonization objectives. This would be in keeping with the forum's practice of implementing peer reviews when national progress is essential to reaching collective goals.

4. Expand access to climate-risk insurance

The world is already locked into a period of increased climate risk and damage due to the past century and a half of pollution that has accumulated in the atmosphere. This necessitates increased emphasis on enhancing the climate resilience of existing and new infrastructure—otherwise, there will be damaged physical assets, lost investment, and misallocation of public and private resources. More intense and frequent climate-fueled natural disasters will increasingly threaten critical infrastructure networks, such as the electricity grid and water supply.[70] Compounding these challenges, infrastructure systems are frequently interconnected, creating the potential for multiple failures during extreme weather events.[71]

Increasing the resilience of infrastructure can produce significant benefits for both developed and developing countries. In the United States, for example, it is estimated that every $1 spent on resilience efforts yields $4 in economic benefits,

not including prevented injuries and lives saved.[72] In the developing world, many countries are still building basic infrastructure, meaning that investments in resilient infrastructure now could avoid additional costs from retrofitting as the effects of climate change intensify.[73]

Despite the benefits of more resilient infrastructure, there remains a gap in finance for climate adaptation that might support these efforts. The cost of adaptation in developing countries alone could range from $140 billion to $300 billion by 2030.[74] By comparison, $25 billion in international public finance went to climate adaptation in 2014. [75]

The G-20 should promote climate resilience from the outset as part of its focus on infrastructure development. To this end, the G-20 should establish closer collaborations with existing international institutions that fund climate-resilient infrastructure in order to share experience and best practices. The Green Climate Fund, for example, is developing expertise in this area.[76]

In addition, the G-20 could expand access to climate-risk insurance. Insurance can help countries to better manage and adapt to the increase of climate-fueled risks facing existing and future infrastructure. Not only can climate-risk insurance help to hedge against potential losses from extreme weather events, providing more security for public and private investments, but it can also assist with post-disaster recovery and create incentives for adaptation measures.[77]

Of the more than 1,000 natural disasters inflicting some $100 billion worth of economic damage in 2015, only 30 percent of these losses were covered by insurance, and the majority of uninsured losses occurred in developing nations in Africa, Asia, and South America.[78] This lack of coverage can put a significant strain on governments, as they must invest in near-term relief and recovery efforts as well as mid- and long-term reconstruction, with infrastructure investment being critical throughout.[79]

As of 2015, climate-related risk insurance was available to 100 million people in developing countries and major emerging countries.[80] However, while the share of insured economic losses in developed countries grew from 20 percent to 40 percent from 1980 to 2006, it held steady in developing countries at approximately 3 percent.[81] There are several reasons for this gap, including that the required premiums for climate-risk insurance can be prohibitively expensive. [82] In addition, there is a lack of the kind of risk modeling in many regions that is required for insurers to offer coverage.[83]

In recognition of the insurance gap, the G-7 set an ambitious goal in 2015 of providing access to insurance against climate-related risks to 400 million additional people in the most vulnerable developing countries by 2020.[84] This would add to the 100 million people in developing countries that already have coverage.[85]

Under the German presidency, the G-20 could strengthen the effort to narrow the insurance gap by adopting this same target. It could also address the obstacles to achieving it, such as lack of familiarity among stakeholders with the innovative policies—such as parametric risk insurance, regional risk pools, and micro insurance—that present opportunities to expand insurance to new populations in developing countries.

To this end, the G-20 could support a platform for sharing insurance policy designs and best practices that would be open to G-20 and non-G-20 countries, subnational governments, regional organizations, and non-governmental organizations. The platform could also focus on increasing investment in the collection of risk modeling data with a particular focus on developing countries.[86] The G-20 could design the platform in coordination with the Insurance Development Forum, a partnership launched in 2016 by The World Bank, the United Nations, and the insurance industry that is focused on expanding access to insurance in developing countries.[87]

4. Steer investments toward low-carbon infrastructure

In order to help mitigate the risks of climate change—and to take advantage of the opportunities—there are a number of tools that the G-20 could promote in its infrastructure initiatives in order to steer investment toward low-carbon options. One tool is to consider the rising cost of carbon pollution in infrastructure investment decisions. Factoring in a so-called proxy price on greenhouse gas emissions when evaluating projects acts as a stress test: It helps determine whether projects will remain financially viable as carbon pollution faces increasing costs.[88] This practice—already well known in the private sector—helps prevent projects that decline precipitously in value or become obsolete before the end of their useful lives. The value of a proxy carbon price could be indexed to an estimation of the financial damage caused by each ton of carbon pollution.[89]

The G-20 could also promote the practice of proxy carbon pricing by countries in their national infrastructure efforts. For instance, in the future, G-20 countries could use proxy pricing to help inform their infrastructure investment and permitting decisions. This would help protect their economies from infrastructure projects that may become stranded in the global pivot to clean energy. A proxy carbon price could also be used when evaluating the costs and benefits of potential power plant and other regulations.

Proxy carbon pricing can also help inform international investments of G-20 countries, which could encourage the multilateral development banks of which they are members—including established banks as well as more recent banks, such as the New Development Bank and the Asian Infrastructure Investment Bank—to adopt the practice of stress testing sets of potential infrastructure investments.[90] This would help steer investment away from high-carbon infrastructure. To date, proxy pricing has been adopted by a handful of banks, including the European Investment Bank and the European Bank for Reconstruction and Development.[91] But given that a number of banks—including the Asian Development Bank, the African Development Bank, and the Inter-American Development Bank, among others—are dedicated to increasing climate investment, the practice could be explored by the wider international development finance community.

Toward a wider lens on socially responsible infrastructure

While this paper focuses on climate-compatible infrastructure, it is also important that steps are taken throughout the project cycle to ensure that infrastructure can deliver the anticipated social benefits in line with the "responsibility" pillar of the German presidency.

When done right, infrastructure development is necessary to attain several Sustainable Development Goals, as highlighted by the G-20's Action Plan on the 2030 Agenda on Sustainable Development. In addition, it is a big-ticket item that also competes with funding for other key goals. Doing infrastructure right is therefore a high-stakes venture in economic, social, and environmental terms.

While drawing in private investment is critical, it also introduces a number of risks that must be managed.[92] At a basic level, the use of private financing can result in private control of critical infrastructure services.[93] For instance, it is common for private investors to demand PPP contract renegotiations, which usually result

in deals that yield higher profits and fewer costly obligations.[94] PPP laws may constrain a government's regulatory scope in ways that protect firm profits. At the same time, governments, seeking to attract investors, can find themselves bearing excessive risks, with losses covered by user fees and taxpayer resources.[95]

These hazards catalyze others that must also be navigated as private sector financing is drawn in. Transferring risk from the private to the public sector—which means that gains are privatized and losses socialized—can drive inequality and weaken the power of governments, undermining development.[96] Moreover, the financialization of infrastructure encourages so-called mega-projects, which are at risk of being over budget while under-delivering economic, social, and environmental benefits.[97] Mega-projects also can require a large amount of land and lead to the displacement of communities, especially in areas where land tenure is unclear.[98]

Such risks are amplified in the context of Africa, which is the region of focus for the G-20 in 2017. Unmet infrastructure demand is particularly stark in Africa—only approximately 40 percent of the population has access to modern infrastructure and electricity—and countries on the continent account for approximately 70 percent of the least developed countries.[99] Since private finance often gravitates toward mega-projects, it may fail to reach the communities and regions that most need infrastructure investment through means such as decentralized solar schemes or railways, due to comparatively low profitability. It is important, therefore, that countries and the private sector work together to strategically deploy their public and private resources in the most effective combinations to help meet development needs in Africa.[100]

Socially responsible infrastructure

Key dimensions for project success

Transparency. Information disclosure and transparency are critical tools to usefully involve stakeholders and affected communities, achieve a balanced risk allocation, limit corruption, make known off-budget commitments, deliver benefits, and hold service providers accountable.

Consultation. Governments should use tools such as the OECD's Public Governance of Public-Private Partnerships, or PPPs, guidelines for public works as well as PPPs, because they involve the users of infrastructure services in ways that help control risks and ensure sustainability.[101] Environmental and social impact assessments should also engage affected communities at the project concept and identification stages.

Safeguards. Upstream, especially in project selection, design, and construction, greater weight should be given to the social and environmental impacts of projects. Downstream, during implementation, there is a trend toward more lenient environmental and social standards and their enforcement.[102] This trend should be reversed through a systematic effort to identify the range of benefits that safeguards help ensure.

Fiscal risks. Where PPPs are the desired modality, the IMF's PPP Fiscal Risk Assessment Model should be tested with the engagement of many stakeholders, and implemented responsibly.[103]

Scale. As it seeks to reduce the shortfall in infrastructure investment, the G-20 should avoid an uncritical preference for mega-projects over "appropriate scale" projects.[104] Importantly, when countries finance multiple, mega-infrastructure projects, there is a risk of a shortfall in financing for more sustainable infrastructure or other budget priorities, such as social protection and health care.

PPP issues. According to a report by the London School of Economics, PPPs "are not regarded as an appropriate instrument for [information technology] projects, or where social concerns place a constraint on the user charges that might make a project interesting for the private sector."[105] Many evaluations substantiate this point, particularly where there are natural monopolies, as may be the case in the water supply and electricity distribution sectors.

Investment guidelines. The G-20 and Organisation for Economic Co-operation and Development, or OECD, should revise their guidelines and principles pertaining to infrastructure financing and investment—including long-term institutional investment—in order to incorporate the principles of the 2030 Agenda on Sustainable Development. At present, such social and environmental principles are secondary and optional, if they appear at all. The High-level Principles on Long-Term Investment Financing by Institutional Investors are a case in point.

Standardization. The standardization of infrastructure projects, including model PPP contract clauses, procurement systems, and disclosure requirements, should be opened to longer and more in-depth consultation with stakeholders.

Conclusion

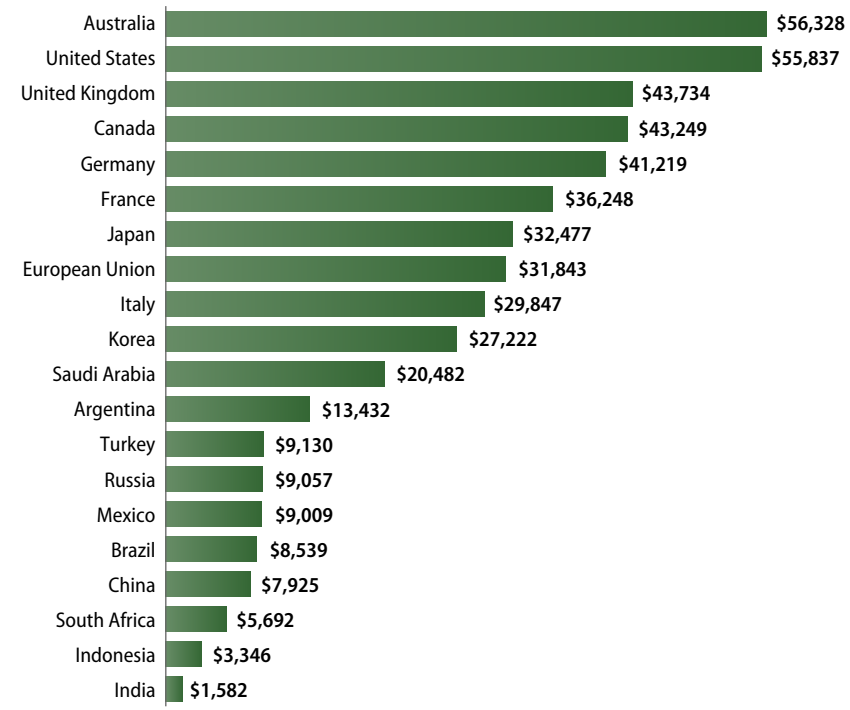
It is vital to prevent the global momentum to curb climate change from slowing. Fortunately, this year's G-20 under the German presidency can provide a near-term line of international defense—and it even has the potential to drive progress by integrating its infrastructure and climate agendas. Moreover, doing so would be true to the founding purpose of the G-20, which is to support global economic stability. This cannot be achieved without climate-compatible infrastructure and, more broadly, a swift transition to a low-carbon global economy.

Appendix: Supplemental figures

FIGURE A1

GDP per capita of G-20 members

GDP per capita, U.S. dollars, 2015

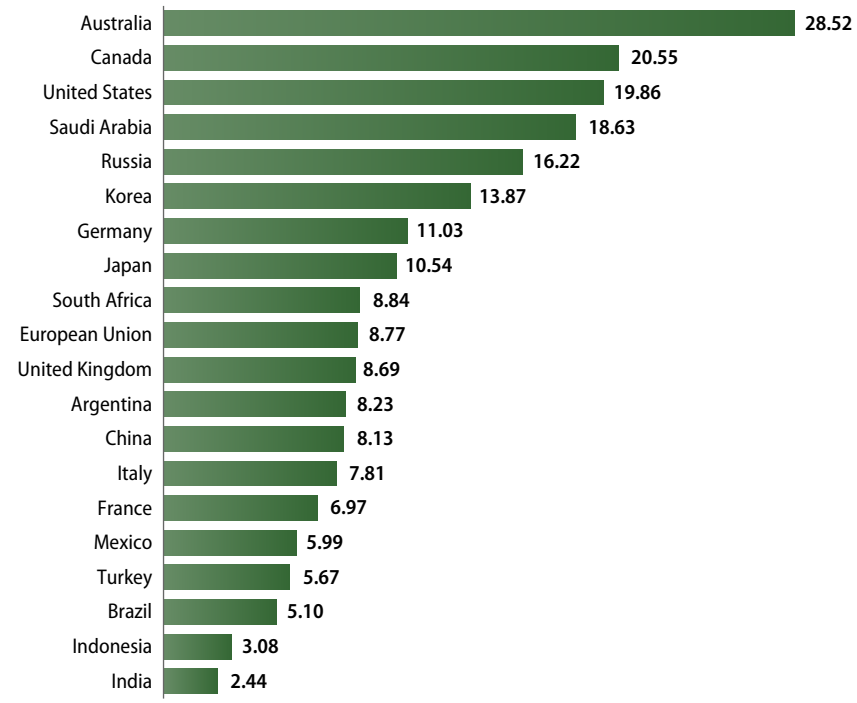


Source: World Bank Group, "GDP per capita (current US$)," available at http://data.worldbank.org/indicator/NY.GDP.PCAP.CD (last accessed November 2016).

FIGURE A2

Greenhouse gas emissions per capita of G-20 members

GHG emissions per capita, in MtCO2e, excluding land-use change and forestry in 2012



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The Center for American Progress produces independent research and policy ideas driven by solutions that we believe will create a more equitable and just world.

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