Center for Global Development
Independent research & practical ideas for global prosperity

Energizing Rio+20

How the United States Can Promote Sustainable Energy for All at the 2012 Earth Summit

Nigel Purvis and
Abigail Jones

April 2012

Independent research & practical ideas for global prosperity

Energizing Rio+20

How the United States Can Promote Sustainable Energy for All at the 2012 Earth Summit

Nigel Purvis and
Abigail Jones

April 2012

Nigel Purvis is a visiting senior associate at the Center for Global Development and the president and CEO of Climate Advisers and former U.S. deputy assistant secretary of state for oceans, environment, and science. Abigail Jones is director of research and policy at Climate Advisers. The authors are grateful for contributions from the Danish Embassy in support of this work and would like to thank Nancy Birdsall, Reid Detchon, and Michele de Nevers for their helpful comments.

CGD is grateful for support of this work from its funders, particularly the Danish Embassy, and its board of directors.

ISBN: 978-1-933286-71-6
Center for Global Development
1800 Massachusetts Ave. NW
Washington DC 20036
www.cgdev.org

Contents

Preface

Global development depends in part on access to reliable, affordable, convenient, and safe cooking fuels and electricity to power economic growth and improve living standards. People live longer, healthier, and more productive lives when they don't spend hours each day gathering fuel and breathing smoky air, and when they don't have to stop reading, studying, or working when it is dark. Today, billions of people lack electricity and clean, safe cooking fuel. Giving them access to such energy is a development imperative; at the same time, successfully confronting climate change—the impacts of which are already being felt disproportionately by the poor—will require a global shift toward sustainable energy. Because unmanageable climate change risks threaten to reverse hard-won development gains, efforts to end energy poverty must be compatible with climate goals. Sustainable development, in other words, requires sustainable energy.

Exciting things are happening on energy. Improved cookstoves, new inexpensive solar lanterns, and numerous other technologies are saving lives, improving the quality of life, and creating new livelihoods in even the most impoverished, rural areas. Today, many companies and governments around the world have the technological, managerial skills, and financial expertise to help address the sustainable energy challenge, while environmental and poverty-oriented NGOs have large networks of supporters for whom these issues have strong resonance. What's lacking most are creative and politically feasible partnerships to scale up these efforts and mobilize financial resources. Fortunately, thanks in no small part to the efforts of UN Secretary-General Ban Ki-moon, the occasion of the Rio+20 Summit provides a useful fulcrum for lifting global ambition.

In this CGD report, Nigel Purvis and Abigail Jones highlight how the United States can meaningfully contribute to global efforts to expand clean energy access and eradicate energy poverty in ways that are consistent with global climate protection goals—ideas captured by the phrase "sustainable energy for all." In view of the challenging political, fiscal, and economic environment in the United States today, these policy recommendations center on ideas to catalyze private-sector know-how and investment to contribute meaningfully to the eradication of energy poverty and expansion of clean energy solutions. The U.S. delegation to Rio+20 should take note.

Nancy Birdsall
President
Center for Global Development

I. Understanding the Energy Poverty Challenge

Worldwide, about 1.3 billion people lack access to electricity (one in five people), while unreliable electricity networks serve another 1 billion people. Roughly 2.7 billion—about 40 percent of the global population—lack access to clean cooking fuels. Instead, dirty, sometimes scarce and expensive fuels such as kerosene, candles, wood, animal waste, and crop residues power the lives of the energy poor, who pay disproportionately high costs and receive very poor quality in return. More than 95 percent of the energy poor are either in sub-Saharan Africa or developing Asia, while 84 percent are in rural areas—the same regions that are the most vulnerable to the adverse effects of climate change (see map, next page).[1]

Energy poverty dramatically constrains economic opportunities and undermines human development, from health and education to gender equality and environmental sustainability. On an economy-wide level, the World Bank estimates that countries with underperforming energy systems may lose up to 1–2 percent of growth potential annually as a result of electric power outages, overinvestment in backup electricity generators, energy subsidies, and losses, and inefficient use of scarce energy resources.[2] On a local level, access to modern energy facilitates human development and enhances climate resilience by providing more efficient and healthier means to undertake everyday tasks. For example, modern energy can pump potable water, reducing the incidence of waterborne diseases and making communities healthier and more productive. It can increase agricultural yields through the use of machinery and irrigation that increase returns to farmers and their families.[3] It can provide clean cooking fuel and light a home, expanding the productive hours of the day and freeing up time that might have been spent collecting firewood. And it can alleviate the household air pollution that kills more than 1.45 million people each year, the majority of whom are women and girls. (Today, the number of premature deaths from household air pollution, most of which is energy-related, is greater than the number of premature deaths from malaria or tuberculosis.)[4]

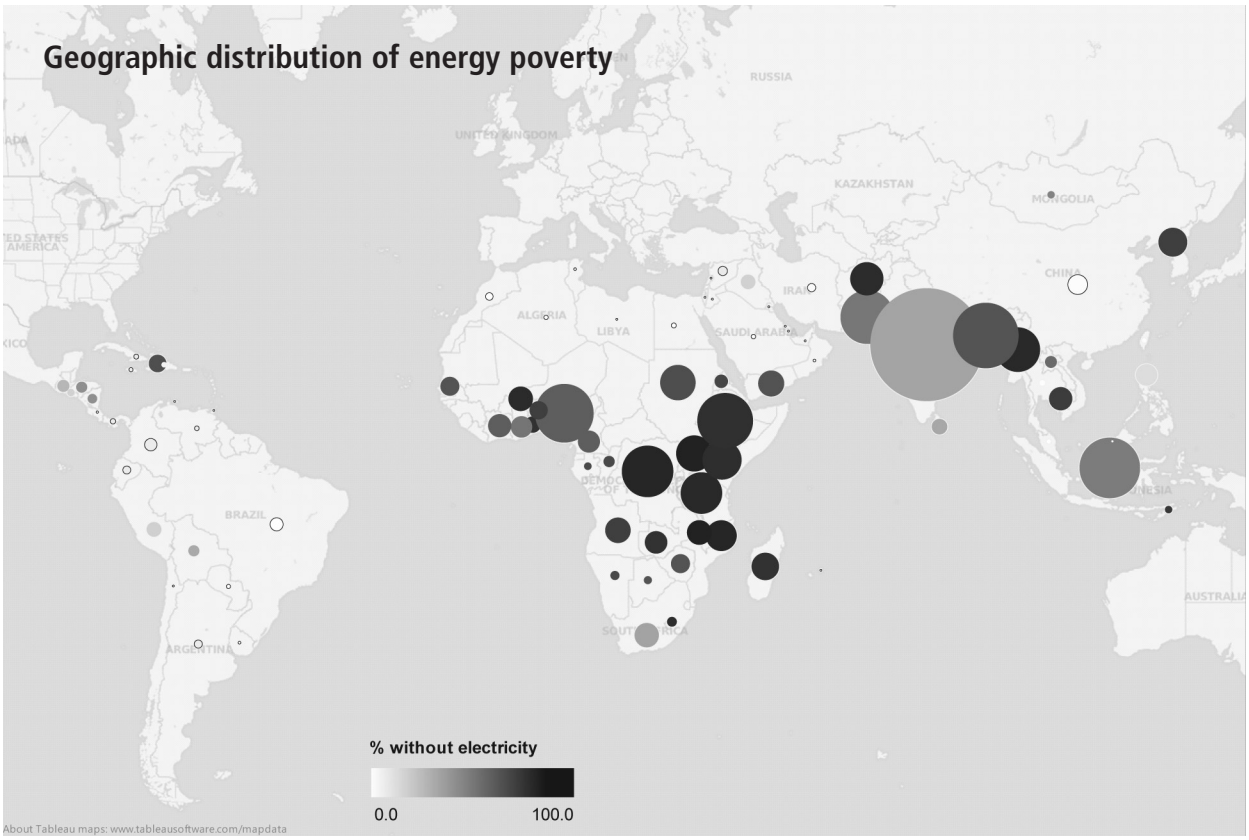
---

1. International Energy Agency, "Energy for All: Financing Access for the Poor," special early excerpt of the World Energy Outlook 2011 (Paris: OECD/IEA, 2011).

2. Vivien Foster and Cecilia Briceño-Garmendia, eds., *African's Infrastructure: A Time for Transformation* (Washington: IBRD/World Bank, 2010).

3. International Energy Agency, "Energy Poverty: How to Make Modern Energy Access Universal?" special early excerpt of the *World Energy Outlook 2010* (Paris: OECD/IEA, 2010).

4. Ibid.



Technology Solutions

Expanding electricity to the 1.3 billion people currently without access will require a mix of technology solutions. Recognizing that the range of electrification technologies is constantly expanding, the following solutions illustrate in broad strokes the types of electrification systems currently available.

- *Grid extension:* Expanding transmission lines to extend the centralized grid is the primary option when the target population is near the existing grid, typically in urban and peri-urban settings, and where the existing grid has excess capacity (uncommon in most developing countries). Electricity generation capacity for the grid can be either fossil burning or renewable, though most current on-grid generation capacity relies on fossil fuels.[5]

- *Mini-grid solutions:* Mini-grids are connected to relatively small, centralized village-level generation sources (usually less than 5,000 kilowatts [kW])

5. Energy Sector Management Assistance Program (ESMAP), "Technical and Economic Assessment of Off-Grid, Mini-Grid and Grid Electrification Technologies," ESMAP Technical Paper 121/07 (December 2007).

Box 1. Defining energy poverty and sustainable energy

Energy poverty entails a lack of access to safe, reliable, and affordable energy; however, given measurement challenges, most of the literature defines energy poverty as "a lack of access to electricity and reliance on traditional biomass for cooking." The traditional definition is used throughout this report.

In contrast, there is no widely accepted definition of sustainable energy. We use that phrase to refer to energy decisions consistent with limiting greenhouse gas emissions to no more than two degrees Celsius—the closest thing to a scientific and global consensus on how to avoid dangerous climate change. Sustainable energy implies a mix of renewable energy sources, fossil fuels, and energy-efficiency measures, with that mix moving rapidly by mid-century toward zero- and low-emission energy.

Fortunately, the two goals of ending energy poverty and protecting the Earth's climate are compatible. The International Energy Agency estimates that ending energy poverty using a mix of energy sources and policies would only increase carbon dioxide emissions by 0.7 percent in 2030 (IEA, "Energy for All").

instead of traditional, large-scale national or regional grids. Mini-grid power plants frequently use renewable energy such as solar, wind, hydro, biomass, or biogas, but often rely on small diesel generators, at least for back-up capacity.[6]

A typical mini-grid system can provide a village with energy for various applications, including lighting and powering radios, televisions, and computers in homes, schools, and clinics, as well as providing power for local industries, agricultural value-adding industries, and labor-saving activities.

- *Off-grid electrification:* Off-grid electrification involves small generation sources for use by individuals or households only. These sources generally use solar, wind, hydro, biomass, or diesel technologies and have a capacity of less than 25 kW. Examples of these include rooftop solar systems and solar-powered lanterns.[7]

The right technology solution depends in large measure on the comparative cost per megawatt-hour (MWh) of the competing options in any given context. In urban areas, for example, grid extension is likely to be more cost effective than in sparsely populated, remote, or mountainous areas where infrastructure investment and power losses from long distance transmission systems raise costs.

Providing clean cooking facilities that enable people to rely less on traditional biomass such as charcoal and agricultural waste will also require a range of tech-

6. Ibid.

7. Ibid.

nology solutions. The right solution for a given community or household will depend on upfront costs, social norms, distribution networks, cooking preferences and practices, and general product knowledge. These technologies include the following:

- *Liquefied petroleum gas (LPG) stoves:* LPG stoves burn a mixture of propane and butane. This heating source, though not renewable, burns considerably more cleanly and more efficiently than traditional cooking fuel technologies employed by the poor. Compared to traditional biomass stoves, for example, LPG stoves reduce emissions of most key pollutants by over 95 percent and energy use by about 50 to 70 percent.

- *Advanced biomass cookstoves:* Advanced biomass cookstoves burn traditional biomass in a cleaner and more efficient manner. The major types of advanced biomass cookstoves include rocket stoves, forced air, and gasifier stoves. Rocket stoves, the simplest but least clean and efficient of the group, feature an insulated L-shaped combustion chamber that reduces total emissions, indoor air pollutants, and fuel costs by allowing for partial combustion of gases released by traditional biomass. Forced air stoves employ an external fan that increases combustion temperatures, allowing the stove to burn more cleanly and efficiently. In gasifier stoves, the fuel is lit from the top, causing the biomass below to combust more completely and efficiently.[8]

While technology solutions will vary from place to place for electricity and cooking, the diversity of low-cost, cost-effective solutions is expanding rapidly and provides confidence that the world can tackle energy poverty through sustainable energy solutions.

Financing for Action

Rapid technological innovation and a new crop of real-world successes are encouraging, of course, but many barriers to action exist. The most frequently mentioned barrier is the financial cost of ensuring that everyone on the planet has access to modern energy. While the true cost of eliminating energy poverty with sustainable energy technologies is unclear, one credible estimate comes from the International Energy Agency (IEA), which estimates the combined total of public and private investments needed could cost $48 billion a year.

In contrast, about $9.1 billion was invested globally in 2009 to extend energy access, including rural electrification, and to reduce the use of traditional biomass. Of the total, 34 percent came from multilateral organizations, 30 percent came

8. For more information, see the Global Alliance for Clean Cookstoves (http://cleancookstoves.org/).

from national governments, 22 percent came from the private sector, and 14 percent came from bilateral foreign assistance.[9]

Expanding electricity access alone will require an additional $20 billion annually now, increasing to $55 billion toward 2030. Costs vary on the basis of consumer density, energy use patterns, and regional geography. The IEA projects that roughly 45 percent of cumulative investment in rural energy access will go into mini-grid solutions, 30 percent will go into grid expansion where it is cost effective, and 25 percent will go to off-grid solutions. Both the mini-grid and off-grid solutions have higher costs per MWh, but no associated transmission or distribution costs.

For all urban zones, the IEA finds that grid extension is the most cost-effective option. Most of this additional investment, about 60 percent, will need to penetrate markets in sub-Saharan Africa where there is greater dependence on mini-grid and isolated off-grid solutions.[10]

These cost estimates are based on technologies that would be compatible with global climate goals. The IEA projects that more than 90 percent of the additional electricity generated to meet 2030 goals through mini-grid and off-grid solutions will come from renewable sources, including solar power, small hydro, biomass, and wind, while less than 40 percent of additional on-grid energy produced will be sourced from renewable power. Despite continued reliance and expansion of traditional fossil fuels, the IEA estimates that global carbon dioxide emissions would only increase by 0.7 percent. This small increase is due to the low level of energy consumed per capita in currently underserved areas and the relatively high proportion of renewable solutions adopted. The IEA notes that advanced cookstoves and greater efficiency in converting fuel to energy would reduce emissions and thereby reduce this projection.[11]

The IEA estimates that an additional $3.7 billion annually ($74 billion in all), is required to expand clean cooking solutions by 2030. Much of this investment, nearly 50 percent, is required to expand biogas systems while additional investments of $20 billion and $17 billion cumulatively will be needed for LPG stoves and advanced biomass cookstoves, respectively.[12] The figures seem daunting from a traditional foreign-aid perspective. The next section explains why that's exactly the wrong way to look at it.

9. International Energy Agency, "Energy for All."

10. Ibid.

11. Ibid.

12. Ibid.

Markets, Not Aid

At the risk of oversimplifying the challenge, the key to successfully providing sustainable energy for all will be making the global effort more like cell phones and less like drugs for infectious diseases.

Over the past decade the world has made remarkable progress against HIV/AIDS, malaria, and other infectious diseases. Seven million people now receive AIDS treatment in developing countries whereas virtually none did in 2002. The number of individuals across the globe suffering from malaria, a once neglected disease, has fallen by 17 percent over the last 10 years.[13] While far more needs to be done, progress on infectious diseases at first glance may appear to offer a model for how to end energy poverty.

Unfortunately, that model probably won't work for energy poverty for three reasons. First, the solutions to infectious diseases and energy poverty are fundamentally different. One key to progress on infectious diseases has been the global partnership between developing nations, donors, and pharmaceutical companies, partly via the Global Fund to Fight AIDS, Tuberculosis and Malaria. Through this mechanism, donor nations make bulk purchases of vital medicines intended for poor communities from drug companies at reduced prices. To date, donor nations have disbursed $20.7 billion to help the global poor gain access to modern medical treatment through the Global Fund. While this formula worked for HIV/AIDS and malaria, it seems unlikely to work today for sustainable energy access. Energy solutions are more varied and have higher marginal costs than pills, which means that corporate social responsibility and public-sector bulk purchases are less likely to drive prices down. Second, in these challenging economic, political, and fiscal times, a large increase in development assistance and a new global fund seem politically infeasible. Third, if more official development resources were available now, these funds would probably go to combating disease, ending hunger, and responding to unanticipated humanitarian crises rather than providing sustainable energy for all. The latter cause remains far less understood and less widely supported than more traditional development goals.

Fortunately, massive public funding and corporate charity are not necessary. The phenomenal spread of mobile phones around the world provides a more analogous and hopeful model of success for energy and demonstrates a path forward that is not dependent primarily on official development assistance. Between 2000 and 2010, the number of mobile phone subscriptions in developing countries increased from 215 million to 4.1 billion. Even war-torn Afghanistan had 38 subscriptions per 100 people in 2010, an average of more than one phone per household.[14] By and large, govern-

13. For more information, see the Global Fund to Fight AIDS, Tuberculosis and Malaria (www.theglobalfund.org/en/).

14. Drew Sloan and Rachel Kleinfeld, *Let There Be Light: Electrifying the Developing World with Markets and Distributed Energy* (Washington: Truman National Security Institute, 2012).

ments do not subsidize these phones. Rather, private companies and the poor have found ways to work together that are profitable for both. Markets and consumers, not philanthropy and aid, have driven and are continuing to drive the global technology revolution. The billions living without modern energy need to be seen as potential energy customers. The world needs to find a way to meet the unmet energy needs of local communities in ways that are economically attractive and sustainable for both energy solution providers and the energy poor alike.

Ample evidence exists suggesting this approach could be made to work to end energy poverty rapidly and affordably. Consider these successes. In sub-Saharan Africa, mobile phone towers in rural areas are being equipped with solar power generators that not only keep the towers functioning, but also allow customers to recharge batteries for phones, radios, and lanterns. Telecommunication companies, in other words, are starting to provide reliable, affordable electricity to the poor in ways that make money and also increase demand for their core business. More efficient end-use products—such as LED lighting—require so much less energy that solar technology becomes cost effective. The cost of solar lanterns has declined so much because of technological improvements that the poor can now recuperate upfront costs quickly to begin making money off the purchase. Wind-up radios are helping augment business revenue by improving the quality of information in a variety of sectors, including agriculture and finance. For example, in Rwanda, coffee-processing techniques, international market and pricing information, and interviews with importers and local cooperatives are disseminated through sustainable, wind-up radios, increasing productivity and profits. New seed varieties that require less energy-intensive farming practices allow farmers to offset higher initial seed costs with savings over the planting season.

The task for policymakers is not to convince taxpayers to fully finance a global campaign to end energy poverty by giving away solar lights and cook stoves. Rather, policymakers must understand and promote the strategic interventions governments can make to unlock the latent demand for energy services in poor communities and to facilitate helpful private investments to overcome a variety of market barriers. The next section examines briefly the diverse nature of the leading market barriers that inhibit private investment and the rapid dissemination of available technology solutions.

Barriers to Private Investment

Unlocking the resources and know-how of the private sector to deliver sustainable energy will require the right enabling environment in new energy markets. Specifically, for the private sector to deploy capabilities and capital, risk-adjusted returns in new energy markets need to be positive and competitive. This typically requires investment climates with protection for intellectual property rights, well-developed capital markets where the regulatory environment and pricing signals are clear and stable, and conditions that guarantee the enforceability of contracts and agreements. Importantly, energy pricing must reflect energy production costs

without being held down by harmful subsidies and mandates. Getting much of this right depends on good policy and regulation.[15]

While a thorough review of new learning on energy financing is beyond the scope of this report, barriers to investment are, in general, country-specific and can be divided into four broad categories:

- *Country and currency risks:* Non-energy-specific country and currency risks relate to concerns about governance, rule-of-law, political stability, security of property rights, and losses from the value of local currency. These risks can discourage businesses from investments in large infrastructure and capital equipment that take years to recoup a profit and are not easily moved if political conditions worsen.

- *Energy-specific barriers:* Energy-specific barriers include the difficulties of pricing risk with governments unwilling to allow price increases, as well as concerns over the stability and certainty of energy policy and regulatory frameworks. This includes fossil fuel subsidies that increase the needed rate of return on cleaner alternatives.[16]

- *Infrastructure gaps:* The need to fill infrastructure gaps, such as holes in electricity transmission and distribution systems, as well as incomplete roads and telecommunications networks, can exacerbate up-front capital costs and make day-to-day transactions inefficient and costly.

- *Consumer repayment capacity:* Income volatility makes end-users reluctant to adopt new technologies and take on responsibilities for per-use charges and monthly bills.[17]

Removing these barriers and creating strong enabling environments for private investment in sustainable energy solutions is no easy task. Admittedly, this is the task of development policy in general—creating rule of law, good governance, sound macroeconomic policies, clear property rights, and many other conditions that seem feasible only in the long run. While true, this perspective loses sight of the potential for progress against energy poverty that could be achieved if we were to focus on removing barriers narrowly within the energy sector. A concentrated, highly tailored effort to addressing the largest obstacles could yield substantial near-term progress. The next section of this report explores what can be done to help do just that in 2012.

---

15. Katherine Sierra, "The Green Climate Fund: Options for Mobilizing the Private Sector," Climate & Development Knowledge Network (6 December 2011).

16. Ibid.

17. World Business Council for Sustainable Development, *Business Solutions to Enable Energy Access for All* (Geneva: WBCSD, 2012).

II. Political Opportunity at Rio+20

Once a decade, world leaders assemble at a global summit to promote the elusive goal of sustainable development, based on the idea that economic growth, environmental protection, and social justice must progress simultaneously. This year, world leaders will gather in Rio de Janeiro, Brazil, from June 20 to 22 to mark the 20th anniversary (Rio+20) of the highest profile event of this type: the original "Earth Summit." Sometimes, as in 1992, these global conferences produce significant new treaties and multilateral institutions that shape international cooperation on climate change, biodiversity conservation, and public funding for the global environment. Sometimes these conferences help change the way people think by reframing and redefining global political priorities. The first of these global gatherings (Stockholm 1972) helped raise consciousness about the pace and scale of global environmental degradation. The original Rio conference (1992) introduced the concept of sustainable development and made climate change an issue that global leaders discuss. The most recent of these gatherings (Johannesburg 2002) highlighted that environmental solutions must also contribute to poverty alleviation to be just and durable and focused on the role of the private sector in accelerating progress.

Few people following the preparations for Rio+20 have high hopes for the upcoming summit. No new treaties or global financial mechanisms will be concluded. International negotiations on climate change—the most politically visible sustainable development challenge—are moving very slowly at best. In addition, the accelerating pace of global environmental change more broadly and the emergence of China, India, Brazil, and other new major economic powers have shaken up discussions about international collaboration on sustainable development. The line drawn in Rio in 1992 between the rights and responsibilities of developed versus developing nations no longer works, if it ever did. The old idea that developed nations would lead the way to sustainable development and that developing nations would follow their example makes no sense,[18] but the world has yet to sort out a new political order whereby major emerging economies would assume new responsibilities commensurate with their newfound influence and capacity.

18. This is true for at least three reasons. First, the urgency of sustainable development challenges does not afford this type of staged approach. Global change—be it fresh water scarcity, biodiversity loss, ocean acidification, overfishing, or climate change—will trigger potentially irreversible adverse impacts around the world unless all nations take action. Second, some developing nations now understand that it may not be in their interest to wait for developed nations as "green growth" may well be the best way to achieve their local sustainable development objectives. Third, the costs of transitioning to sustainable development are proving to be far lower in developing nations than developed nations. Building new homes, factories, cities, and economies the right way the first time is far cheaper than retrofitting or converting after the fact.

Compounding substantive disagreement on sustainable development is a broadly held feeling of general fatigue with the multilateral process among governments and civil society stakeholders alike. Bad blood lingers over the many global summits that have yielded little follow through. Suspicion of top-down global policy setting and new enforceable norms is just as high in China as in the United States. Twenty years ago, a global conference on sustainability elicited excitement; today it may only trigger a yawn.

Yet, there is room for optimism on the sustainable energy front despite these all-too-real political and substantive challenges. To begin with, the idea of sustainable energy for all has created excitement with some developed and developing nations alike. In fact, one might even say that the idea has a certain head of steam. The United Nations General Assembly declared 2012 the International Year of Sustainable Energy for All. Denmark has prioritized renewable energy, energy efficiency and energy access during its 2012 presidency of the European Union and will do so at the next session of the Global Green Growth Forum later in the year. Norway has launched an Energy+ partnership to help expand access to modern energy through the promotion of renewable energy and energy-efficiency financing. The Clean Energy Ministerial, a high-level global forum to promote policies and programs that advance the transition to the global clean energy economy, launched the Solar and LED Energy Access Program to facilitate access to improved lighting services for 10 million people.

These and similar efforts are likely to be thrown together in June at Rio+20. U.N. Secretary-General Ban Ki-moon, with the support of a high-level panel of advisers, is seeking to build global support for a "Sustainable Energy for All" initiative (sometimes referred to as "SE4ALL"), which sets objectives for providing universal access to energy, expanding renewable energy, and increasing energy efficiency. Specifically, the Secretary-General proposes that governments, businesses, and civil society commit to three complementary goals to be achieved by 2030: 1) ensure universal access to modern energy services, 2) double the global rate of improvement in energy efficiency, and 3) double the share of renewable energy in the global energy mix.[19] While a minority of countries would prefer that energy remain outside the purview of the United Nations, most nations may be willing to support the Secretary-General's proposed targets as an outcome of Rio. For some countries, energy goals are part of a larger discussion about whether the international community should adopt a broader suite of sustainable development goals, on par with the relatively high-profile Millennium Development Goals (MDGs) that were adopted in 2000 for the year 2015.

19. Originally these goals were conceived as follows: 1) ensure universal access to modern energy services by 2030, which includes fuels such as natural gas, liquid petroleum gas, diesel, and biofuels as well as improved cooking stoves; 2) reduce global energy intensity by 40 percent by 2030; and 3) increase renewable energy use globally to 30 percent by 2030.

Box 2. U.S. presidential politics at the Earth Summit

In 1992, Rio captured the imagination of a generation and shifted political priorities across the world. The event was followed by millions of people, attracted most of the world's leaders, and had significant global and domestic political implications.

In the United States, Rio even played a small role in the presidential elections and helped draw a contrast between the two major candidates. In the spring of 1992, the State Department and White House advisers did not recommend that President George H. W. Bush attend Rio. The United States was not keen on many of the proposed outcomes of the conference, including the draft UN Framework Convention on Climate Change (UNFCCC) and the UN Convention on Biological Diversity. The Bush administration opposed calls from Europe and developing nations to include in the UNFCCC binding emission- reduction targets for developed nations (the kind the United States later rejected in the 1997 Kyoto Protocol). The Bush administration also had major concerns about the biodiversity convention, partly because developing nations were pressing for global sharing of benefits from intellectual property derived from natural resources (such as some pharmaceuticals). Also, the Bush administration, like many governments, was somewhat jaundiced about Agenda 21, the rambling laundry list of actions that nations were supposed to use to implement their global pledges to pursue sustainable development domestically.

Yet, by the summer the president's political advisers had come to a different view. In the 1988 campaign, President Bush had declared "I want to be the environmental president." And not taking part in Rio seemed hard to explain to independent, undecided voters who were paying attention to environmental issues. Also, many global leaders were calling on the president to attend Rio; indeed, for a time it seemed like President Bush might be the only major world leader not in attendance. President Bush's opponent, Governor Bill Clinton, selected Senator Al Gore, a noted environmentalist, as his running mate. The two challengers presented an image of youth and vitality—perhaps captured best by video footage of the pair throwing an American football in front of their campaign bus. President Bush's political advisers grew concerned that environmental voters, particularly young people, would gravitate toward the Clinton-Gore campaign. Suddenly, attending Rio became a small political necessity. Since the president couldn't go to Rio and refuse to endorse all the major outcomes, President Bush in the end signed the climate convention and endorsed Agenda 21. The Democratically controlled U.S. Senate approved the climate treaty before the year was out, making the United States the first major nation to join the pact.

Could a similar dynamic emerge in 2012? Might President Obama and his advisers conclude that attending Rio+20 could help his reelection campaign, even though they may hold the opposite view right now? Quite possibly. The Secretary-General's renewable energy and energy-efficiency targets are quite consistent with the president's domestic energy policies. Some young people and environmentalists are disillusioned with the president's record on climate change and global development, and visible presidential leadership at Rio+20 might help rekindle enthusiasm among these voters without harming his chances with other constituents. Rio+20, in other words, may be a dog whistle—something the president can use to communicate to a part of the electorate without other parts of the electorate reacting. Moreover, by attending the Summit President Obama could help deliver the recommended outcomes for the United States referenced in the final section of this report.

Admittedly, the political conditions for mounting a large-scale global effort to promote sustainable energy are far from ideal. Policymakers in Europe are focused on the eurozone financial crisis and little else. In the United States, slow growth and lingering high unemployment, large budget deficits, partisan differences on foreign aid and climate policy, and limited public interest in Rio+20 all pose significant challenges, too. For their part, major emerging countries appear to have almost no interest in new global goals, particular ones that touch on climate change.

Making the Most of Rio+20

What specific outcomes should nations produce at Rio+20 to catalyze action on sustainable energy for all? The following would represent an excellent start.

First, nations should agree on the idea of concrete goals to help define a shared vision and to measure progress along the way. The goals offered by UN Secretary General Ban Ki-moon of doubling renewable energy, doubling progress on energy efficiency, and achieving universal access by 2030 seem like reasonable places to start this conversation. Ideally, these goals when finalized—either at Rio+20 or shortly thereafter through a time-bound process launched at Rio+20—would articulate clear baselines and metrics against which the world could measure progress.

Second, NGOs and academics should work to change local attitudes regarding renewable energy. Efforts should include a focus on educating local financial institutions that are currently loath to provide credit to rural energy projects or to end-users. This reluctance is generally driven by the local banks' aversion to providing consumption financing to the poor instead of lending for projects that generate new income streams. Also needed is a global scoping exercise to understand households' current energy expenditures. As described above, most poor households could afford modern energy access, which costs less than kerosene and other existing fuels, but are unable to overcome initial capital costs. Understanding current expenditures can demonstrate untapped market potential and provide greater confidence to lending institutions.

Third, nations should empower specific international institutions to fill vital roles in leading the global effort to achieve sustainable energy for all. The World Bank and other multilateral development banks should be asked to dramatically increase their capacity to provide technical assistance to nations seeking to implement sound policies and strategies to achieve sustainable energy for all. The United Nations, working with its member states, should elevate sustainable development and energy within the UN system, creating a clear focal point for implementation actions, not just policy dialogue. The IEA should work with interested governments to turn its helpful quantitative analysis on energy poverty into clear implementation options—for getting the right technologies and policies in place within a range of diverse national circumstances. Donor nations should be asked to

Box 3. Does the world need Sustainable Development Goals?

After 10 years of negotiations, nations committed themselves in 2000 to the United Nations Millennium Declaration, a new global partnership to reduce extreme poverty by 2015 by achieving progress in eight specific development areas. Known collectively as the Millennium Development Goals (MDGs), this blueprint for action includes 21 targets and 60 indicators for measuring progress on international development. The MDGs range from halving extreme poverty to providing universal primary education.

While the world is on target to meet many of these goals, progress has not been uniform or balanced, and China's growth over the past decade accounts for much of it. Yet even if the MDGs have not altered development outcomes, few dispute the fact that they have brought greater awareness and greater resources to bear on global development efforts.

During the original MDG negotiations, no consensus could be reached on an energy or climate change target. The differences among nations on whether climate action would set back other development objectives were too great, as were views on how nations should divide and share responsibility for action.

In the run up to Rio+20, momentum is building to fill this gap through the adoption of new global Sustainable Development Goals (SDGs). The SDGs are envisaged as a complement to the MDGs and would develop clear targets for challenges ranging from clean water access to food security and sustainable energy access. Proposed by Colombia and Guatemala, the SDGs appear to have broad support from nations ranging from Germany to Cuba. Many see it as the most likely major outcome of Rio+20 outside of energy.

Still, disagreement abounds on timing and process, as well as the SDGs' substance and level of ambition. A number of countries, including SDG proponents Colombia and Guatemala, see the need to get started now and hope to use Rio as an opportunity to get countries to commit to targets and an aggressive timetable for action. Most nations, however, recognize that such decisive action is unrealistic given the current lead-time to Rio and would prefer that Rio+20 launch a process to develop the SDGs following the summit. Within the European Union, some development ministers agree on the need for SDGs and would like to see discussions on sustainable development progress in tandem with the MDGs that expire in 2015.

Nations also remain divided as to whether such targets should be negotiated in the General Assembly or agreed to by a coalition of the willing. Furthermore, they have yet to negotiate the substance of the targets, which is likely to be heated and prolonged. Progress on the Secretary-General's sustainable energy for all targets, either inside or outside the official process, may prove to be a critical forerunner to the SDGs.

mainstream sustainable energy for all into their development assistance strategies and budgets. Developing nations should harmonize sustainable energy policies.

Finally, and perhaps most important, leaders in government, business, and philanthropy should form concrete public-private partnerships to pilot innovative, large-scale solutions in specific countries or regions. Here are two examples of the types of efforts that need to be replicated at Rio+20:

- *Lighting Africa:* The World Bank and International Finance Corporation's Lighting Africa initiative, a partnership launched under the Clean Energy Ministerial (CEM) process, is helping develop commercial off-grid lighting markets in sub-Saharan Africa with the goal of bringing off-grid electricity to 250 million people by 2030. By 2015, the effort is projected to have helped drive down solar portable lighting costs by roughly 40 percent and greatly expand market penetration and uptake of off-grid solar lights. The program, which is already being replicated in India, is worth expanding to all of developing Asia where modern energy access remains an acute problem (see map on page 2).

- *Global Alliance for Clean Cookstoves:* Launched in 2010, the Global Alliance for Clean Cookstoves is a public-private partnership among governments, the private sector, UN agencies, and NGOs seeking to establish a thriving global market for clean and efficient household cooking solutions. Led by the UN Foundation, the alliance aims to disseminate 100 million improved cookstoves by 2020 to reduce mortality, improve livelihoods, empower women, and combat climate change. In only its first year, the alliance has facilitated the development of an interim rating system for the evaluation of cookstove models to establish industry standards that ensure quality products enter the market. It conducted comprehensive market analyses of the clean cookstove sector in Brazil, Nigeria, Ethiopia, Timor-Leste, and Indonesia and enhanced the technical capacity of regional stove testing centers in China, Ethiopia, and other regions or countries.[20]

While these initiatives are in their early stages and lack proven track records, they deserve praise for their market orientation and broad participation. Launching or augmenting global partnerships at Rio+20 that match these efforts in scale, breadth, and innovation is essential.

20. Global Alliance for Clean Cookstoves, annual report (November 2011), http://cleancookstoves.org/wp-content/uploads/2011/09/First-Year-Annual-Report.pdf

III. U.S. Leadership on Sustainable Energy for All

What role can the United States play in all this? With a looming presidential election, high unemployment rates, and financial uncertainty, the United States, like many nations, is focused squarely on pressing domestic challenges. There is almost no political appetite for new international commitments and little pressure from U.S. constituents to deliver at Rio+20. Environmental groups are concerned primarily about domestic energy and clean air policies. Development advocates are working hard to avoid draconian budget cuts to foreign aid programs that may flow from the deficit reduction law passed in 2011.

Still, many around the world are eager for stronger U.S. leadership to advance both the vision and promise of sustainable development, and outlining a clear vision and a concrete set of policies for global sustainable development would be good U.S. foreign policy. These are important challenges, and America has much to offer if it decides to engage. To that end, the next section provides a number of politically feasible recommendations for the Obama administration and Congress to consider—ideas that would contribute to the global effort to realize sustainable energy for all at Rio+20.

Support Global Sustainable Energy Goals

To begin with, the United States should support the Secretary-General's sustainable energy for all objectives as a part of a broader SDG process. As noted above, these targets include ensuring universal access to modern energy services, doubling the rate of improvement in energy efficiency, and doubling the share of renewable energy in the global energy mix by 2030. While these goals lack measurability as currently conceived (there are no baselines against which to judge progress) and perhaps also a degree of ambition if defined too loosely, new energy goals (like the MDGs they mimic) would likely bring greater global attention to energy poverty and over time greater resources to bear on sustainable energy deployment. At Rio, therefore, the United States could at a minimum work to ensure that the international community endorses the Secretary-General's objectives and folds them into a member-state driven process to refine and expand by a date certain.

The United States should also support the creation of a broader suite of SDGs that would include but extend beyond the sustainable energy for all goals. At Rio, the U.S. delegation should help launch a process for finalizing these goals and folding them into any revision of the MDGs for the period after 2015.

By and large, the Obama administration has the authority to implement these recommendations and could do so without triggering a cacophony of partisan criti-

cism. Agreeing to nonbinding global goals on sustainable energy would fall within the president's foreign policy powers. Renewable energy and energy-efficiency initiatives historically have been widely supported by liberals, moderates, and conservatives alike. Global goals in these are unlikely to raise the ire of voters and, if they did, would be easy to defend.

Promote Policies That Work

Private companies will invest approximately $5 trillion annually in energy infrastructure projects by 2020.[21] Compared to that amount, the funds needed to ensure that energy decisions work for the poor and the climate are modest—less than 1 percent. Expanding sustainable energy access is within reach if developed and developing governments can use *public policies* both to create the right investment climate for private action, including on energy pricing, and to establish targeted incentives to realign private investment flows.

While good governance and sound macroeconomic conditions are a prerequisite to private sector investment, policy reform in the energy sector presents a more readily achievable, complementary objective. Good policies can help deploy modern, clean, and efficient technologies in power plants, buildings, factories, vehicles, and cities in ways that advance countries' national development strategies. Well-designed building codes, vehicle standards, renewable-energy standards, energy-efficiency standards, urban planning and transit policies, industrial efficiency standards and incentives for clean technologies can achieve renewable energy and energy-efficiency targets, while lowering the price to operators and encouraging greater market penetration. For example, China established its first energy-efficiency standards in 1999, and by 2008 it had enacted national standards covering 18 major types of appliances. From 2000 to 2005, these standards lowered energy consumption by 47 terawatt-hours, reduced CO2 emissions by 50 million metric tons, and saved $3.4 billion.[22]

It's not just major economies that are making the link between energy policy and success on development. In Ethiopia, for instance, a $5 million scheme to distribute compact fluorescent light bulbs obviated the need to spend $100 million to lease and fuel diesel power plants. Vietnam, too, has met rapidly growing demand for energy in part through efficiency investments. In 2009, Bangladesh realized that its national electrical grid lacked sufficient capacity to meet growing demand. After examining the cost of building an expensive new power plant in consultation with the World Bank, the government concluded that it could reduce energy demand and increase economic growth by phasing-out incandescent lights and replacing them with high-quality compact fluorescent bulbs. An independent

21. Hal Harvey and Laura Segafredo, *Policies That Work: How to Build a Low-Emissions Economy* (San Francisco, Calif.: ClimateWorks Foundation, 2011).

22. Ibid.

World Bank assessment found that this project did more to promote development, increase energy access, and reduce climate change per dollar expended than any other intervention sponsored by the World Bank.[23]

Eliminating regressive energy subsidies would also go a long way toward expanding sustainable energy access. In 2010, governments worldwide spent more than $300 billion to subsidize fossil fuels. Roughly 85 to 90 percent of the benefits accrue to middle-income and wealthier groups, since the poor typically do not use a lot of energy.[24] At the same time, fossil fuel subsidies encourage inefficient, carbon-intensive use of energy, and can build powerful and harmful political constituencies for preserving this arrangement.

Since reforming policy is so central to success, how could the United States promote knowledge sharing and implementation? How could it help rapidly spread best-practice sustainable energy and energy access policies across the world?

Making technical assistance from leading experts on this topic readily available to governments with the political will to act would be one sensible solution. Expertise about how to pursue clean energy and energy access exists in numerous organizations around the world; however, significant gaps in understanding, capacity, and regional coverage remain. Almost 90 percent of the development strategies submitted by nations to the World Bank identify smart energy and climate change policies as one of their top priorities, a massive increase from a decade ago. More than half of the developing countries in the G-20 identify a need for greater capacity on energy issues, especially among government agencies and regulators. In addition, many of these have identified a specific need for technical assistance relating to best-practice policies.[25] Furthermore, most multilateral, national, and independent centers of excellence in energy policy lack the resources and capacity to respond quickly to requests for technical assistance from developing nations and other stakeholders. Overcoming these capacity challenges at the international and local level is absolutely vital to promoting sustainable energy for all.

At Rio+20, the United States should offer concrete ideas for how to scale up technical assistance and knowledge sharing on best-practice policies to help achieve the sustainable energy for all goals on access, energy efficiency, and renewable energy. For example, the Clean Energy Solutions Center, a virtual network of experts on and tools for energy policy funded by the United States and Australia through the Clean Energy Ministerial, should be expanded. The virtual network should inte-

23. Independent Evaluation Group (World Bank), *Phase II: The Challenge of Low Carbon Development, Climate Change and the World Bank Group* (Washington: World Bank, 2010).

24. Harvey and Segafredo, *Policies That Work*.

25. Abigail Jones, Christian Downie, and Nigel Purvis, "A Proposal for a Consultative Group on Low Emissions Development," Resources for the Future Discussion Paper 11-25 (June 2011).

grate the technical capacity of existing bricks-and-mortar centers of applied policy research across the world. Strengthening this global network would enable nations to build domestic capacity and gather helpful insights about how best to achieve sustainable energy for all, building on lessons learned elsewhere. To be effective, these institutions should be prefunded by the international community to assist any government with the political will to tailor and implement proven policies for achieving sustainable energy for all. This theory of change—spreading knowledge through a global network of experts that serves as a global public good that governments can access largely without cost—is precisely how the international community spread the knowledge needed for the green revolution in the 1960s via the Consultative Group for International Agricultural Research (CGIAR). While the subject matters are quite different, the challenge is fundamentally the same: ensuring that people everywhere learn what has worked elsewhere and apply those lessons locally in appropriate and tailored solutions. In the case of energy, as was true for agriculture, implementing the right policies will be essential to success. The world needs to invest now in building capacity to help nations identify, adopt, and implement nationally appropriate policy solutions for sustainable energy for all.

Create a New Investment Vehicle

The primary challenge when it comes to financing is not a lack of money but rather a lack of suitable investment vehicles. According to the IMF, long-term institutional investors in 17 OECD countries held $60 trillion in total assets, while total bank assets amounted to an additional $72 trillion in 2009. Institutions and companies that are interested in earning investment returns on clean energy projects with good development outcomes manage a healthy portion of these funds. The California Public Employees' Retirement System (CalPERS), for example, has assets valued in excess of $200 billion. The Abu Dhabi Investment Authority holds $627 billion in assets; China's SAFE Investment Company likely manages $568 billion, while the Norwegian Government Pension Fund Global manages $560 billion.[26] Venture capital funds, including Generation Investment Management and Kleiner Perkins, have $2.83 billion and $1.5 billion in assets under management, respectively. These investors and many others are actively looking for opportunities to make money in ways that promote the global clean energy revolution.

What's missing is neither interest nor funds, but rather an abundance of investment-grade opportunities; there just are not enough projects that meet basic investment criteria. To attract big money, investment opportunities need to be 1) large-scale, 2) liquid, and 3) clear about the level of risk involved. Currently, none of these conditions are met. Take scale, for example: a typical solar photovoltaic mini-grid may generate 10 to 100 kilowatts of power and cost considerably less than $1 million. These projects need to be bundled into investment opportunities

26. For more information, see the Sovereign Wealth Fund Institute (www.swfinstitute.org).

with total capital requirements at roughly the $500 million level to get the attention of large institutional investors. Liquidity is also lacking. Energy projects in the developing world are generally not securitized—meaning that investors cannot buy and sell ownership stakes in them quickly and easily, and project risks are not spread out over a larger class, as needs to occur to reduce risk to manageable levels. Few investors in London or New York are willing to investigate the risks involved in specific solar lighting projects in small villages in Tanzania or mini-grid projects in rural India. Very few investors are willing to invest large sums in projects when they have no means of easily reselling the resulting equity or debt interests when investment strategies or conditions change.

To overcome these barriers, new investment vehicles and institutions are needed to aggregate projects to an investment-worthy scale, distribute project risks across broad sectors and regions, and to give birth to vibrant secondary markets that provide adequate liquidity. None of this seems likely to happen without government encouragement. The United States is the logical country to lead an effort given the size of its venture capital and investment community, the prominence of its financial markets and exchanges, and its tradition of support for business-oriented foreign investment agencies, such as the Overseas Private Investment Corporation (OPIC) and the Export-Import Bank (Ex-Im).[27]

To attract new capital flows and change the asset allocation strategies of private and official institutional investors, the United States should announce at Rio+20 its commitment to work with other nations to develop a new "deal flow generator"—a new mechanism within existing international financial institutions that would connect long-term investors (including pension funds, life insurance, endowment funds, and sovereign wealth funds) with sustainable energy for all investment opportunities. This new mechanism would 1) aggregate sustainable energy projects to create large-scale investment opportunities, 2) perform due diligence on projects and rate investment opportunities to help private investors manage risk, and 3) cluster projects or securitize them to create liquid and tradable assets that could be traded on private secondary markets. These tasks are well-suited to the sort of public-private interventions that are expected to form the centerpiece of Rio+20.[28] The United States should team with progressive pension funds and sovereign wealth funds to pilot such a mechanism with the goal of mobilizing at least $5 billion in new investments aligned with sustainable energy for all goals by 2015.

---

27. OPIC funds provide investors with financing, guarantees, political risk insurance, and support for private equity investment funds, while Ex-Im is the official export credit agency of the United States and assists in financing the export of U.S. goods and services to international markets.

28. Other reforms are also required on both the demand and supply sides to encourage long-term investment, including within the respective regulatory environment and domestic bond terms of each country in which projects are financed.

Such a mechanism would naturally build on the work being done in the context of the Brazil-U.S. Joint Initiative on Urban Sustainability (JIUS), a platform seeking to mobilize large-scale investment in green infrastructure in both Rio de Janeiro and Philadelphia. As part of this initiative, partners are working to aggregate and bundle small-scale infrastructure projects into investment-size portfolios for diverse investors ranging from the World Bank to Goldman Sachs.[29] Scaling up this effort to the global level to support sustainable energy for all would provide a useful starting point.

De-risk Private Investment

Working at the global level is essential, but the United States should also harness the power of domestic laws and institutions to deliver sustainable energy for all by 2030. As noted above, because of widespread latent demand for clean, affordable energy among the poor, new energy markets in developing nations could be worth several tens of billions of dollars a year within a decade. But for the reasons mentioned in broad strokes previously—shortcomings in governance, rule of law, and other investment conditions—persistent risks for U.S. companies remain. Large-scale energy projects, in particular, often require large upfront investments, a consistent policy environment, and decades of economic, political, and social stability before turning a profit. In view of these barriers, U.S. companies may miss out on new energy market opportunities in the developing world absent government assistance.

The U.S. government should act swiftly to ensure U.S. companies have every opportunity to compete by helping American corporations manage a wide variety of sovereign and investment risks. The export credit agencies of the United States, primarily OPIC and Ex-Im, are the principal means by which the federal government assists U.S. companies reduce the risk of international commercial transactions in developing nations. To its credit, the Obama administration has already dramatically increased lending through OPIC for clean energy. In FY2010, OPIC provided about $150 million to support the deployment of sustainable energy technology in developing nations. In FY2011, OPIC finance in this area ballooned to over $1.1 billion. This is a positive initial step.

In the run-up to Rio+20, the United States should announce a suite of new initiatives to extend further the impact of OPIC and Ex-Im. In addition to more funding, which remains essential, the United States should expand beyond the use of traditional techniques—such as issuing loan guarantees, securing affordable credit, and offering political risk insurance—by having U.S. export credit agencies offer new products. First, these agencies should consider establishing "first loss" funds that would give passive private investors additional confidence because public investors would absorb initial losses. This would help exporters and U.S.

29. Shalini Vajjhala, Global Leaders Forum Presentation, Johns Hopkins School of Advanced International Studies (Washington), March 16, 2012.

investors in energy projects attract larger amounts of affordable private capital because expected rates of return for private investors would be larger with the government sharing the downside risk. Second, our export credit agencies should do more to incubate good investment ideas in the clean energy sector and help translate those concepts into finely tuned business plans. Dedicated seed funding to help small and medium businesses work with developing countries to develop sustainable energy projects would be a good start. New programs in this area would guide U.S. companies over the valley of death between inspiration and profitability.

Third, U.S. export credit agencies should be encouraged to cofinance projects with their counterparts in Germany, Japan, and other developed nations to more effectively align and leverage available global public funding. Ironically, many of the developed countries with the strongest domestic climate policies are doing the least to ensure their export credit agencies promote renewable energy, energy efficiency, and energy access abroad. Lending standards and environmental safeguards are required to ensure that energy sector projects support the goals of sustainable energy for all. Finally, U.S. agencies should be allowed to take equity stakes in private transactions that produce exceptionally high public policy benefits, particularly on clean energy. Equity investments from the U.S. government would attract other investors on favorable terms and help close more deals. A new equity fund reserved only for equity investments that had high expected returns from a sustainable energy for all standpoint would move the U.S. government from being a mere lender to a genuine business partner. Admittedly, some of these measures would expose the U.S. government to additional risk and would require Congressional consent. But, if managed well, these risks would also bring higher returns on investment for the U.S. government and thus strengthen the self-financing model that contains costs and ensures U.S. export credit agencies enjoy broad support.

In general, efforts to promote U.S. exports and create good domestic jobs in the energy area are also popular at home. In this context, providing technical assistance to help nations reform policies in ways that would increase markets for U.S. sustainable energy products and services would make sense to the public. Although additional resources for jumpstarting U.S. support for sustainable energy for all would require Congressional approval, these could be found within the existing Federal budget, and thus need not become politically problematic. Energy assistance represents a tiny portion of foreign aid disbursements (approximately 2 percent), which itself is less than one percent of the federal budget. Doubling U.S. energy assistance programs and lending to implement the strategy advanced here would represent an affordable and a politically realistic down payment on U.S. leadership.

While U.S. funding for export credit agencies has become a minor partisan sticking point this year—as a symbol of corporate subsidies—these programs have traditionally been popular in Congress and with the American people. Expanding and reforming these programs in ways that require Congressional consent may not be possible this election year, but should prove achievable in the near future.

Conclusion

A major global effort to promote energy efficiency, renewable energy, and energy access in the name of sustainable energy for all would produce tremendous benefits for international development and the climate. While the economic, fiscal, and political conditions for such a campaign are far from ideal, the Rio+20 summit in June 2012 presents a number of important opportunities for progress. With the right preparations, Rio+20 could help set clear and compelling global clean energy and energy access goals, while also launching innovative public-private partnerships to move the world decisively toward action.

The United States must do its part to energize Rio+20. Specifically, the United States should support the UN Secretary-General's sustainable energy for all targets and help launch a process to ground them in a broader suite of SDGs as part of a revised MDG process. The United States also should help spread best-practice energy policies by pressing for a scaled-up, more coherent global mechanism for knowledge sharing and technical assistance, including by expanding and linking the Clean Energy Solutions Center to a bricks-and-mortar network of the world's leading experts on energy efficiency, renewable energy, and energy access policies. Moreover, the United States should use Rio+20 to launch a collaborative effort with private banks and investors to design, most likely within an existing international financial institution, a mechanism for aggregating and securitizing smaller-scale clean energy projects in the developing world to help mobilize the roughly $48 billion a year needed to reach universal energy access by 2030. Domestically, the United States should adjust its export credit policies to help U.S. companies profitably meet the latent demand for clean energy in poor nations, thereby creating new markets for American goods and services.

Focusing as they do on unleashing private enterprise, stimulating economic growth, and expanding trade, these measures would advance U.S. economic, development, and climate goals in ways that would attract broad political support at home and abroad. Sustainable development requires sustainable energy, and the United States should be at the forefront of promoting both.

ENERGIZING RIO+20

HOW THE UNITED STATES CAN PROMOTE SUSTAINABLE ENERGY FOR ALL AT THE 2012 EARTH SUMMIT

2012 Center for Global Development
ISBN 978-1-933286-71-6

Center for Global Development
1800 Massachusetts Ave. NW
Washington DC 20036

www.cgdev.org