

ELECTRIFY AFRICA ACT OF 2015

REPORT TO CONGRESS

INTRODUCTION

In 2013, President Obama launched *Power Africa*, a partnership among the U.S. Government, African governments, bilateral and multilateral development partners, and the private sector to improve access to electricity in sub-Saharan Africa. During the U.S.-Africa Leaders Summit in August 2014, the President tripled Power Africa's goals, setting new targets to increase access to electricity by 30,000 megawatts (MW) generation capacity and 60 million household and business connections.

At the inception of the initiative, the White House assembled 12 U.S. Government Departments and Agencies to collaborate in support of doubling access to electricity in sub-Saharan Africa. The U.S. Government agencies brought diverse expertise in finance, trade, technical assistance, governance, energy markets and economic development support. Today, Power Africa is a U.S. Government-led initiative that is bringing together a global network of private sector partners, African governments, and development partners to tackle the challenge of electrifying Africa.

The interagency Power Africa Working Group (PAWG) was established to guide and coordinate the implementation of Power Africa. Co-led by the National Security Council and USAID, PAWG members include the Departments of State, Treasury, Agriculture, Commerce, Energy, as well as the U.S. Export-Import Bank, (EXIM), U.S. Agency for International Development (USAID), Millennium Challenge Corporation (MCC), Overseas Private Investment Corporation (OPIC), U.S. African Development Foundation (USADF), U.S. Trade and Development Agency (USTDA), and the U.S. Army Corps of Engineers (Army Corps). Power Africa also involves the partnership of African partner governments, private sector companies, multilateral and bilateral development partners, and civil society organizations. The development partners include the African Development Bank (AfDB), the World Bank Group (WBG), the European Union (EU), the Governments of Canada, Norway, Sweden, and the United Kingdom, the U.N.'s SE4ALL initiative, the AU's NEPAD Agency, and the International Renewable Energy Agency.

In February 2016, Congress passed and the President signed into law, the Electrify Africa Act of 2015 (P.L. 114-121) to encourage the efforts of countries in sub-Saharan Africa to develop an appropriate mix of power solutions, including renewable energy, for more broadly distributed electricity access in order to support poverty reduction, promote development outcomes, and drive economic growth. The Statement of Policy in the Electrify Africa Act of 2015 states that that it is the policy of the United States to promote first-time access to power and power services for at least 50 million people and encourage installation of at least 20,000 additional MW of electrical power by 2020.

On behalf of the U.S. Government Departments and Agencies collaborating on Power Africa, this report is submitted pursuant to the requirements of the Electrify Africa Act of 2015. To the degree possible, the report is organized to reflect key legislative elements as required.

SECTION 4

Development of a Comprehensive Multiyear Strategy

As directed by the Electrify Africa Act of 2015 (P.L. 114-121), the U.S. Government is establishing a comprehensive, integrated, multi-year strategy to encourage the efforts of countries in sub-Saharan Africa to implement national power strategies and develop an appropriate mix of power solutions to provide access to sufficient, reliable, affordable, and sustainable power in order to reduce poverty, drive economic growth, and create jobs consistent with Section 3: Statement of Policy.

The Statement of Policy in the Electrify Africa Act of 2015 states (in part) that it is the policy of the United States to promote first-time access to power and power services for at least 50 million people and encourage installation of at least 20,000 additional megawatts (MW) of electrical power by 2020.

The strategy required maintains sufficient flexibility for and remains responsive to concerns and interests of affected local communities and technological innovation in the power sector.

Power Africa lays out in the *Power Africa Roadmap: A Guide to Reaching 30,000 MW and 60 Million Connections* (Roadmap) a 15-year strategy (2016-2030) that will guide how Power Africa and all of its partners will achieve these ambitious goals to increase access to electricity in sub-Saharan Africa. Power Africa's goals also align with the goals of increasing access by 50 million people and at least 20,000 MW by 2020 as articulated in the Electrify Africa Act of 2015.

Power Africa focuses on three strategic pillars:

1. Achieving 30,000 MW of increased generation by supporting existing transactions expected to reach financial close and advancing new transactions by 2030;
2. Achieving 60 million connections through on-grid and off-grid expansion by 2030; and
3. Unlocking energy sector potential through reforms, capacity building, and strengthened national and regional power pools.

Partnership is at the heart of this strategy, including partnerships with (1) African governments and institutions that set national and regional power priorities and policies, finance projects, and create the enabling environment necessary for power sector transactions to move forward; (2) the private sector, which includes developers, project sponsors, financiers, equipment suppliers, and industry associations; (3) development partners, including multilateral institutions and bilateral governments that provide direct support for power sector transactions and assist our government partners to improve sector governance; and, (4) civil society organizations (CSOs), ranging from international non-governmental organizations to local African non-governmental and community-based organizations.

The coordination and sharing of information regarding efforts by governments, development partners, and private sector leads to greater impact. Through workshops, memoranda of understanding (MOUs), and the joint development of plans and implementing approaches, the success of Power Africa's strategy hinges in large part on ensuring stakeholder alignment across a country's power sector.

Assisting countries in sub-Saharan Africa to establish track records of successful power projects is critical to attracting and sustaining future investment flows in energy infrastructure development. Power Africa's integrated strategy enables sub-Saharan African countries to create the hard infrastructure (power plants and grids) as well as the soft infrastructure (institutional capacity, policies, and regulatory frameworks)

necessary for long-term, sustainable power sector growth. Power Africa’s focus on facilitating increased private sector participation is among the most sustainable and practical ways to increase access to affordable and reliable energy in sub-Saharan Africa and underpins the strategic approach.

Power Africa’s tools for achieving its objectives include (1) support for effective project preparation; (2) transaction assistance; (3) access to finance; (4) risk mitigation; (5) policy and regulatory design and reform; (6) improved power sector governance; (7) capacity-building and technical assistance; (8) legal assistance; and, (9) convening and coordination.

To help advance transactions across the continent, Power Africa deploys power sector experts to serve as transaction advisors to help support private sector partners and host governments identify and overcome obstacles to private sector investment in the energy sector. We expect the number of transaction advisors, which currently number more than 30, to grow as demand for services in support of this strategy increases. These on-the-ground experts work to remove the technical, financial, and policy barriers slowing down individual transactions, and help connect various stakeholders with innovative solutions, such as new risk mitigation tools, and encourage reforms needed for a robust enabling environment for private investment in the power sector.

To help private sector developers overcome hurdles, Power Africa provides and/or facilitates access to a range of financing and risk mitigation mechanisms. This includes equity investments from private sector partners for small-to-medium renewable energy projects, loan guarantees, senior and mezzanine financing, grants, project preparation support, technical assistance, export finance, and political and commercial risk insurance.

Effective management is critical for expanding and sustaining a country’s power sector. To this end, Power Africa works with governments that demonstrate the political will to implement difficult, but necessary, reforms, reduce corruption, prioritize commercial viability and financial soundness of the sector, open their energy markets to private investment, and improve the design and management of their power sectors. The Department of State and other Power Africa USG agencies work with African governments to encourage the changes necessary to attract more concentrated Power Africa support.

Similarly, regional and country teams, located at U.S. embassies and development partner missions throughout sub-Saharan Africa, work directly with local governments and institutions to optimize the use of our partners’ resources to build local capacity. These teams help local governments to implement the specific reforms necessary to advance transformative transactions.

Technical assistance and capacity-building support also ensures that local governments will be able to oversee a sustainable power sector long after Power Africa’s strategic efforts are implemented.

Using this diverse set of tools, Power Africa is catalyzing “first-of-their-kind” transactions that will create pathways for future projects to move forward without USG involvement. Power Africa will unlock and accelerate the development of sustainable power sectors by removing barriers to investment and strengthening the enabling environment.

Pillar 1) Promote First-Time Access to Power and Power Services for at Least 50,000,000 People by 2020

Power Africa aims to meet and exceed Electrify Africa’s goal of providing first-time access to power and power services for at least 50 million people by 2020 by focusing on expanding both on-grid and off-grid

access. With an average of five people per household, expanding access to 50 million people will require 10 million new connections. Power Africa aims to exceed this target by achieving at least 10 million new grid connections *and* 10 million new off-grid connections by 2020. In addition to these 20 million new connections, as laid out in the Roadmap, Power Africa aims to achieve 40 million additional connections, or 60 million new connections in total, by 2030.

Power Africa aims to facilitate new on-grid connections by scaling-up support for large-scale urban and rural grid roll-out programs. The growth, scale, and density of sub-Saharan Africa's urban populations provide an opportunity to connect millions of people to the grid for the first time by addressing affordability constraints, facilitating innovative payment models, and supporting utilities. In addition, many households in peri-urban and rural areas live close enough to existing infrastructure that they can be economically connected in the near-term through grid extensions. While African partner governments are responsible for managing and coordinating their grid development, Power Africa will continue to work with its development partners to mobilize technical and financial support for every step of the transmission and distribution value chain (including planning, regulatory reform, financing, procurement, and project management) to significantly increase the likelihood of successfully expanding on-grid access. Power Africa also intends to leverage the expertise and resources of development finance institutions (DFIs), export credit agencies (ECAs), and the private sector to mobilize the large volume of capital needed to drive grid expansion projects, especially where utilities remain publicly owned. Where utilities are private companies, Power Africa will work with its partners to improve their performance and bring in new investment to help fund transmission and distribution expansion.

In addition, there are millions of people who live beyond the projected reach of the grid. For these consumers, off-grid solutions, such as solar home systems, micro-grids, and mini grids will provide them access to electricity. To reach these households, *Beyond the Grid*, a Power Africa sub-initiative supporting off-grid and small-scale solutions, will partner with the private sector, African partner governments, development partners, and CSOs to connect households and businesses through off-grid energy solutions. Power Africa's *Beyond the Grid* strategy reflects not only the importance of off-grid options for meeting rural households' power needs, but also the role of the private sector in delivering power to rural communities. Power Africa's strategy is designed to attract even greater levels of private sector involvement, crowding in additional investment. Currently, the off-grid space is more open to private intervention than the grid-connected sector, since many utilities that manage national grids are still state-owned. In addition, private companies have brought great innovation to the off-grid space, and the strategy includes efforts to continue to make resources available to help scale-up successful models and develop new ones which will lead to greater numbers of people connected.

Pillar 2) Installation of at Least 20,000 Additional Megawatts of Electrical Power by 2020

Power Africa will increase generation by supporting at least 20,000 MW of additional electrical power to reach financial close by 2020, and more than 30,000 MW by 2030, using a transaction-centered approach. Supported transactions vary in capacity and fuel source depending on country needs and resources. Further, Power Africa also supports transmission and distribution projects (public and public-private) that unlock generation capacity and rehabilitate faulty grids that fail to deliver power to end-users.

To reach the 20,000 MW goal by 2020, Power Africa will pursue three integrated approaches:

1. Focus on maximizing value from existing transactions that Power Africa currently tracks that could reach financial close by 2020 -- approximately 12,000 to 13,000 MW. To do so, Power

- Africa will expand early and late-stage transaction support, and provide finance support through a variety of mechanisms and partners to accelerate project timelines to reach financial close and commissioning.
2. Advance new deal flow by increasing support to natural gas and renewable energy transactions -- approximately 7,000 to 9,000 additional MW.
 3. Increase generation efficiency at underutilized power plants by improving plant management and/or financing repairs or full refurbishments -- approximately 1,300 to 2,000 MW.

Pillar 3) Unlocking Energy Sector Potential

Power Africa directly links transactions and access goals to policy, regulatory and enabling environment imperatives. Power Africa activities include policy and regulatory design and reform, as well as capacity building and technical assistance with local governments and local and regional institutions, emphasizing long-term engagement and sustainable growth. This work removes obstacles to specific projects, and builds capacity to sustain future transactions, facilitate additional growth and investment, increase host country institutions governance frameworks, and support regional power trade. Activities reflect prioritized issues and constraints, and respond to objectives and commitments of host governments towards strengthened policy, regulatory, and governance in the power sector.

Power Africa's investments and interventions are based on the Power Africa "Enabling Environment Principles"¹ which outline key characteristics and capacities of national power systems that facilitate responsible investment. Power Africa has identified enabling environment objectives consistent with these principles in host countries through MOUs and other ongoing dialogues. The focus is on incremental and tangible improvements, and integration of best practices to achieve objectives. Power Africa also supports bilateral power trade and the strengthening of regional power pools to optimize national and regional power generation and transmission investments.

In countries where it is implementing Compacts or Threshold Programs with a focus on the power sector, the Millennium Challenge Corporation (MCC) activities lead Power Africa policy and regulatory interventions. Technical assistance and transaction support provided through Power Africa in these countries is aligned with and complementary to MCC activities.

The U.S. Agency for International Development (USAID)-supported mechanisms that facilitate enabling environment improvements include the African Governance Initiative (AGI) Senior Advisors Group, the African Legal Support Fund (ALSF), the Department of Commerce (DOC) Commercial Law Development Program (CLDP), Delivery Units, the National Association of Regulatory Utility Commissioners (NARUC) and the U.S. Energy Association (USEA). The Clean Energy Solutions Center administered by the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) is another available resource where African governments can seek technical assistance and capacity building support.

¹ Strong, Transparent Legal and Regulatory Frameworks, Creditworthy Off-takers, Cost-Reflective Retail Tariff Structures, Technical and Commercial Efficiency, Clear and Transparent Procurement Processes, Sound, Strategic and Integrated Power Sector Planning, Streamlined and Transparent Processes for Project Development, Increased Clean Energy Share, Strong Regional Power Pools, Universal Electricity Access, Achieved through the Strategic Use of On-grid, Off-grid, and Small-scale Solutions, Adherence to Internationally-Recognized Environmental and Social Standards and Best Practices and Gender Equality and Female Empowerment

Power Africa has also established an interagency “Policy Sub-Working Group,” co-chaired by the Department of State and USAID, which serves as a forum for discussion, collaboration, and alignment among interagency actors to ensure that discussions and actions associated with host country policy issues, enabling environment assistance are well coordinated, and help promote policy coherence. As Power Africa implements the Roadmap, the Policy Sub-Working Group’s role includes identifying policy objectives and interventions--in specific countries or in regions--that can improve the enabling environment and developing strategies for implementing those interventions or encouraging governments to pursue the necessary policy changes.

SECTION 4 (b)(2)

General description of efforts in sub-Saharan Africa to (A) Increase power production; (B) Strengthen electrical transmission and distribution infrastructure; (C) Provide for regulatory reform and transparent and accountable governance and oversight; (D) Improve the reliability of power; (E) Maintain the affordability of power; (F) Maximize the financial sustainability of the power sector; and (G) Improve non-discriminatory access to power that is done in consultation with affected communities.

In 2013, the White House assembled 12 U.S. Government agencies to collaborate together to double access to electricity in sub-Saharan Africa. The U.S. Government agencies brought diverse expertise in project preparation, finance, technical assistance, governance, energy markets and economic development support. Today, Power Africa is a U.S Government-led initiative that is bringing together a broad coalition of private sector partners, African governments, and bilateral and multilateral development partners to tackle the challenge of electrifying Africa.

(A) Increase Power Production

The lack of “bankable” projects in sub-Saharan Africa remains a significant obstacle to getting sufficient electricity production to meet the growing demand on the continent. Projects often stall because of the lack of financing, political and economic risks, corruption and poor management, or inadequate supporting infrastructure. Power Africa is working with private sector partners and African governments to address these barriers to investment and catalyzing power projects to reach financial close and eventually commissioning.

To identify projects that could, with Power Africa support, become “bankable,” Power Africa deploys transaction advisors to work on the ground with African governments, developers, investors, banks, and other private sector stakeholders to identify the financing and risk mitigation resources needed to finance power projects. Power Africa’s advisors also support African governments to build their capacity to effectively and transparently negotiate private sector deals. The advisors also can work with governments to identify policy hurdles that are preventing or slowing an influx of private investment in the electricity sector and help the governments address those hurdles.

To date, Power Africa helped support projects expected to generate nearly 4,600 MW to reach financial close. These projects represent approximately 20 percent of the total additional capacity targeted for 2020. To achieve the goal of adding 20,000 MW by 2020, Power Africa will expand early-stage transaction support to the projects that are currently in the feasibility and conceptual design phases, using a combination of risk mitigation tools and project preparation support. In addition, transaction advisors will be deployed to support Independent Power Producers as they work to finalize, for example, the financial

structure of a transaction, power purchase agreements, and address potential policy or regulatory barriers, for those late-stage projects that are further along in their development. Power Africa will continue to connect project developers with development partners and with private financiers and help develop and test innovative financing mechanisms that reduce risk for private investors.

Based on the current projects under development in sub-Saharan Africa receiving Power Africa support, we anticipate that projects expected to generate 12,000 MW will reach financial close by 2020. The estimated new capacity still leaves a gap of approximately 8,000 MW to reach the Electrify Africa goal of 20,000 MW. Power Africa anticipates that there will be large opportunities in a rapidly growing market for additional solar and gas power that can bridge this gap. Solar opportunities have grown rapidly in Ethiopia, Kenya, Ghana, Nigeria, Rwanda, Senegal, South Africa, Tanzania, and Zambia in particular. Natural gas is an abundant resource in some sub-Saharan African countries, and Power Africa aims to support new gas-to-power deals across the continent, including in Nigeria, Ghana, and Kenya.

U.S. Government agencies are working to increase power production through technical assistance, capacity building, financing, risk insurance, and diplomatic engagement. For example, MCC's locally-driven approach has led it to invest in projects in the power sectors in Malawi, Liberia, Ghana and Benin through its compacts, and in Sierra Leone through its threshold program, including:

- Funding the rehabilitation of the Nkula A hydropower facility in Malawi which will result in an increase in its current capacity from 24 MW to 36 MW.
- Co-funding the rehabilitation of the 88 MW Mt. Coffee Hydropower facility in Liberia, building upon project preparation support from the U.S. Trade and Development Agency (USTDA).
- Working with the Government of Benin to fund multiple utility scale solar photovoltaic (PV) facilities with the participation of developers and project finance lenders. In aggregate, support to Benin represents about 78 MW of generation, through investments in solar (45 MW), thermal rehabilitation (32 MW) and hydro run of river unit rehabilitation (1 MW). These additions to capacity are equivalent to one-third of the country's peak demand.

The Overseas Private Investment Corporation (OPIC), the U.S. government's development finance institution (DFI), has played a key role in supporting many utility-scale Power Africa projects with debt financing and political risk insurance commitments that surpassed \$1.6 billion at the end of fiscal year 2015, exceeding OPIC's \$1.5 billion initial commitment under Power Africa. OPIC has also mobilized more than \$3 billion in private sector investment to support 19 Power Africa projects. These projects are expected to create almost 1,500 MW of new generation capacity. This achievement comes years ahead of schedule for OPIC, and the agency is already on its way to fulfilling its additional \$1 billion commitment in support of Power Africa by 2018, announced during President Obama's trip to Africa in 2015. For example:

- OPIC has committed more than \$320 million in financing and insurance for two natural gas power generation facilities in Nigeria and Ghana. In Ghana, OPIC provided financing to Amandi Energy Limited to support construction of a 190 MW combined cycle gas turbine power plant in Aboadze, a coastal city in western Ghana. In Nigeria, OPIC provided support for the 450 MW Azura-Edo open cycle gas turbine power plant.

- In Senegal, OPIC has disbursed \$91 million in financing for the Cap des Biches project, a modern, 53 MW combined-cycle thermal plant, which is helping Senegal address the growing demand for baseload electricity in the country. Another \$71 million in OPIC financing and insurance has been approved to expand the plant by an additional 33 MW.
- OPIC committed \$233 million in financing to support the construction and operation of the 100MW Kipeto wind power project located in Kajiado, Kenya, a rural area 40 miles south of Nairobi.
- OPIC is supporting other utility-scale renewable power projects, including the Lake Turkana wind power plant in northern Kenya and the Redstone solar power plant in South Africa.
- OPIC helped develop a document that outlines 10 essential elements for Power Purchase Agreements (PPA), which are contracts between power producers and off-takers. PPAs are a crucial part of ensuring long-term financial sustainability of a project.

In support of Power Africa, USTDA has increased its energy portfolio in Africa by over 300 percent. USTDA's Power Africa portfolio includes 43 projects in eight countries under Power Africa. Together, these projects have the potential to generate 860 MW of clean energy that will provide electricity to up to 1.7 million households, or 8,500,000 people. This early-stage investment has the potential to mobilize over \$6.8 billion in private and public financing during implementation. This is based on USTDA funding of just under \$26 million, so it could deliver returns hundreds of times the initial investment. In particular:

- In Rwanda, USTDA grants to two small hydropower projects supported the design and analysis that enabled small Rwandan businesses to secure funding and begin building power plants that will supply electricity to hundreds of thousands of people as well as a hospital that previously had unreliable access.
- Oorja Prototonics (Fremont, California) is demonstrating, with USTDA assistance, the capability for its fuel cells to power cell towers across Africa, replacing diesel generators and supplying more reliable cellular service.
- With the help of USTDA grant funding, Tennessee-based Hecate Energy is helping the University of Dodoma in Tanzania develop a 55 MW solar plant that will power the University and its medical clinic. In addition, the agency is connecting the University to Ohio State University as part of an effort to develop the curriculum in East Africa for renewable energy studies.
- USTDA also sponsored a reverse trade mission that brought key Ghanaian energy officials to the United States to meet with U.S. companies and discuss mechanisms to utilize and develop the country's gas resources. The development of floating storage and regasification units (FSRU) was a main focus. As an outcome of the mission, Ghana plans to develop an FSRU to feed gas-fired power projects which will ultimately increase its power generation capacity.

USTDA and OPIC are also implementing the U.S.-Africa Clean Energy Finance (U.S.-ACEF) initiative, an innovative financing program designed to catalyze much-needed private sector investment in renewable energy projects by sponsoring early-stage development activities for projects that are promising candidates for debt support from OPIC or other financiers. Since U.S.-ACEF's launch, OPIC and USTDA have already committed funds for 32 renewable energy projects in 10 sub-Saharan Africa countries. The initial \$20 million of funding, provided by the Department of State, has the potential to mobilize more than \$1.5

billion in project capital. Already, nine projects have graduated from U.S.-ACEF development support to full debt financing commitments, ultimately receiving the required public and private financing. The Department of State also has contributed an additional \$2.5 million to USTDA to support renewable energy projects in a second phase of the U.S.-ACEF program, and has further committed to providing an additional \$7.5 million for future renewable energy projects.

USTDA is also providing advisory services to help the Development Bank of Southern Africa to evaluate clean energy projects across Africa, thereby accelerating project development and financing. USTDA also works with South Africa's IDC to evaluate energy storage solutions that can enable wider adoption of renewable solutions.

The Export-Import Bank (EXIM) is helping to maximize Power Africa's infrastructure development and has pledged \$5 billion of financing and insurance in support of power projects across sub-Saharan Africa. EXIM's commitment constitutes nearly two-thirds of the U.S. Government's initial \$7 billion pledge for the Power Africa Initiative, including:

- The Bank's first Power Africa transactions supported Kaxu Solar I CSP in South Africa. EXIM supported the export heat transfer fluid in the amount of \$23 million from Dow Chemical for a 100MW Concentrated Solar Power Plant.
- To support Ghana's Self-help Electrification program (SHEP), EXIM financed an additional \$50 million for rural electrification. This authorization took place in 2014 and built on the original work completed by a \$344 million facility approved in 2008. The goal is to connect all eligible communities with a minimum population of 500 individuals, or approximately 3,800 villages, to the national grid by 2020.

(B) Strengthen Electrical Transmission and Distribution Infrastructure

The demand for electricity in Africa is growing and expected to double by 2030, with approximately 114,000 MW of capacity additions needed to meet new demand. Nevertheless, getting power to those who need it remains a challenge. With two-thirds of the continent's population without reliable access to power, improving the maintenance and rehabilitation of the existing transmission and distribution infrastructure as well as the development of new infrastructure is urgently needed to deliver power to end users. The reliability and availability of the electricity infrastructure are important pillars of Power Africa.

For example, MCC is supporting improvements to the transmission and distribution infrastructure in a number of countries:

- In Malawi, MCC is funding investments to upgrade the transmission network in order to improve quality and reliability of electricity supply in the country, including adding 409 kilometers (km) of transmission lines in the central and northern regions. MCC will also invest in new transmission substation capacity totaling 670 Mega Volt Amps (MVA). These infrastructure upgrades are expected to help reduce technical losses and increase the capacity of the network to move power from the south, where 98 percent of Malawi's power is generated, to the central and northern regions, as well as handle additional power from much-needed new electricity generation facilities. In addition, MCC is funding the upgrading of existing distribution infrastructure as well as the acquisition of dredging and weed harvesting equipment to protect existing hydropower generation plants on the Shire River.

- In Liberia, MCC is funding the supply and construction of two 26 km, 66kV transmission lines from Mt. Coffee to the Bushrod Island substation in Monrovia, and two 24 km, 66kV transmission lines from Mt. Coffee to the Paynesville substation in Monrovia. Complementing MCC, USAID is supporting the development of a solicitation to support a management contract to operate LEC.
- The MCC Compact with Ghana will fund updating of distribution design and construction standards as well as various distribution network improvements (e.g., low voltage bifurcation and installation of bulk supply points with feeders to existing primary substations) to reduce technical losses throughout the network. The Compact will also fund upgrades to the distribution infrastructure to improve access to reliable electricity for micro, small, and medium enterprises in selected urban and peri-urban areas.
- In Benin, MCC will fund various grid strengthening projects via upgrading and replacement of transmission and distribution infrastructure (including new lines, switchgears and substations, among others).

USTDA is also strengthening transmission and distribution infrastructure:

- In Nigeria, USTDA support is developing a framework to address network gaps and recommend U.S. technologies as part of a plan of action for utility-wide rollouts. While this assistance is still ongoing, it has already resulted in the sales of U.S. technologies in metering and other systems that can improve grid operations. USTDA brought the newly-privatized Nigerian distribution companies to the U.S. to learn about solutions that can help them reduce their losses and modernize their operations. They met with over 50 U.S. firms and, months after they returned to Nigeria, several of them bought U.S. technologies worth over \$3 million to improve their systems. The distribution companies presented their investment plans for the short, medium, and long terms and, as a result, purchased equipment and services from several U.S. companies. Building on this support, USTDA has since funded project preparation assistance for Eko, Ikeja and Benin, which is supporting the modernization of their networks and the reduction of technical and commercial losses, as well as identifying ways to increase collections.
- USTDA support for the Ghana Grid Company Limited (GRIDCO), Ghana's transmission utility, has supported the design of the expansion of over 450 miles of transmission linkages that would transmit power to consumers across the country.
- USTDA also is supporting electricity transmission expansion and distribution in Ghana by helping transmission and distribution companies reduce losses and increase collections.

Through USAID, Power Africa is working to ensure more sustainable power transmission and distribution services by working with African utilities and regulators to improve management capacity and utility operations, as well as developing more transparent and structured power markets.

- In Kenya, USAID is supporting the national utility to integrate solar, wind, and other intermittent sources to Kenya's power grid. USAID is identifying gaps in the current system operations and is supporting the development of Transmission and Distribution Grid Codes to regulate the electricity network, necessary to ensure safety, security, and efficiency of the transmission system. Similar activities are also underway in Ethiopia.

- In Tanzania, USAID is helping the electric utility TANESCO develop an Integrated Resource and Resiliency Planning (IRRP) program as well as Transmission System Operator (TSO) function that will improve the utility's planning, and use of human, physical, and financial resources to build institutional capacity and lay the foundation for a modern, efficient corporate structure. TSO is a precursor to restructuring the energy sector and being able to realize a turnaround in TANESCO's performance to achieve solvency.
- Complementing USTDA's reverse trade mission and technical work in Nigeria, USAID is providing in-depth technical assistance to help three of the largest distribution companies modernize their networks, reduce their technical and commercial losses, improve collections and increase efficiency and serve as models for improving other distribution companies.
- Several countries in East Africa are expected to have surplus power for export in the next several years. At a regional level, Power Africa, through USAID, is working with members of the East African Power Pool (EAPP) and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) to accelerate the completion of vital regional transmission lines and interconnections, and put in place a transparent legal and regulatory framework to support cross-border power trade. By 2018, transmission lines interconnecting Ethiopia, Kenya, Tanzania, Uganda, Rwanda, Burundi and the Democratic Republic of the Congo are scheduled to be completed. Many of these transmission lines are experiencing delays due to land title and compensation as well as project management issues. Through its work with NELSAP, Power Africa is exploring ways to overcome these barriers and keep projects on track.

(C) Provide for Regulatory Reform and Transparent and Accountable Governance and Oversight

Power Africa's strategy is grounded on the premise that increased local capacity, effective governance, and significant private sector participation are critical to expanding and sustaining electricity access. Power Africa, including through the Departments of State, Treasury, and Energy, USAID, and MCC, works with governments that demonstrate the political will to implement difficult, but necessary, reforms to open their energy sector to private investment and a commitment to strengthen its capacity to manage the energy sector sustainably. Power Africa works with African leaders to support efforts to implement legal and regulatory reforms that will promote investor confidence, enable the commercial viability of utilities, incentivize the delivery of reliable and affordable power to end users, and ensure that power sector development contributes to broader economic and social goals.

Reform efforts are designed to achieve:

- Strong transparent legal and regulatory frameworks
- Creditworthy off-takers
- Cost-reflective retail tariff structures
- Technical and commercial efficiency
- Clear and transparent procurement processes
- Sound strategic and integrated power sector planning
- Streamlined and transparent processes for project development

Power Africa's engagement with African countries begins with dialogue among stakeholders about the critical issues that are inhibiting investment, and priorities for reforms or structural change that will enable

the pipeline of transactions to move forward. For example, a barrier to investment in gas-fired power plants is the uncertainty and inadequacy of natural gas supplies, which can be affected by upstream policies, such as domestic obligation requirements or regulated pricing. In this case, Power Africa may engage key stakeholders to identify structural issues and potential solutions. In some countries, lack of clear and transparent procurement processes can lead to suboptimal contracts or concessions; Power Africa can provide assistance in tendering competitive contracts.

Throughout sub-Saharan Africa, Power Africa is working through the National Association of Regulatory Utility Commissioners (NARUC), with support from USAID, to strengthen the capacity of national regulators and help them to move toward more cost-reflective tariffs. For example, in Nigeria, Power Africa is working with the regulator to decrease the length of the Power Purchase Agreement (PPA) review process in order to expedite private investment and decrease costs. In Tanzania, USAID helped to establish the legal and regulatory framework for natural gas pipelines which will allow companies to base investment decisions on defined regulatory parameters, again decreasing costs. USAID is assisting utilities and regulators from Ethiopia, Kenya, and Tanzania to develop the underlying structures to facilitate the long-term sale of electric power from Ethiopia to Tanzania. The methodology developed to assist these investments will serve as a model for the rest of the region. USAID is also working with national regulators who are members of the Power Pool's Independent Regulatory Board to develop a Uniform System of Accounts that will require utilities to abide by the same accounting rules, making it easier to calculate the true costs of regional projects and develop more transparent tariffs.

Through its embassies, and in coordination with the Department of State's Bureau of Energy Resources, the Bureau of African Affairs, and other agencies in the Power Africa Working Group, the Department of State regularly engages foreign governments on the importance of good governance and transparency as a necessary precondition for encouraging private investment and developing the power sector. The Department of State has stationed a Foreign Service Officer on the continent to help lead diplomatic engagement on energy issues, including Power Africa, and is working through embassies and offices in Washington, D.C. with African governments to promote and advance regulatory and policy reforms.

All of Power Africa's technical assistance and transaction support -- whether focused on generation, access, or enabling environment -- involves elements of good governance, reform, and capacity development. In addition, all MCC power-related compacts and threshold programs in sub-Saharan Africa have followed a holistic assessment of policies and regulations, with governments committing to specific reforms as preconditions to receiving MCC assistance.

In addition, Power Africa has signed MOUs with a number of African countries (available on www.usaid.gov/powerafrica) which articulate specific intentions and commitments by African governments to improve the domestic policy, legal, and regulatory environments. Additional MOUs will be developed on a case by case basis, and will be used to articulate both host country and USG commitments and priorities.

Strong Transparent Legal and Regulatory Frameworks

Compounding the problem of inadequate power generation capacity in Africa and the unreliability of transmission and distribution is the lack of capable and transparent regulatory environments. This framework should include a regulatory institution that is autonomous, financially sustainable, has clear authority, capacity to fulfill its mandate, and is held accountable for decisions and actions. It should establish and maintain clear relationships and lines of accountability between key power sector institutions,

including ministries and utilities. The regulatory framework should transparently and consistently guide key aspects such as pricing, land rights, offtake arrangements, and performance standards - which can reduce investor risk while contributing to other development objectives such as environmental protection and universal access.

Most countries are working toward strengthening regulatory capacities, but each country has unique approaches and constraints. Power Africa support considers not only the priority needs for national regulatory capacity, but also the need for common frameworks among countries that hope to engage in cross-border trade.

For example, the Department of State has worked with CLDP to provide guidance on pending energy sector legislation and regulation across sub-Saharan Africa. The Department of State regularly works through U.S. embassies and advisor on the continent to encourage governments to develop and adopt necessary regulations.

In Lesotho, Namibia, and Mozambique, USAID is supporting the development of regulations, procedures, and frameworks needed for Renewable Energy Feed-in Tariff (REFIT) programs, which are necessary to incentivize private sector investment in renewable energy projects.

In Benin, once the Government meets the pre-conditions for the MCC compact to enter into force, MCC plans to fund significant policy, legal, regulatory, and institutional reforms in the power sector aimed at improving governance, management, and operations.

Creditworthy Off-takers

Lack of investor confidence in the creditworthiness of off-takers hinders electricity sector development. Efficient, financially solvent off-takers mitigate investor risk and encourage increased private sector participation. Power Africa is supporting efforts to ensure off-takers are independent and empowered to make sound financial and technical decisions, based on market demand, with accountability to shareholders.

For example, a pre-condition of the MCC Benin Compact entering into force is for the government to establish the operational independence of the power utility, Société Béninoise d'Energie Electrique (SBEE), from various political authorities in daily decision-making. This is a critical step that will help ensure SBEE management is empowered to make sound financial and technical decisions, based on market demand, with accountability to shareholders enhancing SBEE's operational efficiency, financial health, and ultimately creditworthiness. In Mozambique and Namibia, USAID's support to develop a cost-reflective REFIT program and pricing model is increasing investors' confidence in a predictable off take price and risk allocation arrangements with off takers.

With USAID support, the Government of Nigeria has privatized five generation and 10 distribution companies in an effort to increase the quantity of reliable electricity supply for its growing population. USTDA hosted the owners of the new distribution companies for a reverse trade mission that introduced them to U.S. operators, utility regulators, and electrical engineers. The event attracted widespread U.S. industry interest, including over 50 attendees at a briefing where four utilities (Eko, Ikeja, Abuja and Benin) outlined their investment plans and which resulted in over \$3 million in U.S. exports. USTDA is providing direct technical assistance to three of these companies, Eko, Ikeja and Benin, and is helping a fourth company, Port Harcourt, pilot U.S. metering technologies designed to allow the company to expand

electricity access to a broader portion of the populace, includes low-income areas. It is expected that the newly privatized utilities will attract capital for upgrades that will add about 2,500 MW of capacity.

Cost-Reflective Tariffs

Tariffs that cover the cost of generation, transmission, and distribution, (“Cost-reflective tariffs”) are essential to the financial stability of the power sector institutions and to attracting investors seeking a return commensurate with their investment risk taken. Investments in the power sector will only be sustainable if the tariff structure accurately reflects costs and risks, and provides a rate of return that encourages continued private sector engagement. This must be carefully balanced against the critical need to protect consumers, ensure affordability, and expand electricity access. In general, effective tariff management strategies include public engagement, transparent processes, regular adjustment, and appropriate measures to ensure affordability.

USAID is working with regulators and energy providers on the reform of tariffs to accurately reflect the cost of power generation, transmission, and distribution. Through NARUC, USAID is training regulators on the use of an interactive Cost-Reflective Tariff Simulation which enables participants to explore the real-world impacts of different regulatory choices. The simulation aims to improve regulators’ ability to review utility rates and provides a platform for dialogue on the importance and range of inputs regulators must consider when setting tariffs. These simulations increase regulators’ and relevant stakeholders’ understanding of cost of service studies, tariff methodology, and cost-allocation; build consensus on components of cost of service studies and cost-allocation; garner support for cost-reflective tariffs; and provide tools for regulators to develop cost-reflective tariffs.

In Nigeria, Power Africa is providing support through USAID for embedded advisors at the Nigerian Bulk Electricity Trading to ensure new power generation transactions that negotiate approved tariffs meet best practice standards regardless of location.

As a precondition for the \$498 million Ghana Power Compacts, the Government of Ghana was required to settle arrears owed to the power utilities and implement quarterly tariff adjustments.

As part of the Sierra Leone Threshold Program, MCC is also funding the development of a transparent framework and process for tariff setting (including the preparation of rate-case requirements, conducting cost-of-service assessments, and the establishment of an automatic tariff adjustment policy. In Benin, MCC is funding a cost of service study to inform a tariff policy with periodic adjustments that will eventually result in tariffs that are fully cost-reflective. These reforms will create the foundation for the delivery of financially sustainable electricity services, while limiting the opportunities for corruption in the delivery of service.

Power Africa also promotes the need for tariff reform and clear and transparent regulations through Department of State bilateral and diplomatic engagements, including to emphasize the need for cost-reflective tariffs as a means of ensuring sustainability of the power sector and making available scarce fiscal resources for capital investment and poverty-reducing spending.

Power Africa recognizes that cost-reflective tariffs can often be a politically difficult policy to implement, and the embassies work with governments to highlight the medium and long-term gains that arise from the implementation of cost-reflective tariffs.

Few countries in sub-Saharan Africa have fully cost-reflective tariffs and the costs are either subsidized by the government and/or are cross subsidized among different customer classes. For example, many, if not most, African countries deploy a “lifeline tariff” for lower income users along with different tariff levels for other customer classes. In an effort to attract industrial customers, low tariffs are often set for that customer class. Beyond this, different tariffs may be charged to other customer classes depending on various factors, such as consumption patterns. As a result, there may be higher prices to one group of consumers to subsidize lower prices for another group and, in many instances, there are some users that can pay a higher tariff but which, nevertheless, receive the lower tariff. The Department of State and other Power Africa agencies work with African governments to encourage tariff structures that can help fund the sector.

Another key issue impacting affordability is the cycle of underinvestment in energy infrastructure. This cycle is perpetuated by several factors that distort pricing and weaken the financial viability of the utility. We have already discussed the challenges associated with a failure to set cost-reflective tariffs, which are often caused by a lack of understanding of the costs associated with operation and maintenance of utilities. In addition, government subsidies, such as the subsidization of fuel sources like diesel or kerosene, often distort the market for power. Lastly, but critically, high technical and non-technical losses combined with low payment collection deprive utilities of the resources needed to maintain existing infrastructure and invest in new infrastructure. This leads to more outages, dependency on high-cost emergency generation sources and can often lead to higher costs to upgrade the system over time, all of which impact affordability for consumers. In addition, deferred maintenance can mean higher costs down the road and can require higher tariffs to pay to replace and upgrade degraded infrastructure.

Under Power Africa, USAID is working with regulators to improve tariff methodology and structures to balance the need for cost-reflective tariffs and the ability to pay. In particular, USAID is focusing on improving the data that is collected by utilities and provided to regulators to better assess the true cost of power. In Ethiopia and Tanzania, USAID is supporting energy regulators and utilities in conducting cost of service studies as a foundation for tariff-setting. In some countries more sophisticated tariff structures are being adopted including “block rates” that couple usage with costs to consumers and seasonal tariffs that allow for payment during cycles of economic activity for customers such as farmers. Prepaid meters are another tool that is successfully being used in several countries in sub-Saharan Africa to ensure payment for services and increase payment collection rates.

Technical and Commercial Efficiency

Improving technical and commercial efficiency in the electricity sector will enable delivery of more services to more consumers; lower costs throughout the supply chain; and increase quality and commercial viability. Efficiency can be improved through interventions including infrastructure investment and maintenance, improved metering and bill collection, demand-side management, and consumer education.

Power Africa’s assistance to unbundle power assets to reduce monopolistic practices has begun to improve the reliability of power to the end users. Power Africa, through USAID, supported the Nigerian Electricity Regulatory Commission (NERC) to reform the regulatory environment in order to increase the reliability and efficiency of service. As described above, USTDA has helped three Nigerian utilities reduce technical and commercial power losses by assessing each company’s grid monitoring and control systems and recommending associated infrastructure improvements, as well as by providing training on loss reduction and smart grid technologies. This support is ultimately helping these utilities transition to private ownership successfully.

In Liberia, USAID is supporting a loss reduction program that will quantify technical and commercial losses and make recommendations for their reduction. This includes analyzing Liberia Electricity Company's technical and administrative functions by performing Geographic Information System (GIS) mapping, metering, and management systems studies.

In Malawi, MCC is working to improve the Electricity Supply Corporation of Malawi's (ESCOM) financial and operational performance, including funding tariff reforms that will permit recovery of operating costs (including financing costs), capital replacement costs, as well as the capital expansion costs.

As required under its MCC Compact, the Government of Ghana announced that it would seek a concession for a private firm to operate its main distribution company. In complement to MCC plans, USTDA is helping the Ghanaian power company strengthen and modernize its network, which will aid the utility in achieving solvency as a privately-run company.

Clear and Transparent Procurement Processes

Procurement processes that integrate international best practices such as fair and competitive bidding, life-cycle cost analysis, and best-value determination will increase investor confidence, lower long-term costs, and facilitate sustainable, longer-term investments.

Under its Global Procurement Initiative: Understanding Best Value (GPI), USTDA is working extensively with Botswana and Ethiopia to build life-cycle cost analysis and best value determinations into their government procurements, with a focus on their energy tenders. Both countries have experienced frustration with outcomes of their previous low-cost procurement systems, including poorly functioning or unusable energy infrastructure. After conducting both in-country procurement training workshops and study tours to the United States, USTDA is continuing to provide in-depth technical training and onsite advisors to help these governments integrate best value bidding so that they can procure higher value equipment and solutions in a transparent, open manner. For example, USTDA awarded a grant to Botswana's Ministry of Minerals, Energy, and Water Resources to provide two advisors to help the Ministry prepare upcoming energy procurements. In addition to African countries seeking better products, requests for USTDA assistance have also come from U.S. industry, which typically offers technology that is high quality and long lasting. While improving procurement outcomes for GPI partner countries like Ethiopia and Botswana, the GPI also levels the playing field for U.S. companies seeking to compete in international tenders.

MCC's compact in Ghana and its Threshold Program in Sierra Leone both emphasize the need to increase transparency and competitive tendering for energy sector projects, as well as in the operation of the transmission network.

Sound, Strategic and Integrated Power Sector Planning

Planning is a key issue up and down the power value chain, from generation to end-use distribution. Effective planning helps ensure the development of a resilient and least-cost power system that continues to meet demand over time. Power sector planning should consider and integrate key development goals as well as interactions with water, land-use, and air quality. Effective planning will prioritize an optimal mix of energy resources to meet the expected load, new or extended transmission and distribution infrastructure, energy efficiency measures, and off-grid solutions. For instance, this year, several countries are experiencing power shortages due to the severe drought in the region. Planning for the optimal power mix needs to take into account the droughts that occur periodically in the region.

In Uganda, USAID is developing a program to assist in drafting and implementing master plans for several of the country's electricity service territories. These plans will identify least-cost opportunities for both on- and off-grid solutions, ensuring an efficient and effective distribution system. In clarifying plans for on- and off-grid development, the plans will also provide clarity and transparency for investors and other stakeholders, mobilizing additional capital.

In Ghana, USAID is helping to project future natural gas demand and supply; advising on gas infrastructure development plans; advising on institutional, policy, and regulatory reforms to facilitate investment, including development of a Gas Act; and reviewing gas pricing policies to assist in proposing key revisions. USTDA has also supported the efforts of the two distribution utilities in Ghana to reduce losses and increase collections.

Sound planning is also vital for a regional power market. Power Africa is assisting the EAPP planning committee to develop a regional load flow and dynamic planning model for the 2020 target horizon that will help countries identify the transmission investment required to reduce network congestion and accelerate cross-border electricity trade. Finally, to ensure a reliable regional transmission system, Power Africa together with the EAPP is deploying a self-assessment tool to enable countries to evaluate their compliance with the EAPP regional interconnection code and develop plans to upgrade and reform their systems.

Streamlined and Transparent Process for Project Development

Overly complex procedures for mobilizing energy projects often hinder sector development. Streamlining and clearly communicating the steps required to achieve essential project components such as land acquisition, feasibility studies, and standards compliance helps private sector actors navigate and accelerate this process while bringing down transaction costs. For instance, the Government of Tanzania released a draft energy policy in 2015 that includes amendments to the Public-Private Partnership (PPP) Act designed to streamline the process and increase competition for unsolicited proposals. Power Africa, through the Treasury Department, provided technical support to assist in the drafting of the amendments to the PPP Act.

(D) Improve the Reliability of Power

Countries throughout sub-Saharan Africa struggle to provide high quality electricity service to consumers. Dilapidated infrastructure and insufficient generation capacity contribute to voltage fluctuations and frequent widespread power outages, creating significant operational challenges for households and businesses. The ultimate economic and developmental benefit of increased access to electricity depends on the quality of service. Power Africa supports partner countries in improving the reliability of power supply by facilitating increased power generation, working with utilities to improve operational efficiency and technical capacity.

Increasing the Amount of Power on the Grid

Across much of sub-Saharan Africa, insufficient generation capacity represents a critical constraint to reliability. If generation cannot meet demand – either because generation assets do not exist or because they are poorly maintained and operating below capacity – utilities may be forced to cut power for significant populations. Power Africa is working to address this imbalance by advancing power sector transactions that provide additional generation capacity and maximizing the productivity of existing facilities. Projects like the Cap des Biches combined cycle thermal plant in Senegal—supported by OPIC financing and

insurance—are helping to address growing demand for baseload power. Further, renewable energy transactions, such as solar and wind, are advancing as tariffs for these resources become cost competitive with least cost generation sources. Moreover, the timeline for renewable energy transactions - from feasibility analysis to financial close to the actual delivery of power (i.e. online) - are also generally faster than hydrocarbon transactions.

Improving Power Delivery

Once transmission and distribution infrastructure is developed reliability may nevertheless be constrained by a utility's inability to manage power delivery and adequately maintain the transmission and distribution infrastructure. Across sub-Saharan Africa, high technical and commercial losses limit the supply that reaches consumers and contribute to chronic financial challenges for utilities and other stakeholders. Power Africa's work to modernize distribution company networks in Nigeria highlights the critical importance of addressing these challenges. USAID also established a program with the National Power Training Institute of Nigeria and the country's recently privatized utilities to promote commercially-proven best practices in efficiency, operations and management, and regulation.

(E) Maintain the Affordability of Power

Demand Management

Demand-side management efforts occurs at both the customer level (by incentivizing customers to reduce electricity use, especially during peak hours) and at the utility level (by supporting utilities to enhance customer service and build capacity to modify consumer behavior and electricity use. To support demand management, Power Africa tools support sustainable business models and innovative technologies, including smart meters; "Pay as you Go" and pre-paid billing; and energy efficient products.

1. Smart Meters

Smart meters allow consumers to track their usage and to make decisions about when to use power and when to avoid its use by observing price differential during peak and off-peak load times. Smart meters can be used to track billing and payments. For the distribution company, consumer use of smart meters allows for better load planning and identifying the tariff that will meet demand while allowing the utility to recoup its costs. In Nigeria, USTDA is funding a pilot project of 1,000 U.S.-manufactured smart meters for the Port Harcourt Distribution Company (PHED). This support will assess the meters' compatibility and effectiveness for the Nigerian market and could lead to the rollout of 50,000 meters at PHED and up to 500,000 additional meters across Nigeria.

2. Pay As You Go (PAYG)

PAYG financing manages demand by helping consumers pay for power as they need it. The PAYG platform allows customers to make secure mobile payments to power their solar home system which allows them to use and charge devices. These solar home systems are equipped with meters to track the energy purchased and the energy consumed. This innovative, low-cost technology system allows consumers to purchase solar energy products in small increments over time and eliminates the upfront price barrier of solar power, making clean energy affordable for all. It also dramatically expands the global market for solar systems. The PAYG is expected to save customers hundreds of dollars over the life of their units compared with weekly kerosene and phone charging expenditures.

Through Power Africa partners, strides are being made in promoting PAYG technology solutions. Examples include:

- Angaza, a Kenyan for-profit social enterprise which aims to make clean energy products affordable, introduced a PAYG platform to off-grid emerging markets to enable consumers to pay for renewable energy devices over time. Their devices have embedded technologies to make their product line PAYG-ready.
- Txlight Power Solutions Ltd., doing business as Nova-Lumos (Lumos), is supported by \$15 million in OPIC financing to scale up a business that provides off-grid solar electricity to homes and small business throughout Nigeria. The Lumos service includes a home solar panel linked to an indoor storage and connection unit that allows customers to access significant amounts of power on-demand, day or night, utilizing the PAYG by text message.
- M-KOPA pioneered an innovative PAYG platform that allows customers to pay for their solar lighting systems over time. Using this system, M-KOPA, a recipient of early-stage support from Power Africa's U.S.-Africa Clean Energy Finance program, has now reached over 350,000 households, bringing electricity to roughly one million people.
- Power Africa partner Off-Grid Electric leases solar products to customers using the PAYG payment approach. Customers pre-pay for the service in increments as small as \$0.20 a day, with monthly rates as low as \$5. Rooftop panels are delivered by local sales forces and the customer has access to a 24/7 toll-free service line. Off-Grid Electric's network of service agents also provide in-home service at no cost.

USTDA is supporting two additional micro-grid projects with PAYG technology in Tanzania and Kenya. Kenya's Rural Electrification Authority is partnering with U.S. firm Renewvia Energy Corporation (Atlanta, GA) to assess a U.S. solution for solar PV micro-grid system and battery storage at eight locations in Kenya. In Tanzania, MRI Global (Kansas City, MO) is piloting an innovative U.S.-developed hybrid solar PV micro-grid with local developer Rex Investment Limited for deployment in Tanzania's Lake Victoria region. The power could be used for, among other things, cold storage of aquaculture and agricultural products, thereby enhancing economic activity in the area served by the micro-grid. Smart meters will be installed on individual homes and businesses and controlled remotely by a digital management system that tracks credits against electronic payments made via an integrated mobile platform, a system which also allows these customers to qualify for financing.

Power Africa is looking for ways to expand the reach of these models including addressing country-level policy barriers that may be preventing further uptake.

3. Energy Efficient Products

While new power generation and associated infrastructure are critical to bridging the gap between energy supply and demand, the role of energy efficiency as a least-cost energy resource can reduce demand, decreasing the need for expensive peak capacity and allowing electricity supply to be expanded to meet increasing demand in a timely, low-cost, and sustainable way. Energy-efficient appliances for the off-grid market provide increased energy services to customers using solar home systems and micro-grids. These efficient appliances are a market "pull" for off-grid energy, and as off-grid communities today are connected to the grid in the future, the overall demand is less than it would be if they were using inefficient traditional appliances.

Power Africa is supporting the Global Lighting and Energy Access Partnership (Global LEAP), the Clean Energy Ministerial's (CEM) energy access initiative, which works to catalyze the development of commercial markets for energy access solutions. A flagship effort of Global LEAP is the Global LEAP Outstanding Off-Grid Appliance Awards, which help build sustainable markets for energy-efficient off-grid appliances. The inaugural awards identified the world's best, most energy-efficient off-grid color televisions and LED room-lighting appliances. The quality-assured products will help make the most of the limited electricity that may be available to off-grid households and businesses.

Power Africa is a key partner to Global LEAP and announced a \$1.5 million multi-year commitment in June 2016 at the 7th Clean Energy Ministerial in San Francisco to support the expansion of the Global LEAP and Results Based Financing (RBF). The goal of this effort is to drive the use of, and demonstrate the opportunities for, pairing energy efficient appliances with off-grid electricity applications to maximize energy access in East Africa.

(F) Maximize the Financial Sustainability of the Power Sector

Power Africa policy reform and capacity building assistance are designed to create a viable market for investments in the power sector. The power sector is more likely to achieve financial sustainability if there is an efficient enabling environment for private investment. In order to develop the enabling environment, countries must be willing and able to undertake the policy and regulatory reforms necessary to incentivize private sector companies to invest. In general, these assurances concern clarity about governance affecting energy markets, including the government's role in ownership and production of resources, the rights of investors (including land use rights and property rights), tariffs that reflect the cost of service plus a reasonable rate of return, an independent regulator, and transparent commercial processes.

Power Africa has worked with host countries to promote the types of reforms that can maximize the financial sustainability of the power sector.

Developing a cost-reflective tariff is critical to the financial viability of utilities as it helps ensure that the economic returns will be sufficient to attract investors and ensure continued service delivery. *See Section 4(b)(2)(C)* for a description of MCC and USAID's support for regulators to understand and develop cost-reflective tariffs and a description of Power Africa's support for regulatory, policy, and legal reforms.

Building capacity downstream to improve billing and collections can enhance the financial sustainability of utilities. Power Africa addressed this in one instance by supporting the local development of smart meters in Ethiopia. Power Africa's work with utilities, regulators and host government officials to develop capacity with energy governance, cost-reflective tariffs, and best commercial practices downstream provide the enabling environment for sustained investments in the power sector.

Structuring Project Finance

In a typical project finance transaction, a project is financed with some early-stage equity from sponsors for project development and construction; the equity contribution is typically supplemented by mid- and long-term debt from commercial banks and/or development finance institutions (DFIs). Attracting finance on terms that allow for adequate returns on investment or loans for the project developer or lender, respectively, can be challenging in sub-Saharan Africa due to concerns about commercial and political risk. In particular, attracting early-stage finance, prior to a project's construction, can be particularly challenging because a project is considered riskiest at the pre-construction phase.

Power Africa, through its diverse tools, offers early-stage support for project preparation and development, USTDA provides early-stage funding to improve the “bankability” of energy transactions. USTDA grants help African sponsors and developers move projects forward from conception to pre-feasibility and feasibility stages with tailored support. Specific areas of support often include resource assessment, financial modeling, engineering support, and environmental impact studies. USTDA’s project preparation assistance helps other Power Africa partners, like OPIC, to make major investments.

Legal and Commercial Capacity Building

Power Africa is helping to build capacity in finance, law, and governance to expedite negotiations between African governments and the private sector. From learning how to tender a competitive contract, the meaning of important terms, the importance of governments enforcing contracts, to understanding best practices, Power Africa is promoting transparent legal and commercial transactions for local attorneys and government officials to understand, adapt, and implement contracts and to regulate power projects. Through the U.S. Department of Commerce (DOC) Commercial Law Development Program (CLDP), supported by USAID, Power Africa released two practitioner’s guides: one for drafting PPAs called, “*Understanding Power Purchase Agreements*,” and a general guide titled, “*Understanding Power Project Financing*.“ These reference handbooks were the product of consultations with public and private sector stakeholders from Africa, the United States, and Europe. Both books take a detailed and neutral approach to understanding the terms, balancing of interests, and structuring power projects. These handbooks build the capacity of partner governments to negotiate financially sustainable, bankable power projects. The PPA model is available to all Power Africa countries and is also available online.²

Power Africa has made the African Development Bank’s (AfDB) African Legal Support Facility (ALSF) more widely available to partner governments, providing critical funding to expand ALSF’s reach. This facility allows African governments to obtain sophisticated international legal counsel to assist them in negotiating complex energy deals. For example, in Ethiopia, the government requested ALSF’s support to assist with negotiations on the Corbett geothermal project. This project is the first private power project in Ethiopia and therefore the first time the government had to negotiate a power purchase agreement. By facilitating high quality legal support, Power Africa strengthens government capacity to independently negotiate viable power projects in the future.

Managing Investment Risk

Each bank or government has a different analysis about the risk and return profile of a project. “Bankable” projects will, at a minimum, have a creditworthy power purchaser, a forecast stable revenue stream that is adequate to cover debt service and may, in addition, have credit guarantees and political risk insurance, among other elements. In a survey, the Milken Institute³ found that equity investors in frontier-market projects looked for risk-adjusted rates of return between 25 to 35 percent. Recent power project financings of large gas-fired projects in Ghana and Tanzania assumed returns on equity of 20 to 30 percent. While these returns appear robust, success in attracting strategic and other equity investors has nevertheless been limited due to corporate policies against investing internationally or in sub-investment grade-rated countries, policies against investing in regulated industries, aversion to investments with foreign exchange exposure, higher return targets (e.g. target returns above 30 percent are common for hedge funds), and

² For more information on this topic, refer to the *Understanding* series prepared by CLDP and the AfDB, “*Understanding Power Purchase Agreements*,” 2014. Available at: <http://cldp.doc.gov/programs/cldp-in-action/details/1378>

³ Financial Innovations Lab report by the Milken Institute, 2015. Project sponsored by USAID.

limited short-term exit options (e.g. “private equity” funds generally want an exit at 5 years, which is problematic in the power sector where 15 to 20 year holding periods are needed to recover capital and achieve a return).

As a result, traditional sources for project funding, including everything from government allocations to private investment by equity firms and corporate investors, have not been sufficient to meet the needs for energy infrastructure development. A deficit in energy infrastructure severely deters foreign direct investment in other sectors of the economy and reduces a country or region’s overall competitiveness. As a result, there are calls for alternative financing mechanisms, especially through new investment platforms and for regulatory and operational reforms to improve market efficiency. The key to unlocking funding that will galvanize business development is to attract the more traditional investors who do not yet consider the region’s energy infrastructure development to be a stable and safe investment.

DFIs utilize a variety of mechanisms, including loan guarantees, insurance, and subordinated equity, to mitigate risk for investors. OPIC and the Multilateral Investment Guarantee Agency (MIGA), for example, provide support to multiple energy projects in sub-Saharan Africa through direct loans, loan guarantees and risk insurance. The African Development Bank (AfDB) and the International Finance Corporation (IFC) have also had success in providing financing options such as equity investments, direct loans, credit enhancement, and first-loss funds. The IFC provides substantive debt and equity financing for infrastructure projects in Africa and helps governments design Public-Private Partnerships for infrastructure projects. Export credit agencies like EXIM have also helped to bridge financing gaps, providing products similar to many DFIs, such as guarantees and insurance.

(G) Improve Non-Discriminatory Access to Power that is Done in Consultation with Affected Communities

Through U.S. embassies abroad, we maintain a broad set of relationships, stakeholders, and mechanisms that support civil society, national government, private sector, and other actors’ efforts to establish an appropriate enabling environment for non-discriminating access to public services, including power. Power Africa is in the process of strengthening that process further to ensure that private sector partners and host governments have consulted sufficiently with local stakeholders to protect their long-term interests, particularly those in affected communities.

Power Africa supports off-grid lighting and power, primarily household systems (mainly solar based) and micro-grids.

Power Africa also supports reforms, transactions, as well as on-grid and off-grid solutions that promote non-discriminatory access, including for a variety of new service models that mobilize community participation in the provision of power services. For much of sub-Saharan Africa, rural populations are dispersed and located far from grids. This makes providing electricity through a grid connection prohibitively expensive and unreliable. The private sector has the potential to deliver market-based, cost-effective off-grid solutions to these remote communities.

As discussed above, many barriers exist for low income households, including high connection charges, ineffective and outdated metering infrastructure, illegal or extralegal tenure, poor tariff structures, and other social and economic conditions. Inefficient subsidies often aggravate the situation. In many sub-Saharan African countries, electricity tariff subsidies benefit a minority of households that have power in their homes, the majority of whom could afford cost-reflective tariffs. Implementing reforms that advance

effective, efficient, and cost-effective tariffs incentivizes private investment while allowing equitable cost-allocation, including connections for low-income households to the grid.

In Ethiopia, the Electrical Power Corporation connected 25,000 poor households with support from the World Bank. The World Bank also provides grants to finance a large portion of connection charges for poor rural households in Kenya, Liberia, and Uganda through a five-year interest-free loan.

Power Africa promotes campaigns to generate policy and market shifts necessary to overcome barriers and drive the growth of the household solar industry, including the provision of project preparation funding, guarantees, and technical assistance as well as creating a supportive enabling environment. Power Africa also helps the supply chain obtain financing; provides early stage grants and loans for new innovative businesses; funds pilots of new technology and business approaches; provides working capital loans and guarantees to help established businesses increase their scale; and shares market information and data with investors to encourage them to undertake investment in the sector.

SECTION 4(b)(3)

A description of plans to support efforts of countries in sub-Saharan Africa to increase access to power in urban and rural areas, including a description of plans designed to address commercial, industrial, and residential needs.

Power Africa has put in place ambitious plans to facilitate the addition of 60 million new household and business connections by 2030 – effectively doubling the existing total. In order to meet this goal, as well as the target specified in the Electrify Africa Act of 2015 of expanding electricity access to 50 million people by 2020, Power Africa supports an integrated approach that optimizes opportunities for both on- and off-grid solutions across urban, peri-urban, and rural areas.

Power Africa will achieve the goal of expanding electricity access to 50 million people by 2020 as set forth in this Act, and Power Africa's goal of adding 60 million new electricity connections by 2030, by taking a two-pronged approach: (1) Support grid roll-out programs to add 24 to 27 million urban on-grid connections and 11 to 13 million rural on-grid connections; and (2) Intensify *Beyond the Grid* efforts to add 25 to 30 million off-grid connections through 17 to 20 million household solar system connections and 8 to 10 million micro-grid connections by 2030.

Commercial and industrial demands are largely met through Power Africa's support for generation projects since those customers are typically connected to the central grid already. However, Power Africa has a number of projects providing on-site generation at these sites to lower costs and increase reliability. For example, USTDA is providing a grant to Honeywell Group to complete the feasibility study for a power plant that will supply several industrial clusters in southwest Nigeria.

Scaling Grid Roll-Out Programs

The urban population growth, scale, and density in sub-Saharan Africa provide an opportunity to connect millions of people to the grid relatively quickly. Rapid urbanization across the continent is increasing population density in areas already covered by grid infrastructure, with the urban population projected to reach 50 percent by 2030. In addition, many populations in rural areas live close enough to the existing network that they can be connected most cost-effectively through grid extension. Therefore, Power Africa

expects urban areas and rural “near grid” areas to account for approximately 68 percent and 32 percent of its grid connection goal respectively.

Power Africa is already supporting grid expansion through efforts such as EXIM support to Phase IV of the Government of Ghana’s Self Help Electrification Program (SHEP), which will expand electricity access to an estimated 2,130 rural communities. As of September 2015, a total 806 communities had been connected to the grid under this effort, with service connections to resident households and installation of single-phase meters ongoing.

Moving forward, Power Africa will scale up its focus on facilitating new on-grid connections and supporting grid roll-out programs. This work will include efforts such as addressing affordability constraints by lowering the cost of connection and implementing innovative payment models; mitigating regulatory barriers; and mobilizing private sector capital for on-grid connections and associated infrastructure. Major electrification projects are complex. The initial phase of each roll-out is likely to be slow, followed by an acceleration as the utilities and government stakeholders gain experience in grid delivery. As grid roll-out efforts extend into more remote communities, implementation will slow. Overall, Power Africa expects that by 2020, more than 50 million people will be newly connected to the grid.

To facilitate the roll-out of large scale, complex electrification programs that benefit both urban and rural populations, governments, utilities and other stakeholders need the capacity and financial resources to manage the full project delivery value chain. As described in earlier sections, Power Africa plans to engage and provide support across six core components:

Provide Planning Support

Integrated data-driven planning allows governments and utilities to: optimize grid roll-out strategies; expand markets; identify optimal least-cost technologies for specific geographic regions; and align efforts to strengthen transmission and distribution infrastructure with grid roll-out needs. Clear and transparent planning also provides much-needed clarity to potential micro-grid and off-grid developers, who depend on a clear understanding of where the grid will go and when in order to make investments. Power Africa will continue to support effective grid roll-out planning processes and implementation via technical assistance and advisory services.

Provide Regulatory Support

Regulatory barriers can often hinder the rapid scale-up of grid roll-out efforts. For example, households seeking to connect to the grid may face complex and expensive application and inspection requirements. Without a regulatory framework clarifying what happens if the grid extends into an area currently being served by micro-grids, efforts to expand access in rural areas can stall.

Implement the Right Financing Model

Grid roll-out programs require the mobilization of adequate, affordable finance. This includes sizing the required investment and identifying the optimal split across stakeholders; selecting financial mechanisms for funding the government contribution; defining optimal payment and collection mechanisms; and developing cost-reflective, tiered tariff structures. To date, Power Africa’s development partners have taken the lead in financing grid extension.

Build Procurement Capacity

Success grid rollout programs also depend on effective, open, and transparent procurement processes. Moving forward, Power Africa will build on foundational tools like the Commerce’s CLDP program and USTDA’s Global Procurement Initiative to support procurement capacity specific to grid roll-out programs

Develop Utility Project Management Skills

Utilities must have the capacity to manage and deliver complex grid roll-out projects on time and on budget. In Ghana and Benin, MCC’s Compacts include significant components dedicated to strengthening and modernizing utility operations and management, ultimately supporting capacity to manage future grid expansion projects. Moving forward, Power Africa will seek to provide additional technical assistance to utilities managing large-scale grid roll-out programs, ensuring success and sustainability.

Encourage Effective Decision Making and Cross-Sector Coordination

Grid rollout efforts require significant political will and effective coordination across multiple stakeholder groups including government, civil society, private sector industries, and development partners. Power Africa will build on successful examples of such political commitment and coordination, including in Kenya and Rwanda, to ensure the prioritization and successful implementation of grid roll-out programs elsewhere.

Intensifying Beyond the Grid Efforts

Power Africa’s *Beyond the Grid* sub-initiative supports efforts of countries in sub-Saharan Africa to increase access to power using micro-grids with tools designed to work with policy makers to ensure supportive policies and regulations, as well as provide support private sector companies.

Power Africa’s geospatial analysis estimates that by 2030, 55 to 80 million households in sub-Saharan Africa will be too remote to connect to traditional grid infrastructure. Through the *Beyond the Grid Program*, Power Africa is assisting the government to remove barriers to off-grid and micro-grid energy sector projects that provide rural populations access to electricity and supporting private sector investment in off-grid and small scale energy solutions. By 2020, Power Africa expects to connect 10 million households, or 50 million people, to energy access. *Beyond the Grid* expects to focus on household solar systems and micro-grids. These estimates could shift if new technologies and deployment models emerge for off-grid solutions.

These targets underscore the key role of the private sector in delivering power to households in rural communities. *Beyond the Grid* support focuses on leveraging greater levels of private sector involvement. Currently, the off-grid market is a greater opportunity for private-sector intervention than the grid-connected sector, since many utilities that manage national grids are still state-owned. To support private companies seeking to invest in off-grid and micro-grid solutions, *Beyond the Grid* will provide financing, risk mitigation tools, capacity building, and transaction and technical assistance to help entrepreneurs launch and scale up projects. These efforts complement the enabling environment support *Beyond the Grid* provides to policy makers which helps create the policy, regulatory and legal frameworks that allow private sector companies to do business and add new household and business connections.

Finally, the enabling environment is critical for the commercial success of both micro-grids and solar home systems, but particularly so for micro-grids. Micro-grid business models can look like stand-alone energy

systems or like a utility grid, so this uncertainty also often leads to a lack of clear policies and regulations to support the development of the sector. This uncertainty leads to risk from developers and investors. Power Africa's activities to improve the enabling environment is the foundation for achieving the off-grid connections goals.

Household Solar Systems

Over the past three years, PAYG solar system sales have grown to provide electricity to nearly 500,000 homes and businesses in sub-Saharan Africa.⁴ These solar systems may power multiple lighting points and small appliances (e.g., radios, fans, televisions). The household systems market is expected to expand dramatically due to improvements in efficiency and reductions in component prices, which make an affordable option for businesses and households to receive high quality. Innovations in business models, such as PAYG, are also contributing to the affordability.

To increase access to power, *Beyond the Grid* is helping countries accelerate growth in the household solar systems market by providing support to private companies and governments in three key areas: project capital, new markets/models, and enabling environment.

In addition to the sub-Saharan Africa-wide effort to introduce and scale-up household solar technologies to off-grid communities, new partnerships seek to leverage the efforts of other international actors. For, instance Power Africa will continue to support governments and finance institutions across 14 countries in sub-Saharan Africa through the partnership with the United Kingdom's Department for International Development (DFID) Energy Africa Campaign, which generates the policy and market shifts necessary to overcome barriers, and rapidly accelerate market-driven growth in the African household solar industry. Energy Africa partners are mobilizing finance across the supply chain, providing early-stage grants and loans to new businesses seeding innovative solar models, as well as grant funding from other partners to pilot new business models and project preparation support.

Micro-Grids

In sub-Saharan Africa, micro-grids are typically run on solar, hydropower, biomass, or diesel power, and may incorporate multiple sources of power to reduce costs and increase availability. Micro-grid projects are diverse and the market has not yet converged on a single scalable model. Some micro-grid companies have achieved success with biomass, micro-hydropower, and solar generation systems. Other companies are piloting systems with remote monitoring, smart metering controls, and mobile payment capabilities that should make scaling up easier.

As a part of Power Africa's *Beyond the Grid* sub-initiative, USADF launched the Off-Grid Energy Challenge in partnership with General Electric Africa and USAID. The Off-Grid Energy Challenge has successfully awarded \$5.0 million to 50 African owned and managed energy companies. These renewable energy projects utilize technologies such as solar home systems, solar and micro-hydro micro-grids, solar cold storage systems, biogas for refrigeration and pasteurization and retailing of solar products through a

⁴ Bloomberg New Energy Finance and Lighting Global. (2016, February). *Off-Grid Solar Market Trends Report 2016*. Retrieved from Lighting Global: https://www.lightingglobal.org/wp-content/uploads/2016/03/20160301_OffGridSolarTrendsReport.pdf

mobile platform. Over 4,800 new connections have been added through projects funded by the Off-Grid Energy Challenge to date.

One example is in rural Nigeria, where the Green Village Electricity Group (GVEG) used a USAID grant to install a 6 kW solar system, along with portable battery packs, to power 230 homes and businesses. This business model will be replicated in 24 additional rural communities. USAID's DIV is another mechanism Power Africa is utilizing to support private sector innovation in micro-grids.

Beyond the Grid will continue to focus on creating clear regulatory frameworks that address the spectrum of needs of consumers, governments, and service providers. Compared to on-grid projects, micro-grids face relatively more challenges with regard to the enabling environment, because they are technically and operationally similar to the central grid, but are not typically fully included in a country's regulatory framework. This gap results in uncertainty about equipment standards, the ability to charge cost-reflective tariffs, and the implications of the grid reaching an area served by a stand-alone micro-grid. *Beyond the Grid* is building on early achievements and increasing support to help governments and private companies remove these barriers in a manner that increases access to power in urban and rural areas to meet commercial, industrial, and residential needs.

SECTION 4(b)(4)

A description of plans to support efforts to reduce waste and corruption, ensure local community consultation, and improve existing power generation through the use of a broad power mix, including fossil fuel and renewable energy, distributed generation models, energy efficiency, and other technological innovations, as appropriate.

Power Africa has made significant strides in the first three years, helping projects expected to generate over 4,600 MW of power reach financial close. Getting an additional 15,400 MW of power projects to financial close by 2020 will require that African countries continue to embrace reforms needed to drive private sector investments in the power sector. Power Africa supports governments to make tough reforms and strengthen their capacity to sustainably develop and manage their energy sector, including by reducing waste and corruption in the power sector, ensuring local community consultation in the development and management of power projects, and improve existing power generation.

Efforts to Reduce Corruption and Waste

Power Africa is working with partner governments to build their capacity to combat corruption and waste. Through trainings, technical assistance, and support of institutional reforms, Power Africa promotes improved public financial management, regulatory capacity, and transparency that will lead to more accountable systems, processes, and management.

Addressing corruption is a key part of MCC's approach to poverty reduction and the agency has made controlling corruption a key indicator in selecting partner countries for funding eligibility. In addition, MCC has established a range of controls to prevent, detect, and combat fraud and corruption during the course of program implementation. Additionally, the agency's selective approach to partner eligibility, which puts a premium on rewarding countries committed to fighting corruption, incentivizes anti-corruption actions by partner, and potential partner, governments.

USTDA supports transparency in public procurements to improve infrastructure procurement and project management, including through its GPI program in Botswana and Ethiopia. These efforts have led to the Government of Botswana proposing amendments to its national procurement law, which will enhance efficiency, increase transparency, and foster competition. In Ethiopia, USTDA's work has led to the Government of Ethiopia establishing best-value procurement practices in its tender processes.

The Department of Commerce and the U.S. Trade Representative (USTR) work to address corruption and transparency issues through regular bilateral and multilateral engagement with African nations. The U.S. Government's eleven Trade and Investment Framework Agreements with sub-Saharan African countries and regional economic organizations provide a strategic framework and principles for dialogue on a range of trade and investment issues of critical importance to the business community, including corruption and transparency. The Bilateral Investment Treaties with six sub-Saharan Africa partners help to protect private investment and to develop market-oriented policies in partner countries. In addition, the DOC and USTR lead or contribute to regular public analysis of national and regional efforts towards reform on these issues, such as the National Trade Estimate and the World Trade Organization (WTO) Trade Policy Review reports. The Departments of Commerce and State, USTR and other agencies are involved in the AGOA review process and urges governments who may be at risk of losing AGOA eligibility to take the necessary steps to maintain eligibility, including through improved governance.

The Department of State works with governments and civil society through official dialogues, and regular, consistent diplomatic engagements from principals based in Washington D.C., and from embassies in sub-Saharan Africa to emphasize the needs to address corruption. These engagements focus not only on the need for good governance but also on the severe economic impacts of corruption and waste, both of which can stunt economic growth, and slow economic diversification and investment in public goods such as infrastructure, and increase income inequality. In addition, in 2014, President Obama announced the Partnership on Illicit Finance (PIF) at the 2014 U.S.-Africa Leaders Summit, an initiative co-led by the United States and Senegal that brings together African partners and the United States to jointly address the generation and movement of proceeds from corruption and other financial crimes. In May 2016, the U.S. and Senegal launched their National Action Plans under the PIF, with the remaining 6 PIF partners committing to continue to develop, publish and implement national action plans aimed at combatting corruption, impunity, and improving government transparency.

Power Africa is working with several electricity utilities in order to improve overall performance and reduce mismanagement and waste. In supporting the commercialization of three Nigerian distribution companies, USAID will help the companies that demonstrate lower losses and promote better service delivery to local consumers. In doing so, instances of electricity theft, waste, or malfeasance by employees and/or consumers will be identified and appropriate actions recommended to reduce theft and waste. Similarly, in Liberia, USAID is quantifying technical and commercial losses and making recommendations for their reduction.

Ensure Local Community Consultation

Power Africa engages local communities and works to promote sound environmental and social-impact practices in power sector development. Power projects, especially large-scale power projects, will inevitably have some environmental and social impacts. Before any power projects move forward, project developers must review the potential environmental and social impacts and consult with the communities that may be affected by the project. This is often a precondition before international sponsors, including development agencies, DFIs, or international banks, will provide financial or technical support for the

projects. While the form and level of community consultation and environmental, and social impact reviews may vary from project to project, depending on the requirements of local regulations and differing environmental compliance policies of partner agencies, Power Africa - through its environmental compliance review process - ensures that international best practices in environmental standards apply to its projects. These include the IFC's Environmental and Social Performance Standards, the Equator Principles, or the AfDB's Integrated Safeguard System.

USAID, for example, reviews Environmental Social Impact Assessments (ESIAs) for late-stage Power Africa transactions for completeness. Two of the criteria for completeness are: whether an appropriate level of consultation has occurred with affected communities and if international best practice for resettlement of affected communities is being implemented.

In order to help projects proactively support timely community engagement, Power Africa is initiating a new program to help support the private sector in developing renewable energy projects that actively involve and support local communities, including women and youth, and that more effectively address social and environmental concerns. This model will be rolled out in other countries as well.

While each U.S. Government agency is guided by policies and best practices in social safeguards, Power Africa increasing its formal and informal dialogue with civil society through regular consultations with civil society organizations to strengthen this aspect of our work.

Supporting a Broad Power Mix

Power Africa seeks to promote and facilitate investment in diversified generation portfolios that ensure affordable and reliable access to modern energy services for all people. Diversification enhances energy security by avoiding over-dependence on a single generation source and buffering the power sector from severe fluctuations in price or supply (e.g., hydropower availability during times of drought). It also promotes clean energy development, since a generation portfolio including a mix of technologies presents opportunities to balance variable renewable technologies like solar and wind, and take advantage of renewable resources when they are available.

Natural Gas

Natural gas use for power generation presents both near term and long term opportunities for Power Africa to increase generation capacity in sub-Saharan Africa. In the near term, Power Africa is providing assistance for upstream, mid-stream, and downstream natural gas development through investment or credit enhancements, direct transaction advisory assistance and technical assistance for governments evaluating Independent Power Projects (IPPs). In the long term, Power Africa will assist governments in establishing regulatory frameworks, conducting supply and demand studies, and establishing procurement frameworks necessary to optimally capitalize on large natural gas discoveries and establish sustainable gas-to-power programs.

Natural gas supply shortages are a constraint to existing power plants, forcing lower utilization rates. While shortages exist, the potential to increase natural gas supply in Africa is large, and several new gas fields are being developed. In Ghana, for example, Power Africa provided technical assistance to develop the offshore gas fields by supporting a USTDA reverse trade mission to introduce floating storage regasification units to Ghanaian stakeholders and then developing and finalizing the contractual framework for the infrastructure development of the Jubilee field. Technical assistance included support for the drafting of a natural gas industry institutional and regulatory framework, and the necessary protocols for

safe operations. This support led to the new Jubilee infrastructure coming online in 2014. USTDA has planned two additional reverse trade missions to help unlock gas generation capacity in the major markets of South Africa and Nigeria in late 2016 and early 2017, respectively. In East Africa, Power Africa is supporting the Kinyerezi gas power plants, the development of plants using gas from the Lamu basin in Kenya, and providing technical assistance to facilitate the adoption of cost-reflective tariffs that will attract international companies to develop Tanzania's gas fields.

In Nigeria, the Department of State and USAID are working with the Nigerian government to review and adjust current gas policies in order to help the Government of Nigeria structure policy and fiscal frameworks to incentivize increased production of associated and non-associated natural gas resources to strengthen the stability of natural gas supply for power generation. In addition, USTDA support to Nigerian companies is supporting the development of gas pipelines that can distribute gas to market.

The Department of Energy is also working with experts and emerging African natural gas producers to increase local officials' understanding of Liquefied Natural Gas (LNG) projects to enable governments to make more informed decisions.

Solar

Solar developers are proving that it is possible to build solar PV plants at scale. In the United States, First Solar recently completed two 550 MW plants (Topaz and Desert Sunlight in California, currently the world's largest solar PV plants), while SunPower is developing a 579 MW Solar Star Project. Developers in emerging markets are also stepping into the market. As solar technology continues to improve and developers learn through experience, solar will become increasingly competitive in African countries, especially for those that rely on high-cost oil or diesel as a major part of their power generation mix.

Parts of Southern Africa have solar irradiation levels as high as 2,500 kWh per square meter, some of the highest in the world (and on par with the Sahara Desert in North Africa).

This potential has not gone unnoticed; several African countries are already operating or are now developing utility-scale plants. In South Africa, more than 2,000 MW of utility-scale solar plants were contracted in between 2011 and 2014 as part of the country's Renewable Energy Independent Power Producer Program (REIPPPP). The largest operational plan is the Jasper Solar PV Plant, developed by Power Africa Partner SolarReserve, with an installed capacity of 96 MW that can power up to 80,000 homes.⁵

Power Africa's approach to identifying new opportunities and ramping up utility-scale solar has four strategic pillars:

- Competitive procurements: Support transparent, competitive independent power producer tender processes (such as auctions) that attract private sector players and ensure that countries receive cost-competitive generation options.
- Smart public and private incentives: Assist and encourage African governments to establish the legal and regulatory frameworks that create a transparent playing field for private investors and developers, while ensuring sustainable, reliable, and cost-effective generation for governments.

⁵ Power Africa Roadmap, 38.

- Sustainable grid integration: Ensure that intermittent solar generation can be integrated into the existing grid and, where necessary, support measures to strengthen the grid and increase the level of integration.
- Regional power sharing: Help countries to think and act regionally to unlock large (and cost-competitive) solar projects that would not be feasible for a single country.

Recently, with support from Power Africa, through USAID, the IFC's Scaling Solar program in Zambia helped manage a competitive procurement that will lead to the development of two 50 MW solar PV projects. The two provisional winning bids are priced at approximately US\$.06 and US\$.078 per kilowatt hour, which is the lowest cost for solar energy in sub-Saharan Africa.

Geothermal

Geothermal development is complex and involves significant upfront risks. As with oil and gas, developers must find and harness a fuel source that is thousands of meters below the ground. It takes numerous studies, in-depth planning, and significant up-front capital investment to confirm the quality of resources. In addition to the hurdles shared with oil and gas development, geothermal resources are currently geographically limited to East Africa, often in remote locations without access to roads or ports. Moreover, geothermal resources cannot be exported like oil or gas. As a result, there has been less private investment in geothermal than other base load fuels.

Despite these risks, there is great potential in East Africa for geothermal energy development. In 2015, Kenya was ranked eighth in the world for geothermal energy development, with over 600 MW. Nearly all of this development, however, has come from the Kenyan Generation Company (KenGen) which is majority government-owned. Private development is still lagging. Power Africa is working with other donors and partners in East Africa to overcome the up-front capital, planning, policy, and regulatory barriers to geothermal investment. In Kenya, USAID also launched a new Partnership with KenGen to improve the operational efficiency of its geothermal plants and explore options for partnering with the private sector in the development of future projects.

The 500 MW Corbetti Project in Ethiopia has already benefited from Power Africa's geothermal strategy. Power Africa's transaction advisors were influential in helping Ethiopia develop its first ever PPA with an independent power producer (IPP) for Corbetti by providing negotiation support, financial modeling expertise, and technical assistance to Ethiopian Electric Power. The Corbetti project has also been selected for support by the African Union's East Africa Geothermal Risk Mitigation Facility. Power Africa is now working with the Ethiopian Government to draft a new geothermal law governing resource exploration and development rights. Further technical collaboration on the Corbetti transaction supported by Power Africa included legal assistance from the AfDB's African Legal Support Facility. Power Africa, including representatives from DOE and DOE's NREL, and the U.S.-East Africa Geothermal Partnership, are working with KenGen to provide capacity building and technical assistance for growth obstacles in areas including geothermal subsurface and surface technology, and information technology systems integration and geothermal data management.

Wind

Although wind power generation potential is limited across much of Sub-Saharan Africa, particularly compared to the potential for gas and solar, the technology will still be a critical component to a diversified

and cleaner power supply for the region. There are three key factors that will continue to drive a sub-set of Power Africa activities supporting the development of the wind sector:

- 1) Rich Resources in Select Markets: East Africa is one of the most richly-endowed wind energy resource regions on the planet.
- 2) Lowest Cost and Mature Clean Energy Technology: Wind energy is one of the most mature renewable and zero-emission energy technologies, and currently has one of the lowest cost of electricity (LCOE).
- 3) Proven Success and Reliable Pipeline in Select Markets: Power Africa partners have closed transactions and proven the potential for wind energy development in key markets where pipeline investment continues apace.

In Kenya, the Lake Turkana Wind Power consortium utilized Power Africa technical assistance and financing instruments (a loan and a partial risk guarantee from the AfDB and an investment guarantee from OPIC) to reach financial close on a 310 MW wind farm transaction that is now under construction. Power Africa provided transaction advisory assistance to the Kenya Electricity Transmission Co. Ltd. in their negotiations with Kenya Power to evacuate power from Lake Turkana. The pricing and risk allocation model used to establish this wheeling regime will also be helpful for future undertakings in Kenya.

A condition precedent to financial close for one of the project's financiers was adoption of critical reforms to strengthen the grid operations and infrastructure of the national utility, Kenya Power. Through its Grid Management Support Program, Power Africa provided technical assistance to Kenya Power to help it address the challenges of integrating intermittent renewable energy into the national grid.

Hydropower

Hydropower represents approximately 30 percent of tracked Power Africa transactions, and is generally an inexpensive source of renewable energy. However, dam projects are capital intensive and have strict international guidelines on the environmental and social impacts created from reservoirs. Large hydropower project developments have long lead times and often require significant or complete state ownership due to the high capital cost, despite being one of the least costly power production sources per MW, on average. Additionally, where downstream countries are affected by neighboring country's dams, international agreements over power production and water sharing must be reached. Power Africa expects significant additional hydropower generation from both reservoir-based (storage) projects and run-of-river projects for both grid and off-grid power, forecasting that about 12,000 megawatts of hydropower will be added by 2030, mostly with these smaller run-of-river plants.

USTDA awarded a grant to support the efforts of DC HydroPower Ltd., a Rwandan energy company, to develop two run-of-river hydropower plants in northwest Rwanda. A U.S. engineering firm provided hydrological modeling, technical design, and pre-construction energy estimation to help the project achieve bankability. The project, which will install a combined 3.6 MW of new electricity generation capacity, will electrify over 7,000 households and businesses across the mountainous Musanze District.

USTDA also provided a grant to Kastan Mining PLC, a Tanzanian company, to support the development of two 10 MW run-of-river hydropower facilities that will supply power to Tanzania's public utility and to villages in the Lukosi River Basin area. The project will provide the technical and financial analysis, as

well as recommendations on standardized hydropower plant configurations necessary for the project to receive financing.

Under MCC's compact with the Government of Malawi, MCC funding is being used to rehabilitate and upgrade the Nkula A hydropower plant, originally commissioned in 1966. The rehabilitation will increase the plant's rating from 24 MW to 36 MW, thereby increasing the availability of power, and extending the plant's operating lifetime.

Coal

On June 25, 2013, President Obama announced the Climate Action Plan, which lays out a national plan for tackling climate change. The plan calls for an end to public financing of new coal-fired power plants overseas, except for a) the most efficient coal technology available in the world's poorest countries in cases where no other economically feasible alternative exists, or b) facilities deploying carbon capture and sequestration technologies. Power Africa adheres to the policy articulated in the President's Climate Action Plan in evaluating potential support coal-fired power or coal gasification plants.

Distributed Energy Systems

Distributed energy refers to small-scale projects that provide electricity closer to customer homes and businesses. These can be off-grid, such as home power system or micro-grids, or grid-connected. Power Africa supports both off-grid projects and small-scale renewable projects, like solar or micro-hydropower that are located in remote areas and serve the local population as well as feeding into the central grid.

Power Africa is supporting distributed energy systems through its *Beyond the Grid* investments. Focusing on attracting private sector investments into this sector and working with governments to remove barriers to off-grid and micro-grid projects, Power Africa expects to provide nearly half its connections through home and micro-grid systems. For a detailed description of what Power Africa is doing to support distributed energy systems, *see Section 4(b)(3)(B)*.

Energy Efficiency

While new power generation and associated infrastructure are critical to bridging the gap between energy supply and demand, the role of energy efficiency as a least-cost energy resource can reduce demand, decreasing the need for expensive peak capacity and allowing electricity supply to be expanded to meet increasing demand in a timely, low-cost, and sustainable way.

Appliances and lighting are primary consumers of electricity in residential and commercial buildings. And as more Africans become connected to the grid, the efficiency of appliances and lighting becomes even more critical to cost-effectively meet demand, mitigate supply constraints, and improve utility sector performance.

MCC is introducing energy efficiency projects to its power sector compacts in sub-Saharan Africa. Under its compact with the Government of Ghana, MCC is supporting, with approximately \$25 million, the development and enforcement of standards and labels to provide information on the energy efficiency performance of selected energy consuming appliances and products; training for energy management professionals regarding energy auditing; public education to help ensure consumers are fully informed of the benefits and trade-offs of higher efficiency appliances and equipment; as well as pilot tests and

demonstrations of distributed applications (e.g., PV back-up power and solar powered street lighting) focused on government electricity consumers. In Benin, MCC has programmed approximately \$9 million to support the expansion and strengthening of energy efficiency standards and labeling programs, including: the formulation of technical standards; development of a program for product labeling; enhancement of product quality enforcement and testing; introduction of support for public sector procurement of energy efficiency goods and industrial energy efficiency.

USAID is also supporting operational improvements to existing generation capacity in Ethiopia, Ghana, Liberia, Kenya, and Nigeria. By improving partner governments' capacity to ensure efficient operations and maintenance, supporting governments to rehabilitate existing geothermal plants, supporting commercialization and loss reduction programs, USAID is promoting energy efficiency that will reduce technical and commercial losses in targeted power sectors. In Tanzania, USAID carried out a demand-side management study that recommended and is leading to the adoption of a time-of-use tariff by TANESCO for its larger industrial customers, reducing system costs and greenhouse gas emissions by avoiding oil-fired generation at peak hours. As part of IRRP in Tanzania, USAID also is funding a green building activity to support the Tanzania Green Building Council in developing new buildings with energy efficient design features.

Grid Modernization and Best Practices

Creating a modern power system has both technical and operational components. On the technical side, the grid needs to be robust, able to deliver power reliably and handle intermittent power, like wind and solar, without disruption of service. A modern grid has smart metering and communications technology through the system so that billing is efficient and faults are detected and managed quickly. On the operational side, a modern system operates efficiently and cost effectively.

Across sub-Saharan Africa, generation, transmission, and distribution losses are highly problematic, with losses exceeding 50 percent in some countries. For a summary of Power Africa work to support grid modernization, see *Section 4(b)(2)(B)*.

SECTION 4(b)(5)

An analysis of existing mechanisms for ensuring, and recommendations to promote (A) Commercial cost recovery; (B) Commercialization of electric service to consumers through distribution service providers, including cooperatives; (C) Improvements in revenue cycle management, power pricing, and fees assessed for service contracts and connections; (D) Reductions in technical losses and commercial losses; and (E) Non-discriminatory access to power, including recommendations on the creation of new services provider models that mobilize community participation in the provision of power services.

Power Africa offers a suite of catalytic support services that are applied to the critical technical areas of power distribution. A robust “toolbox” of technical resources, methodologies, and activities includes: assistance to African host governments to develop policies that create an enabling investment climate; creating viable financial structures and project life-cycle business models; technical assistance for power projects; credit and insurance for the project; legal and commercial assistance; and technical, legal, commercial and institutional capacity building support for partner countries.

(A) Commercial Cost Recovery

Power Africa encourages and supports commercial cost recovery in the power sector, which is essential to a financially viable power system. Cost-reflective tariffs—charged to end consumers, and reflecting the true cost of generation, transmission, distribution and supply —provide financial incentives for private sector players to enter and effectively participate in power generation, transmission, and distribution markets. Combined with effective billing and collections systems and comprehensive loss prevention programs, they help ensure the financial soundness of utilities necessary to expand connections, and provide reliable service to industrial and consumer markets. For examples of Power Africa’s support promoting cost-reflective tariffs, *see Section 4(b)(2)(C)*.

(B) Commercialization of Electric Service through Distribution Service Providers, including Cooperatives, to Consumers

Power Africa is also assisting African governments, power regulators, utilities, and off-grid service providers to encourage the commercialization of electricity service provision through distribution service providers, including cooperatives, to consumers. To be sustainable, electrical distribution must be done on a commercial basis, i.e. revenues must cover costs. In order to provide a sustainable, consistent power to consumers, utilities tied to the grid, as well as distribution service providers off the grid, need to provide power on a commercial basis.

Allowing the private sector and communities to generate and distribute power is a cost effective way to increase access to power. For example, a firm which generates power for its own use during business hours may be capable of providing power to its neighbors. If this is done on a commercial basis, supplying communities becomes financially viable and can often serve as an anchor provider for ‘island’ grid arrangements/ programs. The community may then use power for residences, shops, street lighting, hospital and/or community center. Connecting to a generator could serve as a back-up or and additional power source for a mini grid. These distributed service providers, with their own generation, help relieve pressure on the national grid to expand and allow the national grid to operate with greater effectiveness. National grids can purchase power from the distributed energy sources to back up supply during peak load hours—the time when the grid system is stressed to meet increased consumer demand for power, and consumers are at the greatest risk of a power outage. This approach to integrating distributed energy to address increases in demand for power can enhance access to end users connected to the grid.

The enabling environment in the African power sector must include: ability of the private sector and communities to generate and distribute power and connect to the grid at a fair price; cost-reflective tariffs; creditworthy off-takers; sound, strategic, and integrated power sector planning; streamlined and transparent processes for project development; low import taxes on electrical equipment; protected and enforceable intellectual property rights; and adherence to internationally-recognized environmental and social standards and best practices. An ideal enabling environment would allow the private sector to operate at all levels of the power system (ownership, construction, and operation) and in all the activities (generation, transmission, and distribution). Power Africa, through the policy sub-group, Department of State diplomatic engagement, and engagement from others including Treasury and USAID, works with African governments to establish the policies, legislation, and regulation needed to shape this enabling environment.

Additionally, the ability of existing distribution service providers and start-ups to access early stage financing and technical support is essential to meeting energy needs in African countries. Power Africa is

helping countries adopt needed reforms to permit the private sector, communities, and entrepreneurs to increase power generation, transmission and related services.

For example, MCC is helping Malawi’s ESCOM to obtain a “shadow” credit rating via its cooperation with the Public-Private Infrastructure Advisory Facility (PPIAF), and introducing private sector participation in the provision of distribution services in the form of a concession for LEC in Liberia and ECG in Ghana.

(C) Improvements in Revenue Cycle Management, Power Pricing, and Fees Assessed for Service Contracts and Connections

To strengthen the efficiency, financial health, and sustainability of the power utilities in Africa, Power Africa provides assistance to regulators, ministries, and utilities that improve revenue cycle management, power pricing, and fees assessed for service contracts and connections. Interventions supporting revenue cycle management include accurate metering, transparent billing, and timely collection of fees from consumers. Through technical and capacity building trainings and programs, Power Africa builds the capacity of regulators to price power by adjusting pricing to meet demand for electricity in a manner that maximizes revenues and manages demand, through approaches such as peak and off-peak pricing. To cover the costs of existing and new connections, including improvements at the transmission level related to power pools and transnational trading of energy, beneficiaries receive technical support to determine appropriate fee structures for service contracts and connections. For more information about pricing, including cost-reflective tariffs, see *Section 4(b)(2)(C)*.

(D) Reductions in Technical Losses and Commercial Losses

Power Africa is supporting efforts to reduce technical and commercial losses in the transmission and distribution of energy in sub-Saharan Africa. Technical losses refer to the differences between energy generated and energy delivered to end-users, (*i.e.*, losses in energy in transmission and distribution in power systems, including line losses and transformation losses). Non-technical or commercial losses describe energy that is used, but not billed, as a result of factors external to the power system, including electricity theft and errors in metering, accounting, and record-keeping or administrative losses.

For many countries in sub-Saharan Africa, energy losses are a serious problem, representing losses in revenues for utilities. Utilities not recovering costs can lead to companies struggling with solvency and unable to provide reliable power and to meet the demand for new connections. These energy and revenue losses need to be reduced to cover costs in the supply of electricity and to help utilities to become financially viable. Reducing losses or improving energy efficiency can also help cover rises in demand without the necessity to increase installed capacity.

Table 1 presents losses, as percent of generated energy, for select countries in sub-Saharan Africa in 2013, with an average for developing countries in sub-Saharan Africa of 11.83 percent. For comparison, the average loss percentage for high income countries is 6.61 percent, the United States is 5.96 percent, and the European Union is 6.05 percent.

Table 1: Transmission and Distribution Losses (% of total) in Sub-Saharan Africa (2013)

Country	% Loss	Country	% Loss
Angola	11.28	Niger	33.63
Botswana	39.04	Namibia	27.72

Congo (ROC)	44.29	Nigeria	15.34
Eritrea	14.33	Senegal	15.98
Ethiopia	18.98	South Africa	8.49
Gabon	19.71	Sudan	22.91
Ghana	21.54	Tanzania	18.00
Mozambique	17.77	SSA (developing)	11.83

Source: World Bank Development Indicators

Assistance on reducing technical losses focuses on engineering and financing issues. Technical losses are associated with lengthy distribution lines, inadequate size of conductors on distribution lines, poor location of distribution transformers away from load centers, low power factor of primary and secondary distribution system, bad workmanship, imbalances in current along three-phase circuits, uneven current loads and distribution, inappropriate transformer sizing and selection, leaking of power, overloading lines, and poor quality of equipment. All technical losses cannot be eliminated as they are inherent and natural in the structure and characteristics of the system. However, the losses can be reduced to a practical minimum level.

Reducing non-technical losses can be quite complicated. The losses may be due to theft through an illegal connection to the grid, tampering with a consumption meter, unmetered consumption due to lack of accurate metering, poor administration of billing and collection, collusion, or corruption. Critical conditions for success in reducing commercial losses are establishing accountability; local ownership of the impetus for reforms; encompassing technical processes; human capacity and willingness to motivate institutions to fulfill their roles; and justifying the efforts in terms of social benefits achieved and communicated clearly to the public.

Assistance can help with non-technical methods to reduce commercial losses: tackling collusion through field inspections by the most reliable employees; publicizing cases of theft; reengineering business operations; making available reliable and transparent information within the company and to government and other external stakeholders, making possible a detect and inspect approach; and charging the politically powerful people, if guilty. Operational improvements include the areas of: commercial cycle or metering, billing, and collecting; detection and regularization of fraud and unmetered connections; disconnection and reconnection of customers related to debts and/or fraud; and dealing with customers in the office and over the phone.

Assistance can also help with technical methods to fight commercial losses: using advanced metering infrastructure (AMI) which allows remote metering, reading, and monitoring, especially on large consumers; implementing pre-paid metering; using medium-voltage distribution (MVD) in areas that are non-manageable due to violence or crime; and managing demand through smart grids. Use of AMI has a watchdog effect on users and the company's corporate governance and anti-corruption efforts when customers and employees understand that monitoring translates to accountability.

Pre-Payment Metering (PPM) is a cost-effective commercial option for low-consumption household and commercial consumers. Consumers can be disconnected remotely when their credit is used up. AMI also allows the use of MVD to supply consumers in areas where access is not safe by connecting customers directly to medium- to low-voltage transformers. Smart grids help manage demand by informing users on real-time prices, start and end of peak periods, and accumulated consumption.

Power Africa promotes loss reduction through a number of programs. In Nigeria, USAID supported NERC with an action plan for ranking problematic feeder lines (voltage power lines that transfer power from a distribution substation to distribution transformers). The ranking of feeder lines enables NERC to set priorities for service quality and enforcement operations. As part of the action plan, USAID recommended bolstering inspections and enforcement programs. USAID is also supporting regional workshops in East, West, and Southern Africa to address the commercial challenges in the region, including best practices in collections, billing, losses, theft reduction, and marketing.

USTDA's U.S.-Africa Clean Energy Standards Program will include technical workshops to build capacity and expose utility personnel, regulators, and government officials to available U.S. equipment. For example, visiting professionals and government officials are introduced to advanced metering options that can help reduce commercial losses, to better transformers and conductors for reducing technical losses in transmitting power, or to cost-effective ways to handle billing and collecting.

In addition, MCC is planning to work with utilities in Malawi, Ghana and Benin, to assist each utility with their goal of reducing both technical and commercial losses.

For other examples of how Power Africa is reducing technical and commercial losses, *see Section 4(b)(2)(C).*

(E) Non-Discriminatory Access to Power, including Recommendations on the Creation of New Services Provider Models that Mobilize Community Participation in the Provision of Power Services

Power Africa supports reforms, transactions, and on-grid and off-grid solutions that promote non-discriminatory access, including for a variety of new service models that mobilize community participation in the provision of power services.

The key groups in non-discriminatory access to power are geographical low-income households and women-headed households. For much of sub-Saharan Africa, rural populations are spread out and generally located far from grids. This makes providing electricity through a grid connection prohibitively expensive and unreliable because of high technical losses inherent in long-distance transmission. The importance of off-grid solutions and the private sector in delivering these solutions is of high importance for these communities.

Many barriers exist for low income households connecting to available grids. These include high connection charges that make hook-ups unaffordable, illegal tenure that government disqualifies households from connecting, and other social and economic conditions. Inefficient subsidization aggravates the situation. In many sub-Saharan African countries, electricity tariff subsidies benefit the minority of households that have power in their homes, the majority of whom could afford cost-reflective tariffs. Implementing effective, efficient, and cost-effective tariffs and subsidies would provide incentives for private investment while allowing low-income households to connect to the grid.

Efforts are underway to reform tariffs and subsidies and to provide financing to low income households to facilitate connecting to grids. For example, the World Bank funded Access to Rural Expansion Project in Ethiopia has helped the Electrical Power Corporation connect 25,000 poor households. The World Bank is also implementing grants that fund the financing of a large percent of connection charges for poor rural households in Kenya, Liberia, and Uganda through a five-year interest-free loan.

Power Africa is supporting national government efforts to establish an appropriate enabling environment for non-discriminating access to power that: empowers the private sector and communities to generate and distribute energy; facilitates connecting distributed energy systems to the grid; and provides reasonable payments for energy being provided to the grid by these systems.

One of the key thrusts of Power Africa efforts is support for off-grid lighting and power, primarily household systems (mainly solar based) and micro-grids. Through our work with the private sector and with African Governments, Power Africa encourages investments that take into account the social impact on the community and projects that take into account data from a diverse and representative set of stakeholders.

The private sector is the key to providing non-discriminatory access to power, including in the off-grid or micro-grid areas. Power Africa provides training and technical assistance to support the development of power sector markets that are capable of attracting private sector investment. Interventions include capacity building of local entities to: (1) remove barriers that prohibit the growth off-grid and micro-grid projects, and (2) incentivize public and private actors to develop the market for off-grid solutions. Through this approach, Power Africa supports private sector companies to enter the off-grid market, improve business operations, and introduce new business models.

Under the Off-Grid Challenge, USADF has made 50 awards worth \$5 million to African entrepreneurs in six countries. The awardees are applying off-grid solutions using renewable resources in sub-Saharan Africa that will lead to an estimated 1 million connections. In Nairobi's slums, on Off-Grid Challenge winner, Afrisol Energy Ltd., is using biodigesters to provide small businesses with electricity and biogas. And in rural parts of western Kenya, another grant winner, Mibawa Suppliers, is expanding its business of providing pay-as-you-go lighting and chargers to households.

Power Africa is supporting efforts to expand power distribution services by entrepreneurial firms that allow customers to pay energy services as they are used. These efforts are proving to be quite successful in providing non-discriminatory access to power in rural communities. For example, Solar Sister retails portable solar lights in rural sub-Saharan African communities through female solar entrepreneurs. Starting with only two sellers in 2010, by 2015 Solar Sister has expanded to over 1,200 entrepreneurs, mostly in Uganda, Tanzania, and Nigeria. Solar Sister's entrepreneurs pay for inventory when it is sold. Referred to as "pay-as-you-go," this business model overcomes the problems of lack of access to start-up capital and low-threshold of risk. Solar Sister's work allows women, who often are excluded from household decisions a direct line of income and decision making about powering the household. The program expands rural electricity access by providing solar power at a rate that is equivalent to or cheaper than other light sources, such as kerosene.

SECTION 4(b)(6)

A description of the reforms being undertaken or planned by countries in sub-Saharan Africa to ensure the long-term economic viability of power projects and to increase access to power, including: (A) Reforms Designed to Allow Third Parties to Connect Power Generation to the Grid; (B) Policies to Ensure there is a Viable and Independent Utility Regulator; (C) Strategies to Ensure Utilities Become or Remain Creditworthy; (D) Regulations that Permit the Participation of Independent Power Producers and Private-Public Partnership; (E) Policies that Encourage Private Sector and Cooperative Investment in Power Generation; (F) Policies that Promote Compensation for Power Provided to the Electrical Grid by On-Site Producers; (G) Policies to Unbundle Power Services; (H) Regulations to Eliminate Conflicts of Interest in the Utility Sector; (I) Efforts to Develop Standardized Power Purchase Agreements and Other Contracts to Streamline Project Development; (J) Efforts to Negotiate and Monitor Compliance with Power Purchase Agreements and Other Contracts Entered Into with the Private Sector; (K) Policies that Promote Local Community Consultation with Respect to the Development of Power Generation and Transmission Projects

Regulatory, policy, and enabling environment reforms will be the foundations for unlocking sub-Saharan Africa’s energy potential. Investors and project developers gravitate to countries where they see strong opportunities for investment, which requires, at a minimum, strong transparent legal and regulatory frameworks; creditworthy off-takers; cost-reflective tariffs; transparent procurement processes; strategic and integrated project development; and adherence to internationally recognized standards and best practices. Power Africa’s approach is based on a core set of principles that set the conditions for a functional power sector - the Enabling Environment Principles. See Section 4(b)(2)(C) and Section 4(b)(2)(E) for an in depth description of what Power Africa is doing to promote these reforms.

(A) Reforms Designed to Allow Third Parties to Connect Power Generation to the Grid

In sub-Saharan Africa, there is broad range of what can be considered power markets. Some “markets” are tightly controlled by Power Africa’s partner governments. These markets are characterized by a single off-taker and offer limited access to the grid. There is also a largely unregulated power market, characterized by multiple off-takers, auctions, and cross border wheeling. In these hybrid markets, Power Africa has helped to facilitate independent power projects. As these projects develop, there will be many more “third parties” seeking to sell power in these hybrid markets. In order for the third parties to work and connect to the national grid, governments will have to adopt reforms which facilitate shared infrastructure access, and strengthen related regulatory capacity.

Allowing third parties to connect to the grid can be a cost-effective way to increase access in both urban and rural areas. Frequently, industrial operations use dedicated generators which typically generate power during peak load time—while the business is open—and could also supply power to the surrounding community during off-peak hours. The owner of a distributed energy generator can be compensated for the power generated, making the ownership of the power source economically viable over the long term and in effect subsidizing the operating costs of the primary business.

Connection to the third party’s generator would provide a back-up source of power for the community, particularly at night when people need lighting on roads, in homes, for micro-businesses, and in community centers.

The government, as owner and operator of the national grid, has an interest in purchasing power from the distributed energy source for the same reason: to back up supply for peak load hours when older power

infrastructure is stressed and power blackouts are prevalent. Integrating distributed energy power can enhance service, especially for end users connected to the grid.

To take advantage of the benefits of allowing third parties to access the grid, Power Africa partner countries need to adopt reforms that will permit independent power producers to engage confidently with the utility. Power Africa has over 40 private sector partners focused primarily on developing distributed energy and micro-grid projects in the rural and peri-urban areas of sub-Saharan Africa. To accelerate the necessary reforms, Power Africa is providing assistance to:

1. Develop transparency in governance for the power sector;
2. Adopt tariffs that reflect the costs of power; and
3. Build capacity for commercial transactions.

For more information about how Power Africa supports these reforms, see *Section 4(b)(2)*.

Capacity for Commercial Transactions

Improved technical and commercial efficiency in the electricity sector will enable delivery of more services to more consumers; lower costs throughout the supply chain; and increased quality and commercial viability. Efficiency can be improved through interventions including infrastructure investment and maintenance, improved metering and bill collection, demand-side management, and consumer education.

USTDA provides technical assistance to support regulatory reform related to infrastructure development. In Nigeria, USTDA is providing technical assistance to help the Benin Electricity Distribution Company develop an investment plan, framework and design for the modernization of its electricity distribution network. The assistance will recommend a utility-wide rollout of smart grid technologies and systems that could help reduce electricity losses from 40 percent to a goal of 12 percent.

In addition, establishing industry standards is the focus of USTDA's U.S.-Africa Clean Energy Standards Program, a series of technical workshops that are helping to ensure that the decision makers who develop and implement standards, testing protocols and regulatory procedures for Africa's energy sector are informed of internationally accepted, industry-led standards.

(B) Policies to Ensure there is a Viable and Independent Utility Regulator

A strong and transparent regulatory framework facilitates both private and public investment. This framework should include a regulatory institution that is autonomous, has clear authority and capacity to fulfill its mandate, and is held accountable for its decisions and actions. It should also establish and maintain clear relationships and lines of accountability between key power sector institutions, including Ministries, utilities, and the regulator. The framework should also clarify important regulatory aspects such as pricing, land rights, offtake arrangements, and performance standards - which can reduce investor risk while contributing to other public policy objectives such as environmental protection and universal access.

Toward this end, Power Africa partners have been working closely with African government officials and utility regulators to build capacity to ensure that the upstream and downstream power planning decisions are consistent, and to set tariffs that reflect the cost of power. (*See Section 4(b)(2)(C)* describing Power Africa's partnership with the National Association of Regulatory Utility Commissioners (NARUC).

For a description of USAID is doing to support utility regulators, *see Section 4(b)(2)(D), Section 4(b)(2)(E), and Section 4(b)(5)(C).*

(C) Strategies to Ensure Utilities Become or Remain Creditworthy

Lack of investor confidence in the creditworthiness of off-takers hinders electricity sector development. Efficient, financially solvent off-takers mitigate investor risk and encourage increased private sector participation. In general, one of the most critical tools for enhancing the creditworthiness of the power utility is allowing it to charge and recover through retail tariffs the full cost of the provision of power to consumers. Power sectors undergoing significant structural change and/or modernization often face a steep learning curve in determining and setting appropriate cost-reflective tariffs. Diverse stakeholders including utilities and regulators must understand their respective roles in requesting, determining, and approving tariffs. Ideally, regulatory bodies must have the autonomy and accountability to determine and implement appropriate tariffs without undue interference from other parties.

Combined with effective billing and collections systems and comprehensive loss prevention programs, cost-reflective tariffs help ensure the financial soundness of utilities so that they can expand connections and provide reliable service.

See Section 4(b)(2)(C) for a discussion of MCC and USAID support for cost-reflective tariff reform.

(D) Regulations that Permit the Participation of Independent Power Producers and Private-Public Partnerships

Regulations that permit public-private partnerships and facilitate investments in power projects should have as their underlying goal the development of a sustainable power sector with ongoing capital investments to support related infrastructure. Building capacity for partner countries in evaluating regulatory, legal, and structural barriers to investment and innovation is central to Power Africa's partnership with governments in sub-Saharan Africa. To develop an attractive investment climate, Power Africa provides technical assistance to governments, utilities and regulators to develop necessary commercial practices (including cost-reflective tariffs), intellectual property rights associated with power projects, and mitigation of risks (including establishment of land rights).

For more information on Power Africa's work to support IPPs and PPPs, *see Section 4(b)(6)(I) below.*

(E) Policies that Encourage Private Sector and Cooperative Investment in Power Generation

Early on, Power Africa recognized that its goals to increase generation of and access to electricity in sub-Saharan Africa would require cooperative investment in the power sector. Public-private partnerships involving U.S. and host governments working with private developers and investors needed to be strengthened with tools available from multilateral development banks. The tools and expertise of all Power Africa partners, including the unique perspectives and expertise of international partners, offer the strongest and most efficient policy collaboration in developing a sustainable power sector. Accordingly, Power Africa has formal partnerships with the Governments of Canada, Norway, Sweden and the United Kingdom, as well as with multilateral institutions, such as the European Union, the African Development Bank and the World Bank Group. Power Africa also has technical agreements with the African Union's New Economic Partnership for Africa's Development (NEPAD), the International Renewable Energy Agency, and the United Nations' Sustainable Energy for All (SE4ALL) initiative. Power Africa works

collaboratively on projects of mutual interest that advance the goals of increasing sustainable energy use and access in Africa. These development partners have collectively committed approximately \$12 billion in support of Power Africa's goals.

Additionally, Power Africa has forged partnerships with more than 100 private sector partners, who have collectively committed to invest \$31 billion to investing in power projects, and transmission and distribution projects across sub-Saharan Africa in support of Power Africa's goals. Power Africa works with an additional fifteen foundations and nongovernmental organizations (NGOs), including trade associations and non-profit organizations.

On any given Power Africa project, multiple U.S. Government agencies work with the private sector and other partners in multilateral organizations to develop bankable power sector transactions. Activities to develop capacity and policies to facilitate investment in the power sector are comprehensive and broad, including:

- Assisting African host governments develop policies to create an enabling investment climate
- Creating viable financial structures
- Providing technical assistance with the power project
- Providing credit and insurance for the project
- Providing legal and commercial assistance; and
- Building capacity building with the technical, legal, commercial and institutional supports for partner countries

Power Africa agencies and partners collectively deploy the assistance needed to bring power projects online and to make power accessible to millions of African households. Several recent examples of the progress Power Africa partners have made toward the goal in increasing investments in the power sector include:⁶

- After surpassing its initial commitment of \$250 million invested in large-scale power projects in Ghana, Kenya, and Nigeria, the Africa Finance Corporation (AFC) announced the provision of a \$25 million loan as part of a \$150 million senior unsecured syndicated loan facility to Kenya Power and Lighting Company. The facility will support the rehabilitation and expansion of Kenya's power transmission and distribution network to increase its capacity from the current 2,000 MW to 5,000 MW by 2020.
- In 2014, a SunFunder portfolio company, SolarNow, closed more than €2 million in equity financing from private sector partners Novastar Ventures and Acumen. SolarNow, which provides homes, schools and businesses in Uganda with high-quality solar power systems and short-term financing, expects to close an additional \$2 million in debt capital before the end of 2015. SunFunder received early stage support from U.S.-ACEF.
- In August 2014, the Swedish International Development Agency (SIDA) announced its partnership with Power Africa and committed to mobilize \$1 billion for sustainable energy development in sub-Saharan Africa over the next decade. SIDA focuses its support entirely on renewable energy and energy efficiency and gives high priority to the avoidance of greenhouse gases. SIDA is developing a program of guarantees and grants focusing on the rural, off-grid

⁶ *Ibid.*

sector, which is expected to reach 1.5 million people in Zambia alone. SIDA is also planning to provide assistance in Tanzania and Mozambique, as well as regional energy cooperation through capacity building and institutional support to the Southern Africa Power Pool (SAPP), EAPP, and NEL SAP.

- The World Bank Group has been a partner since 2014, when it committed \$5 billion in support of Power Africa, through technical and financial support, including loans and guarantees, in Ethiopia, Ghana, Kenya, Liberia, Nigeria, and Tanzania. To date, the World Bank reports that it has made significant progress towards this \$5 billion pledge, having already committed more than \$2.6 billion in financial support for 12 projects, and close to \$300 million of investments from IFC. The World Bank is a major investor in the African energy sector and in FY 16 reports having a portfolio of 46 active projects totaling \$9.7 billion across the continent. The World Bank Group's approach consists primarily of financial support through investment lending, loans and guarantees from MIGA and IBRD, investments from IFC; coupled with capacity building and technical assistance.
- In 2013, the AfDB announced its support to advance Power Africa's goals as an anchor partner, with a commitment of \$3 billion. It invests in transactions, supports policy reforms, provides advisory services to developers, and implements capacity building activities for African partners. It also offers loans, guarantees, and risk insurance. From 2013 to 2015, the AfDB approved approximately \$4.1 billion in power sector projects across sub-Saharan Africa through all of its windows of assistance, including grants, loans, guarantees, equity investment, and technical assistance. This includes \$683 million in electricity projects in Tanzania and Kenya. AfDB's support of a transmission line in Kenya is pivotal for the Lake Turkana wind project, a Power Africa-supported project.

Power Africa is also pursuing the development of African power sectors through collaborative agreements with multilateral development institutions. NEPAD, a technical body of the African Union, signed a MOU with Power Africa in September 2014 for enhanced collaboration in the development of transformational energy projects prioritized by region. And at the U.N. Climate Summit of 2014, Power Africa signed an agreement with Sustainable Energy for All (SE4ALL) to improve access beyond the grid and to develop investment profiles for SE4ALL countries to support transactions.

(F) Policies that Promote Compensation for Power Provided to the Electrical Grid by On-Site Producers

USAID is working with governments, utilities and the private sector across sub-Saharan Africa to ensure that private sector end-users with on-site power production have consistent and transparent policies and regulations governing sales of power to the grid. Among these are Power Purchase Agreements and the need to utilize industry best practices, including incorporating contractual guarantees that obligate off-takers to compensate on-site producers. In many instances, USAID is also working to develop and promote mechanisms that backstop payment obligations through government guarantees, letters of support, or Put Call Option Agreements. In addition, the Agency is ensuring that there are legal frameworks that establish the policies and regulations around what happens when a central grid reaches a micro-grid, including treatment of the generating and distribution assets. Power Africa is working with governments, donors and private sector companies in Kenya and Uganda to develop these legal frameworks, utilizing successful examples from around the world.

A number of Power Africa partner countries have negotiated with distributed energy power producers to sell power to the grid (mostly renewable energy). In Kenya, USAID is helping the Government of Kenya explore the option of replacing feed-in-tariffs for power projects exceeding 10 MW with auctions. If adopted, auctions are expected to increase private sector investment in renewable energy.

The Tanzania REFIT program was initiated prior to Power Africa by Power Africa's predecessor, the Africa Infrastructure Program, with the goal of incentivizing the development of small scale renewable energy projects. REFITs are designed to attract private sector investment in clean energy in both on- and off-grid applications. In Tanzania, after holding discussions with a number of public and private stakeholders, Power Africa helped develop a cost-reflective REFIT Program for small hydro, wind, solar, and biomass projects under 10 MW. This effort involved reforming regulations to include special provisions to accommodate off-grid connections. In addition, Power Africa revised PPA Guidelines and Application Procedures. The REFIT program was finalized by the Energy and Water Utilities Regulatory Authority (EWURA) Board in 2015.

(G) Policies to Unbundle Power Services

Unbundling refers to the separation of the institutions that control the components of the power sector. A fully unbundled sector will have separate companies who are responsible for generation, transmission and distribution. Unbundling is frequently a first step to privatization of the power sector.

With Power Africa support, Nigeria unbundled its system in 2013 and privatized generation and distribution, but retained the transmission company under government ownership. USTDA and USAID have provided technical assistance to Nigerian distribution companies in the areas of industry best practices and tariff design. *See Section 4(b)(2)(C)* for a more detailed description of how Power Africa is supporting the Government of Nigeria to reform its power sector.

Power Africa, through USAID, continues to also support the efforts of the Governments of Ethiopia and Tanzania work towards unbundling their power services. In Tanzania, efforts are underway to unbundle the parastatal utility, TANESCO into at least three separate companies. The first unbundled entity will be the generation company, planned for establishment in 2017. However that ambitious timeline will likely not be met.

(H) Regulations to Eliminate Conflicts of Interest in the Utility Sector

The regulatory reforms necessary to bring private investment to sub-Saharan Africa require explicit statements delineating responsibility and authority between:

- Management of energy resources;
- Power generation sectors; and
- Utility regulators

In addition, an investor requires assurance of the land rights and ownership rights to the power project. In many sub-Saharan Africa countries, laws do not codify these rights.

Malawi provides an example of Power Africa helping to mitigate conflicts of interest. Under the Malawi Compact with MCC, the Government of Malawi reviewed the conflict of interest between the utility, ESCOM's board of directors, and the board of the Malawi Electricity Regulatory Authority (MERA).

Based on the findings of the review, the Government of Malawi committed to changing the composition of

the board of MERA to eliminate the conflict of interest faced by board members serving on the board of ESCOM.

(I) Efforts to Develop Standardized Power Purchase Agreements and Other Contracts to Streamline Project Development

Private sector sponsors, developers and investors characterize the length of time it takes for projects to reach financial close as a significant barrier to investment in Africa. The opportunity cost for investors is the use of their equity and resources in alternative emerging markets where a project's bankability is more readily apparent. To overcome this obstacle, Power Africa's interventions aim to accelerate financial close of power sector deals.

Early-stage financing for feasibility, engineering, or other impact studies shortens the time to financial close. Grants from Power Africa partners such as USTDA to secure such financing help move projects from concept to inception. These grants are not standardized grants but nevertheless are major movers that accelerate and streamline project development.

The Power Purchase Agreement (PPA)

The PPA is the central contract that governs the sale and purchase of power. The off-taker and producer need to negotiate the PPA to ensure that both parties are aware of, and can agree to comply with, their obligations. Due to the complexity of the PPA, significant pre-planning and advice of outside legal counsel is often required. Capacity building work done by Power Africa has successfully expedited PPA negotiations.

In early November 2014, the DOC CLDP, in partnership with the African Legal Support Facility, brought together a group of international experts to draft and publish a PPA handbook. The handbook provides an overview of PPAs and the obligations, risks and remedies that are found within them and has been used in multiple PPA trainings across sub-Saharan Africa. *See Section 4(b)(2)(F)* for a more detailed description of the “Understanding Power Purchase Agreements” guide developed by DOC, USAID, and AfDB.

Country-specific efforts supported by Power Africa to streamline and standardize PPAs include the following examples:

- A Power Africa transactions advisor embedded with the Government of Ethiopia in 2013 helped to develop a geothermal PPA that became a model for other public-private negotiations in the country.
- The Power Africa supported NARUC—East Africa Regional Partnership Exchange provided the Kenya Energy Regulatory Commission (ERC) with the necessary training to approve a PPA for 30 MW between Kenya Power and the Rwanda Energy Group. In addition, the meetings equipped the ERC with greater capacity for reviewing and approving the wheeling agreement to transmit electricity from Kenya to Rwanda through Uganda.
- Power Africa prepared a standard PPA that has been used in several frontrunner solar PV projects. This has involved work with independent power producers and the Nigerian Bulk Electricity Trading on tariffs and PPAs in Nigeria.
- In Kenya, Power Africa provided training to the utility Kenya Power in the negotiation of solar PPAs.

Tenders

It is preferable for the off-taker to solicit bids from producers using a transparent and competitive tender. In countries with massive power deficits, however, unsolicited proposals are sometimes permitted as a means of quickly increasing power generation capacity. USTDA's GPI is providing a procurement advisor to help Botswana's Ministry of Minerals, Energy and Water Resources implement best-value practices in advance of upcoming energy procurements. This knowledge transfer will accelerate project development. Additionally, USTDA has conducted in-country procurement workshops and procurement study tours to the United States to help officials from Botswana and Ethiopia evaluate life cycle project costs that can help off-takers be better prepared to evaluate potential deals.

Independent Power Producers (IPPs)

IPPs play a critical role in the power sector as they bring significant technical know-how, direct investment of various resources (e.g. financial, capacity building), and spur market competition. IPPs enter a market through the aforementioned tender avenues - competitive tenders or unsolicited proposals. In recent years, sub-Saharan Africa energy ministries have created IPP units to address the unique needs of IPPs complex power projects. As such, Power Africa is increasingly realizing opportunities to support host country's efforts to incentivize greater IPP investment in the power sector. For example, Power Africa and the World Bank Group (WBG) are working with host countries, such as Ghana and Zambia, to advance IPP-led projects.

In Ghana, Power Africa and the World Bank are each collaborating with the Ghana Ministry of Power to refine parameters for screening IPP-led projects. Further, in Zambia, Power Africa and WBG operating division IFC are working with the Ministry of Finance Industrial Development Corporation Ltd. to implement IFC's Scaling Solar program, which promotes not only the use of competitive tenders, but also IPP-led projects in the power sector.

(J) Efforts to Negotiate and Monitor Compliance with Power Purchase Agreements and Other Contracts Entered Into with the Private Sector

A PPA is a contract between the purchaser or "off-taker" (often a state-owned electricity utility or a government agency) and a privately-owned power producer.⁷ The contract specifies a predetermined stream of payments for the concession power project. In addition to the terms relating to the sale and purchase of power, the PPA also specifies the required design, outputs, operation and maintenance for the power plant. The power producer agrees to make available to the purchaser, the contracted capacity of energy and to deliver the energy in accordance with the PPA.

Capacity building assistance for off-takers through Power Africa will reduce the likelihood of breach of contract. The involvement of the host government will also diminish the probability of abrogation of the PPA. Effective negotiation and agreement to terms will minimize the risk of non-compliance with contractual commitments. It will also enable the off-taker/government to understand when its rights are being infringed.

⁷ This section is based on *Understanding Power Purchase Agreements*, U.S. Department of Commerce, Commercial Law and Development Program and the AfDB, African Legal Support Facility, 2014.

PPAs typically do not contain hair-triggers that may lead to termination⁸ since it is not in the interest of the off-taker, the project company, or the lenders. There may be default circumstances that can lead the no-defaulting party to exercise the right to terminate the agreement, and vice versa. In general, the legal and policy framework in the jurisdiction where the power plant is located would be evaluated against the PPA that was signed by both the IPP and the off-taker.

Circumstances of buyer default might include: failure to pay; insolvency; misrepresentation; failure to meet milestones; problems with interconnection infrastructure or associated facilities; changes in assignment of the PPA (by reorganization or privatization); or material breach. Seller default includes: failure to reach financial closure; insolvency; misrepresentation; failure to commence construction; abandonment; breach of project's insurance; failure to operate in accordance with prudent utility practices; failure to achieve minimum threshold of availability; failure to maintain government consents; material breach; or change in control of seller without consent.

There are a number of mechanisms established to prevent termination of contracts. These include mediation and arbitration, which seek to settle disputes between the parties. Under certain circumstances, the parties may still have recourse through the court system. Where possible, Power Africa helps mediate between the operator or developer and the off-taker. In such cases, Power Africa's transaction advisor or the U.S. Embassy, depending on whether the dispute is commercial or political in nature, will seek to provide support and facilitate a dialogue between the parties to try to resolve the dispute.

(K) Policies that Promote Local Community Consultation with Respect to the Development of Power Generation and Transmission Projects

To mitigate the environmental and social impacts of power projects, especially those of a large scale, it is critical that project developers consult with potentially impacted communities from the earliest phases of development, assess potential environmental and social impacts, and develop mitigation plans to adequately address potential impacts. Carrying out an environmental and social safeguards assessment is a precondition for development finance institutions, donors, and most financial institutions. While the exact requirements for community consultation and environmental and social impact reviews may vary among donors and institutions, most align with the IFC's Environmental and Social Performance Standards, the Equator Principles, or the AfDB's Integrated Safeguard System. Power Africa considers the IFC Social and Environmental Performance Standards to be a best practice. For a description of how Power Africa is supporting community consultation for contested power projects, see *Section 4(b)(4)(B)*.

Section 4(b)(7)

A description of plans to ensure meaningful local consultation, as appropriate, in the planning, long-term maintenance, and management of investments designed to increase access to power in sub-Saharan Africa

In sub-Saharan Africa, governments, businesses and households all recognize that access to reliable energy can improve the quality of life and stimulate economic growth. Therefore, when developing plans to increase access to electricity, it is necessary to take into account the interests of these various local

⁸ This discussion of contract abrogation is taken from *Understanding Power Purchase Agreements, ibid.*

constituencies. Power Africa works with host governments and private sector partners to promote consultative processes that assure local communities' and indigenous populations' interests are addressed as power sector transactions advance. Power Africa supports formal engagement with populations affected by the development of power projects and to ensure that local communities also benefit from these projects.

All U.S. Government entities participating in Power Africa work to apply strict environmental and social standards, and to avoid, mitigate, and manage associated risks and impacts in a sustainable way. Generally, these agencies apply the IFC's Performance Standards on Social and Environmental Sustainability, which represent the most common threshold standards for risk management applied by bilateral and multilateral development agencies.

USTDA helps by funding environmental and social impact studies for projects in the early project preparation stage to ensure that projects review the potential environmental and social impacts before receiving financing from DFIs and other financiers. Typically, USTDA ensures projects in planning stages adhere to internationally recognized environmental and social risk management frameworks like the Equator Principles. For later stage transactions, Power Africa also works with governments, independent power producers, and off-takers to promote best practices that will advance and sustain power projects, maximizing their benefits to the community.

Most importantly, Power Africa supports direct engagement with the community to build capacity for participation in the operations and management of power projects. For example, in off-grid communities, Power Africa partners engage local stakeholders in developing business models for the marketing and maintenance of solar lanterns. Working closely with local businesses and governments, Power Africa assists off-takers and utilities with optimal tariff design that will achieve the greatest benefits for local users. Power Africa also improves the efficiency of operations for local utilities by facilitating tools to estimate demand and track expected receipts. Finally, through capacity building with power sector regulatory bodies, Power Africa provides the tools to evaluate the financial, economic and social trade-offs associated with power-related public policy.

To support IPPs, off-takers, utilities, regulators and host governments, Power Africa has invested significantly in building local capacity to strengthen institutions with appropriate structural, regulatory, financial, and legal models and reinforcing international best practices so they can conduct maintenance and management. For example, when the Government of Ethiopia requested support to assist in their negotiations for the geothermal project, Power Africa and its partners provided training and high quality legal support to build the government's capacity to negotiate future independent power projects, especially those initiated by local stakeholders.

SECTION 4(b)(8)

A description of the mechanisms to be established for: (A) Selection of Partner Countries for Focused Engagement on the Power Sector; (B) Monitoring and Evaluating Increased Access to, and Reliability and Affordability of, Electricity in Sub-Saharan Africa; (C) Maximizing the Financial Sustainability of Power Generation, Transmission, and Distribution in Sub-Saharan Africa; (D) Establishing metrics to demonstrate progress on meeting goals relating to access to electricity, power generation, and distribution in sub-Saharan Africa; (E) Terminating Unsuccessful Programs

(A) Selection of Partner Countries for Focused Engagement on the Power Sector

While all sub-Saharan African countries can benefit from Power Africa's resources, tools, and assistance, the opportunities and challenges differ from country to country. The following factors were considered in developing country-specific plans:

- Present U.S. Government engagements, including Departments of State, Treasury, Agriculture, Commerce, and Energy, EXIM, USAID, MCC, OPIC, USADF, U.S. Army Corps of Engineers, and USTDA;
- Availability of tools from the U.S. Government and multi- and bilateral partners to support Power Africa interventions;
- Need and potential for expansion of electricity generation and access;
- Existence of a pipeline of transactions that will advance generation and access goals;
- Financial feasibility and sustainability of the proposed activities;
- Potential for market growth in the development and deployment of cleaner and renewable energy technologies;
- Political will, capability, and willingness of the African partner government to undertake critical reforms and create an environment conducive to private sector investment in power;
- Current regulatory environment;
- Capabilities of the governments and utilities, including in the areas of governance and corruption; and
- Overall impact

The willingness of partner governments to embrace reforms, sound energy sector governance in the country, significant interest from the international investment community, and the high potential for the development of power projects and sustained growth in the country's power sector are particularly critical conditions before Power Africa support is deployed in any given country.

While the selection criteria will remain essentially unchanged over time, the countries selected for focused engagement in the power sector will change in response to fluctuations in the above factors.

Under the overall framework of the PAWG and its selection, each involved U.S. Government agency applied its own criteria within its own authorities, operational and program management systems and procedures to decide on its focus, programs, and projects in support of the overall goals and objectives. For example, MCC only assists countries that are eligible for assistance through showing commitment to good governance, economic freedom, and investing in their citizens, and only in sectors in line with the results of a constraints analysis.

(B) Monitoring and Evaluating Increased Access to, and Reliability and Affordability of, Electricity in Sub-Saharan Africa

The Power Africa Coordinator's office is taking the lead in monitoring and evaluating increased access to, reliability, and affordability of electricity in sub-Saharan Africa.⁹ The Power Africa Monitoring, Evaluation and Learning (ME&L) unit regularly collects data on funding impacts from all U.S. agencies and departments, partner governments other donors, and private sector partners. This data informs management decision making to ensure that Power Africa is continually adapting its approach to maximize impact close coordination with the PAWG. Power Africa regularly analyzes performance data and conducts evaluations of programming to systematically monitor its progress towards its stated power generation and transmission goals as well as its developmental effects on access to reliable and affordable electricity in sub-Saharan Africa.

(C) Maximizing the Financial Sustainability of Power Generation, Transmission, and Distribution in Sub-Saharan Africa

Ensuring financial sustainability of power generation, transmission, and distribution in sub-Saharan Africa is a critical component to increasing private sector investment in the power sector and sustainable access to power for people across Sub-Saharan Africa. It is one of the basic tenets of the efforts to increase access to power under the Electrify Africa Act and is embraced by all the involved partners in Electrify Africa. Private investment will not take place without this condition being met. Support for individual projects by the involved U.S. agencies and partners is conditioned on the requirement of financial sustainability being met.

The U.S. Government and its partners are providing technical assistance to help host governments, regulatory bodies, and utilities improve the legal framework, policies, regulations, and operations to maximize financial sustainability throughout the power system. The involved parties coordinate communications and are cooperating in providing assistance to countries and utilities that are willing to undertake necessary reforms. Assistance for transactions is based on the feasibility that projects can achieve financial sustainability. For example, assistance for transactions includes technical assistance to governments negotiating PPAs to help them include conditions that are necessary for financial sustainability of the projects. *See Section 4(b)(2)(F)* for a more in-depth description of how Power Africa supports the financial sustainability of the power sector.

(D) Establishing metrics to demonstrate progress on meeting goals relating to access to electricity, power generation, and distribution in sub-Saharan Africa

Both for Electrify Africa overall and for the projects of the individual agencies, metrics or quantifiable targets have been or are being established by the PAWG and individual agencies in order to demonstrate progress on meeting goals relating to access to electricity, power generation, and distribution in sub-Saharan Africa. The Power Africa Coordinator's Office has established a ME&L Plan for the entire program. The plan covers not only projects the U.S. Government is directly supporting, but also most of the development partners' power programs and private sector partners' investments.

⁹ Such monitoring and evaluation efforts are in addition to, rather than in lieu of, MCC's own monitoring and evaluation of power-related projects in those countries where MCC has compacts.

The ME&L Plan lays out the framework that shows how the U.S. Government agencies, in partnership with the private sector, other public donor and multilateral partners, and partner governments, will monitor progress towards goals for increasing access to power in sub-Saharan Africa. The plan includes targets, baselines, and data collection and analysis approaches. It includes an Evaluation Plan to identify and track evaluations throughout the entire program over time; to schedule performance monitoring tasks and responsibilities that will be conducted over the program life; and to provide performance indicator background for all performance and context indicators. The overall plan allows the monitoring and evaluating of performance against targets and intended results, furthers the identification of challenges and problems, and facilitates the sharing of lessons-learned to improve implementation. The full range of partners regularly contributes data, analysis, and reports on indicators. The regular reporting keeps the parties informed of progress, issues, and problems so that timely corrective or supportive actions can be undertaken.

In addition, each agency and partner monitors progress and evaluates results for their own projects. Each funded project has its own ME&L plan that feeds into the overarching Power Africa ME&L plan. Each project requires regular reports covering financial aspects and performance. These reports plus regular monitoring, including site visits, allows the identification and correction of problems and issues and/or the addition of resources to take advantage of opportunities on a timely basis.

(E) Terminating Unsuccessful Programs

Regular monitoring of individual projects—and the program by individual agencies, by the PAWG, and the Electrify Africa program overall—allows for timely identification and remedy of issues that may impair program success. Termination of unsuccessful programs is one of the options.¹⁰ Generally, corrective measures are attempted first, with termination or suspension considered if the mitigating measures do not solve the issue or problem in a timely fashion. Actual termination or suspension is carried out by the involved agency under its own rules, regulations, and procedures.

SECTION 4(b)(9)

A description of how the President intends to promote trade in electrical equipment with countries in sub-Saharan Africa, including a description of how the government of each country receiving assistance pursuant to the strategy: (A) Plans to Lower or Eliminate Import Tariffs or Other Taxes for Energy and Other Power Production and Distribution Technologies Destined for Sub-Saharan Africa, including Equipment Used to Provide Energy Access, Including Solar Lanterns, Solar Home Systems, and Micro and Mini Grids; and (B) Plans to Protect the Intellectual Property of Companies Designing and Manufacturing Products That Can be Used to Provide Energy Access in Sub-Saharan Africa

Through participating U.S. Government agencies and partners, Power Africa promotes U.S. trade in electrical equipment in sub-Saharan Africa through three channels: (1) providing information to and involving private sector partners; (2) support for specific power projects; and (3) improvements in the enabling environment for private sector investment in power. Over 120 private companies have made commitments to support Power Africa's goals to increase access to electricity across the continent. In

¹⁰ Such termination by Power Africa is in addition to, rather than in lieu of, any suspension or termination of MCC's assistance to any project pursuant to *MCC's Policy on Suspension and Termination*.

facilitating financing agreements for power projects, Power Africa is creating opportunities for providers of electrical equipment.

Trade Promotion

The United States is promoting trade in electrical equipment through three of the main actors in U.S. trade promotion efforts—the DOC, Department of State, and USTDA. In order to support trade efforts and the various initiatives in sub-Saharan Africa, the U.S. Government has a commercial presence at in 24 nations in sub-Saharan Africa, including new offices in Angola, Tanzania, Ethiopia, and Mozambique, in addition to its offices in all 50 states, in over 100 cities in the United States.

In 2015, the DOC doubled its Foreign Commercial Service presence in sub-Saharan Africa from four offices to eight offices and launched a number of efforts to support U.S. businesses in the region, with a particular focus on infrastructure and energy. The Commercial Service's Institutional Investor Roadshow, was a key response to in recognition of the needs of many African countries have for long-term, smart, private capital investment to strengthen local capital markets and build major infrastructure.

The DOC's International Trade Administration (ITA) plays a key role in Power Africa's trade promotion activities supporting exporters in electrical equipment and other energy sector suppliers and service providers. The ITA provides commercial support to power transactions including electrification transactions through the work of the Commercial Service in promoting energy sector trade in sub-Saharan Africa, along with specialized trade promotion programs like Trade Missions, Reverse Trade Missions, and International Buyer Programs (IBPs) that match foreign buyers to U.S. companies at major energy industry trade shows. The ITA also provides critical market entry services for U.S. exporters to sub-Saharan Africa through Gold Key Services, single company promotions for U.S. companies, and support for U.S. Pavilions at trade shows and conferences in Africa.

In December 2015, the ITA's PowerGen International Buyer Program included over 200 government and private sector delegates from 10 Power Africa countries participating in the largest energy sector trade show in the United States. U.S. firms and Power Africa country partners benefitted from briefings by the U.S. Foreign Commercial Service, MCC, OPIC, and USTDA officials on energy sector opportunities including electrification project opportunities in Africa. Commerce Secretary Penny Pritzker also led an Energy Infrastructure Trade Mission to Ghana and Nigeria in May 2014. The Mission included a high-level meeting with ECG, which demonstrates the strong trade relationship between the U.S. and Ghana and to encourage the ECG to partner with the U.S. private sector so that it may benefit from U.S. innovations and expertise.

The ITA recently released two useful market assessments designed, in part, to support electrical equipment and renewable energy exporters to Africa: the 2016 Smart Grid Top Markets Report and the 2016 Renewable Energy Top Markets Report. Under the Renewable Energy and Energy Efficiency Export Initiative, these reports serve dual purposes: (1) prioritize U.S. Government export promotion efforts that help target limited resources toward the markets and sectors that are most likely to result in U.S. exports and (2) inform external decision makers and managers of key trends, areas of opportunity, and important challenges facing U.S. exporters. In the Smart Grid report, Nigeria is ranked as the fourth best market for smart grid transmission and distribution equipment. The Renewable Energy report ranks Kenya at four and South Africa at 13 in the overall ranking for projected export markets; Kenya as first for geothermal export market; Ghana as number 25 for solar energy exports; and Kenya as 15 for wind energy exports.

In order to strengthen Power Africa's work supporting the growth of trade in electrical equipment and other energy sector technologies and services between the United States and Africa, USAID and the DOC established the Power Africa Commerce liaison positions in both Washington and South Africa. The Commerce Liaisons work with the ITA, Commercial Service, and other interagency representatives to coordinate and expand support for U.S. companies exporting to – and doing business in – Africa.

The USTDA is another key interagency actor in Power Africa's promotion of electrical equipment exports to sub-Saharan Africa through its project planning and partnership building activities. A key component of this support is the identification of U.S. sources of supply so that African project developers can procure quality U.S. goods and services. USTDA also supports projects that pilot U.S. technologies in local contexts, proving the technology's viability and introducing U.S. brands to African markets.

USTDA pilots innovative U.S. energy technology in emerging markets. Increasingly, new U.S. renewables solutions are designed first for markets like those in Africa. With USTDA assistance, MRI Global (Kansas City, MO) is leading a team of four U.S. companies and the Lawrence Berkeley national Laboratory to demonstrate the viability of an advanced mini-grid solution for powering even the most remote African villages. The pilot in Tanzania, once complete, has the potential to be replicated across the many island communities in East and Central Africa.

USTDA's reverse trade missions bring key African decision makers to the United States to introduce them to U.S. technology and service providers, financiers, policy and regulatory frameworks, and other resources that can support the development of new power infrastructure. Since 2013, USTDA has supported nine such activities that provided African delegates the opportunity to meet with U.S. suppliers during business briefings, site visits, and one-on-one meetings. USTDA also uses digital platforms – including its website, e-newsletter, and social media presence – to alert U.S. exporters of upcoming procurements of electrical equipment and services in the region. USTDA also publishes public reports on the markets and projects the Agency funds, to give U.S. companies the detailed assessments they need to compete successfully.

USTDA's GPI program educates public procurement officials in emerging markets about how to establish value-based procurement practices and policies that integrate life-cycle cost analysis and best-value determination in a fair, transparent manner. The GPI promotes international best practices in value-based procurement methodologies in order to foster sustainable infrastructure investments and level the playing field for U.S. companies competing in public tenders. USTDA targets its GPI support in Africa toward public tenders in energy and related infrastructure.

The Department of State and USTR are furthering U.S. trade policy and advancing export opportunities for U.S. business in sub-Saharan Africa, including for electrical equipment, through a variety of means, including global, regional and bilateral trade initiatives, trade agreements, and the WTO.

The Department of State regularly supports firms doing business in sub-Saharan Africa, including for electrical equipment exports; advocates for strong intellectual property protection and enforcement; and promotes global entrepreneurship and innovation.

Doing Business in Africa Campaign

To amplify the U.S. Government's trade promotion efforts, the President established the Doing Business in Africa Campaign (DBIA) in November 2012 to promote broad-based economic growth and job creation in the United States and Africa by encouraging U.S. companies to trade with and invest in Africa.

The President's Advisory Council on Doing Business in Africa (PAC-DBIA) was formed in November 2014 and consists of fourteen private sector corporate members, including small businesses and representatives from the energy industry and other related infrastructure and service sectors. The Council advises the President, through the Secretary of Commerce, on ways to strengthen commercial engagement between the United States and Africa, including: infrastructure; investment and access to capital; trade and supply chain development; health system strengthening; capital market capacity building; regional cooperation; and marketing and outreach.

Trade Africa

Trade Africa is a partnership between the United States and sub-Saharan Africa to boost trade with and within Africa, increasing regional trade and economic ties among Africa, the United States, and other global markets. For both the United States and Africa, trade generates new export markets for goods, services, and technology, including for electrical equipment, allows for new job opportunities for unemployed and disaffected youth, and improves the overall business environment, making conditions more appealing for private investors.

(A) Plans to Lower Or Eliminate Import Tariffs Or Other Taxes for Energy And Other Power Production And Distribution Technologies

As needed, the U.S. Government, through its regular trade promotion activities, Power Africa, Doing Business in Africa, and Trade Africa, is working with countries receiving assistance pursuant to the strategy on plans to lower or eliminate tariffs or other taxes for energy and other power production and distribution technologies destined for sub-Saharan Africa, including equipment used to provide energy access, including solar lanterns, solar home systems, and micro-grids. Power Africa, with its many partners, is focused on improving the enabling environments for power across sub-Saharan Africa. Enabling environment assistance can include any support related to regulatory reform, capacity building and knowledge sharing, policies and planning, and utility strengthening. As appropriate to the individual country and the aims of the assistance, support for lowering or eliminating import tariffs and other taxes for energy and other power production and distribution technologies destined for sub-Saharan Africa are also included.

Lowering or eliminating import tariffs and other taxes are considered critical commercial elements in and an important part of the efforts to develop an attractive investment climate, and to remove barriers to investment in power. It is part of the policy dialogue agenda across the partners. To the extent that such import tariffs or other taxes constitute a serious barrier to the enabling environment or to the completion of a specific transaction or activity in power, business, or trade in sub-Saharan Africa, one or more of U.S. Government agencies or initiative partners will work with the country to lower or eliminate the import tariffs or other taxes.

(B) Plans to Protect the intellectual property of companies designing and manufacturing products that can be used to provide energy access in sub-Saharan Africa

The U.S. Government is deeply committed to and involved with protecting and enforcing intellectual property rights (IPR) of U.S. citizens and companies. USTR, DOC, and Department of State are heavily engaged in protecting U.S. intellectual property and in improving intellectual property protection and enforcement around the world. In addition, Power Africa engages on specific IP issues as needed and

appropriate to furthering specific transactions or improving the enabling environment for private investments in the power sector.

USTR uses a wide range of bilateral and multilateral trade tools to promote strong intellectual property laws and effective enforcement worldwide, reflecting the importance of intellectual property and innovation to the future growth of the U.S. economy. Key areas of work include:

- Negotiation, implementation, and monitoring of intellectual property provisions of trade agreements;
- Bilateral and regional engagement through such vehicles as the annual "Special 301" review and report and numerous IP dialogues with trading partners;
- Multilateral engagement on IP issues through the WTO, and other organizations;
- Implementation of trade policy in support of U.S. innovations, including those in the pharmaceutical and medical technology industries; and
- Provision of interagency trade policy leadership.

DOC, primarily through its United States Patent and Trademark Office (USPTO), promotes stronger and more effective IP protection and enforcement around the world and can assist firms in developing protection and enforcement strategies, and in many cases can provide companies with information to aid in navigating a foreign government's legal system. The USPTO furthers effective IP protection and enforcement for U.S. innovators and entrepreneurs worldwide by working with other agencies to secure strong IP provisions in free trade and other international agreements. It also provides training, education, and capacity building programs designed to foster respect for IP and encourage the development of strong IP protection and enforcement regimes by U.S. trading partners. USPTO's Global Intellectual Property Academy provides intellectual property training both at USPTO headquarters and in-country across Sub-Saharan Africa, on a variety of different topics including IP Office administration, patents, designs, trade secrets, trademarks, geographic indications, copyrights and enforcement.

USTDA's pilot projects facilitate the introduction of U.S. technology in a manner conducive to the protection of intellectual property. The limited scope of the projects, as well as the close involvement of the U.S. provider, simplifies monitoring and builds relationships that can turn into sustainable commercial partnerships. In addition, the USTDA-sponsored U.S.—Africa Clean Energy Standards Program helps regulators in sub-Saharan Africa to establish the necessary standards, conformity assessments and technical regulations for the adoption of clean energy technologies.

Substantial assistance has been and is being given to strengthening intellectual property rights protection and enforcement in sub-Saharan Africa. For example, through CLDP and USPTO, the DOC has long been working with countries in sub-Saharan Africa on intellectual property rights. CLDP and USPTO have helped understanding and compliance with obligations under the WTO TRIPS Agreement in the countries of Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe. CLDP and USPTO have worked with regional economic communities in West Africa (ECOWAS), Southern Africa (SADC), and East Africa (EAC), as well as individual countries to improve their intellectual property rights protection and enforcement regimes. The countries helped include Botswana, Burundi, Ghana, Kenya, Liberia, Malawi, Mali, Mauritius, Namibia, Nigeria, Rwanda, South Africa, Uganda, and Zambia, and Zimbabwe. CLDP has also assisted in improving the legal and regulatory environment for the power sector in Ethiopia, Ghana, Kenya, Liberia, Nigeria, and Tanzania.

SECTION 4(b)(10)

A description of how the President intends to encourage the growth of distributed renewable energy markets in Sub-Saharan Africa, including off-grid lighting and power, that includes: (A) An Analysis of the State of Distributed Energy; (B) A Description of Market Barriers to the Deployment of Distributed Energy Technologies Both On- and Off-Grid in Sub-Saharan Africa; (C) An Analysis of the Efficacy of Efforts by the Millennium Challenge Corporation, the Overseas Private Investment Corporation, the United States Agency for International Development, and United States Trade and Development Agency to Facilitate the Financing of the Importation, Distribution, Sale, Leasing, or Marketing of Distributed Energy Technologies; (D) A Description of How Bolstering Distributed Energy To Enhance the Overall Effort to Increase Power Access in Sub-Saharan Africa

Power Africa intends to encourage the growth of distributed energy markets in sub-Saharan Africa, including off-grid lighting and power through its *Beyond the Grid* sub-initiative, consistent with the elements outlined implementation of Electrify Africa Act of 2015. Through the *Beyond the Grid* sub-initiative, Power Africa focuses on promoting investments and growth for off-grid and small-scale energy solutions. *Beyond the Grid* is working with over 60 investors and partners to provide off-grid solutions, including household solar and micro-grid solutions. These investors and partners have committed over \$1 billion toward achieving off-grid options. *Beyond the Grid* is also working with other donors and institutions to promote distributed energy systems, including the SE4ALL, DFID, and the AfDB.

This includes generating awareness and interest in such systems; creating enabling legal, regulatory, and procedural environments conducive to the spread of distributed energy systems; inspiring greater efforts in this area from African governments and multilateral and bilateral donors and institutions; partnering with and stimulating the private sector to innovate in and deliver distributed energy systems; and fostering greater participation of civil societies and communities in obtaining and providing such systems.

(A) An Analysis of the State of Distributed Renewable Energy in Sub-Saharan Africa

Sub-Saharan Africa is one of the most promising markets for distributed energy systems over the next 10 to 20 years. With growing populations and economies, there is an urgent need for new generating capacity to address the extensive lack of power access across the continent. Demand for electricity is expected to triple over the next 15 years.

Falling costs and innovative financing mechanisms are putting small-scale distributed solar within the reach of more people. It will take considerable time to achieve grid connections for the hundreds of millions of Africans who lack access to reliable power. In the meantime, distributed energy systems can offer lighting and power now.

The use of distributed energy systems is spreading rapidly and widely in sub-Saharan Africa, driven by lower costs and innovation and assisted by governments, donors, and NGOs. Reduction in costs and improvements in performance both of the solar system and of the appliances, e.g. LED bulbs over incandescent ones, and more efficient fans and televisions, are greatly facilitating the marketing of solar home systems in particular. The costs of solar PV modules have declined by 75 percent between 2009 and 2015.

Solar powered portable lights and home kits offer better service at lower costs than the present use of kerosene, candles, battery torches or other fossil-fuel stopgap technologies. Potential savings in lighting and charging costs make investing in distributed energy systems financially attractive. The off-grid population in sub-Saharan Africa is estimated to have spent over \$14 billion on lighting in 2014 plus an additional \$2.4 billion for mobile phone charging. It is estimated that consumers save \$3.15 for every dollar spent on small solar PV systems in Africa. The payback period for a simple portable solar lantern to replace kerosene lighting is three to four months and then the lantern provides light for free for up to three years.

Cost savings are driving the development of solar home systems for lighting and appliances in a wide range of African countries. The Global Off-Grid Lighting Association, founded in 2012, had expanded by the end of 2015 to 97 members in 10 countries in sub-Saharan Africa. The sales of branded small solar products in the region have grown from 200,000 units in 2010 to 4.3 million units in 2014. As of June 2015, 10.7 million households in sub-Saharan Africa are estimated to be using small PV solar home systems.

Presently most sales are for solar home systems capable of providing lighting and charging of cellphones and other small electrical items. However, solar home systems capable of powering appliances, such as TVs and fans, are capturing increasing market share. A report by Global LEAP found that the global off-grid appliance market is poised for significant growth and has the potential to become a \$4.7 billion market by 2020; increasing energy efficiency is the key driver of this commercial opportunity. Power Africa announced on June 1, 2016, a \$1.5 million multi-year commitment to support the expansion of Global LEAP+RBF to East Africa. Global LEAP+RBF is an innovative new partnership to drive and demonstrate scale in the global off-grid appliance market.

Firms engaged in the industry are investing in expanding distribution networks and customer support. In addition, the wide differential between average costs of more than 200 solar PV home systems sold in Africa and the best practice cost points to significant potential for cost reductions and the furthering of sales momentum.

Sustainable, private sector-led business models are succeeding in the marketplace for distributed energy systems in sub-Saharan Africa. The models are being driven by innovative financing options and a growing cohort of entrepreneurs along with dramatically decreasing costs of the technology. Successful models include, for example, PAYG, microfinance credit to finance the purchase of a system, pay for inventory when sold, and leasing arrangements.

Power Africa's efforts to encourage innovative business momentum include providing project preparation funding, guarantees, and technical assistance as well as improving the enabling environment through technical assistance and capacity building.

Low price generics and counterfeits are threatening the expanding market for solar home products by undermining consumer confidence and brand names. Firms are fighting back by focusing on higher-value products and downstream services, building brand identity, forging new partnerships, chasing new markets, and joining in the cost race. Some companies, including d.light, Greenlight Planet, and Nokero, have introduced new products in 2015 aimed at the low-priced end of the market. To compete, they use brand, service, economics of scale, and quality premiums along with distribution networks.

African countries and donors are assisting the distributed energy movement. Senegal has installed 35 hybrid (solar PV, battery, and diesel) micro-grid systems and plans on installing 41 more. In Rwanda, USTDA is supporting the development of several small hydropower projects in rural communities near the Ugandan border. In Kigoma, Tanzania, USTDA and OPIC are supporting the development of a 5 MW solar

facility that will provide clean and reliable power to an isolated micro-grid. Micro-grids are also an area where the U.S. industry is very active. USTDA is also partnering with Renewvia Energy Corporation to demonstrate and evaluate their innovative micro-grid solutions for the East African market. Similar micro-grid market developments have been established in Nigeria, Tanzania, Uganda, and other African countries.

Many African countries have demonstrated commitment to generation of power from renewables and distributed energy systems, as reflected in national energy plans and announced targets. Several countries have adopted renewable energy policies, mainly involving fiscal incentives, public investments, loans, and grants. Appropriate regulatory policies are increasingly being introduced, demonstrating the growing maturity of African markets. For example, Mali is allowing local energy companies and initiatives (communities, NGOs, women's associations, etc.) to generate electricity. As a result, around 400 micro-grids have been put into place to date.

However, scaling up distributed energy systems across sub-Saharan Africa requires governments, policy makers, and regulators to establish or strengthen the framework to catalyze private investment. The off-grid market needs dedicated policy and regulatory frameworks in order to incentivize the private sector, foster innovative business and financing models, and create enabling conditions for deployment of distributed energy systems. Power Africa and its partners are working to create these conditions by raising awareness of, bringing attention to, and assisting in the creation of better conditions for distributed energy system. Better conditions include support for private entities producing and distributing such systems, improvements to the enabling environment for such undertakings, and financing for actual systems, especially solar and micro-grids.

Power Africa is supporting the Electrification Financing Initiative (ElectriFI), a new EU initiative launched by the European Commissioner for International Cooperation and Development, through USAID. ElectriFI is an innovative enabling facility to unlock, accelerate and leverage private sector investment to increase or improve access to affordable, reliable, sustainable and modern energy in developing countries. ElectriFI seeks to support electrification investments that will lead to new and improved connections, with a focus on addressing the needs of populations living principally in rural, underserved areas as well as areas affected by unreliable power supply. In addition, ElectriFI seeks to encourage the adoption of renewable energy, with a particular emphasis on decentralized energy solutions. The EU has contributed 75 million Euros to ElectriFI, and Power Africa will provide \$10 million to the facility.

Overall, distributed energy technologies in sub-Saharan Africa are available, reliable, and increasingly cost-competitive. Led by private sector entrepreneurs, dynamic growth of the market for distributed energy systems is underway. It is estimated that by 2020, 44 million African households will be using off-grid solar systems. Power Africa, African governments, and other stakeholders are taking actions to support and accelerate this growth by creating conditions to accelerate deployment of distributed energy systems, in particular to mobilize finance, to create a supportive policy and regulatory environment, and to assist the private sector, especially with startups.

(B) A Description of Market Barriers to the Deployment of Distributed Energy Technologies Both On- and Off-Grid in Sub-Saharan Africa

Substantial barriers exist to the widespread deployment of distributed energy technologies both on- and off-grid in sub-Saharan Africa. Within the contexts of the wide diversity across the continent and between countries, barriers include those related to the physical and infrastructural setting, the political and general business environment, the financial sector, the power sector, the market for distributed energy systems, and

supporting institutions and policies. The physical setting often includes inhospitable terrain, taxing climate, and remote locations. In addition, regional infrastructure is underdeveloped throughout sub-Saharan Africa.

These conditions have affected the ability of African economies to compete on the global stage. In the 2015 competitiveness rankings of the World Economic Forum, sub-Saharan Africa as a region performs at the bottom. Out of the 34 sub-Saharan African countries ranked, only two, Mauritius and Botswana, ranked in the top half (not in the top quarter) of the 144 countries rated. Twenty-two of the 34 countries ranked in the bottom quarter of the rated countries, with 10 being in the lowest 15 rated countries.

The competitiveness report found that the five most problematic factors for doing business in sub-Saharan Africa are access to finance, corruption, inadequate supply of infrastructure, inefficient government bureaucracy, and tax rates. The report concludes that most African countries are in the situation where basic requirements – such as sound institutions and macroeconomic policies, adequate infrastructure, and a healthy and educated workforce – are necessary to establish a firm basis for sustainable growth. The report judges persistent infrastructure deficits, poor education outcomes, and difficulties in providing skills needed by businesses as the most important barriers to transforming African economies.

The World Bank's Doing Business 2016 report ranks sub-Saharan Africa as the worst region in the world for doing business. Only three of the ranked 42 sub-Saharan African countries are in the top half of the 189 countries rated – Mauritius (32), Rwanda (62), and Botswana (72). The remaining countries are in the bottom half, with 15 in the bottom quarter. Several of the indicators in the World Bank's Doing Business report, including the length of time it takes to set up a business or ease of acquiring construction permits, address particularly relevant obstacles for energy projects. The off-grid sector in Rwanda has grown rapidly over a short period of time as they have improved their Doing Business score and are seen as a country where it is relatively easier to set up and run a business.

Another critical barrier is the lack of affordable finance for various stages in the development of a firm providing distributed energy systems. Most African countries face difficulties associated with weak financial systems, reflecting low domestic savings rates and poor financial intermediation services. Limited domestic finance capability along with low country credit ratings deters international investors. Domestic financial institutions are often unfamiliar with lending for energy projects, perceive high risks in the area, and do not offer appropriate credit terms and amounts. The power sector itself is often a serious barrier. The power sector is frequently characterized by lack of an adequate overall master energy plan, weak power regulations, financially unsustainable utilities, state monopolies, lack of cost-reflective tariffs, lack of provision for private generation of power, excessive technical and commercial losses, lack of standards for off-grid systems, unconnected regionally, etc. Many countries lack regulatory and supporting policies, especially for connecting distributed energy systems to grids. These include net metering, feed-in-tariffs, tradable renewable energy certificate, auctions, etc. Standards and quality assurance are also important for off-grid technologies and can bolster market developments. For a further description of Power Africa's efforts in these areas, see *Section 4(b)(2)*.

In the market for distributed energy systems, especially for new entities, barriers include high start-up costs, lack of knowledge of the latest or appropriate technology, and lack of sufficient finance for start-up and expansion. In addition, the companies usually face severe capacity limitations. Lack of skilled staff can lead to serious sales, installation, operations, and maintenance problems.

Most countries in sub-Saharan Africa lack specific policies to promote distributed energy systems. Possible policies to accelerate the adoption of distributed energy systems include: integrated energy planning that

analyzes on-grid and off-grid solutions; fiscal incentives and public financing; access to affordable finance; regulatory and policy measures to promote the adoption of off-grid solutions; and investment promotion measures to: improve availability of local financing, reduce perceived risks by using public financing, establish Public-Private Partnerships (PPPs) for cost and risk sharing, and reinforce the liquidity of financial markets through independent and transparent regulatory frameworks and reporting bodies.

However, some countries in sub-Saharan Africa have taken steps to support the deployment of distributed energy systems. Tanzania, for example, has put in place a comprehensive policy and regulatory framework to support small power producers. This includes producers with less than 1 MW generation capacity being exempted from licensing; small power producers being allowed to supply electricity from both grid-connected and off-grid systems; and standard PPA and Tariff Methodology being applied to developers and buyers. Kenya and Tanzania provide fiscal incentives in the form of exemptions from VAT and import-duty to bring down upfront cost of stand-alone systems. Rwanda gives VAT exemptions to encourage the purchase of high-quality system components.

Power Africa is attempting to overcome or reduce many of these barriers through promoting appropriate policies; providing financial, technical, and capacity building assistance to companies; and assistance to improve utilities, regulators, and government agencies in the power sector. A specific example of this support is DOE's engagement in *Beyond the Grid* primarily through the Clean Energy Ministerial energy access initiative, Global LEAP.

An appropriate enabling policy and regulatory framework includes: national energy plans and renewable energy targets; legal provisions to allow private generators to service off-grid markets, access to concession schemes, and regulations that facilitate cost recovery (e.g. those relating to tariffs) and reduce risks associated with the arrival of the main grid; a policy mix to foster stable and long-term market development while adapting to changing technological and market conditions; implementing deployment policies aimed at strengthening firm-level capabilities; building a domestic industry; promoting education and research and facilitating investment and technology transfer; broadened sources of financing; and expanded regional grid integration and power trade.

(C) An Analysis of the Efficacy of Efforts by the Millennium Challenge Corporation, the Overseas Private Investment Corporation, the United States Agency for International Development, and United States Trade and Development Agency to Facilitate the Financing of the Importation, Distribution, Sale, Leasing, or Marketing of Distributed Energy Technologies

As part of Power Africa, MCC, OPIC, USAID, and USTDA are facilitating the financing of the importation, distribution, sale, leasing, or marketing of distributed energy technologies. Power Africa is providing an overall framework, shared objectives, and cooperative structure for the five institutions. Increasing resources to carry out the Electrify Africa Act would help to increase the efficacy of the institutions and their cooperation.

MCC provides large-scale, time-limited grants to poor, but relatively well-governed, countries to fund country-led proposals designed to address binding constraints to economic growth. This locally-driven approach has led MCC to fund, among others, projects in the power sectors of Malawi, Liberia, Ghana and Benin through its compacts, and in Sierra Leone through its threshold program. Specifically in Benin, MCC is facilitating the financing of distributed energy technologies and various off-grid clean energy solutions (e.g., small-scale biomass, solar and hybrid systems) for communities as well as other renewable energy

devices for households. The Government of Benin agreed, as a condition of MCC's funding, to establish a clear and transparent framework to clarify ownership, operations, tariffs and other issues pertaining to micro-grids.

Under Power Africa, OPIC has become an international leader in providing debt financing to innovative off-grid companies in sub-Saharan Africa to allow them to quickly scale-up operations. These types of projects frequently utilize new or untested business models that may be more challenging for commercial banks to finance. One such example is OPIC's \$15 million commitment to Nova Lumos, which is introducing portable, affordable home solar kits in Nigeria. The solar kits are about the size of a small suitcase, connect to a rooftop panel, and consumers can pay for their power with their cell phones. OPIC understands that these off-grid solutions can be an effective way, sometimes the only way, to bring electricity to rural communities.

OPIC financing has also been committed to support the construction of the first small power plant feeding into a micro-grid being constructed by NextGen Solar in Tanzania, which also received U.S.- Africa Clean Energy Finance (ACEF) initiative support from USTDA. In remote regions of western Tanzania, where less than 10 percent of the population has access to a reliable source of power, diesel is the main source of fuel in the region and must be delivered by truck, in a time consuming and costly process because this region is so far from other urban centers in the country, extending the country's main electrical grid is considered cost prohibitive. Smaller "micro-grids" are seen as a good practical solution for reaching such rural populations. OPIC has committed \$9.7 million to NextGen Solar to support construction of a five megawatt solar plant that is expected to provide power to more than 150,000 rural households and support additional economic development in the region.

OPIC recently approved a \$15 million loan to a new investment vehicle managed by SunFunder that will provide financing to companies operating in developing countries that manufacture, distribute and install solar lighting and energy systems. This project uses OPIC's Innovative Financial Intermediaries Program (IFIP), which focuses on smaller investment funds that apply innovative approaches to address specific development challenges.

SunFunder will provide receivables financing, project financing, and inventory/working capital loans to the manufacturers, distributors, installers and retailers that provide solar energy in countries such as Tanzania, Kenya, Rwanda, Ethiopia, Zambia, Philippines, Uganda, Ghana, Pakistan and India. The types of solar products will range from portable solar powered lamps to 200W solar home systems to 500kW diesel replacement systems. The social impact of having bright, durable and safe energy will enable businesses to stay open longer and allow children to study at night.

OPIC has also worked to cultivate innovative processes to create new tools for supporting development. For example, OPIC created Portfolio for Impact (PI), which is a pilot program to facilitate financing of highly developmental and innovative early-stage projects. The first recipient of financing through the PI program is PAMIGA S.A., which is supporting microfinance loans to rural farmers in sub-Saharan Africa so they can buy home solar kits and micro-irrigation equipment to increase their productivity.

OPIC has supported early-stage renewable energy projects in Africa through the U.S.-ACEF, an innovative financing program developed by OPIC, USTDA, and USAID, and sponsored by the U.S. Department of State, to help promising projects get off the ground. The program is designed to catalyze much needed private sector investment in clean energy projects in Africa by providing support for early- stage project development costs.

USAID is the lead U.S. Government agency that works to end extreme global poverty and enable resilient, democratic societies to realize their potential. In support of Power Africa, USAID is providing technical assistance for improving the enabling environment, assisting transactions to reach financial closure, and installing off-grid and micro-grid projects. USAID is providing its assistance to encourage financing for distributed energy technologies through a wide range of grants, projects, and Global Development Alliances. Under USAID leadership, Power Africa's *Beyond the Grid* initiative has over 40 private sector partners and practitioners that have committed to invest more than \$1 billion into distributed energy systems over the next five years.

USAID is also working with partner governments to help push through much needed energy sector reforms and manage an extensive pipeline of power sector projects; facilitating the development and financial close of power generation, transmission, and distribution transactions to support the adoption and implementation of policy, regulatory, and enabling environment reforms critical to private sector engagement and investment; and strengthening the capacity of regulators to improve planning, management, and operations.

In October 2015, Power Africa announced a new fund through USAID Development Credit Authority which seeks to catalyze USD \$75 million in private-sector debt financing to support enterprises along the off-grid and small-scale renewable energy value chains in sub-Saharan Africa. This guarantee facility is focused on supporting Power Africa's *Beyond the Grid* objective of bringing electricity to underserved communities through off-grid and small-scale energy solutions. This 8-year guarantee facility will leverage \$75 million in debt capital for businesses operating along the off-grid and small-scale value chains to support their activities in 33 countries across sub-Saharan Africa. Loans may be made in USD or local currency (to be determined by the lender), up to a maximum of the equivalent of USD \$5 million. The facility will be working with multiple financial partners, and the first publicly announced partner is Ceniarth, LLC.

USAID's DCA also is providing partial credit guarantees for financing household systems to large-scale projects. For example, DCA provided partial guarantees for private sector financing \$50 million for portfolio of distributed solar-battery hybrid power systems in Nigeria; \$11 million for a 10 MW run-of-river hydro project in Tanzania; \$12 million for a 10 MW hydro project on the Kiwira River in Tanzania; and \$8 million for retail loans to finance household connections in Kenya.

USTDA is playing a leading role in helping U.S. companies' pilot new renewable and distributed energy technologies in sub-Saharan Africa. For example, a USTDA grant to a Tanzanian renewable energy company is partially funding a feasibility study and pilot project that supports the development of a 2 MW hybrid solar PV mini-grid project in Tanzania's Lake Victoria region. The feasibility study is being undertaken by a U.S. engineering firm and their U.S. technology partners to evaluate the technical and commercial viability of the project, which would increase Tanzania's installed renewable energy generation capacity and help to electrify an estimated 5,900 Tanzanian households and businesses. The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) has agreed to support this pilot project with specialized expertise in renewable resource assessment at the project location and with analysis and optimization of mini-grid design.

In South Africa, a USTDA grant is helping to fund a feasibility study and pilot project to qualify methanol fuel cell technology for use by the telecommunications industry. The fuel cell systems will replace diesel fuel generators as the primary or secondary power supply at remote telecommunications tower sites. The developmental impacts of displacing diesel generators with fuel cells would include improvement of South Africa's physical telecommunications infrastructure and operational efficiency, reduction of carbon dioxide

emissions, and job creation. The feasibility study is being undertaken and partially funded by Oorja, a U.S. direct methanol fuel cell manufacturer.

USTDA is also furthering distributed energy through its support for captive power projects to industrial users. A \$455,000 grant to the Honeywell Group in Nigeria funded a feasibility study which was completed in June 2016 and investigated the technical, financial, and feedstock requirements for a proposed \$89 million, 50 MW natural gas-fired captive power plant. The project is being developed by the Honeywell Group for its food processing, cold storage, and agro-allied industries at the Flower Gate industrial park in Ogun State, Nigeria. The USTDA assistance is promoting the application of innovative U.S. technologies.

As the official export credit agency of the United States, EXIM has a congressional mandate to bolster engagement in sub-Saharan Africa and has pledged \$5 billion to Power Africa. While EXIM is not a DFI, its mission to finance the export of U.S. goods and services, and its ability to also finance some local costs neatly dovetails with Power Africa's mission of expanding electricity access in sub-Saharan Africa.

Through short, medium, and long-term debt, loan guarantees, and insurance products, EXIM works with developers and U.S. equipment suppliers to facilitate the completion of both large and small power projects, including distributed energy projects in rural Africa. As one example, EXIM recently provided export credit insurance to a domestic manufacturer of solar suitcases. The policy insured the exporter's receivables from African purchasers, facilitating the sale and distribution of a critical technology for end-users across Africa, including hospitals. EXIM's products can be particularly useful for sensitizing market entry for innovative technologies, which might not otherwise receive traction, but help tackle the unique challenges of Africa's distributed energy sector.

(D) A Description of How Bolstering Distributed Energy Can Enhance the Overall Effort to Increase Power Access in Sub-Saharan Africa

Bolstering distributed energy is an essential element in the overall effort to increase power access in sub-Saharan Africa. Distributed energy systems are the only way to provide electrification to areas where grid expansion is technically or financially unviable, and a quicker way to reach millions currently without grid connections.

One of the key thrusts of Power Africa efforts is distributed energy systems for off-grid lighting and power, primarily household systems (mainly solar based) and micro-grids. Efforts here include mobilization of official and private interests, finance, and actions in pursuing, facilitating, and providing off-grid lighting and power; support for creating the policy, legal, and regulatory framework for such actions; support for making more business friendly environments for such efforts; and support for closing on transactions to provide such items.

Power Africa is pursuing improvements needed to effectively promote distributed energy systems. These are most urgently required in the policy, regulatory and institutional enabling environment for the power sector and business; in the business models, operations, and technologies used by private sector companies; and in financing channels and mechanisms. These improvements will not only help those now striving to provide distributed energy systems, but also others who will follow as conditions improve.

Success in the bolstering the deployment of distributed energy systems will spur demand by other households and communities for access to power. This growing demand in turn can help drive reforms, activities, and investments to provide access to power.

SECTION 4(b)(11)

A description of plans to ensure that small and medium enterprises based in sub-Saharan Africa can fairly compete for energy development and energy access opportunities associated with this Act.

A major objective of Power Africa is to ensure fair competition for small and medium enterprises through non-size discrimination in its activities, the creation of an enabling environment which allows small and medium enterprises to compete fairly, and a series of programs aimed especially at small and medium enterprises.

Power Africa encourages small and medium enterprises (SMEs) to apply for Power Africa assistance and to participate in Power Africa programs. However, it can be difficult to find local partners in underserved markets and regions even though some of the most transformative ideas are developed by highly innovative SMEs during their early stage ventures. That is why some Power Africa partners, like OPIC, have developed pilot programs to help stimulate interest in these small, but highly developmental, projects. OPIC has found that SME's can often have a significant development impact when provided with the necessary capital and resources to reach a commercially sustainable scale.

In response to the established need for SME financing, OPIC's Portfolio for Impact (PI) program provides financing to projects that offer significant potential for positive social impact, but may face challenges obtaining financing. PI projects are typically projects that purely private sector lenders might consider too small or too early stage to support, or the size of the loan they are seeking might be too small to merit consideration by a private lender. PI is currently providing small loans of \$1 million to \$5 million to SMEs throughout Sub-Saharan Africa.

Despite PI's extension, sub-Saharan African nations have a pervasive need for private capital investment, and U.S. private capital investment is often limited. Congressional support for OPIC to solicit and facilitate the participation of local and regional companies in power, renewable and climate change projects in low-income countries in Africa through the use of dollar-denominated financing and risk insurance would expand opportunities for SMEs in the region.

USTDA also has been active in encouraging energy development and access among small- and medium-sized businesses; the majority of USTDA grantees under Power Africa are African small businesses. Many of the project developers building smaller power projects in rural areas have small operations themselves. Power Africa's reach, including the increased field presence of its personnel, has expanded knowledge about U.S. government tools to a wider variety of people and places, enabling smaller firms to access available resources. For example, Rwandan company, DC HydroPower, employs fewer than 20 people and, with the help of a USTDA grant and Power Africa's advocacy, was able to bring a small hydropower project to financial close. This project could provide electricity to nearly 100,000 Rwandans who have no grid access as well as potentially provide up to 500 local jobs in project construction. Electricity in this rural area will help to spur the development of more small Rwandan businesses like DC HydroPower.

Activities and diplomatic engagements aimed at improving the enabling environment for private investment in power benefit enterprises of all sizes, allowing small and medium enterprises to participate and compete fairly. Efforts in this area have focused on building capacity; developing a legal, regulatory, and policy framework that is inviting to private investment; and creating a more favorable climate for development of cleaner energy sources, especially renewables. The aim of the enabling environment efforts

is to provide a sound legal, regulatory, and policy framework for investment and governance, one that facilitates and promotes private sector investment by all sizes of enterprises, ensures commercially sustainable distribution of power, and promotes growth of the power sector that contributes to the country's development goals. *See Section 4(b)(2)(C) and Section 4(b)(2)(E)* for a description of Power Africa's support for regulatory, policy, and legal reforms.

The work of Power Africa is clearing the way for small and medium enterprises by demonstrating the financial and technological feasibility of small distributed energy systems; improving the performance of utilities to allow others to generate power and supply electricity to households and to the grid; changing the regulatory mind-set; creating appropriate, legal, regulatory, and policy frameworks to allow for private sector participation in the power sector, including by small and medium enterprises; and harmonizing policies to drive investment and stability for all sizes of enterprises.

The focus of Power Africa's *Beyond the Grid* initiative is to unlock investment and growth in off-grid and small-scale energy solutions. This effort focuses, in part, on linking small African enterprises to off-grid electricity sources, thereby generating economic opportunities for creative SMEs to develop and operate in off-grid locations.

Under the Beyond the Grid initiative, Power Africa and its development partners are sponsoring activities aimed at small and medium enterprises. These activities include help to meet critical needs in the areas of project capital and new markets or models. For example, USAID offers early stage Powering Agriculture grants, DIV innovation grants, DCA loan guarantees, and Global Development Alliances (GDA) targeting small and medium enterprises.

The Off-Grid Energy Challenge, aimed especially at small and medium enterprises, has been quite successful. The USADF, in partnership with General Electric Africa and USAID, launched the Challenge in 2013. Nearly 50 small and medium African companies have received awards of up to \$100,000. The awards are being invested in reliable, innovative off-grid energy that can be replicated across sub-Saharan Africa.

SECTION 4(b)(12)

A description of how United States investments to increase access to energy in sub-Saharan Africa may reduce the need for foreign aid and development assistance in the future

U.S. Government investments to increase access to energy in sub-Saharan Africa may reduce directly and indirectly the need for foreign aid and development assistance in the future by facilitating a stronger, more diversified economy, and better access to education and health care. Power Africa's efforts to improve the policy environment, strengthen institutions, intensify partnerships and cooperation, and enhance civil society capacity are expected to result in increased private sector investment, sustainable economic growth, and poverty reduction.

The unlocking of the energy sector's potential will continue to deliver benefits long after the initial U.S. investments. Achievements in improving the enabling environment in order to realize tangible investments, to foster private and public sector cooperation and to assist transactions to reach successful financial closure will open the way for further private sector investments in power. The proven track record of

successful projects, along with a more attractive, business friendly environment, will likely sustain private foreign and domestic investments in the future, not only in power, but also in other areas.

As a result of the successful U.S. investments, African countries will have in place better policy, legal, and regulatory frameworks to stimulate innovation, trade, and investment; more experienced pathway opened up for private sector investment; stronger capacity in government for providing appropriate framework and dealing with the private sector; more developed project and management skills and broader experience; improved government oversight, power regulators, and utilities in power; commercially viable and financially sustainable power sector; and more opportunities for regional power sharing and electricity trading. The institutional strengthening and skills acquired from experience and capacity building in attracting U.S. investments will support further economic development with less foreign assistance.

Implementing the Electrify Africa Act also indirectly reduces the future need for foreign assistance by building partnerships and programs that will continue to foster benefits beyond the life of the Act. African governments, utilities, regulators, the private sector, CSOs, and local communities are building stronger relationships that will lead to improved coordination and collaboration on power sector development issues in the future. These created linkages and joint undertakings will continue to promote improved standards of living and prosperity, and thereby may reduce the need for development assistance in the future.

Work on implementing the Electrify Africa Act is also strengthening CSOs, including communities, and trade and business associations, so they can play appropriate roles in achieving universal access to affordable, reliable, sustainable electricity. Strengthened local organizations and networks are better able to design and implement sustainable business models that deliver market-based services and represent constituents' interests. As empowered and engaged actors, CSOs strive to connect to the right people, to the right organizations, and to the right resources; to bring pressure; and to undertake actions to achieve not only successes for their constituencies in the energy sector, but also in other areas; and, hence, may reduce the need for foreign assistance in the future.

Improved policy environment, strengthened institutions, stronger partnerships, and enhanced civil society capacity are expected to lead to increased private sector investments and access to electricity. These will have a multiplier effect. Electricity means students can study at night without using kerosene lamps, patients can be treated with clean equipment and unspoiled vaccines and rural businesses can operate after dark. Each of these improvements leads to increased educational and health outcomes, sustained economic growth, and ultimately to poverty reduction.

SECTION 4(b)(13)

A description of policies or regulations, both domestically and internationally, that create barriers to private financing of the projects undertaken in this Act

On the ground, substantial barriers exist to private financing of power projects in sub-Saharan Africa, many related to African governments' domestic policies and regulations that discourage private sector investments in the power sector.

In sub-Saharan Africa, infrastructure projects do not lend themselves easily to direct investment. Long time horizons, complicated project planning, and coordination of multiple public and private sector partners make it difficult to structure deals. The financial and political risks associated with investment decisions are much greater in sub-Saharan Africa than in more developed economies because of the region's smaller

markets; less mature political structures or political instability; knowledge and capacity gaps, especially related to project preparation and planning; weak legal, regulatory, and policy frameworks; uncertain creditworthiness of state-owned utilities; and shallow capital markets. Higher risks, or perceived risks, can deter investors, which means that projects can go un- or underfunded or can only access capital with much less favorable terms.

To reduce private sector risk and encourage private financing for development purposes, including for power projects in sub-Saharan Africa, the United States and a number of other developed countries, multilateral institutions, and DFIs have adopted policies, regulations, and mechanisms to provide early stage financing for developing private power projects, such as joint or blended financing and political and credit insurance. Early stage financing reduces the risks and associated costs to project feasibility. Joint financing with DFIs, the United States, or other developed countries, reduces the risk for private lenders by reducing the likelihood of default. Partial Risk Guarantees (PRG) cover private sector lenders against the risk of payment default due to non-performance by governments. Partial credit guarantees cover debt-related instruments for a portion of scheduled payments against all risks, thereby improving the terms of commercial debt.

In addition, corruption persists in many of the countries on the continent, and not all countries hold their investors to the same standards of behavior overseas.

In supporting this Act's ambitious goals, Power Africa seeks to maximize the full range of tools and instruments available across the U.S. Government to facilitate energy transactions in sub-Saharan Africa. The U.S. Government has also identified additional flexibilities that could enable us to do more, faster. For example, the lapse in EXIM's full authority in July 2015 prevented EXIM from continuing to work on a number of Power Africa-related projects that were at early stages in the approval process pipeline. However, since the Bank's reauthorization in early December, staff has resumed the dialogue with the project sponsors about moving these transactions forward.

EXIM remains committed to Power Africa and to helping to work toward the goals set forth by the Electrify Africa Act. However, as of the submission of this report, EXIM's Board of Directors remains without a quorum. A majority of EXIM's Board, which, as currently constituted, equals three out of five members, is needed for a quorum. EXIM's Board of Directors must approve all medium and long term transactions valued over \$10 million. As the Board only currently has two serving members, a third Board member must be confirmed by the U.S. Senate before it would be able to approve those transactions. Without a Board, EXIM is limited in its ability to finance U.S. exports for power projects in Africa and to support the broader Power Africa initiative and activities under this Act. In addition, EXIM 2015 Competitiveness Report found that the combination of the lapse in authorization and lack of a Board quorum issue has disadvantaged the long-term competitiveness of U.S. exporters exporting to these and other markets.

OPIC's financial tools are crucial to the success of Power Africa, but OPIC's current year-by-year authorization provides a degree of uncertainty to innovative companies like NextGen Solar and SunFunder. Longer-term Congressional authorization for OPIC would provide greater certainty and demonstrate the U.S. Government's commitment to sustainable energy projects in sub-Saharan Africa, particularly investments in much-needed distributed energy projects in underserved regions.

SECTION 4(b)(14)

A description of the specific national security benefits to the United States that will be derived from increased energy access in sub-Saharan Africa

The successful pursuit of sustainable global development is a central pillar of U.S. foreign policy and national security and is essential to building a more stable and prosperous world. Increased energy access in sub-Saharan Africa benefits the national security of the United States by contributing to improving the lives, prosperity, and stability of almost 15 percent of the world's population. Access to energy stimulates sustainable and broad-based economic growth; improves standards of living and reduces poverty, including by facilitating increased access to health care and education, enhances productivity and innovation; and improves safety and security. The public policies needed to sustain long-term infrastructure investments also help to reinforce accountable and transparent governance structures needed to achieve and sustain development gains, and empower governments to more effectively deliver public services to their citizens, thereby helping to make African countries more secure, stable, and prosperous.

The resulting stability not only facilitates job opportunities for Africans but also creates opportunities for U.S. trade and investment and increased stability and security in a region that offers so much promise.

Power Africa's partnership-driven approach to expanding energy access will also help build relationships and deepen engagement, trust, and mutual prosperity between the U.S. Government and African governments, private sector actors, civil society groups, communities, and average citizens. Our support for game changing investments in the energy sector will also help strengthen and empower African governments, through targeted capacity building, to successfully and sustainably develop and manage a critical sector, with potential positive spillover effects in other sectors. It is a long-term commitment on the part of the American people to see Africa succeed.