Electrify Africa Act Progress Report

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Introduction

In February 2016, Congress passed the Electrify Africa Act of 2015 (Public Law 114-121) (the "Act") to encourage the public and private sectors in sub-Saharan African countries to develop power solutions that reduce poverty, promote development outcomes, and drive economic growth. The Act promotes first-time access to power and power services in sub-Saharan Africa (SSA) for at least 50 million people and encourages the installation of at least 20,000 additional megawatts (MWs) of electrical power by 2020.

Section 7 of the Act requires the President to transmit to Congress a report on progress made toward achieving the *Power Africa Multi-Year Strategy*. Along with a description of efforts Power Africa has made, the report analyzes the results achieved and the challenges that remain in fully realizing the Act's objectives.

On behalf of the U.S. Government (USG) Departments and Agencies that collaborate on Power Africa, the U.S. Agency for International Development (USAID) submits this progress report pursuant to the requirements of the Act. To the degree possible, the final report is organized to reflect key legislative elements, as requested.

Top-Line Results to Date

As of January 2019, Power Africa has achieved the following results:

Estimated beneficiaries who have gained access to electricity:	**58,552,435**
MW that have reached financial close:	**10,095 MW**
Number of power transactions that have reached financial close:	**120**
Actual value of/dollars invested in these Power Africa transactions:	**$20.5 billion**
MW that have moved from financial close to operation:	**2,652 MW**

Background on the Power Africa Partnership

The United States launched Power Africa to align the vision, tools, and expertise of 12 USG Departments and Agencies with the efforts of African governments and the private sector to double energy access across SSA. Coordinated by USAID, Power Africa has added 147 private-sector partners, as well as 18 multilateral and bilateral development organizations, to mobilize private capital, drive a transformative development agenda, and facilitate key public-sector regulatory and policy reforms to reach Power Africa's goals and promote progress on the Journey to Self-Reliance.

Collectively, Power Africa's partners have committed to spend $56 billion[1] to advance the initiative's goal of doubling access to electricity in SSA. These commitments come from a range of companies critical to the energy-project value-chain, such as developers, financiers, construction firms, transmission and distribution companies, suppliers of equipment, and foundations and energy associations. Power Africa pairs each partner with a Relationship Manager who mobilizes the partner's commitments by sharing information regarding market conditions and trends, introducing them to a broader network, and

[1] When joining the initiative, a Power Africa partner either issues a commitment letter or signs a Memorandum of Understanding in which it makes a commitment to achieve certain objectives in support of the Power Africa goal. These commitments come in the form of financing, new MWs, or new connections.

bringing to bear Power Africa's collective toolbox of available resources that ultimately facilitate private-sector investment in underserved energy markets.

To date, the USG, excluding projects funded by the Millennium Challenge Corporation (MCC), has disbursed a total of approximately $543 million in appropriated funds in pursuit of Power Africa's goals. The portion of this funding that went toward the facilitation of power-generation projects has unlocked private- and public-sector investment in deals that have reached financial close worth $20.5 billion.[2] The USG's financial contribution creates substantial leverage, and reflects the influence Power Africa has in bringing together scores of like-minded entities with substantial resources to tackle this monumental challenge.

Executive Order No. 13746, issued in November 2016, established the interagency Power Africa Working Group (PAWG), co-chaired by the Power Africa Coordinator within USAID and the National Security Council. The Power Africa Coordinator's Office ensures the alignment and efficiency of resources among the 12 USG Departments and Agencies that support Power Africa, while the PAWG facilitates information-sharing.

Power Africa also has three interagency sub-working groups organized into pillars: Pillar One: Generation (focused on growing MWs); Pillar Two: Access to Energy (focused on increasing on-grid electrical connections and off-grid access to electricity); and Pillar Three: Enabling Environment (focused on improving the legal and policy landscape, technical capacity, and operational norms to attract investment). In addition to monthly meetings of the working-groups, Power Africa fosters alignment through interagency liaison positions. These staff split their time between Departments and Agencies that support Power Africa's vision and the Coordinator's Office, to strengthen communication between Washington and field-based teams.

Additionally, USAID uses interagency agreements to transfer appropriated funds it receives for Power Africa to other U.S. Government Departments and Agencies that have specific tools, resources, and personnel that are best-positioned to advance particular power-sector deals and public-sector reforms. To date, on behalf of Power Africa USAID has transferred funding to the U.S. Trade and Development Agency (USTDA); the Overseas Private Investment Corporation (OPIC); the US. Departments of State, Commerce (DOC), Energy (DOE), and the Treasury (DOT); and the U.S. African Development Foundation (USADF). These Departments and Agencies have increased significantly their support of energy projects in SSA. For example, in Fiscal Year (FY) 2012, USTDA obligated $1.15 million towards SSA energy projects, which represented 27 percent of its overall investments in SSA. However, in FY 2018, this investment rose to $13.9 million, which comprised 82 percent of USTDA's overall investments in SSA.

This unified interagency structure, combined with Power Africa's relationship-management program, provides companies that are seeking to do business in the energy sector in SSA an interagency "one-stop shop" to access a wide array of USG resources that support both investment and export opportunities. The structure also works to ensure the USG implements policy and activities in a coordinated fashion, and in support of American strategic priorities.

Power Africa also has worked with key, influential donor partners in the energy sphere, who bring considerable technical expertise, financial contributions, and relationships to the Power Africa toolbox. These relationships provide the USG insights into power-sector deal flows that other development partners support—which offers the opportunity to share new trade leads for private companies to sell their

[2] This figure represents the aggregate investment made by all parties in relation to the 120 power-generation projects that have reached financial close with support from Power Africa.

products and services. To maximize collaboration, Power Africa team-leads at U.S. Embassies across SSA often chair, or co-chair, Development Partner Working Groups in their respective countries. Additionally, Power Africa assigns technical relationship managers to each development partner, who are responsible for working with their counterparts to implement the partnership agreements and coordinate efforts in the sector. Development partners have committed a total of $16.3 billion to Power Africa's goals, and have already mobilized $10.7 billion toward this commitment.[3]

Power Africa Strategy

To achieve the Act's goals of 20,000 MWs and 50 million beneficiaries by 2020, and, additionally, Power Africa's longer-term goals of 30,000 MWs and 60 million new connections by 2030, the initiative divides its work into the three pillars mentioned above in relation to the PAWG: (1) Generation (MWs); (2) Access to Energy (Connections); and, (3) Enabling Environment. In 2018, following substantial consultations with partners, Power Africa developed a *Power Africa 2.0 Strategy* that includes a renewed focus on improving investment conditions, reforming power utilities, developing transmission infrastructure, and creating more opportunities for U.S. companies to invest in the SSA energy sector. Power Africa also has published sector strategies, including a Transmission Roadmap[4] and a Gas Roadmap,[5] to help coalesce knowledge and support for these critical aspects of the power industry. Power Africa expects to develop similar strategic documents to support the power sector, where needed, in the future. More specific discussion of Power Africa's three focus pillars appears below.

Pillar 1: Generation (MWs)

By employing a transaction-focused, demand-driven approach for supporting generation deals, Power Africa addresses the constraints to project development and investment in SSA's energy sector. This approach leverages the resources of USG Departments and Agencies to "crowd in" private investment while simultaneously driving policy reform. Helping to resolve the critical impediments that hinder actual deals opens doors for other deals that are facing similar challenges. Power Africa's team of field-based regional and country-focused Transaction Advisors—professionals with experience in both the energy and investment sectors—work across SSA to help governments prioritize, coordinate, and expedite the implementation of power projects. In addition, the PAWG provides a mechanism to engage the USG interagency to advance key transactions that use all the USG's resources and expertise. Power Africa's partners have helped 120 projects that comprise 10,095 MWs of new power-generation reach financial close. As of the date of this report, the Coordinator's Office is tracking a further 945 transactions with the potential for an estimated 85,291 MW of new generation capacity. More-detailed descriptions of financially closed projects appear in Annex 2, and public-facing transaction information is available through the Power Africa Tracking Tool app[6].

Innovative Approaches to Project Finance

Financing is a critical roadblock to advancing power projects in SSA's comparatively nascent markets, which require creative solutions to mitigate project. Power Africa's innovative approaches to project

[3] For more key information on Power Africa, please see our Medium Blog: https://medium.com/power-africa/key-power-africa-facts-in-one-place-6470b4538f5c
Additional information is also available in the Power Africa Annual Report Video: https://youtu.be/weKqNPqzY90

[4] Power Africa Transmission Roadmap Link: https://www.usaid.gov/sites/default/files/documents/1860/PA_Transmission_Roadmap_508.pdf

[5] Power Africa Gas Roadmap Link: https://www.usaid.gov/documents/1860/power-africa-gas-roadmap-2030#overlay-context=documents/1860/power-africa-gas-roadmap-2030

[6] Power Africa Tracking Tool Application: https://itunes.apple.com/app/patt/id1039913424?mt=8

finance, technical assistance, and personnel training overcome these obstacles and advance projects toward financial close and commissioning. In Nigeria, for example, investors and lenders have traditionally been wary of the elevated risk of non-payment and political interference by government counterparties on long-term Power Purchase Agreements (PPAs), which, combined with the lack of available sovereign guarantees, makes financing private power-sector projects very difficult. To overcome this challenge, USAID provided technical support to the Nigeria Bulk Electricity Trading Company (NBET), which led to the successful negotiation of a long-term PPA that includes a Put-Call Option Agreement (PCOA) with the Ministry of Finance. The PCOA's innovative structure provides needed payment assurances to developers and investors, without adding to the Federal Government of Nigeria's existing debt burden. The first independent power producer (IPP) project in Nigeria unlocked 450 MWs of power-generation capacity, and Nigeria is now a model for other countries in that need power project financing.

Pillar 2: Access to Energy

Beyond the Grid

Given the large proportion of the SSA population that lives beyond the reach of a traditional power grid, promoting off-grid access to energy is vital to advancing self-reliance. Power Africa's Beyond the Grid (BTG) program unlocks investment and growth for private-sector off-grid energy solutions on the African continent. BTG seeks to enable 25–30 million new off-grid energy connections by 2030 by accelerating household-level (solar home systems) and community-level (micro-grids) electrification solutions. To achieve this goal, BTG, primarily through USAID and USADF resources, accomplishes the following:

- Supporting private-sector off-grid companies to promote innovative products and services, enhance management skills, and scale up and grow their businesses successfully through market and business intelligence;
- Encouraging enabling environments that facilitate private-sector success through regulatory and policy regimes tailored to each country's environment and market; and
- Facilitating access to finance for off-grid companies.

BTG has made impressive progress toward its goal, having reached an estimated 55 million beneficiaries from more than 12 million off-grid connections as of December 2018.[7] Private companies have achieved these results by establishing and scaling viable business models that provide off-grid energy solutions across the continent with a broad range of technical and financial assistance under USAID contracts and USADF grants. While national policies primarily focus on household, business, and community-scale electrification, their critical role in enabling private-sector investment in energy access cannot be overstated. Only through supportive policy and regulatory frameworks will investors have the confidence to invest in these challenging markets to provide vital financing to private-sector companies that deliver off-grid energy services. To date, BTG has helped private-sector off-grid companies raise over $113 million in financing to grow their businesses and accelerate off-grid energy access.

One important way in which Power Africa has been able to provide power access to the poorest of the poor is through solar lanterns. Because they generally constitute "First Tier" access to power under the Sustainable Energy for All Multi-Tier Framework[8], solar lanterns are a proven first step on the energy-

[7] Power Africa follows Global Off-Grid Lighting Association (GOGLA) methodology in estimating beneficiaries from off-grid connections.

[8] Multi-Tier Framework link: https://www.seforall.org/sites/default/files/Beyond-Connections-Introducing-Multi-Tier-Framework-for-Tracking-Energy-Access.pdf

access continuum for low-income customers[9]. The impact of even First-Tier electricity access can be dramatic for households that have not previously had power, as highlighted in the footnoted video[10]. However, Power Africa prioritizes funding for solutions that can provide higher-tier power access so that households and businesses can, at a minimum, power multiple lights and operate efficient appliances. For this reason, Power Africa decided in 2017 to cap the number of solar lanterns in its connections results at 12 million (20 percent of Power Africa's 60 million connections goal for 2030) so the initiative can channel additional resources to higher-tier power access as the market matures.

Power Africa also works closely with other USG partners, such as USTDA and USADF, to advance off-grid energy access.[11] USTDA connects U.S. technologies, equipment, and service-providers to these markets through feasibility studies as well as standards workshops, conducted in partnership with the American National Standards Institute. To date, USTDA has funded more than $7 million in feasibility studies for the development of mini-grids, which lay the groundwork to connect over 100,000 households in eight SSA countries. Through USADF's successful Off-Grid Energy Challenge, African-owned enterprises receive small grants to advance off-grid energy solutions across the continent. The Challenge runs targeted funding windows that finance such enterprises as women-owned businesses and companies that are operating in refugee settlements and also leverage funding from large international partners like General Electric. Since 2013, the Challenge has awarded more than $7 million to 75 enterprises in nine countries.

Power Africa's BTG program is also pursuing two strategic partnerships to advance off-grid energy access. First, to further expand energy access through solar home systems, Power Africa co-founded the Scaling Off-Grid Energy Grand Challenge, along with the Department for International Development of the United Kingdom of Great Britain and Northern Ireland, the African Development Bank, and the Shell Foundation. Second, Power Africa co-founded the Smart Communities Coalition initiative, co-chaired with Mastercard, to bring energy access, connectivity, and digital tools to refugee settlements. Pilot projects are underway in Kenya and Uganda, and the Coalition has ambitions to scale the effort in other geographic locations, based on learning from the initial pilots.

Grid Expansion

Distribution

Power Africa's on-grid access (or "grid roll-out") program facilitates the connection of new customers, including households and businesses, to central power grids. In tandem, Power Africa strengthens utilities and other relevant institutions to ensure the electricity provided to customers is increasingly reliable and that the distribution sector attains financial viability. Many distribution utilities across the continent (over 90 percent) that face significant financial deficits and operate at a continual loss also struggle to expand their customer bases, improve performance, or make critical investments in infrastructure. Weak utilities have significant negative impacts on the viability of the power sector overall, which hinder investment, especially from international sources, across the entire value-chain. Power Africa addresses these challenges by focusing on facilitating four core components of successful grid roll-outs:

- ***Electrification Planning****:* Data-driven electrification planning enables least-cost investment strategies, and provides much-needed clarity for developers and off-grid investors. USAID assists rural-electrification agencies in planning their grid-extension efforts, and promotes least-cost models. In Uganda and Ethiopia, USAID funded the United State's National Rural Electric

[9] GOGLA Powering Opportunity: The Economic Impact of Off-Grid Solar, https://www.gogla.org/sites/default/files/resource_docs/gogla_powering_opportunity_report.pdf

[10] https://www.youtube.com/watch?v=8meaImFb9Uo&feature=youtu.be

[11] USADF Off Grid website: https://www.usadf.gov/off-grid/

Cooperative Association (NRECA) to develop integrated electrification master-planning frameworks, which form the foundation of supplemental activities to accelerate investment in least-cost electricity.

- ***Diversifying Financing for Grid Extension****:* Traditional donor funding is insufficient (and often too slow) to facilitate large-scale grid extension. Power Africa works to broaden and diversify the group of financing actors involved in distribution. For example, USAID provided an investment guarantee through its Development Credit Authority (DCA) to enable commercial lending to the Zambian utility for infrastructure investment and new connections.
- ***Facilitating End-User Payment of Connection Costs:*** High upfront connection and household-wiring costs often prevent households from gaining access to power legally, even if they are already within reach of the existing distribution network. Power Africa, through USAID, works with utilities and ministries to address affordability barriers, either by lowering costs or by changing payment structures.
- ***Strengthening the Operations and Management of Utilities :*** African utilities must have the capacity to connect new customers (often in relatively dispersed, lower-income areas) without incurring unsustainable financial losses and deliver complex grid roll-out projects on time and on budget. Power Africa provides management-advisory services to build utilities' capacities in this area, and has made significant progress in Nigeria and Ethiopia by placing long-term teams in country to work hand-in-hand with utility companies to regularize customers and improve operational efficiencies.

Grid roll-out has become an increasingly important area of focus for Power Africa and, in many ways, is the most-challenging area in which Power Africa works because of the severe financial distress that nearly all public utilities on the continent experience. Through field-based advisory support and hands-on technical assistance provided by USAID to reduce losses and increase new customer connections, to date, Power Africa has facilitated 708,452 new on-grid connections, predominantly in Nigeria and Ethiopia, and expects its on-grid connections figure to grow rapidly as the program expands into new countries and begins working with new distribution utilities. In addition to facilitating new connections, USAID's assistance to four power-distribution companies (DISCOS) in Nigeria (*e.g.*, improving customer experience, enhancing performance management, and instituting pay and reward schemes) helped the DISCOs collectively generate $154.4 million of new revenue in approximately two years—money tinvested back into the sector that helps reduce investment risk. Additionally in Nigeria, USTDA has provided support to the Eko, Ikeja, and Benin distribution companies, including to develop a framework and design for smart-grid modernization, which recommended technologies and systems for a utility-wide roll-out that targets the reduction of commercial and technical losses within their service areas.

Transmission

As SSA energy markets evolve, and Power Africa positions itself to maximize opportunities for U.S. and other firms that are seeking to expand, the *Power Africa 2.0 Strategy* has identified the need to engage more deeply on the development of transmission networks. In many of the markets where Power Africa has been most active (*e.g.*, Ghana, Kenya, Nigeria, Ethiopia, Zambia, Sénégal, Rwanda, and Liberia), experts project excess generation capacity unless critical transmission infrastructure is developed to deliver power to customers and enable large-scale regional trade. In 2018, Power Africa produced detailed analyses of power-trading opportunities and barriers in East and West Africa, along with the projected financial and economic benefits of prioritizing specific transmission lines. Based on these data, Power Africa developed and launched a Transmission Roadmap in late 2018, which is enhancing collaboration between major stakeholders by identifying projects critical to cross-border electricity trade, highlighting risks, and identifying solutions and parties best placed to provide them. Power Africa already provides technical support to advance specific transmission lines. In Southern Africa, Power Africa has placed a full-time Project Coordinator to manage the development of a 560-kilometer (km), 400-kilovolt (kV) transmission line needed to evacuate power from a planned 400-MW gas plant in

Mozambique. In addition, USTDA funds technical assistance to provide transmission-design advisory services related to the planned Mozambique-Zambia 400-kV transmission interconnector, namely the detailed design and technical inputs for the tender documents for the engineering, procurement, and construction contract.

Pillar 3: Enabling Environment

As part of its transaction-focused approach, Power Africa improves the enabling environment by providing personalized training and guidance to key ministries, regulators, and other power-sector officials. Providing this support to host-country governments not only helps move current transactions forward, but also lays the foundations for increased private investment in the sector.

Policy, Legal, and Regulatory Reform

Working alongside like-minded donors, Power Africa advocates for well-crafted laws on independent power producers (IPPs) and other types of legislation that establish clear lines of accountability between private energy developers, public utilities, ministries, and regulators. Clarifying such issues as pricing, land rights, off-take arrangements, and environmental and social performance standards helps strengthen legal frameworks, reduce investors' risk and increase their confidence. Private companies can operate with greater certainty in a transparent enabling environment. Power Africa strengthens Africa's regulators, by helping them become politically independent, have clear authorities, and make more transparent decisions.

Capacity Building and Technical Assistance

Even with strong legal and regulatory frameworks in place, human and institutional capacity in SSA to regulate the sector is fairly weak. Power Africa works to enable local utilities and regulators to deliver on complex energy projects, and to work effectively with the private sector. Efforts to build the capacity of local institutions since Power Africa's launch have made a difference, as evidenced by increases in access to electricity, installed generation, and the number of signed PPAs across the continent. For example, Power Africa has provided funding to the African Development Bank's African Legal Support Facility (ALSF), which hires high-quality, international legal counsel to represent African governments alongside local counsel in their negotiations for power-sector deals. One of these ALSF interventions involved a $4 billion oil-refinery deal in Uganda awarded to two U.S. companies who were competing against allegedly unscrupulous Chinese bidders. The ALSF support provides governments with competent and ethical legal counsel whom they select from a panel of internationally reputable firms. These law firms (at significantly reduced billing rates) negotiate fair and sustainable deals that will stand up to future scrutiny, while simultaneously training local lawyers who can manage future negotiations.

Power Africa teams also provide on-site training to African energy officials at all levels on topics critical to achieving self-reliance, including integrated power-sector planning; utility-loss reduction; best practices in transparent, competitive procurement and project finance; and other technical areas. In partnership with the U.S. Energy Association, the National Association of Regulatory Utility Commissioners, and other leading organizations, Power Africa pairs experienced U.S. energy professionals with their African counterparts to fill critical skills gaps and tackle specific challenges by using a cost-effective peer-to-peer model that builds trust. For long-term technical support, Power Africa's in-country advisors identify the technical, financial, and political solutions needed to facilitate faster access to power, and then work closely with partners to provide and implement them.

Strengthened National and Regional Power Pools

USAID and the State Department's Bureau of Energy Resources provide technical assistance and other support to regional power pools to facilitate the cross-border trade in electricity, enhance energy security,

and harness regional energy resources at lower cost. The success of regional power pools depends on the extent to which participating governments and operators can define a common legal and regulatory framework. In East Africa, USAID helped negotiate the sale of up to 400 MW of power from Ethiopia across Kenya to Tanzania, and is currently advising Kenya and Tanzania on the wheeling tariff. USAID also funded comprehensive research to demonstrate the financial benefits of regional trade, which identifies more than $30 billion that the full implementation of regional trading could save through 2030. Power Africa's power-pool support not only helps African countries achieve lower-cost energy, but also contributes to regional cooperation and stability.

Summary of Pillar 3 Accomplishments

Successes in Building Skills

In partnership with the U.S. Department of Commerce's Commercial Law and Development Program, Power Africa produced a series of practical reference books for African energy officials and other stakeholders, including *Understanding Power Project Procurement,*[12] *Understanding Power Project Financing*[13], and *Understanding Power Purchase Agreements*.[14] Written in plain language by a group of international experts, these handbooks now sit on the desks of energy practitioners across the continent, and offer a common framework and set of actions governments can take as they transition toward a more predictable and competitive power market.

In Nigeria, Power Africa deployed 11 field-based utility specialists to work with four large distribution companies (DISCOs) to improve service-delivery, enhance commercial performance, and institute turnaround plans. Since the program's launch in May 2016, electricity losses for each DISCO have decreased by as much as 12.7 percent, revenues have increased by a combined 58.6 billion *Naira* ($154.4 million), 4,000 staff have received training, and more than 546,000 new customers have connected to the grid. By enhancing the financial health and stability of Nigeria's distribution sector, these achievements reduce investment risk and create significant opportunities for growth throughout the entire power system. In addition, Nigeria prosecuted its first-ever prosecutions of non-paying customers for electricity theft , which marks an important step toward the long-term solvency of the sector.

In Zambia, Power Africa helped the government develop a detailed geospatial map that formed the basis of a national electrification strategy, made available to the public, which allowed private developers to plan their investments in the off-grid sector more effectively and increase sales. In Sénégal, Power Africa worked with the Ministry of Energy and the national utility to improve demand-forecasting, which resulted in an updated master plan for generation and transmission through 2035 that includes the integration of 400 MW of grid-connected solar and wind power and will open new opportunities for renewable-energy companies, including from the United States. To advance cross-border electricity trading, Power Africa strengthened the East Africa Power Pool's ability to conduct stability simulations, a critical function to ensure the power system's operators can cope with disruptions.

Legal and Regulatory Reform

In Malawi, the MCC conditioned funding on Parliament's passage of the Electricity Act Amendment of 2016, which allows private-sector participation in the electricity sector for the first time and unbundles the national utility to increase its commercial viability. The new legal framework enabled Malawi's utility to

[12] Understanding Power Project Procurement Book Link:
http://cldp.doc.gov/sites/default/files/UnderstandingPowerProjectProcurement.pdf
[13] Understanding Power Project Financing Book Link:
http://cldp.doc.gov/sites/default/files/UnderstandingPowerProjectFinancing.pdf
[14] Understanding Power Purchase Agreements Book Link:
http://cldp.doc.gov/sites/default/files/Understanding_Power_Purchase_Agreements.pdf

conduct its first competitive tender, which attracted 21 bids from international companies. In Ethiopia, Power Africa assisted the government to enact the Geothermal Resource Development Proclamation, which establishes the licensing and regulatory structure for private-sector participation in the growing geothermal sector. In Mozambique, Power Africa helped the government and the private sector work together to strengthen the law to create a newly independent energy regulator insulated from short-term political pressures, and strengthened protections for investors. In Nigeria, Power Africa helped the Nigerian Electricity Regulatory Commission to unveil new regulatory policy guidelines that ensure the effective monitoring of distribution companies' financial transactions, including a uniform financial-reporting format that will allow the regulator to calculate cost-reflective tariffs accurately.

Community Engagement

Power Africa's experience has shown that insufficient engagement with local communities can lead to delays and terminations of power projects. Power Africa encourages project developers, utilities, and governments to embrace community engagement to help de-risk transactions and create shared value for both companies and local stakeholders. In January 2018, Power Africa launched the *Guide to Community Engagement for Power Projects in Kenya*,[15] a practical manual to help developers and communities join forces and avoid the impasses that have hindered African infrastructure projects in recent years. Power Africa organized an innovative peer-exchange between Kenya's main generation company and energy companies from New Zealand to share best practices for working with indigenous communities who live in close proximity to geothermal power plants. Following the professional exchange, the generation company adopted a long-term community-engagement strategy that acknowledges the validity of local concerns and recognizes community engagement as a core business practice.

Mitigating Environmental Impacts

To ensure that activities funded and supported by Power Africa do not have a negative impact on the environment, all of the initiatives procurements follow USAID's Environmental Procedures spelled out in USAID's Automated Directives System (ADS) Chapter 204, "Environmental Procedures."[16] Power Africa–supported transactions must have an approved Environmental and Social Impact Assessment (ESIA), and Power Africa does not support transactions beyond the financing stage if the developer has not conducted an ESIA. Power Africa reviews ESIA reports for all supported transactions to ensure that, at a minimum, they have met the standards set by cognizant national authorities and that there are no significant environmental and social impacts associated with the transactions. The Power Africa Environmental and Social Review Methodology (a checklist method) ensures that ESIAs address environmental and social impacts adequately. Power Africa also offers tools to help companies and countries mitigate identified environmental impacts, such as with the Kipeto Wind Park in Kenya. That intervention is described in an article on our Power Africa Medium Blog.[17]

Gender Accomplishments

Since its launch, Power Africa has been committed to advancing the principles of equality between men and women and female empowerment. Men and women experience energy poverty differently; Power Africa, therefore, considers gender issues in its program designs to ensure that men and women both benefit from efforts to increase electricity connections.[18] Data demonstrate that women are under-

[15] Guide to Community Engagement for Power Projects in Kenya book link: https://www.usaid.gov/sites/default/files/documents/1860/FINAL_Guide_to_Community_Engagement_-_Jan_17_2018_508-compressed.pdf,

[16] ADS 204 "Environmental Procedures" link: https://www.usaid.gov/sites/default/files/documents/1865/204.pdf

[17] The Long Road: Bringing Kenya's Second Largest Wind Farm to Financial Close: https://medium.com/power-africa/the-long-road-bringing-kenyas-second-largest-wind-farm-to-financial-close-8cecbe503f72

[18] Integrating Gender Considerations into Energy Operations, p 5, ESMAP Knowledge Series 014/13.

represented in the sector's workforce.[19] Power Africa promotes women's participation in the energy sector, such as through the Young Women in African Power Leadership program. Launched in 2018, the first of several planned programs provided leadership training to 37 young women from 24 African countries to provide professional skills for career advancement. Power Africa has funded the Engendering Utilities program since its launch in 2015, and worked with electric utilities to create greater professional opportunities for women in the utility workforce. Nigeria's Eko Electricity Distribution company tripled the number of gender-informed human-resources policies, and Kenya Power and Lighting Company saw a 61 percent increase in the number of women who participate in professional trainings. Power Africa also launched a "Women in African Power" business network, which has more than 600 members.

Highlights from Illustrative Projects

Power Africa funds and supports a variety of interventions that take a holistic approach to building up the energy sector in SSA. Below is a selection of some of our most-effective interventions; however a more detailed description of each USG-supported transaction is available in Annex 2.

On-Grid: USAID provides targeted technical assistance to the Ethiopian Electric Utility (EEU) and four electric-distribution companies in Nigeria, with a focus on technical/business-management improvements to strengthen the financial solvency and operational efficiency of these institutions. In Nigeria, specific assistance included inspecting the quality of meter installations; strengthening revenue-protection teams; conducting pole-climbing tests for connection and disconnection; and conducting training for staff at all levels, including executive management. Since the program's launch in May 2016, it has dramatically exceeded utility-performance targets, as each of the four distribution companies reduced electricity losses by as much as 12.7 percent and increased revenues by a combined 58.6 billion *Naira* ($154.4 million). With this support, the four companies added 279,645 new connections in FY 2018 (and more than 546,000 since May 2016), which benefitted an estimated 2.7 million people over the life of the program.

Meanwhile in Ethiopia in FY 2018, USAIDhelped District utility teams read meters; resolve billing issues; and train utility employees on billing, collection, disconnection issues, and approaches to improve the performance of utilities. In the South Addis Ababa region, with USAID's assistance, revenue-collection improved by more than 94 million *birr* ($3.4 million), exceeding the annual target of the Ethiopian Electric Utility (EEU). With this support, EEU has been able to make 11,817 new connections, which benefit an estimated 59,000 people.

Off-Grid: The Stanbic-M-KOPA $55 million deal[20] reached financial close on September 2017. M-KOPA has connected more than 700,000 East Africans to electricity through its solar off-grid systems. Co-lenders included private-sector partners Stanbic Bank ($9 million) and CDC, the development-finance institution of the United Kingdom ($20 million), as well as donor partners FMO, the Dutch development bank ($13 million), and Norfund, Norway's development-finance institution ($13 million), who support the creation of the largest off-grid, mobile-based pay-as-you-go, specific commercial-debt facility. Power Africa Beyond-the-Grid advisors in Kenya provided Stanbic Bank support with overall off-grid sector due diligence, which was key to its consideration of this deal.

Power Africa, through its partnership with USTDA, also helps specific private-sector companies expand in or enter into the SSA off-grid market. Renewvia, a small solar-energy developer based in Atlanta, Georgia, has completed USTDA-funded feasibility studies of micro-grid sites across Kenya. Renewvia also started to raise capital to begin building at least 15 sites in remote locations across the country, which

[19] Global Gender Gap Report 2017, p.34, The World Economic Forum.

[20] Link to the "Breaking records to finance off-grid" article for Stanbic-M-KOPA: http://www.m-kopa.com/breaking-records-in-financing-off-grid/

will connect electricity to an expected 3,900 households and businesses in its beginning phase. Power Africa Beyond-the-Grid advisors are supporting Renewvia to raise grants and debt to build these micro-grids. Renewvia has commissioned three sites, funded out of equity and using American metering and storage technology. Two of the micro-grids came online during the Summer 2018 on small islands in Kenya's Lake Victoria, and provided the first safe energy source available to the islands' nearly 10,000 residents and businesses. Previously, their only sources of power had been burning kerosene or petrol or using disposable batteries. Both Lake Victoria micro-grids feature a mobile-payment platform that uses *M-Pesa* and the Commercial Bank of Africa to facilitate transactions and provide a continuing revenue stream. Through this innovative payment system, the islands' residents now have access to an easy and affordable way to purchase reliable, clean energy. In Nigeria, Renewvia finalized a USTDA-funded feasibility study in early 2018 for 25 new micro-grid sites that total five MW of power. They have closed debt financing to develop two sites, which will also use a proprietary payment platform to connect an expected 2,800 local households and businesses in the Niger Delta.

Generation of MWs

***Taiba N'Diaye* ("*Taiba*"), 158 MW, Wind, Sénégal:**
Taiba, Sénégal's first utility-scale wind farm, is expected to increase the country's power generation by 15 percent and demonstrates Power Africa's partnership model and toolbox in action: Power Africa partner *Lekela* (an Actis company) developed the project; Vestas, a Power Africa partner, provided the wind turbines; USAID's Power Africa teams at the West Africa (Accra) and Sénégal (Dakar) Missions provided transaction assistance for *Lekela*; and OPIC provided debt financing, political-risk insurance, and a cross-currency interest-rate swap for the guarantee provider.

Renewable Energy Independent Power Producer Program ("REIPPP") 2,310 MW - Solar PV, CSP, Wind, Biomass, and Hydro, South Africa:
Power Africa provided critical technical assistance in the form of legal and financial due diligence and project-document preparation to help advance 27 projects under the South Africa REIPPP, a competitive power-procurement program. Through USAID's technical support, more than 2,300 MW of clean power-generation projects and approximately 56 billion South African Rand ($4 billion) of investment achieved financial close. Power Africa's assistance was fundamental to the government-developer negotiations on all of the projects.

Lake Turkana, 310 MW, Wind, Kenya:
The Lake Turkana Wind Power Project will provide up to 310 MW of wind power to the Kenya national grid, and is one of the biggest power investments ever made in Kenya. Power Africa partner Aldwych co-developed the project with KP&P BV Africa. Power Africa worked with multiple agencies to support this project, including USAID, which is creating an enabling policy environment for renewable power in Kenya by supporting a grid-management program to help Kenya integrate intermittent renewables. Power Africa partners Nedbank and the African Development Bank (ADB) supported the ADB Project-Risk Guarantee for the associated transmission line.

Kpone Independent Power Plant ("KIPP"), 350 MW, Gas, Ghana:
In support of the KIPP, Power Africa reviewed loan documents; assisted with lender requests; consulted on the PPA negotiation; and provided due diligence on Cenpower Generation Company Limited's financial models, reports, and recommendations for the Electricity Company of Ghana and the Ministry of Finance and Economic Planning. KIPP is expected to improve Ghana's electricity security by increasing the country's installed generation capacity by around 13 percent when operational (expected in Q1 2019). KIPP will provide approximately 600 jobs during the peak of construction, most of which will be for Ghanaians, and will employ at least 70 people full time during operation. KIPP's development included 19 U.S. companies; General Electric provided the gas turbines.

Annex 1: Results Summary

	Partner-Only Supported	USG-Supported	Total
Generation			
# of Megawatts (MW) at Financial Close	**1,891**	**8,204**	**10,095**
# of Transactions at Financial Close	32	88	120
# of MW Pending Financial Close	9,633	33,811	43,444
# of Transactions Pending Financial Close	93	585	678
# of MW Commissioned (operational)	**1,199**	**1,453**	**2,652**
# of Transactions Commissioned	21	19	40
# of MW Tracked			85,912
# of Transactions Tracked			945
			Connections
Total Number of Beneficiaries	**44,358,128**	**14,194,307**	**58,552,435**
Total Off-Grid Beneficiaries	44,358,128	10,652,047	55,010,175
Total On-Grid Beneficiaries	0	3,542,260	3,542,260
Total Number of Connections	**9,710,815**	**3,079,077**	**12,789,892**
Actual Connections - On-Grid	0	708,452	708,452
Actual Connections - Off-Grid	9,710,815	2,370,625	12,081,440

Partnership Commitment		
# of Private-Sector Partners	147	
of which # of U.S. Partners	*72*	
# of Public Development Partners	18	165
Private-Sector $ Committed	$40.0 billion	
Public-Sector $ Committed	$16.25 billion	$56.25 billion

Annex 2: Project Descriptions

The following list of power-generation transactions supported by Power Africa have reached financial close. The term "financial close" describes the very significant milestone in the power-generation life-cycle when all parties have completed due diligence, negotiated long-term financing, settled on long-term power-purchase arrangements (up to 30 years), arranged for appropriate credit enhancements or sovereign protections, and reached agreement on all other material-risk allocations to move to the next step of actually constructing the facility. Parties regularly take longer (many years) to reach financial close than to build the plant and make it operational.

Working with private-sector companies, development partners, and government counterparts to help deals reach financial close is almost always the most-important role Power Africa can play in power-generation, given our broad, multi-agency tool kit and expansive network of partners. Without Power Africa's interventions, many deals would be delayed significantly, potentially not reach financial close, or never be built.[21] For this reason, our work emphasizes helping deals reach financial close, especially given that most deals that reach this milestone do become operational.

Power Africa tracks and reports on projects that become operational, because the ultimate goal of 30,000 MW of new generation capacity by 2030 is a measure of production.

[21] Two quotes that highlight the impact Power Africa is having on specific power deals:

"The *Cap des Biches* [Sénégal] financing agreement is tangible evidence of the power of Power Africa. It is by far the fastest project that I have ever worked on in Africa, and Power Africa made all the difference. This project would have taken four years in the absence of Power Africa. Instead it took one. This is the power of an idea that is embraced and sponsored by the United States." – Joseph Brandt, Chief Executive Officer, ContourGlobal

"On a complex project like the Azura-Edo IPP [Nigeria], there was continual need for inter-governmental and inter-agency engagement performed with patience and discretion. The leadership and staff of Power Africa met this challenge with aplomb." – David Ladipo, Azura Power Holdings

"

BOTSWANA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Botswana	HFO generation	35	0	0
Total		**35**	**0**	**0**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Botswana	Francistown Fast Track Project Phase 2	Hydro HFO generation	35	0	0
Total			**35**	**0**	**0**

Botswana generates the majority of its power from coal, with a coal reserve of about 200 billion tons and coal bed methane reserves of 0.15–3.2 trillion cubic feet. Of the country's 730 MW of installed capacity, only about 450 MW is available for power production. Imports, primarily from South Africa, meet additional demand. Access stands at 60 percent. The 3,200 hours of sunshine per year illustrate the country's significant solar-power potential, which, as an untapped market, provides investment opportunities for U.S. companies.

Botswana faces challenges in expanding electricity access throughout the country because it does not have an Integrated Resource Plan that maps the way forward for its energy policy. , Botswana lacks consensus around the independence and limits of powers of its regulatory authority, the Botswana Energy Regulatory Authority (BERA). In addition, Botswana's lack of experience in the renewable-energy realm, on- and off-grid, impedes its efforts toward its energy-access goals.

Power Africa assists Botswana on a number of fronts. USAID is helping the Botswana Power Corporation in the tender procurement of 100 MW of solar PV. A successful tender promises to attract increased investment interest in the country as Botswana's credit rating and currency remain stronger than its regional neighbors. USAID also helps the country with its part in the Southern Africa Regional national gas strategy. To improve the enabling environment, USAID supports BERA in the creation of regulatory frameworks, guidelines, and regulations. USAID is in the early stages of assessing the potential of a mega-solar program in Botswana that would bring much-needed power to the country and open up additional investment opportunities to the private sector.

Name:	Francistown Fast Track Project Phase 2
Type:	HFO Generation
Location:	Botswana
Result:	35 MW
Cost:	

Summary
APR Energy, a Power Africa private-sector partner, signed a contract in May 2015 with the Botswana Power Corporation (BPC), the national electric utility, to provide a 35 MW diesel module under a two-year contract with a September 2017 term end date. APR Energy will install and operate the fast-track, turnkey power plant adjacent to BPC's existing 70 MW generating facility outside of Francistown, which brings installed capacity for BPC to 105 MWs. The power plant features diesel-power modules that have been redeployed from APR Energy's former project in Libya.

Impact
At the time, Botswana received less electricity because of system constraints on the Southern Africa Power Pool (SAPP), which led to load shedding that had negative effects on industries and residential users. This second-phase project allowed the BPC to further alleviate load shedding and economic disruptions in the country's second-largest city.

CAMEROON

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Cameroon	Hydro Generation	420	$1,300	0
Total		**420**	**$1,300**	**0**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Cameroon	Nachtigal amont	Hydro Generation	420	$1,300	0
Total			**420**	**$1,300**	**0**

Nearly half of Cameroon's population lacks access to power, which constrains economic and social development. With more than 20 GW of estimated hydropower potential, substantial gas reserves, and a unique geographic position between West and Central Africa however, Cameroon presents significant opportunities for power-sector investment. Cameroon was one of the first countries in sub-Saharan Africa to begin liberalizing its power sector, but it has yet to achieve an efficient and competitive market. Government of Cameroon appears keen to adopt the changes necessary to advance the energy sector and infrastructure development. Major challenges include dilapidated infrastructure; corrupt practices that deter international investors; delayed unbundling and concessioning processes; and an insufficient regulatory framework to facilitate Independent Power Producers. The procurement process for new projects has also been particularly difficult and costly, representing a serious roadblock to investment from the private sector. Historic underinvestment in transmission and high distribution losses impede recovering costs, harnessing remote resources, and electrifying large segments of the peri-urban and rural population.

In Cameroon, Power Africa supports driving energy projects toward financial close through transaction advisory services, in collaboration with the African Development Bank and other partners. With limited support in Cameroon, Power Africa successfully supported off-grid sector development by connecting companies to in-country investment opportunities. Given the relatively low lifetime generation cost from large hydropower and resultant attractive tariff, Cameroon expects to export power to neighboring countries. Power Africa's programs promote the economic benefits of regional electricity trade and supports the development of the Central African Power Pool, which would be a viable market for Cameroon's excess power.

Name:	Nachtigal amont hydroelectric Project
Type:	Hydro Generation
Location:	Cameroon
Result:	420 MW
Cost:	$1,300 million total

Summary

The 420 MW hydropower facility is being developed by a Cameroonian company, Nachtigal Hydro Power Company (NHPC), created on July 2016. Shareholders of NHPC include the Republic of Cameroon (ROC), Electricité de France (EDF), International Finance Corporation (IFC), Africa 50, and the Fund STOA. EDF as shareholder is the lead developer. A consortium of companies managed by EDF will construct the facility, which will be operated by NHPC with EDF assistance. ENEO (Offtaker) will purchase electricity under a 35-year power purchase agreement (PPA). The hydroelectric facility is a run of river hydro plant able to operate as based-load facility but also able to supply intermediate peaking demand. It includes: seven 60 MW Francis turbines; a headrace concrete-lined canal to conduct water to the hydroelectric power plant; an auxiliary power plant to generate electricity from the environmental flow rate; a double bus bar 225 kV generation substation; and a double circuit 50.3 km transmission line equipped with two bundle conductors to transport the power produced from the power plant generation substation to the Nyom 2 connection substation. Interconnection facilities will transfer to the transport operator after commercial Operation. The commissioning is anticipated for 2023.

Financing

Financial Close was achieved in December 2018, and the first disbursement was made in January 2019. Development finance institution participants include AFC, the African Development Bank, France's Proparco, the United Kingdom's CDC, EAIF, the European Investment Bank, IFC, Deutsche Investitions, and the Netherlands Development Finance Company and a local tranche mainly provided by Société Générale and Standard Charter. IBRD provided two distinct partial-risk guaranteed instruments, one to backstop to ENEO electricity-bill payments for several months under the year PPA, the other one to backstop return on capital obligation to refinance local lenders loan after year seven and 14 if such lenders do not renew their loans.

Impact

The project brings a structural change in energy matrix in Cameroon by adding 420 MW of a long-term, reliable, competitive (under 7.0 Euro cents/kwh) and clean source of capacity and electrical energy in a power system with available capacity of near 1400 MW today. The plant will help the Government reduce production cost and cater for demand growth. It will also increase government tax revenues and consolidate large hydro operating expertise in the country and the region.

GHANA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Ghana	Natural Gas Generation	550	$1,452	$250
Total		**550**	**$1,452**	**$250**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Ghana	Amandi Energy	Natural Gas Generation	200	$552	$250
Ghana	Kpone Independent Power Plant	Natural Gas Generation	350	$900	0
Total			**550**	**$1,452**	**$250**

Ghana has long been one of West Africa's most stable and promising economies. It has implemented policies that promote energy-sector development as essential to achieving macroeconomic stability and becoming a middle-income country by 2020. Ghana has relatively robust and transparent investment, legal, and regulatory frameworks. However, special interests often influence Government decision-making processes, especially those related to power-sector projects, which rarely include input from industry and may marginalize technical staff within the government. Power Africa has provided technical-advisor support as the Government aims to create a more transparent and equitable review process for power projects. Specifically, the Government of Ghana is reviewing overlapping regulatory authority, particularly in the gas sector, and expanding local content regulations and enforcement under the Energy Commission. In 2014, the Millennium Challenge Corporation—a U.S. government agency designed to reduce poverty by focusing on economic growth in poor, well-governed countries—signed a Compact with Ghana after identifying power-related problems as major constraints to economic growth and conditioned its power-sector grant on substantial institutional changes being made by the government.

The lack of creditworthiness of the main electricity off-taker, the Electricity Company of Ghana (ECG), remains an obstacle to private-sector participation. Transfering ECG operations to a private-sector entity, one of the primary conditions for MCC's assistance package, is expected to improve the power sector's financial health.

Power Africa supports Ghana to mitigate its long-standing enabling-environment challenges through technical assistance and capacity-building focused on fiscal management, long-term power-sector planning and operational reforms, demand-side management, developing natural gas for power generation, energy efficiency, and regulatory reform. Power Africa supports two embedded advisors in Ghana's Ministry of Energy, who retain key advisory roles to the Government of Ghana. These advisors provide targeted analysis and transactions facilitation to help the Ministry of Energy's concerted efforts to expand the commercial supply of domestic gas, reduce the cost of power, and stabilize the power sector's finances. Power Africa, through USTDA, provides grants for feasibility studies for a variety of renewable energy projects. Power Africa also works directly with the Government of Ghana through a USTDA mini-grid feasibility study to explore business models that will enable sustainable mini-grid development and highlight U.S. mini-grid technologies and equipment, while supporting the Government of Ghana's universal energy-access objectives.

Name:	Amandi Energy
Type:	Natural Gas Generation
Location:	Ghana
Result:	200 MW
Cost:	$552 million total $250 million by USG

Summary

The Amandi Power Plant is a 192 MW combined cycle gas turbine (CCGT), dual fuel power project in Ghana's western region on the Atlantic coast, near the town of Aboadze. A consortium of developers, the Amandi Founder Group (AFG), founded Amandi Energy. Amandi Energy will sell power to ECG under a 25-year Power Purchase Agreement (PPA) and will be fueled initially by light crude oil but is expected to switch to indigenous gas from Ghana's offshore Sankofa natural gas field once available. USAID convened the private-sector stakeholders and coordinated their interface with the Government of Ghana to push the project toward financial close, especially relying on the support from the USAID-funded embedded advisor in the Ministry of Energy and Petroleum. The Overseas Private Investment Corporation (OPIC) also provided debt financing as well as political-risk insurance, and MCC's $498 million Ghana Power Compact, while programmed and implemented separately from the Power Africa Coordinator's Office, helped incentivize the government reforms that are stimulating private investment in Ghana's power sector. For this project, AFG partnered with the project's majority owner, Endeavor Energy, backed by the global private-equity firms Denham Capital and Aldwych International. METKA S.A. currently serves as the engineering, procurement, and construction provider. Endeavor Energy, Denham Capital, Aldwych International, and General Electric (turbine supplier) are all Power Africa private-sector partners. This project reached financial close in December 2016 and is expected to be commissioned in July 2019.

Financing

The $552 million investment required for the Amandi project comprises $134 million in equity from the sponsor group, which includes Endeavor, AFG, Aldwych, Pan African Infrastructure Development Fund 2 managed by Harith General Partners, and ARM-Harith Infrastructure Fund. The $418 million in debt financing was provided by a group of lenders, including OPIC, which provided a $250 million loan, as well as the CDC Group plc, which provided an $83 million loan. Other debt providers include Nedbank Limited and Rand Merchant Bank, which contributed $85 million. OPIC provided reinsurance of $210 million.

Impact

The Amandi project will be crucial to help meet Ghana's growing power needs. Once constructed, the plant will be one of the most fuel-efficient power plants in the country and will produce more than 1,600 gigawatt hours (GWh) per year, providing energy to up to one million Ghanaian households.

Name:	Kpone Independent Power Plant
Type:	Natural Gas Generation
Location:	Ghana
Result:	350 MW
Cost:	$900 million total

Summary

The Kpone Independent Power Plant (KIPP) project is a 350 MW, $900 million combined-cycle gas-turbine power plant in Kpone, Ghana, which commenced construction in early 2015. Cenpower Generation Company Limited is a Special Project Vehicle (SPV) created to develop the Kpone Independent Power Plant in the Tema industrial zone, close to Ghana's capital, Accra. As the lead USG agency on this project, USAID provided transaction support to the Electricity Company of Ghana (ECG) to review final changes to the PPA submitted by CenPower and to address any requests from lenders prior to closing. Additionally, USAID provided negotiating and structuring support to ECG during negotiations. Power Africa partners involved in financing the project include General Electric, Investec, Standard Bank, Rand Merchant Bank, and the African Finance Corporation. The project reached financial close in December 2014.

Financing

The project financing includes two components: A $650 million debt tranche and a $250 million equity tranche. 1) A consortium of South African commercial banks and international-development finance institutions are funding the debt under export credit cover. Rand Merchant Bank (RMB) acted as the Global Lead Bank and Mandated Lead Arranger for the commercial banking tranche. Other South African banks involved in the transaction as Mandated Lead Arrangers included Nedbank and Standard Bank. Nederlandse Financierings-Maatschappij voor Ontwikkelings Landen N.V. (FMO), the Dutch Development Bank, acted as the Mandated Arranger for the DFI tranche. 2) Three leading investment groups will join the equity consortium. The new investors are Sumitomo Corporation of Japan, African Infrastructure Investment Fund II and its co-investors, and FMO.

Impact

KIPP will be among the largest private Independent Power Producers in the country, accounting for approximately 10 percent of Ghana's dependable installed capacity and approximately 15 percent of its available thermal-generation capacity. The CCGT plant will be among Ghana's most fuel-efficient thermal power stations. Once in production, the power plant will become a critical base-load component in meeting Ghana's growing electricity demand.

GUINEA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Guinea	Heavy Fuel Oil (HFO) Generation	50	$121	$50
Total		**50**	**$121**	**$50**

TOTAL BY TRANSACTIONS

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Guinea	Tè (Kipe) Power Project	HFO Generation	50	$121	$50
Total			**50**	**$121**	**$50**

Guinea is strategically located for connection to the West Africa Power Pool and has the potential to generate six gigawatts of hydropower. These untapped hydropower resources are not yet economically viable, preventing full regional integration that would allow for large-scale cross-border trade. Guinea's power system is constrained, particularly during the six-month dry season. In recent years, the Government of Guinea has demonstrated its intent to make critical reforms. Guinea has established an independent regulator (although it is not yet fully operational); begun review of a law to allow build-own-operate (BOO) and build-own-transfer (BOT) public- private partnerships; and increased tariffs (although this action was not driven by robust data and analytics).

To boost the sector's long-term sustainability, Power Africa has provided technical assistance on regional exports, rural electrification planning, and institutional capacity building. Power Africa has provided multiple trainings to power-sector officials on cost-reflective tariffs, power project development, and competitive procurement and gives ongoing transaction advisory assistance to large-scale generation projects and off-grid companies.

Tè (Kipe) Power Project
HFO Generation
Guinea
50 MW
$121 million total
$50 million by USG

Summary

The Tè Power project is a 50 MW greenfield power plant under construction in Conakry, Guinea, by Tè Power Company (TPC), a special-purpose company incorporated in Guinea. Endeavor Energy, the lead developer and majority owner, and Energie, Environnement et Mines S.A., a Mauritanian mining and power company, are sponsors of TPC. The Government of Guinea will purchase the power generated under a five-year build, own, and operate Power Purchase Agreement. This project reached financial close in March 2018 and is expected to deliver 50 MW of reliable, baseload electric power to Guinea's power-deficient market by mid-2019. The Overseas Private Investment Corporation (OPIC) provided debt financing and political-risk insurance. The Department of Commerce also provided support. Power Africa partners include Denham Capital and Endeavor Energy. The project reached financial close in March 2018.

Financing

The $121 million investment required for the Tè project comprises $32 million in equity from Endeavor and $50 million in debt financing from OPIC and $39 million in debt from the CDC Group PLC. OPIC also committed $50 million of political-risk insurance.

Impact

By using a well-known, proven, and highly efficient technology (reciprocating engines) to guarantee reliable and affordable supply, as well as constructing a new 300-meter transmission line to connect the plant to the grid, the Tè project adds a greater amount of baseload electricity generation. Once constructed, the plant is expected to improve electricity access for more than one million Guineans.

KENYA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Kenya	Wind Generation	410	$ 1,415	$250
Kenya	Geothermal Generation	158	$ 490	0
Kenya	Biomass Generation	8	$ 30	0
Kenya	Solar (Micro-Grid)	1	0	0
Total		**577**	**$ 1,935**	**$250**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Kenya	Lake Turkana Wind Power Project	Wind Generation	310	$1,095	$0
Kenya	Olkaria V	Geothermal Generation	158	$490	0
Kenya	Kipeto	Wind Generation	100	$320	$233
Kenya	Cummins Baringo	Biomass Generation	8	$30	0
Kenya	Garden City Mall Solar System	Solar Generation	1	$1.9	$1.3
Total			**577**	**$1,936.9**	**$234.3**

Kenya has one of the most developed power sectors in sub-Saharan Africa. Kenya benefits from an active private sector, Kenya Power's long track record as a creditworthy off-taker, and abundant renewable energy resources including geothermal, wind, and solar. To achieve the Government of Kenya's goal of universal energy access by 2020, the country needs an estimated $2.5 billion of additional investment. A limited and aging transmission infrastructure, difficulty in obtaining financing, and an opaque procurement process for power-generation projects continue to constrain sector growth. In addition, disputes over land rights and inadequate community-engagement efforts have hindered power project development in recent years.

Power Africa supports power-sector development in Kenya through financing, transaction and technical assistance, advocacy, and investment promotion. By mobilizing more than $1 billion in private investment, it will accelerate power projects across all technologies to help Kenya reach its goal of universal energy access by 2020. To address the need for better community-engagement practices, Power Africa provided technical assistance to help power-project developers in Kenya employ best practices in community engagement, which resulted in reduced instances of company-community conflict. The successful close of the delayed 100 MW Kipeto project can be attributed, in part, to the success of its sustained community-engagement process support by Power Africa.

Name:	Lake Turkana Wind Power project
Type:	Wind Generation & Transmission
Location:	Kenya
Result:	310 MW
Cost:	$1,095 million total

Summary

The Lake Turkana Wind Power project (LTWP) will provide up to 310 MW of wind power to the Kenya national grid. The project includes the construction of a 436 km publicly owned transmission line between Loyangalani and Suswa and associated substations. This transmission line will connect LTWP to the national grid and a 33 kV electrical collector network. According to the power purchasing agreement (PPA), Kenya Power will purchase the power at a fixed price over a 20-year period. Power Africa supported this project through direct technical assistance and through its partners. Technical assistance included support to strengthen Kenya's enabling environment for renewable power and, specifically, to improve its grid management of intermittent renewables. Power Africa partners Standard Bank of South Africa, the African Development Bank (AfDB), and Nedbank committed financing and insurance. Power Africa is providing support for this transaction through the AfDB's partial-risk guarantee for an associated transmission line. This project reached financial close in 2014 and was commissioned late in 2018.

Financing

LTWP is a consortium comprised of the Dutch company KP&P BV Africa, Aldwych Turkana International Limited, Vestas Eastern Africa Limited, KLP Norfund Investment AS, Danish Investment Fund for Developing Countries (IFU), Finnish Fund for Industrial Cooperation Ltd, and Sandpiper Limited. The AfDB is providing a $150 million loan and a partial-risk guarantee. Other financial partners include the European Investment Bank, the Standard Bank of South Africa, Nedbank Limited, and the EU-Africa Infrastructure Trust Fund. LTWP is solely responsible for the financing, construction, and operation of the wind farm. Under an Engineering, Procurement, and Construction (EPC) arrangement, Vestas manufactured and installed the turbines and will maintain the plant under a 15-year service and availability contract.

Impact

The Lake Turkana project adds 310 MW of clean, reliable electricity capacity to the Kenyan national grid and will help reduce the levelized cost of electricity. The project will generate more than 1,400 GWh of power per year, equivalent to approximately 15 percent of the country's current electricity consumption.

Name:	Olkaria V
Type:	Geothermal Generation
Location:	Kenya
Result:	158 MW
Cost:	$490 million total

Summary

The Olkaria V project consists of a geothermal power plant (two units of 79 MW each), steam fields, power transmission lines (approximately five km in length), and related facilities at the Olkaria geothermal area in Nakuru County, located in central Kenya. In 2016, Power Africa and Kenya Electricity Generating Company PLC (KenGen) concluded a Cooperation Framework, which established a strategic partnership to advance Kenya's energy goals. Based on the Cooperation Framework, Power Africa

provided technical assistance to KenGen during the development of this and other projects. Power Africa also assisted KenGen in optimizing reservoir productivity across the entire Olkaria field. Major partners include the Power Africa partner Japan International Cooperation Agency (JICA) and Mitsubishi. This project reached financial close in March 2017 and is expected to be commissioned in late 2019.

Financing
In March 2016, JICA signed a loan agreement with the Government of the Republic of Kenya in Nairobi to provide an Official Development Assistance (ODA) loan of up to 45.69 billion yen to develop the Olkaria V Geothermal Development project (valued at approximately $402.5 million as of January 2017). Kenya Electricity Generating Company Ltd. awarded Mitsubishi Corporation, together with Mitsubishi Hitachi Power Systems Ltd. and H Young & Co. Ltd., a full turnkey contract for the construction of Olkaria V in Kenya.

Impact
This geothermal plant provides low-cost, reliable, and clean energy for Kenya, helping to stabilize the power supply's seasonal variation from the 800 MW of hydropower capacity, which has affected Kenya in the past and resulted in deploying expensive short-term thermal power.

Name:	Kipeto
Type:	Wind Generation
Location:	Kenya
Result:	100 MW
Cost:	$320 million total $233 million USG

Summary
Kipeto Energy Limited (KEL) is developing a 100 MW wind power plant in Kajiado County in the Rift Valley Province of Kenya. The energy generated from the Kipeto wind farm will be sold exclusively to the national off-taker, Kenya Power and Lighting Company (KPLC), under a 20-year power purchase agreement. General Electric (GE) will provide the 60 wind turbines required for the project, which also consists of underground cables to KEL's substation, and a 220 kV overhead transmission line, which will transfer power to the national grid through Isinya substation. KEL will build a new 17 km road to the project site. To move the project forward, Power Africa conducted a Biodiversity Action Plan to understand, reduce, and compensate for the possible impact of wind turbines on endangered vultures and other raptors at the Kipeto site. In line with IFC social safeguard standards, Power Africa partner Actis undertook extensive community engagement. Negotiations with the community resulted in a Community Development Framework which identifies project area socio-economic development needs, potential partners, and ways forward, and will inform the creation of a Community Trust. Power Africa partners involved include Actis and GE.

Financing
The project is funded by equity from Actis LLP (88 percent) and a Kenyan company Craftskills Wind Energy International (12 percent) alongside senior debt of $232,560,000 from OPIC, the USG's development finance institution. London-based private equity firm Actis holds 88 percent majority share, which it bought in mid-2018 from African Infrastructure Investment Managers, the IFC, and Craftskills, who originally initiated the project. Additionally, OPIC has committed $50 million in re-insurance while the African Trade Insurance Agency provides a standalone guarantee to cover up to three months of potential late payments by the offtaker. Finally, GE is to provide sixty 1.7 MW turbines. Worley Parsons is to manage the 22-month development phase on behalf of KEL.

Impact
Kipeto is close to Nairobi and introduced a geographical advantage by being close to the main load center of Kenya, which reduced the technical losses of power supplied. Being one of the first wind IPPs in Kenya, Kipeto paves the way for future private investment in Kenya's nascent wind-energy sector.

Name:	Cummins Baringo
Type:	Biomass Generation
Location:	Kenya
Result:	8.4 MW
Cost:	$30 million total

Summary
This is a 12 MW USD 30 million biomass transaction located in Kenya. The developers are Cummins Inc. and Gentec Energy. The plant will employ an estimated 2,500 locals and is expected to operate for 20 years. An invasive weed known as methenge is a menace to residents of Baringo County, suppressing other forms of vegetation and greatly reducing grazing areas for livestock. The project seeks to turn this obnoxious weed into biomass-based power generation, which will create positive socio-economic impacts in the community. Construction is complete; however, during the completion tests engineers observed the gasification plant was depositing tar into the generators. The developer is working on a technical solution to protect the generators.

Financing
The project cost is $30 million in private financing. Power Africa provided transaction advisory services to move the deal forward.

Impact
The plant will use a toxic, invasive plant as fuel stock, thereby providing an ecological benefit as well as employing up to 2,500 local people, many of whom are expected to be women.

Name:	Garden City Mall Solar System
Type:	Solar Micro-grid Generation
Location:	Kenya
Result:	.86 MW
Cost:	$1.9 million total
	$1.3 million USG

Summary
Garden City is a 33,000 square meter mall in Nairobi, Kenya. Backed by Actis Private Equity, it was the first mixed-use development in East Africa to gain Leadership in Energy and Environmental Design certification. The 858-kilowatt solar installation, one of the largest rooftop solar projects in East Africa, is integrated into the rooftop carpark and provides clean energy to the mall and surrounding mixed-use buildings.. The USG provided funding through a USAID Global Development Alliance Investment. Solarcentury won the engineering, procurement, and construction contract for this project, while NVI Energy provided technical oversight.

Financing
Crossboundary Investment Fund uses finance to remove the barriers to solar adoption by financing construction and paying for ongoing maintenance in exchange for a long-term commitment from the

customer enterprise that purchases the power. This solution eliminates the barriers to solar adoption by removing both upfront cost and the technical risk of solar for the client.

Impact
This installation produces electricity to power the Garden City Mall in Nairobi and will offset around 18,750 tons of carbon over the lifetime of the system.

LIBERIA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Liberia	Hydro Generation	88	$365	$165
Total		**88**	**$365**	**$165**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Liberia	Mount Coffee Hydropower Plant Rehabilitation Project	Hydro Generation	88	$365	$165
Total			**88**	**$365**	**$165**

The Government of Liberia is working closely with development partners to rebuild its electricity infrastructure. Liberia's civil war, which ended in 2003, destroyed much of the country's power sector. At approximately 12 percent, Liberia has one of the lowest electricity-access rates in the world. By 2030, the Government of Liberia aims to meet an anticipated peak demand of 300 MW and serve one million customers, connecting 70 percent of the population in Monrovia and providing access to 35 percent of the rest of Liberia. In 2010, the Liberian government established the Rural Renewable Energy Agency (RREA) followed by the 2015 legislative approval of the Liberia Electricity Law in October 2015. These two pieces of legislation provide a foundation to modernize the electricity sector and, for the first time, set a framework for private-sector participation. Since then, RREA launched its rural energy strategy and masterplan, and the legislature confirmed three commissioners to establish the Liberia Electricity Regulatory Commission.

Many barriers remain, including the absence of an official national electricity master plan, high tariffs, system losses, intermittent payment for electricity by the government, and limited government and institutional capacity. Addressing these concerns, as well as building the national utility and sector regulator's capacity, are critical to a path forward in Liberia. MCC and the Government of Liberia Compact Agreement, which was signed in November 2015, provides $257 million for funding the rehabilitation of the Mt. Coffee Hydroelectric Plant, developing a training center for utility staff, supporting an independent energy-sector regulator, and supporting the development of a nationwide road-maintenance framework. MCC's funding decisions are based on strict economic analysis and are independent of Power Africa, but Power Africa has also provided important technical assistance to RREA and funded the construction of three pilot renewable-energy projects and a 77 km grid extension project to support MCC's work

Name:	Mt. Coffee Hydropower Plant
Type:	Hydropower Generation
Location:	Liberia
Result:	88 MW
Cost:	$365 million total $165 million by USG

Summary

MCC is providing $165 million for construction and operation financing, which is built, in part, on a 2008 USTDA feasibility study of the Mt. Coffee Hydropower Rehabilitation as well as MCC's own rigorous economic analysis. Now completed, the Mt. Coffee Hydropower Plant has a total installed capacity of 88 MW (four generating units of 22 MW each). Other Power Africa partners include the Government of Liberia, KfW (Germany), the Government of Norway, and the European Investment Bank. This project obtained all of its funding commitments in January 2016.

Financing

MCC is financing more than 40 percent of the project ($165 million that includes reconstruction of a water pipeline) while the Government of Norway ($69 million), European Investment Bank ($62 million), and KfW ($65 million) each provided approximately 18 percent of the financing. The Government of Liberia financed approximately $14 million.

Impact

Prior to the completion of Mt. Coffee, a 23 MW diesel plant was the sole source of Liberia's available generation capacity, forcing larger facilities such as hotels, restaurants, and office buildings to self-generate electricity at extraordinary import costs. Mt. Coffee's clean hydropower will generate electricity for the capital city of Monrovia and provide additional power for increased grid connections in a country with a 12 percent current access rate. This project will reduce 23,063 tons per year in greenhouse gases.

MALAWI

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Malawi	Hydro Generation	12	$52	$42
Total		**12**	**$52**	**$42**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Malawi	Nkula Rehabilitation	Hydro Generation	12	$52	$42
Total			**12**	**$52**	**$42**

With a high population density, Malawi has one of the lowest per capita GDPs in the world. Malawi has the capacity to generate 439 MW, though its heavy reliance on large hydro is often constrained by drought and low water levels. Moving forward, solar and new hydro technologies have the potential to enter the power market.

Malawi's $350.7 million Millennium Challenge Corporation (MCC) Compact, signed in 2011, was designed to increase individual and business incomes and reduce poverty by improving the availability, reliability, and quality of the power supply, expanding access to power, reducing the cost of doing business, and revitalizing Malawi's power sector.

Through MCC's work, Malawi's energy sector has gone through important sector reforms, including the unbundling of the national utility, the Electric Supply Company of Malawi (ESCOM) and the establishment of the Electricity Generation Company of Malawi (EGENCO). Malawi's power market is undergoing restructuring, with strong investor interest and political will for Independent Power Producers (IPPs) to enter the market. However, Malawi continues to struggle with non-cost-reflective tariff levels, access to finance for projects, and a lack of cohesive strategy for the off-grid sector. Power Africa supports long-term sustainability in the sector through IPP transaction advisory support, grant funding for feasibility studies, regulatory reform technical assistance, and off-grid sector support.

MCC's evidence-based approach to program design and implementation adheres to economic analysis and rigorous monitoring and evaluation regardless of which sector or country is targeted for investment.

Name:	Nkula A Rehabilitation
Type:	Hydropower Generation
Location:	Malawi
Result:	12 MW
Cost:	$52 million total $42.39 million by USG

Summary

Under the Nkula A project, the Electricity Company Malawi Limited (EGENCO) rehabilitated, upgraded, and modernized the Nkula A Hydropower Plant. The plant's original nameplate capacity of 36 MW was restored from previous operations at 24 MW prior to the rehabilitation. A Power Africa partner, the MCC provided support to the government of Malawi for this project, which reached financial close in September 2015 and was commissioned in September 2018.

Financing

MCC provided funding through the Millennium Challenge Account – Malawi, which awarded the contract for the rehabilitation, upgrade, and modernization of the power plant.

NAMIBIA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Namibia	Solar Generation	65	$150	0
Namibia	Wind Generation	6	$13	0
Total		**71**	**$163**	**0**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Namibia	Alcon Consulting Services (Pty) Ltd	Solar Generation	5	$12.5	0
Namibia	Aloe Investment No.27 (Pty) Ltd.	Solar Generation	5	$12.5	0
Namibia	Camelthorn Business Ventures No. 2 (Pty) Ltd.	Solar Generation	5	$12.5	0
Namibia	Ejuva 1	Solar Generation	5	$12.5	0
Namibia	Ejuva 2	Solar Generation	5	$12.5	0
Namibia	HopSol Power Generation (Pty) Ltd	Solar Generation	5	$12.5	0
Namibia	Momentous Solar One (Pty) Ltd	Solar Generation	5	$12.5	0
Namibia	Metdecci Energy Investments (Pty) Ltd.	Solar Generation	5	$12.5	0
Namibia	NCF Energy (Pty) Ltd	Solar Generation	5	$12.5	0
Namibia	Ombepo Energy (Pty) Ltd.	Wind Generation	6	$12.5	0
Namibia	Osona Sun Energy (Pty) Ltd.	Solar Generation	5	$12.5	0
Namibia	Sertum Energy Namibia (Pty) Ltd.	Solar Generation	5	$12.5	0
Namibia	Tandii Investment (Pty) Ltd	Solar Generation	5	$12.5	0
Namibia	Unisun Energy	Solar Generation	5	$12.5	0
Total			**71**	**$175**	**0**

The Namibian power sector has undertaken several reforms to attract Independent Power Producers by providing a stable investment environment, including horizontally consolidating more than 70 distributors into five regional electricity distribution companies and establishing transparent tariff setting procedures, all overseen by the sector regulator. Multiple barriers to the sector's long-term sustainability persist, including the creditworthiness of distribution utilities, the strength of the energy sector regulator, and broader macroeconomic context. The Government of Namibia has diversified its energy generation beyond imports, including through a renewable energy feed-in-tariff program, which Power Africa helped design. Namibia's energy security depends on implementing the national integrated resource plan, released in 2017, as demand currently outstrips domestic supply, therefore paving the way for Namibia to secure future-generation assets.

In Namibia, Power Africa through the Southern Africa Energy Program (SAEP) provides technical-assistance support to various public and private stakeholders, including the Electricity Control Board, NamPower, and the Ministry of Mines and Energy (MME). While several generation projects have come online in the past few years through the Renewable Energy Feed-in Tariffs (REFIT) program, Namibia, through NamPower, continues to seek opportunities for increasing baseload generation. As the selection for this baseload generation advances, SAEP has offered assistance to the Government of Namibia to move these transactions forward.

SAEP supported the financial close of the following solar- and wind-power plants under the Renewable Energy Feed-in-Tariff (REFIT) program, managed by NamPower. REFIT backing financed the projects. The REFIT Program streamlines implementation of projects with less than 10 MW to ensure cost generalizations so prices can be pre-set. This approach provides transparency to entrepreneurs, who can be assured that structuring a viable project will have predictable offtake prices with predictable risk-allocation arrangements. This enabling environment design aims to usher in privately financed clean-energy development projects.

Name:	Alcon Consulting Services (Pty) Ltd
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
This is a five MW solar photovoltaic (PV) power plant under Namibia's pilot Renewable Energy Feed-in Tariff (REFIT) Program being managed by NamPower—one of 14 licensees under this pilot program. USAID/Southern Africa provided funding for the development of the REFIT Program. Alcon Consulting Services (Pty) Limited is the development vehicle, set up as a 70-30 percent partnership between the French-Namibian partnership InnoSun and the Namibian Aussenkehr Energy Investments. The latter is an energy-focused special purpose vehicle (SPV) set up by Transkunene Holdings, a Namibian entity with Net Assets of $73 million and interests in diamonds, oil and gas, civil works, and electricity. InnoSun was created in 2008 and has a portfolio of solar and wind projects in Namibia potentially totaling 300 MW, including three other REFIT projects. The project reached financial close in July 2016.

Financing
REFIT financed the project. The REFIT Program streamlines implementation of projects with less than 10 MW for which cost generalizations can be made so prices can be pre-set. This approach provides transparency of rules to entrepreneurs, who can be assured that if they structure a viable project, it will have a predictable offtake price with predictable risk-allocation arrangements with the offtaker. The enabling environment designed under such a program aims to usher in privately financed clean-energy development projects. $2.65 million from Innosun and $9.18 million from InnoVent will fund Alcon solar park's construction.

Name:	Aloe Investment No. 27 (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
Aloe Investment No. 27 (Pty) Limited is the project SPV. Shareholding for this project is split 70 percent with Spanish AEE Power Ventures and 30 percent with four Namibian individuals. AEE Power is an engineering, procurement, and construction contractor and power project developer specializing in developing countries, particularly in Africa. AEE Power was founded in Madrid, Spain, about ten years ago, and since then has built a portfolio of 400 MW, including projects in Angola, the Democratic Republic of Congo, Ghana, Kenya, Nigeria, Rwanda, South Africa, and Zambia. The project reached financial close in May 2016 and commissioned in July 2017.

Financing
The Global Climate Partnership Fund SICAV-SIF (GCPF), managed by ResponsAbility Investments AG, will fund Aloe Investment No. 27 Pty Ltd with $7.7 million.

Name:	Camelthorn Business Ventures No. 2 (Pty) Ltd.
Type:	Solar Generation

Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
The SPV, Camelthorn Business Ventures No. 2, is a partnership between four Italian entrepreneurs, a construction company called Investment and the Outapi Import Trust of Namibia, a charitable trust owned by the Governor of the Region, and the Town CEO. Inno capital (Pty) Ltd will provide Camelthorn Business Venture (Pty) Ltd with $8.16 million for a five MW Solar PV in Outapi. The project reached financial close in May 2016.

Name:	Ejuva 1
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
The SPV is a 66-34 percent partnership between Consolidated Infrastructure Group (CIG) of South Africa and Benzel & Partners Investments Ltd. of Namibia. CIG is a Johannesburg Stock Exchange–listed entity formed in 2007 and operating 50 percent in energy, along with building materials, oil and gas, and rail infrastructure. The PDN partner, Benzel & Partners Investments, is an IT and consumables import/export business and is also involved in the construction business. CIG is funding Ejuva One Solar project with approximately $8.4 million dollars. The project reached financial close in April 2016.

Name:	Ejuva 2
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
The SPV is a 66-34 percent partnership between CIG of South Africa and Benzel & Partners Investments Ltd of Namibia. CIG is a Johannesburg Stock Exchange–listed entity formed in 2007 and operating 50 percent in energy, along with building materials, oil and gas, and rail infrastructure. The PDN partner, Benzel & Partners Investments, is a technology and consumables import/export business and is also involved in the construction business. CIG is funding Ejuva One Solar project with approximately $8.4 million dollars. The project reached financial close in April 2016.

Name:	HopSol Power Generation (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary

HOPSOL Power Generation (Pty) Limited is a Namibian SPV formed as a partnership between HopSol Africa Construction, a subsidiary of the Swiss developer HopSol AG, and the Namibian Ouyelele Company. HopSol AG is a small, family-owned company based in Zurich that builds, owns, and operates Solar PV projects worldwide. The project reached financial close in January 2016 and was commissioned in June 2016.

Financing
Standard Bank Namibia provided $4.8 million, and equity provided additional funds.

Name:	Momentous Solar One (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
Momentous Solar One (Pty) Limited is the project SPV. It is a 60 percent partnership with Canadian Solar UK Projects Ltd., 10 percent with Momentous Energy Namibia, and 30 percent with MTJ Investments (Pty) Ltd. Founded in 2001 and listed as a NASDAQ company with $700 million net worth and $3 billion in assets, Canadian Solar UK is an affiliate of Canadian Solar. Momentous Energy Namibia and MTJ are owned by one individual and represent the power-distribution-network component of the project. The project reached financial close in July 2016.

Financing
Canadian Solar will be funding the Momentous Solar One project with the ring-fenced $8.4 million dollars.

Name:	Metdecci Energy Investments (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
Metdecci Energy Investment (Pty) Limited is a partnership between the South African Met Group, the Czech PV company Decci, and the Namibian Vigor Energy Investments Company. The project reached financial close in April 2016 and began operating in March 2017.

Financing
Summit Private Equity (SPE) is the fund manager of Summit Funds PCC, which provided Metdecci Energy Investment Pty Ltd with approximately $7.5 million for the construction of the solar power plant.

Name:	NCF Energy (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
NCF Energy (Pty) Limited is the SPV. Ino-Harith Capital (Pty) Ltd, as the fund manager of GIPF, has indicated GIPF has the source of funds and $7 million readily available and earmarked for the development of the NCF Energy Pty Ltd 5 MW PV plant including the transmission line at Okatope. The project reached financial close in May 2016.

Financing
Senior and Mezzanine debt is provided by Nedbank and Absa in equal shares in their capacity as joint Mandated Lead.

Name:	Ombepo
Type:	Solar Generation
Location:	Namibia
Result:	6 MW
Cost:	$12.5 million

Summary
Ombepo Energy (Pty) Limited is the SPV and is owned 95-5 percent by an InnoSun-Lüderitz town council partnership. InnoSun was created in 2008 with 70 percent ownership by InnoVent of France and 30 percent by Namibian Black Diamond Investments. InnoSun is the very first IPP ever to sign a renewable energy–based power purchase agreement with NamPower. InnoSun has a portfolio of solar and wind projects in Namibia potentially totaling 300 MW. Xiangtan Electric Manufacturing Group committed to finance Ombepo Energy PTY (Ltd) with approximately $3.8 million for the wind farm's installation. The project reached financial close in July 2016 and was commissioned in September 2017.

Name:	Osona Sun Energy (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
Osona Sun Energy (Pty) Limited, owned by the French Namibian company Innosun, is the SPV. InnoSun was created in 2008 with 70 percent ownership by InnoVent of France and 30 percent by Namibian Black Diamond Investments, a partnership of five African business women. InnoSun has about $41 million in Net Assets and is the first independent power producer ever to sign a renewable energy–based power purchase agreement (PPA) with NamPower. Innosun has a portfolio of solar and wind Projects in Namibia potentially totaling 300 MW, including three other REFIT projects. The project reached financial close in March 2016 and commissioned in September 2016.

Name:	Sertum Energy Namibia (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
Sertum Energy (Pty) Limited is the project SPV. The ownership is a 70-30 percent partnership between Enertronica and Mr. Elton Katangolo, a Namibian national who had the ownership of the SPV that initially had a generation license and signed the PPA. Initially, Sertum had a 27 MW license and was collaborating with the Italian renewable energy developer Sintec to start renewable-energy projects. Sintec is a small company of about 12 professionals that has developed about 200 MW solar PV projects in Italy, another 200 MW in South Africa, and about 75 MW in Turkey over the last ten years. The project reached financial close in May 2016.

Financing
CONFIDI CENTRO ITALIA provided an amount of $7.96 million for this project.

Name:	Tandii Investment (Pty) Ltd.
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
As a fund manager of the Government Institution Fund of Namibia (GIPF), Ino-Harith Capital (Pty) Ltd, has indicated GIPF as the source of funds and approximately $7 million is readily available and earmarked for the development of the Tandii Investment Pty Ltd 5 MW PV plant including the transmission line at Okatope. The project reached financial close in May 2016.

Name:	Unisun Energy
Type:	Solar Generation
Location:	Namibia
Result:	5 MW
Cost:	$12.5 million

Summary
Unisun is the project vehicle. The project reached financial close in May 2016.

Financing
CONFIDI CENTRO ITALIA provided $7.96 million for this project.

NIGERIA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Nigeria	Natural Gas Generation	2,397	$2,297	$70
Nigeria	Hydro Generation	636	$457	0
Total		**3,033**	**$2,754**	**$70**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG Contribution (US$M)
Nigeria	Azura-Edo	Natural Gas Generation	450	$600	$70
Nigeria	Egbin Power	Natural Gas Generation	220	$407	0
Nigeria	First Independent Power/Afam	Natural Gas Generation	180	0	0
Nigeria	First Independent Power / Elema	Natural Gas Generation	75	0	0
Nigeria	First Independent Power / Omoka	Natural Gas Generation	25	0	0
Nigeria	Kainji Power--Jebba Hydro Power Station (Privatized Asset)	Hydro Generation	96	0	0
Nigeria	Kainji Power--Kainji Hydro Power Station	Hydro Generation	540	$457	0
Nigeria	Olorunsogo I power plant	Natural Gas Generation	213	0	0
Nigeria	Omotosho I	Natural Gas Generation	74	0	0
Nigeria	Sapele Power	Natural Gas Generation	940	$434	0
Nigeria	Ughelli Power project	Natural Gas Generation	220	$856	0
Total			**3,033**	**$2,754**	**$70**

Nigeria is the largest economy in sub-Saharan Africa, but limitations in the power sector constrain growth. Though Nigeria is endowed with large oil, gas, hydro, and solar resources, and already has the potential to generate 12,522 MW of electric power from existing plants, most days it generates around 4,000 MW, which is insufficient for demand. Despite vast market opportunities, severe enabling environment challenges that hinder sustainable sector growth continue to plague Nigeria. In particular, the lack of commercially viable distribution companies, weak sector regulator, and volatile macroeconomic

performance have been longstanding challenges for private sector investment. Nigeria has privatized its distribution companies, so tariff levels vary widely in the country.

Power Africa support has improved commercial operations and reduced losses at five distribution companies, including an additional 56.3 billion naira of revenue, aggregate loss reduction as high as 12.7 percent, and 546,356 additional on-grid connections. Power Africa also aims to improve the transparency and independence of the Nigeria Electricity Regulatory Commission (NERC) through technical assistance on regulatory practices and tariff setting. Other areas of Power Africa assistance include planning support to the Transmission Company of Nigeria to attract new investment in the transmission network and transaction advisory services for Independent Power Producer (IPP) projects and off-grid companies.

Name:	Azura-Edo
Type:	Natural Gas Generation
Location:	Nigeria
Result:	450 MW
Cost:	$600 million total $70 million by USG

Summary

The Azura-Edo independent power plant (IPP) is a 450 MW open-cycle gas-turbine power station. Azura-Edo is the first phase of a 1,500 MW IPP facility developing near the north eastern outskirts of Benin City in Nigeria. Azura-Edo employs three Siemens, heavy-duty, E-class gas turbines. Initially, Power Africa assisted the Nigerian Bulk Electricity Trading Plc (NBET) with power purchase agreement (PPA) negotiations and the development of the Put/Call Option Agreement (PCOA), which was adopted in lieu of a government guarantee. In 2015, the USG facilitated President Buhari's decision to waive compliance with a presidential circular for the project. Power Africa transaction advisors supported final steps needed for financial close along with Power Africa partners and Aldwych International. The founder, majority shareholder, and lead sponsor of the Azura-Edo IPP is Azura Power Holdings, an investment holding company for IPPs in Africa. The other co-shareholders are African Infrastructure Investment Managers, Asset and Resource Management Company Limited, and Aldwych. American Capital Energy Infrastructure also provided equity investments. The project reached financial close in December 2015 and was commissioned in December 2018.

Financing

Equity and debt investors finance this multi-million-dollar project. There are 15 lending institutions providing debt to the project and four equity investors. The World Bank's Multilateral Investment Guarantee Agency (MIGA) will provide $492 million in political-risk insurance for the project, which covers equity investments by Amaya Capital Ltd, American Capital Energy and Infrastructure, Aldwych Azura Limited, the African Infrastructure Investment Fund 2 Power Holding, and Asset and Resource Management Ltd. MIGA will also cover commercial lending by Siemens Bank, KfW IPEX, Rand Merchant Bank (RMB), and Standard Bank—with Standard Chartered Bank acting as agents on behalf of the lenders. MIGA guarantees will also cover hedging instruments by Standard Chartered and RMB, which consists of the construction, operation, and maintenance. OPIC provided $20 million in insurance as well as $50 million of debt financing while the remaining private-sector funding amounted to $492 million.

Impact

This project is expected to reduce 659,512 tons of greenhouse gas per year while adding 450 new MW to the grid.

Name:	Egbin Power Project
Type:	Natural Gas Generation
Location:	Nigeria
Result:	220 MW
Cost:	$407.3 million total

Summary

Under the Egbin Power Project, the Bureau of Public Enterprises (BPE) (Nigeria) sanctioned the privatization of the country's largest power company, Egbin Power PLC. The company is now 70 percent owned by a joint venture between Korea Electric Power Corp and the Sahara Group conglomerate (Nigeria), which has interests in power distribution, with the other 30 percent held by the Government of Nigeria. The Egbin Power Project restored 220 MW of lost generation capacity from under-investment. USAID worked with NBET to finalize the PPA to permit privatization. This project reached financial close in November 2013.

Name: First Independent Power/Afam
Type: Natural Gas Generation
Location: Nigeria
Result: 180 MW
Cost:

Summary
The First Independent Power Limited/Afam power plant was privatized as part of Nigeria's efforts to restructure and reform the energy sector. USAID provided technical assistance to the Bureau of Public Enterprises (BPE) and NBET by reviewing and commenting on current drafts of the support agreement; project agreements; credit and reimbursement agreements; partial-risk guarantees; letters of credit; and other related documentation. First Independent Power Limited/Afam is a licensed power generation company, which owns and operates power plants in Rivers State, Nigeria, and was incorporated in 2006. The project reached financial close in September 2013.

Name: First Independent Power/Elema
Type: Natural Gas Generation
Location: Nigeria
Result: 75 MW
Cost:

Summary
The Elema Power Plant was part of Nigeria's efforts to restructure and reform the energy sector. USAID assisted in the privatization efforts by providing technical assistance to the BPE and NBET by reviewing and commenting on current drafts of the support agreement; project agreements; credit and reimbursement agreements; partial-risk guarantees; letters of credit; and other related documentation. First Independent Power Limited/Elema (Nigeria) is a licensed power generation company, which owns and operates power plants in Rivers State, Nigeria, and was incorporated in 2006. The project reached financial close in September 2013.

Name: First Independent Power/Omoka
Type: Natural Gas Generation
Location: Nigeria
Result: 25 MW
Cost:

Summary
The Omoka power plant was part of Nigeria's efforts to restructure and reform the energy sector. USAID provided technical assistance to the BPE and NBET by reviewing and commenting on current drafts of

the support agreement, project agreements, credit and reimbursement agreements, partial risk guarantees, letters of credit, and other related documentation. Incorporated in 2006, First Independent Power Limited (Nigeria) is a licensed power generation company, which owns and operates power plants in Rivers State, Nigeria. The project reached financial close in September 2013.

Name: Kainji Power--Jebba Hydro Power Station (Privatized Asset)
Type: Natural Gas Generation
Location: Nigeria
Result: 96 MW
Cost:

Summary
Kainji Plc consists of two hydroelectric power plants – Kainji Hydroelectric power plant (Kainji HEP) and Jebba Hydroelectric power plant (Jebba HEP) located in the Kainji and Jebba regions of Northern Nigeria. Kainji Plc was part of Nigeria's efforts to restructure and reform the energy sector, which included privatization of state-owned energy assets. The Jebba plant is one of Nigeria's cheapest and steadiest suppliers of electricity, and USAID supported the rehabilitation of its generation capacity. USAID provided technical assistance to the BPE and NBET, which included reviewing and commenting on current drafts of the support agreement; project agreements; credit and reimbursement agreements; partial risk guarantees; letters of credit; and other related documentation. Power Africa partners the Africa Finance Corporation (AFC), Guarantee Trust Bank, and the African Development Bank were involved in the project. This project reached financial close in November 2013.

Financing
The AFC and the Guarantee Trust Bank Plc committed to a $68 million debt-financing facility to Mainstream Energy Solutions Limited consortium for the acquisition of the Kainji Power Plc.

Name: Kainji Power—Kainji Hydro Power Station
Type: Natural Gas Generation
Location: Nigeria
Result: 540 MW
Cost: $456.5 million total

Summary
The Kainji PLC was privatized as part of Nigeria's efforts to restructure and reform the energy sector. Kainji consists of two hydroelectric power plants – Kainji Hydroelectric power plant (Kainji HEP) and Jebba Hydroelectric power plant (Jebba HEP) located in the Kainji and Jebba regions of Northern Nigeria. The Kainji plant is one of Nigeria's cheapest and steadiest suppliers of electricity, and USAID supported its generation capacity rehabilitation. USAID provided technical assistance to the BPE and NBET, which included reviewing and commenting on current drafts of the support agreement; project agreements; credit and reimbursement agreements; partial risk guarantees; letters of credit; and other related documentation. This project reached financial close in November 2013.

Name: Olorunsogo I Power Plant
Type: Natural Gas Generation
Location: Nigeria
Result: 213 MW

Cost:	$177.3 million total

Summary
The Olorunsogo I power plant was privatized as part of Nigeria's efforts to restructure and reform the energy sector. USAID provided technical assistance to the BPE and NBET, which included reviewing and commenting on current drafts of the support agreement; project agreements; credit and reimbursement agreements; partial risk guarantees; letters of credit; and other related documentation. This project reached financial close in December 2013 and was commissioned in November 2015.

Name:	Omotosho I
Type:	Natural Gas Generation
Location:	Nigeria
Result:	74 MW
Cost:	$217.5 million total

Summary
Under the Omotosho I project, the Niger Delta Power Holding Company (NDPHC) engaged in a privatization and sale process for five key Nigeria Integrated Power Project Plants (NIPP) by March 2018, including the Omotosho power plant. Omotosho I restores the power plant's 74 MW capacity to a total 305 MW gas plant capacity. Power Africa deployed two embedded advisors (legal and commercial) and additional short-term technical assistance to the NDPHC. Power Africa's assistance was largely focused on negotiations and finalization of the Share Sale Agreement for the sale of the privatization assets and the finalization of the Gas Supply Processing Agreement for the gas supply to the Omotosho NIPP. USAID also assisted the BPE and NBET through the PPA negotiations. This project reached financial close in August 2014 and was commissioned in November 2015.

Name:	Sapele Power
Type:	Natural Gas Generation
Location:	Nigeria
Result:	940 MW
Cost:	$434 million total

Summary
This transaction was part of Nigeria's efforts to restructure and reform the energy sector. USAID provided technical assistance to the BPE and NBET, which included reviewing and commenting on current drafts of the support agreement; project agreements; credit and reimbursement agreements; partial risk guarantees; letters of credit; and other related documentation.

Name:	Ughelli Power Project
Type:	Natural Gas Generation
Location:	Nigeria
Result:	220 MW
Cost:	$856 million total

Summary

When the Ughelli Power Plant was privatized, its ownership transferred from the government of Nigeria to Transcorp Power Limited. Ughelli Power Plant is a gas-fired thermal plant located in Ughelli, Delta State, in the Niger Delta region of Nigeria and is an asset of Transnational Corporation of Nigeria Plc (Transcorp)'s power subsidiary, Transcorp Ughelli Power Limited. USAID supported the project through options for credit-enhanced long-term financing. Other major partners included the United Bank of Africa. This project reached financial close in November 2013 and was commissioned in September 2015.

RWANDA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Rwanda	Hydro Generation	4.80	$ 18	0
Rwanda	Solar Generation	8.50	$ 23	$ 0.4
Rwanda	HFO Generation	30	$ 30	0
Total		**43.3**	**$ 71**	**$ 0.4**

TOTAL BY TRANSACTIONS

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Rwanda	Gigawatt Global Agahozo-Shalom Youth Village Solar Project	Solar Generation	8.5	$23	$0.4
Rwanda	Keya	Hydro Generation	2.2	$3	0
Rwanda	Rwanda Thermal Project	Heavy Fuel Oil (HFO) Generation	30	$30	0
Rwanda	Rwaza-Muko I	Hydro Generation	2.6	$15	0
Total			**43.3**	**$71**	**$0.4**

The Government of Rwanda envisions transitioning from a developing country to a middle-income country including a 100 percent electricity access target by 2024. Critical enabling environment challenges include misalignment of power supply and demand, limited financing for off-grid companies, and limited affordability of electricity solutions for rural households and businesses. Rwanda will likely face an oversupply of energy from 2020 onward and is exploring power trade with neighboring countries. The Government is increasingly interested in intervening in the off-grid sector, including through regulations for the importation of solar home systems and demarcations of off-grid areas through the National Electrification Plan.

Power Africa supports Rwanda in both on- and off-grid policy development and implementation; technical assistance and capacity-building for energy-sector institutions; and mobilization of finance. Power Africa also supports private-sector companies with U.S. Embassy support to move transactions forward. Power Africa works with Rwanda's utility to build capacity in planning, project management, and network modeling to strengthen the network and to accelerate on-grid connections. These efforts will boost transmission and distribution capacity, enable regional trade, and improve the utility's financial performance. In collaboration with other donors, Power Africa also advises the Rwandan government on the design and implementation of its rural electrification strategy, which supports the rollout of solar home systems and mini-grids.

Name:	Gigawatt Global Agahozo-Shalom Youth Village Solar Project
Type:	Solar Generation
Location:	Rwanda
Result:	8.5 MW
Cost:	$23.7 million total $0.4 million by USG

Summary
In July 2013, renewable energy company Gigawatt Global signed a 25-year power purchase agreement (PPA), a concession agreement, and a guarantee with the Rwandan government to build an 8.5 MW solar power plant east of Kigali. The clean power project is East Africa's first grid-connected, utility-scale solar energy facility and represents a full 3.9 percent contribution to the entire country's power-generation capacity. The electricity will feed into the national grid under a 25-year PPA with the Rwanda Energy Group (REG)). $400,000 in funding from the Overseas Private Investment Corporation (OPIC) Africa Clean Energy Finance Initiative supported the solar farm. This project reached financial close in February 2014 and was commissioned in December 2014.

Financing
In addition to OPIC's funding of $0.4 million, financing came from a consortium of the Netherlands Development Finance Company (FMO), London's Emerging Africa Infrastructure Fund, the Norwegian Investment Fund for Development Countries (Norfund), Scatec Solar ASA, and KLP Norfund Investments.

Impact
The solar PV plant is East Africa's first utility-scale solar project to go online. The 8.5 MW solar plant is located at the Agahozo-Shalom Youth Village, a residential and educational farm community for orphaned youth, 60 kilometers east of the Rwandan capital Kigali.

Name:	Keya Keya, Nkora, Nyamyotsi I, Nyamyotsi II, Cyimbiri
Type:	Hydro Generation
Location:	Rwanda
Result:	2.2 MW
Cost:	$3.1 million total

Summary
The Keya, Nkora, Nyamyotsi I, Nyamyotsi II, Cyimbiri projects are brownfield run-of-river hydropower projects currently operated and maintained by Energicotel Ltd under a 25-year concession from the Government of Rwanda. Power Africa provided a hydrology expert to optimize operations at the plants and assisted with commercial agreements and other transaction advisory services. In the private sector, Energicotel originally partnered with Adre Hydropower as a technical-service provider, but also independently developed projects with the support of other providers such as Hydro-Energie Roth, which has provided a proposal to deal with sediment issues at some of the plants. Energicotel is a Rwandan-owned micro hydropower development company. The projects reached financial close in February 2017 and was commissioned in December 2018.

Financing

This is a portfolio of five brownfield run-of-river hydro projects, totaling 3.38 MW, built and financed by the Government of Rwanda and eventually leased on a concession to upgrade and operate the plants.

Impact
This Keya mini-hydro power plants located in Rubavu district with a combined installed capacity of 3.38 MW and will generate 11,563,200 kWh annually.

Name:	Rwanda Thermal Project
Type:	HFO Generation
Location:	Rwanda
Result:	30 MW
Cost:	$30 million total

Summary
Power Africa partner SoEnergy formed a joint venture with a Rwandan fuel supplier to build, own, and operate rental light-fuel-oil thermal units totaling 20 MW to be installed in Kigali and 10 MW at one additional site. SP is the sole fuel supplier to the plants. Both sites have access to the national grid and are owned by Energy Development Corporation Limited. The PPA for the project was signed in February 2017. Power Africa assisted with moving the project forward by providing the initial draft of the PPA and ongoing negotiation support to unblock key deal issues. The United States Department of Commerce and the United States Department of State also provided support. The project reached financial close in February 2017 and was commissioned in September 2017.

Financing
SoEnergy, a U.S. firm, entered a JV with local-fuel supplier, to jointly own and operate the units.

Impact
This short-term emergency power was procured when Rwanda was struggling to meet peak energy demand. At 30 MW, the plant represented a significant proportion of Rwanda's installed capacity and had a substantial impact on load shedding.

Name:	Rwaza-Muko I
Type:	Hydro Generation
Location:	Rwanda
Result:	2.6 MW
Cost:	$15 million total

Summary
For the Rwaza-Muko I project, Rwandan energy developer DC HydroPower Ltd developed two run-of-river hydropower plants on the Mukungwa River in Rwanda's northwest Musanze District. Rwaza I will generate 2.6 MW, respectively. The U.S. Trade and Development Agency (USTDA) provided funding under the Africa Clean Energy Finance Initiative, which is funded by the U.S. Department of State. USAID provided transaction advisory services for verifying project data and feasibility study recommendations and developing the technical-design package, budget, and execution details required for the project. The Department of State also provided support. Other major partners included DC HydroPower LtdGIZ, Frontier Investments, and responsAbility, and the engineering firm Ritoch-Powell & Associates (United States). The project reached financial close in January 2017 and was commissioned in September 2018.

Financing
Frontier Investments (Danish venture equity fund under U.S.-based Accion International) and investment company, responsAbility (Switzerland) each provided 30 percent of the equity and DC HydroPower (the grantee) will retain the remaining 40 percent. The U.S. Trade and Development Agency funded $0.525 million towards project development.

Impact
The project is expected to be developed in phases over a two-year period and would install a combined 2.6 MW of new renewable-energy generation capacity and help to electrify new households and businesses in Musanze District.

SÉNÉGAL

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Sénégal	HFO Generation	86	$219	$192
Sénégal	Wind Generation	158.7	$377	$263
Sénégal	Solar Generation	58.5	$93	$2
Total		**303.2**	**$689**	**$457**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Sénégal	*Cap des Biches*	HFO Generation	53	$134	$116
Sénégal	*Cap des Biches Expansion*	HFO Generation	33	$85	$76
Sénégal	*Parc Eolien Taiba N'Diaye*	Wind Generation	158.7	$377	$263
Sénégal	Senergy I	Solar Generation	29	$48	$2
Sénégal	*Ten Merina Ndakhar* project	Solar Generation	29.5	$45	
Total			**303.2**	**$689**	**$457**

The Government of Sénégal has made power-sector development a key component of its *Plan Sénégal Emergent*, which aims to make Sénégal an emerging economy by 2025. Due to the lack of a spinning reserve and the poor state of the existing network, effective integration of new intermittent energy to the national grid may not be possible. Priorities for the government include lowering the cost of generation by reducing dependence on imported liquid fuels and increasing electricity access, particularly in rural areas. Sénégal has significant potential to develop solar and wind power and to develop its offshore natural gas resources. The Government aims to achieve universal access through a combination of on- and off-grid solutions, though the country's rural concessions program faces significant hurdles. Lingering enabling environment challenges include complex procurement processes, a dearth of creditworthy utility, and insufficient sector planning.

Power Africa supports Sénégal's power sector through a diverse set of financial and technical assistance that helps private-sector developers and other stakeholders identify and advance investment opportunities. USAID also has provided technical assistance to prepare an updated generation and transmission master plan in collaboration with the Ministry of Energy, Senelec, and other key stakeholders. Power Africa is currently working with the Ministry of Energy to assess Sénégal's rural-electrification efforts to date and identify recommendations to accelerate access gains. Power Africa also provides continuous transaction advisory assistance to private-sector off-grid companies and rural concession holders, helping them to strengthen business models and expand services. Addressing deficiencies in sector governance, Power

Africa's enabling environment support focuses on building the institutional capacity of the regulatory agency and national utility.

Name:	*Cap des Biches*
Type:	HFO Generation
Location:	Sénégal
Result:	53 MW
Cost:	$134 million total $116 million by USG

Summary
ContourGlobal, an international power generation company, has signed an agreement with the Senegalese national utility SENELEC, to rehabilitate the existing *Cap des Biches* brownfield site and construct a new 53 MW heavy-fuel, oil-fired thermal facility under a 20-year Power-Purchase Agreement. *Cap des Biches* is a combined cycle, heavy-fuel, oil-fired thermal power plant capable of high efficiency rates with lower power generation costs. OPIC provided financing and political-risk insurance for this project, and IFC provided a cross-currency swap. The project reached financial close in December 2015 and was commissioned in June 2016

Financing
This project's financing model brings together two leading development finance institutions: OPIC and IFC, with OPIC committing financing up to $91 million and $25 million of political-risk insurance for Phase I of this project, and IFC providing an 18-year cross-currency swap of the same amount. ContourGlobal provided the equity.

Name:	*Cap des Biches* Expansion
Type:	HFO Generation
Location:	Sénégal
Result:	33 MW
Cost:	$85 million total $76 million by USG

Summary
The *Cap des Biches* Expansion project will add 33 MW of capacity to the existing 53 MW electric power plant that is located in Rufisque (near Dakar). The expansion consists of two combustion engines, one of which is equipped with a heat-recovery system, and a short transmission line connecting the expansion units to an existing substation. The power plant will use heavy fuel oil with the option to convert to natural gas. The power plant site is adjacent SENELEC facility and is located in an industrialized zone. ContourGlobal is the project developer responsible for this expansion, and OPIC is providing the debt financing. The project reached financial close in January 2017.

Financing
OPIC committed $53 million in financing and $23 million of political-risk insurance.

Name:	*Parc Eolien Taiba N'Diaye*
Type:	Wind Generation
Location:	Sénégal

Result:	158.7 MW
Cost:	$377 million total
	$129 million by USG

Summary

The *Parc Eolien Taiba N'Diaye* project is a 158.7 MW wind farm under development in Taiba N'diaye, Sénégal, approximately 70 km north of Dakar. The project will consist of 46 Vestas wind turbines, each to produce 3.45 MW under a full engineering, procurement, and construction contract. SENELEC, the national utility company of Sénégal, will purchase the power under a 20-year Purchasing Power Agreement. Power Africa supported the Taiba N'diaye transaction, which is the first wind project in Sénégal, for three years with assistance to the developer in financing, insurance, negotiation, and resolution in land-rights issues. OPIC also supported this project by providing financing and insurance, as well as a grant through the Africa Clean Energy Finance (ACEF) initiative. In June 2016 Lekela Power, a 60:40 joint venture between Actis (UK) and a consortium led by Mainstream Renewable Power (Ireland), acquired co-development rights and sole investment rights in the project.. The project reached financial close in July 2018 and is expected to be commissioned in 2020.

Financing

OPIC committed up to $124.1 million in financing, an investment guaranty of up to $125.9 million for a U.S. cross-currency interest-rate swap, a $1 million grant through ACEF, and more than $12 million in political-risk insurance. EKF, Denmark's Export Credit Agency, also provided financing, and the World Bank's MIGA also provided political-risk insurance.

Impact

This project significantly increases the generating capacity in Sénégal in addition to being one of the lowest-priced electricity sources in the country, which has one of the highest electricity tariffs in sub-Saharan Africa. It is also the first utility-scale wind project in the country and paves the way for future private-sector investment in wind power.

Name:	Senergy I
Type:	Solar Generation
Location:	Senegal
Result:	29 MW
Cost:	$47.9 million total
	$2 million by USG

Summary

Senergy PV S.A. developed and now owns and operates a 29.49 MW PV solar farm in Santhiou Mékhé (150 km outside of Dakar) that delivers 20 MW of power to the national grid via a newly constructed 9.5 km transmission line. Senegalese President Macky Sall inaugurated the Senergy solar power plant in Santhiou Mékhé in June 2017. Power Africa advanced the 29 MW Senergy I transaction to financial close in 2016 through a range of support to project stakeholders that included evaluation of and advice to the local project partner on financial models and the PPA to ensure bankability. Proparco, the subsidiary of the French Development Agency, has partnered with Meridiam, a global investor and asset manager, French manufacturer Solairedirect (ENGIE), and Schneider Electric in the construction and operation of this solar PV project. In early 2015, Meridiam began project development in partnership with the French manufacturer Solairedirect, the Senegal Strategic Sovereign Investment Fund (FONSIS), and Senergy

SUARL (Sénégal). In this project, Solairedirect will be responsible for construction of the plant, and Schneider Electric will supply the inverters and transformers. The project reached financial close in April 2016 and was commissioned in June 2017.

Financing
Proparco allocated a EUR 34.5 million loan ($39.2 million) to finance the construction and operation of Sénégal's Senergy photovoltaic solar power plant. Additional financing comes from Meridiam, FONSIS, and Senergy SUARL. OPIC committed more than $2 million in reinsurance to this project.

Impact
This project was the first solar park to come online in Sénégal and in West Africa, and has paved the way for other solar IPPs in the country. Synergy 1 provides a cheap and reliable addition to the country's energy capacity.

Name:	*Ten Merina Ndakhar* Project
Type:	Solar Generation
Location:	Sénégal
Result:	29.5 MW
Cost:	$45.2 million total

Summary
The *Ten Merina Ndakhar* project constructed and operated a 29.5 MW PV solar farm in Merina Dakhar Commune located approximately 120 km northeast of Dakar. The project will construct a 3.5 km transmission line connecting the solar farm to the national grid via a 30 kilowatt/90 kilovolt distribution substation. The project is a partnership between the two French companies Meridiam (85 percent), the financier, and Eiffage (15 percent), which carried out the construction and operation of the power plant. The company signed a 25-year Purchasing Power Agreement with SENELEC and was supported by the BIO and Proparco. Solairedirect (subsidiary of ENGIE) and RMT conducted the construction. The project reached financial close in December 2016 and was commissioned in January 2018.

Financing
Meridiam committed an estimated EUR 43 million to finance the plant. To provide such funding, Meridiam took out an 18-year EUR 34.5 million loan with Proparco and BIO for to finance construction and operations. OPIC committed $2.96 million in reinsurance to the project

Impact
This project connects the Merina Dakhar Commune solar farm to the national power grid.

SOUTH AFRICA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
South Africa	Wind Generation	1,362.8	$850	0
South Africa	Solar Generation	897.9	$1,216	0
South Africa	Hydro Generation	4.7	$30	0
South Africa	Biomass Generation	25	$115	0
South Africa	REIPPP Projects Cost	0	$3,097	0
Total		**2,290.4**	**$5,308**	**0**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
South Africa	Kangnas Wind Farm	Wind Generation	136.7	$260	0
South Africa	Konkoonsies II Solar	Solar Generation	75	0	0
South Africa	Nxuba Wind Farm	Wind Generation	138.9	0	0
South Africa	Karusa Wind Farm	Wind Generation	139.8	0	0
South Africa	Excelsior Wind project	Wind Generation	31.9	0	0
South Africa	Greefspan PV Power Plant No.2 Solar Park	Solar Generation	55	0	0
South Africa	Dyason's Klip 1	Solar Generation	75	0	0
South Africa	Kaxu Solar One	Solar Generation	100	$891	0
South Africa	Bokamoso Solar Park	Solar Generation	67.9	0	0
South Africa	Copperton Wind Farm	Wind Generation	102	0	0
South Africa	Aggeneys	Solar Generation	40	0	0
South Africa	Dyason's Klip 2	Solar Generation	75	0	0
South Africa	Ngodwana Energy Project	Biomass Generation	25	$115	0
South Africa	Droogfontein 2 Solar Park	Solar Generation	75	0	0
South Africa	Golden Valley Wind	Wind Generation	117.7	0	0
South Africa	Firefly Investments	Solar Generation	60	$325	0
South Africa	Oyster Bay Wind Farm	Wind Generation	140	$180	0
South Africa	Garob Wind Farm	Wind Generation	135.9	0	0

South Africa	Roggeveld	Wind Generation	140	0	0
South Africa	Siruis Solar PV	Solar Generation	75	0	0
South Africa	De Wildt Solar Park	Solar Generation	50	0	0
South Africa	Kruisvallei Hydro	Hydro Generation	4.7	$30	0
South Africa	Perdekraal East Wind Farm	Wind Generation	107.8	$170	0
South Africa	Soetwater Wind Farm	Wind Generation	139.4	$180	0
South Africa	Wesley-Ciskei wind project	Wind Generation	32.7	$60	0
South Africa	Waterloo Solar Park	Solar Generation	75	0	0
South Africa	Zeerust Solar Park	Solar Generation	75	0	0
South Africa	REIPPP Projects Cost			$3,097	0
Total			**2,290.4**	**$5,308**	**$0**

South Africa has one of the most-developed energy-policy environments on the continent. The energy-planning framework provides predictability for private-sector actors, and the procurement regulations are relatively clear at the national level. The national regulator is also one of the strongest on the continent and regularly sets tariff levels through open and consultative processes. South Africa operates a highly successful, though currently politically constrained, Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) for utility-scale transactions. Though South Africa is a leader on the continent for energy-sector development, enabling-environment challenges remain. In particular, the weak South African economy coupled with power outages present challenges to the Government of South Africa and the private sector. Other challenges include the lack of capacity within municipalities for developing new power generation, delays in integrated resource planning, ongoing financial instability within Eskom, and regulatory uncertainty in the development of small renewable generation projects.

Power Africa, through its Southern Africa Energy Program, made a significant contribution to South Africa's Independent Power Producer (IPP) Office's REIPPPP by supporting the advancement of 27 renewable energy projects. Responding to the IPP Office's request for support, Power Africa provided training to REIPPP staff on how to conduct initial due-diligence work specific to the technical/engineering and economic-development components of the bids. Power Africa's technical, legal, and financial assistance was essential for gaining consensus between the involved parties, which resulted in 27 IPP projects reaching commercial close in March 2018, and 25 of the 27 projects reaching financial close by August 2018. As these projects move forward, in the coming five years South Africa will see USD 3.9 billion in private-sector investment, the creation of 5,200 new jobs, and will realize more than 2,000 MW of new clean generation to support much-needed economic growth. Power Africa continues to support the South Africa Department of Energy's Integrated Resource Plan on future power generation developments.

Name:	Firefly Investments
Type:	Solar Generation
Location:	South Africa
Result:	60 MW
Cost:	$325 million total

Summary
This project includes SunEdison in the Free State's development, construction, commissioning, and operation of a 60 MW solar photovoltaic (PV) utility power project. This project is in response to a South African government initiative to increase investment in renewable energy production, especially solar. The project deploys advanced solar-power-generation technology in the host country and generates new jobs in a rural part of South Africa. OPIC was the lead USG agency on this transaction and the majority debt provider. The project reached financial close in October 2014.

Financing
OPIC committed up to $250 million in financing (pre-Power Africa) and $34 million in political-risk insurance to the project.

Name:	KaXu Solar One
Type:	Solar Generation
Location:	South Africa
Result:	100 MW
Cost:	$891 million total

Summary
KaXu Solar One is a 100 MW concentrated solar power (CSP) plant constructed on a 1,100ha site near Pofadder in the Northern Cape Province. This plant will use concentrated solar parabolic troughs to heat a chemical liquid. The Export-Import Bank of the United States provided support to this project by way of financing the export of heater transfer fluid from Dow Chemical. The South Africa Independent IPP Office awarded Abener and Teyma, two subsidiaries of Abengoa, the engineering, procurement, and construction contract for the KaXu Solar One project. Rioglass manufactured the mirrors, and Schott supplies HCEs for the parabolic troughs used in the project. Lastly, Siemens supplied the steam turbine for the solar thermal power plant, and Mott MacDonald conducted the feasibility study for the project. The project reached financial close in February 2013 and was commissioned in February 2015.

Financing
Shareholders of KaXu Solar One include Abengoa (U.S. solar division, 59 percent), the IDC (29 percent) and the Kaxu Community Trust (21 percent). EXIM provided a $23 million direct loan to Abengoa, while the IFC provided direct financing of R1.25 billion ($143 million) for two CSP projects in South Africa including KaXu Solar One and the 50MW Khi Solar One project. The IFC also provided $264 million in parallel loans for the construction of these two projects. IFC coordinated Clean Technology Fund (CTF), Development Bank of Southern Africa (DBSA), FirstRand Bank, IDC, and Nedbank as the lenders for the KaXu Solar One project.

Impact
KaXu Solar One is estimated to reduce greenhouse gas emissions by 160,050 tons per year.

REIPPPP Projects

Individual cost information for the following REIPPPP projects is not available. The total cost is an estimated $3.097 billion. The impact of the REIPPPP projects under the latest round include massive cost reductions in tariffs for renewable power, making them more in line with international prices. The projects increase the share of renewables in a country where the energy mix is still dominated by coal-fired power plants. Projects support the local economy through stipulated local content requirements, and local community participation in the project shareholding has been hailed as a model that should be implemented internationally. Power Africa's support of the REIPPPP projects is an important bilateral win between the United States and South Africa.

Name:	Aggeneys
Type:	Solar Generation
Location:	South Africa
Result:	40 MW

Summary

Aggeneys Solar is a 40 MW greenfield PV solar plant with a nameplate capacity of 45.1 MW (contracted capacity of 40 MW) located approximately four km east of Aggeneys in the Northern Cape Province over an area approximately 116 hectares and will comprise approximately 147,840 panels. The project will connect to a new substation that will be constructed on site and connect to the existing 66kV Gamsberg Aggeneis transmission line that runs past the site through a loop-in, loop-out connection. The South Africa Independent IPP Office awarded the project in round four ofREIPPPP. The U.S.-based Project Company will be responsible for the financing, construction, ownership, maintenance, and operation of the facility. The project reached financial close in July 2018 and is expected to be commissioned in 2019.

Financing

Partners include Biotherm Energy (60 percent), Ramizest Ltd (27.5 percent) and BBBEE SPV (12.5 percent), with equity lending by Nedbank Ltd.

Name:	Bokamoso Solar Park
Type:	Solar Generation
Location:	South Africa
Result:	67.9 MW

Summary

The Bokamoso Solar Park project is a 67.9 MW greenfield PV plant, approximately 19 km southwest from Leeudoringstad in the North West Province. It will use single-axis tracking technology and will include a new 1332 kV substation. As of late 2017, SunEdison sold all its assets in South Africa to Old Mutual, who is the new owner for the Bokamoso Solar Park project. The project reached financial close in July 2018 and is expected to be commissioned in 2020.

Financing

Nedbank and Barclays are the lenders for the Bokamoso Solar project. Absa is the senior debt provider.

Name:	Copperton Wind Farm
Type:	WindGeneration
Location:	South Africa

Result:	102 MW

Summary
The Copperton Wind Farm, developed by Gestamp Wind for an estimated project cost of R2 billion (roughly $142 million), is a 102 MW wind farm located in the Northern Cape that comprises 34 wind turbine generators, each with a three MW capacity. The wind farm will include a 132 kV substation that will connect directly to a distribution line owned by a state-owned power utility Eskom. A major partner in the Copperton Wind Farm project is Elawan Energy (formally Gestamp Wind), a subsidiary of Gestamp Renewables. The project reached financial close in August 2018 and is expected to be commissioned in 2020.

Financing
The primary lender for the Copperton Wind Farm is Standard Bank.

Name:	Dyason's Klip 1
Type:	Solar Generation
Location:	South Africa
Result:	75 MW

Summary
Dyason's Klip 1 is a 75 MW greenfield PV project located 15 km southwest of the city of Upington. The project was developed by Scatec Solar in partnership with Scatec Solar Upington Local Community Trust, and Norfund. The project reached financial close in April 2018 and is expected to be commissioned in 2020.

Financing
Equity is provided by Scatec Solar (42 percent), Scatec Solar Upington Local Community Trust (40 percent), and Norfund (18 percent). A loan was provided by Standard Bank.

Name:	Dyason's Klip 2
Type:	Solar Generation
Location:	South Africa
Result:	75 MW

Summary
Dyason's Klip 2 is a 75 MW greenfield PV project located 15 km southwest of the city of Upington. Scatec Solar developed the project in partnership with Scatec Solar Upington Local Community Trust and Norfund. The project reached financial close in April 2018 and is expected to be commissioned in 2020.

Financing
Equity is provided by Scatec Solar (42 percent), Scatec Solar Upington Local Community Trust (40 percent), and Norfund (18 percent). A loan was provided by Standard Bank.

Name:	De Wildt Solar Park

Type:	Solar Generation
Location:	South Africa
Result:	50 MW

Summary
The De Wildt Solar Park is a 50 MW greenfield PV project located in the North West Province. Approximately 250,000 solar panels, each 1m x 2m, will be installed on 166 hectares of land. The project will use single-axis tracking technology. An Eskom 88kV power line will be built on the property. As of late 2017, SunEdison sold all its assets in South Africa to Old Mutual, who is the new owner for the De Wildt Solar Park project. The project reached financial close in July 2018 and is expected to be commissioned in 2020.

Financing
Nedbank and Barclays are the lenders for the De Wildt Solar Park project. Absa is the senior debt provider.

Name:	Droogfontein 2 Solar Park
Type:	Solar Generation
Location:	South Africa
Result:	75 MW

Summary
Droogfontein 2 is a 75 MW greenfield PV plant located in Kimberley, Northern Cape Province. As of late 2017, SunEdison sold all its assets in South Africa to Old Mutual, who is the new owner for the Droogfontein 2 project. The project reached financial close in July 2018 and is expected to be commissioned in 2020.

Financing
Nedbank and Barclays are the lenders for the Droogfontein 2 Solar Park project.

Name:	Excelsior Wind Project
Type:	Wind Generation
Location:	South Africa
Result:	31.9 MW

Summary
The Excelsior Wind project is located about 30 km south-west of Swellendam, in the Western Cape Province. It will have a nameplate capacity of 32.5 MW (contracted capacity of 31.9 MW) and comprise 13 Goldwind turbines of 2.5 MW each, with a hub height of 90 m. The on-site Excelsior substation will connect to the Vryheid substation at a voltage of 132 kV. The South Africa Independent IPP Office awarded the project in the fourth round extension of REIPPPP. The project reached financial close in July 2018 and is expected to be commissioned in 2019.

Financing
Partners include Biotherm Energy (60 percent), Ramizest Ltd (27.5 percent) and BBBEE SPV (12.5 percent), with equity lending by Nedbank Ltd.

Name:	Garob Wind Farm
Type:	Wind Generation
Location:	South Africa
Result:	135.93 MW

Summary
Garob Wind Farm is a 135.93 MW wind plant in Copperton, Northern Cape Province that will consist of 46 Acciona turbines at three MW each. Juwi, a renewable power supplier, first approached Garob landowners in June 2011 to negotiate and secure development rights. Juwi installed a measurement tower (met mast) the same year to record the meteorological conditions necessary for accurate development. The remainder of pre-bid development took place over the period 2012 to 2014. Juwi approached Italian utility Enel Green Power (EGP) and negotiated a deal where Enel would take ownership of the project when the project was named a preferred bidder. The project reached financial close in 2018 and is expected to be commissioned in 2021.

Financing
Enel Green Power RSA has a 60 percent equity share, while Khana Energy owns 30 percent, and Garob Local Community Trust has 10 percent. Nedbank Limited and Absa are senior lenders.

Name:	Golden Valley Wind
Type:	Wind Generation
Location:	South Africa
Result:	117.72 MW

Summary
The Golden Valley Wind Power project, located in Cookhouse in the Eastern Cape Province, has a capacity of 120 MW (and contracted capacity of 117.72 MW). The project will consist of 48 Goldwind 2.5 MW turbines installed on approximately 10,000 hectares. The South Africa Independent IPP Office awarded the project in Round 4 of South Africa's REIPPPP. The project reached financial close in July 2018 and is expected to be commissioned in 2019.

Financing
Partners include Biotherm Energy (60 percent), Ramizest Ltd (27.5 percent) and BBBEE SPV (12.5 percent), with equity lending by Nedbank Ltd.

Name:	Greefspan PV Power Plan No. 2 Solar Park
Type:	SolarGeneration
Location:	South Africa
Result:	55 MW

Summary
The Greefspan PV project, located 57 km southwest of Douglas in the Northern Cape Province, is a 55 MW greenfield solar PV plant that will use single-axis tracker technology. As of late 2017, SunEdison sold all its assets in South Africa to Old Mutual, who is the new owner for the Greefspan PV Power Plant No.2 Solar Park project. The project reached financial close in July 2018 and is expected to be commissioned in 2020.

Financing
Nedbank and Barclays are the lenders for the Greefspan PV Power Plant No.2 Solar Park project. Absa is the senior debt provider.

Name:	Kangnas Wind Farm
Type:	Wind Generation
Location:	South Africa
Result:	136.7 MW

Summary
The Kangnas Wind Farm is a 136.7 MW development located in the Nama Khoi Municipality in the Northern Cape, near the town of Springbok. A consortium led by Mainstream Renewable Power developed the project. The Department of Energy in South Africa awarded Mainstream under the fourth round extension of REIPPPP. Companies providing equity for the project alongside the developer, the South African branch of Mainstream Renewable Power Developments Ltd, include African Rainbow Energy and Power, generation company Lekela, and Old Mutual Life Assurance Company. Major partners include the IFC, a Power Africa partner, Absa, the consortium of Concor and Conco (construction contractor), and Siemens Gamesa Renewable Energy, which will supply and install the wind turbines. The project reached financial close in June 2018 and is expected to be commissioned in 2020.

Financing
The equity members of the projects are Mainstream Renewable Power (along with a consortium of investors such as the IFC and the Rockefeller Brothers Fund), African Rainbow Energy and Power (AREP), H1 Holdings, Local Community members through established community trusts with shareholding funded by other project equity partners, Lekela, and Old Mutual Life Assurance Company (South Africa). Absa is the lead arranger of debt for this project.

Name:	Karusa Wind Farm
Type:	Wind Generation
Location:	South Africa
Result:	139.8 MW

Summary
The Karusa Wind Farm, located between the towns of Sutherland and Matjiesfontein in the Northern Cape province, has a contracted capacity of 139.8 MW and will comprise 43 Vestas V117 3.3 MW wind turbines and associated wind farm infrastructure. African Clean Energy Developments (ACED) is the project developer, with Enel Green power, Pele Green Energy, and Karus Wind Farm Community Trust as project sponsors. Vestas Southern Africa will handle turbine supply and installation. Other major partners include Power Construction (Civil Balance of Plant EPC Agreement) and Consolidated Power Projects (Electrical Balance Of Plant EPC Agreement). The plant is expected to be operation for 20 years. Construction expected to start in the second half of 2019, and it will be operational in the second half of 2021.

Financing
This 139.8 MW project was financed partly by Nedbank, a Power Africa partner, and Absa.

Name:	Konkoonsies II Solar
Type:	Solar Generation
Location:	South Africa
Result:	75 MW

Summary
The Konkoonsies II Solar project is a greenfield PV facility that will have a nameplate capacity of 86 MW (contracted capacity of 75 MW) located approximately 32 km northeast of Pofadder in the Northern Cape Province. The project will comprise 282,240 solar PV panels and will connect to the existing Paulputs Main Transmission Substation (MTS), located adjacent to the site. The South Africa Independent IPP Office awarded the project in round 4 of the South Africa's REIPPPP. The U.S.-based Project Company will provide the financing, construction, ownership, maintenance, and operation of the facility. The project reached financial close in July 2018 and is expected to be commissioned in 2019.

Financing
Partners include Biotherm Energy (60 percent), Ramizest Ltd (27.5 percent) and BBBEE SPV (12.5 percent), with equity lending by Nedbank Ltd.

Name:	Kruisvallei Hydro
Type:	Hydro Generation
Location:	South Africa
Result:	4.7 MW

Summary
Kruisvallei Hydro is a 4.7 MW hydro project along Ash River in the Free State Province. Sidala Energy Solutions developed the project, which Building Energy acquired to bid. Building Energy bid as the engineering, procurement and construction, and operations and maintenance (O&M) contractor with the intention to replace Sidala Energy post-Preferred Bidder award. The project reached financial close in July 2018 and is expected to be commissioned in 2021.

Financing
H1 Capital (Pty) Ltd owns a 46.5 percent share. Rand Merchant Bank acts as a lender.

Name:	Ngodwana Energy Project
Type:	Biomass Generation
Location:	South Africa
Result:	25 MW

Summary
Ngodwana Energy is a 25 MW biomass project developed at Sappi Ngodwana Mill in Mpumalanga near the Ngodwana Substation. The biomass will be supplied from local plantations through a land lease and biomass-supply agreement with Sappi Southern Africa Limited. The project partners include Sappi Southern Africa, KC Africa, and Fusion Energy. Broad-based participation is assured through the Ngodwana Energy Employees Trust and the Ngodwana Energy Community Trust, which will each hold a five-percent stake in the project. The project reached financial close in April 2018 and is expected to be commissioned in 2020.

Financing
The project will be funded with 75 percent senior debt and 25 percent shareholder equity. Shareholders include Sappi Southern Africa Ltd (30 percent), Fusion Energy (Pty) Ltd (30 percent), KC Africa (Pty) Ltd (30 percent), Ngodwana Energy Employees Trust (5 percent), and Ngodwana Energy Community Trust (5 percent). IDC is funding the Community Trust and SAPPI Workers Trust to both acquire five percent shareholding in the project, in support of Broad Based Black Economic Empowerment participation in projects. Senior and Mezzanine debt will be provided by Nedbank and Absa in equal shares in their capacity as joint Mandated Lead Arrangers.

Name:	Nxuba Wind Farm
Type:	Wind Generation
Location:	South Africa
Result:	138.9 MW

Summary
The Nxuba Wind Farm is a 140 MW (contracted capacity of 138.9 MW) wind transaction in located in the Eastern Cape Province. The Nxuba Wind Farm project will comprise 47 Acciona AW125 3 MW wind turbines, and associated wind farm infrastructure, including a 2 km overhead line from the wind farm substation to the Poseidon substation, connecting at a voltage level of 132 kV.

Financing
The senior lenders are Nedbank Ltd. and Absa.

Name:	Oyster Bay Wind Farm
Type:	Wind Generation
Location:	South Africa
Result:	141.9 MW

Summary
The Oyster Bay Wind Farm is a 141.9 MW wind farm development located in the Eastern Cape Province. The project will connect to the Melkhout substation, located near Humansdorp, via the existing Melkhout-Kouga overhead line infrastructure. The wind farm's construction will start by the first half of 2019, and it is expected to be operational in the first half of 2021 and to run for 20–25 years once operational. RES Southern Africa developed the Oyster Bay Wind Farm, which was sold to Enel Green RSA. Power Construction Ltd served as the civil contractor, with Consolidated Power Projects Ltd as the electrical contractor, and Vestas Southern Africa supplied the turbines. The project reached financial close in July 2018 and is expected to be commissioned in 2021.

Financing
Lenders included Nedbank Limited and Absa.

Name:	Perdekraal East Wind Farm
Type:	Wind Generation
Location:	South Africa
Result:	107.76MW

Summary

The Perdekraal East Wind Farm is a 107.76 MW onshore wind project located in the Western Cape near Touwsrivier. A consortium led by Mainstream Renewable Power developed the project. The Department of Energy in South Africa awarded Mainstream under the fourth round extension of REIPPPP. The equity members of the projects include Mainstream Renewable Power, along with a consortium of investors such as the IFC, A Power Africa partner, and the Rockefeller Brothers Fund. Other partners include African Rainbow Energy and Power (AREP), H1 Holdings, Lekela, Old Mutual Life Assurance Company (South Africa) and local community members through established community trusts with shareholding funded by other project equity partners. Other private partners include the consortium of Concor and Conco, appointed as the construction contractor, and Siemens Gamesa Renewable Energy, which will supply and install the wind turbines. The project reached financial close in June 2018 and is expected to be commissioned in 2020.

Financing
Companies providing equity for the project alongside Mainstream include African Rainbow Energy and Power, generation company Lekela, and independent investment managers Old Mutual Life Assurance Company.

Name:	Roggeveld
Type:	Wind Generation
Location:	South Africa
Result:	140 MW

Summary
Roggeveld is a wind farm with a nameplate capacity of 147 MW and a contracted capacity of 140 MW located north of Matjiesfontein, 50 km southwest of Sutherland in the Northern Cape and 45 km northwest of Laingsburg in the Western Cape. It will be connected at Komsberg Substation. Roggeveld Wind Power is comprised of Building Energy and G7 Renewable Energies as the project developers, GEPF (Africa), H1 Capital Ltd, Roggeveld Community Trust, and Acciona Windpower South Africa as the Engineering, Procurement and Construction (EPC), the O&M contractor and the equipment supplier. The project reached financial close in April 2018 and is expected to be commissioned in 2021.

Financing
The primary lender for the Roggeveld project is Rand Merchant Bank (RMB).

Name:	Siriuis Solar PV
Type:	Solar Generation
Location:	South Africa
Result:	75 MW

Summary
The Sirius Solar PV project is a 75 MW greenfield PV project located 15 km southwest of the city of Upington. The project reached financial close in April 2018 and is expected to be commissioned in 2020.

Financing
Standard Bank is the lender for the Sirius Solar PV project, while the equity structure comprises Scatec Solar (42 percent), Scatec Solar Upington Local Community Trust (40 percent), and Norfund (18 percent).

Name:	Soetwater Wind Farm
Type:	Wind Generation
Location:	South Africa
Result:	139.4 MW

Summary
The Soetwater Wind Farm project will have an installed capacity of 139.4 MW and is located between the towns of Sutherland and Matjiesfontein in the Northern Cape Province. Soetwater Wind Farm will commence construction in the second half of 2019, with operations on line in the second half of 2021. It is expected to be operational for a period of 20 years. African Clean Energy Developments (ACED) is developing the Soetwater Wind Farm, with sponsorship from Pele Green Energy and Enel Green Power, both Power Africa partners, as well as the Soetwater Wind Farm Community Trust. Power Construction Ltd served as the civil contractor, with Consolidated Power Projects Ltd as the electrical contractor, and Vestas Southern Africa supplied the turbines. The project reached financial close in July 2018 and is expected to be commissioned in 2021.

Financing
The Soetwater Wind Farm was financed by Nedbank and Absa.

Name:	Waterloo Solar Park
Type:	Solar Generation
Location:	South Africa
Result:	75 MW

Summary
The Waterloo Solar Park is a 75 MW greenfield PV plant located on the Waterloo Farm in the North West Province. It will use single-axis tracking technology and will include a new 132 kV substation and a loop-in, loop-out into the existing Eskom overhead lines. The Waterloo Solar project forms part of the Window 4 Extension of the South Africa's REIPPPP. The project reached financial close in July 2018 and is expected to be commissioned in 2020.

Financing
Nedbank and Barclays are the lenders for this project, owned by Old Mutual as of late 2017 (originally owned by SunEdison).One of the leading South African banks (Absa) will provide long-term debt, approximately 70 to 80 percent of the total project cost. Shareholders including Old Mutual, Siyakhula Women's Opportunity Trust, and the Local Community Trust will provide the remaining 20 to 30 percent equity.

Name:	Wesley-Ciskei Wind Project
Type:	Wind Generation
Location:	South Africa
Result:	32.7 MW

Summary
Not-for-profit organization Just Energy, initially established by the Bank of America Foundation and Oxfam, and InnoWind, a subsidiary of EDF Energies Nouvelles (France), will develop the 32.7 MW Wesley-Ciskei wind project in partnership with landowners and farmers in the former Ciskei Homeland area of the Eastern Cape. The project will feature ten wind turbines and was part of the fourth bid window

Extension under South Africa's REIPPPP. Developers include InnoWind, the South African subsidiary of EDF Energies Nouvelles, and Just Energy, established by the Bank of America Foundation and Oxfam. Wind turbines, operation, and maintenance are provided by Vestas. Other partners include Telagystix and Uncedu Lwethu Winds of Change. The project reached financial close in April 2018 and is expected to be commissioned in March 2020.

Financing
Standard Bank provided the lending for this project.

Name:	Zeerust Solar Park
Type:	Solar Generation
Location:	South Africa
Result:	75 MW

Summary
The Zeerust Solar project is a 75 MW greenfield photovoltaic (PV) project located in the south of Zeerust Town, in the North West Province. The project will include a new 88 kV substation and three km of overhead lines to the new substation and use single-axis tracker technology. The Zeerust Solar project is part of the Window 4 Extension of South Africa's Renewable Energy Independent Power Producer Procurement Programme. The Zeerust Solar project reached financial close in July 2018 and is expected to be commissioned in 2020.

Financing
Nedbank and Barclays are the lenders for this project, owned by Old Mutual as of late 2017 (originally owned by SunEdison). One of the leading South African banks will provide long-term debt, approximately 70 to 80 percent of the total project cost. Shareholders including Old Mutual, Siyakhula Women's Opportunity Trust, and the Local Community Trust will provide the remaining 20 to 30 percent equity.

TANZANIA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Tanzania	Hydro Generation	7.7	$29	0
Tanzania	Hydro Generation & Distribution	2.9	$6	0
Tanzania	Natural Gas Generation	576	$527	0
Tanzania	Solar Generation	5	$13	0
Total		**591.4**	**$575**	**0**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Tanzania	Kigoma Solar Power	Solar Generation	5	$13	0
Tanzania	Kinyerezi I	Natural Gas Generation	150	$183	0
Tanzania	Kinyerezi I Expansion	Natural Gas Generation	186	0	0
Tanzania	Kinyerezi II	Natural Gas Generation	240	$344	0
Tanzania	Luponde Hydropower project	Hydro Generation & Distribution	2.9	$6	0
Tanzania	Tulila	Hydro Generation	7.5	$28	0
Total			**591.4**	**$575**	**0**

Tanzania has abundant wind and solar resources that present clear opportunities for private-sector investment. Tanzania has made progress in its grid expansion, increasing generation capacity with natural gas, facilitating an enabling environment for solar home systems, and completing a new standard Power Purchase Agreement (PPA) in 2017 that expands opportunities for small-scale power producers. Tanzania's reliance on expensive thermal and emergency generation sources have led to higher energy costs and reduced the financial stability of its energy sector. Tanzania struggles with a lack of creditworthy off-taker and cost-reflective tariffs. The Government of Tanzania has begun to reform the operations of TANESCO (the national utility) to meet new demand for more affordable energy.

Power Africa supports the Tanzanian energy sector through transaction assistance for priority-generation projects, technical-advisory services to help unlock constraints to private-sector investment and capacity-building for key institutions. Power Africa is working to reduce losses and hybridize five isolated diesel generation plants in Tanzania. These five sites will create opportunities for private-sector investment in renewable power plants, which will help reduce dependency on expensive diesel generators. Separating electricity transmission and distribution from generation is key to creating transparency, providing open access to the electricity grid, and is critical for unlocking regional electricity trade opportunities. In 2015, Power Africa began working with TANESCO to establish and develop an independent transmission system operator. Power Africa also advises TANESCO on its business structure, revenue requirements, transmission tariff margin, and five-year financial model.

Name:	Kigoma Solar Park
Type:	Solar Generation
Location:	Tanzania
Result:	5 MW
Cost:	$13 million total

Summary
Tanzanian developer NextGen Solawazi built a 5 MW solar power plant in Kigoma, Tanzania with support from USTDA and OPIC. The facility will deliver power to an isolated grid administered by TANESCO that serves millions of Tanzanians in western Tanzania. Construction is complete, but the plant is not yet energized due to a dispute with the offtaker. Power Africa provided USAID technical assistance to the Tanzanian Energy and Water Utilities Regulatory Authority (EWURA) on renewable energy feed-in-tariff (REFIT) procurement and facilitating an agreement by Tanzania's Rural Energy Agency (REA) to issue a commitment letter to cover the cost of the transmission line. Other USG support included Africa Clean Energy Finance initiative (ACEF) funding from both USTDA and OPIC. Non-USG partner support included: debt from Tanzania Ex-Im Bank (closed in January 2017); debt from Diamond Trust Bank (closed in January 2017); and convertible debt from ElectriFI (closed in April 2017). NextGen Solawazi and their U.S. parent company NextGen Solar are Power Africa private-sector partners.

Financing
USTDA and OPIC both provided funding under the ACEF initiative. OPIC provided $400,000 in ACEF funding to fund lender's due diligence. USTDA provided a $200,000 grant to fund an owner's engineer. Tanzania Ex-Im Bank extended $1,100,000 in debt; this tranche closed in January 2017. Diamond Trust Bank extended $8,545,000 in debt; this tranche closed in January 2017. ElectriFI extended $2,100,000 in convertible debt; this tranche closed in April 2017.

Name:	Kinyerezi I
Type:	Natural Gas Generation
Location:	Tanzania
Result:	150 MW
Cost:	$183 million total

Summary
The Kinyerezi I project constructed a 150 MW gas-fired power plant as well as a 220/132kV Sub Station and 220/132kV transmission lines to connect the new power plant to the existing transmission network. In developing this project, USAID advised the Government of Tanzania on the project. Jacobsen Elektro Company (Norway) constructed the plant and transmission network, using turbines manufactured by Power Africa partner General Electric (United States),and delivered the power plant to the Tanzanian utility company, TANESCO, which then took the plant into commercial operation. This project reached financial close in December 2013 and was commissioned in April 2016.

Name:	Kinyerezi I Expansion
Type:	Natural Gas Generation
Location:	Tanzania
Result:	186 MW

Cost:	$183 million total

Summary
The Kinyerezi I Expansion project is for the construction of a new single cycle gas fired 186 MW plant, expected to support the replacement of other higher-cost forms of liquid fossil fuel. Power Africa advanced the transaction to financial close by engaging the private sector to provide debt financing (although subsequently, the Government of Tanzania provided sole equity financing) and performing a detailed technical review of the project feasibility study. Power Africa advisors prepared a Recommendation Memo for TANESCO's Board of Directors to approve the project. Both USAID and the U.S. Department of Commerce provided support. Jacobsen Elektro Company (Norway) constructed the plant with turbines manufactured by Power Africa partner General Electric (United States). TANESCO is the sponsor for the project and will also be the offtaker. This project reached financial close in February 2016 and is expected to be commissioned in 2019.

Financing
The Government of Tanzania provided sole equity financing for this project, with total costs of $183 million.

Impact
Project will lead to the displacement of other forms of liquid fossil fuel usage and deliver substantial positive benefits for Tanzania's electricity cost.

Name:	Kinyerezi II
Type:	Natural Gas Generation
Location:	Tanzania
Result:	240 MW
Cost:	$344 million total

Summary
The Kinyerezi II project developed a 240 MW combined-cycle gas-turbine plant made up of six turbines in a four-plant complex. The plant uses gas and steam to generate electricity with a potential to produce 167.82 MW from natural gas and 80.4 MW from steam. All six turbines have been commissioned and have started generating electricity into the national grid. Power Africa advisors performed a detailed technical review of the project feasibility study and drafted the recommendation memo for TANESCO's Board of Directors to approve the project. The contractor, Sumitomo Corporation (Japan) undertook this project, which reached financial close in February 2016 and was inaugurated in a ceremony by Tanzania's President Magufuli on April 3, 2018, for commissioning.

Financing
This project is estimated to be worth $344 million. The Government of Tanzania provided 15 percent of the project financing (approximately $52 million), with the additional 85 percent ($292 million) sourced from a soft loan from Sumitomo Mitsui Bank and Japan Bank for International Cooperation (JBIC).

Impact
Project will lead to the displacement of other forms of liquid fossil fuel usage and deliver substantial positive benefits for Tanzania's electricity cost.

Name:	Luponde Hydropower Project
Type:	Hydro Generation & Distribution
Location:	Tanzania
Result:	2.9 MW
Cost:	$5.9 million total

Summary
The Luponde Hydropower project developed two adjacent hydro sites, linked together to feed a common point of interconnection with Tanzania's public utility company (TANESCO). Power Africa provided advisory assistance through all stages of development on this project, which is part of REA's Mini and micro-grid Results based Financing (RBF) Program. Power Africa project partners include Luponde Hydro Ltd - SPV and Rift Valley (Zimbabwe).

Financing
This project received an $840,000 grant application from REA's Mini and micro-grid Results Based Finance program funded by Swedish International Development Agency and the United Kingdom's Department for International Development.

Impact
The project will be located in Njombe district in Njombe Region in Southern Highlands Zone. The project will connect nine villages; five villages are in Luponde Ward and four are in Lungilo Ward. It is expected to result in 1,400 direct connections and reduce GHG emissions by 6,183,409 tonnes per year.

Name:	Mwenga Hydropower Project Network extension to Kihansi Basin (Phase II)
Type:	Hydro micro-grid
Location:	Tanzania
Result:	4 MW
Cost:	$7.6 million total

Summary
The Mwenga Hydropower project is an integrated renewable-energy infrastructure project, which is located in Mufindi District (Iringa Region) east of the town of Mafinga, containing 32 villages in Luhanga, Ihuna, Mdabulo, Ihalimba, Kibengu, Mapanda and Mtwango Wards. Phase I has already connected 14 villages, and this extension effort (Phase II) plans to connect 18 villages to 4 MW of energy. These 18 villages will be connected to the existing Mwenga network and hydropower station via the construction of a 205 km high voltage and low voltage power distribution network. As the lead USG agency on this project, USAID provided transaction advisory services throughout the project from the conception phase to the current stage of operationalization. Power Africa partner Mwenga Hydro Limited (Tanzania), using a special purpose vehicle, serves as the implementer and main partner on this project. The project reached financial close in April 2018 and is expected to be commissioned in 2021.

Financing
Tanzania's Mini and Micro-Grids RBF Facility funded by SIDA and DFID provided a grant worth $1.62 million and the remainder will be provided in with debt and equity financing (around $6 million).

Impact
The extension of the network is expected to lead to about 3,000 new connections (equipped with prepaid meters) and will connect about 430 village institutions, small businesses, as well as about 2,580 rural

households, to clean electricity, enabling the local population to access electricity for domestic and productive (income generating) uses. The estimated population that will directly or indirectly benefit from the sustainable developmental impact of this initiative is between 39,000 to 40,000.

Name:	Tulila
Type:	Hydro Generation
Location:	Tanzania
Result:	7.5 MW
Cost:	$28.3 million total

Summary

Tulila is a run-of-river hydroelectric plant with an earth-fill dam and a weir system to divert water to the plant and increase the naturally available head. The water then flows to a powerhouse, designed for containing three identical 2.5 MW turbines but currently equipped with two 2.5 MW turbines (5 MW). This means the plant can expand up to 7.5 MWs. Tanzania's national public utility, TANESCO, purchases all electricity generated by the plant through a standardized Power Purchase Agreement (PPA). Power Africa supported the Tanzanian Rural Energy Agency (REA) by helping draft support letters issued by the Ministry of Energy and Minerals and TANESCO to the lenders on the Tulila hydro transaction, ultimately clearing one of the final hurdles to reach financial close. At the time, there were no mechanisms that explicitly dealt with the commercial risk associated with TANESCO, hence the support letters provided additional comfort to the lenders and insurers. The Benedictine Sisters of St. Agnes developed and run the plant, with support from Swiss entrepreneur Albert Koch as the project sponsor. The Tulila Hydro-Electric Plant Company Limited, a special purpose vehicle (separate legal entity), acted as buyer, owner and borrower for the project. AF-Iteco, which delivered the complete technical project from the initial studies up to commissioning, provided all engineering work, support for licensing, finance, and insurance. The project reached financial close in December 2014 and was commissioned in February 2016.

Financing

AF-Iteco, provided total financing of $28.3 million for this project by a combination of a bank loan, subordinated loans, equity, and a $1.5 million Green Performance Grant, approved by Tanzania's REA. Insurance was provided by Swiss Export Risk Insurance.

Impact

This project is expected to result in a GHG reduction of 10,661 tons per year. Run-of-river plants provide significantly fewer environmental and social issues when compared to traditional dam projects.

UGANDA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Uganda	Hydro Generation	61.8	$ 170	$ 14
Total		**61.8**	**$ 170**	**$ 14**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Uganda	Achwa 2	Hydro Generation	42	$ 110	0
Uganda	Kyambura	Hydro Generation	7.6	$ 26	0
Uganda	Sindila/Butama small hydropower	Hydro Generation	5.3	$ 19	$ 14
Uganda	SM Hydro Limited	Hydro Generation	6.9	$ 16	0
Total			**61.8**	**$ 170**	**$ 14**

Uganda's favorable enabling environment and broad presence of private-sector investment presents a unique opportunity to deliver on Power Africa goals. Uganda is one of the few liberalized sub-Saharan African countries; Uganda has financially viable energy markets, with generation, transmission, and supply segments unbundled since 2001. The independent electricity regulatory authority undertakes sector regulation and oversight. The largest distribution company, UMEME, is privately owned and has a 20-year concession for distribution and retail. Independent power producers currently account for nearly 60 percent of generation capacity. Despite these positive developments, the lack of integrated power-sector planning and a dysfunctional financial ecosystem restrict the Ugandan power sector, and the country has one of the lowest electrification rates in Africa, at approximately 22 percent in 2018.

Power Africa is supporting master planning efforts for 13 distribution company concessions and identifying potential for more than 800,000 new on-grid connections and more than 400 mini-grid sites. Power Africa is working with financial institutions and concessionaires to mobilize finance, creating new opportunities across the value chain. Power Africa is also helping to pilot and roll out innovative off-grid product designs and payment platforms, especially those that tap into digital financial services, with the aim of reaching thousands of rural Ugandans with cleaner and productive electricity. Power Africa and its partners are working to improve and create a supporting ecosystem for the off-grid market by launching a market accelerator to spur a vibrant marketplace of enterprises. Power Africa also continues to provide transaction advisory services to enable generation projects to come to financial close.

Name:	Achwa 2
Type:	Hydro Generation
Location:	Uganda
Result:	42 MW
Cost:	$110 million total

Summary

The Achwa 2 Hydropower Plant (HPP) project developed a 42 MW run-of-river hydropower project, located on the banks of the Achwa River in the districts of Pader, Kitgum, and Gulu. It will contain four vertical Francis turbines and vertical synchronous generators and will build a 14 kilometer (km) access road, five km of service roads, and interconnection facilities to the grid substation as part of the project scope. Power Africa's embedded investment advisor at the African Development Bank (AfDB) performed due diligence on the project for financing, negotiating the terms of the credit agreements and the security packages, and furthered Conditions Precedent to effectively execute financing documentation for financial close. Power Africa assisted through a United States Agency for International Development (USAID) contribution to Berkeley Energy's Africa Renewable Energy Fund (AREF). ARPE Limited (Uganda) was the project developer and is the owner of the project, along with Berkeley Energy (United States) and PAC S.p.A. (Italy). The contractor Voith, as the engineering, procurement, and construction (EPC) contractor, was responsible for project design, manufacturing, supply, and transportation, as well as erection, testing, and commissioning of the project. The project reached financial close in May 2017.

Financing

Berkeley Energy is the majority shareholder and equity was provided by PAC S.p.A and the AfDB ($1,329,585). AfDB provided $14,330,754 in debt financing, Deutsche Investitions-und Entwicklungsgesellschaft mbH provided $20 million, and the Belgian Investment Company for Developing countries, the Organization of the Petroleum Exporting Countries, Fund for International Development, and Investec also contributed.

Impact

This transaction is expected to provide electricity to 35,000 Ugandans, and reduce greenhouse gas (GHG) emissions by 109,945.957 tons per year.

Name:	Kyambura
Type:	Hydro Generation
Location:	Uganda
Result:	7.6 MW
Cost:	$26.15 million total

Summary

The Kyambura Hydro Generation project constructed and operated a run-of-river hydro power plant in Kyambura, with a planned installed capacity of 7.6 MW and 36.7 GWh in annual production. USAID provided transaction advisory services, liaising with Finergreen, the project developer, Ziba Limited, and DTB Uganda on the project and a possible loan from SUNREF. USAID also liaised with ACIC, a Dubai-based fund, regarding a loan. The Power Africa East Africa Regional Beyond the Grid advisor supported the project to access financing, reviewing teaser documents, linking with potential investors, and providing details of guarantee schemes. ECLE (Sri Lanka) and KSJ (Sri Lanka) supported Ziba Limited, as did United Kingdom Department for International Development (DfID), the Government of Germany, and the Government of Norway. The project reached financial close in August 2017.

Financing
The Uganda GET FiT program provided both private equity and debt financing of approximately $5.4 million, while Ziba provided 25 percent of the equity. The National Development Bank of Sri Lanka led financing. The World Bank also provided an IDA Partial Risk Guarantee (PRG) instrument.

Name:	Sindila/Butama Small Hydropower
Type:	Hydro Generation
Location:	Uganda
Result:	5.25 MW
Cost:	$18.5 million total $13.65 million by USG

Summary
The Sindila/Butama small hydropower project provided the construction and operation of the 5.25 MW Sindila Mini-Hydropower Station on the Sindila River in Western Uganda. The 5.25 MW plant will generate 26.6 GWh annually. Power will be carried 5.7 km to the national grid on a new 33 kilovolt (kV) overhead transmission line to be constructed by the Rural Electrification Agency. OPIC committed financing for this project and also supported the development costs through the Africa Clean Energy Finance facility. Other major supporters of this project included DFID, the European Union Africa Infrastructure Fund, the German development bank KfW, the GET FiT Uganda Program, KMRI (United States), the Government of Norway, and the World Bank. The project reached financial close in January 2017.

Financing
Fieldstone Africa was an equity partner for this project, and Lereko Metier Sustainable Capital Fund has project investment rights. OPIC also committed $13.65 million in support of this effort and $1 million for the development costs of this hydropower plant (and two others). The World Bank provided a partial risk guarantee instrument.

Name:	SM Hydro Limited
Type:	Hydro Generation
Location:	Uganda
Result:	6.9 MW
Cost:	$15.7 million total

Summary
The SM Hydro Limited project is developing a 6.9 MW run-of-river mini hydropower plant on the Muyembe River in Eastern Uganda under a build, own, operate agreement. The electricity generated will be transferred to the national grid and sold to the Uganda Electricity Transmission Company Limited company under a 20-year PPA. Power Africa and USAID are providing a Development Credit Authority guaranteed loan facility from Standard Chartered to East and Southern Africa Trade Bank (TDB, formerly known as "PTA Bank") for this project. SM Hydro Limited is the main partner on this project, with VS Hydro Limited Bystol also involved. The SM Hydro project reached financial close in July 2018 and is expected to be commissioned in 2021.

Financing

TDB provided a $11 million Facility A loan to SM Hydro Ltd. Project sponsors include Kifaru Holdings Limited, Lukeman Mwereri, and Mount Elgon Hydropower Company Limited.

ZAMBIA

TOTAL BY TECHNOLOGY

Location	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Zambia	Solar Generation	75.7	$119	$1
Total		**75.7**	**$119**	**$1**

TOTAL BY TRANSACTION

Location	Name	Technology	MW	Total Cost (US$M)	USG contribution (US$M)
Zambia	Scaling Solar Zambia Round 1 - Bangweulu	Solar Generation	47.5	$70	0
Zambia	Scaling Solar Zambia Round 1 - Ngonye	Solar Generation	28.2	$49	$1
Total			**75.7**	**$119**	**$1**

Access to electricity is an important driving force behind economic development in Zambia, and the Government of Zambia has declared its commitment to developing and maintaining its energy infrastructure and services. Although there are pockets of private-sector activity in generation, transmission, and distribution, the vast majority of power in Zambia is operated by ZESCO, the vertically integrated state-owned utility. However, the sector is opening up to new Independent Power Producers (IPPs) for on-grid and off-grid transactions. The Government of Zambia expects to bring online additional MWs of solar, hydro, and thermal power through 2020. A lack of creditworthy off-takers, growing government debt, and a lag in transmission and distribution capacity pose challenges to the enabling environment.

During 2017, Power Africa made marked progress in supporting Zambia's power-sector development through its technical assistance to the energy regulation board as well as support for multiple feasibility studies. Technical reforms allowed the board to set tariffs in advance, permitting conditional adjustments in tariff changes to be factored into the utility's planning model. USTDA increased its support of multiple projects by committing project-preparation support for wind and geothermal as well as a mini-grid project. Power Africa placed a Senior Energy Policy Advisor in the Ministry of Finance to advise on critical policy developments and a Senior Technical Advisor in ZESCO who works to build systems and capacity for the integration of intermittent renewable energy sources. At the end of 2016, Power Africa, with the Ministry of Energy and the regulator, developed a Renewable Energy Feed-In Tariff (REFIT), complete with a standardized Power Purchase Agreement. Power Africa provided $2 million to support the International Finance Corporation's (IFC) Scaling Solar program in Zambia, which is expected to result in up to 100 MW of new solar power.

Name:	Scaling Solar Zambia Round 1 – Ngonye
Type:	Solar Generation
Location:	Zambia
Result:	28.2 MW
Cost:	$49 million total $1 million by SG

Summary
Zambia's Industrial Development Corporation (IDC Zambia) awarded this project to developer ENEL Green Power (Italy), acting through its Renewable Energies Division, Enel Green Power (EGP). The contract was designed using the Scaling Solar program framework developed by the International Finance Corporation (IFC). IDC will retain a 20 percent stake in the installation and EGP the remaining 80 percent. The state-owned utility company ZESCO will purchase the electricity generated by the Ngonye PV solar project under a 25-year PPA. When commissioned, this project will be one of the first grid-connected solar PV plants in Zambia. Power Africa supported ZESCO with PPA negotiations for these transactions and had previously reviewed the underlying PPAs and provided detailed comments. Power Africa advisors also provided general advice to the Ministries of Energy and Finance on the projects. Power Africa/USAID also plans to contribute $1 million to the IFC project costs if the project is successful. Other project partners include African Renewable Energy Initiative, ENEL Green Power, and the Scaling Solar Program. The project reached financial close in June 2018.

Financing
The financing package arranged by the IFC includes senior loans of up to $10 million from the IFC, up to $12 million from the IFC-Canada Climate Change Program, plus $2.5 million in interest-rate swaps from the IFC and a $2.8 million partial risk guarantee from the World Bank's International Development Agency. The European Investment Bank (EIB) is also providing $11.75 million in loans to the project.

Name:	Scaling Solar Zambia Round 1 – Bangweulu
Type:	Solar Generation
Location:	Zambia
Result:	47.5 MW
Cost:	$70 million total

Summary
This project will construct a solar plant in the Lusaka South Multi-Facility Economic Zone and will be developed under Zambia's utility-scale IPP scheme. Industrial Development Corporation (IDC Zambia) awarded the contract for the project to developer Neoen S.A.S in partnership with solar manufacturer, First Solar, with a 20 percent stake in the installation. The state-owned utility company ZESCO will purchase the electricity generated by the project under a 25-year PPA. The USG supported this project with OPIC financing, and Power Africa supported the Zambia Electricity Supply Corporation (ZESCO) with PPA negotiations and provided general advice to the Ministries of Energy and Finance on the project. Additionally, Power Africa/USAID agreed to provide $1 million to cover IFC costs, only to be paid if the project is successfully completed. Bangweulu Power Corporation Limited is comprised of two developers, Neoen and First Solar, and IDC Zambia. The IFC is also actively involved as transaction advisors to the IDC. The project reached financial close in May 2018, and when commissioned, will be one of the first grid-connected solar PV plants in Zambia.

Financing

The financing package includes senior loans of up to $26 million from the IFC and up to $13 million from OPIC, along with a partial risk guarantee from the World Bank's International Development Agency.

Impact

The Project is expected to have a high developmental impact in Zambia by increasing solar electricity supply by approximately 55MW in a country that is heavily reliant on hydroelectric sources for power. Nearly 95 percent of Zambia's current installed capacity comes from hydropower plants, which have been severely affected by drought.

Annex 3: Acronyms

ACED	African Clean Energy Developments
ACEF	Africa Clean Energy Finance Initiative
AFC	African Finance Corporation
AfDB	African Development Bank
AFG	Amandi Founder Group
AREF	Berkeley Energy's Africa Renewable Energy Fund
ATI	Africa Trade Insurance
BERA	the Botswana Energy Regulatory Authority
BGFZ	Beyond the Grid Fund for Zambia
BIO	Belgian Investment Company for Developing Countries
BOO	Build, own, operate
BOT	Build, own, transfer
BPC	Botswana Power Corporation
BTG	Beyond the Grid
CCGT	Combined cycle gas technology
CHPS	Community-based health planning and services
CIG	Consolidated Infrastructure Group
DDI	Diamond Development Initiatives
DEG	Deutsche Investitions-und Entwicklungsgesellschaft mbH
DFID	United Kingdom Department for International Development
ECB	Electricity Control Board
ECG	Electricity Company of Ghana
EDF	Electricité de France
EGENCO	Electricity Generation Company of Malawi
EGP	Renewable Energies Division Enel Green Power
EIB	European Investment Bank
ESCOM	Electricity Supply Corporation of Malawi
ESIA	Environmental and Social Impact Assessment
EWSA	Rwanda Energy, Water, and Sanitation Authority
EWURA	Tanzanian Energy and Water Utilities Regulatory Authority
EXIM	Export Import Bank of the United States
FMO	Netherlands Development Finance Company
GCPF	Global Climate Partnership Fund SICAV-SIF
GDP	Gross Domestic Product
GE	General Electric
GHG	Greenhouse gas
GW	Gigawatt
GWEC	Gbarnway Woelah Electricity Cooperative

HFO	Heavy Fuel Oil
HHP	Hydropower plant
HPS	Husk Power Systems
IDC Zambia	Industrial Development Corporation Zambia
IFC	International Finance Corporation
IFU	Danish Investment Fund for Developing Countries
IPP	Independent Power Producers
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
JRPS	Jumeme Rural Power Solar-hybrid project
KEL	Kipeto Energy Limited
KenGen	Kenya Electricity Generating Company PLC
KIPP	Kpone Independent Power Plant
Km	Kilometer
KPLC	Kenya Power and Lighting Company
kWh	Kilowatt Hour
LESSP	Liberia Energy Sector Support Program
LTWP	Lake Turkana Wind Power Project
MCC	Millennium Challenge Corporation
MIGA	Multilateral Investment Guarantee Agency
MME	Ministry of Mines and Energy
MW	Megawatt
NBET	Nigerian Bulk Electricity Trading Plc
NDPHC	Niger Delta Power Holding Company
NERC	Nigeria Energy Regulatory Commission
NGSEN	Tanzania's National Gender and Sustainable Energy Network
NHPC	Nachtigal Hydro Power Company
Norfund	Norwegian Investment Fund for Developing Countries
O&M	Operations and maintenance
OFID	Fund for International Development
OPEC	Organization of the Petroleum Exporting Countries
OPIC	Overseas Private Investment Corporation
PAEGC	Powering Agriculture Energy Grand Challenge for Development
PATRP	Power Africa Transactions and Reforms Program
PCOA	Put/Call Option Agreement
PFAN	Private Finance Advisory Network
PPA	Power Purchase Agreement
PRG	Partial Risk Guarantee
PV	Photovoltaic
RBF	Results based Financing
REA	Tanzania's Rural Energy Agency
REEEP	Renewable Energy and Efficiency Partnership
REFIT	Renewable energy feed-in-tariff

REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
ROR	Run-of-river
RREA	Liberia's Rural and Renewable Energy Agency
RREA	Liberia's Rural and Renewable Energy Agency
SAEP	Southern Africa Energy Program
SAPP	Southern Africa Power Pool
SENELEC	Société Nationale d'Electricité du Sénégal (Senegal's national public utility)
SERV	Swiss Export Risk Insurance
SHS	Solar home system
SIDA	Swedish International Development Cooperation Agency
SPV	Special purpose vehicle
SUNREF	Sustainable Use of Natural Resources and Energy Finance
TANESCO	Tanzania's national public utility
TMG	Technology Management Group
TPC	Tè Power Company
UMEME	Largest Distribution Company for Uganda
UNIDO	United Nations Industrial Development Organization
USADF	United States African Development Foundation
USAID	United States Agency for International Development
USG	U.S. Government
ZESCO	Zambia Electricity Supply Corporation